# Improving Diagnostic Quality & Safety/ Reducing Diagnostic Error: Measurement Considerations

ENVIRONMENTAL SCAN

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NATIONAL QUALITY FORUM

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# EXECUTIVE SUMMARY

In 2019, NQF, with funding from the Department of Health and Human Services, is convening a new multistakeholder expert Committee to revisit and build on the work of the Diagnostic Quality and Safety Committee. The new Improving Diagnostic Quality & Safety/ Reducing Diagnostic Error: Measurement Considerations Committee will review the Diagnostic Process and Outcomes domain of the measurement framework, updating or modifying subdomains or applicable cross-cutting themes as needed.

In addition, the Committee will identify any high-priority measures, measure concepts, current performance measures, and areas for future measure development that have emerged since the initial development of the measurement framework. Informed by these activities, the Committee will develop practical guidance in the application of the Diagnostic Processes and Outcomes framework, including specific Use Cases to demonstrate how the framework can be operationalized in practice as well as detailed recommendations for the reduction of diagnostic error.

This first report, the environmental scan, describes new literature published since the original environmental scan conducted in 2016-2017 to support the activities of the Improving Diagnostic Quality and Safety project.

Although no updates were made to the Diagnostic Process and Outcomes Domain, the scan identified several articles supporting the composition of the subdomains, and their continued relevance to reducing diagnostic error. As well, no updates were made to the High-Priority Areas for Future Measure Development.

The scan also identified a variety of articles supporting the importance of the cross-cutting themes identified in the previous report. In addition, one new theme was identified: Importance of Advancing Science in Diagnostic Error.

Finally, the scan identified 19 new fully developed measures to add to the measure inventory, as well as 17 new measure concepts applicable to the process and outcomes domain. In either case, the measures were primarily concerned with the Diagnostic Efficiency and Diagnostic Accuracy subdomains of the Diagnostic Process and Outcomes domain; other measures were identified in the Information Gathering and Documentation subdomain.

# BACKGROUND AND PROJECT OBJECTIVES

A 2015 report of the National Academies of Sciences, Engineering, and Medicine (NASEM), *Improving Diagnosis in Health Care*, defines diagnostic errors as the failure to establish or communicate an accurate and timely assessment of the patient's health problem, and suggests these types of diagnostic errors contribute to nearly 10 percent of deaths each year and up to 17 percent of adverse hospital events.[1] The NASEM Committee on Diagnostic Error in Health Care suggested that most people will experience at least one diagnostic error in their lifetime.

The delivery of high-quality healthcare is predicated upon an accurate and timely diagnosis. Diagnostic errors persist through all care settings and can result in physical, psychological, or financial repercussions for the patient. The NASEM Committee noted that there is a lack of effective measurement in the area, observing that "for a variety of reasons, diagnostic errors have been more challenging to measure than other quality or safety concepts."[2]

In follow-up to the NASEM report, the National Quality Forum (NQF), with funding from the Department of Health and Human Services (HHS), convened a multistakeholder expert Committee (the Diagnostic Quality and Safety Committee) to develop a conceptual framework for measuring diagnostic quality and safety, to identify gaps in measurement of diagnostic quality and safety, and to identify priorities for future measure development. As part of this project, which resulted in the 2017 report *Improving Diagnostic Quality and Safety*, NQF engaged stakeholders from across the healthcare spectrum to explore the complex intersection of issues related to diagnosis and reducing diagnostic harm[3].

In 2019, NQF, with funding from the Department of Health and Human Services, is convening a new multistakeholder expert Committee (see **Appendix A**) to revisit and build on the work of the Diagnostic Quality and Safety Committee. The new Improving Diagnostic Quality & Safety/ Reducing Diagnostic Error: Measurement Considerations Committee will review the Diagnostic Process and Outcomes domain of the measurement framework, updating or modifying subdomains or applicable cross-cutting themes as needed, based on a review of new literature published since the work of the former Committee concluded. In addition, the Committee will identify any high-priority measures, measure concepts, current performance measures, and areas for future measure development that have emerged since the initial development of the measurement framework. Informed by these activities, the Committee will develop practical guidance in the application of the Diagnostic Processes and Outcomes framework, including specific Use Cases to demonstrate how the framework can be operationalized in practice as well as detailed recommendations for the reduction of diagnostic error.

## The 2017 Diagnostic Quality and Safety Measurement Framework

The Diagnostic Quality and Safety Committee developed a measurement framework based largely on the NASEM committee's conceptual model of the diagnostic process, while also drawing on concepts from the literature, including Singh and Sittig's SaferDx Framework[4] and Donabedian's organizing concepts of structure, process, and outcome.[5] The goal of the measurement framework is to serve as a guide for future measure development efforts by any and all stakeholders attempting to improve diagnostic quality and safety. A measurement framework highlights gaps where measures are needed and can serve as a template for prioritizing the allocation of scarce resources towards improvement efforts.

Table 1 specifies the three domains and 11 subdomains for categorizing measures of diagnostic quality and safety.

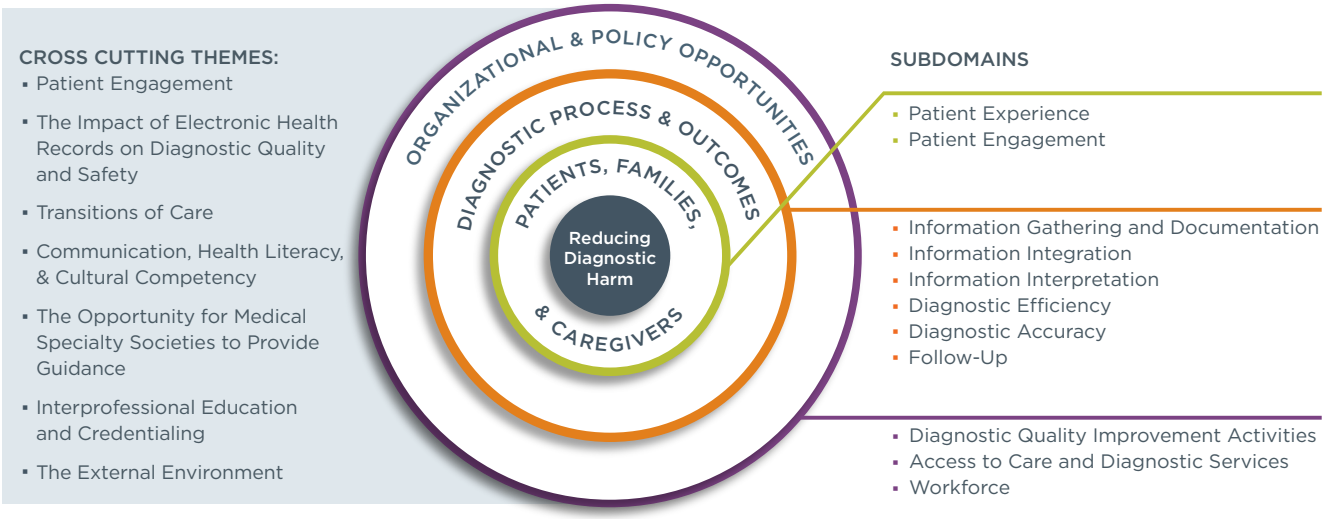
**TABLE 1. DIAGNOSTIC QUALITY AND SAFETY MEASUREMENT FRAMEWORK**

| Domain | Subdomain |
|---|---|
| Patients, Families, and Caregivers | Patient Experience<br>Patient Engagement |
| Diagnostic Process & Outcomes | Information Gathering and Documentation<br>Information Integration<br>Information Interpretation<br>Diagnostic Efficiency<br>Diagnostic Accuracy<br>Follow-Up |
| Organizational and Policy Opportunities | Diagnostic Quality Improvement Activities<br>Access to Care and Diagnostic Services<br>Workforce |

The Patients, Families, and Caregivers domain includes the patient's perception of the diagnostic process, inclusion, and communications among providers, patients, caregivers, and the system. The Diagnostic Process domain addresses the actions and processes that are carried out by the healthcare providers and/or teams to develop, refine, and confirm a diagnosis, or to explain the patient's health problem. The Organizational and Policy Opportunities domain addresses organizational attributes that affect diagnostic performance. This includes organizational learning from diagnostic errors, diagnosis-related quality improvement activities, availability of diagnostic resources (e.g., organizational access to on call radiology services), and workforce sentiment.

Figure 1 shows a graphic representation of the final measurement framework demonstrating the relationship between domains and subdomains, and cross-cutting themes.

**FIGURE 1. DIAGNOSTIC QUALITY AND SAFETY FRAMEWORK**



# DIAGNOSTIC PROCESS AND OUTCOMES DOMAIN

The Diagnostic Process and Outcomes domain of the Framework addresses the actions and processes that are carried out by healthcare providers and/or teams to develop, refine, and confirm a diagnosis, or to explain the patient's health problem. The updated environmental scan identified a number of articles that add additional breadth to some subdomains, describing additional interventions and approaches that may be useful in reducing diagnostic error. For example, as described below, new literature published in 2018 outlines the use of E-trigger tools to help detect diagnostic errors in electronic records. However, the information found in the scan did not contradict the previous work or require that any substantive changes be made to the original Diagnostic Process and Outcomes domain of the Framework published by NQF in 2017. Key findings from the environmental scan relevant to the Diagnostic Process and Outcomes subdomains are noted below.

## Diagnostic Process & Outcomes Subdomains

- Information Gathering and Documentation: Includes the collection and documentation of diagnostic-related information
  - The scan identified one article that describes how patient narratives may be a useful source of information in identifying factors that lead to diagnostic errors, in particular the physician-patient relationship.[6]
- Information Integration: Includes the use of consultants, hand-offs, and care transitions between providers (e.g., provider-provider, provider-system communication)
  - The scan identified one article outlining a model for application of the NASEM recommendations related to diagnostic teams, reviewing roles and suggesting interventions to improve teamwork and diagnostic outcomes.[7]
  - A study conducted in the Netherlands evaluated the impact of an asthma diagnostic consultation service; results suggest such consultative services could improve diagnostic effectiveness.[8]
  - Another study examined random vs. non-random peer review of radiology findings; results suggest that random peer review leads to significant underreporting of diagnostic errors, and that non-random peer review identified significantly more cases of error and trends that may be used for quality improvement.[9]
  - Another paper identified sources of adverse events related to ICU-ward handoffs during transfers, using a survey methodology to identify ways in which communication issues may lead to errors.[10] Rehabilitation needs, intravenous access/hardware and risk assessments for readmission to the ICU were commonly mis-communicated, and there was also frequent miscommunication about pending results.
- Information Interpretation: Includes the use of decision support and best practices, cognitive processing, and machine computation
  - A number of articles addressed issues related to clinical reasoning and cognitive bias, highlighting the important role of cognitive bias as a contributing factor to cognitive errors. Some articles offered potential models for understanding and mitigating bias in the diagnostic process, as well as the important role of cognitive bias in diagnostic errors.[11–13]

- Diagnostic Efficiency: Includes timeliness, efficiency, and appropriate use of diagnostic resources and tests
  - A study of the use of head computed tomography (HCT) in emergency department evaluations of headache showed that reduced HCT use was not followed by an increase in death or missed diagnosis.[14]
- Diagnostic Accuracy: Includes diagnostic errors, delay in diagnoses, and missed diagnoses
  - One study examined autopsy cases to identify discrepancies between autopsy and clinical diagnosis, finding a significant number of discrepancies. These discrepancies were associated with unexpected deaths, inadequate workups, and quality issues. Discrepancies identified in the autopsy may serve as a useful way to identify and measure quality and diagnostic error, particularly given the high discrepancy rate.[15]
  - Several articles looked at trigger tools, including the Institute for Healthcare Improvement's Global Trigger Tool. A novel framework was proposed that is relevant, the Safer Dx Trigger Tools Framework, which is intended to enable health systems to develop and implement e-trigger tools to identify and measure diagnostic errors using electronic health record (EHR) data.[16] Specifically, e-trigger tools can detect potential diagnostic events and allowing health systems to monitor event rates as well as study contributory factors and identify targets for improving diagnostic safety. Some e-triggers can also monitor data prospectively and identify patients at high-risk for a future adverse event where preventive actions may be beneficial in reducing diagnostic errors.[17]
- Follow-Up: Includes appropriate and timely follow-up of labs, radiology, consultation notes, and other diagnostic findings
  - One article summarized key concepts and challenges with regard to follow-up on critical radiology test results, suggesting strategies for assuring closed-loop communication of results.[18]

# CROSS-CUTTING THEMES

At the time of the publication of the framework developed by the Diagnostic Quality and Safety Committee, the Committee identified a variety of issues and considerations applicable to measure development and the diagnostic process that were not necessarily addressed in any one domain. These "cross-cutting themes" were intended to be a part of any future discussion of applications of the measurement framework. As part of this project, NQF reviewed literature in order to identify any updates to the cross-cutting themes originally elaborated by the previous Committee.

**Patient Engagement:** Engaging patients and using their knowledge of their own medical histories is a critical aspect of the diagnostic process.

A review of the literature confirmed that incorporating the patient's perspective, engaging them in their care, and leveraging their knowledge to improve the diagnostic process will lead to fundamentally better outcomes. One analysis of patient-authored narratives of care experience found that just nine percent were satisfied with the response of the institution to their report of a diagnostic error – and nearly half did not report the error at all. In tracing the causes of diagnostic error, the analysis revealed four principal categories: 1) ignoring patients' knowledge, 2) disrespecting patients, 3) failing to communicate, and 4) engaging in manipulation or deception. The authors recommend new lifelong learning requirements to improve and maintain clinician communication skills.[6]

Likewise, a review of the causes of overdiagnosis of optic neuritis found that the most common diagnostic error was in eliciting or interpreting critical elements of patient history – responsible for a third of missed or alternative diagnoses.[19] Finally, patient engagement was cited as a key component to improve the management of test results. By improving patient access to their own medical records, documentation errors may be more readily identified and remediated.[18]

**Impact of Electronic Health Records (EHR) on Diagnostic Quality and Safety:** Diagnostic quality and safety can be advanced significantly if electronic health records have the capacity to collect key information related to diagnosis and are interoperable within and across organizations. Interoperability is particularly relevant to diagnosis given the frequent occurrence of errors when information transfers across systems.

A review of the literature confirmed that leveraging electronic health records to improve diagnostic processes and outcomes, and ensuring those systems are interoperable and with sufficient capacity to collect all the information needed to support a diagnosis, remains an important priority for the field. One study of 925 medical offices found that a lower score on patient safety culture was significantly correlated with more frequently reported health IT problems, included unavailability of lab or imaging tests.[20]

**Transitions of Care:** Problems with transitions of care and errors during care transitions (e.g., loss of information critical to patient care) can be a direct cause of and have a significant impact on diagnostic errors.

A review of the literature found support for the continuing importance of care transitions to the process of diagnosis, reduction of diagnostic error, and improvement of diagnostic outcomes. For example, one study of process maps that included a survey of residents suggested that adverse events due to communication challenges were common, and that these could be attributable to the failure to document important diagnostic information.[10]

**Communication, Health Literacy, and Cultural Competency:** Communication—between the provider and the patient, and between providers—is a key issue in diagnostic quality and safety.

When communicating with patients about their diagnoses, healthcare professionals should be sensitive to the patients' health literacy and cultural needs or preferences.

A review of the literature found additional support for communication as an important component of a successful diagnostic process, and supporting improved diagnostic outcomes. For example, one article advanced a new, expanded "core team" model of diagnosticians that includes the patient, physician and nursing staff, as well as pathologists, radiologists, and others.[7] Another article noted that an increased reliance on electronic notification systems led to increased incidence of key diagnostic alerts being ignored by the recipient provider. The study recommends that institutional and system-level policies be created to assign a responsible entity for following-up on abnormal or critical test results, and that these policies be accompanied by structures to ensure accountability to promote adherence.[18]

An article evaluating the nation's progress in diagnostic error safety improvements reached similar conclusions about the priority of this effort.[21]

**The Opportunity for Medical Specialty Societies to Provide Guidance:** Improving diagnostic quality and safety will require medical specialty societies to engage and provide guidance as diagnostic measures are developed, in particular for conditions that are frequently misdiagnosed or can lead to serious harm in the event of a diagnostic error.

The literature review found additional support for valuing the contributions of medical specialty societies. In particular, radiology was highlighted across several articles as an essential diagnostic discipline. One overview article reviewed a variety of typologies of radiologist error, and recommended culture change and implementation of new strategies aimed at reducing bias.[22]

In addition, the American College of Radiology highlighted that "radiologists are in a unique position to be the aggregators, brokers, and disseminators of information critical to making an informed diagnosis", recommending radiologists be fully integrated into the informational linkages that underly the diagnostic process.[23]

One observation study examined 3422 audited deaths in a surgical mortality database to determine if a clinical decision-making incident may have occurred.[24] Among the 226 cases where there was a clinical-decision making incident, the most common issues was a decision to operate (44% of cases), but diagnostic error was the second most common (22%), suggesting a high prevalence of diagnostic errors in surgical clinical decision-making incidents.

**Interprofessional Education and Credentialing:** Diagnostic quality and safety should become an important component of professional education, and credentialing organizations should ensure that their reviews emphasize diagnostic quality and safety. *These efforts should include strategies to minimize the impact of cognitive biases.*

The literature review found support for incorporating concepts supporting high quality diagnostic processes and improved diagnostic outcomes in professional education and as a component of training as well as credentialing. Several review articles underscored the importance of cognitive biases in leading to diagnostic errors, suggesting the possibility of a revision to the cross-cutting theme in order to capture this important component. One review underscored the close relationship between cognitive bias and diagnostic errors, defining "cognitive bias" as heuristics, or "short-cuts", that are used to make decision-making faster but are vulnerable to error. Examples included social and cultural biases as well as biases such as confirmation bias. The review highlighted the importance of implementing procedures, such as checklists, as well as simply slowing down, in order to minimize the impact of biases on clinical decision-making.[11]

Another review categorized cognitive biases in their application to radiology, including the "availability bias" where diagnoses that are more memorable and easily remembered are more likely to be attributed, or even "regret bias" where radiologists overestimate the likelihood of a highly pernicious disease in order to avoid an adverse outcome from having missed the diagnosis.[13] Likewise, another review found cognitive biases to be widespread, the reason for over a third of fatal medical errors.[25]

**External Environment:** Issues related to the external environment, such as the alignment of payment incentives to promote timely and correct diagnosis, are less amenable to quality measurement but will have a significant impact on diagnostic quality and safety.

A literature review found additional support for consideration of the external environment as a key cross-cutting theme. For example, one study found that diagnostic performance degraded for radiologists after an overnight shift, both in terms of time taken to complete the diagnosis, and diagnostic accuracy. An external environment that supports reducing physician fatigue and stress is an important component of an improved diagnostic process.[26]

Another external factor highlighted in the cross-cutting theme description is the possibility of payment incentives to heighten accountability and strengthen diagnostic outcomes. One review advances new approaches to reducing diagnostic error having to do with heightening accountability via payment mechanisms. One is making reimbursement more flexible to account for clinician time that is not directly face to face and is instead concentrated to diagnostic processes, such as data gathering and interpretation, or even interprofessional coordination. Another is to champion alternative payment models that would support centers of diagnostic expertise and excellence, or increase accountability for diagnostic errors.[27]

**Importance of Advancing Science in Diagnostic Error (NEW):** Studies also identified research agendas in diagnostic error that may be relevant in the future development of quality measures. For example, Children's Hospitals Solutions for Patient Safety Network identified 49 research topics in the areas of high reliability, safety culture, open communication, and early detection of patient deterioration and sepsis.[28]

# PRIORITIZED MEASURE CONCEPTS

## Purpose and Limitations of Measure Concepts

NQF distinguishes between a measure and a measure concept. A **measure** is defined as a fully developed metric that includes detailed specifications – to the point that the measure could be readily implemented in the specified care setting on the basis of these specifications alone - and generally will have undergone scientific testing to ascertain whether the measure, as specified, is both a reliable and valid measure of quality or cost. A fully developed measure identifies what should happen (what is being measured), who should be measured (population), where measurement should happen (setting), when it should happen (time), and how it should occur. A **measure concept** is an idea for a measure that includes a description of the potential measure, possibly including planned target and population.

The measure concepts identified in the 2017 Diagnostic Quality and Accuracy project are intended to serve as a starting point for measure developers attempting to developing quality measures that will serve to reduce the incidence or mitigate the harm of diagnostic errors, especially in those areas where there are few or no existing performance measures. The goal of the environmental scan in this new project is to identify new measure concepts that may have been identified by NQF, or in the literature, as possible starting points for performance measures.

As these measure concepts are considered for development, testing, and use, the Committtee notes that some concepts could be developed for use in accountability programs while others may be better suited for quality improvement or benchmarking purposes.

The prioritized measure concepts are not intended to be differentiated by whether they would be appropriate for accountability programs, quality improvement, or both applications. When measures are used for **accountability applications**, performance results are used to make judgments and decisions as a consequence of performance. For example, performance results can be used for reward or recognition (e.g., certification programs), payment, or provider selection (e.g., public reporting). Measures used for **quality improvement** help organizations identify strengths and areas for improvement in healthcare delivery; organizations then use a systematic approach to make improvements in care. **Benchmarking** refers to the process of comparing the performance of accountable entities with that of their peers or with external best practice results.

## New Measure Concepts

In order to identify new measure concepts, NQF reviewed new literature published since 2016, the date of the previous environmental scan for the Improving Diagnostic Quality and Accuracy project, including reports published by the National Quality Forum. Two of these NQF reports, Advancing Chief Complaint-Based Quality Measurement and Population-Based Trauma Outcomes, yielded a variety of measure concepts across four components of the Diagnostic Process and Outcomes domain of the Improving Diagnostic Quality and Accuracy Framework.

The summary table below indicates the count of measure concepts identified by domain. A full list of measure concepts can be found in Appendix C.

**TABLE 2. COUNT OF NEW MEASURE CONCEPTS BY DOMAIN**

| Domain | Measure Concept Count |
|---|---|
| Information Gathering and Documentation: Includes the collection and documentation of diagnostic-related information | 2 |
| Information Integration: Includes the use of consultants, hand-offs, and care transitions between providers (e.g., provider-provider, provider-system communication) | 0 |
| Information Interpretation: Includes the use of decision support and best practices, cognitive processing, and machine computation | 0 |
| Diagnostic Efficiency: Includes timeliness, efficiency, and appropriate use of diagnostic resources and tests | 8 |
| Diagnostic Accuracy: Includes diagnostic errors, delay in diagnoses, and missed diagnoses | 7 |
| Follow-Up: Includes appropriate and timely follow-up of labs, radiology, consultation notes, and other diagnostic findings | 0 |

# HIGH-PRIORITY AREAS FOR FUTURE MEASURE DEVELOPMENT

The previous Diagnostic Quality and Safety Committee agreed that all areas of measurement discussed above are important aspects of diagnostic quality and safety and should continue to be explored to help clinicians and healthcare researchers learn more about improving diagnostic performance. However, Committee members identified measurement areas that they considered as high priorities for measure development.

The environmental scan did not yield any additional high-priority areas for future measure development, nor were any revisions to the existing high-priority areas for future measure development required.

# MEASURE INVENTORY

NQF staff completed an environmental scan of performance measures specifically concerned with Diagnostic Processes and Outcomes (as described in the conceptual framework) that could be used either by stakeholders in order to reduce diagnostic errors in their care settings, or serve as models for other, similar performance measures where the original may be inapplicable. The search for measures was limited those that are in development, in testing, and in use or were otherwise updated since the environmental scan was completed for the previous project, Improving Diagnostic Quality and Safety, in 2016. This search was designed to update the measure inventory published as part of the Improving Diagnostic Quality and Safety project in 2017. In several cases, measures that had not been included in the original inventory were added on a new reviewed of endorsed NQF measures and measures added to the federal measures inventory, even though those measures had been endorsed at the time of the previous environmental scan. Other measures were newly developed and added to either inventory in the time since the 2017 scan was conducted.

Measures were identified in the National Quality Forum Quality Positioning System (QPS) database, as well as in the CMS Measures Inventory (CMIT) database. Measures were classified based on the subdomains of the Diagnostic Process and Outcomes domain of the Diagnostic Quality and Accuracy framework. In total, 19 measures were identified. A full list of measures can be found in **Appendix B**.

| Domain | Measure Count |
|---|---|
| Information Gathering and Documentation: Includes the collection and documentation of diagnostic-related information | 0 |
| Information Integration: Includes the use of consultants, hand-offs, and care transitions between providers (e.g., provider-provider, provider-system communication) | 0 |
| Information Interpretation: Includes the use of decision support and best practices, cognitive processing, and machine computation | 0 |
| Diagnostic Efficiency: Includes timeliness, efficiency, and appropriate use of diagnostic resources and tests | 18 |
| Diagnostic Accuracy: Includes diagnostic errors, delay in diagnoses, and missed diagnoses | 1 |
| Follow-Up: Includes appropriate and timely follow-up of labs, radiology, consultation notes, and other diagnostic findings | 0 |

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# APPENDIX A:
## Improving Diagnostic Quality & Safety/Reducing Diagnostic Error: Measurement Considerations Committee

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# APPENDIX B:
## Additions to the Measure Inventory Applicable to the Diagnostic Process and Outcomes Domain

| NQF ID or Source | Title | Type | Classification |
|---|---|---|---|
| **CMS Quality Measures Inventory** | Discouraging use of MRI for Diagnosis of Carpal Tunnel Syndrome | Process | Diagnostic Efficiency |
| **CMS Quality Measures Inventory** | Needle biopsy to establish diagnosis of cancer precedes surgical excision/ resection | Process | Diagnostic Efficiency |
| **CMS Quality Measures Inventory** | Notification to the ordering provider requesting amylase testing in the diagnosis of suspected acute pancreatitis | Process | Diagnostic Efficiency |
| **CMS Quality Measures Inventory** | Notification to the ordering provider requesting myoglobin or CK-MB in the diagnosis of suspected acute myocardial infarction (AMI) | Process | Diagnostic Efficiency |
| **CMS Quality Measures Inventory** | MRI Lumbar Spine for Low Back Pain | Efficiency | Diagnostic Efficiency |
| **CMS Quality Measures Inventory** | Use of Imaging Studies for Low Back Pain (eCQM) | Process | Diagnostic Efficiency |
| **CMS Quality Measures Inventory** | Coagulation studies in adult patients presenting with chest pain with no coagulopathy or bleeding | Process | Diagnostic Efficiency |
| **CMS Quality Measures Inventory** | Non-recommended Prostate-Specific Antigen (PSA)-based screening in older men | Process | Diagnostic Efficiency |
| **CMS Quality Measures Inventory** | New Corneal Injury Not Diagnosed in the Post-Anesthesia Care Unit/ Recovery Area | Outcome | Diagnostic Accuracy |
| **CMS Quality Measures Inventory** | Appropriate use of imaging for non traumatic shoulder pain | Process | Diagnostic Efficiency |
| **CMS Quality Measures Inventory** | Appropriate follow up imaging for non traumatic knee pain | Process | Diagnostic Efficiency |

| NQF ID or Source | Title | Type | Classification |
|---|---|---|---|
| **CMS Quality Measures Inventory** | Overuse Of Imaging for the Evaluation of Primary Headache | Process | Diagnostic Efficiency |
| **CMS Quality Measures Inventory** | Overuse of Diagnostic Imaging for Uncomplicated Headache | Efficiency | Diagnostic Efficiency |
| **CMS Quality Measures Inventory** | Appropriate Use of DXA Scans in Women Under 65 Who Do Not Meet the Risk Factor Profile | Efficiency | Diagnostic Efficiency |
| **CMS Quality Measures Inventory** | Diagnostic report timeliness, completeness and accuracy - impact on patient outcomes and management | Process | Diagnostic Efficiency |
| **CMS Quality Measures Inventory** | Appropriateness: Follow-up Computed Tomography (CT) Imaging for Incidentally Detected Pulmonary Nodules According to Recommended Guidelines | Process | Diagnostic Efficiency |
| **CMS Quality Measures Inventory** | Appropriate follow-up imaging for benign adrenal masses | Process | Diagnostic Efficiency |
| **CMS Quality Measures Inventory** | Appropriate Use Criteria Mechanism for review, documentation and evaluation for clinical practice improvement | Process | Diagnostic Efficiency |
| **CMS Quality Measures Inventory** | Unnecessary Screening Colonoscopy in Older Adults | Efficiency | Diagnostic Efficiency |

# APPENDIX C:
## New Measure Concepts Applicable to the Diagnostic Process and Outcomes Domain

| Source | Description | Classification |
|---|---|---|
| **Chief Complaint Framework** | Prescription of over-the-counter or prescription cough medicine for young children with a presenting problem of cough | Diagnostic Accuracy |
| **Chief Complaint Framework** | Patients with a presenting problem of dizziness, weakness, or fall injury who receive a falls assessment | Diagnostic Efficiency |
| **Chief Complaint Framework** | Effective care and diagnostic process for infants with a presenting problem of fever | Diagnostic Efficiency |
| **Chief Complaint Framework** | Use of pelvic ultrasound for patients in early pregnancy with a presenting problem of abdominal pain | Diagnostic Efficiency |
| **Chief Complaint Framework** | Use of head CT in patients without focal neurological symptoms with a presenting problem of syncope | Diagnostic Efficiency |
| **Chief Complaint Framework** | The proportion of children with a CT scan ordered for a presenting problem of febrile seizure | Diagnostic Efficiency |
| **Chief Complaint Framework** | Pediatric patients with a presenting problem of cough and sore throat receiving antibiotics | Diagnostic Efficiency |
| **Chief Complaint Framework** | Rate of missed stroke diagnosis for patients with a presenting problem of dizziness/vertigo with or without headache | Diagnostic Accuracy |
| **Chief Complaint Framework** | Rate of missed sepsis diagnosis among patients with presenting problems of fever or upper respiratory tract infection, sore throat, or generalized weakness/ fatigue | Diagnostic Accuracy |
| **Chief Complaint Framework** | Rate of missed myocardial infarction among patients with presenting problems of chest pain or shortness of breath | Diagnostic Accuracy |
| **Chief Complaint Framework** | Patients with a behavioral health presenting problem (e.g., depression, attempted suicide) that are discharged with a structured suicide risk assessment and suicide safety plan | Diagnostic Efficiency |

| Source | Description | Classification |
|---|---|---|
| **Chief Complaint Framework** | Rate of missed spinal abscess diagnoses in patients with a presenting problem of back or neck pain | Diagnostic Accuracy |
| **Trauma Outcomes** | Diagnosis and Management of injury in pregnant patients (EAST Guidelines) | Diagnostic Accuracy |
| **Trauma Outcomes** | Imaging in adult ED patients with minor head injury | Diagnostic Efficiency |
| **Trauma Outcomes** | Delirium Diagnosis | Diagnostic Accuracy |
| **Trauma Outcomes** | Delirium Screening | Information Gathering and Documentation |
| **Trauma Outcomes** | Use of Glasgow Coma Scale with reporting of all three components (eye, verbal and motor response) | Information Gathering and Documentation |


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