Decision - Diagnosis: An Introduction to Diagnostic Error and Medical Decision-Making

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Abstract

Introduction: Despite the importance and ubiquity of the diagnostic process, diagnostic errors are common and costly, with respect to both health care spending and patient morbidity and mortality. Medical educators then have a duty to address diagnostic errors as part of their quality improvement and patient safety curricula. Given these challenges and the existing educational gap, we created a curriculum in diagnostic reasoning and diagnostic error. Methods: This 1-hour lecture provides a robust introduction to the topic of diagnostic as well as an opportunity for structured self-reflection about learners’ own experience with diagnostic errors. The educational outcomes were developed not only to give learners the knowledge and skills they need to improve the diagnostic process and decrease diagnostic error but also to cultivate and demonstrate attitudes of humility and openness about diagnostic reasoning and error for learners and faculty. Results: This work has been presented and evaluated in the standalone format included here and adapted for use during full- and partday workshop sessions. It was well received by learners and effective at improving both internal medicine and pediatric resident knowledge about medical decision-making and cognitive biases. Discussion: This educational activity is an important contribution to implementing focused educational interventions about diagnostic error and medical decision-making, and can serve as an introduction for a larger curriculum or as a stand-alone educational activity.

Keywords

Heuristics, Cognitive Error, Cognitive Bias, Diagnostic Error, Medical Decision-Making

Educational Objectives

By the end of this session, learners will be able to:

1. Recognize different types of thinking used in medical decision-making and identify the strengths and weaknesses of different thought processes.
2. Explain the prevalence and impact of diagnostic errors and the factors that contribute to this type of error.
3. Define common cognitive biases that occur in daily practice.
4. Identify at least one cognitive strategy that they can immediately implement to reduce the occurrence of cognitive errors.

Introduction

An estimated 10% to 15% of inpatient diagnoses and 5% of outpatient encounters involve diagnostic error, defined as a missed, delayed, or incorrect diagnosis. Diagnostic errors also have a marked impact on health care providers, and the emotional effects of diagnostic error can be long-lasting and harmful. Given the prevalence of diagnostic errors, medical educators have a duty to address them as part of their quality improvement and patient safety curricula. There is a call to better address this type of error from high levels, including the Institute of Medicine (now the National Academy of Medicine) and the Joint Commission. However, most current quality improvement and patient safety curricula have not explicitly...
addressed diagnostic error. On September 22, 2015, the Institute of Medicine released a report on diagnostic error in health care. This report is a call to action for patients, families, providers, and educators. Currently, there are minimal publicly available, peer-reviewed educational resources to comprehensively address the issue of diagnostic error. One prior MedEdPORTAL publication provides an introductory overview of cognitive error. We have built upon this prior work by creating a lecture and self-reflection exercise that provide a deeper look into the scope of and contributors to diagnostic errors, additional information on the dual-system processes involved in medical decision-making, and exploration of additional cognitive biases. We have taken an interactive, case-based approach that encourages audience participation. Speaker notes indicate areas of the talk that can easily be customized to incorporate personal stories. We have found that learners in our respective institutions have responded best to content that feels personally and locally relevant. Hearing a clinician they personally know describe his/her own experiences with error highlights the fact that this affects us all.

In conducting a needs assessment with residents, survey data from 64 residents (93% response rate) revealed that 98% of residents agreed that it was possible to reduce cognitive errors and that reduction of cognitive errors would improve patient safety. Ninety-five percent of residents also felt that they had a significant role in reducing cognitive errors, but only 27% were aware of strategies they could use to reduce or eliminate cognitive errors. Only 33% percent of residents felt encouraged by their supervisors to discuss cognitive errors, and only 54% had seen discussion of cognitive errors modeled by their supervisors. A review of literature on this topic revealed to us that this problem was not unique to our institution.

Therefore, we created a curriculum on medical decision-making and diagnostic error to close the gap between residents’ desire to reduce diagnostic error and their knowledge and empowerment to do so. This module provides foundational content on the topic of medical decision-making and cognitive error. Ongoing conversation is crucial to empowering providers to address and reduce diagnostic errors. This module sets the stage, giving participants a shared sense of urgency and a common lexicon for continuing dialogue.

Methods
This resource includes an introductory lecture (Appendix A) and self-reflection exercise (Appendix B) that will take 45 to 60 minutes to deliver, depending on pacing of the speaker and engagement and questioning with the audience. Faculty should prepare by reviewing the materials prior to the session and be open to sharing their own experience with diagnostic errors. The content is primarily delivered through the speaker, with images and words on the slides meant to enhance—but not duplicate or replace—the spoken word. The slides themselves will not stand alone without use of the speaker notes. Thus, it will likely be helpful to practice delivering the presentation at least once. If you will be using this introductory lecture as a stand-alone lesson, we strongly encourage you to devote 10-15 minutes to have learners perform the self-reflection exercise. This can be done immediately at the end of the session or up to 1 week later at the beginning of another educational session.

This presentation is meant to be interactive. Encourage participants to provide answers to questions that are embedded in the lecture. You may wish to do this through calling on audience members, asking for volunteers, or taking time to do a pair share at one or two points throughout. Use personal stories from your home institution; this can easily be achieved by substituting your own stories for those in the speaker notes. This creates a sense of authenticity. Also included in this resource are a list of key references (Appendix C) and a printable PDF version of the introductory lecture (Appendix D).

Results
This work has been presented in the stand-alone format included here and also adapted for use during full- and part-day workshop sessions. We have also delivered this lecture as the initial session in a multimodule curriculum on diagnostic error and medical decision-making at the University of Minnesota for pediatrics and internal medicine—pediatrics combined residents.
Over 6 months of participation in the complete curriculum and in measurement of internal medicine residents who participated in a half-day workshop, residents uniformly improved performance between the pretest and posttest on content knowledge questions regarding medical decision-making and cognitive biases.

Residents were surveyed at the beginning and end of year one of the longitudinal curriculum. On a scale of 1 (strongly disagree) to 5 (strongly agree), residents rated sessions at an average of 4.2 in response to “I feel that this block education session will improve my future practice in pediatrics” (n = 47, 68% response rate). Residents also showed significant improvements in ability to define various cognitive errors (mean score 1.23 out of 7 vs. 4.18 out of 7, p < .05). In response to “I am aware of strategies I can use to reduce the impact of cognitive errors in my patient care,” 45% of residents responded agree on the pretest versus 94% on the posttest (p < .0001). These data were presented at the Diagnostic Error in Medicine 8th International Conference.9

Former residents were contacted 12 months after completing 2 years of the longitudinal curriculum on diagnostic error, for which this was the introductory lecture. One hundred percent of residents who responded to the postsurvey (N = 22, 32% response rate) agreed that the curriculum was helpful overall. After the curriculum, residents were more likely to be aware of strategies to decrease diagnostic error (30.5% vs. 72.7%, p < .05). They also rated themselves as likely to consider the impact of cognitive biases (3.8 on a 5-point Likert scale) and discuss their reasoning with patients, families, and colleagues (3.8 on a 5-point Likert scale).

**Discussion**

Diagnostic reasoning is fundamental to safe, effective, and high-value health care, and development of diagnostic reasoning is one of the most important attributes in medical education. However, the diagnostic process is complicated, and the methods by which one makes diagnostic decisions evolve as one gains medical knowledge and experience.11 Further, different clinical situations require different approaches to diagnostic reasoning, including pattern recognition, algorithm following, and hypothetico-deductive reasoning. The complexity and variation in the diagnostic process, coupled with the fact that the process occurs in our heads, make education explicitly about the diagnostic process complicated.1213 This is likely the reason that few curricula heretofore have addressed the diagnostic process directly.

There are some challenges to implementing this module for learners. First, faculty facilitating the session must be open about their own errors and avoid judgment and negativity when errors are discussed. The session must be completely safe, and the errors should be discussed in a respectful and consistently confidential manner. Second, if the culture of a program does not allow for open discussion of error and its emotional impact, this curriculum is unlikely to be effective. Lastly, programs must commit to discussing errors and the diagnostic process during the course of learners’ clinical activities in addition to this formal educational activity.

We believe this to be an innovative contribution to the body of educational materials about diagnostic error and to be robust in its approach. Adoption of this curriculum is an important first step in improving the diagnostic process, analyzing diagnostic errors, and ensuring trainee emotional safety.

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Disclosures
None to report.
Funding/Support
Andrew Olson receives grant funding from the Doctors Company Foundation to develop and evaluate a medical student curriculum about diagnostic error and medical decision-making. Emily Ruedinger and Andrew Olson have received travel support from MedU, a nonprofit designer of virtual patient cases for medical students. Andrew Olson’s grant and Emily Ruedinger’s travel funding were awarded after the development and implementation of the content submitted here.

This study was supported by a Clinical Care Innovation Challenge Award from the Association of American Medical Colleges (Emily Ruedinger and Andrew Olson). A portion of Emily Ruedinger’s time was supported by training Grant Number T71MC00006 from the Maternal and Child Health Bureau (Principal Investigator: Michael Resnick).

Ethical Approval
This publication contains data obtained from human subjects and received ethical approval.

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Received: September 2, 2015  |  Accepted: February 25, 2016  |  Published: April 14, 2016