Calibrate Dx: A Resource To Improve Diagnostic Decisions

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PATIENT SAFETY

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Introduction

"Better is possible. It does not take genius. It takes diligence. It takes moral clarity. It takes ingenuity. And above all, it takes a willingness to try."[1]

- Atul Gawande

Lifelong learning is essential for achieving and maintaining diagnostic excellence. Diagnostic excellence involves not just making a correct and timely diagnosis but also doing so while using the fewest resources, optimizing patient experiences, and managing uncertainty.[2] Errors in diagnosis likely affect more than 12 million U.S. adults per year (or 1 in 20), and about half of these errors can lead to severe or permanent harm.[3] Reducing these errors requires both individual clinicians and healthcare systems to work toward diagnostic excellence.[4]

Calibration, defined as alignment between a person's diagnostic accuracy and their confidence in that accuracy, is an essential component of diagnostic excellence.[2] Miscalibration, i.e., misalignment between a person's diagnostic accuracy and their confidence in that accuracy, can manifest as either overconfidence or underconfidence (Figure 1). Miscalibration can lead to misdiagnoses, delayed diagnoses, under- or overtesting, and inefficient diagnostic processes.[5]

Figure 1. Calibration Alignment and Effects on Diagnostic Decision Making

UNDERCONFIDENCE

Inefficient use of resources (testing, consultations)

Potential for unnecessary delays in diagnosis and treatment

WELL-ALIGNED CALIBRATION

Achieves diagnostic excellence

Judiciously uses testing and referrals

Knows where to focus continuing education and improvement efforts

OVERCONFIDENCE

Increased likelihood of missed or wrong diagnosis

Missed opportunity to enhance clinical expertise

Once clinicians complete their professional training and begin to practice independently, they seldom receive formal feedback on their diagnostic processes and outcomes. This situation creates a "calibration gap"[6] or a gap between how they think they are doing and how they are actually doing. As such, clinicians may underestimate the number of their patients who experience a missed, delayed, or wrong diagnosis.[7,8] Timely and effective feedback on clinicians' diagnostic decisions can fill this gap.[9,10]

This resource aims to support clinicians like you in your quest for diagnostic excellence by providing tools to address the "calibration gap." This resource will guide you through a series of steps to self-assess and generate feedback about your diagnostic decision making and use that information to help you become better calibrated. When you compare your perceived performance to your actual performance, you will make better decisions about what is going well and where you should focus your learning and improvement efforts.

Getting Started

WHO SHOULD USE THIS RESOURCE?

This resource is primarily aimed at individual clinicians whose scope of practice includes diagnosis. However, secondary potential audiences can include any learners, educators, or health professionals in medicine.

SCOPE OF THIS RESOURCE

This resource focuses on diagnosis, including processes involved in making a diagnosis and the outcome of giving an explanatory label to patients after these processes unfold. Although processes related to management and treatment of patients sometimes overlap, the context for this resource is exclusively diagnosis.

WHAT YOU WILL NEED TO USE THIS RESOURCE

- Dedicated time. We estimate this self-evaluation exercise will require a few hours of your time; we recommend repeating the exercise every few months to maximize your learning.
- Your own cases to review.
- One or more partners with whom to discuss your learning.

PRIVACY, SECURITY, CONFIDENTIALITY, AND PRIVILEGE CONSIDERATIONS

Check with the appropriate point of contact in your organization before creating a list of cases, accessing your patients' records, or beginning to work with the tools provided for this activity. Having access to medical records for patient care purposes does not necessarily mean that you or your colleagues are authorized to access your patients' information for other purposes.

Also, be aware that if confidentiality and privilege protections for this kind of activity are available and desired, it is likely that they will only apply if specific requirements are followed. Certain steps may need to be taken in advance and the activity may need to be conducted in a certain way. In addition, information related to this activity may need to be stored in a certain location to ensure compliance with the Health Insurance Portability and Accountability Act Privacy and Security Rules and any requirements related to confidentiality and privilege protections. You should also be clear about how information related to the activity might be shared and used within your organization and for what purposes.

Overview of Calibration Exercise

This resource will guide you in implementing four steps of the diagnostic calibration learning and improvement cycle shown in Table 1. The sections that follow further describe each step in the cycle.

TABLE 1. Diagnostic Calibration Learning and Improvement Cycle

STEP	ACTIVITY	GUIDE REFERENCE
SPECIFY the calibration task	Choose an area of practice for which you would like to be better calibrated. You will likely learn more by focusing on a specific area of practice than reviewing your cases at random.	Page 5
EVALUATE diagnostic performance using self-assessment and peer feedback tools in this resource	Select a small sample of your cases, review them for learning opportunities, and seek further feedback from a colleague.	Page 7
PLAN AND APPLY improvement strategies and continuously monitor performance	Identify improvement strategies for yourself (and, when appropriate, your team and your system), and begin to take appropriate action. Repeat the previous steps at regular intervals.	Page 10
REFLECT on this exercise and adjust if needed	Reflect on this calibration exercise over time, evaluate additional areas of interest, and make adjustments as needed.	Page 13

*Ambrose SA, et al. How Learning Works. San Francisco: Jossey-Bass; 2010.[11]

If you are using this resource for the first time, review each of the following sections to understand these steps in the calibration learning and improvement cycle. You can navigate back to these sections as needed using the table of contents.

To see an example of how these steps might look in practice, see “Putting It All Together” (page 14).

Specify The Calibration Task

MAIN IDEA

Decide what areas are important to your clinical practice and focus on case scenarios that you encounter fairly often.

Table 2 lists certain types of scenarios that you might consider for calibration exercises. Calibration exercises should occur at regular intervals so that you can monitor your clinical reasoning and diagnostic outcomes over time.

Tip: As a general rule, focus on diagnoses and situations that are common in your practice, rather than rare events.

Table 2. Case Scenarios To Consider for Calibration Exercises

TYPE OF SCENARIO	WHY CONSIDER IT	EXAMPLES
Diagnosis-specific situations	Certain diagnoses are known to be frequently missed or delayed.	Sepsis, meningitis, stroke, appendicitis, cancer, pulmonary embolism
Undifferentiated presentations	Common symptoms with broad differential diagnoses may be susceptible to cognitive biases.	Abdominal pain, shortness of breath, abnormal uterine bleeding
Unexpected trajectories	Specific events suggest presence of an earlier opportunity to make the correct diagnosis.	Patients with change in diagnosis or management during emergency room visit or hospitalization, unexpected escalation of care or return visit, repeat visits for the same condition/concern without a definitive diagnosis
Diagnostic test interpretation or followup	Certain lab and imaging studies and other tests are prone to misinterpretation or missed followup.	Investigations for anemia, assessment of cognitive impairment, pulmonary nodules on chest x ray
High-risk situations	Specific situations, such as care transitions or complex cases involving multiple disciplines, are known to be at high risk for error.	Clinician handoffs, transfers between hospitals, incidental findings, multimorbidity, multiple subspecialists involved in patient's care
Patient populations at higher risk	Patients who face systemic social and health inequities may be at higher risk for breakdowns in care.	People with undocumented status, those who are uninsured or underinsured, those facing challenges related to health literacy

Formulating Questions To Guide Calibration

Once you have chosen a general area of focus, consider both the diagnostic processes[13,14] and diagnosis-related outcomes[15] for which you will need more information to evaluate your performance. For instance, you can focus on steps in the diagnostic process (e.g., could I improve certain aspects of the workup I did to make the diagnosis, regardless of its accuracy?). Another option is to compare your perceived outcomes with actual outcomes (e.g., how appropriate was my diagnostic assessment? Was my diagnosis correct?), as shown in Table 3.

The standards by which you evaluate your diagnostic reasoning and decision making can depend on several factors, including the availability of a reference standard or clinical guidelines. In many situations, no clear "gold standard" workup or assessment strategy exists. Thus, different clinicians are likely to anticipate different risks, use resources in different ways, ask for help differently, and monitor a situation differently.

The goal is not necessarily to identify a single, correct process or diagnosis (there might not be one). It is to understand if the process you used and diagnosis you made were reasonable given the information available to you at the time—that is, would most reasonable clinicians in the same situation make the same diagnostic decisions?

Develop one or more **calibration questions** to guide your review as you examine your cases. Focus on areas of improvement that are most important to you. Examining both processes and outcomes may help you evaluate your performance and become better calibrated. The examples below are to stimulate your thinking and are neither exhaustive, nor prescriptive.

Table 3. Sample Calibration Questions for Diagnostic Process and Outcome Domains

DIAGNOSTIC PROCESS	
Domain	**Sample Question**
Patient-provider encounter (e.g., history and physical examination)	Was the differential diagnosis sufficiently broad?
Diagnostic test performance and interpretation	Were the ordered tests indicated by the clinical situation?
Followup and tracking of diagnostic information	Did I follow up on labs, imaging studies, and consultant recommendations in a timely manner?
Subspecialty consultations and referrals	Was the amount of workup adequate before consulting or referring to a specialist?
Patient factors/behaviors	Did barriers to communicating effectively with the patient change my diagnostic process?

DIAGNOSTIC OUTCOMES	
Domain	**Sample Question**
Effectiveness	What was the patient's ultimate diagnosis and how did I make it?
Timeliness	Could I have made a correct diagnosis sooner?
Efficiency	Were the time and resources I used to arrive at the diagnosis more or less than I expected?
Safety	Did a knowledge gap, cognitive bias, or problem with attention or memory lead to missing important findings?
Patient centeredness	Did I communicate the diagnosis to the patient effectively and in a timely manner?
Equity	Were my outcomes consistent across patients of all backgrounds?

Note: Diagnostic process questions are organized according to a conceptual model of diagnosis from the National Academies of Sciences, Engineering, and Medicine.[14] The outcomes are organized according to the six domains of healthcare quality.[15]

Evaluate Diagnostic Performance

MAIN IDEA

A systematic approach to reviewing the care of your patients will help you identify the information you need to evaluate your diagnostic decision making and facilitate improved calibration. Including a colleague in this process will add value.

SELECT CASES FOR REVIEW AND REFLECTION

Choose three to five cases to review to assess your performance. If you need to narrow down a larger list of cases, opt for more recent cases as you may remember more clearly the circumstances and your mindset during those cases. Aim for a variety of cases over time, not limited to those that are unusual or highly memorable.
Do not limit the cases you choose to times when things went wrong. If you can select cases independent of the outcome, you are more likely to understand your typical performance.

Define objective selection criteria to obtain a more representative sample. Examples of selection criteria include:

- A random sample of all patients you diagnosed with pneumonia in the past 6 months.
- The last few patients who presented with abdominal pain.
- The last few patients who were unexpectedly admitted (or readmitted) to the hospital after an appointment with you.
- Patients transferred to another clinician's care whose diagnosis subsequently changed significantly.
- A random sample of patients with whom you experienced communication barriers.

Your primary sources of information will be the medical record and your recollection of the case, stimulated by review of clinical documentation. Secondary sources of information may include followup with the patient (when appropriate and allowable) and other involved clinicians.

WHAT DEFINES A "CASE"?

To evaluate diagnostic performance, focus on the initial patient presentation and the subsequent trajectory related to the same condition. Depending on the setting, the diagnostic process may unfold over multiple days (or longer) and multiple encounters. Thus, before reviewing a case, you will need to ensure you can access all the relevant information needed to review the evolution of the patient's diagnosis.

HOW TO FIND CASES THAT MEET YOUR CRITERIA

Create a prospective followup list. Many electronic health records (EHRs) allow clinicians to create personal reminders or lists. As you encounter patients who would be appropriate to follow up for calibration activities, include them in this list – if you have confirmed it can be used for this purpose. If you have a reminder function, you can use it to specify a time to review the record (e.g., 3 months after initial diagnosis). To avoid hindsight bias (i.e., when knowing an outcome overly influences your evaluation of the processes leading to the outcome[16]), consider adding cases to your list before outcomes are known, and then follow up at a later date.

Work with informatics personnel to identify relevant cases. Some EHR systems include query tools that can generate a list of cases that meet criteria you specify, such as date of service and diagnosis. A health information technology or informatics specialist in your organization may be able to create a report (e.g., patients you diagnosed with a certain condition in the last month) that provides a list of cases relevant to your calibration goals.

Learn From Your Own Cases

RECOMMENDED TIME COMMITMENT

3-4 hours

Once per quarter

SET ASIDE A DEDICATED TIME AND SPACE FOR YOUR REVIEW

Completing the review and reflection process at one time is recommended. Ensure you have reliable access to patient records. If applicable, consider having practice guidelines, evidence-based medicine references, and other relevant materials ready to access.

WHY WORK WITH ANOTHER CLINICIAN?

A colleague can be a helpful source of feedback, especially when no clear standard for calibration is available. Your colleague might also provide useful feedback that can help prevent "overcorrecting" in response to what you learn. Reviewing each other's performance can be mutually beneficial and enhance learning for both.

Once you have identified cases, review each case individually and then reflect on your reasoning across cases. Use the **Diagnostic Calibration Debrief Tool** (Appendix A) as a guide. Follow the steps below.

CONSIDER USING A STANDARDIZED TOOL FOR INDIVIDUAL CASE REVIEWS

Your calibration questions may require collecting diagnosis-specific information from medical records. However, the Revised Safer Dx Instrument and Fishbone diagram tools may help you work through the assessment of your diagnostic reasoning and identify opportunities for improvement for each case (see Appendixes for examples):

- The Revised Safer Dx Instrument (Appendix B) is a validated tool consisting of 13 items that prompt review of the diagnostic process.[17] This tool can help you determine whether you had any missed opportunities in the diagnostic process. Instructions for using the instrument are included in the open-access publication about development of this tool[17] and in the appendix.
- A Fishbone diagram (Appendix C), modified for diagnostic safety events, can be used to break down complex events according to different types of contributing factors, including system-related and cognitive factors. Instructions for applying a fishbone diagram to diagnostic safety are discussed in an open-access paper by Reilly, et al.[18,19]

SUMMARIZE YOUR ASSESSMENT OF YOUR DIAGNOSTIC PERFORMANCE IN A BRIEF NARRATIVE

Develop an overall self-assessment of your performance across cases. You might note specific aspects of the diagnostic process that went especially well, those that could be improved, and contextual factors that might have influenced the diagnostic process. Summarize the "take home" message and consider action steps that may enhance your performance. Section 2 of the Diagnostic Calibration Debrief Tool can facilitate this brief write up.

The section "Putting It All Together" provides an example of how a clinician can approach this exercise. Appendixes D-F provide further examples of completed case review tools in other practice areas.

MEET WITH A COLLEAGUE FOR A "DEBRIEF"

Share your self-assessment narrative with one or more colleagues to solicit feedback. For example, ask a peer at a similar career stage or skill level or a more experienced clinician to review it. If permissible and feasible, arrange to make your source data (i.e., medical records) accessible to your colleagues.

While agreement is neither the goal nor an assurance of accuracy, a difference of opinion could provide a clue that something could have been done differently and should be investigated further. The goal is to discuss the actions and thought processes involved in a particular patient care situation, encourage reflection on those actions and thought processes, and incorporate improvement into future performance.[20]

Consider working collaboratively so that you and your colleagues can share and learn from one another. It may be helpful to walk through each case by reflecting aloud, starting with "Tell me about the case" and then asking followup questions such as "Take me into the room. What were you worried about?"…"What did you do next?"…"What did you think might happen?"…"When/how did you decide to ask someone for help?"…"How did you monitor the situation? What were you looking for?" Questions about how you managed uncertainty may yield further useful insight into each other's decision making.

NOTE: During record reviews, you may find cases in which a patient experienced or is at risk of harm that was not previously recognized or disclosed to the patient. In these situations, action may be needed to ensure the patient is safe and that the appropriate parties in the organization are aware so they can take any necessary actions. For example, your organization may have a Communication and Resolution Program (CRP) process that should be initiated. Follow your organization's policies to notify the appropriate individual/office (e.g., quality or risk management program) of any newly identified harm or risk of harm to a patient.

Plan and Apply Improvement Strategies

MAIN IDEA

Act on what you found by identifying improvement opportunities. These may include ways of building your own knowledge and skills, but also consider extending your lessons and ideas for improvement to your care team and health system.

WHAT CAN I DO WITH WHAT I LEARNED?

Step 1. Identify improvement opportunities. One way to translate these indepth case reviews into actual performance improvement is to find knowledge or skill gaps and try to address those gaps using concrete, actionable steps. You could brush up on the diagnostic criteria of a certain disease or the value of a certain test, or you could use available resources more to support your clinical reasoning. For instance, you could learn how to better leverage different features and functions of the EHR, access diagnostic testing guidelines, bookmark online knowledge resources, and identify experts in your practice or specialty and reach out to them for guidance or mentoring. Just as valuable, clinicians will often be able to identify their individual strengths and areas in which they are well calibrated.

Step 2. Develop an action plan. Translate your insight into specific actions to sustain and integrate continuous learning. Some examples include:

1. Orally share lessons about a knowledge gap with three colleagues in order to internalize it.
2. If you had difficulties recognizing out-of-reference range values on uncommonly ordered lab tests, commit to looking up reference ranges and causes of false negatives/positives on tests you do not order frequently.
3. If you noticed absence of differential diagnoses on patients who had unexpected trajectories, commit to using knowledge resources to broaden your differentials at prespecified times (e.g., once per clinic day, once per shift, once per week on inpatient service).

Step 3. Consider augmenting your case reviews with simulation. Simulation has been used effectively across medicine to help clinicians master a broad range of skills, from advanced procedural techniques to communicating more effectively with patients and beyond.[21,22] While research has not yet quantified the effects of simulated cases on diagnostic calibration,[23] simulated cases may be a useful complement to calibrate your clinical reasoning.

In simulated cases, patients are presented in real-life clinical scenarios. Generally, clinical information is presented in parts, asking you as the learner to stop at various points to consider a differential diagnosis and next steps as if the patient were in front of you. As the case unfolds, you can compare your clinical reasoning with that of the authors, usually content experts, providing real-time feedback on your diagnostic process.[24]

This type of deliberate practice can help identify knowledge gaps and can weave the case presentation and diagnostic reasoning into your episodic memory the way an actual patient encounter often does.[25] In addition, these cases are generally easily accessible, low cost, widely distributed, and amenable to remote practice.[26]

Following are several outlets that provide virtual simulated cases:

New England Journal of Medicine - Interactive Case Series (NEJM Group)

NEJM has featured these interactive cases since 2009.[27] A subscription or access via a medical library is required. An archive of these cases can be found at: https://www.nejm.org/multimedia/interactive-medical-case.

New England Journal of Medicine - Case Records of the Massachusetts General Hospital (NEJM Group)
A subscription or access via a medical library is required. An archive of these cases can be found at: https://www.nejm.org/medical-articles/case-records-of-the-massachusetts-general-hospital.

Journal of General Internal Medicine - An Exercise in Clinical Reasoning
A subscription or access via a medical library is required. An archive of these cases can be found at: https://www.springer.com/journal/11606. Search for "exercise in clinical reasoning."

Journal of Hospital Medicine - Clinical Care Conundrums
A subscription or access via a medical library is required. An archive of these cases can be found at: https://www.journalofhospitalmedicine.com/jhospmed/clinical-care-conundrums.

MedEdPORTAL (Association of American Medical Colleges)
Available free of charge at https://www.mededportal.org/. Search for "simulation case" and "simulated case."

Medscape
Available free with registration at https://www.medscape.com. Look under the "CME & Education" menu.

Human Diagnosis Project
Link to download the app available free of charge at https://www.humandx.org/.

The Clinical Problem Solvers podcast
Available free of charge at clinicalproblemsolving.com or through podcast streaming services.

WHAT IS USEFUL FOR THE PATIENT'S CARE TEAM TO LEARN?

Often, clinicians will be able to distill important lessons that can benefit the entire care team. Some institutions have structured channels of communication so that the entire interdisciplinary care team regularly discusses their shared patients. They may conduct daily interdisciplinary rounds, team huddles, or regular safety meetings, which could all serve as venues for case discussion.[28,29] In other settings, communication between these groups is unstructured and on the fly.

Calibration exercises could serve as an impetus for teams to create a more formal system for interdisciplinary case review. Calibration exercises could also identify cases for existing teams that review quality and safety events for improvement opportunities.

WHAT IS USEFUL FOR PEERS WHO ARE NOT ON MY CARE TEAM?

Did you identify practical insights that may be of value to other clinicians in your practice specialty or in similar settings? Check with the point of contact in your organization who can advise about sharing what you learned in a way that meets the requirements of any applicable patient privacy and patient safety/quality improvement confidentiality protections. One venue for dissemination may be morbidity and mortality or other quality improvement and safety conferences where clinicians from multiple departments and groups (e.g., risk management, laboratory, radiology, and members of quality committees) can learn and act on your findings and experiences. Other venues may include clinic- and service-level meetings, journal clubs, and local professional society meetings.

WHAT ARE THE LESSONS FOR THE BIGGER SYSTEM?

Systems thinking is an essential additional lens to analyze diagnostic events. If a system issue contributed to a missed opportunity or near-miss in your practice, it likely also affected other clinicians and patients. Instead of devising a workaround, consider initiating a process that might result in a solution to improve care across the system. For example, if you missed visualizing an important test result because of how the EHR displayed information, you can recommend a change to the default display settings to your medical informatics team and the point of contact in your organization for patient safety improvement activities. More information on this topic can be found at: https://psnet.ahrq.gov/primer/systems-approach.

Reflect on Diagnostic Performance and Adjust if Needed

MAIN IDEA

Every round of case reviews should lead to additional reflection and insight into your diagnostic reasoning and related outcomes, thereby increasing your diagnostic calibration in a continuous learning process.

Over time, consider alternating the foci of your calibration exercises between new clinical scenarios and domains and those scenarios and domains you examined in the past. You may also want to meet with different peers with varying areas and levels of expertise to broaden the perspectives you encounter when completing these calibration exercises. More perspectives will increase the chances that you will obtain an accurate assessment of your diagnostic reasoning, thus improving your calibration.

Consider incorporating additional techniques to improve your calibration that you did not consider or engage in during your initial iterations of the exercise. For example, incorporate open discussion of your diagnostic reasoning and resulting outcomes with others if you only assessed your performance alone. Acknowledge and discuss diagnostic uncertainty with your colleagues and your patients.[30] Lastly, adopt a perspective of "humility rather than heroism with [your] diagnostic decision-making capabilities."[31]

Putting It All Together

Let's review how to use Calibrate Dx by walking through the steps with one clinician who decided to try it. Meet our (fictional) colleague, Dr. Nguyen.
Dr. Nguyen is an early career hospitalist who often feels pressed for time during a typical day. After one of his patients unexpectedly decompensated and was transferred to intensive care, he wanted to figure out if his diagnostic reasoning was affected at moments of high stress, especially for his sicker patients.

Implementing the Diagnostic Calibration Learning and Improvement Cycle

STEP	DESCRIPTION	HOW DR. NGUYEN APPROACHED THIS STEP
SPECIFY the calibration task.	Choose an area of practice for which you would like to be better calibrated. You will likely learn more from focusing on a specific area of practice than reviewing your cases at random.	Dr. Nguyen decided that he would track some of his patients who had a rapid response team called so he could go back and review his own diagnostic performance.
EVALUATE diagnostic performance.	Select a small sample of your cases, review them for learning opportunities, and seek further feedback from a colleague.	After working with the Quality Management Office on needed permissions and logistics for himself and the peer he wanted to consult, he made a separate list in the electronic health record and added patients when a rapid response team was called. Dr. Nguyen reviewed the cases from his list using the Revised Safer Dx Instrument (Appendix B). After completing his case reviews, he summarized the process using the Diagnostic Calibration Debrief tool (Appendix A) and discussed what he learned with his colleague. See Dr. Nguyen's completed case review tools in Appendix D.
PLAN AND APPLY improvement strategies.	Identify improvement strategies for yourself (and, when appropriate, your team and your system), and begin to take appropriate action. Repeat the previous steps at regular intervals.	Dr. Nguyen thought that the differential diagnosis of new onset hypotension in hospitalized patients was an important teaching point. He arranged to end a routine staff meeting 15 minutes early in order to share his findings with a small group of hospitalists. He also set a calendar reminder to repeat the case review process in 6 months.
REFLECT on diagnostic performance and adjust if needed.	Reflect on this calibration exercise over time, evaluate additional areas of interest, and make adjustments as needed.	Dr. Nguyen identified additional areas of interest based on this case to include differential diagnoses for high-risk changes in hospitalized patients. He reviewed the recent literature on the differential diagnosis for hospitalized patients with new onset dyspnea, new onset fever, and new onset delirium. Over time, he began to incorporate these strategies into his teaching.

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List of Appendixes

Appendix A. Diagnostic Calibration Debrief Tool

Appendix B. Revised Safer Dx Instrument

Appendix C. Modified Fishbone Diagram

Appendixes D-G.

Each of the following case examples includes a completed debriefing tool that summarizes the case review process, followed by a sample completed case review tool (Revised Safer Dx Instrument or Modified Fishbone Diagram) for one of the patient records that were reviewed in the process.

- **Appendix D.** Review of Rapid Responses
- **Appendix E.** Review of Pulmonary Emboli Diagnoses
- **Appendix F.** Review of Colorectal Cancer Diagnoses
- **Appendix G.** Review of Children Presenting With Vomiting

Appendix A.
Diagnostic Calibration Debrief Tool (1 of 2)

This tool can help you plan and summarize your efforts to calibrate your diagnostic performance and includes space for your self-assessment, peer feedback, and ideas for improvement.

Do NOT record any patient health information (PHI), provider-specific information, or any other identifying information (e.g., dates) in this document.

Section 1. Case Review Plan

FOCUS OF CALIBRATION
(Examples: diagnosis-specific situations, undifferentiated presentations, unexpected trajectories, diagnostic test interpretation, high-risk situations, your organization's priorities, high-risk patient populations)

PROCESS(ES) EVALUATED

- ☐ Patient-provider interactions
- ☐ Test performance and interpretation
- ☐ Followup and tracking
- ☐ Consultations and referrals
- ☐ Patient factors
- ☐ Other

OUTCOME(S) EVALUATED

- ☐ Effectiveness
- ☐ Timeliness
- ☐ Efficiency
- ☐ Safety
- ☐ Patient centeredness
- ☐ Equity

DATA SOURCE(S) OR SELECTION CRITERIA FOR RECORDS REVIEWED:
(Examples: personal "remind-me" list, EHR query)

CASE REVIEW TOOL USED:

☐ Revised Safer Dx ☐ Fishbone Diagram ☐ Other ☐ No specific tool used

CALIBRATION QUESTION(S) CONSIDERED (SEE TABLE 3 FOR EXAMPLES):

1.
2.
3.

Continued on next page

Diagnostic Calibration Debrief Tool (2 of 2)

Section 2. Reflections and Assessment

WRITE A SUMMARY ASSESSMENT AFTER REVIEWING YOUR CASES. CONSIDER THE FOLLOWING QUESTIONS AS YOU REFLECT ON YOUR DIAGNOSTIC PERFORMANCE:

- What did you learn from your case reviews? What, if anything, surprised you?
- How did you manage uncertainty in the diagnostic process?
- What went well? What will you repeat in similar cases in the future?
- What will you do differently in similar cases in the future?

TAKE-HOME MESSAGE:

SELF-REFLECTION AFTER DISCUSSING ASSESSMENT WITH PEER:

NEXT STEPS:
(e.g., plans for sharing, discussion, new initiatives)

Appendix B.

Revised Safer Dx Instrument

1	2	3	4	5	6	7
Strongly Disagree			**Neutral**			**Strongly Agree**

	ITEM	SCORE
1	The documented history was suggestive of an alternate diagnosis, which was not considered in the diagnostic process.	
2	The documented physical exam was suggestive of an alternate diagnosis, which was not considered in the diagnostic process.	
3	Data gathering through history, physical exam, and review of prior documentation (including prior laboratory, radiology, pathology, or other results) was incomplete, given the patient's medical history and clinical presentation.	
4	Alarm symptoms or "red flags" (i.e., features in the clinical presentation that are considered to predict serious disease) were not acted upon.	
5	The diagnostic process was affected by incomplete or incorrect clinical information given to the care team by the patient or their primary caregiver.	
6	The clinical information (i.e., history, physical exam, or diagnostic data) should have prompted additional diagnostic evaluation through tests or consults.	
7	The diagnostic reasoning was not appropriate, given the patient's medical history and clinical presentation.	
8	Diagnostic data (laboratory, radiology, pathology, or other results) available or documented were misinterpreted in relation to the subsequent final diagnosis.	
9	There was missed follow-up of available or documented diagnostic data (laboratory, radiology, pathology, or other results) in relation to the subsequent final diagnosis.	
10	The differential diagnosis was not documented OR the documented differential diagnosis did not include the subsequent final diagnosis.	
11	The final diagnosis was not an evolution of the care team's initial presumed diagnosis (or working diagnosis).	
12	The clinical presentation at the initial or subsequent presentation was mostly typical of the final diagnosis.	
13	In conclusion, based on all the above questions, the episode of care under review has a missed opportunity to make a correct and timely diagnosis.	

Reprinted with permission from Singh et al. Recommendations for using the Revised Safer Dx Instrument to help measure and improve diagnostic safety. Diagnosis (Berl). 2019;6(4):315-323.

Appendix B, cont'd

How To Review a Case for Learning Opportunities Using the Revised Safer Dx Instrument

Important: Before analyzing cases, reviewers should read the original manuscript that describes the development and use of the Revised Safer Dx Instrument, which is freely available:
Singh H, Khanna A, Spitzmueller C, Meyer A. Recommendations for using the Revised Safer Dx Instrument to help measure and improve diagnostic safety. Diagnosis (Berl). 2019;6(4):315-23. doi:10.1515/dx-2019-0012.

WHAT YOU WILL NEED TO BEGIN:

- Approval to access medical records and patient identifiers for conducting this improvement activity
- Revised Safer Dx Instrument
- Additional case review tools (optional)

1 ENSURE THAT YOU AND ANY OTHER REVIEWERS HAVE A SHARED UNDERSTANDING OF DIAGNOSTIC ERROR

- Keep the fundamental question in mind: could something different have been done to make the correct diagnosis earlier?
- Make your judgments about clinicians' decision making and diagnostic reasoning based on the information they had available at the time.
- Look for missed opportunities not only by clinicians but also by the care team, system, and patients.

2 IDENTIFY THE EPISODE OF CARE TO EVALUATE

- Usually involves all the care a patient received over a given period of time for a specific health problem they present with.
- Can span multiple encounters, including inpatient, emergency, and outpatient visits, or focus on a sole encounter such as a hospitalization.

3 REVIEW THE CHART WITH A FOCUS ON DIAGNOSTIC PROCESS RATHER THAN THE ULTIMATE OUTCOME

- Start by evaluating the clinical encounter (history, exam, tests ordered), as well as the initial presumed diagnosis or working differential diagnosis.
- Read through the chart to understand how the diagnostic processes and reasoning evolved rather than focusing on the ultimate accuracy of the diagnosis or any potential adverse outcome.
- Also look at progress notes, test results, referrals, consultant notes, and other documents that informed the diagnosis.
- Use current literature or guidelines to evaluate the diagnostic process.

Appendix B, cont'd

How To Review a Case for Learning Opportunities Using the Revised Safer Dx Instrument

4

ANSWER THE PROMPTS IN THE REVISED SAFER DX INSTRUMENT TO MAKE A DETERMINATION ABOUT MISSED OPPORTUNITIES

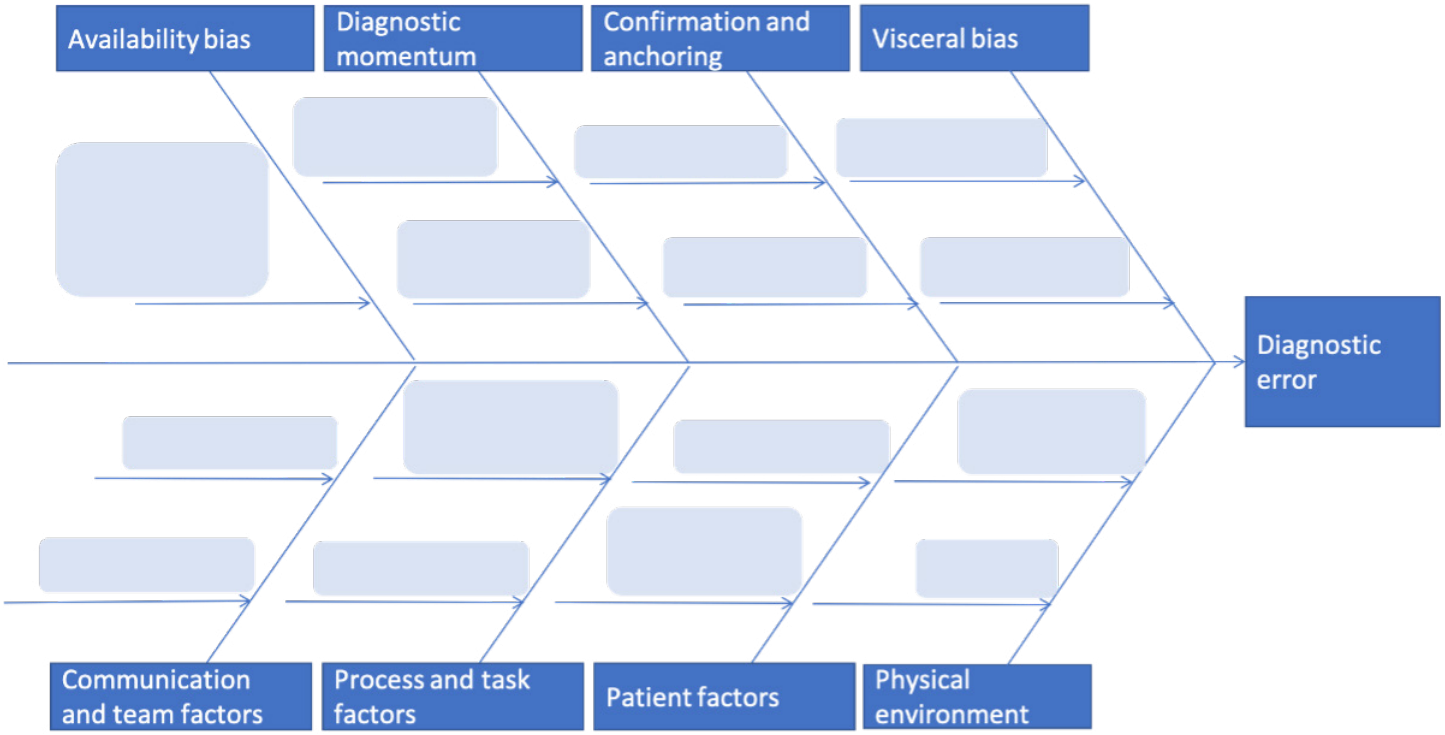
- Prompts 1-12 ask you to evaluate the diagnostic processes at various stages such as history taking, physical exam, diagnostic testing, consulting, and clinical reasoning.
- The higher you score each prompt, the more likely you think there was a missed opportunity for diagnosis at this stage of the process.
- Prompt 13 asks you to look at the case as a whole and come to a final judgment as to whether there was a missed opportunity for diagnosis.
- Do not try to add up the numbers of each question to make any type of overall score. The questions are only to help you think through each item so you can make an overall assessment at the end with prompt 13.
- Write a few sentences to add context and explain your reasoning for your answer to prompt 13.

Appendix C.

Modified Fishbone Diagram

The modified fishbone has been widely adopted in healthcare settings to help patient safety experts understand the complex interplay of factors that contribute to a diagnostic error.

The categories at the top of the diagram represent contributing factors related to cognition, while system-level factors are listed at the bottom. Although the facts of each case will vary, the goal in dissecting a case is to identify and categorize all the contributing factors you can find. This process can help clarify the specific causes of the error and guide quality improvement activities. An example of a completed fishbone diagram can be found in **Appendix E.**



For more information about using the modified fishbone diagram, refer to the open-access manuscript below:

Reilly JB, Myers JS, Salvador D, Trowbridge RL. Use of a novel, modified fishbone diagram to analyze diagnostic errors. Diagnosis 2014;1:2, 167-171. https://doi.org/10.1515/dx-2013-0040.

Appendix D.

Review of Rapid Responses

Diagnostic Calibration Debrief Tool (1 of 2)

This tool can help you plan and summarize your efforts to calibrate your diagnostic performance and includes space for your self-assessment, peer feedback, and ideas for improvement.

Do NOT record any patient health information (PHI), provider-specific information, or any other identifying information (e.g., dates) in this document.

Section 1. Case Review Plan

FOCUS OF CALIBRATION
(Examples: diagnosis-specific situation, undifferentiated presentations, unexpected trajectories, diagnostic test interpretation, high-risk situations, your organization's priorities, high-risk patient populations)

High risk situation – rapid response

PROCESS(ES) EVALUATED

- ☑ Patient-provider interactions
- ☐ Consultations and referrals
- ☐ Test performance and interpretation
- ☐ Patient factors
- ☐ Other
- ☑ Followup and tracking

OUTCOME(S) EVALUATED

- ☑ Effectiveness
- ☑ Safety
- ☑ Timeliness
- ☐ Patient centeredness
- ☑ Efficiency
- ☐ Equity

DATA SOURCE(S) OR SELECTION CRITERIA FOR RECORDS REVIEWED:
(Examples: personal "remind-me" list, EHR query)

Charts I saved in my "cases to review" list

CASE REVIEW TOOL USED:

☑ Revised Safer Dx ☐ Fishbone Diagram ☐ Other ☐ No specific tool used

CALIBRATION QUESTION(S) CONSIDERED (SEE TABLE 3 FOR EXAMPLES):

1. Did I consider a broad differential diagnosis?
2. Was my thinking affected by biases?

Appendix D, cont'd

Review of Rapid Responses

Diagnostic Calibration Debrief Tool (2 of 2)

Section 2. Reflections and Assessment

WRITE A SUMMARY ASSESSMENT AFTER REVIEWING YOUR CASES. CONSIDER THE FOLLOWING QUESTIONS AS YOU REFLECT ON YOUR DIAGNOSTIC PERFORMANCE:

- What did you learn from your case reviews? What, if anything, surprised you?
- How did you manage uncertainty in the diagnostic process?
- What went well? What will you repeat in similar cases in the future?
- What will you do differently in similar cases in the future?

I evaluated my last 3 rapid responses. I managed all 3 rapid responses effectively and the patients were stabilized. However, one patient had bacteremia and sepsis and rapid response was called for hypotension. I was surprised because this patient seemed stable throughout the day, though when I look back, he had been persistently tachycardic. I noticed that during the rapid response, I did not really document much of a differential diagnosis for the hypotension, which was probably just because of lack of time. This patient seemed under-resuscitated and had tachycardia as a result. But one needs to be careful not to miss something new. Also, it may help next time to also consider things like bacterial seeding or an alternate pathogen as a cause for the worsening sepsis or other reasons for tachycardia.

TAKE-HOME MESSAGE:

I did not recognize the tachycardia and did not fully document a differential diagnosis for the patient's eventual hypotensive episode. In this case, the patient had not been adequately resuscitated with fluids.

SELF-REFLECTION AFTER DISCUSSING ASSESSMENT WITH PEER:

My partner thought that I managed the patients well. He noted a need for more thorough differential on new findings but also that time to document these is often limited. He agreed with the diagnosis that the patient was under-resuscitated.

NEXT STEPS:
(e.g., plans for sharing, discussion, new initiatives)

I will share my reflection with colleagues in a small group and discuss the best strategies for noninvasive hemodynamic monitoring of septic patients. I will also review the differential diagnosis for hypotension in septic patients.

Appendix D, cont'd

Review of Rapid Responses

Revised Safer Dx Instrument

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

	ITEM	SCORE
1	The documented history was suggestive of an alternate diagnosis, which was not considered in the diagnostic process.	2
2	The documented physical exam was suggestive of an alternate diagnosis, which was not considered in the diagnostic process.	2
3	Data gathering through history, physical exam, and review of prior documentation (including prior laboratory, radiology, pathology, or other results) was incomplete, given the patient's medical history and clinical presentation.	3
4	Alarm symptoms or "red flags" (i.e., features in the clinical presentation that are considered to predict serious disease) were not acted upon.	2
5	The diagnostic process was affected by incomplete or incorrect clinical information given to the care team by the patient or their primary caregiver.	1
6	The clinical information (i.e., history, physical exam, or diagnostic data) should have prompted additional diagnostic evaluation through tests or consults.	4
7	The diagnostic reasoning was not appropriate, given the patient's medical history and clinical presentation.	3
8	Diagnostic data (laboratory, radiology, pathology, or other results) available or documented were misinterpreted in relation to the subsequent final diagnosis.	2
9	There was missed follow-up of available or documented diagnostic data (laboratory, radiology, pathology, or other results) in relation to the subsequent final diagnosis.	3
10	The differential diagnosis was not documented OR the documented differential diagnosis did not include the subsequent final diagnosis.	5
11	The final diagnosis was not an evolution of the care team's initial presumed diagnosis (or working diagnosis).	1
12	The clinical presentation at the initial or subsequent presentation was mostly typical of the final diagnosis.	6
13	In conclusion, based on all the above questions, the episode of care under review has a missed opportunity to make a correct and timely diagnosis.	3

Note: This rapid response was for hypotension in a patient already being treated for sepsis. The patient's decompensation was a progression of his known sepsis, so I do not think there was a missed diagnostic opportunity.

Appendix E.

Review of Pulmonary Emboli Diagnoses

Diagnostic Calibration Debrief Tool (1 of 2)

This tool can help you plan and summarize your efforts to calibrate your diagnostic performance and includes space for your self-assessment, peer feedback, and ideas for improvement.

Do NOT record any patient health information (PHI), provider-specific information, or any other identifying information (e.g., dates) in this document.

Section 1. Case Review Plan

FOCUS OF CALIBRATION
(Examples: diagnosis-specific situation, undifferentiated presentations, unexpected trajectories, diagnostic test interpretation, high-risk situations, your organization's priorities, high-risk patient populations)

Pulmonary embolism (PE)

PROCESS(ES) EVALUATED

- ☐ Patient-provider interactions
- ☑ Test performance and interpretation
- ☐ Followup and tracking
- ☐ Consultations and referrals
- ☐ Patient factors
- ☐ Other

OUTCOME(S) EVALUATED

- ☑ Effectiveness
- ☐ Timeliness
- ☐ Efficiency
- ☑ Safety
- ☐ Patient centeredness
- ☐ Equity

DATA SOURCE(S) OR SELECTION CRITERIA FOR RECORDS REVIEWED:
(Examples: personal "remind-me" list, EHR query)

Retrospective chart review

CASE REVIEW TOOL USED:

☐ Revised Safer Dx ☑ Fishbone Diagram ☐ Other ☐ No specific tool used

CALIBRATION QUESTION(S) CONSIDERED (SEE TABLE 3 FOR EXAMPLES):

1. Did I have any delayed diagnoses of PE?
2. Did I use scoring systems like a PERC score or a Wells score? Did I check a D-dimer?
3. What proportion of my CTAs are positive for PE?

Appendix E, cont'd

Review of Pulmonary Emboli Diagnoses

Diagnostic Calibration Debrief Tool (2 of 2)

Section 2. Reflections and Assessment

WRITE A SUMMARY ASSESSMENT AFTER REVIEWING YOUR CASES. CONSIDER THE FOLLOWING QUESTIONS AS YOU REFLECT ON YOUR DIAGNOSTIC PERFORMANCE:

- What did you learn from your case reviews? What, if anything, surprised you?
- How did you manage uncertainty in the diagnostic process?
- What went well? What will you repeat in similar cases in the future?
- What will you do differently in similar cases in the future?

I looked at the last 5 patients for whom I ordered a CT scan looking for PE. I was surprised to see that all of the CTs that I ordered had a clinically significant PE. I would have expected at least a few negative tests given the fact that the symptoms of PE can mimic several other common diagnoses. In one case, I held off on ordering a CT scan because I was much more suspicious of an acute MI. This delayed the PE diagnosis. It looks like one patient had a PERC score calculated, and I checked a Wells score with a d-dimer appropriately on the other patients for whom I had at least some suspicion. However, I wonder if I am regularly missing patients who have symptoms. Going forward, I think I need to have a lower threshold to suspect PE in symptomatic patients. It could be that I need to find a strategy to keep PE top of mind when I see a new symptomatic patient or do a quick review for myself on the various presentations of patients with PE. I may need to have a lower threshold to using scores like the Wells score with a d-dimer to help my decision making.

TAKE-HOME MESSAGE:

I need to have a lower threshold for suspecting PE in patients.

SELF-REFLECTION AFTER DISCUSSING ASSESSMENT WITH PEER:

My other team member had a lower proportion of CT scans that were positive for PE. This could be because she had PE higher on her differential in patients with shortness of breath or chest pain.

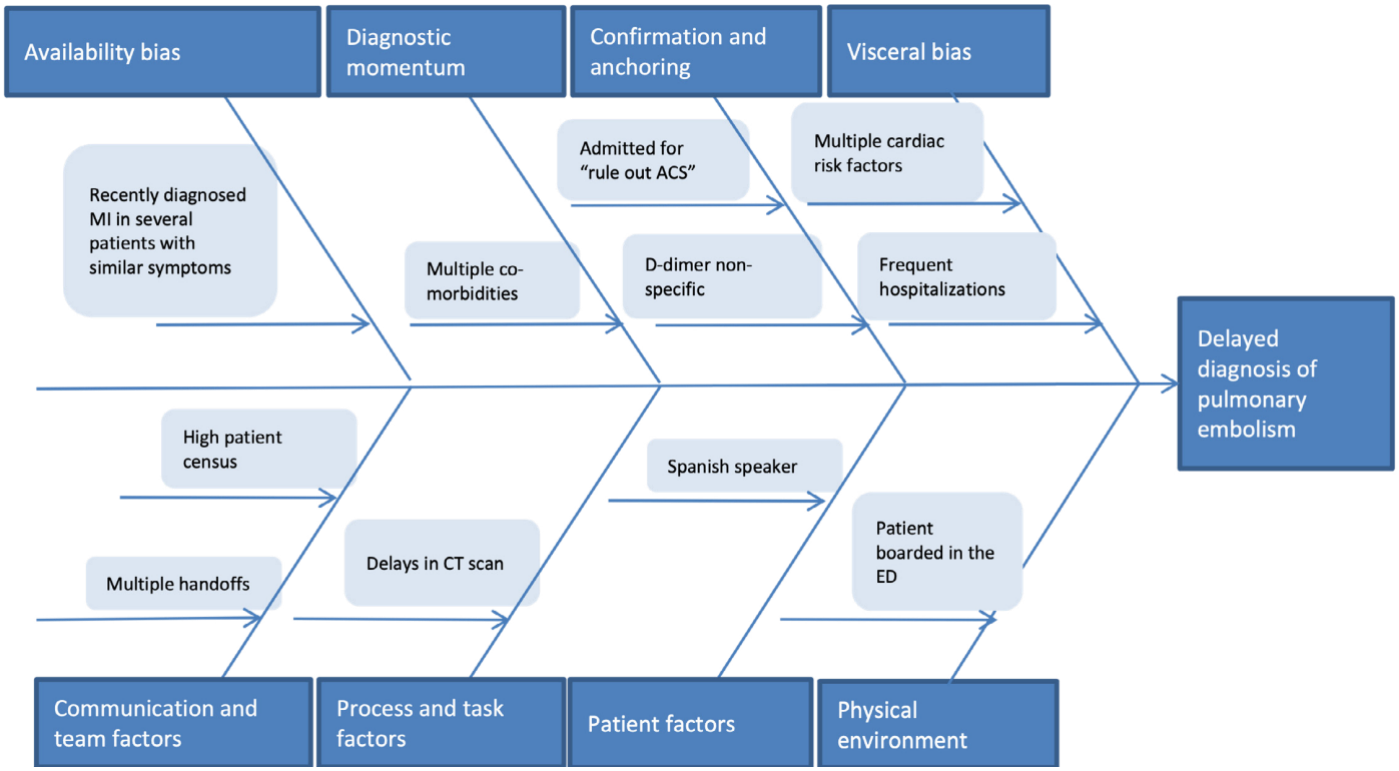
NEXT STEPS:
(e.g., plans for sharing, discussion, new initiatives)

I will present this case at a lunch conference and stimulate a discussion among the group about their triggers for calculating Wells and PERC scores, as well as for ordering d-dimers and CT scans.

Appendix E, cont'd

Review of Pulmonary Emboli Diagnoses

This fishbone diagram outlines factors contributing to the case of delayed diagnosis of PE described in the debrief tool above.



Appendix F.

Review of Colorectal Cancer Diagnoses

Diagnostic Calibration Debrief Tool (1 of 2)

This tool can help you plan and summarize your efforts to calibrate your diagnostic performance and includes space for your self-assessment, peer feedback, and ideas for improvement.

Do NOT record any patient health information (PHI), provider-specific information, or any other identifying information (e.g., dates) in this document.

Section 1. Case Review Plan

FOCUS OF CALIBRATION
(Examples: diagnosis-specific situation, undifferentiated presentations, unexpected trajectories, diagnostic test interpretation, high-risk situations, your organization's priorities, high-risk patient populations)

Diagnosis of colorectal cancer

PROCESS(ES) EVALUATED

- ☑ Patient-provider interactions
- ☑ Test performance and interpretation
- ☑ Followup and tracking
- ☑ Consultations and referrals
- ☑ Patient factors
- ☐ Other

OUTCOME(S) EVALUATED

- ☑ Effectiveness
- ☑ Timeliness
- ☑ Efficiency
- ☑ Safety
- ☐ Patient centeredness
- ☐ Equity

DATA SOURCE(S) OR SELECTION CRITERIA FOR RECORDS REVIEWED:
(Examples: personal "remind-me" list, EHR query)

EHR query

CASE REVIEW TOOL USED:

☑ Revised Safer Dx ☐ Fishbone Diagram ☐ Other ☐ No specific tool used

CALIBRATION QUESTION(S) CONSIDERED (SEE TABLE 3 FOR EXAMPLES):

1. Were there opportunities to make the diagnosis earlier?
2. Did I interpret test results correctly?
3. Did preexisting biases affect my clinical decision making?

Appendix F, cont'd

Review of Colorectal Cancer Diagnoses

Diagnostic Calibration Debrief Tool (2 of 2)

Section 2. Reflections and Assessment

WRITE A SUMMARY ASSESSMENT AFTER REVIEWING YOUR CASES. CONSIDER THE FOLLOWING QUESTIONS AS YOU REFLECT ON YOUR DIAGNOSTIC PERFORMANCE:

- What did you learn from your case reviews? What, if anything, surprised you?
- How did you manage uncertainty in the diagnostic process?
- What went well? What will you repeat in similar cases in the future?
- What will you do differently in similar cases in the future?

I looked at my last 3 cases of colon cancer. I did a pretty good job in two of the cases about getting these patients referred to GI early for a colonoscopy. In one case, the diagnosis was harder and took more time. In this case, a few things stood out. I was surprised that this diagnosis affected a patient so young who did not seem to have much of a family history. Also, the symptoms of colon cancer seemed to overlap so closely with her other known issues of constipation and fibroids. She also had a falsely reassuring CT scan. All of these could have led to premature closure. In the future, I think I will have to just keep in mind that colon cancer can present in a lot of different ways that may not fit the pattern I have in my head. Also, we will need a better way of being notified in clinic if a patient misses an important specialist followup, as I currently had no way of knowing that she missed her GI appointment.

TAKE-HOME MESSAGE:

Colorectal cancer can have various presentations and affect younger patients.

SELF-REFLECTION AFTER DISCUSSING ASSESSMENT WITH PEER:

My partner noted that, given the constellation of change in stool caliber, weight loss, iron deficiency anemia, I probably could have referred her to see GI earlier. She did note that when her patients miss a specialist appointment, she often has no idea until she figures it out on her own.

NEXT STEPS:
(e.g., plans for sharing, discussion, new initiatives)

I plan to read about colorectal cancer presentations and discuss with my colleagues about various presentations they have seen. I can present this case at our morbidity and mortality conference. In addition, I will talk to IT to figure out the best way an EHR can notify us if a patient misses a specialty appointment.

Appendix F, cont'd

Review of Colorectal Cancer Diagnoses

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

	ITEM	SCORE
1	The documented history was suggestive of an alternate diagnosis, which was not considered in the diagnostic process.	6
2	The documented physical exam was suggestive of an alternate diagnosis, which was not considered in the diagnostic process.	4
3	Data gathering through history, physical exam, and review of prior documentation (including prior laboratory, radiology, pathology, or other results) was incomplete, given the patient's medical history and clinical presentation.	5
4	Alarm symptoms or "red flags" (i.e., features in the clinical presentation that are considered to predict serious disease) were not acted upon.	5
5	The diagnostic process was affected by incomplete or incorrect clinical information given to the care team by the patient or their primary caregiver.	3
6	The clinical information (i.e., history, physical exam, or diagnostic data) should have prompted additional diagnostic evaluation through tests or consults.	6
7	The diagnostic reasoning was not appropriate, given the patient's medical history and clinical presentation.	3
8	Diagnostic data (laboratory, radiology, pathology, or other results) available or documented were misinterpreted in relation to the subsequent final diagnosis.	5
9	There was missed follow-up of available or documented diagnostic data (laboratory, radiology, pathology, or other results) in relation to the subsequent final diagnosis.	2
10	The differential diagnosis was not documented OR the documented differential diagnosis did not include the subsequent final diagnosis.	2
11	The final diagnosis was not an evolution of the care team's initial presumed diagnosis (or working diagnosis).	7
12	The clinical presentation at the initial or subsequent presentation was mostly typical of the final diagnosis.	5
13	In conclusion, based on all the above questions, the episode of care under review has a missed opportunity to make a correct and timely diagnosis.	6

This was a missed opportunity to diagnose colorectal cancer. Initial symptoms were thought to be related to constipation and hemorrhoids. Subsequent findings of weight loss and anemia prompted a workup, but it was delayed.

Appendix G.

Review of Children Presenting With Vomiting

Diagnostic Calibration Debrief Tool (1 of 2)

This tool can help you plan and summarize your efforts to calibrate your diagnostic performance and includes space for your self-assessment, peer feedback, and ideas for improvement.

Do NOT record any patient health information (PHI), provider-specific information, or any other identifying information (e.g., dates) in this document.

Section 1. Case Review Plan

FOCUS OF CALIBRATION
(Examples: diagnosis-specific situation, undifferentiated presentations, unexpected trajectories, diagnostic test interpretation, high-risk situations, your organization's priorities, high-risk patient populations)

Presentation of a child with vomitting

PROCESS(ES) EVALUATED

- ☑ Patient-provider interactions
- ☐ Consultations and referrals
- ☐ Test performance and interpretation
- ☐ Patient factors
- ☐ Other
- ☑ Followup and tracking

OUTCOME(S) EVALUATED

- ☐ Effectiveness
- ☑ Safety
- ☑ Timeliness
- ✓ Patient centeredness
- ☐ Efficiency
- ✓ Equity

DATA SOURCE(S) OR SELECTION CRITERIA FOR RECORDS REVIEWED:
(Examples: personal "remind-me" list, EHR query)

EHR query

CASE REVIEW TOOL USED:

☑ Revised Safer Dx ☐ Fishbone Diagram ☐ Other ☐ No specific tool used

CALIBRATION QUESTION(S) CONSIDERED (SEE TABLE 3 FOR EXAMPLES):

1. Were there opportunities to make the diagnosis earlier?
2. Did I get good enough history from the patient's family?

Appendix G, cont'd

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Diagnostic Calibration Debrief Tool (2 of 2)

Section 2. Reflections and Assessment

WRITE A SUMMARY ASSESSMENT AFTER REVIEWING YOUR CASES. CONSIDER THE FOLLOWING QUESTIONS AS YOU REFLECT ON YOUR DIAGNOSTIC PERFORMANCE:

- What did you learn from your case reviews? What, if anything, surprised you?
- How did you manage uncertainty in the diagnostic process?
- What went well? What will you repeat in similar cases in the future?
- What will you do differently in similar cases in the future?

I looked at my last 4 cases of vomiting in the clinic. I was surprised that one of the patients actually had pancreatitis. The majority of our patients in clinic end up having self-limited gastroenteritis, and I have not really diagnosed pancreatitis in a while. So certainly, there was recall bias affecting my diagnosis. Looking back, I also remember having a hard time getting a good history in part because of the choppy phone connection we had with the Spanish interpreter. I do think that once I saw her symptoms persist, I was quick about rethinking through other causes of vomiting in a child.

I think in the future I will just have to keep in mind that vomiting has such a broad differential diagnosis. I may need to read a bit more about pancreatitis just so it stays fresh in my mind for the next time or have a schema or some other resource easily accessible in clinic. I also want to make sure I prioritize getting a good phone connection with the interpreter, and I may need to talk to the clinic staff about strategies for this.

TAKE-HOME MESSAGE:

Vomiting in pediatrics can be a symptom of many diagnoses. While gastroenteritis may be most common, there are many other things to consider.

SELF-REFLECTION AFTER DISCUSSING ASSESSMENT WITH PEER:

My peer noted that he also has difficulty in clinic getting medical interpreter services quickly. He noted that my clinical decision making in the moment seemed reasonable.

NEXT STEPS:
(e.g., plans for sharing, discussion, new initiatives)

I plan to read more about pancreatitis in children. I also need to remember to have a high index of suspicion for other diagnoses, especially when the patient has vomiting but no diarrhea. I will advocate for greater access to medical interpreter services.

Appendix G, cont'd

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1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

	ITEM	SCORE
1	The documented history was suggestive of an alternate diagnosis, which was not considered in the diagnostic process.	3
2	The documented physical exam was suggestive of an alternate diagnosis, which was not considered in the diagnostic process.	4
3	Data gathering through history, physical exam, and review of prior documentation (including prior laboratory, radiology, pathology, or other results) was incomplete, given the patient's medical history and clinical presentation.	6
4	Alarm symptoms or "red flags" (i.e., features in the clinical presentation that are considered to predict serious disease) were not acted upon.	3
5	The diagnostic process was affected by incomplete or incorrect clinical information given to the care team by the patient or their primary caregiver.	2
6	The clinical information (i.e., history, physical exam, or diagnostic data) should have prompted additional diagnostic evaluation through tests or consults.	5
7	The diagnostic reasoning was not appropriate, given the patient's medical history and clinical presentation.	3
8	Diagnostic data (laboratory, radiology, pathology, or other results) available or documented were misinterpreted in relation to the subsequent final diagnosis.	3
9	There was missed follow-up of available or documented diagnostic data (laboratory, radiology, pathology, or other results) in relation to the subsequent final diagnosis.	2
10	The differential diagnosis was not documented OR the documented differential diagnosis did not include the subsequent final diagnosis.	1
11	The final diagnosis was not an evolution of the care team's initial presumed diagnosis (or working diagnosis).	5
12	The clinical presentation at the initial or subsequent presentation was mostly typical of the final diagnosis.	6
13	In conclusion, based on all the above questions, the episode of care under review has a missed opportunity to make a correct and timely diagnosis.	5

My diagnosis was delayed in part because my history taking was hindered by a language barrier. I initially didn't document a wide differential because I have seen so much gastroenteritis in clinic, especially lately. I think I did a good job of re-evaluating my differential and workup when symptoms persisted.

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