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# Reducing cognitive errors in dermatology: Can anything be done?

Miles Dunbar, MS,<sup>a</sup> Stephen E. Helms, MD,<sup>b,c</sup> and Robert T. Brodell, MD<sup>a,d</sup>  
*Jackson, Mississippi; Rootstown and Cleveland, Ohio; and Rochester, New York*

An increasing focus on the prevention of medical errors is a direct result of a growing patient safety movement. Although the reduction of technical errors has been the focus of most interventions, cognitive errors, usually more than one error linked together, actually cause the majority of misdiagnoses. This article examines the most common types of cognitive errors in dermatology. Two methods to minimize these errors are recommended: first, cognitive debiasing techniques reduce the common initiating factor of error cascades; and secondly, the application of prospective hindsight attacks the final common pathway that leads to misdiagnosis. (J Am Acad Dermatol 2013;69:810-3.)

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In 1999, the Institute of Medicine published the report *To Err is Human*, which brought widespread attention to the incidence of preventable errors in medicine.<sup>1</sup> Realizing the magnitude of this problem, the medical community mobilized resources in search of approaches to minimize these errors. Adverse medical events resulting from technical errors have been reduced by following evidence-based checklists, promoting hand hygiene, and improving surgical teamwork during procedures.

These systems-related errors are accidents waiting to happen and result from insufficiencies of policies and processes. A dramatic illustration involves a simple 5-item checklist that includes: (1) hand-washing procedures, (2) use of sterile gown and drapes, (3) chlorhexidine scrubbing of patients' skin, (4) avoidance of the femoral vein, and (5) daily checks for the earliest discontinuation of central lines at access sites. This led to a 66% decrease in bloodstream infection rates related to use of central-line catheters in the intensive care unit, saving an estimated \$175 million and 1500 lives in participating hospitals.<sup>2-4</sup> Clearly, checklists provide a cognitive

net to catch mental flaws in memory, attention, and thoroughness inherent in the human condition.<sup>4</sup>

In contrast to system improvements that reduce errors in the ways that we "do," there has been relatively little, if any, published evidence of success in reducing cognitive errors (ie, errors in the way we *think*). Traditionally, this has been attempted through CME and self-assessment courses designed to plug gaps in a dermatologist's knowledge base. This article suggests a methodology to reduce cognitive errors by encouraging dermatologists to make changes in their thought processes.

## COGNITIVE ERRORS: A COMMON PROBLEM

Autopsy studies have shown that between 10% and 15% of all diagnoses are inaccurate.<sup>5-7</sup> Cognitive errors contribute to 74% of these diagnostic errors. Furthermore, diagnostic errors are the second most common cause of nonoperative adverse medical events, surpassed only by adverse drug reactions.<sup>6,8,9</sup> Fortunately, the field of dermatology, being a visual specialty, may have a somewhat lower diagnostic

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From the University of Mississippi School of Medicine<sup>a</sup>; Internal Medicine, Dermatology Division, Northeast Ohio Medical University, Rootstown<sup>b</sup>; Dermatology, Case Western Reserve University, Cleveland<sup>c</sup>; and University of Rochester School of Medicine and Dentistry.<sup>d</sup>

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Reprint requests: Robert T. Brodell, MD, University of Mississippi School of Medicine, 2500 N State St, Jackson, MS 39216. E-mail: [rbrodell@umc.edu](mailto:rbrodell@umc.edu).

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error rate. Several studies on diagnostic errors in other perceptual specialties (specifically pathology and radiology) have shown that these fields have a diagnostic error rate near 5%.<sup>7</sup> A recent publication focused on self-reports of 150 dermatologists reporting their most recent and most serious errors.<sup>10</sup> The vast majority of 282 self-reported errors were technical in nature, with only 19 cognitive errors in diagnosis.<sup>10</sup> We believe this is a significant underestimation of cognitive errors and reflects the focus on technical errors in the literature. Regardless of a specific rate, dermatologists all agree that we must strive to reduce errors as much as possible.

### TYPES OF COGNITIVE ERRORS

In the quest to find strategies for reducing cognitive errors, Graber et al<sup>6</sup> dissected cases of known diagnostic error to determine their causes and, more importantly, classify them in an organized manner. In 100 cases of diagnostic error, they identified 320 contributing cognitive errors, which were classified as relating to faulty synthesis, faulty knowledge or skills, or faulty data gathering.

Faulty synthesis accounted for 264 of the 320 (83%) instances of cognitive factors leading to diagnostic error. Faulty synthesis is a broad description of 18 subcategories of cognitive factors leading to diagnostic error that share “flawed processing of the available information.”<sup>6</sup> The remaining 54 of the 320 (17%) instances were the result of faulty knowledge or skills or faulty data gathering.

Of the subcategory of faulty synthesis, premature closure (failure to consider alternate diagnostic possibilities) was the single most common error. This is best defined as jumping to conclusions. It was a contributing factor in 39 of the 100 cases of diagnostic error.<sup>6</sup> Although premature closure was common, it was rarely the sole factor leading to misdiagnosis. In fact, in the cases of misdiagnosis that resulted from cognitive errors, there was an astonishing average of 4.3 distinct cognitive errors per case.<sup>6</sup> Using a Pearson *r* test for correlation, it can be demonstrated that the co-occurrence of cognitive factors is not random; they occur in recognizable patterns or clusters. There is also a degree of predictability in these cascades. Premature closure was present in the 3 most common clusters of factors leading to diagnostic error, and it was usually the final cognitive error that was ultimately responsible for the misdiagnosis. Because of this, it represents a critical target for preventive strategies.<sup>6</sup>

Just as there is a final common pathway, there may be a common initiating factor in the category of faulty synthesis. The initial factor is rooted in heuristics, the nonanalytic process of pattern

recognition that is subject to biases, or the more recently coined term “cognitive dispositions to respond.” Heuristics are mental shortcuts that allow a dermatologist to make visual flashcard diagnoses. They are deeply rooted in an individual’s past experiences. This introduces 2 potential flaws in cognition: (1) pattern recognition replaces objective scrutiny, and (2) personal anecdotal evidence is used. The first leads to an acceptance of superficial similarities, and the second ignores scientifically validated evidence-based medicine.<sup>7,11,12</sup> The presence of these biases suggests that cognitive errors are predictable and most probably preventable to some degree.

### PREVENTION OF COGNITIVE ERRORS

Many strategies for reducing cognitive error have been proposed. Perhaps the 2 most productive approaches are: (1) cognitive debiasing techniques, which focus on the most common initiating factor in error cascades, and (2) prospective hindsight, which targets the final common pathway leading to misdiagnosis.

#### Cognitive debiasing techniques

Cognitive dispositions to respond (biased heuristics) often, and perhaps always, influence the diagnoses made by dermatologists. Cognitive bias usually occurs without any awareness on the part of the physician.<sup>7,12-14</sup> It is logical that the adverse effects of cognitive dispositions to respond can be reduced by educating dermatologists to recognize them, thus reducing tendencies to distort sound clinical decision-making.<sup>12,14</sup> The goal is that dermatologists will then recognize these errors in their clinical practice (Table D). Each of us should try to avoid:

- 1) *Availability error*: this refers to the disposition to judge things as being more prevalent if they come readily to mind.<sup>5,7</sup>
- 2) *Representativeness restraint*: this refers to the tendency to focus on prototypical features associated with a disease. Representativeness restraint affects the clinical dermatologist in 2 distinct ways. First, it fosters a tendency to ignore diagnoses when the presentation of a disease is atypical (does not seem to fit the prototype). Secondly, it engenders a bias toward attributing a diagnosis to a condition that fits the most obvious, often very superficial, similarities of an established prototype.<sup>5,7,14</sup>
- 3) *Anchoring*: this refers to a tendency to favor an initial working diagnosis and often causes the

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