VIEWPOINT

Management Reasoning
Beyond the Diagnosis

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Clinical reasoning—the integration of clinical information, medical knowledge, and contextual (situational) factors to make decisions about patient care—is fundamental to medical practice.[1-3] Poor reasoning is an important cause of medical error; for example, diagnostic errors are thought to contribute to approximately 10% of patient deaths and hospital adverse events.[4] Most research in clinical reasoning has focused on decisions related to diagnosis, ie, diagnostic reasoning.

By contrast, management reasoning—which we define as the process of making decisions about patient management, including choices about treatment, follow-up visits, further testing, and allocation of limited resources—remains less well understood.[2,3] Paradoxically, management actually may be more important: diagnosis is only a means to an end (namely, proper management),[5] clinicians must frequently manage patients before making a definitive diagnosis, and diagnosis often hinges on management decisions (eg, choices regarding additional diagnostic testing). The distinction of diagnosis and management is not new; for example, informaticians commonly distinguish diagnostic support tools from drug prescribing tools. However, research in the cognitive processes of management reasoning is not well developed.

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A better understanding of management reasoning could help to expand the current conception of medical error and may offer potential insights regarding error prevention, clinical practice quality improvement, overuse and appropriate use of diagnostic tests, and training and assessment of health professionals.

Features of Diagnostic and Management Reasoning

Diagnostic reasoning is primarily a classification task that assigns meaningful labels to a constellation of symptoms, examination findings, and test results.[1] These labels, which often connote a specific underlying pathology, shape the clinician's and patient's understanding of the underlying illness and facilitate communication among team members and with the patient.[5] By contrast, management reasoning is primarily a task of prioritization, shared decision making, and monitoring, and is typically more complex. Management reasoning differs from diagnostic reasoning in at least 5 ways.

First, diagnoses can be established as correct or incorrect. Different labels might appropriately be assigned to a given constellation of clinical findings (eg, "upper respiratory infection" or "acute sinusitis"), and for some diagnoses (eg, chronic Lyme disease) controversy exists regarding exactly what the label signifies. Nonetheless, the correctness of each label as an accurate reflection of the underlying illness can (at least in theory) be determined. Conversely, in management, the answer is often, "It depends." Patient preferences, societal values, logistical constraints, and resource availability appropriately influence management decisions. There are usually multiple paths to a successful outcome, and often multiple acceptable outcomes. Management reasoning involves contrasting, prioritizing, and selecting among the myriad reasonable (defensible) options.

Second, management plans are influenced by, and management reasoning must integrate, the preferences, values, resources, and constraints of the patient, clinician, other health care professionals, the institution, and payers.[6] Diagnostic reasoning, by contrast, is generally not influenced by values and preferences. A man with chest pain either is or is not experiencing a myocardial infarction regardless of his wishes or preferences, ability to pay, or proximity to a cardiac catheterization suite. The management plan (eg, whether to perform cardiac catheterization) depends on all these factors.

Third, diagnosis can often be done in isolation from the patient. A clinician can review recorded clinical information (history, examination findings, test results) and render a diagnosis; indeed, this is commonly done in solving clinical vignettes. Conversely, management decisions usually require communication and shared decision making with the patient and often with others including nurses, social workers, hospital administrators, insurance agencies, and public policy makers, each of whom could have an interest in how a condition is managed. Although multiple-choice questions frequently recognize only one "next best step in management," in reality, selecting the best option nearly always requires some element of negotiation.

Fourth, management plans are inherently fluid and require ongoing monitoring and frequent adjustments. Experienced clinicians can often anticipate such adjustments ("We will start with lifestyle measures; if blood sugar remains high after 3 months, we will start metformin and might subsequently add glimepiride.") but the plan remains incompletely specified at any given moment. Conversely, diagnoses can typically be definitively assigned at a given point in time. The diagnosis might subsequently change over time ("stage II prostate cancer"

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becomes "prostate cancer in remission" or "stage IV prostate cancer"), but this does not invalidate the correctness and completeness of the initial diagnosis.

Fifth, diagnostic reasoning involves a finite range of solutions and interacting factors. Additionally, some uncertainties in diagnosis (eg, incomplete information) can be accommodated by applying less-specific labels (eg, accepting a diagnosis of "community-acquired pneumonia" without trying to specify the causative pathogen). By contrast, management reasoning involves a dynamic interplay among people, systems, settings, and competing priorities, and is thus inherently complex and contextually "situated."[7] Moreover, management often entails more uncertainties (eg, unpredictable response to treatment) and these uncertainties often require a more detailed plan (ie, broader-based treatments, more contingencies, more frequent monitoring).

Research Priorities

Several areas of management reasoning require further research. First, management reasoning is taught, assessed, and then practiced under the presumption that it involves cognitive processes similar to diagnostic reasoning. This presumption should be tested. For example, experts commonly incorporate highly efficient and accurate pattern recognition processes in rendering a diagnosis.[2] Yet the explicit consideration of treatment costs and benefits, the use of rubrics to guide management decisions, and the integration of each patient's unique circumstances all suggest a deliberate, analytical process. As such, the balance among these cognitive processes may differ for management reasoning.

Second, better understanding is needed regarding how to define and recognize management errors. In contrast with diagnoses, for which a definitive correct/incorrect judgment can (at least in theory) usually be made, multiple reasonable management options nearly always exist.[7] It is also difficult to judge the correctness of patient preferences and how these are integrated; clinicians with effective yet different communication approaches might elicit different values or prioritize values differently, resulting in different management decisions. A good management plan might result in a poor clinical outcome (progression of cancer despite optimal therapy), a suboptimal plan might result in a good outcome (antibacterial treatment for viral respiratory infection), and a plan based on an incorrect or uncertain diagnosis might be correct for the diagnosis but suboptimal overall (aspirin for myocardial ischemia subsequently characterized as caused by coronary artery dissection). These issues might be simplified in nonclinical research settings by controlling key aspects of the clinical problem (eg, the information in a vignette or the specificity of a diagnosis), but in both controlled and clinical research settings the definition of management error requires careful consideration.

Third, research is needed to determine how to teach management reasoning, both in training and continuing into practice. Essential competencies include shared decision making, integration of stakeholder preferences (ie, those of patients, health care professionals, institutions, and payers), and monitoring of treatment response, yet how to optimally facilitate learning these and other management skills remains unknown. Clinicians must also learn to acknowledge complexity and act under conditions of uncertainty. Assessment of management reasoning must not only address these skills, but also use methods that accommodate multiple plausible solutions.

Fourth, strategies that support management reasoning in clinical practice need to be identified and implemented. In particular, tools and processes will be needed to help manage the interacting and situation-specific factors (ie, characteristics and preferences of the patient, clinical team, and health care system) that make management complex and potentially overwhelming. These strategies might include involving all members of the health care team in eliciting preferences, educating patients, articulating a plan, and monitoring therapy; implementing novel technologies to support management tasks (eg, computer-generated or crowdsourced treatment recommendations; tools that support clinicians in identifying and prioritizing multiple alternative plans); facilitating access to information that supports the integration of patient values and preferences (eg, decision aids explaining the patient-specific prognosis and benefits, risks, and out-of-pocket costs of potential test and treatment options); and monitoring the cognitive task load to permit intervention before it exceeds the clinician's cognitive capacity. Research and practice innovations have already identified both problems and potential solutions in this area[4]; viewing these issues through the distinct lenses of diagnostic and management reasoning may facilitate additional insights.

ARTICLE INFORMATION

Published Online: May 10, 2018. doi:10.1001/jama.2018.4385

Conflict of Interest Disclosures: All authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none were reported.

Disclaimer: The views expressed herein are those of the authors and not necessarily those of the Department of Defense or other federal agencies.

Additional Contributions: We thank Larry Gruppen, PhD (Department of Learning Health Sciences, University of Michigan, Ann Arbor), for his substantial contributions in elaborating the ideas expressed in this article; he did not receive compensation for these contributions.

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