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Improving Diagnostic Quality and Safety/Reducing Diagnostic Error: Measurement Considerations

Committee Web Meeting 5

March 12, 2020

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Agenda

- Welcome, Review of Meeting Objectives, and Introductions
- Overview of Use Case Approach
- Reaction and Discussion of Use Case 3
- Reaction and Discussion of Use Case 4
- Opportunity for Public Comment
- Next Steps

Welcome and Introductions

NQF Project Staff

- **Meredith Gerland,** MPH, CIC, Director
- **Deidra Smith**, PMP, Senior Project Manager
- **Carolee Lantigua**, MPA, Project Analyst
- **Jesse Pines**, MD, Consultant

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Committee Roster

- David Andrews
- David Newman-Toker, MD, PhD
- Flavio Casoy, MD, FAPA
- Karen Cosby, MD
- Sonali Desai, MD
- Jane Dickerson, PhD
- Andreea Dohatcu, PhD, DABR, MRSC, CMQ
- Mark Graber, MD
- Helen Haskell, MA
- Cindy Hou, DO
- John James, PhD
- Joseph Kunisch, PhD
- Prashant Mahajan, MD, MPH, MBA
- Kathy McDonald, MM, PhD
- Lavinia Middleton, MD
- Craig Norquist, MD
- Shyam Prabhakaran, MD
- Ricardo Quinonez, MD, FAAP
- Roberta Reed
- Hardeep Singh, MD, MPH
- Colleen Skau, PhD
- Michael Woodruff, MD
- Ronald Wyatt, MD

Federal Liaisons

Nonvoting Committee Representatives

- Andrea Benin, MD
- David Hunt, MD
- Marsha Smith, MD, MPH, FAAP

Overview of Use Case Approach

Purpose of Use Cases

- Uses cases will:
  - Apply to various systems, settings, stakeholders, and populations
  - Describe a specific diagnostic error
  - Identify causal factors and diagnostic challenges
  - Share solutions to overcome the diagnostic error
  - Identify measurement approaches and concepts to assess the degree to which the solutions are being implemented
- Case exemplars will be included to assist with identifying barriers and solutions, and to demonstrate granular solutions in practice
  - The case exemplars should illustrate the error in practice, highlight diagnostic challenges and causal factors, and offer global and granular solutions

Approach

1. **Clinical Context:** Identify the clinical context for the specific error occurring
2. **Case Exemplars:** Brainstorming specific case exemplars to thread through the rest of the questions
3. **Diagnostic Challenges/Casual Factors:** Identify the diagnostic challenges and causal factors that contribute to the error
4. **Solutions:** Identify global and granular solutions to prevent and overcome the diagnostic error
5. **Quality Measurement:** Identify opportunities for performance measures

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Use Case Topics

- **Use Case 1: Cognitive Error – Missed Subtleties**
  - Subtle clinical presentations of dangerous conditions when the disease "signal" is to low
- **Use Case 2: System Error – Communication Failure**
  - Failure to "close the loop" on communication diagnostic test results for important conditions
- **Use Case 3: Cognitive Error – Information Overload**
  - Information overload in complex, critically ill patients when the disease "signal" is too high
- **Use Case 4: Cognitive Error – Dismissed Patient**
  - Prolonged diagnostic odyssey for chronic symptoms when the disease "signal" is almost nonexistent

Use Case 3: Cognitive Error – Information Overload

Information overload in complex or critically ill patients when the disease "signal" is too high

Clinical Context for Cognitive Error – Information Overload

- There is increasing complexity in both the content of clinical care (e.g., aging population, multiple chronic comorbidities, sicker hospitalized patients) and the delivery of that care (e.g., faster pace of care, more complex and disconnected teams, increased regulatory oversight, complicated electronic health records [EHR], novel technologies)
- The sheer volume of information and how its presented to clinicians can sometimes lead to errors
- Excessive cognitive load, both intrinsic and extraneous loads, serves as one of the key underlying causes
- Alarm or alert fatigue also contributes to these errors

Question 1: Case Exemplars

- Identify a handful of clinical case exemplars related to information overload that the group can use to “test run” ideas when working on the subsequent questions

Examples of possible case exemplars:

- A burn victim who is intubated the ICU requires large-volume fluid repletion. Several days after admission, the blood pressure drops acutely and he has a low-grade fever, so the patient is pan-cultured and treated with broad-spectrum antibiotics for presumed sepsis pending culture results. Since sepsis was the presumed diagnosis, other causes of hypotension were not investigated. The patient dies of massive pulmonary embolism the next day.
- A patient with complex post-operative heart valve repair with a subtle increasing anion gap acidosis is missed. The trend reflects a lactic acidosis, indicating sepsis, and a delay in antibiotic administration results in a prolonged ICU stay for sepsis and bacteremia which infects the repaired valve, requiring additional surgery. Notably, the EHR has no trend analysis and there was no trigger to help identify this subtle trend.
- A complex outpatient with multiple co-morbidities and medications has been visiting multiple doctors and getting multiple tests. There is a large volume of test results that are poorly organized in the EHR, and a lack of cogent, narrative summaries. A positive Lyme serology is missed, and the patient goes on to suffer neurologic complications from delay in diagnosis and antibiotic treatment.

Question 2: Diagnostic Challenges/Causal Factors

- When reflecting on the case exemplars, consider:
  1. How do the specific diagnostic challenges posed by these cases inform our understanding of common causes of information overload?
  2. How do these different types or causes of information overload inform how we would develop countermeasures or solutions?

Examples of possible diagnostic challenges and/or casual factors:

- Clinical complexity (e.g., distracted by a bigger problem, busy chasing the usual suspects, findings are masked by the patient's clinical state)
- Information complexity
- EHR designed without consideration of human factors
- Alarm fatigue
- Interruptions
- Process complexity (e.g., multiple steps to find the correct consultant or on-call provider)
- Physical fatigue (e.g., overnight shift, no sleep)
- Mental fatigue (e.g., alarm or alert fatigue, long shifts with highly repetitive diagnostic tasks in laboratory or radiology settings)

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Question 3: Solutions

- When identifying promising solutions to prevent and overcome diagnostic errors due to information overload, consider:
  1. What are the most promising global solutions that could help overcome this error?
  2. What are the most promising granular solutions within these strategies to help overcome this error?
  3. How can these solutions be operationalized across various settings and stakeholders?

Examples of possible global and granular solutions:

- Protocolize known, high-stakes diagnostic pathways
- Improve the usability of EHRs through the use of trend and other visualization methods
- Reduce the number of notifications and increase clinical salience
- Use artificial intelligence (AI) to recognize data patterns to identify clinically relevant findings
- Reduce the number of extraneous tasks required by clinicians to find information, allowing clinicians to focus on clinical tasks (i.e., task offloading)
- Create a “single source of truth” that contains the clinician on-call list
- Simulation training of clinicians
- Teamwork to distribute cognitive load
- Decrease overall workload (e.g., limit the number of patients simultaneously cared for by a single clinician)
- Rotate or shift repetitive tasks at scheduled intervals

Question 4: Quality Measurement

- When identifying opportunities for quality measurement, consider:
  1. What kind of diagnostic performance measures might be useful in assessing the incidence of process failures, diagnostic errors, and misdiagnosis-related harms for some of the specific clinical scenarios identified within this use case?
  2. Are some measures more promising than others to be operationally feasible in current practice for purposes of ongoing monitoring or to determine the impact of interventions/solutions to help prevent harms from information overload from occurring?

Examples of possible measure concepts:

- Surveys by clinicians on EHR usability
- Rate of EHR data visualization methods meeting quality standards
- Clinical productivity of clinicians as a measure of cognitive load (e.g., patients seen per hour)
- Use of specific communications technology (e.g., texting)
- Time to detection of important clinical events (e.g., sepsis)
- Interoperability of health information technology through participation in a health information exchange

Use Case 4: Cognitive Error – Dismissed Patient

Prolonged diagnostic odyssey for chronic symptoms when the disease "signal" is almost nonexistent

Clinical Context for Cognitive Error – Dismissed Patient

- Patients with uncommon conditions, or unusual presentations of more common conditions, sometime experience long diagnostic delays in the assessment of chronic symptoms that are mild, non-specific, or evolving slowly
- Patients may be labeled as having “medically unexplained symptoms”, or may be dismissed as having functional symptoms, somatization, or hypochondriasis
- Delays may occur because a condition is rare and indolent, and therefore unknown to the clinician
- Non-specific symptoms are especially prone to diagnostic odysseys because symptoms may cross many specialty lines and multidisciplinary communication may be lacking
- In some cases, the patient may have tried to communicate something critical to the correct diagnosis, but it as not heard or appreciated by the clinician
- Affective bias also contributes to these errors, with clinicians not listening, not hearing, or giving up on the patient entirely

Question 1: Case Exemplars

- Identify a handful of clinical case exemplars related to errors due to dismissed patients that the group can use to "test run" ideas when working on the subsequent questions

Examples of possible case exemplars:

- A pediatric patient is having abdominal pain caused by gluten-intolerance in celiac disease. The pain is attributed to reflux, and gluten intolerance is not investigated by multiple family practice clinicians. Ultimately, the mother self-refers to a gastrointestinal specialist who makes the accurate diagnosis.
- A patient with multiple sclerosis (MS) is misdiagnosed as having fibromyalgia, which results in a direct dismissal of the patient. The MS is missed by many clinicians from various specialties who fail to consider alternative diagnoses once an early diagnosis of fibromyalgia is made. The patient is finally taken seriously when a clinician becomes concerned about the possibility of acute stroke symptoms. An MRI is performed, which reveals the correct diagnosis of MS.
- A patient with vestibular migraine (i.e., chronic, unrelenting dizziness triggered by head, eye, or world motion) presents with intermittent severe dizziness to many clinicians for multiple years. The patient has negative test results (e.g., brain imaging, tilt-table, and electrophysiologic testing), but the correct diagnosis is discovered by a neurologist who trials migraine medications.

Question 2: Diagnostic Challenges/Causal Factors

- When reflecting on the case exemplars, consider:
  1. How do the specific diagnostic challenges posed by these use cases inform our understanding of common causes resulting from dismissed patients?
  2. How do these different types or causes of these errors inform how we would develop countermeasures or solutions?

Examples of possible diagnostic challenges and/or casual factors:

- Relative rarity of the condition
- Non-specific nature of symptoms
- Involvement of multiple clinicians across settings
- Lack of primary care physician or clinician who synthesizes information from multiple sources

Question 3: Solutions

- When identifying promising solutions to prevent and overcome diagnostic errors due to dismissed patients, consider:
  1. What are the most promising global solutions that could help overcome this error?
  2. What are the most promising granular solutions within those strategies to help overcome this error?
  3. How can these solutions be operationalized across various settings and stakeholders?

Examples of possible global and granular solutions:

- Use of AI/machine learning to detect patterns for diagnostic odyssey in EHR and/or claims data
- Early referral for genetic counseling
- Early referral for specialist care and detailed diagnostic testing
- Protocols for inducing consultations (e.g., three visits for the same symptom with no explanation)
- Clinician education on affective bias (e.g., performing a "gut check" for feelings of anger, frustration, hopelessness)
- Clinician education on patient-centered diagnostic decision-making
- Patient engagement in diagnosis

Question 4: Quality Measurement

- When identifying opportunities for quality measurement, consider:
  1. What kind of diagnostic performance measures might be useful in assessing the incidence of process failures, diagnostic errors, and misdiagnosis-related harms for some of the specific clinical scenarios identified within this use case?
  2. Are some measures more promising than others to be operationally feasible in current practice for purposes of ongoing monitoring or to determine the impact of interventions/solutions to help prevent harms from cognitive error- dismissed patient from occurring?

Examples of possible measure concepts:

- Time to diagnosis for rare conditions
- Patient surveys on their/their children's diagnostic odyssey
- Total cost of the diagnostic odyssey

Opportunity for Public Comment

Next Steps

Next Steps for Reducing Diagnostic Error

Meeting	Date
Web Meeting 6: Continued updates to use cases 3 and 4	May 19, 2020
Web Meeting 7: Finalize cross-cutting recommendations for measurement to reduce diagnostic error, improve patient safety	June 30, 2020
Web Meeting 8: Final review of report and public comments	September 1, 2020
Final Report	October 7, 2020

Project Contact Information

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- Project page: http://www.qualityforum.org/Reducing_Diagnostic_Error.aspx
- SharePoint: http://share.qualityforum.org/Projects

Questions

THANK YOU.

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