

Diagnostic Errors

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Background

The past decade's quest to improve patient safety has chiefly addressed quantifiable problems such as medication errors, health care–associated infections, and postsurgical complications. Diagnostic error has received comparatively less attention, despite the fact that landmark patient safety studies have consistently found that diagnostic error is common. In the [Harvard Medical Practice Study](#), diagnostic error accounted for 17% of preventable errors in hospitalized patients, and a [systematic review](#) of autopsy studies covering four decades found that approximately 9% of patients experienced a major diagnostic error that went undetected while the patient was alive. Taken together, these studies imply that thousands of hospitalized patients die every year due to diagnostic errors.

An extensive body of research has examined the causes of diagnostic error at the individual clinician level. This work has been informed by the field of [cognitive psychology](#), which studies how individuals process information and subsequently develop plans. As applied to health care, we have learned that clinicians frequently use heuristics (shortcuts or "rules of thumb") to come up with a provisional diagnosis, especially when faced with a patient with common symptoms. While heuristics are ubiquitous and useful, researchers have used categories developed in cognitive psychology to [classify](#) several types of errors that clinicians commonly make due to incorrect applications of heuristics:

Cognitive Bias	Definition	Example
Availability heuristic	Diagnosis of current patient biased by experience with past cases	A patient with crushing chest pain was incorrectly treated for a myocardial infarction, despite indications that an aortic dissection was present.

Cognitive Bias	Definition	Example
Anchoring heuristic (premature closure)	Relying on initial diagnostic impression, despite subsequent information to the contrary	Repeated positive blood cultures with <i>Corynebacterium</i> were dismissed as contaminants; the patient was eventually diagnosed with <i>Corynebacterium</i> endocarditis.
Framing effects	Diagnostic decision-making unduly biased by subtle cues and collateral information	A with opioid misuse disorder with abdominal pain was treated for opiate withdrawal , but proved to have a bowel perforation.
Blind obedience	Placing undue reliance on test results or "expert" opinion	A false-negative rapid test for <i>Streptococcus</i> pharyngitis resulted in a delay in diagnosis.

While cognitive biases on the part of individual clinicians play a role in many diagnostic errors, underlying health care system problems also contribute to missed and delayed diagnoses. Missed or delayed diagnoses (particularly cancer diagnoses) are a prominent reason for malpractice claims, and much of the research into systems causes of diagnostic error arises from studies of closed malpractice claims in [primary care](#), [pediatrics](#), [emergency medicine](#), and [surgery](#). Poor teamwork and [communication](#) between clinicians have been identified as predisposing factors for diagnostic error in [emergency medicine](#) and [surgery](#). Lack of reliable systems for common outpatient clinical situations, such as triaging acutely ill patients by [telephone](#) and following up on [test results](#), also increases the likelihood of diagnostic error.

Preventing Diagnostic Errors

Given that many diagnostic errors are caused by subtle biases in clinicians' thought processes, some diagnostic errors may be prevented by systems to mitigate the effect of these biases and provide physicians with objective information to assist with decision-making. Clinicians are frequently unaware of diagnostic errors that they have committed, particularly if they do not have an opportunity to see how their diagnoses turned out over time. Therefore, regular feedback to clinicians on their diagnostic performance is essential.

Unfortunately, reliable decision support or feedback systems do not yet exist. One of the earliest uses of information technology in medicine was decision support for clinical diagnosis, particularly for notoriously high-risk and difficult diagnoses such as acute myocardial infarction. However, computerized diagnostic decision support has not yet been proven to improve overall diagnostic accuracy, although active [research](#) continues in this area.

The autopsy has been the "gold standard" for diagnosis since medicine became a profession, but autopsy rates have progressively declined over the past few decades, to the point where a recent editorial raised concern over the "[vanishing nonforensic autopsy](#)." It is recommended that teaching institutions perform autopsies on 25% of inpatient deaths, but few academic hospitals reach this benchmark. The result: not only are clinicians not receiving feedback on their diagnoses, but pathologists are performing fewer and fewer autopsies during their training.

More progress has been made in addressing systems causes of diagnostic error. Information technology has improved clinicians' ability to follow up on diagnostic tests in a timely fashion, which should reduce the incidence of delayed diagnoses. Structured protocols for [telephone triage](#), [teamwork and communication training](#), and [increased supervision of trainees](#) may also lead to improved diagnostic performance. However, studies evaluating the effect of these interventions on diagnostic error rates are lacking.

Finally, there are aggressive [efforts](#) to teach clinicians and trainees about the relevant parts of cognitive psychology. The principal goal is to engage clinicians in "meta-cognition" (reflecting on their own thinking), with the hope that they will catch some of their own misuse of heuristics before they cause harm. A 2016 [systematic review](#) found evidence that these strategies can improve clinicians' diagnostic reasoning in simulated settings. Recent systematic reviews have assessed the evidence base of interventions to prevent [cognitive errors](#) and [systems problems](#) that can lead to diagnostic error.

Current Context

The National Academy of Medicine (formerly the Institute of Medicine) released a [report](#) in 2015 describing diagnostic error as a blind spot in the safety field. The committee made several recommendations to improve diagnosis, including promoting teamwork among interdisciplinary health care teams, enhancing patient engagement in the diagnostic process, implementing large-scale [error reporting systems](#) with feedback and corrective action, and improving health information technology. The report also recommended health care system reforms, including establishing a work system and [safety culture](#) that foster timely and accurate diagnosis, improving the medical liability system to foster learning from missed or delayed diagnoses, reforming the payment system to support better diagnosis, and increasing funding for research in diagnostic safety. Another challenge for addressing diagnostic error is the lack of [measures](#) of diagnostic accuracy. In fact, current quality measurements do not take diagnostic accuracy into account at all, meaning that organizations could score well on quality measures even if patients receive the correct treatment for an incorrect diagnosis.