

Replacing Hindsight With Insight: Toward Better Understanding of Diagnostic Failures

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*“A mistake follows an act [and] names it.
An act, however, is not a mistake;
it becomes mistaken.”*

Paget, The Unity of Mistakes¹

Reviews of malpractice claims have a morbid attraction that is similar to gazing at crash scenes. Both provide the observer with a vicarious, cathartic experience. These stories of tragedy, defeat, and loss seem almost as popular in general medicine²⁻⁶ and emergency medicine⁷⁻¹² as tragedy was in Sophocles's Athens. The reasons for their popularity are the same now as they were then. They support a perception of control that has important psychological, social, and political benefits¹³ by making a complex, chaotic, and irreducibly uncertain world appear to be simpler and more linear.

Closed-claim reviews typically find fault with the thinking or behavior of individual physicians: they failed to order the right test, failed to do a “complete” physical examination, and so on. These assessments conveniently skirt the identification of other causes that have higher stakes. For example, finding flaws in the design of equipment or processes would lead to expensive and embarrassing shutdowns or retooling. Finding management failures would threaten those in charge. But finding that 1 or more workers had a “cognitive breakdown” preserves the status quo and provides a convenient, default conclusion when no other explanation is immediately apparent (or desired). It also allows follow-up actions to be limited to “. . . soporific injunctions about better training.”¹⁴

In this issue of *Annals*, Kachalia et al¹⁵ present a closed claim review of ED cases in which problems in diagnosis were thought to play a role in the adverse outcomes. Diagnostic failures have not received much attention in discussions of patient safety.¹⁶ This is strange, considering that they are said to be the second most common cause of adverse events¹⁷ and malpractice claims.¹⁸ Strange but understandable, though, because understanding diagnosis-related failures is difficult¹⁹⁻²¹ and progress in this area has been slow. Two reasons it has been slow

are reliance on impoverished problem worlds and unrealistic models of human performance, and ignorance of the effects of hindsight bias.

Models of Human Performance

Most inquiries into diagnosis have viewed the physician as an information-processing device that is usually flawed. Decisions and actions are viewed as discrete events rather than as a continuous flow of activity. Informational cues are viewed as clearly available “nuggets” of objective knowledge rather than constructions that workers build from their own expertise and expectancies. Physicians are thought of as individuals working in isolation rather than as heterogeneous groups of clinicians working together. Physicians are presumed to react to some state of the world, rather than anticipating some possible future state and acting to facilitate or forestall it.²² The diagnostic process is viewed as one of either hypothetico-deductive or Bayesian reasoning, rather than perception,²³ and the relationship between diagnosis and the choice of goals and actions is ignored.²⁴ This model of diagnostic thinking does not correspond well to what people in the real world actually do,²⁴⁻²⁶ and its continued use only impedes efforts to understand diagnostic failures.

Viewing diagnosis as a problem of perception and sense-making is a more promising alternative model of human performance. This approach recognizes that real-world problems do not present themselves as givens but must instead be constructed from circumstances that are puzzling, troubling, uncertain, and possibly irrelevant. To convert these circumstances into “problems,” physicians must make sense of an uncertain and disorganized set of conditions that initially makes no sense.²⁷ Here, much of the work of diagnosis consists of preconscious acts of perception^{28,29} and sense-making by physicians who use a variety of strategies to make sense of their real-world context.²⁴

For experts in a field of practice, this problem framing occurs mostly unbidden and without effort. Every July, case presentations by new interns demonstrate that the ability to frame a problem is acquired, rather than innate. These framings are more constructions by the subject than objective aspects of

the external world. An intern's inexpert problem framing conveys random bits from the stream of passing stimuli, instead of familiar situations such as "renal colic," "ischemic pain," or "probable sepsis." This model holds that many diagnostic failures occur before the act of thinking about diagnosis even starts. Rather than being misdiagnosed, the problem is misperceived,³⁰ which explains why those who are later described as "making the wrong diagnosis" saw it at the time as the only reasonable one to make. Assessments and actions that look like "errors" to outsiders who see them in retrospect are unremarkable, routine, normal, even unnoticeable to those who are making them.³¹ Sense-making is a perceptive act that turns circumstances into *situations*, combinations of circumstances at a given moment in a particular context that are imbued with meaning and can serve as a foundation for actions and expectations.^{24,32}

Hindsight Bias

Both hindsight and outcome bias have been convincingly demonstrated in a number of fields, including medicine.³³⁻³⁵ These biases are powerful and insidious and make it hard for historical analyses (such as root cause analysis or closed claim review) to yield useful understandings of accidents or adverse events.^{33,35-40} In hindsight bias, those who know what happened after the fact consistently overestimate what others who lacked that knowledge could have known. Individuals "... who know the outcome of a complex prior history of tangled, indeterminate events, [view] that history as being much more determinant, leading 'inevitably' to the outcome they already know."²⁷ Thus, reviewers who know the outcome of a case glibly judge cues to the correct diagnosis as being much more evident than they actually were and routinely overestimate the probability of the observed outcome. In retrospect, cues not only *might* have been but *could* have been detected. Hindsight bias converts the disjointed and disorganized array of disparate events that the participants faced into a coherent causal framework that the reviewer uses to "explain" what happened.³⁹ Outcome bias is similar. Those who know the quality or desirability of the outcome use it to judge the quality of the process and people involved in obtaining it. For example, knowledge that a patient sustained an injury negatively influences judgment about the quality of care even when no causal relationship exists.³⁵

Hindsight and outcome biases are also preconscious and cannot be overcome by simply willing ourselves to ignore them any more than we can will ourselves to be taller. Cautioning reviewers not to let outcome knowledge influence their judgment is equally ineffective.^{33,39} Hindsight bias is so powerful and so pervasive that some have contended that it must be fundamentally adaptive, arguing that our minds evolved not to understand and explain the past but to quickly and efficiently adapt to the future.^{31,39,41} Making history simple primes us for complex futures by allowing us to project simple models onto those futures. Anxiety over our inability to control threatening events is a significant stressor. Hindsight bias gives

us a sense of control over events, reduces that anxiety, and thus makes effective action easier.

Hindsight bias is the mechanism behind the illusion of "errors" that retrospective analyses of adverse events so eagerly seek to count and examine. "Errors" are like optical illusions: simultaneously convincing and false.^{31,40,42-44} "Errors" (which can only be seen in hindsight) are powerful ways for external observers to organize and impose structure on past events, to reconstruct a past reality. They convert complex and confusing histories into more linear, more certain, and less ambiguous narratives that provide a sort of delusional clarity.^{31,39} As a physician subject in Paget's¹ study of medical failure reflected, "... the errors are errors now, but they weren't errors then."

Questions such as "How could they not have noticed?" and "How could they not have known?" often arise in retrospective examinations of adverse events. These questions arise not because people were behaving bizarrely but rather because *we* (the reviewers) have chosen the wrong frame of reference to understand their behavior.²⁶ We do not learn much by asking why the way a practitioner framed a problem turned out to be wrong. We do learn when we discover why that framing seemed so reasonable at the time.

How to Make Progress

Improving our understanding of problems in diagnosis and providing better tools for physicians will require basic changes in how we understand clinical practice.

First, we must use more sophisticated and nuanced models of diagnostic reasoning^{24,25,29} that accord to what people actually do, rather than what we imagine should be done. This requires abandoning sterile laboratory exercises in favor of studying practitioners in the real world—as it were, "in the wild."⁴⁵ These models require analysts to be particularly sensitive to context and to the preconscious processing abilities that experts in a field of practice use unawares.

Second, we must minimize the effects of hindsight and outcome biases by using techniques from other fields. For example, there are techniques for post hoc analyses that aim to reconstruct the world as it appeared to clinicians at the time of the event.⁴⁶⁻⁴⁸ Reconstruction makes it possible to understand why and how people were led into behavior that seemed so right but turned out to be wrong. This will require attending to the "messy details" of clinical work^{49,50} and long-term, substantive partnerships between clinicians and experts in human performance.

Third, we must avoid the temptation to use data that were collected for another purpose. Many of the data on diagnostic difficulties originate from attempts to allocate responsibility or blame. These data are inherently limited because they were carefully crafted to advance distinct social purposes and are inextricably entangled with the context of their production.

Patient safety has relied for too long on a retrospective "error elimination" strategy that relies heavily on hindsight to identify and eliminate "causes" of "errors." However, physicians are "condemned to live in the future," not the past.⁴¹ A better

approach would be to use experience to better understand current (and future) work ecology—the pattern of constraints that shape opportunities and risks in practice. If we understand the actual circumstances that led to adverse events, we can gain the insights that can be used to make those constraints more evident to clinicians, which will lead to genuine and lasting improvements in the safety of clinical practice.

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**2007 Sports Medicine
Subspecialty Certification and
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The American Board of Emergency Medicine (ABEM), the American Board of Family Medicine, (ABFM), the American Board of Internal Medicine (ABIM), and the American Board of Pediatrics (ABP), will administer the certification examination in Sports Medicine and the recertification examination in Sports Medicine on July 19-21, 26-28, and August 2-4, 2007. The examination will be administered at computer-based testing centers. Candidates will schedule an examination appointment on one of those days.

The eligibility criteria are available from each of the four board offices or on the boards' web sites: www.theabfm.org, www.abem.org, www.abim.org, www.abp.org.

Physicians must submit initial certification applications to the board through which they hold their primary specialty certificate. Physicians certified by more than one of the sponsoring boards may select the board through which they apply. Physicians recertifying must submit their recertification applications to the board through which they hold their initial subspecialty certificate. Upon successful completion of the examination, the board through which the physician submitted the application will award certification.

Application materials will be available from the ABEM office on January 15, 2007, and will be accepted with postmark dates through April 2, 2007. ABFM, ABIM, and ABP diplomates should contact their boards for application cycle information.

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