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ORIGINAL RESEARCH

Hospital commitments to address diagnostic errors: An assessment of 95 US hospitals

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Abstract

Background: Diagnostic errors are a leading cause of patient harm. In 2022, the Leapfrog Group published a report containing 29 evidence-based practices that hospitals can adopt to reduce diagnostic errors.

Objectives: To understand the extent to which US hospitals have already implemented these practices, we conducted a national pilot survey of Leapfrog-participating hospitals.

Methods: To reduce respondent burden, we divided the 29 practices across two surveys: one focused on organizational culture and structure (Domain 1), and the second focused on the diagnostic process itself (Domain 2).

Results: A total of 95 hospitals from 23 states responded to one or both surveys. On average, hospitals reported implementing 9 of the 16 practices (56%) in Domain 1 and 8 of the 13 practices (62%) in Domain 2. The rate of practice implementation varied greatly, with some hospitals implementing as few as three practices in their domain. The most commonly implemented practices were ensuring access to medical interpreters, continuous access to radiologists, ensuring staff and patients can report diagnostic errors and concerns, and having a formal process to identify and notify patients when diagnostic errors occur. The least implemented practices included convening a multidisciplinary team focused on diagnostic safety and quality, a CEO commitment to diagnostic excellence, conducting diagnosis-focused risk assessments, and training clinicians to optimize clinical reasoning in the diagnostic process.

Conclusions: The findings suggest large and important implementation gaps for practices related to diagnostic excellence and can inform new initiatives to promote diagnostic excellence in US hospitals.

INTRODUCTION

Diagnostic errors are a common and preventable source of harm for patients.[1] The National Academy of Medicine (NAM) 2015 report, *Improving Diagnosis in Health Care*, underscored the lack of national attention on this issue and presented several recommendations for addressing diagnostic safety at the federal and state level, through professional training, and within healthcare organizations.[2] Of the eight main recommendations, four were aimed at healthcare organizations. However, after nearly 10 years from the release of this report, there are no federal standards for measuring and reporting diagnostic errors in US healthcare.[3] Therefore, without formal direction from public or federal entities, healthcare organizations are challenged to prioritize diagnostic safety while continuing to meet other patient safety requirements. To address diagnostic safety, healthcare organizations need novel diagnostic tools and strategies, diagnosis specific resources and education, and infrastructure dedicated to diagnostic safety.[4]

Prior surveys show that most organizations are not prioritizing diagnostic safety despite recognizing diagnostic errors as a common problem.[5,6] The Leapfrog Group, a national employer consortium that measures and publicly reports healthcare safety and quality metrics, conducted a voluntary survey of 61 Leapfrog hospitals in 2017 regarding their progress in addressing diagnostic quality and safety.[5] Although most were aware of the need to improve the diagnostic process in their organizations, commitment and progress was generally lacking. Only one in four had identified diagnostic safety as a priority for their organization.

In 2022, the Leapfrog Group, published "Recognizing Excellence in Diagnosis: Recommended Practices for Hospitals," a report featuring 29 evidence-based practices that address diagnostic safety and quality, selected from systematic literature review, discussions with subject matter experts, and the input from a multistakeholder Advisory Group.[7] The practices focused on organizational structures and diagnostic processes in high-risk areas where diagnostic errors are common, including the emergency department (ED), inpatient units (e.g., labor and delivery units, critical care units), and key hospital departments such as radiology, laboratory medicine, and pathology.[8–13] In this current work, we conducted a quantitative assessment of individual hospitals' commitment to diagnostic safety through an evaluation of their use of the proposed evidence-based practices. We sought to determine what practices were already being used by most hospitals and if any of the practices were underutilized or misunderstood.

METHODS

We developed a survey to assess practice implementation in US hospitals. Over 2300 acute care hospitals that participated in the Leapfrog Hospital Survey, representing 78% of all inpatient beds in US acute care hospitals, were invited to complete the survey to identify areas for progress. In August 2022, invitations were sent to the Leapfrog Hospital Survey's primary and secondary contacts, often including the hospital's director of quality, responsible for completing their hospital's survey each year. To reduce respondent burden, we divided the 29 practices across two surveys: one focused on organizational culture and structure (Domain 1), and the second focused on the diagnostic process (Domain 2). The 112 hospitals that expressed interest in participating were randomly assigned to Domain 1 (54 hospitals) or Domain 2 (55 hospitals); three hospitals opted to complete both surveys.

Most practices contained several goals, and all were accompanied with a list of two to seven resources and strategies hospitals might use to achieve a particular practice (Appendix 1). Hospitals evaluated their current implementation of practices using a scale of 5 (i.e., "Not under consideration," "Exploring and Preparing," "Planning and Resourcing," "Implementing and Operationalizing," "Fully Implemented and Evaluating Impact") and indicated the resources and strategies used from a list. If hospitals utilized a resource or strategy not listed, they had the option to provide a free-text response describing the resource or strategy they used to achieve implementation of the practice. We also solicited feedback about the practices and perceived barriers through free text questions at the end of each survey. We conducted bivariate analyses using hospital characteristics to understand the degree to which this sample of hospitals represented all US hospitals. Characteristics were obtained through the Centers for Medicare & Medicaid Services FY 2023 Inpatient Prospective Payment System (IPPS) Final Rule Impact File and the 2022 Leapfrog Hospital Survey. Implementation was defined as having answered, "Implementing and Operationalizing" or "Fully Implemented and Evaluating Impact" for the practice. Practices were ranked by percent implementation, and free text responses for the resources and strategies were coded and reviewed to identify instances when the goal of the practice was likely not achieved.

Results

A total of 91 short-term acute care and 4 pediatric hospitals participated in the study, which corresponded to a 4% response rate (95 out of 2282 hospitals). Of the 95 hospitals that participated, most (95%) were in urban metropolitan areas, had graduate teaching programs (66%), and were not considered safety-net hospitals (80%). The size of hospitals ranged from 10 to 954 inpatient beds, with a mean bed size of 274. This sample of hospitals was twice as likely to have received the top Leapfrog Hospital Safety Grade of "A" than the average general acute-care hospital. Free-text response analysis showed that the teams completing the survey consisted of medical and administrative directors ranging from Chief Medical Officer to department directors (e.g., pharmacy, radiology, emergency medicine, patient experience). A total of 21 hospitals did not submit the Survey by the deadline (10 hospitals assigned to Domain 1 and 11 hospitals assigned to Domain 2). Five hospitals originally assigned to Domain 2 and one hospital originally assigned to Domain 1 elected to complete the survey for the other domain to align and benchmark with other hospitals in their system.

Fifty-three hospitals responded to the Domain 1 survey. Implementation across the 16 practices ranged from 3 to 12 practices (Figure 1), with an average implementation of 9 practices (56%). Two practices were reported as implemented by over 90% of hospitals. The most implemented practice, Practice 1.2E, notifying affected

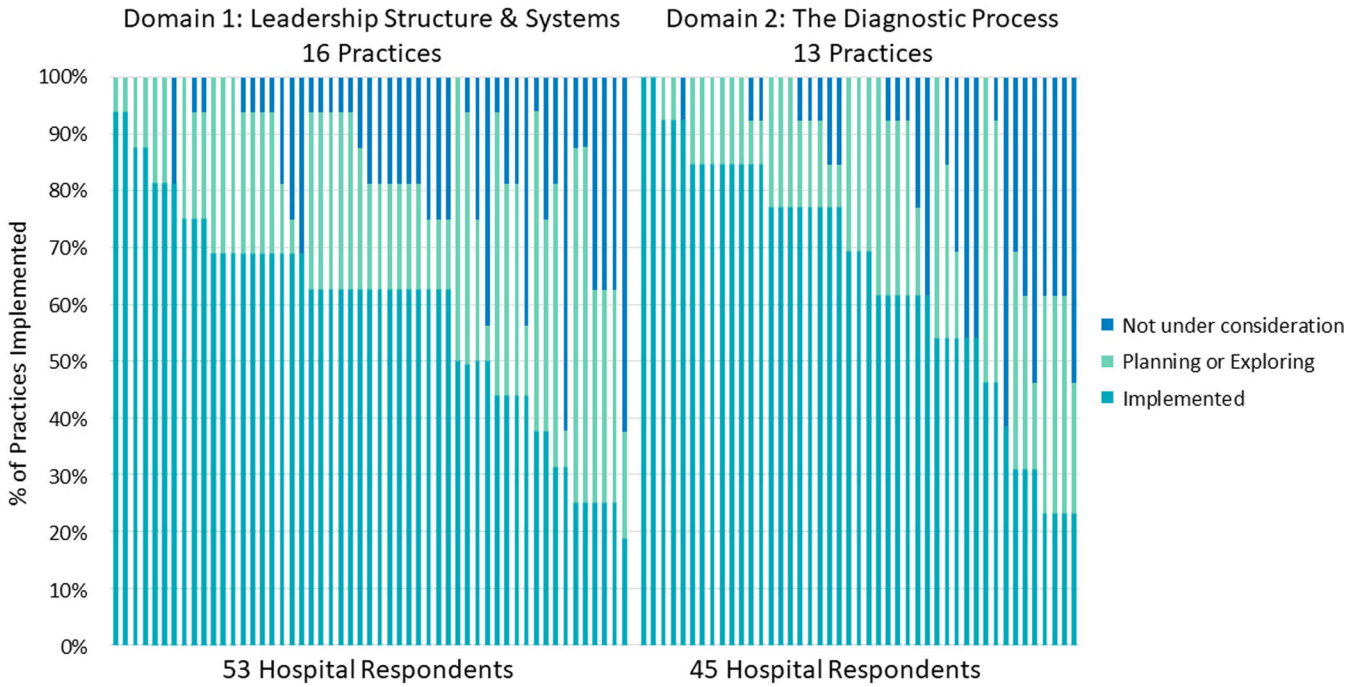

FIGURE 1 Individual hospital progress in implementation of recommended practices for reducing diagnostic errors. A total of 53 hospitals were surveyed on their progress in implementing 16 practices related to leadership structure and systems (Domain 1); 45 hospitals were surveyed on their progress in implementing practices focused on improving the diagnostic process (Domain 2).

patients or caregivers that a diagnostic error occurred, was largely achieved using the following two strategies:

- Thirty-eight of the 49 hospitals (78%) had an "existing communication and disclosure policy, with a particular focus on cases of delayed, wrong, and missed diagnoses resulting in harm."
- Twenty-five of the 49 hospitals (51%) answered that their "…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 second most implemented practice, Practice 1.3B, providing multiple channels for patients or caregivers to report diagnostic errors and a formal process for investigation was mostly achieved with the following two strategies:

- Forty-six of the 49 hospitals (94%) answered, "Our hospital analyzes patient concerns submitted in free text fields from the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey."
- Thirty-nine of the 49 hospitals (80%) answered, "Our hospital maintains a patient experience department that ensures patients are encouraged and educated on how to report diagnostic errors and concerns via telephone, e-mail, or in-person visits, ensures patients who file a concern are contacted to follow-up, and ensures the concerns are logged in an incident reporting system."

Practice 1.2A that assessed whether CEOs delivered a statement to staff demonstrating commitment to diagnostic excellence, was the least adopted practice in Domain 1 (13%; Table 1). Additionally, only 25% of hospitals had convened a multidisciplinary team dedicated to reducing diagnostic errors and reviewing root cause analyses to prevent future oversight (Practice 1.1B).

Forty-five hospitals responded to the Domain 2 survey focused on the diagnostic process. Implementations ranged from 3 to 13 practices (Figure 1) and was generally higher than Domain 1 practices, with an average implementation of 8 practices (62%). Among hospitals that completed the Domain 2 survey, all hospitals reported providing patients with medical interpreters (Practice 2.1C) and using at least one of the five recommended resources. All but one hospital implemented Practice 2.2A, ensuring continuous access to radiologists to interpret imaging studies and provide input on test selection. This practice was achieved using at least one of the following three strategies:

- Thirty-two out of 44 hospitals (73%) had "intramural teleradiology arrangements (staff radiologists are available to read and interpret images from home) in place for all routine imaging…"
- Twenty-nine out of 44 hospitals (66%) had "a program of ongoing review to evaluate the accuracy of the teleradiology provider, the accuracy of their readings and any diagnostic discrepancies, and a mechanism for providing feedback to the teleradiology provider."
- Twenty-seven out of 44 hospitals (61%) had "extramural teleradiology arrangements (contracted radiologists are available to read and interpret images) in place for all neuroimaging and specialty imaging…"
- Two hospitals did not report using any of the listed strategies.

TABLE 1 Hospital progress in implementing recommended diagnostic-related practices.

Recommended practice		Implemented (%)
1.1A	Establish goals for patient engagement, communication, and teamwork	38
1.1B	Convene a multidisciplinary team to promote diagnostic safety and quality	25
1.1C	Communicate progress of diagnostic safety programs	53
1.2A	Demonstrate commitment to diagnostic excellence through CEO leadership	13
1.2B	Promote teamwork	66
1.2C	Target training and education to nurses, pharmacists, and allied health professionals	40
1.2D	Make it easy for hospital staff to report diagnostic errors and concerns	89
1.2E	Openly communicate diagnostic errors to patients	92
1.3A	Help patients and their family caregivers communicate complete and accurate information	45
1.3B	Make it easy for patients and family caregivers to report diagnostic errors and concerns	92
1.3C	Encourage patients to use patient portals	70
1.3D	Empower patients and family caregivers to escalate care	62
1.4A	Conduct a risk assessment	26
1.4B	Measure and monitor diagnostic safety outcomes	83
1.4C	Optimize the EHR to support accurate and timely diagnosis	70
1.5A	Dedicate time for analysis and learning	75
2.1A	Train clinicians and others involved in the diagnostic process to collect accurate health information	47
2.1B	Correct inaccurate diagnosis and data in the EHR	58
2.1C	Ensure medical interpreters are available	100
2.2A	Ensure access to radiology experts	98
2.2B	Jointly review diagnostic discrepancies	56
2.2C	Provide needed diagnostic expertise for patients admitted to the emergency department	56
2.2D	Provide knowledge resources to clinicians	76
2.2E	Train clinicians to recognize and minimize cognitive errors	33
2.2F	Implement and monitor adherence to diagnostic guidelines	82
2.3A	Manage diagnostic uncertainty at handoffs	53
2.3B	Communicate clear instructions to patients discharged with an uncertain diagnosis	69
2.3C	Communicate clear instructions to patients discharged with pending test results	69
2.3D	Implement “closed loop” communication	51

Note: All practices are derived from the 2022 report “Recognizing Excellence in Diagnosis: Recommended Practices for Hospitals.”[7] Practices highlighted in blue were selected for inclusion in the 2024 Leapfrog Hospital Survey.

Abbreviation: EHR, electronic health records.

The least adopted practice was Practice 2.2E, training clinicians to optimize clinical reasoning in the diagnostic process (33%) (Table 1).

In qualitative responses at the end of each survey, hospitals reported experiencing implementation barriers due to general resource shortages (e.g., staff, time, budget, IT support), limitations of their electronic health records (EHRs), and amenability of physicians to change. When hospitals commented on resources and strategies they used to achieve implementation of individual practices, they noted that implementation was achieved largely through the extension of existing patient programs, which may not use diagnostic safety-specific tools and techniques. For example, risk assessments and root cause analyses are longstanding tools to improve patient safety, but applying these tools to a diagnostic error without specifically tailoring the approach to focus on diagnosis will yield less useful results.[14]

DISCUSSION

The results of this survey, even among a self-selected set of safety-conscious organizations, show major gaps in addressing key aspects of diagnostic quality and safety, particularly around leadership,

organizational commitment, and training. Most organizations reported that their CEO had not made an organizational commitment, nor had they convened a multidisciplinary team dedicated to reducing diagnostic errors and reviewing root cause analyses to prevent future oversight. This gap has also been highlighted in a recent call to action that "clear guidance for leaders on this topic has been elusive."[15] Adopting diagnostic-focused training (e.g., AHRQ's TeamSTEPPS for Diagnosis Improvement or other interventions aimed at improving teamwork and communication) would be a cost effective intervention, yet all practices pertaining to training were among the least implemented practices with less than half of hospitals utilizing them.

Implementation was higher than expected with four practices being implemented by almost every hospital sampled. Although this is an encouraging finding, the results are not definitive. Having a policy or process in place, such as notifying patients and caregivers when a diagnostic error occurs (Practice 1.2E), does not ensure that the policy is rigorously applied. Additionally, providing patients and caregivers with channels to report diagnostic errors (Practice 1.3B) does not ensure that those channels are accessible and easy to navigate, or that reports are regularly followed up on. Hospitals still need leadership and staff committed to ensuring these policies, protocols, and infrastructure are functional and effective—all of which could be achieved using the less implemented leadership and training practices forementioned. Widespread implementation of other practices, such as providing medical interpreters or ensuring 24/7 access to radiologists, can be explained by recent rapid technological advances such as virtual translation services and teleradiology services.

When hospitals provided a resource or strategy not listed to achieve implementation of individual practices, they often noted an existing patient program that may not focus on or use diagnostic safety-specific tools and techniques. For example, two hospitals indicated in the free text response that they implemented Practice 1.1B, convening a multidisciplinary team, through a daily safety huddle of senior leaders or a root cause analysis committee. While risk assessments and root cause analyses are longstanding tools to improve patient safety, applying these tools to diagnostic errors without specifically tailoring the approach to focus on diagnosis will yield less useful results.[14]

A major limitation of this survey was that respondents were self-selected, demonstrating their existing interest in improving diagnostic quality, and are likely not representative of all hospitals nationwide. Additionally, without a thorough interview of each hospital, we could not verify that every aspect of a practice was met when implementation was selected. In fact, some free response texts indicated that some hospitals may not have achieved implementation. These limitations suggest that self-reported progress in diagnostic safety may be over-exaggerated in these results. Nevertheless, the variation in practice implementation demonstrated that even high achieving hospitals have been slow to implement many of the best practices in achieving diagnostic excellence. Variation in practice uptake might also depend on organizational culture, as well as financial resources and staff available to the hospital.

There is a need for external motivators to accelerate progress in diagnostic safety within healthcare organizations. Regulating and accrediting organizations focus primarily on treatment and management, not diagnosis. Payers could provide incentives for diagnostic quality, and although a framework for adopting this approach has been proposed,[16] we are not aware of any progress in implementation. Once a commitment to diagnostic safety, either through internal motivation or external pressure, is realized within healthcare organizations, this set of practices will serve as a guide to how diagnostic excellence may be achieved. Results from this study show that most hospitals in the United States have a long way to go.

The survey results helped Leapfrog select 11 practices to include in the 2024 Leapfrog Hospital Survey as an optional section for reporting (Table 1). The practices selected were generally less likely to be implemented by most hospitals or considered a high-impact intervention, indicating their potential as targets for diagnostic safety improvement. The 2024 Leapfrog Hospital Survey will be the first national benchmark focused on diagnostic quality and safety. By establishing benchmarking standards for diagnostic quality and safety, the Leapfrog Survey could potentially accelerate the adoption of recommended practices to promote diagnostic excellence in US hospitals.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

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APPENDIX 1

Tables A1–A9.

TABLE A1 Domain 1 survey: Recommended 1.1 practices and supporting resources and strategies derived from the 2022 report "Recognizing Excellence in Diagnosis: Recommended Practices for Hospitals."[7]

1.1A	Senior administrative leaders both
	• Establish separate goals for all the following:
	  ◦ Engaging patients,
	  ◦ Improving communication between patients and their care team,
	  ◦ Promoting better communication and teamwork between members of the care team to reduce errors in diagnosis, and
	• Are held accountable for these goals in all the following ways:
	  ◦ Sharing these goals with the Board and throughout the organization,
	  ◦ Communicating progress toward meeting these goals at least annually to the Board, and
	  ◦ Including progress toward meeting these goals in the senior administrative leaders' annual performance reviews, incentives, or compensation.
	
	Resources and strategies
	1. 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 that align with organizational priorities and needs related to patient engagement
	2. Senior administrative leaders set a goal to partner with the hospital's Patient and Family Advisory Council (PFAC) to identify opportunities to reduce errors in diagnosis (including, delayed, wrong, or missed diagnoses, and diagnoses not communicated to the patient) and implement PFAC recommendations (e.g., recommendations on engaging patients in their own diagnosis, following up on pending test results at discharge, increasing interaction with the patient portal, giving patients opportunities to report diagnostic concerns)
	3. Senior administrative leaders set a goal to involve a PFAC member in another hospital-wide or departmental committee working to reduce errors in diagnosis (including delayed, wrong, or missed diagnoses, and diagnoses not communicated to the patient)
	4. 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
	5. Senior administrative leaders use AHRQ's TeamSTEPPS® for Diagnosis Improvement to set goals for staff training that align with organizational priorities and needs related to communication and teamwork between members of the care team
	6. Senior administrative leaders set a goal to measure and improve nurse and clinical pharmacist perceptions of being a valued member of the diagnostic team (e.g., the rate at which nurses and clinical pharmacists actively participate on rounds)
	7. Senior administrative leaders monitor and display (e.g., internal newsletter or intranet) run charts that track percentage of staff trained using AHRQ's TeamSTEPPS® for Diagnosis Improvement

1.1B	Senior administrative leaders convene a multidisciplinary team sponsored by the Chief Medical Officer, or other senior administrative leader, that meets all the following criteria: • The team establishes a leader who regularly reports to the executive sponsor, • At a minimum, the team includes representatives from nursing, pharmacy, laboratory medicine, radiology, and the ED, • The team leader communicates quarterly with the Board and other senior administrative leaders on issues related to reducing errors in diagnosis (including delayed, wrong, or missed diagnoses, and diagnoses not communicated to the patient), • The team leader convenes staff from key clinical departments (including at least, if applicable, ED, hospital medicine, pediatrics, surgery, radiology, and obstetrics, intake or transfer coordinators, case management, pathology, radiology, and laboratory) quarterly to discuss strategies to reduce errors in diagnosis 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), and • Designated members of the team collaborate with other staff to evaluate the implementation of programs (e.g., AHRQ's TeamSTEPPS® for Diagnosis Improvement) aimed at reducing errors in diagnosis (including delayed, wrong, or missed diagnoses, and diagnoses not communicated to the patient) and to make recommendations for further training. Resources and strategies 1. Our hospital hired a physician dedicated full time to convene a multidisciplinary team and lead their work

(Continued)

TABLE A1 (Continued)

1.1C	Senior administrative leaders communicate information regarding cases of errors in diagnosis, efforts to reduce errors in diagnosis, and the outcomes of those efforts both internally (e.g., hospital staff and hospital committees) and externally (e.g., patients and family caregivers, the community, other institutions), and to the board of directors. This includes specific activities related to error reduction, the results of interventions that have been implemented, and lessons learned from analysis of diagnostic errors. Resources and strategies 1. Senior administrative leaders share information and updates on our hospital's efforts to reduce errors in diagnosis (including delayed, wrong, or missed diagnoses, and diagnoses not communicated to the patient), including lessons learned, goals, and programs through a monthly internal newsletter or the organization's intranet 2. Our hospital publishes information on lessons we've learned to reduce errors in diagnosis (such as learnings related to reducing delayed, wrong, or missed diagnoses, and reducing diagnoses not communicated to the patient), goals and programs on our website or through a community newsletter or annual report 3. Our hospital highlights programs initiated to improve diagnosis (such as reductions in delayed, wrong, or missed diagnoses, and diagnoses not communicated to the patient) in press releases or at community events 4. Our hospital shares information on efforts to improve diagnosis (such as learnings related to reducing delayed, wrong, or missed diagnoses, and reducing diagnoses not communicated to the patient) with other hospitals and organizations through quality reports or research results published in scientific journals

Abbreviation: ED, emergency department.

TABLE A2 Domain 1 survey: Recommended 1.2 practices and supporting resources and strategies derived from the 2022 report "Recognizing Excellence in Diagnosis: Recommended Practices for Hospitals."[7]

1.2A	The hospital CEO demonstrates a commitment to diagnostic excellence through a written or verbal commitment delivered to all staff, stating that the advancement of diagnostic excellence is a priority for the organization Resources and strategies 1. Our hospital's CEO, in partnership with the hospital's PFAC, sponsors an all-staff event to announce new goals or a new initiative to advance diagnostic excellence 2. Our hospital's CEO participates in a series of "town hall" style talks on diagnostic excellence 3. Our hospital's CEO identifies or designates "champions" of diagnostic excellence in high-risk departments (e.g., the ED, radiology, laboratory medicine, critical care) and introduces them to the organization as leaders of diagnostic-improvement projects 4. Our hospital's CEO writes a newsletter that is distributed to all staff or a blog on the intranet to share their commitment to diagnostic excellence
1.2B	Senior administrative leaders promote effective teamwork in diagnosis by instituting policies or protocols that encourage all the following: • Diagnostic input and second opinions from clinician peers, • Diagnostic input from nurses, pharmacists, and other clinical staff who touch the patient, and • 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. Resources and strategies 1. Our 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. 2. Our 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. 3. Physicians in the ED consult with colleagues, including nurses, pharmacists, radiologists, and laboratory staff before discharge or admission to an inpatient unit to get input on key diagnostic information. 4. Our hospital has a standard protocol in place where patients with an uncertain diagnosis at a specific point-in-time (48–72 h after admission) automatically get a second review by a different clinical team 5. Our hospital has a policy to include radiologists on tumor boards and in multidisciplinary conferences 6. Pathologists provide feedback to other clinicians about test selection choices and successes and failures in interpretation of results

(Continued)

TABLE A2 (Continued)

1.2C	The hospital targets training and education specific to the diagnostic process to nurses, pharmacists, and other allied health professionals Resources and strategies 1. Our hospital ensures that nurses, pharmacists, and other allied health professionals are included in trainings on AHRQ's TeamSTEPPS® for Diagnosis Improvement 2. Our hospital has modified existing courses (e.g., courses on interdisciplinary communication identification of sepsis, or when to call a Rapid Response Team) to explicitly link the course content to the diagnostic process and through the delivery of the course ensures that nurses, pharmacists, allied health professionals, and staff from radiology and laboratory medicine understand their role in the diagnostic process 3. Our hospital ensures that targeted training to nurses, pharmacists, and allied health professionals is applied during interprofessional patient rounds to ensure that all individuals participating in interprofessional rounding actively participate in the discussions and contribute to decisions about the patient's diagnosis
1.2D	The hospital has a formal process in place for staff to report diagnostic errors and concerns (e.g., breakdowns in communication, breakdowns in the diagnostic process). The process encourages psychological safety for those sharing their cases 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, responding to, and learning from staff-reported diagnostic errors, concerns, or questions, • A formal protocol for nonpunitively notifying clinicians involved in the patient's care and supportively engaging with them in any investigations, • An emphasis on transparency, and • A formal protocol for soliciting feedback from hospital staff on the psychological safety and usability of the process. Resources and strategies 1. Our hospital has an easy-to-use system to facilitate reporting of diagnostic errors and diagnosis-related concerns, either through a mobile application or hotline 2. Our hospital uses its incident/event 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 3. Senior administrative leaders regularly review the number and type of diagnostic errors and concerns being reported and provides retraining opportunities, reminders, and incentives (e.g., a component of performance evaluations) to encourage reporting of diagnostic errors and concerns by clinicians and others involved in the diagnostic process, if gaps in usage are identified 4. Our hospital considers the terms and language used in the reporting process. For example, on an electronic reporting form, the term "diagnostic error" is rephrased as an "opportunity to make a more accurate or timely diagnosis" to encourage a broader range of reporting. 5. Our hospital pairs an easy-to-use electronic reporting system with a clinician champion who reinforces the importance of event reporting
1.2E	The hospital has a formal process in place for notifying patients and/or their family caregivers when diagnostic errors resulting in harm have occurred Resources and strategies 1. Our hospital includes diagnostic errors along with other adverse events in its existing communication and disclosure policy, with a particular focus on cases of delayed, wrong, and missed diagnoses resulting in harm 2. Our 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. 3. Our hospital is part of the Pathway to Accountability, Compassion and Transparency (PACT) Collaborative, or is implementing a Communication and Resolution Program consistent with the guidelines promulgated by Collaborative for Accountability and Improvement

Abbreviations: ED, emergency department; PFAC, Patient and Family Advisory Council.

TABLE A3 Domain 1 survey: Recommended 1.3 practices and supporting resources and strategies derived from the 2022 report "Recognizing Excellence in Diagnosis: Recommended Practices for Hospitals."[7]

1.3A	The hospital provides patients and their family caregivers with tools to help them communicate complete and accurate personal health information to the care team Resources and strategies 1. Our hospital uses 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 2. Our hospital includes links to evidence-based tools on its public website; for example, the Society to Improve Diagnosis in Medicine Patient's Toolkit for Diagnosis, a patient-designed toolkit available in English or Spanish, that helps patients clearly communicate their symptoms and health information
1.3B	The hospital does both of the following: • Provides patients and family caregivers with multiple channels (e.g., grievance process, ombudsman, patient-generated incident reporting, patient portal, patient survey) to report diagnostic errors and concerns, and • Has a formal process in place to investigate and respond to the patient-reported diagnostic errors and concerns. Resources and strategies 1. Our hospital surveys patients to ask if they have identified errors in their electronic health record visit notes 2. Our hospital maintains a patient experience department that ensures patients are encouraged and educated on how to report diagnostic errors and concerns via telephone, e-mail, or in-person visits, ensures patients who file a concern are contacted to follow-up, and ensures the concerns are logged in an incident reporting system 3. Our hospital analyzes patient concerns submitted in free text fields from the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey
1.3C	The hospital has a standard, hospital-wide process that allows patients and family caregivers to escalate care that includes all the following: • A written policy specifying that a patient or family caregiver can initiate the escalation of care, • A formal process for notifying patients and family caregivers, verbally or in writing, about the policy and how to activate the process for an escalation in care, and • Training for clinicians and others involved in the diagnostic process, so they know how to respond to a patient or family caregiver once the process for the escalation of care has been activated. Resources and strategies 1. Our hospital has a policy on the escalation of care and the use of rapid response teams that allows patients and family caregivers to initiate the process. Information about activating the process is shared with patients when they are admitted to the hospital, and staff are trained on how to respond once the process has been initiated. 2. Our hospital logs activation of rapid response teams and regularly reviews the log to identify patterns of activation and patient outcomes that could identify opportunities for local system improvement
1.3D	The hospital ensures that patients use the patient portal to review their test results and other diagnostic related information by doing all the following: • Providing patients with written instructions in their preferred language for medical decision-making on how to access the portal during and after their hospital visit, • Providing patients with access to the patient portal on tablets or other hospital-owned devices during their hospital visit (if applicable), • Giving patients access to all the health information in their electronic medical records (with rare exceptions, e.g., to protect the privacy of a minor) without a fee and without delay, • Regularly tracking patient use of the portal, • Periodically soliciting feedback from patients on the usability of the portal, andIdentifying barriers to use of patient portals and working to address them (e.g., language barriers, access to devices or internet). Resources and strategies 1. Our hospital actively encourages patients to use the patient portal and develops a strategy for clinicians to recommend using the patient portal during and after the hospital visit to access progress notes, discharge summaries, and test result notifications 2. Our hospital trains both administrative (e.g., registration staff) and clinical staff on use of the portal so they can assist patients who seek help 3. Our hospital monitors use of the patient portal (e.g., how often patients read information about their test results) and seeks input from patients to improve use 4. Our hospital partners with its PFAC to discuss strategies to improve patient use of the portal. This includes the hospital Chief Information Officer, or an equivalent, attending PFAC meetings to discuss this topic and working with the PFAC to identify avenues to communicate with patients in the broader community.

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TABLE A3 (Continued)

5. Our hospital partners with its patient portal vendor to build mechanisms for patients to report symptoms, outcomes, and electronically request modifications to the clinical information in the medical record, if these features are not already available.
6. Our hospital responds to inequities in patient portal use by implementing a policy expanding access to underserved communities, a mobile version of the patient portal, and/or a Spanish language version of the application.

Abbreviation: PFAC, Patient and Family Advisory Council.

TABLE A4 Domain 1 survey: Recommended 1.4 practices and supporting resources and strategies derived from the 2022 report "Recognizing Excellence in Diagnosis: Recommended Practices for Hospitals."[7]

1.4A	The hospital conducts an annual risk evaluation using a standardized risk assessment tool (e.g., the Safer Dx Checklist) to identify gaps in staffing and clinical expertise, tools and technology, and communication and teamwork that contribute to errors in diagnosis Resources and strategies 1. Our hospital has a small team of clinicians and others involved in the diagnostic process from the major clinical services (e.g., emergency department [ED], inpatient, radiology, laboratory medicine) complete the Safer Dx Checklist. Results from the checklist are used to develop goals and inform process improvements. 2. Our hospital conducts 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. 3. Our 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.
1.4B	Senior administrative leaders put processes and structures in place to identify, track, and analyze errors in diagnosis, including errors that result in harm or death, with a focus on high-risk areas of the hospital (e.g., ED, labor and delivery units, critical care units), and regularly communicate performance and progress on improvement initiatives with their board of directors Resources and strategies 1. Senior administrative leaders deploy electronic trigger tools to mine EHRs for diagnostic errors, assign individual case analysis to extract learnings, and share learnings and opportunities for improving the diagnostic process 2. Senior administrative leaders ensure that data from incident reports, patient complaints, malpractice suits, and autopsies are used to identify diagnosis-related harm 3. Senior administrative leaders take action to encourage both patient and staff-reported diagnostic errors and concerns and put systems in place for psychologically safe and easy to use reporting 4. Senior administrative leaders can regularly monitor performance on nationally endorsed measures of quality of care in diagnosis (see examples on page 45 of the Recognizing Excellence in Diagnosis Recommended Practices Report)
1.4C	The hospital has a process in place to identify and address features of the EHR (e.g., storage of laboratory results, workflows, display of patient data and messaging capabilities) that may contribute to diagnostic errors Resources and strategies 1. On an annual basis, our 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. For example, these activities are performed as part of annual self-assessments based on the ONC-sponsored SAFER Guides. 2. Our hospital has 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. 3. In setting the annual IT budget for our hospital, administrators and budget managers ensure 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 4. 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 ED's EHR to help make decisions about neuroimaging for head trauma in children in the ED.

Abbreviation: EHR, electronic health records.

TABLE A5 Domain 1 survey: Recommended 1.5 practices and supporting resources and strategies derived from the 2022 report "Recognizing Excellence in Diagnosis: Recommended Practices for Hospitals."[7]

1.5A	Clinicians and others involved in the diagnostic process have protected time to participate in activities that help improve the diagnostic process, which at a minimum includes: • Analyzing patient-reported concerns and diagnostic safety outcomes data, • Documenting and sharing what is learned with others, and • Using the documented information to develop and implement improvement activities. Resources and strategies 1. One or more clinicians from our hospitalist service or ED are allocated dedicated time to participate in 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. 2. Clinicians and others involved in the diagnostic process have protected time to participate on interdisciplinary diagnostic safety teams and participate in team activities. 3. Clinicians and others involved in the diagnostic process have protected time to participate in training and educational programs.

Abbreviation: ED, emergency department.

TABLE A6 Domain 2 survey: Recommended 2.1 practices and supporting resources and strategies derived from the 2022 report "Recognizing Excellence in Diagnosis: Recommended Practices for Hospitals."[7]

2.1A	Clinicians and others involved in the diagnostic process are trained in the use of evidence-based tools and strategies to collect complete and accurate personal health information from patients and family caregivers to facilitate a timely and accurate diagnosis Resources and strategies 1. Our hospital trains clinicians and others involved in the diagnostic process to use AHRQ's Toolkit for Engaging Patients to Improve Diagnostic Safety, including the 60 s To Improve Diagnostic Safety training, which prepares clinicians to practice deep and reflective listening for 1 min at the start of a patient encounter
2.1B	The hospital ensures that their EHR captures the correct diagnosis by having a process in place to review, update and correct inaccurate diagnoses on "problem lists" and elsewhere in the EHR Resources and strategies 1. Clinicians throughout the hospital encourage their patients to review their problem list online to identify errors that need correction and provide instructions for patients to report errors so they can be corrected 2. Clinicians in inpatient units, including critical care units, review problem lists with patients while on rounds and make corrections in real-time in the EHR 3. Our hospital has a protocol that outlines what information to include on the problem list (and what to leave out), what to do with outdated information, and who is responsible for the list's accuracy 4. Our hospital uses an EHR capable of linking a problem on the problem list to its supporting progress notes, administrative data, and clinical data such as test results and symptom documentation 5. Our hospital uses evidence-based guides to instruct clinicians on the proper use of "copy and paste," such as the Emergency Care Research Institute (ECRI)'s Toolkit for the Safe Use of Copy and Paste
2.1C	Patients and family caregivers whose preferred language for medical information differs from their care team are provided with a professional medical interpreter (available 24 h a day, 7 days a week), either on-site, via telephone, or via videoconferencing, to assist with obtaining complete and accurate health information from the patient and communicating complete and accurate information back to the patient Resources and strategies 1. If available, our hospital matches patients whose preferred language for medical decision-making is not English with a certified bilingual clinician during diagnostic encounters 2. Our hospital ensures that the clinicians responsible for the patient's diagnosis have immediate access to professional medical interpreters to assist with obtaining the patient's medical history and communicating further plans and diagnostic information back to the patient 3. Our hospital contracts with a medical interpreter service provider that offers phone and/or video interpretation 24 h, 7 days a week that clinicians can access through a phone number or through a secure application on their personal device or a hospital-provided device

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TABLE A6 (Continued)

4. Our hospital makes video interpretation devices highly accessible to clinicians by making them widely available throughout the hospital
5. Our hospital employs virtual translation services to provide medical interpretation when on-site interpreters are not available

Abbreviation: EHR, electronic health records.

TABLE A7 Domain 2 survey: Recommended 2.2 practices and supporting resources and strategies derived from the 2022 report "Recognizing Excellence in Diagnosis: Recommended Practices for Hospitals."[7]

2.2A	The hospital has access to a radiologist 24 h a day, 7 days a week, either onsite or remotely, to read and interpret urgent and emergent imaging studies and provide timely input on imaging test selection Resources and strategies 1. Our hospital has intramural teleradiology arrangements (staff radiologists are available to read and interpret images from home) in place for all routine imaging (adult and pediatric) whenever a staff radiologist is off-site to allow for 24 h, 7 days a week access to a radiologist 2. Our hospital has extramural teleradiology arrangements (contracted radiologists are available to read and interpret images) in place for all neuroimaging and specialty imaging (pediatric imaging at a general hospital) that allows for 24 h, 7 days a week access to a radiologist 3. Our hospital has a program of ongoing review to evaluate the accuracy of the teleradiology provider, the accuracy of their readings and any diagnostic discrepancies, and a mechanism for providing feedback to the teleradiology provider
2.2B	The hospital has a quarterly process by which radiologists and pathologists identify cases where a pathology finding (e.g., biopsy, cytology, or autopsy results) is discrepant with clinical and/or imaging impressions and then jointly review and reconcile any discrepant findings Resources and strategies 1. Our hospital holds a quarterly conference where pathologists and radiologists review all biopsies of a certain case type and produce a single integrated report resolving any discrepant findings
2.2C	The hospital conducts a risk assessment of commonly misdiagnosed high-risk conditions in the ED to ensure it has access (on-site or remotely) to the clinical expertise and technologies needed to achieve timely and accurate diagnosis Resources and strategies 1. Our hospital provides rapid access to experts in stroke diagnosis and appropriate diagnostic technologies. The hospital maintains 24 h, 7 days a week access to neurological consultants (on-site or teleneurology) and neuroimaging (especially MRI). The hospital also deploys novel diagnostic tests (e.g., video-oculography) to facilitate remote eye movement assessment for posterior strokes. 2. Our hospital has a protocol for using teleneurology in the diagnosis of epilepsy. This protocol enlists experienced specialists in epilepsy and neurophysiology in reading EEG records in real-time where these experts would otherwise be unavailable.
2.2D	The hospital integrates knowledge resources into the clinical workflow to help clinicians improve their diagnosis in real-time for cases where there is diagnostic uncertainty and educates and incentivizes (e.g., through a performance evaluation) clinicians to use these resources Resources and strategies 1. Our hospital provides all clinicians with online access to UpToDate, Micromedex, or equivalent medical knowledge resources 2. Our hospital ensures that clinical decision support is available for clinicians considering which, if any, diagnostic tests or imaging studies may be appropriate 3. Our hospital ensures that all clinical staff have access to one or more decision support resources during the diagnostic process 4. Our 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
2.2E	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 (e.g., team input, second opinions, decision-support tools for diagnosis) to improve diagnostic performance. Resources and strategies 1. Our hospital has a training program that highlights the importance of clinical reasoning and the cognitive process

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TABLE A7 (Continued)

	2. Our hospital utilizes one or more of the Society to Improve Diagnosis in Medicine's checklists, mnemonics, and decision support tools in the Clinical Reasoning Toolkit to improve clinical reasoning 3. Our hospital has implemented "Take 2: Think Then Do" program (or equivalent) to emphasize the value of a 2 min "time out" for reflection to improve diagnosis
2.2F	The hospital deploys evidence-based clinical pathways for diagnosis in the ED and measures the consistency of their implementation and their impact on diagnostic performance (e.g., post-ED hospitalizations or mortality) Resources and strategies 1. Our hospital engages ED clinicians 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 2. Our hospital has protocols in place to ensure ED staff follow appropriate evidence-based guidelines for stroke diagnosis, particularly posterior circulation stroke, such as the American College of Emergency Physicians guideline on evaluation of adult patients with suspected transient ischemic attack (TIA) 3. Our 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 4. Our hospital shares clinical pathways with other hospitals in our region 5. Our 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

Abbreviations: ED, emergency department; EEG, electroencephalogram; MRI, magnetic resonance imaging.

TABLE A8 Domain 2 survey: Recommended 2.3 practices and supporting resources and strategies derived from the 2022 report "Recognizing Excellence in Diagnosis: Recommended Practices for Hospitals."[7]

2.3A	The hospital has a written policy that outlines the protocol(s) 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, etc.) Resources and strategies 1. Our hospital implements evidence-based tools and resources to improve both verbal communication (e.g., AHRQ's TeamSTEPPS® for Diagnosis Improvement or IPASS) and electronic communication (e.g., based on a self-assessment from ONC-sponsored SAFER Guide for Clinician Communication) 2. Our hospital regularly convenes 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 3. Our hospital has a written policy documenting the protocol 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
2.3B	For patients discharged home from the hospital or the ED with an uncertain diagnosis, or where potential diagnoses involve high-risk conditions, the hospital has a protocol that ensures patients receive both of the following: • Discharge summary notes with available test results and any test results that are pending, and instructions on when the patient should follow-up, and • Explicit, condition-specific instructions, in the patient's preferred language for medical decision-making, on what to watch out for, when to return to the hospital, and how to get timely follow-up care, if needed. Resources and strategies 1. Our hospital has amended our patient discharge protocol to add specific elements for uncertain or potentially high-risk diagnoses, which outlines the steps and instructions described in the practice statement 2. Our hospital periodically conducts patient focus groups to ensure our protocol, 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 3. Our hospital has amended our patient discharge protocol to ensure discharge instructions are made available to the patient in the patient and/or family caregiver's primary language

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TABLE A8 (Continued)

2.3C	The hospital has a process and protocol in place to ensure that patients are discharged from the ED or hospital with both: • A list of their lab and imaging test results and • A list of any pending test results and written instructions, in the patient's preferred language for medical decision-making, on how to obtain those results Resources and strategies 1. Our 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 2. Our hospital has 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 (e.g., hospitalists) 3. Our 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 4. Our 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.
2.3D	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 appropriate care team and communicated to the patient in an appropriate timeframe based on the result Resources and strategies 1. Our hospital models its policy after the U.S. Department of Veterans Affairs national policy for the safe communication of test results to patients and clinicians, which includes national standards on timeliness of test result communication and informs performance measurement and quality improvement programs implemented across our system 2. Our hospital uses a similar system to the 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 3. Our hospital reviews and adopts recommended practices on test result communication and follow-up found in the ONC-sponsored SAFER Guides 4. Our 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 5. Our hospital manages incidental findings by adopting an electronic system to assist with tracking and following-up of clinician recommendations 6. Our 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

Abbreviations: ECRI, Emergency Care Research Institute; ED, emergency department.

TABLE A9 Additional questions in survey: Free text response.

1	From your perspective, which single practice will drive the greatest improvement in reducing errors in diagnosis (including delayed, wrong, or missed diagnoses, and diagnoses not communicated to the patient) at your hospital?
2	From your perspective, which single practice will have the least impact on reducing errors in diagnosis (including delayed, wrong, or missed diagnoses, and diagnoses not communicated to the patient) at your hospital?
3	What are the main barriers your hospital faces in implementing one or more of the recommended practices?
4	What would accelerate the implementation of one or more of the recommended practices?
5	Who was part of the team that completed the Pilot Survey? (titles/roles, not individual names)