RECOGNIZING EXCELLENCE IN DIAGNOSIS
Recommended Practices for Hospitals
July 2024 Update

THELEAPFROGGROUP
Giant Leaps for Patient Safety

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Recognizing Excellence in Diagnosis: Recommended Practices for Hospitals (July 2024 Update)

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ABOUT THE LEAPFROG GROUP

The Leapfrog Group is a nonprofit watchdog organization that serves as a voice for health care consumers and purchasers, using their collective influence to foster positive change in United States (U.S.) health care. Leapfrog is the nation's premier advocate of transparency in health care—collecting, analyzing, and disseminating data to inform value-based purchasing and improve decision-making.

Through the annual Leapfrog Hospital Survey and Leapfrog Ambulatory Surgery Center (ASC) Survey, Leapfrog sets national standards for safety and quality, and publicly reports hospital and ASC progress on meeting those standards. In addition, Leapfrog issues the biannual Leapfrog Hospital Safety Grades in which an A, B, C, D, or F is assigned to all general hospitals and represents their track record for keeping patients safe from accidents, errors, and infections. Hundreds of employers and other purchasers, along with coalitions of consumer advocates use Leapfrog ratings to make informed decisions. Employers and purchasers also use Leapfrog's ratings to structure health benefits to reward excellence.

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FOREWORD

The Leapfrog Group was founded in 2000 by business leaders inspired by *To Err Is Human*, a landmark report from the Institute of Medicine (now the National Academy of Medicine) that exposed the problem of medical errors and launched the modern patient safety movement to address them.

Over the decades, Leapfrog has expanded and improved reporting on patient safety by harnessing the burgeoning fields of health services research and measurement science. This report represents a breakthrough in that research: the emerging recognition of diagnostic errors as one of the nation's most significant sources of patient harm. In 2015, the National Academy of Medicine (NAM) issued a call to action to improve diagnosis, warning that virtually every American will suffer the consequences of a diagnostic error at least once in their lifetime and noting that every year 250,000 hospital inpatients will experience a diagnostic error.[1] Experts have found diagnostic errors to be the leading cause of medical malpractice claims,[2] accounting for as many as 17% of all hospital adverse events.[1]

Along with researchers at The Johns Hopkins University, Leapfrog conducted a small study and found that hospitals were aware of the problem of diagnostic errors, but unsure where to start to solve it.[3] In response, in 2022, Leapfrog published *Recognizing Excellence in Diagnosis*: *Recommended Practices for Hospitals*, a compilation of 29 evidence-based practices for hospitals to get started in tackling diagnostic errors. These practices were identified in concert with quality measurement at Johns Hopkins Medicine, leadership from two world-renowned experts who devoted their careers to diagnostic excellence — Hardeep Singh, MD, MPH and Mark Graber, MD, FACP — and the determination and diligence of a diverse array of experts and stakeholders.

This report updates that original 2022 report on recommended practices with a fresh literature review to take advantage of the formidable advances in the science of quality measurement in diagnosis, as well as our expert field-testing of practices with through a formal pilot process, and our analysis of comments and feedback from hundreds of hospitals across the country.

The result is a distilled list of 24 recommended practices for achieving diagnostic excellence in hospitals, along with many new resources, strategies, and approaches proposed by hospitals and new research to improve the safety and quality of diagnosis.

Leapfrog's approach to diagnostic excellence aligns with our approach to patient safety. We assume errors will be made, which is why hospitals should have in place structures and processes that minimize harm to the patient from human error. Our goal is to see rapid, widespread adoption of these structures and processes so that patients can access the highest quality care.

Leah Binder
President and CEO, The Leapfrog Group

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IDENTIFYING THE RECOMMENDED PRACTICES

Overview of Diagnostic Errors in Hospitals

In 2015, the National Academy of Medicine published *Improving Diagnosis in Healthcare*, a landmark report that summarized all the research in the field to that point and proposed a roadmap for reducing diagnostic errors in health care.[1] The NAM report concluded that diagnostic errors are ubiquitous, surprisingly common, and cause inordinate harm. Roughly one in 10 diagnoses is incorrect, and one in 20 outpatients in the US will experience a diagnostic error every year. The NAM concluded that ".... most of us will experience at least one diagnostic error in our lifetime, sometimes with devastating consequences." Studies published since the NAM report are consistent with NAM's conclusions. Diagnostic errors dominate malpractice lawsuits in most specialties and cause the most harm to patients.[4]

A systematic review of diagnostic errors involving hospital inpatients found a quarter million will experience a harmful diagnostic error annually in the United States,[5] and the most recent analysis estimated that some 550,000 patients suffer permanent disability or death every year from diagnostic error[6]. A systematic review examined diagnosis-related harm in U.S. adult intensive care units and found an estimated 40,000 deaths annually.[7] A systematic review of diagnostic error in pediatric critical care units reported an incidence of 10% to 23% based on autopsy studies, and 8%-12% based on chart reviews.[8] Adverse events are also encountered in pediatric emergency department visits, with a substantial fraction reflecting diagnostic errors.[9] Additional research is presented in Appendix B.

Although we have learned a great deal about diagnostic errors, very little has been done by health care organizations to address the problem. Aside from a handful of pioneering hospitals, most health systems are still on the sidelines, despite data on the magnitude of the problem and recommendations from the NAM report to address the problem.[10] [11] A survey administered by Leapfrog found that while most hospitals who responded were aware of the diagnostic error problem, their commitment to change was limited.[3]

A host of interventions have been considered and recommended to reduce the risk of diagnostic error, or to minimize harm to patients, but essentially none of these interventions have been implemented or even trialed. There are two key barriers that explain why health systems do not approach this problem with the urgency it deserves. First, many hospitals do not know where to start. There is no clear consensus on the specific best practices, measures, or performance standards that all hospitals should consider when striving for diagnostic excellence. Second, they don't know *why* they need to start. Hospitals do not get a clear signal from the public, private payors, regulators, or accreditors that diagnostic safety and quality is a priority.

Deriving the Recommended Practices in this Report

Leapfrog set out to establish a comprehensive set of practices we could confidently recommend that hospitals should implement immediately to limit harm from diagnostic errors. Recommended Practices are hospital-led and site-specific interventions for which there is some clear rationale (recommended by subject matter experts and/or peer-reviewed literature) that links the practice to improvements in the diagnostic process and/or diagnostic outcomes in hospitals. For the purposes of this report, these are practices that were

identified and prioritized by the [Recognizing Excellence in Diagnosis Advisory Group](#), and generally represent practices that have been implemented and assessed in one or more organizations.

In 2021, our research team conducted a literature review dating back to the 2015 NAM report, *Improving Diagnosis in Health Care*, searching for interventions ideally suited for the hospital setting and studies on the incidence and etiology of diagnostic errors. This information was reviewed and synthesized and supplemented with recommendations from subject matter experts. We identified over 300 potential practices, and with input from our [Advisory Group](#), achieved consensus on a smaller set of 29 recommended practices and two promising practices that can substantially improve diagnostic processes and outcomes. In July 2022 we published our report, [Recognizing Excellence in Diagnosis: Recommended Practices for Hospitals,](#) outlining these recommended practices.

In this 2024 update of our original report, we updated the published scientific literature that serves as a basis for this practice set, with a focus on identifying new research that builds the evidence base, resources, and implementation examples of the 29 recommended practices identified in 2022. In many cases, the actual text of the recommended practice has also been updated, either to match updated evidence, or to resolve outstanding questions asked by stakeholders, including hospitals in the process of implementing these practices.

Practices were also revised in response to the [Recognizing Excellence in Diagnosis: National Pilot Survey Report](#). Nearly 100 hospitals completed a pilot survey conducted by Leapfrog, reporting their progress in implementing each of the 29 recommended practices and offering feedback on the practices. Respondents offered promising new resources, tools, and approaches to implementing the practices, as well as identified key gaps in progress. These new insights are incorporated into this updated report.

Integrating Measurement of Diagnostic Excellence with Other Measures of Safety and Quality

In the [Pilot Survey](#), participating hospitals requested clear guidance on which practices to implement first and what practices would logically follow thereafter. Hospitals also indicated that because many longstanding patient safety initiatives were already in place, Leapfrog should distinguish practices where integration into existing patient safety initiatives is an appropriate and effective approach and identify where initiatives should be specifically and exclusively focused on diagnostic excellence.

Grouping the practices in this fashion necessitates a new measurement framework that captures these dimensions. In this report update, practices are presented in three categories:

Building on Progress: well-aligned with existing quality and safety initiatives
  1. [Openly communicate diagnostic errors to patients](#)
  2. [Make it easy for hospital staff to report diagnostic errors and concerns*](#)
  3. [Provide clinicians with resources to update knowledge and support decision-making](#)
  4. [Communicate clear instructions to patients discharged with an uncertain diagnosis](#)
  5. [Ensure critical results from tests pending at discharge are reviewed](#)
  6. [Manage diagnostic uncertainty at handoffs](#)

7. [Establish goals for patient engagement, communication, and teamwork*](#)
8. [Help patients and their family caregivers communicate complete and accurate information](#)

Focused Innovation: Practices where implementation will require a specific focus on diagnosis, as opposed to relying on an extension of an existing patient safety initiative.

9. [Measure and monitor diagnostic safety outcomes*](#)
10. [Dedicate time for analysis and learning*](#)
11. [Promote teamwork*](#)
12. [Jointly review differences between imaging and pathology results*](#)
13. [Provide access to appropriate subspecialty expertise for pediatric patients and patients with a possible stroke in the emergency department*](#)
14. [Implement "closed loop" communication*](#)
15. [Convene a multidisciplinary team to promote diagnostic safety and quality*](#)
16. [Demonstrate commitment to diagnostic excellence through executive leadership*](#)
17. [Conduct a risk assessment*](#)

Aspirational: Practices for improving diagnostic safety and quality where implementation is quite rare nationwide, and where universal implementation may take longer for many hospitals.

18. [Implement and monitor adherence to diagnostic guidelines](#)
19. [Optimize the electronic health record to support accurate and timely diagnosis](#)
20. [Communicate progress of diagnostic safety programs](#)
21. [Train clinicians to recognize and minimize cognitive errors](#)
22. [Provide feedback to clinicians](#)

*Denotes a practice included in the 2024 Leapfrog Hospital Survey.

RECOMMENDED PRACTICES: BUILDING ON PROGRESS

Practices that are well-aligned with existing quality and safety initiatives

Recommended Practice 1: Openly communicate diagnostic errors to patients

The hospital has a formal process in place for identifying and notifying patients and/or their family caregivers when diagnostic errors occur resulting in harm.

Rationale

Disclosing certain egregious medical errors like wrong site surgery or transfusion of the wrong blood type, often referred to as "never events," to patients and family caregivers is now more common due to efforts from The Leapfrog Group, The Joint Commission, AHRQ, and other organizations. However, there are many types of medical errors that also result in harm that are not part of an existing disclosure policy or mandated by accreditors or state or federal agencies, including harm from diagnostic errors.[12]

Disclosing the medical error to patients and family caregivers when harm occurs is associated with less intense emotional impacts on patients and less avoidance of the health care facilities and clinicians involved in the error.[13] Additionally, while hospital concerns over litigation often prevent disclosure of medical errors, studies show that the AHRQ *CANDOR (Communication and Optimal Resolution) program* has reduced the number of malpractice suits arising from unexpected outcomes while improving case reporting.[14] [15] Another study found that offering harmed patients an appropriate apology and the results of the safety investigation also reduced the likelihood of a claim.[16]

Resources and Strategies

- The hospital enhances its existing communication and disclosure policy to include "diagnostic errors," as defined in this report, with a particular focus on cases of delayed, wrong, and missed diagnoses resulting in harm.
- The hospital has a standard process to identify potential diagnostic errors and refers these cases for risk management review. Risk management applies a standard protocol to identify cases where the patient was harmed from a diagnostic error, and then initiates a root cause analysis. Staff trained in the AHRQ *CANDOR* program communicate with the patient and family caregiver throughout the process of disclosure, response, and resolution.
- The hospital joins the Pathway to Accountability, Compassion and Transparency (PACT) Collaborative, or has implemented a Communication and Resolution Program consistent with the guidelines promulgated by the Collaborative for Accountability and Improvement.

2024 Update Notes

No updates.

Recommended Practice 2: Make it easy for hospital staff to report diagnostic errors and concerns

The hospital has a formal process in place for staff to report diagnostic errors and concerns (Safety 1 issues such as breakdowns in communication or breakdowns in the diagnostic process), as well as cases where the diagnostic process was exemplary (Safety 2). The process encourages psychological safety and staff adoption (the process is safe and easy to use) and should include all the following:

- Staff training on how and when to report diagnostic errors and concerns.
- A formal protocol for investigating and responding to staff-reported diagnostic errors, concerns, or questions.
- A formal protocol for notifying clinicians involved in the patient's care and non-punitively including involved clinicians in case investigations.
- An emphasis on transparency.
- A formal protocol for soliciting feedback from hospital staff on the psychological safety and usability of the process.

Rationale

Individual members of the care team are an important source of diagnostic error reporting because they experience and witness first-hand the diagnostic errors and breakdowns in the diagnostic process. However, members of the care team can be reluctant to report these incidents to others. Voluntary or "passive" staff reporting pathways are notorious for underreporting. Fewer than 6% of undesirable events are ever reported, and of these, almost none of the reports are made by physicians nor concern diagnostic errors. [17] Nevertheless, these reporting systems are important because some errors may only be identified through this mechanism. Several interventions have been shown to improve passive reporting systems, including incentives[18], adding pathways to reporting, mandating self-reporting as hospital policy, educating clinicians on what is considered reportable, and allowing anonymous reporting.[17] Interventions to increase reporting by medical students and trainees, including a trainee-led monthly conference to review adverse event reports,[19] and a curriculum for trainees on reporting procedures and integrating these into daily activities[20] were effective in increasing the number of reports and reducing patient harm.

Valuable lessons on improving diagnostic safety can also be derived from the study of "good catches" and cases where everything goes well.[21][22] This "Safety 2" approach may promote case reporting and improve the safety culture by making safety discussions easier and positive in tone.

Resources and Strategies

- The hospital establishes an easy-to-use system to facilitate reporting of diagnosis-related concerns, either through a mobile application[23] or hotline.
- The hospital expands the use of its incident reporting system to include diagnostic errors and concerns, regularly reminds clinicians and other staff to use the system and reports out on usage statistics on a regular basis.
- Senior administrative leaders regularly review the number and type of incidents being reported and provides training, reminders, and incentives to encourage reporting of diagnostic errors and concerns by clinicians and others involved in the diagnostic process, if gaps in usage are identified.

- The hospital considers the terms and language used in the reporting process. For example, on an electronic reporting form, the term "diagnostic error" could be rephrased as a "learning opportunity to make a more accurate or timely diagnosis" to encourage a broader range of reporting. One study found that this update increased physician reports from a baseline of 0 up to 2 per hundred admissions within 6 months.[24]
- The hospital pairs an easy-to-use electronic reporting system with a clinician champion who reinforces the importance of event reporting. One study found that when the hospital added a desktop icon in the EHR for hospitalists to report a possible case involving diagnostic error and had a hospitalist peer championing use of the reporting system, 36 valid reports were submitted in the first 6 months, none of which would have been identified through the organization's existing risk management program.[185]
- The hospital provides training for medical students and trainees, including a trainee-led monthly conference to review adverse event reports,[19] and a curriculum on reporting procedures and ways to integrate these into daily activities, to increase the number of reports.[20] The conferences introduce trainees to patient safety investigations and quality improvement work and illustrate how they could participate in these initiatives.
- The hospital leverages both Safety 1 and Safety 2 approaches to improve diagnostic performance and outcomes. Staff are familiar with both approaches.[22]

2024 Update Notes

Updated to incorporate new research around Safety 2 approaches and offer a new strategy on training for medical students and trainees. Measured in the 2024 Leapfrog Hospital Survey.

Recommended Practice 3: Provide clinicians with resources to update knowledge and support decision-making

The hospital integrates knowledge resources and decision-support capability into the clinical workflow to help clinicians improve their diagnosis in real-time for cases where there is diagnostic uncertainty and incentivizes clinicians to use these resources.

Rationale

Although most diagnostic errors involve breakdowns in clinical reasoning, many reflect deficiencies in knowledge. Clinical questions arise in practice and most go unanswered. Knowledge-related questions arise in roughly one third of cases in general practice, and physicians fail to pursue the answer in more than half of these situations.[25] In cases of diagnostic error, probably the most common reason for missed diagnosis is simply that "It never crossed my mind," as reported by internists with an average of four diagnostic errors in the past year.[26]

Providing knowledge resources and decision support tools for differential diagnosis can help address these common problems in care delivery. Decision support resources for differential diagnosis hold promise to address knowledge gaps in clinical practice and improve the likelihood of a correct diagnosis. However, decision support tools do have limitations and are often underused. AHRQ's systematic review of clinical decision support for diagnosis concluded, from exploratory studies, that these tools provide a useful adjunct to clinical decision-making and improve diagnosis and compliance with evidence-based recommendations.[80]**Error! Bookmark not defined.** Similar conclusions have been reached in other studies and systematic reviews.[27] [28] [29]

Resources and Strategies

- The hospital provides all clinical staff with online access to UpToDate, Micromedex, or equivalent medical knowledge resources. Ideally these are all EHR-integrated.
- The hospital ensures that clinical decision support is available for clinicians considering which, if any, diagnostic tests or imaging studies may be appropriate.
- The hospital ensures that all clinical staff have access to one or more decision support resources for a differential diagnosis.
- The hospital has a program to incentivize the use of medical knowledge and clinical decision support resources and monitors the efficacy and use of that program.

2024 Update Notes

- Retitled to offer additional specificity around the intent.

Category: Building on Progress

Recommended Practice 4: Communicate clear instructions to patients discharged with an uncertain diagnosis

For patients discharged home from the hospital or the ED with an uncertain diagnosis, or where potential diagnoses involve high-risk conditions, the hospital should have a policy that ensures patients receive both of the following:

- Discharge summary notes with available test results and any test results that are pending.
- Explicit, condition-specific instructions for the patient and family caregiver on what to watch out for, when to return to the hospital, or how to get timely follow-up care, if needed.

Rationale

Many patients have a preliminary diagnostic evaluation in the ED or during their hospital admission that requires follow-up and further evaluation in an ambulatory setting. However, patients leaving the ED or hospital are often unclear on how or when to re-engage with care if their symptoms change or progress.[30]

Resources and Strategies

- The hospital has amended their patient discharge policy to add specific elements for uncertain or potentially high-risk diagnoses, which outlines the steps and instructions described in the practice statement.
- The hospital periodically conducts patient focus groups to ensure their policy, as executed, is effective in helping patients and their family caregivers obtain test results that were pending at discharge and understand how and when to seek the next phase of care. The hospital PFAC could lead this initiative.
- The hospital has amended their patient discharge policy to ensure discharge instructions are made available to the patient in the patient and/or family caregiver's primary language.

2024 Update Notes

- No updates.

Recommended Practice 5: Ensure critical results from tests pending at discharge are reviewed

The hospital has a process and protocol in place to ensure both that patients are discharged from the ED or hospital with a list of any pending test results and written instructions to obtain those results, and that all critical results from pending tests are reviewed by the appropriate physician.

Rationale

A test result is a critical piece of diagnostic information. Missed test results can lead to a missed diagnosis, or a missed opportunity to correct an erroneous diagnosis. The risk of a missed test result is magnified for patients in transition from hospital to home.[31] [32] A systematic review of 12 studies concluded that up to 16% of patients released from the ED and 23% of patients discharged from inpatient care will have laboratory test results pending.[33] In one study, 41% of medical inpatients had one or more test results (laboratory or imaging) pending at discharge, over 40% of the results were abnormal, and 9% required action, importantly, the patients' physicians were unaware of 62% of the test results.[34]

Often, test results pending at discharge are not mentioned in the discharge summary. The clinician(s) who assume the patient's care in the post-discharge ambulatory setting may not be aware that these tests were ordered and will not see the results because they are routed back to the hospital-based physician. It is critical to ensure patients know where and when to obtain these results.

Resources and Strategies

- The hospital implements a rigorous follow-up system for test results pending at discharge with a clear hierarchy of clinicians responsible for acting on results as they come in. Monitoring physician acknowledgement of test results pending at discharge can improve follow-up and ensure abnormal results are reviewed.[35] [36]
- The hospital develops a standard set of clear instructions for patients to obtain pending test results, using input from patients and family caregivers, representatives from Laboratory Medicine and Radiology, and representatives from the ED and other relevant hospital departments (hospitalists).
- The hospital monitors test results pending at discharge before and after implementation of the new discharge instructions to ensure more patients are obtaining their pending test results once they are discharged home.
- The hospital implements an automated email or text message system that notifies patients when their pending test results are ready. Discharge instructions note that patients can expect the email notification.[37]

2024 Update Notes

- Retitled to offer additional specificity around the intent, and the statement was revised to clarify the focus on pending test results.

CASE STUDY: CALLING PATIENTS FOR TEST RESULT FOLLOW-UP

Kirsten Edler, MSN, CRNP, CPPS, CPHQ, Frederick Health Hospital, Frederick, MD

Kathy J. Weishaar MD, MMM, FHM, Frederick Health Hospital, Frederick, MD

During the height of the COVID-19 pandemic, ED staff at Frederick Health Hospital noticed a dangerous pattern: patients afraid of being exposed to COVID-19 were leaving the ED after tests were performed, but before they saw a physician who could give them their test results and appropriate discharge instructions. In response, the hospital conducted a Failure Mode and Effects Analysis (FMEA) and identified that one issue with patients leaving the unit before an official discharge was not knowing what tests(s) had been completed, what the results were, and where to find pending test results.

To mitigate this patient harm risk, the hospital partnered with the ED and Service Excellence Department to implement a protocol wherein clinically trained staff, including nurses and pharmacists, call the patient to close the loop and notify them of any test results that were pending at discharge and communicate the appropriate next steps. The Service Excellence Department developed scripting to communicate test results and enhance standard message delivery.

In addition, the success of this program also depended on collaboration with the Registration Department. The team refined their process to ensure the accurate collection of telephone numbers and email addresses, they helped patients register for the patient portal. Kirsten Edler led the FMEA team in the implementation of the new protocol.

○ **Process Map - Activity:** A step in a process.

○ **Key Process Input:** The source of variability at each process step.

○ **Potential Failure Mode:** The ways that the process can fail for each key input. An input can have multiple failure modes.

○ **Potential Failure Effects:** The output results of each failure mode. A failure mode can have multiple failure effects.

○ **SEV (severity rating):** The severity of the output on each step. Use a 1 to 10 scale, where 10 is high severity and 1 is low severity. To mitigate potential legal issues, carefully define high severity outputs.

○ **Potential Causes:** The causes of the failure mode.

○ **OCC (occurrence rating):** How frequently the cause is likely to occur. Use a 1 to 10 scale, where 10 is highly frequent and 1 highly infrequent.

○ **Current Controls:** The way that the failure cause or mode is detected or controlled (for example, a poka-yoke device).

○ **DET (detection rating):** The ability of each control to detect or to control the failure cause or mode. Use a 1 to 10 scale, where 10 is poor detection or control (the cause is almost never detected before the failure) and 1 is high detection or control (the cause is almost always detected before the failure).

Evaluate the RPN to identify the risks.

○ **RPN:** The product of the **SEV**, **OCC**, and **DET** scores. A high **RPN** score indicates a more severe, more frequent, or less controlled problem. Always investigate a failure effect that has a high severity, regardless of its **RPN** value.

▪ After you correct the failure, enter new **SEV**, **OCC**, and **DET** values to recalculate the **RPN**. You can record up to two sets of improvements, which is adequate for most situations.

Recommended Practice 6: Manage diagnostic uncertainty at handoffs

The hospital has a written policy that outlines the steps care team members should take when handing off patients with diagnostic uncertainty to the care team assuming responsibility for the next phase of care, including different units within the same hospital (e.g., emergency department to inpatient unit, hospital to skilled nursing facility, general hospital to free-standing pediatric hospital, hospital to primary care physician, to and from intensive care units, between specialty services).

Rationale

Uncertainty in diagnosis needs to be acknowledged and managed in everyday practice, and failure to address uncertainty is a major issue in cases of diagnostic error.[38] This is particularly true during handoffs and transitions in care. Critical elements of the handoff to convey to the care team assuming responsibility for the next phase of care are what has already been done, and what still needs to be done or considered. These facts need to be well documented, along with the degree of certainty or uncertainty regarding them. New tools to manage uncertainty are appearing and are especially useful at handoffs. [39 40 41 161 42]

Handoffs are prone to errors. Problems with handoffs are commonly cited in cases of diagnostic errors, which include failure to follow-up on abnormal test results. Failure to mention key items and to explain issues or complexities clearly are commonly-encountered causative factors in cases of diagnosis-related error and harm.[43 44 45] Safer patient handoffs are a major recommendation from NAM[1] and HRET[46], and is one of the 10 key items on the *Safer Dx Checklist.*[188]

Resources and Strategies

- The hospital implements evidence-based tools and resources to improve both verbal communication (e.g., *TeamSTEPPS® for Diagnosis Improvement* or IPASS) and electronic communication (e.g., based on a self-assessment from the *ONC-sponsored SAFER Guide for Clinician Communication*).[47]
- The hospital takes the lead in convening a group of clinicians and administrators from neighboring facilities (e.g., nursing homes, primary and specialty care offices) to review and improve documentation and communication of uncertainty in diagnoses so the receiving facility can take the appropriate next steps.
- The hospital has a written policy of steps to transition the patient's care to a primary care team that includes written communication of the most likely diagnosis and its degree of certainty.

2024 Update Notes

- Additional studies are cited as tools to manage uncertainty in handoffs.

Recommended Practice 7: Establish goals for patient engagement, communication, and teamwork

Senior administrative leaders establish separate goals for engaging patients, improving communication between patients and their care team, and promoting better communication and teamwork between members of the care team to improve diagnosis and:
- Share these goals with the Board and throughout the organization.
- Communicate progress towards meeting these goals at least annually to the Board.
- Include progress towards meeting these goals in the senior administrative leaders' annual performance reviews, incentives, or compensation.

At least one of these goals should be to engage the PFAC in initiatives to reduce diagnostic errors, by educating the PFAC, soliciting their input into ongoing initiatives or enabling the PFAC to lead such an initiative.

Rationale

Several studies and national reports have highlighted the importance of the three pillars of diagnostic safety: patient engagement, communication between patients and clinicians, and communication and teamwork within the care team.

Improving patient engagement is a core recommendation from The Joint Commission, AHRQ, NAM[1], IHI[186], and other organizations. Systematic reviews report strong evidence for engaging patients in their own care and in patient safety initiatives at the organizational level, report positive effects on patient safety, financial performance of hospitals, patient experience scores, medical record accuracy, and adverse event reports.[48] [49] [50] An AHRQ-sponsored environmental scan found that "both patients and clinicians support patient and family involvement and participation in their own care and recognize that it can lead to better patient experiences and improved outcomes."[51]

The patient-practitioner clinical encounter is the foundation of correct diagnoses. Nevertheless, research suggests that nearly 80% of diagnostic errors can be traced back to a process breakdown in the encounter, and a majority of these are related to the history-taking portion.[52]

Promoting effective teamwork in the diagnostic process was the number one recommendation in the 2015 NAM report *Improving Diagnosis in Health Care,[1]* based on abundant evidence from other high-reliability professions where teamwork has proven to be a cardinal feature of high-performing, safe systems. Many diagnostic errors involve deficiencies or breakdowns in the team-based aspects of diagnosis, and communication-related issues are particularly common. Teamwork brings fresh eyes to a problem, as an effective way to catch errors and biases. Effective teamwork promotes care coordination, an especially important factor in determining patient satisfaction with their care, and the outcomes of that care.

When senior administrative leaders set goals for patient engagement, communication, and teamwork to improve diagnostic safety, they share these goals with the Board and staff and regularly report their progress towards meeting the goals to the Board. This transparency sends a clear message to the entire organization that diagnostic safety is an organizational priority that deserves both staff and financial resources. The AHRQ Issue Brief, *Leadership to Improve Diagnosis: A Call to Action*, emphasizes that hospital leadership is responsible for implementing a collective accountability framework that includes opportunities for both formal and informal learning opportunities.[53]

Resources and Strategies

- Senior administrative leaders set goals to partner with the hospital's Patient and Family Advisory Council (PFAC) to identify and work towards resolving diagnostic safety and quality issues, including implementing PFAC recommendations on engaging patients on their own diagnosis (e.g., following up on pending test results at discharge, interacting with the patient portal, reporting diagnostic concerns). Leaders can refer to SIDM's *PFAC Guide for Hospital and Health System Leaders,* which includes best and promising practices for structuring, recruiting, onboarding and operating a PFAC.
- Senior administrative leaders set a goal to involve a PFAC member in another hospital-wide or departmental committee working on improving diagnostic safety and quality. Hospitals can refer to SIDM's Patient and Family Advisory Council (PFAC) Toolkit for Exploring Diagnostic Quality.
- Senior administrative leaders use *AHRQ's Guide to Patient and Family Engagement or AHRQ's Toolkit for Engaging Patients to Improve Diagnostic Safety* to set goals related to implementing recommended strategies that align with organizational priorities and needs related to patient engagement.
- Senior administrative leaders use the American Institutes for Research *Roadmap for Patient and Family Engagement in Healthcare* or the Patient Safety Foundation's *Actionable Patient Safety Solution: Person and Family Engagement* to design and implement programs to improve patient engagement at the hospital.
- Senior administrative leaders use *AHRQ's TeamSTEPPS® for Diagnosis Improvement* to set goals for staff training and implementing strategies that align with organizational priorities and needs related to communication and teamwork between members of the care team.
- Senior administrative leaders establish goals to measure and improve nurse and clinical pharmacist perceptions of being a valued member of the diagnostic team. For example, the rate at which nurses and clinical pharmacists actively participate on rounds could be measured.
- Senior administrative leaders monitor and display (e.g., internal newsletter or intranet) run-charts that track percentage of staff trained using one or more of the AHRQ resources listed above or track other established goals.

2024 Update Notes

- Updated to specify the importance of engaging with the PFAC directly on initiatives to reduce diagnostic errors and added additional resources for hospitals seeking to do so.

Patient and Family Advisory Councils (PFACS)

Leaders at hospitals looking to meaningfully engage with patients in their community and reinforce community trust can start by establishing a Patient and Family Advisory Council (PFAC). PFACs are a low-cost, low-tech intervention that sits at the intersection of the hospital's or health system's efforts to achieve high patient satisfaction and uses the patient experience to improve the quality and safety of care. As a result, PFACs serve as a lynchpin facilitator of two-way communication, relationship management, and improvement work.

Marty Hatlie, a formal civil rights attorney, and longtime patient safety advocate, recommends hospitals turn to their PFACs if struggling with next steps in reducing patient safety events, improving diagnostic quality and safety, or avoiding readmissions. This partnership can take the form of offering opportunities to Patient and Family Advisors to co-create solutions at regular PFAC meetings and serve on hospital committees or working groups, thereby creating a communication pipeline directly from users of care to organizational leadership and governance. Marty credits a strong institutional vision and leadership, active engagement by hospital board members, and a commitment to transparency in sharing safety and quality information with the patient community in his analysis of PFAC engagement to achieve sepsis reduction at MedStar Health.

Marty recommends that hospitals be creative about the role PFACs can play in contributing to improvement work. For example, PFAC members can be powerful advocates for change by sharing their stories about care delivery, bring patient experience and insight to the co-creation of improvement interventions, and be acute observers when rounding with hospital leaders. At the same time, PFACs can advance outward-facing improvement work, helping shape external communication and outreach about the importance of speaking up about safety concerns, using patient portals and following-up with discharge instructions, among other dimensions of being an engaged and activated patient.

Martin J. Hatlie, JD, President & CEO, Project Patient Care

Recommended Practice 8: Help patients and their family caregivers communicate complete and accurate information

The hospital provides patients and their family caregivers with tools to help them communicate complete and accurate personal health information to the care team.

Rationale

The initial interview with the patient provides key information for diagnosis and is the foundation for establishing effective relationships between the care team and the patient. Communication breakdowns during the initial interview are commonly cited sources of diagnostic errors.[54][55] Moreover, communication is a cardinal element of effective patient care and the key to patient satisfaction.[56] It helps ensure that patients are ready to play an active role as members of the care team. For example, they can ask "What else could this be?" throughout the diagnostic encounter. Considering ways to improve communication can pay important dividends in improving the diagnostic process.[57]

Giving patient access to their medical documentation has been transformative in efforts to improve patient engagement and communication. As an example, patients who read encounter notes via the Open Notes portal were 40% more likely to have closed the loop on ordered tests and consults.[58]

Resources and Strategies

- The hospital uses the Toolkit Implementation Roadmap from the AHRQ Toolkit for *Engaging Patients to Improve Diagnostic Safety*, which includes deploying *Be The Expert On You*, a patient-facing strategy that prepares patients and their families to tell their personal health stories in a clear, concise way.
- The hospital includes links to evidence-based tools on its public website, including the SIDM *Patient's Toolkit for Diagnosis*, a patient-designed toolkit available in English or Spanish, that helps patients clearly communicate their symptoms and health information.

2024 Update Notes

- Updated to include new research on leveraging patient portals to reduce diagnostic errors from pending test results as an example of an opportunity for patients to communicate information to their providers.

CASE STUDY: ENGAGING PATIENTS TO IMPROVE DIAGNOSTIC SAFETY

Be The Expert on You Toolkit

Chris Goeschel, ScD, MPA, MPS, RN, FAAN, Assistant Vice President of the MedStar Institute for Quality and Safety

As part of a contract with the AHRQ, the MedStar Health Institute for Quality and Safety worked with patients and providers to develop the Be the Expert on You Toolkit, a strategy hospitals and ambulatory care sites can use to help patients seeking care to clearly communicate and share information during the patient-clinician encounter.

Care sites looking to use the Be the Expert on You Note Sheet have many options for successful implementation. During field testing, some hospitals chose to provide the resource in-person upon patient arrival, by front desk staff; alternatively, some organizations distributed the Note Sheet via e-mail or through the patient portal. Hospitals can use the implementation worksheet included as part of the Toolkit to choose the appropriate path for them.

One hospital reported distributing the Note Sheet after the initial encounter with the nurse, with an opportunity for the nurse to explain the form. A successful implementation of the Toolkit will involve training physicians, nurse practitioners, medical assistants, and front desk staff, to ensure most staff can assist patients with questions about the form. The completed form serves as an important way for patients and families to make sure the provider has information relevant to the patient visit.

RECOMMENDED PRACTICES: FOCUSED INNOVATION

New ideas where implementation will require a specific focus on diagnosis

Recommended Practice 9: Measure and monitor diagnostic safety outcomes

Senior administrative leaders put processes and structures in place to identify, track, and analyze diagnostic errors, including errors that result in harm or death, with a focus on high-risk areas of the hospital (e.g., EDs, labor and delivery units, critical care units), and regularly communicate performance and progress on improvement initiatives with their board of directors.

Rationale

The NAM designated the improvement of diagnostic safety a national priority in 2015.[1] Nevertheless, health care organizations generally are not capturing these events, and calls to make diagnostic safety a priority have largely been ignored.[184][185][59] Hospitals need to address this problem by systematically identifying the incidence of diagnosis-related harm in their own patients. This can only be accomplished when senior administrative leaders prioritize measurement and monitoring activities. Many hospitals have processes in place to identify and measure treatment-related quality and safety but no such infrastructure for measuring diagnostic safety. Outcome measurement is a key step toward improving safety, generally, and is specifically needed to improve diagnosis. AHRQ's *Operational Measurement of Diagnostic Safety: State of the Science* offers practical guidance for hospitals seeking to use measures to enhance diagnostic safety.[60] Hospitals can also look to AHRQ's MeasureDx publication, a resource to help health care organizations prepare to learn about diagnostic safety events in their facilities. Measure Dx outlines a step-by-step approach with suggestions for engaging people in the organization, selecting a measurement approach that fits the organization's capabilities, systematically detecting and analyzing diagnostic safety events, and using this information for learning and improvement.

Resources and Strategies

- Senior administrative leaders can deploy electronic trigger tools to mine EHRs for diagnostic errors and opportunities for improving the diagnostic process. Electronic trigger tools are algorithms that identify patients who may have experienced a diagnostic error based on information in their EHR; for example, a return visit with a new diagnostic/therapeutic intervention.[61][62] Children's Hospital Colorado has adopted a systematic, non-voluntary approach to identify instances of ED diagnostic errors through rigorous electronic trigger tools followed by structured expert case review.[63] Error rates and outlier signals are systematically identified and actions are taken.
- Senior administrative leaders ensure that hospital staff are trained to identify diagnosis-related harm from incident reports, patient complaints, malpractice suits, and autopsies.
- Senior administrative leaders take action to encourage both patient and staff-reported diagnostic errors and concerns and put systems in place for safe and easy to use reporting.
- Geisinger pioneered a LEDE program, which includes using e-trigger tools to identify potential diagnostic errors, followed by individual case analysis.[129]
- Nationwide Children's Hospital developed a new approach to identifying diagnostic concerns, including root cause analyses, cases discussed at morbidity and mortality (M&M) conferences, and a trigger tool for patients with abdominal pain. Cases were then reviewed by an interdisciplinary team to extract lessons learned.[64]
- Organizations may find it valuable to collaborate with others in projects to improve diagnosis. SIDM's *Coalition to Improve Diagnosis* includes hospitals explicitly prioritizing their pursuit of diagnostic safety, and other opportunities to collaborate are available through organizations such as ECRI or the Child Health PSO, which published the Improving Communication to Enhance Diagnostic Safety Toolkit in

response to a finding that communication issues in the care team was the top contributor to diagnostic errors.

2024 Update Notes

- Updated with additional resources for identifying opportunities for collaboration in initiatives to reduce diagnostic errors.

Category: Focused Innovation

Recommended Practice 10: Dedicate time for analysis and learning

Clinicians and others involved in the diagnostic process have protected time to participate in activities that help improve performance in diagnosis including, at a minimum:

- Analyzing patient-reported concerns and diagnostic safety outcomes data.
- Documenting and sharing what is learned with others.
- Using the documented information learned to develop and implement improvement activities.

Rationale

Involving clinicians and others involved in the diagnostic process in efforts to pursue diagnostic safety and quality will ensure that the most important problems are targeted, and real-world improvements are achieved. A valuable model for performance improvement centers is the "learning health system," where observations of ongoing practice outcomes serve as the basis for subsequent improvement efforts.[65][66] This concept can be applied to improving diagnostic safety and quality.[67]

Resources and Strategies

- One or more clinicians from the hospitalist service or ED are allocated dedicated time to diagnostic improvement activities. These individuals work with the safety, quality, and risk management staff to evaluate reports of diagnostic concerns, help conduct and analyze diagnostic safety checklists and surveys, and collaborate in developing improvement programs.
- Clinicians and others involved in the diagnostic process have protected time to participate on interdisciplinary diagnostic safety teams and participate in team activities.
- Clinicians and others involved in the diagnostic process have protected time to participate in training and educational programs.

2024 Update Notes

- No update.

Recommended Practice 11: Promote teamwork

Senior administrative leaders continuously promote effective teamwork in diagnosis by putting policies or protocols in place to encourage:

- Diagnostic input and second opinions from clinician peers.
- Diagnostic input from nurses, pharmacists, and other clinical staff who touch the patient.
- Communication among clinicians and others involved in the diagnostic process and staff in radiology and the clinical lab regarding test selection and test result interpretation.

Rationale

Examples abound where breakdowns in teamwork led to diagnostic errors. In the case of Thomas E. Duncan, the first patient in the U.S. diagnosed with the Ebola Virus disease, the nurse who triaged the patient obtained and documented his history of recent travel to an endemic region in West Africa. However, the physician who saw the patient did not obtain this history, read the nurse's note, nor communicate with her, resulting in a delayed diagnosis and unnecessarily exposing many people to Ebola.[68]

Second opinions change the diagnosis in at least 10% of cases,[69] and increasing evidence suggests that groups considering a diagnosis more quickly and accurately arrive at a diagnosis compared to an individual.[70][71] [72]Adverse events were reduced by 30% when physicians in the Emergency Department consulted with a colleague three times per shift.[166]

Promoting teamwork in the diagnostic process was the leading recommendation in NAM's *Improving Diagnosis in Health Care* report[1] based on abundant evidence from other high-reliability professions where teamwork has proven to be a cardinal feature of high-performing, safe systems. Improving communication should be a major focus of efforts to improve teamwork in diagnosis. Breakdowns in communication are encountered in more than half of cases involving diagnostic error. New models for ward-based teams are emerging that focus on optimizing team structures and operations, and developing shared mental models, psychological safety, and team trust.[73] Structured information sharing improves communication within medical teams.[74]

Teamwork should begin by engaging nursing staff as critical members of the diagnostic team.[75][76][77][78] Nurses are often the first to interact with the patient, to see returning lab and imaging tests, and to detect changes in the patient's condition. They are ideally situated to monitor the diagnostic process and know if communication between the patient and physician was effective and complete. In many organizations, nurses participate in patient rounds and are encouraged to engage in discussions and decisions.[79]

Including pharmacists on patient rounds can promote consideration of drug interactions and side effects as explanations for new symptoms. Pharmacists, physical therapists, and other members of the clinical staff have valuable insights when they share observations that could contribute to an accurate and timely diagnosis. [80][81] Leading researchers in the diagnosis field have published calls to improve collaboration between frontline clinicians and radiologists and laboratory professionals to reduce diagnostic errors.[82][83][84]

Resources and Strategies

- The hospital designates individuals to be trained as facilitators using AHRQ's *Facilitator's Implementation Roadmap*. Trained facilitators then teach the *TeamSTEPPS for Diagnosis Improvement* course to small teams of clinicians and others involved in the diagnostic process.
- The hospital practices interdisciplinary patient rounding in inpatient and critical care units. As part of the practice of interdisciplinary rounding, nurses, pharmacists, and allied health professionals engage in the discussions and contribute to decisions about the patient's diagnosis. Broadening the practice of interdisciplinary rounds to occur across all settings and be inclusive of all care team members can promote diagnostic excellence as each member offers insight relevant to their discipline. For example, including a pharmacist adds a lens for possible drug interactions or side effects contributing to new symptoms and a physical therapist can explain unexpected changes in mobility.
- Physicians in the ED consult with colleagues, including nurses, pharmacists, radiologists, and laboratory staff before discharge or admission to get input on key diagnostic information. At Boston Children's Hospital, the regional communications center connects clinicians at outlying centers to ED or intensive care unit physicians to briefly discuss complex cases to provide advice or consider transfer.
- The hospital has a standard process in place where patients with an uncertain diagnosis at a specific timepoint (48 to 72 hours after admission) automatically get a second review by a different clinical team.[85]
- The hospital has a policy to include radiologists on tumor boards and in multidisciplinary conferences.[82]
- The hospital has a policy encouraging pathologists to provide feedback to other clinicians about test selection choices and successes and failures in interpretation of results.[83]
- Senior administrative leaders use the Improving Communication to Enhance Diagnostic Safety toolkit developed by the Child Health Patient Safety Organization Toolkit.

2024 Update Notes

- Updated with several new journal articles to support the rationale for this practice, as well as a new toolkit to improve communication. Incorporated major elements of the 2022 practice "Target training and education to nurses, pharmacists, and allied health professionals."

Recommended Practice 12: Jointly review discrepancies between imaging and pathology results

The hospital, at least quarterly, has a process by which radiologists and pathologists jointly review and reconcile cases where a biopsy, cytology, or autopsy result are discrepant with clinical and imaging impressions.

Rationale

The first recommendation from the 2015 NAM report *Improving Diagnosis in Health Care* was to improve teamwork in diagnosis, and this applies directly to radiologists and pathologists;[1] "...pathologists, radiologists, and treating health care professionals should work collaboratively to improve diagnostic testing and imaging processes."

The feedback from pathologists on cases where there is a discrepancy between pathology results and imaging impressions provides a valuable opportunity for radiologists across all levels of experience to learn from these cases, improve their skill, and improve patient care.

Several researchers have provided evidence that joint review of radiology and pathology findings identifies resolvable discrepancies in diagnosis and care plans, and improves quality.[86][87][88] In cancer diagnosis, for example, the rate of discordance between radiologic and pathologic interpretations ranges from 1%-6% in a population where the malignancy incidence in cases thought to be benign has reached up to 25%-30%.[89] Recent advances in informatics and artificial intelligence have facilitated joint radiology/pathology review processes.

The value of jointly reviewing cancer cases has prompted the suggestion of added value in more fully integrating the quality assurance programs in radiology and pathology.[90][91][92] The diagnosis of stroke, cancer, sepsis, and myocardial infarction, just to name a few, all depend on input from both laboratory tests and advanced imaging, and coordinating these services offers the potential to streamline care and improve timely diagnosis.

Resources and Strategies

- At the University of Kansas Medical Center in Kansas City, a weekly conference is held where pathologists and radiologists review all breast biopsies and produce a single integrated report.[93]
- The University Hospital Zurich in Switzerland hosts a weekly meeting of pathologists and breast center radiologists to discuss upcoming procedures and any discrepancies between biopsy results and ultrasound impressions. The value of these correlative reviews was demonstrated in a recent study: In 94 cases the breast lesion was categorized as BiRads 5 (highly suggestive of malignancy) but the original biopsy was read as benign. Fifty-seven of these patients underwent a second biopsy, which demonstrated malignancy in 46%. The authors concluded that: "Determining imaging-pathology concordance after US-guided breast biopsy is essential. Discrepant cases and further diagnostic steps need to be discussed with an interdisciplinary approach".[94]

2024 Update Notes

- Updated practice statement to be more specific about the process for joint review, as well as new research on the value of these initiatives.

Recommended Practice 13: Provide access to appropriate subspecialty expertise for pediatric patients and patients with a possible stroke in the emergency department

The hospital ensures that the emergency department has access to the clinical expertise and technologies needed to ensure timely and accurate diagnosis of high-risk conditions (conditions that are commonly misdiagnosed and result in harm or death to the patient) identified by the department. Priority conditions include patients with possible stroke, and pediatric emergencies.

Rationale

The ED is a high-risk area for diagnostic error and presents many opportunities to improve diagnosis.[95][96] Cases encountered locally are the most motivating to local clinicians; however, there is now appreciable data on the conditions most likely to be involved.[97][98] Emerging evidence identifies two areas where subspecialty expertise would improve care outcomes:

Stroke: Early diagnosis and treatment are critical to achieve the best clinical outcomes in patients with cerebrovascular events. Missed strokes are a serious cause of misdiagnosis-related harm in the ED.[99] Evaluating patients with dizziness is especially challenging, and without expert evaluation, patients with cerebellar ischemia will be missed.

Pediatrics: Diagnosis in pediatric patients presents many challenges, and the likelihood of diagnostic errors in this population is equal to or exceeds that in adults.[100] Several studies support these findings, including: (1) Eight percent of children admitted to critical care units are misdiagnosed[101], (2) Over three percent of children seen in pediatric emergency departments had an adverse diagnostic event, with most found to be preventable[102], (3) black and Hispanic children were at a higher risk of delayed diagnosis of appendicitis[103] , and (4) a retrospective study of 954 emergency departments found a pediatric misdiagnosis rate of nearly 16%.[104] From these and other studies, one priority condition in children is appendicitis.[105][106]

Resources and Strategies

- Johns Hopkins Medicine provides consistent, rapid access to experts in stroke diagnosis and appropriate diagnostic technologies. The hospital maintains 24 hours a day, 7 days a week access to neurological consultants (on-site or teleneurology) and neuroimaging, especially MRI. The hospital deploys novel diagnostic tests such as video-oculography that have been shown to facilitate major improvements in posterior stroke/dizziness diagnosis,[107] leveraging these[108] or related technologies[109] to facilitate remote eye movement assessment[110] for posterior strokes.[111][112] Finally, they offer post discharge access to specialists for short-term follow-up related to stroke diagnosis.
- The American Academy of Neurology's Telemedicine Work Group has found that teleneurology has a strong case for use in the diagnosis of epilepsy. This approach would enlist experienced specialists in epilepsy and neurophysiology in reading EEG records in real-time at rural hospitals that otherwise would not have access to this expertise.[113]
- Better access to advanced imaging and specialty consultation have been emphasized as key approaches to improving ED diagnosis.[114]

- Substantially reworded to specify the gaps in expertise that should be priorities for hospitals, as well as added several new studies on the gap in pediatrics.

Recommended Practice 14: Implement "closed-loop" communication

The hospital has a written policy that outlines the responsibilities of each care team member to ensure all critical and subcritical test results, including those pending at discharge, are viewed by the care team and communicated to the patient in a timely manner.

Rationale

Closed-loop communication means that every test result is sent, received, and addressed in a timely manner, and the patient is notified of the results and next steps. Test result follow-up is a longstanding problem that leads to delays in diagnosis and treatment. Breakdowns in communicating important test results to patients are common, even with modern EHRs. Delays and breakdowns in communicating abnormal radiologic findings are the second most common cause of a malpractice suit in radiology, and communication breakdowns are twice as likely to result in potential harm.[115] [116] In a study of alerted abnormal lab results, 6.4% were not followed-up within 30 days.[117]

These omissions can lead to patient harm and are encountered with some frequency in every study of diagnostic error. Tests pending at discharge, tests sent to outside labs, and revised test reports are especially problematic for communicating results to patients.

Several solutions have been advanced, but "Closed loop communication"[118] is a strong recommendation from a wide range of authoritative sources including NAM,[1] The Joint Commission,[119] AHRQ[120] and ONC.[121] Each of these resources, and one systematic review of approaches[122], provides guidance on addressing breakdowns in test result communication.

Resources and Strategies

- The hospital models the U.S. Department of Veterans Affairs national policy for the safe communication of test results to patients and clinicians. This policy includes national standards on timeliness of test result communication and informs performance measurement and quality improvement programs widely implemented across the VA health care system.[123]
- The hospital investigates and replicates Kaiser Permanente Southern California's "SureNet" system, which uses an algorithm to proactively identify patients that are overdue for a follow-up of abnormal tests. [124]
- The hospital reviews and adopts recommended practices on test result communication and follow-up found in the ONC-sponsored *SAFER Guides*.
- The hospital utilizes ECRI's *Closing the Loop Toolkit* to communicate all patient data and health information requiring an action to the correct individuals so the appropriate next step can occur.
- The hospital manages incidental findings through the tracking and follow-up of clinician recommendations and replicates efforts such as the Backstop recommendation tracking system program piloted by the University of Rochester.
- The hospital adheres to the safety actions outlined in The Joint Commission *Quick Safety Issue 52* to improve communication of test results and ensure patients understand any required next steps based on their results (e.g., optimize your organization's health IT capabilities, improve your organization's patient portal).[125]

2024 Update Notes

- No updates.

CASE STUDY: DEVELOPING A SYSTEM TO CLOSE THE LOOP

SureNet Identifies Missed Follow-Ups

Michael Kanter, MD, Chair of Clinical Science; Professor, Kaiser Permanente

To minimize breakdowns in communication, the Kaiser Permanente health system created a "safety net" program, called SureNet, to track and resolve missing follow-ups of test results. SureNet works by regularly, electronically scanning the entire electronic medical record database, across all 12 million patients in Kaiser's health system, and checking for over fifty different possible scenarios of missed follow-ups and potential medication safety issues. When a missing follow-up is identified, the physician, facility and, in some cases, the patient is alerted and encouraged to complete the missing test.

Although most of these tests are designed for missing results in an ambulatory setting, some are applicable to hospitals, especially in the ED. For example, if an elevated creatinine is found in a patient's blood, and a follow-up blood test is not completed 3 months later to potentially diagnose chronic kidney disease, the system sends an alert to conduct the test. Another example is a follow-up alert with patients who reported suicidal ideation during an ED visit.

Dr. Kanter recommends hospitals identify what data they can access (claims data, data in the EHR), identify a gap in follow-ups, and design an intervention to periodically scan patients' EHRs to identify these missing follow-ups. Although every system will have different capabilities and limitations, most hospitals are not currently engaged in this kind of work. Dr. Kanter also cautions that when designing a system, hospitals should be careful to not contribute to provider burden or alert fatigue, and ensure alerts are only delivered to clinicians when they are both highly specific and actionable. The SureNet program should create its interventions such that the physician's workload is minimized.

Recommended Practice 15: Convene a multidisciplinary team to promote diagnostic safety and quality

Senior administrative leaders convene a multidisciplinary team sponsored by the CEO or CMO that meets all the following criteria:

- At a minimum, the team includes representatives from nursing, pharmacy, laboratory medicine, radiology, pathology, hospital medicine or inpatient care specialists, the emergency department, and quality or risk management.
- The team leader communicates regularly with the Board and other senior administrative leaders on issues related to diagnostic safety and quality.
- The team meets at least quarterly to discuss diagnostic safety and quality issues and any lessons learned from specific patient cases.
- Designated members of the team collaborate with others involved in the diagnostic process to ensure diagnostic errors identified by the hospital undergo a root cause analysis and ensure the findings are shared with the staff involved in the case. If the patient was harmed, actions to prevent future similar errors are shared with the patient (and/or family caregiver).
- Designated members of the team collaborate with other staff to evaluate the implementation of programs (e.g., AHRQ's TeamSTEPPS) aimed at improving diagnostic safety and quality and to make recommendations for further training.

Rationale

There have been multiple calls for leaders of health care organizations to take action to address diagnostic error.[184][185][126] Leaders have the responsibility and opportunity to create a shared sense of purpose that drives everything forward in their organizations. "Whole system quality" is a new concept that describes the leadership principles, values, and patterns of behavior that set the foundation for all quality and safety-improvement efforts.[127] One comparative study found that hospitals where leadership emphasized a specific focus on quality improvement and health care excellence, fostered broader engagement with their board of directors by effectively communicating goals and progress.[128]

Resources and Strategies

- Geisinger pioneered a Learning and Exploration of Diagnostic Excellence (LEDE) program, with a physician dedicated full-time to the effort. Key elements of their 5-point action plan included a top-level virtual organizing committee, a focus on measurement for improvement, engagement of frontline clinicians in performance improvement efforts, and learning from identified opportunities to improve diagnosis in the framework of an "accountable culture."[129]
- Hardeep Singh, MD and colleagues convened an international panel of subject matter experts to develop through consensus a set of 10 high-priority practices organizations should use to proactively consider risks to timely and accurate diagnosis.[130]
- A complementary approach based on the SaferDx framework[187] outlines the 10 most important practices organizations should adopt to improve diagnosis, with examples how these might be implemented at the level of departments or the organization as a whole.[131]

2024 Update Notes

- Updated with additional resources and strategies to offer alternatives to hospitals looking to implement this practice.

Divvy Upadhyay, MD, MPH,
Division of Quality and Safety,
Geisinger

Geisinger's Committee to Improve Clinical Diagnosis (CICD)

At Geisinger, Dr. Divvy Upadhyay's full time job is focused on coordinating and improving diagnostic safety as part of the system's Committee to Improve Clinical Diagnosis (CICD) and the Safer Dx Learning Lab. His main role is to gather information when diagnostic errors occur, and share lessons learned across the Geisinger's health system to drive improvement, including providing feedback to individual providers and departments. Typically, he directly receives cases from clinicians, patient experience department and risk management. He works with the Chair of the Committee and member clinicians from various departments in the health system to review cases and create "learning opportunities".

Dr. Upadhyay says the CICD at Geisinger garnered institutional leadership support and created a formal charter to develop innovative approaches to identify and analyze diagnostic missed opportunities and provide recommendations. "The CICD aims to pursue diagnostic excellence", he says, "while promoting learning and a culture of safety". The CICD's tasks are constantly evolving in an effort to create a learning health system, but it is slowly changing the local culture to encourage acknowledging, reporting, and learning from missed diagnostic opportunities.

"We encourage our providers to share learning opportunities because we believe that is a reflection of the commitment to our patients who trust us to continuously improve our processes and advance patient care".

Focusing staff resources on improving diagnostic safety, and providing feedback on diagnostic performance directly to providers, will help directly improve patient care, clinician satisfaction and subsequently the hospitals' quality and safety performance measures and reputation, which Upadhyay believes is the "hidden ROI."
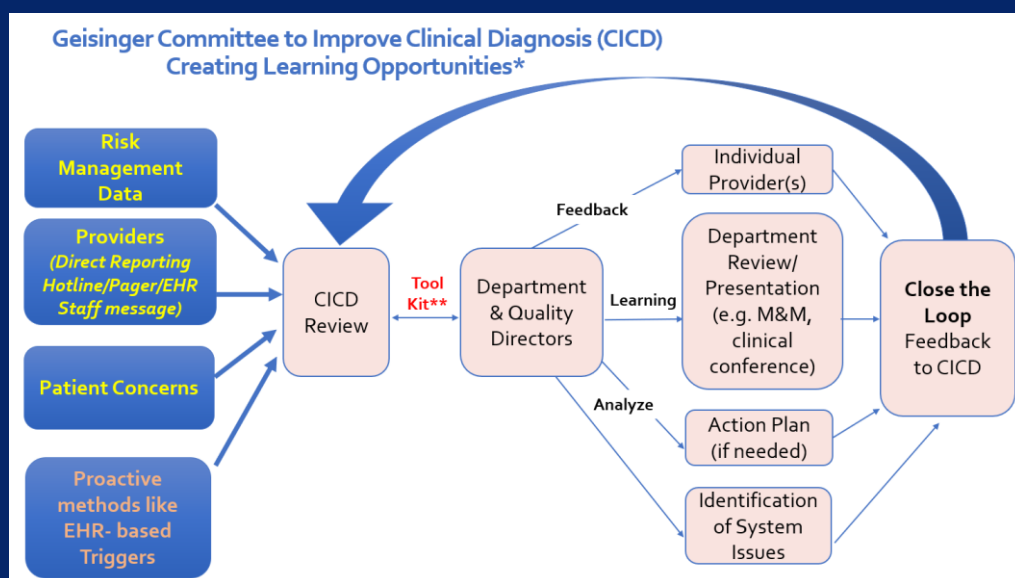
Geisinger Committee to Improve Clinical Diagnosis (CICD) Creating Learning Opportunities*

Category: Focused Innovation

Recommended Practice 16: Demonstrate commitment to diagnostic excellence through executive leadership

The hospital CEO or CMO delivers a formal written or verbal commitment to all staff to reduce harm to patients from errors in diagnosis and describes at least one specific action that will result from the commitment.

Rationale

The pursuit of diagnostic excellence requires extensive planning, resource allocation, and execution that must be spearheaded by the leader of the organization. Leaders have the responsibility and opportunity to create a shared sense of purpose that drives everything forward in their organizations. In *Safe Practices for Better Healthcare–2010 Update*, NQF stated that leaders are responsible for "personally reinforcing the principles of patient safety regularly and continuously to staff at all levels of the organization."[132] A systematic review found managerial support for medical leaders was a key component of success.[133] Additionally, having senior administrative leaders set the direction of health care organizations and execute the strategic plans were posited as key components in quality and safety.[134] This call for hospital CEOs to take a leading role in sponsoring improvements to diagnostic safety is echoed in AHRQ's *Leadership to Improve Diagnosis: A Call to Action*.[53]

Resources and Strategies

- AHRQ's *Leadership to Improve Diagnosis: A Call to Action*[53] presents both the business case and the ethical responsibility to improve diagnostic outcomes, and a comprehensive step-by-step plan to accomplish this using a collective accountability framework.
- The CEO should consider the discrete steps they can take to evidence the organization's commitment to improving diagnosis, including:
  - Authoring a widely-disseminated statement committing the CEO and the organization to improving diagnosis and its outcomes throughout the organization.
  - Partnering with the hospital's PFAC to sponsor an all-staff event to announce new goals and initiatives to advance diagnostic excellence.
  - Participating in 'town hall'-style talks on diagnostic excellence.
  - Designating 'champions' of diagnostic excellence in high-risk departments (i.e., the emergency department, radiology, laboratory, critical care, etc.) and introducing them to the organization as leaders for diagnostic-improvement projects.
  - Authoring a newsletter or an internet blog stating their commitment to achieving diagnostic excellence, and the importance of prioritizing diagnosis-improvement in the organization.

2024 Update Notes
- Substantially updated to expand the appropriate approaches to implementing this practice.

Recommended Practice 17: Conduct a risk assessment

The hospital conducts an annual risk evaluation to identify gaps in clinical expertise or tools and technology that contribute to diagnostic errors.

Rationale

Breakdowns in system-related components of care are common.[135] System-related factors have been identified in approximately 65% of diagnostic error events,[136] and system-related factors commonly degrade the cognitive aspects of the diagnostic process.[137] The NAM has detailed several system-based factors (technical or organizational barriers such as problems with communication and care coordination; inefficient processes; technical failures; and equipment problems) relevant to diagnosis and emphasized their criticality in enabling overall quality and safety.[1] A systematic risk assessment will provide organizations with a structured approach to identify and prioritize gaps that lead to diagnostic errors and to start to address these issues.

Resources and Strategies

- The hospital identifies a small team of clinicians and others involved in the diagnostic process from the major clinical services (e.g., emergency department, inpatient, radiology, laboratory medicine) to complete the Safer Dx Checklist.[188] Results from the checklist are used to develop goals and inform process improvements.
- Hospitals can conduct a hospital-wide assessment of diagnostic errors resulting in harm, including the frequency and severity assessment of each of those errors using a severity scale such as the National Coordinating Council for Medical Error and Reporting Index.
- To supplement the standardized risk assessment, the hospital conducts annual qualitative interviews with clinicians, including nurses and pharmacists, allied health professionals, and others involved in the diagnosis process to identify systemic problems in the diagnostic process.

2024 Update Notes

- Updated the practice statement to expand the possibilities for implementing this practice.

Hardeep Singh, MD, MPH, Michael E. DeBakey Veterans Affairs Medical Center and Baylor College of Medicine

The Safer Dx Checklist

Hospitals should conduct a self-assessment using the Safer Dx Checklist of 10 recommended practices that can help achieve diagnostic excellence. This checklist can help hospitals understand the current state of their diagnostic practices, identify areas to improve upon, and track progress towards diagnostic excellence over time. After obtaining leadership support, a multidisciplinary team of individuals from various clinical and non-clinical disciplines should assemble and invite in quality and safety professionals, patient representatives, medical educators, and trainees. The team should first review every practice and rate how well it is implemented at the hospital using this scale: Full, Partial, Not Implemented.

After completing the checklist, the team should develop an action plan to implement practices that are not currently fully implemented and set defined metrics and roles and responsibilities to ensure progress. This team should meet regularly to review and analyze the current state of diagnostic safety until all 10 high-priority practices are fully implemented. When hospitals have incorporated all of the practices into the organization, they should continue to review the checklist annually and revise the action plan as needed.

Hospitals wanting to promote diagnostic excellence through the Safer DX Checklist can access it here.

Checklist Responses

For each of the 10 checklist items, team members from the organization (either individually or as a group) should select the **Implementation Status** that best represents the current state of their organization's practices:

- **Full**: A well-known and well-documented practice that occurs reliably in the organization.
- **Partial**: The practice occurs in the organization sometimes. While it is well-documented, the practice is not well known or it may be implemented inconsistently across the organization.
- **Not Implemented**: This practice does not occur in the organization.

The Safer Dx Checklist:
10 High-Priority Practices for Diagnostic Excellence
(Scenarios are examples of actions to improve the practices)

Implementation Status (Current state of organization's practices)

Full | Partial | Not Implemented

1 Health care organization leadership builds a "board-to-bedside" accountability framework that includes structure, capacity, transparency, time, and resources to measure and improve diagnostic safety.

Scenario 1: Senior leadership/C-suite establish a multidisciplinary team (e.g., diagnostic safety committee) charged with identifying and addressing opportunities to reduce errors at the institutional level. The team includes department leaders and clinical champions.

Scenario 2: Senior leadership/C-suite consistently share diagnostic safety data with the governance board. This includes quantitative data to measure and track diagnostic safety as well as narrative patient stories, patterns, and action plans.

2 Health care organization promotes a just culture and creates a psychologically safe environment that encourages clinicians and staff to share opportunities to improve diagnostic safety without fear of retribution.

Scenario: Ensure non-punitive conditions that encourage clinical and non-clinical staff to report missed opportunities, harms, "good catches," tips, and lessons related to diagnostic safety. Close the loop and share information on corrective actions or steps taken to prevent recurrence in a timely and effective manner.

RECOMMENDED PRACTICES: ASPIRATIONAL GOALS

Ideas for improving diagnostic safety and quality where implementation is rare

Recommended Practice 18: Implement and monitor adherence to diagnostic guidelines

The hospital deploys clinical pathways for diagnosis to help clinicians consistently implement evidence-based guidelines for care in the ED and measures the impact of implementing the guidelines on diagnostic performance (e.g., post-ED hospitalizations).

Rationale

Guideline-concordant care generally improves the quality and safety of health care processes and reduces variation in care provision. The American College of Emergency Physicians (ACEP) issues guidelines for diagnosing a wide range of high-risk clinical conditions commonly encountered in the ED. Many other ED-relevant guidelines are available from major medical centers or professional societies. These include guidelines for diagnosing stroke,[138] sepsis,[139] appendicitis,[140] and spinal abscess.[141] Promoting use and monitoring adherence to published guidelines can improve the diagnostic process for patients.

Resources and Strategies

- The hospital engages ED staff to review and adopt one or more published national guidelines that address high-risk conditions and monitor the quality of care before and after via the ACEP Clinical Emergency Data Registry.
- The hospital has protocols in place to ensure ED staff follow appropriate evidence-based guidelines for stroke diagnosis, particularly posterior circulation stroke, such as the ACEP guideline on evaluation of adult patients with suspected transient ischemic attack (TIA).[142]
- The hospital deploys clinical care pathways that help clinicians consistently implement such guidelines and implements measures of stroke hospitalizations following ED treat-and-release visits to facilitate ongoing monitoring of diagnostic performance.[143] [144]
- The hospital shares clinical pathways with other hospitals in their region. For example, a large pediatric referral center with an abundance of local pathways shares these pathways through active collaboration with general hospitals in the region. The regional centers in turn share feedback with the referral center.
- The hospital has protocols in place to ensure that staff follow appropriate evidence-based guidelines for diagnosing sepsis, such as the *Surviving Sepsis Campaign: International Guidelines for Management of Sepsis and Septic Shock 2021*.[145]

2024 Update Notes

- No updates.

Recommended Practice 19: Optimize the electronic health record to support accurate and timely diagnosis

The hospital has a process in place to identify and address features of the EHR that contribute to diagnostic errors.

Rationale

The EHR is central to most clinical activities in the hospital today. The EHR's configuration and the practices governing its use play a major role in every step of the diagnostic process.[146] Many features of the EHR can contribute to improved diagnosis,[147] [148] but there are several specific vulnerabilities in the EHR design that, if remain uncorrected, can detract from diagnostic safety and quality.[149]

Clinicians who use the EHR in daily practice have an excellent sense of EHR strengths and weaknesses and can identify specific vulnerabilities that lead to diagnostic errors. Examples of vulnerabilities include clinical information that is unavailable when using the EHR system, an overwhelming number of messages that can "bury" important notifications such as newly available test results, even incorrect pre-populated data.[150] [151] However, organizations must heed these suggestions and assign Health IT staff to work with clinicians to study any identified problems.[152]

Acknowledging the central role of the EHR in diagnosis and care delivery, the ONC has provided authoritative advice on EHR-related safety,[153] and organizations will be expected to attest to annual self-assessments using the ONC-sponsored Safety Assurance Factors for EHR Resilience (SAFER) Guides beginning in 2022 to meet CMS regulations.[154]

Resources and Strategies

- On an annual basis, the hospital actively seeks formal input from clinical staff on their satisfaction with the EHR and their recommendations to improve features that will reduce diagnostic errors and improve the diagnostic process. Some of these activities could be performed as part of annual self-assessments based on the ONC-sponsored SAFER Guides that most hospitals will be conducting starting in 2022.[155]
- The hospital establishes a workgroup or small committee of both health IT and clinical staff that meets at least quarterly to discuss active concerns with the EHR's configuration and how to address them.
- In setting the annual IT budget for the hospital, administrators and budget managers meet to include items that correspond to initiatives to resolve diagnostic safety issues identified in the EHR, and regularly review the items to ensure those funds are being disbursed.
- Just-in-time decision support systems are used, when available, to support diagnosis for common medical complaints or scenarios. For example, the *Pediatric Emergency Care Applied Research Network (PECARN) Clinically Important Traumatic Brain Injury* decision tool is integrated within the emergency department's EHR to help make decisions about neuroimaging for head trauma in children in the emergency department.

2024 Update Notes

- No updates.

Recommended Practice 20: Communicate progress of diagnostic safety programs

Senior administrative leaders communicate information regarding incidences of diagnostic errors, efforts to improve diagnostic safety and quality, and the outcomes of those efforts both internally and externally (e.g., hospital staff, hospital committees, patients and family caregivers, the community, other institutions), and to the board of directors. This includes specific activities related to diagnostic safety improvement, the results of interventions and solutions that have been implemented, and lessons learned from analysis of diagnostic errors.

Rationale

While diagnostic errors in hospitals are common, they have not received the same level of attention as other medical errors such as healthcare-associated infections or medication errors. Senior administrative leaders should send a clear message to hospital staff, patients and family caregivers, and the community that diagnostic safety and quality are organizational priorities and efforts are underway to reduce harm to patients from diagnostic errors. This public commitment is an important first step for quality improvement and public accountability.[156] [157] [158]

Resources and Strategies

- Senior administrative leaders share information and updates on the hospital's diagnostic safety learnings, goals, and programs through a monthly internal newsletter or the organization's intranet.
- The hospital publishes information on its diagnostic safety learnings, goals, and programs on its website or through a community newsletter or annual report.
- The hospital highlights programs initiated to improve diagnosis in press releases or at community events.
- The hospital shares information on their efforts to improve diagnostic safety with other hospitals and organizations through quality reports or research results published in scientific journals.

2024 Update Notes

- No updates.

Recommended Practice 21: Train clinicians to recognize and minimize cognitive errors

The hospital trains clinicians to optimize clinical reasoning in the diagnostic process. This includes training on critical thinking, avoiding and recognizing cognitive and affective bias, and utilizing organizational resources (team input, second opinions, decision-support tools for diagnosis) to improve diagnostic performance.

Rationale

The NAM report details how most diagnostic errors involve breakdowns in clinical reasoning, but most organizations have yet to take any specific steps to improve this cognitive aspect of diagnosis.[1][185] Most clinicians have little training in critical thinking, how to optimize clinical reasoning, or how to avoid or recognize cognitive bias. Some clinicians cannot access this training. Implementing an organization-wide educational program to address cognitive errors presents a timely opportunity to tackle this ubiquitous problem.

Diagnostic time-outs are a novel and effective approach to improving diagnosis[159][160] and these can be purposefully included at the time of admission, transfers, or if the diagnosis remains uncertain after the first 24-48 hours after admission.[161] The time out provides the opportunity to review the facts of the case, reconsider alternative diagnoses, and explicitly acknowledge and document diagnostic uncertainty.

Training should include three elements:
- Practical advice on steps clinicians can take on their own to improve clinical reasoning, including reflection during a "diagnostic pause," or brief two-minute timeout, and using tools to promote critical thinking.[162][163][164]
- Familiarizing clinicians with the common types of bias that arise in clinical decision-making. Training on biases makes it easier to recognize instances where bias may have detracted from optimal diagnosis.[165]
- Information on organizational resources to use and getting help from others. This includes asking for input from team members, seeking second opinions and consults,[166] and having ready access to decision-support resources.[120]

AHRQ's systematic review of diagnostic error interventions concluded that "training on metacognitive skills may improve diagnostic accuracy, particularly as clinical experience increases" and that "online training, either didactic or via simulation, can be successfully used as a mode of delivery for educational interventions targeting clinical reasoning and diagnostic safety." Safety training to improve critical thinking is "feasible, well received, and effective."[120]

Resources and Strategies

- The hospital develops a training program that highlights the importance of clinical reasoning and the cognitive process, and includes some of the checklists, mnemonics, and decision support tools to improve clinical reasoning that are published on SIDM's website.
- To encourage reflection and critical thinking in the diagnostic process, the Clinical Excellence Commission (New South Wales, AU) implemented the "Take 2: Think Then Do" program in all hospitals, emphasizing the value of a two minute "time out" for reflection to improve diagnosis.[167] Similarly, the Child Health PSO's (www.childrenshopsitals.org) *Diagnostic Safety Toolkit* includes directions and a template for a "time out" for reflection.[168]

2024 Update Notes

- Substantially updated the rationale to reflect additional research in this area supporting these training approaches and expanding the elements of training to include familiarity with bias.

Category: Aspirational Goals

Recommended Practice 22: Provide feedback to clinicians

The hospital provides clinicians with feedback on their diagnostic performance. The hospital should follow specific best practices when providing feedback to clinicians including timeliness, preparing the clinician before receiving the feedback, and fostering a learning environment and constructive dialogue.

Rationale

The 2015 NAM report *Improving Diagnosis in Health* cited "limited feedback to clinicians about diagnostic performance" as a key root cause of diagnostic errors, even though feedback "is essential for improved diagnostic performance".[1] The emphasis on the importance of systematic feedback goes back decades further,[169] but little progress has been made since. As Meyer and Singh argue, "clinicians must learn about the ultimate accuracy of their diagnoses, as well as the processes that led them to those diagnoses…or why diagnostic performance was suboptimal."[170]

Interventions are available to provide feedback to clinicians consistently and in a manner carefully targeted to enable continuous improvement. One promising model is the Diagnosis Learning Cycle, in which researchers engage in a deliberate process of drawing from research in other fields to develop a model of diagnostic reasoning, which in turn supports a model of providing regular feedback to clinicians.[171]

Resources and Strategies

- Hospitals leaders can foster use of AHRQ's Calibrate Dx tool so individual clinicians at the hospital have an opportunity to evaluate and calibrate their individual diagnostic performance.
- At Geisinger, the hospital tested a program to deliver performance feedback to clinicians on missed opportunities in diagnosis.[172] The program first identified potential cases from risk management, clinician reports, and patient complaints. Next, the hospital developed a guide to ensure the feedback sessions were structured, supportive, and nonpunitive. After training with a clinical psychologist, department leaders served as facilitators of feedback sessions, which generally lasted 20 to 30 minutes and reviewed both individual and system-based root causes of the diagnostic missed opportunity under discussion.
- At University of California San Diego, the *Post-Handoff Reports of Outcomes (PHAROS) project* uses the EHR to create an individual summary for clinicians that lists patients recently under their care and highlights outcomes after the patient was handed off to another clinician.

2024 Update Notes
- Newly added practice.

TAKING ACTION

Quality Improvement

Achieving excellence in diagnosis is a laudable goal and will save countless lives. Yet most health care organizations are at the very beginning of this journey: aware of the need to reduce the harm associated with diagnostic error but unsure where or how to start.[3]

This report is meant to be used by hospitals, including senior administrative leaders, physicians, radiologists, pathologists, nurses, pharmacists, and others involved in the diagnostic process, as well as patient safety officers, quality directors, risk managers, and others who can use the practices to guide quality improvement. The recommended practices are meant to be implemented in high-risk areas throughout the hospital where diagnostic errors are common, including the emergency department (ED), inpatient units (e.g., labor and delivery units, critical care units), and departments central to the diagnostic process such as radiology, laboratory medicine, and pathology. Each practice reflects the latest evidence on what hospitals can and should do to improve diagnostic safety and quality, which has been guided and refined with input from our multistakeholder Advisory Group.

The resources and strategies that accompany each practice serve as concrete examples for those working to implement the practice, but hospitals should not be limited to the specific examples in this report. The examples are intended to provide a "jumping off" point for hospitals to begin this work.

Although the primary audience for this report is hospitals, other stakeholders like patients and purchasers can leverage their roles to improve diagnostic safety and quality. When visiting a hospital, patients should be aware of their options to seek an escalation of care when needed, prepare for their visit using patient guides such as those supplied by the Agency for Healthcare Research and Quality (AHRQ), make use of their electronic patient portals, and even report their diagnostic concerns directly to the hospital.

As purchasers, employers can recognize and reward hospitals that implement these recommended practices to improve diagnostic quality and safety. Purchasers and third-party payors like health plans can promote dialogue about diagnostic excellence by educating patients and calling attention to the importance of choosing hospitals committed to diagnostic excellence and undertaking a visible effort to improve performance in this dimension of health care quality. Importantly, purchasers can continue to apply pressure on hospitals to be transparent about their implementation of practices chosen to improve diagnostic safety and quality, and report results on measures of clinical outcomes in diagnosis.

It starts at the top. If hospital leaders demonstrate that diagnostic safety and quality is a priority for the organization, it will be a priority. AHRQ has published an Issue Brief, *Leadership To Improve Diagnosis: A Call to Action*, for organizations who are ready to address diagnostic safety and quality that identifies clear first steps for hospital leaders.

Culture is the key. Establishing a culture of safety in hospitals has been on the forefront of successful patient safety and quality initiatives for years. Hospitals should continue to build on that foundation as they embark on their journey to improve diagnostic safety. When hospital staff feel safe to speak up and are encouraged to

listen to others on the care team, patients and family caregivers feel like they are listened to and transparency is embraced, change can happen.

Hospitals know how to do this. Since the seminal report *To Err is Human* estimated 98,000 lives lost to preventable medical errors each year, hospitals have been working to reduce medical errors and preventable patient harm. Reducing harm to patients from diagnostic errors is no different. Hospital leaders must commit to organizational engagement, conduct a risk assessment to identify critical problems, incorporate measurement, use rapid-learning Plan-Do-Study-Act (PDSA) cycles, and listen to patients about their problems and recommendations for solutions.

The problem is urgent. Thousands of patients are harmed by diagnostic errors every day. There is never going to be a better time to start than now. The recommended practices in this report focus on senior administrative leadership and their commitment and local risk assessment to help hospitals select practices that are most relevant to their patients and diagnostic safety gaps. Clinicians and other staff as well as patients and family caregivers should be engaged in making decisions about which of the selected practices to implement first.

Be transparent. This report aims to engage hospitals across the U.S. in the hard work of reducing harm to patients from diagnostic errors. We encourage hospitals to be transparent about their gaps, both internally and externally, and to initiate or join collaboratives to share experiences and learn from others. In practical terms, hospitals should consider joining a Patient Safety Organization (PSO) and voluntarily reporting data – in return, PSOs will provide feedback to help health care organizations learn from past adverse events and diagnostic errors and take steps to prevent recurrence. Likewise, hospitals can take advantage of AHRQ's *Common Format for Event Reporting – Diagnostic Safety (Version 1.0)*, which will facilitate collecting and reporting information about diagnostic errors in a standardized way. Finally, hospitals should disclose diagnostic errors to patients and family caregivers when harm occurs.

Monitor progress. Track progress after implementing recommended practices and continually analyze the data collected and try to identify gaps or trends that offer a clear indication of potential issues in the quality of care that led to diagnostic error. In time, a hospital's progress in implementing these recommended practices will be scored and publicly reported as part of the Leapfrog Hospital Survey.

Additional resources are presented in Appendix E.

Diagnostic Excellence in the 2024 Leapfrog Hospital Survey

Over the coming years, Leapfrog plans to publicly report whether hospitals achieve high standards for diagnostic excellence. Future reports will describe the process for establishing those standards with the Expert Panel and offer descriptive statistics of the performance of hospitals nationwide.

Employers and other purchasers who founded Leapfrog, as well as third party payors like health plans, use Leapfrog standards in contracting, value-based benefits design, and reporting to employees and their communities. The goal is for hospitals that achieve these standards to be rewarded for excellence in the marketplace.

The first step in developing and reporting performance on standards is to gather the data needed to set reasonable and feasible standards for excellence, which Leapfrog accomplishes through the annual Leapfrog

Hospital Survey. As indicated above, Leapfrog convened an Expert Panel to help identify the recommended practices to incorporate in the 2024 Leapfrog Hospital Survey. The members of the Expert Panel are:

Robert El-Kareh, MD, MPH, MS, UC San Diego School of Medicine

Kelly Gleason, PhD, RN, Johns Hopkins School of Nursing

Kenneth Michelson, MD, MPH, Lurie Children's Hospital of Chicago

Vinita Parkash, MBBS, MPH, Yale University School of Medicine

Ramin Khorasani, MD, MPH, Harvard Medical School

With guidance from the Panel, Leapfrog has included questions about the following recommended practices for diagnostic excellence in the 2024 Hospital Survey:

Recommended Practice 2: [Make it easy for hospital staff to report diagnostic errors and concerns](#)

Recommended Practice 7: [Establish goals for patient engagement, communication, and teamwork](#)

Recommended Practice 9: [Measure and monitor diagnostic safety outcomes](#)

Recommended Practice 10: [Dedicate time for analysis and learning](#)

Recommended Practice 11: [Promote teamwork](#)

Recommended Practice 12: [Jointly review differences between imaging and pathology results](#)

Recommended Practice 13: [Provide access to appropriate subspecialty expertise for pediatric patients and patients with a possible stroke in the emergency department](#)

Recommended Practice 14: [Implement "closed loop" communication](#)

Recommended Practice 15: [Convene a multidisciplinary team to promote diagnostic safety and quality](#)

Recommended Practice 16: [Demonstrate commitment to diagnostic excellence through executive leadership](#)

Recommended Practice 17: [Conduct a risk assessment](#)

The complete set of Survey questions is available in [Appendix C](#), including an indication of how each Survey question links back to a specific recommended practice. Though the questions are not scored or publicly reported in 2024, submissions from hospitals will be used to refine Survey questions in subsequent cycles, and ultimately to establish a standard of performance that will score and publicly report hospitals nationwide on their progress. Leapfrog will continue to post updates on this initiative to our homepage, [Recognizing Excellence in Diagnosis](#).

APPENDIX A: DEFINITIONS OF KEY TERMS USED IN THIS REPORT

Diagnostic error: An event where one or both of the following occurred, with harm or high potential of harm to the patient:

- Delayed, wrong, or missed diagnosis: At least one missed opportunity to pursue or identify an accurate and timely diagnosis based on the information that existed at that time.
- Diagnosis not communicated to the patient: Accurate diagnosis was available but was not effectively communicated to the patient or family.

(Adapted from the definition of a "diagnostic safety event" from the 2021 AHRQ *Common Formats for Event Reporting – Diagnostic Error*.)

Measurement framework: A tool to organize recommended practices related to diagnostic safety and quality in hospitals. Measurement frameworks are used in health care quality measurement as conceptual models that create an organized structure for different ideas about what is most important to measure in each area of health care.

Recommended practices: Practices for which there is some clear rationale (recommended by subject matter experts and/or peer-reviewed literature) that links the practice to improvements in the diagnostic process and/or diagnostic outcomes in hospitals. For the purposes of this report, these are practices that were identified and prioritized by our Advisory Group, and generally represent practices that have been implemented and assessed in one or more organizations.

Senior administrative leaders: Individuals responsible for hospital-wide departments or services (e.g., Chief Executive Officer, Chief Administrative Officer, Chief Nursing Officer, Chief Medical Officer).

Clinicians: Health care professionals qualified for clinical practice (providing direct care to patients). Clinicians include physicians, nurses, pharmacists, or other allied health professionals (adapted from CMS).

Care teams: Care teams are groups of health care professionals who collectively take responsibility for a set of patients. Care teams blend multidisciplinary skills, focusing insights of several people rather than a single clinician on each patient's problems (adapted from AHRQ).

Others involved in the diagnostic process: Health care professionals that include, but are not limited to radiologists, pathologists, laboratory personnel, and others.

Family caregiver: Any relative, partner, friend or neighbor who has a significant personal relationship with, and provides a broad range of assistance for, a person receiving medical care or long-term care services such as an older person, a child, or an adult with a chronic or disabling condition. These individuals may be primary or secondary caregivers and live with, or separately from, the person receiving care (adapted from the Family Caregiver Alliance).

Purchasers: Private and public sector employers and health plans who pay for health care services on behalf of their employees or members.

APPENDIX B: OVERVIEW OF DIAGNOSTIC ERRORS IN HOSPITALS

Definition of "Diagnostic Error"

The Advisory Group agreed on the following definition of a diagnostic error: An event where one or both of the following occurred, with harm or high potential of harm to the patient:

- Delayed, wrong, or missed diagnosis: At least one missed opportunity to pursue or identify an accurate and timely diagnosis based on the information that existed at that time.
- Diagnosis not communicated to the patient: Accurate diagnosis was available but was not effectively communicated to the patient or family.

The definition is adapted from the 2021 AHRQ *Common Formats for Event Reporting – Diagnostic Safety*. The Advisory Group selected the AHRQ definition because it reflects the most current thinking from leading experts in diagnosis[173] and builds upon previously articulated definitions of diagnostic error, including the one advanced by NAM in 2015. This definition also reflects the Advisory Group's input to ensure that diagnostic errors are clearly defined for patients, their family caregivers, hospital leaders, clinicians, and others involved in the diagnostic process.

The Advisory Group did modify the AHRQ definition by adding "with harm or high potential of harm," in place of "whether or not the patient was harmed." This update clarifies the goals of this project, to focus on diagnostic errors that have the highest impact on patient safety. The Advisory Group also added the word "effectively" to the definition of "diagnosis not communicated to patient" to indicate the importance of clearly communicating diagnoses in terms that patients understand, and that are actionable for the patient as they seek continuing care.

Other definitions of key terms used in this report are listed in Appendix A.

Incidence and Etiology of Diagnostic Errors in Health Systems

In 2015, NAM published *Improving Diagnosis in Healthcare*, a landmark report that summarized all the research in the field to that point and proposed a roadmap for reducing diagnostic errors in health care.[1] The NAM report concluded that diagnostic errors are ubiquitous, surprisingly common and cause inordinate harm. Roughly one in 10 diagnoses is incorrect, and one in 20 outpatients in the U.S. will experience a diagnostic error every year. The NAM concluded that "…. most of us will experience at least one diagnostic error in our lifetime, sometimes with devastating consequences." Studies published since the NAM report are consistent with NAM's conclusions. Diagnostic errors dominate malpractice lawsuits in most specialties and cause the most harm to patients.[174] This problem is not limited to just the United States. The incidence of diagnostic error in ambulatory settings in the United Kingdom is comparable to the U.S.,[175] and diagnostic error has been recognized as a major global concern.[176]

A systematic review of diagnostic errors involving hospital inpatients found a quarter million will experience a harmful diagnostic error annually in the United States,[177] and the most recent analysis estimated that some

550,000 patients suffer permanent disability or death every year from diagnostic error[178]. A systematic review examined diagnosis-related harm in U.S. adult intensive care units and found an estimated 40,000 deaths annually.[179] A systematic review of diagnostic error in pediatric critical care units reported an incidence of 10%-23% based on autopsy studies, and 8%-12% based on chart reviews.[180] Adverse events are also encountered in pediatric emergency department visits, with a substantial fraction reflecting diagnostic errors.[181]

The ED is considered the *petri dish* for diagnostic errors and the incidence will very likely exceed that in ambulatory and inpatient care settings. Diagnostic errors are the primary cause for malpractice suits involving patients seen in the ED.[2] A systematic review of diagnostic errors in the ED concluded that although the rate of diagnostic error in this setting was relatively low (5.7%), the aggregate harm was substantial, with some 2.5 million patients harmed each year, including 350,000 patients incurring permanent disability or death.[182]

The NAM 2015 report identified three main etiologic factors contributing to diagnostic error:

Diagnosis is complex: There are roughly 200 symptoms but over 10,000 diseases. Only a fraction of these diseases (roughly 1,000) is covered in medical education. Even common conditions can present in a variety of ways, depending on the patient and the stage of disease. Although "rare" diseases are indeed rare, there are so many rare diseases that an estimated 1 in 15 individuals worldwide has a "rare" condition, according to the World Health Organization.

Human cognition is fallible: Although all physicians are taught the essence of clinical reasoning, they generally receive little or no training in critical thinking, they rarely use decision-support resources designed to aid diagnosis, and they share many cognitive and affective (emotion-related) biases that are common in human decision-making in every setting. Production pressure, interruptions, distractions, fatigue, illness, burnout, and many other factors also degrade clinical decision-making.

Our health care systems are imperfect and error-prone: There are potential breakdowns in every step of the diagnostic process. Follow-up processes are often rudimentary while safety monitoring and improvement are typically secondary priorities below financial stability and productivity in most organizations. The patient-practitioner clinical encounter is the foundation of correct diagnoses. Nevertheless, research suggests that nearly 80% of diagnostic errors can be traced back to a process breakdown in the encounter, and a majority of these are related to history-taking.[183]

Addressing the problem

Although we have learned a great deal about diagnostic error, very little has been done by health care organizations to address the problem. Aside from a handful of pioneering hospitals, most health systems are still on the sidelines, despite data on the magnitude of the problem and recommendations from the NAM report to address the problem.[184] [185] A survey administered by Leapfrog found that while most hospitals who responded were aware of the diagnostic error problem, their commitment to change was limited.[3]

A host of interventions have been considered and recommended to reduce the risk of diagnostic error, or to minimize harm to patients, but essentially none of these interventions have been implemented or even trialed. There are two key barriers that explain why health systems do not approach this problem with the urgency it

deserves. First, many hospitals do not know where to start. There is no clear consensus on the specific best practices, measures, or performance standards that all hospitals should consider when striving for diagnostic excellence. Second, they don't know why they need to start. Hospitals do not get a clear signal from the public, private payors, regulators, or accreditors that diagnostic safety and quality is a priority.

Nevertheless, there are some clear next steps for all hospitals. Improving patient engagement is a core recommendation from The Joint Commission, AHRQ, NAM,[1] Institute for Healthcare Improvement (IHI),[186] and other organizations. As well, promoting teamwork in the diagnostic process was the number one recommendation in NAM's *Improving Diagnosis in Health Care* report,[1] based on abundant evidence from other high-reliability professions where teamwork has proven to be a cardinal feature of high-performing, safe systems. Many diagnostic errors involve deficiencies or breakdowns in the team-based aspects of diagnosis, and communication-related issues are particularly common.

APPENDIX C: 2024 HOSPITAL SURVEY SECTION ON DIAGNOSIS

Recommended Practice 16: <u>Demonstrate commitment to diagnostic excellence through executive leadership</u>

Leadership Commitment to Diagnostic Excellence

1) In the past 36 months, has your hospital's CEO or CMO made a formal commitment (verbally or in writing) to all staff to make reducing harm to patients from errors in diagnosis an organizational priority, and communicated at least one specific action the hospital will take to further the commitment? *If "no" to question #1, skip question #2 and continue question #3.*	o Yes o No
2) What specific actions were communicated by your hospital's CEO or CMO as part of their formal commitment to reducing harm to patients from errors in diagnosis? *Select all that apply.*	☐ Allocated financial resources ☐ Allocated staff time ☐ Designated a senior leader or clinician champion ☐ Formed a committee ☐ Implemented a performance measure ☐ Implemented a QI project ☐ Other

Recommended Practice 7: <u>Establish goals for patient engagement, communication, and teamwork</u>

Patient Engagement

3) Has your hospital chartered a Patient and Family Advisory Council (PFAC) that meets regularly? *If "no" to question #3, skip question #4 and continue to question #5.*	o Yes o No
4) In the past 36 months, has your hospital's PFAC: • received education regarding errors in diagnosis or the diagnostic process, • had input into any initiatives aimed at reducing errors in diagnosis, or • led any initiatives aimed at reducing errors in diagnosis?	o Yes o No

Recommended Practice 17: Conduct a risk assessment

Risk Assessment and Mitigation

5) In the past 36 months, has your hospital conducted a risk assessment to identify additional clinical expertise or technologies that are needed to reduce errors in diagnosis (including delayed, wrong, or missed diagnoses, and diagnoses not communicated to the patient)? *If "no" to question #5, skip question #6 and continue to question #7.*	o Yes, led by our multidisciplinary team o Yes, led by a different entity at the hospital (please specify): _____ o No
6) What steps has your hospital taken to gain access to the additional clinical expertise or technologies needed to reduce errors in diagnosis? *Select all that apply.*	☐ Allocated budget ☐ Researched potential resources ☐ Met with vendors to begin the procurement process for the resource ☐ Contracted with an external resource ☐ Other ☐ None of the above

Recommended Practice 2: Make it easy for hospital staff to report diagnostic errors and concerns

Recommended Practice 9: Measure and monitor diagnostic safety outcomes

Recommended Practice 12: Jointly review differences between imaging and pathology results

Recommended Practice 13: Provide access to appropriate subspecialty expertise for pediatric patients and patients with a possible stroke in the emergency department

Recommended Practice 15: Convene a multidisciplinary team to promote diagnostic safety and quality

Convening a Multidisciplinary Team Focused on Diagnostic Excellence

7) In the past 36 months, has your hospital convened a multidisciplinary team that meets all the following requirements: • Specifically focused on reducing harm to patients from errors in diagnosis; • Sponsored by either the CEO or CMO; • Includes, at a minimum, representatives from nursing, pharmacy, laboratory medicine, radiology, pathology, hospital medicine or inpatient care specialists, emergency medicine, and quality or risk management; • Meets at least quarterly; • Reports to senior leaders quarterly; and • Reports to the Board annually? *If "no" to question #7, skip question #8 and continue to question #9.*	o Yes o No

8) Has the multidisciplinary team helped to educate staff on their work on reducing errors in diagnosis?	○ Yes ○ No
9) Has the multidisciplinary team reviewed any clinical or administrative data, patient experience or patient reported data, or incident reports to identify or track errors in diagnosis? *If "no" to question #9, skip question #10 and continue to question #11.*	○ Yes ○ No ○ No, but a different team at the hospital has reviewed data or incident reports to identify or track errors in diagnosis
10) If an error in diagnosis was identified through the review of any of the data sources used in question #9, did the team conduct any analyses or case reviews within four weeks of the error being identified and ensure the findings were communicated to the individuals involved in the patient's care and hospital leadership?	○ Yes ○ No ○ No, but a different team at the hospital has conducted at least one root cause analysis or case review of a diagnostic error
11) Has the multidisciplinary team encouraged all staff (verbally or in writing), including all clinicians who participate in the diagnostic process, to report errors in diagnosis via the hospital's incident or event reporting system?	○ Yes ○ No ○ No, but a different team at the hospital has encouraged all staff to report errors in diagnosis
12) Has the multidisciplinary team convened emergency medicine staff to identify commonly misdiagnosed conditions (e.g., stroke, heart attack, VTE) in the emergency department? *If "no" to question #12, skip question #13 and continue to question #14.*	○ Yes ○ No ○ No, but the emergency medicine staff independently meet to identify commonly misdiagnosed conditions
13) Has the multidisciplinary team worked with the emergency medicine staff to develop or implement any initiatives aimed at improving accurate and timely diagnosis of these commonly misdiagnosed conditions?	○ Yes ○ No ○ No, but the emergency medicine staff have independently implemented at least one such initiative
14) Has the multidisciplinary team convened radiologists and pathologists to discuss diagnosis related issues, including potential discrepancies, and analyze cases where there is a discrepancy between radiology and pathology findings? *If "no" to question #14, skip question #15 and continue to question #16.*	○ Yes ○ No ○ No, but radiologists and pathologists independently meet to discuss diagnosis-related issues
15) Has the multidisciplinary team worked with the pathologists and radiologists to develop or implement protocols to ensure timely review and resolution of discrepancies, and timely communication of diagnoses to patients and their families?	○ Yes ○ No ○ No, but radiologists and pathologists independently developed

	or implemented at least one such protocol

Recommended Practice 10: [Dedicate time for analysis and learning](...)

Recommended Practice 11: [Promote teamwork](...)

Training and Education

16) In the past 36 months, has your hospital trained any staff in an evidence-based program to improve communication among members of the care team (including nurses, pharmacists, and other allied health professionals), within the context of the diagnostic process or in reducing errors in diagnosis (e.g., AHRQ's TeamSTEPPS for Diagnosis Improvement)?	○ Yes ○ No
17) In the past 36 months, has your hospital modified any existing staff training curriculum (e.g., interdisciplinary communication, early identification of sepsis, etc.) to include content on communication among members of the care team (including nurses, pharmacists, and other allied health professionals), within the context of the diagnostic process or in reducing errors in diagnosis?	○ Yes ○ No
18) In the past 36 months, has your hospital allocated any of the following staff members at least one hour a month (on average) of paid protected time (with no other clinical or administrative responsibilities) to participate in any of the following activities: • Review of clinical or administrative data, patient experience or patient reported data, or incident reports to identify or track errors in diagnosis (including delayed, wrong, or missed diagnoses, and diagnoses not communicated to the patient); • Root cause analysis or case review of errors in diagnosis (including delayed, wrong, or missed diagnoses, or diagnoses not communicated to the patient); • Training to improve teamwork or communication for the purposes of improving the diagnostic process; • Participation in a multidisciplinary team or committee convened to reduce harm to patients from errors in diagnosis (including delayed, wrong, or missed diagnoses, and diagnoses not communicated to the patient); or • Develop, test, or implement interventions to reduce errors in diagnosis or improve the diagnostic process? *Select all that apply.*	☐ All members of the multidisciplinary team ☐ Some members of the multidisciplinary team ☐ Clinical analytics staff supporting the multidisciplinary team ☐ Other clinicians not engaged with the multidisciplinary team ☐ Other nurses, pharmacists, and other allied health professionals not involved in the multidisciplinary team ☐ Other ☐ No staff are offered one hour a month of paid time

Recommended Practice 14: [Implement "closed loop" communication](#)

Closing the Loop on Cancer Diagnosis

19) 12-month reporting period used:	○ 01/01/2023 – 12/31/2023 ○ 07/01/2023 – 06/30/2024
20) Do pathologists at your hospital routinely document the date in which they communicate pathology reports indicating a diagnosis of colon, lung, or breast cancer to a patient or a patient's ordering physician? *If "no" to question #20, skip the remaining questions in Section 6E and* *continue to the Affirmation of Accuracy.*	○ Yes ○ No
21) Did your hospital calculate the proportion of colon, lung, or breast cancer diagnoses in which the patient or patient's ordering physician was notified within five business days of the report being signed by the pathologist, and do you choose to report those data to this Survey? *If "no" or "yes, but fewer than 30 cases met the inclusion criteria for the* *denominator," skip the remaining questions in Section 6E and continue* *to the Affirmation of Accuracy.*	○ Yes ○ No ○ Yes, but fewer than 30 cases met the inclusion criteria for the denominator
22) Total number of patients (18 years or older) with a diagnosis of colon, lung, or breast cancer:	_____
23) Total number of patients from question #22 with documented communication between the pathologist and the patient or patient's ordering physician within five business days of the report being signed by the pathologist: *Documented communication includes:* • *A documented phone call between the pathologist and patient or patient's ordering physician of the diagnosis, and* • *A timestamp, read receipt, or email response indicating that the patient or patient's ordering physician read an electronic communication of the diagnosis.*	_____
24) Total number of patients from question #22 who were notified, either by phone or electronically, that the pathology report with their diagnosis was uploaded to the patient portal and ready for review: *Hospitals that do not upload pathology reports to the patient portal or notify patients when reports are uploaded, should enter "0."*	_____

APPENDIX D: THE ADVISORY GROUP

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APPENDIX E: RESOURCES AND PIONNEERING ORGANIZATIONS

Key Publications

Leapfrog Reports

Recognizing Excellence in Diagnosis: National Pilot Survey Report (2024)

Recognizing Excellence in Diagnosis: Recommended Practices for Hospitals (2022)

Leapfrog Toolkits

Patient and Family Advisory Council (PFAC) Toolkit for Exploring Diagnostic Quality (2024)

Root Cause Analysis of Cases Involving Diagnostic Error: A Handbook for Healthcare Organizations (2024)

Signal Publications

National Quality Forum: Improving Diagnostic Quality and Safety Final Report (2017)

Institute of Medicine: Improving Diagnosis in Health Care (2015)

Additional Resources

AHRQ Resources

As the lead Federal agency addressing diagnostic quality and safety, AHRQ has assembled a large repository of resources concerning diagnosis and diagnostic error. These include a set of recently developed tools to improve diagnostic safety in the hospital setting, and an expanding set of issue briefs that cover a wide range of topics in this area:

AHRQ Tools to improve diagnostic safety

- Calibrate Dx is a self-evaluation tool for clinicians to improve their diagnostic decision making.
- Measure Dx: A Resource to Identify, Analyze, and Learn from Diagnostic Safety Events is a resource to help healthcare organizations detect, analyze, and learn from diagnostic safety events.

AHRQ Tools to improve patient engagement and teamwork

- Questions Are the Answer**:** Asking questions about a diagnosis or other aspects of care is a step that patients can take to make care safer.
- Guide to Patient and Family Engagement in Hospital Quality and Safety: This guide encourages hospital patients and family members to be involved in their care. It focuses on four primary strategies for promoting patient/family engagement in hospital safety and quality of care.
- Resources To Facilitate Communication Between Patients and Clinicians: From the IOM report, "Improving Diagnosis in Health Care," this toolkit includes a checklist and other resources to help patients understand what they can to do prevent diagnostic error.

- [A Toolkit for Engaging Patients to Improve Diagnostic Safety](#): is designed to promote enhanced communication and information sharing within the patient-provider encounter to help patients, families, and health professionals work together as partners to improve diagnostic safety.

AHRQ Issue Briefs on Diagnosis

These recent white papers commissioned by AHRQ cover a wider range of key issues:
- [Current State of Diagnostic Safety: Implications for Research, Practice, and Policy](#) ([PDF](#), 1.4 MB)
- [Strategies for Improving Clinician Psychological Safety in Reporting and Discussing Diagnostic Error](#) ([PDF](#), 1 MB)
- [Pediatric Diagnostic Safety: State of the Science and Future Directions](#) ([PDF](#), 1.5 MB)
- [Reimagining Healthcare Teams: Leveraging the Patient-Clinician-AI Triad To Improve Diagnostic Safety](#) ([PDF](#), 1.7 MB)
- [Patient Experience as a Source for Understanding the Origins, Impact, and Remediation of Diagnostic Errors. Volume 1: Why Patient Narratives Matter](#) ([PDF](#), 1 MB)
- [Patient Experience as a Source for Understanding the Origins, Impact, and Remediation of Diagnostic Errors. Volume 2: Eliciting Patient Narratives](#) ([PDF](#), 1 MB)
- [Diagnostic Safety Across Transitions of Care Throughout the Healthcare System: Current State and a Call to Action](#) ([PDF](#), 2 MB)
- [Reinforcing the Value and Roles of Nurses in Diagnostic Safety: Pragmatic Recommendations for Nurse Leaders and Educators](#) ([PDF](#), 1.2 MB)
- [Improved Diagnostic Accuracy Through Probability-Based Diagnosis](#) ([PDF](#), 976 KB)
- [Distributed Cognition and the Role of Nurses in Diagnostic Safety in the Emergency Department](#) ([PDF](#), 1.5 MB)
- [Improving Education—A Key to Better Diagnostic Outcomes](#) ([PDF](#), 2 MB)
- [The Contribution of Diagnostic Errors to Maternal Morbidity and Mortality During and Immediately After Childbirth: State of the Science](#) ([PDF](#), 1.4 MB).
- [Leadership To Improve Diagnosis: A Call to Action](#) ([PDF](#), 2.3 MB).
- [Health Information Technology for Engaging Patients in Diagnostic Decision Making in Emergency Departments](#) ([PDF](#), 3 MB)
- [Evidence on Use of Clinical Reasoning Checklists for Diagnostic Error Reduction](#) ([PDF](#), 971 KB).
- [Telediagnosis for Acute Care: Implications for the Quality and Safety of Diagnosis](#) ([PDF](#), 1 MB).
- [Operational Measurement of Diagnostic Safety: State of the Science](#) ([PDF](#), 2 MB).

The Society to Improve Diagnosis in Medicine (SIDM) is the only nonprofit organization focusing solely on diagnostic quality and safety. The [SIDM website](#) provides access to a host of resources and tools for organizations, clinicians, and patients to improve diagnosis, and offers links to register for the SIDM newsletters and publications. SIDM's *Coalition to Improve Diagnosis* includes over 60 health care organizations committed to improving diagnosis outcomes; if you are serious about improving diagnostic quality in your organization, consider joining.

The Safer Dx collection of resources by Hardeep Singh MD and colleagues includes:

- The Safer Dx [Framework](#)[187] presents a novel view of diagnostic errors as missed opportunities that allows health care organizations to evaluate diagnostic safety proactively.
- The Safer Dx [Checklist](#)[188] is a set of 10 high-priority recommendations to improve diagnostic safety in healthcare organizations.
- The Safer Dx [Instrument](#)[189] is a tool safety committees can use to decide if a patient case might reflect a missed opportunity to have made the correct diagnosis.

Pioneering Organizations

Several organizations have already started work to improve diagnostic quality and safety. Examples include:

- **Kaiser Permanente Southern California's** "SureNet" system is a pioneering effort to proactively monitor electronic health records (EHRs) for delays in follow-up of tests and in addressing abnormal test results in a timely fashion.[190]
- **Geisinger Health (Danville, PA)** has implemented pilot program for organizational and personal learning. The program models leadership commitment, learning from cases, and optimizing health IT resources for diagnosis.[191]**Johns Hopkins Medicine** incorporates many elements of learning organization, and hosts an AHRQ-sponsored Diagnosis Center of Excellence.[192]
- **Baystate Medical Center** in Springfield, MA Baystate Medical Center employs a multifaceted approach to improve diagnostic quality and safety including:
    - Clinical reasoning education: Formal clinical reasoning curricula and elective rotations in diagnosis for medical students and residents.
    - Diagnostic teaming: Baystate's Clinical Reasoning Academy provides Interprofessional training in diagnostic teamwork for all interested members of the health care team and patients/caregivers on the Patient and Family Advisory Council.
    - Diagnostic decision aids: Diagnostic decision support (VisualDx) is integrated into the electronic health record and a telemedicine dermatology consultation service is available for pediatric inpatients with rashes.
    - Diagnostic error reporting: Providers can quickly and easily submit reports of suspected diagnostic errors using a smartphone app (CaseShare).
- **Children's Hospital of Philadelphia** hosts a new Center for Diagnostic Excellence (CDE) that aims to operationalize achievement and evaluation of diagnostic excellence across the health system and to advance pediatric diagnostic excellence research and education. To date, the CDE has reviewed over 650 cases for missed opportunities in diagnosis; utilized diagnostic case reviews to guide institutional safety learning and improvement efforts; developed and implemented diagnostic reasoning curricula for faculty and hospital staff, driven by a robust needs assessment; and collaborated with a family advisory council to develop and implement a diagnostic resource for patients and families.

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