

# **Diagnostic Decision Support Systems: Why Aren't They Used More And What Can We Do About It?**

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Clinical decision support systems have been promoted as one of the key features of electronic health records most likely to lead to a real transformation in our healthcare system. A major concern, however, is that often these systems are underutilized. Decision support features are often not used and clinicians frequently ignore, override, or fail to seek out suggestions that could improve care.

This underutilization may be even more true for diagnostic decision support systems (DDSS), which were some of the earliest examples of medical informatics innovations. This presentation will explore some of the reasons behind the lack of utilization and will offer design and implementation suggestions to improve the use of systems. It will focus on the aspects of the technology, the users, and the current healthcare environment that lead to less than optimal use of DDSS, despite evidence that diagnostic errors represent a significant source of medical errors and adverse events.

There have been a variety of DDSS that focus on specific problem areas, some of which utilize artificial intelligence approaches and others use statistical pattern recognition models. However, this presentation will focus primarily on the broad-based systems designed to address a variety of diseases in Internal Medicine and Pediatrics.

As background to the discussion of DDSS, the presentation will begin with an overview of the extent and impact of diagnostic errors, followed by what is known about diagnostic decision making<sup>1</sup>. It will draw on a variety of literature from psychology, as well as research in medical education and medical decision making. This literature will include efforts to teach and assess physician problem solving, as well as efforts to improve decision making.

This discussion will be followed by a description of the functions of DDSS and a brief history of DDSS development and evaluation<sup>2</sup>. Examples will be drawn from several DDSS, some of which are currently commercially available today. The discussion will also include a description of results of studies that specifically examined the effectiveness of

DDSS on improving users' diagnostic and work-up decisions<sup>3-5</sup>.

The remainder of the discussion will include an examination of those features of (1) DDSS design and implementation, (2) the current healthcare system and, (3) DDSS users that together lead to an underappreciation of the extent of diagnostic errors, failure to recognize the role that DDSS can have in healthcare, and lack of use of system suggestions. Specific aspects of DDSS that are addressed include the need for users to select relevant patient data, enter it into the DDSS (usually by means of a controlled vocabulary), and review what is often a lengthy list of diagnostic suggestions. The challenges for proper utilization that result from these and other design features will be examined. In addition, we will review aspects of the healthcare system that make appropriate use of DDSS a challenge. These include its fragmentation, time pressures, lack of electronic capture of patient outcomes, and reimbursement mechanisms. Finally, characteristics of clinicians that impact DDSS use will be discussed.

The presentation will conclude with suggestions for the role that medical informaticians can play in strategies for effective design and implementation of DDSS and other applications to improve diagnostic decision making.

## References

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4. Berner ES, Maisiak RS, Heudebert GR, Young KR, Jr. Clinician performance and prominence of diagnoses displayed by a clinical diagnostic decision support system. *AMIA Annu Symp Proc* 2003;76-80.
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## Biosketch

**Eta S. Berner, Ed.D.**, is Professor, Health Informatics Program, Department of Health Services Administration, University of Alabama at Birmingham. Her research interests focus on the evaluation of CDSS, with a special interest in physician problem-solving and diagnostic decision support systems. She recently completed an AHRQ-funded project on evaluating PDA-based decision support tools. In addition her funding support from AHRQ, her research has been supported by the National Library of Medicine, the National Board of Medical Examiners, and the HRSA Bureau of Health Professions. Her current research on physician diagnosis and decision support is funded by the Paul Mongerson Foundation within the Raymond James Charitable Endowment Fund.

Dr. Berner has a strong teaching and publication record in the area of medical problem-solving and CDSS. She has been teaching graduate informatics students on the topic of CDSS for over ten years. She is also director of a new AMIA 10 x 10 course. Her CDSS publications have appeared in the *New England Journal of Medicine*, *JAMIA*, *MD Computing*, the *Journal of Healthcare Information Management*, the *AMA Virtual Mentor* series, as well as the *AMIA Proceedings*. Dr. Berner was also invited to write a book chapter on CDSS in the third edition of Ball et al, *Healthcare Information Management Systems* (Springer, 2004) and she is editor of the book, *Clinical Decision Support Systems: Theory and Practice* (2<sup>nd</sup> edition in press, Springer, 2006).