

Chapter 13

New Technologies in Personalized Decision Support to Enhance Patient Choice: Applications and Challenges

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ABSTRACT

Medical decisions are difficult when there are two or more reasonable options and each option has good and bad features that different people may value differently because of differences in health, risk factors, preferences, or values. Personalized decision support tools are being developed in many areas, but two particularly promising areas are patient decision aids and Risk Prediction Models (RPMs). These personalized decision support tools can help patients and/or providers make better decisions about preventing, managing, or treating disease, taking into consideration specific aspects of an individual patient that distinguish them from an 'average' patient or the population at large. Decision aids tend to focus on individual differences in preferences and values, whereas RPM's focus on individual differences in clinical, biological, and behavioral risk factors. There are tremendous opportunities with both approaches, and both have been shown to be able to improve clinical judgment and decision making. Decision support tools are needed that provide personalized service that addresses important individual differences in biology, values, and preferences, and that targets the provider-patient dyad.

INTRODUCTION

Medical decisions are especially difficult when there are two or more reasonable options and each option has good and bad features that different people may value differently. What may be

important for one person may be unimportant for another, and no clear answer applies to everyone. Differences may be due to differences in personal values and preferences, or to differences in medical history, family history, or genetic or behavioral risk factors that make one person more of less

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susceptible to the benefits or harms of a treatment option. Patient decision aids and risk prediction models are types of personalized decision support that are increasingly being used to help patients make more informed treatment decisions. Both are attempts to abandon ‘one-size-fits-all’ medicine, but one (decision aids) primarily focuses on individual differences in preferences and values (implicitly assuming that differences in clinical risk factors either do not exist or are not important); the other RPMs focus on individual differences in clinical, biological, and behavioral risk factors, implicitly assuming that differences in preferences and values are unimportant or will sort themselves out once patients are aware of their risks.

There are many chronic diseases, such as diabetes, where different patients may benefit from different treatment goals due to differences in age, the presence of other health conditions (comorbidities), and their ability to care for themselves and manage their disease. These differences require that doctors provide a highly personalized form of care, tailoring treatment goals and treatment approaches accordingly.

Patient safety is a growing concern (Kohn, et al., 2002) and many clinical decision support systems focus on reducing errors resulting from medication ordering, dispensing, and administration. Computerized Physician Order Entry (CPOE) is a type of decision support system that integrates a knowledge base (about medications) with patient clinical information (the electronic health record). CPOE target health care providers, not patients themselves, and can generate patient-specific recommendations and alerts for the prescriber about drug allergies, drug interactions, and recommended follow-up laboratory testing. CPOE has been shown to reduce length of stay, reduce repeat laboratory testing; reduce turnaround times for laboratory, pharmacy and radiology requests, and potentially result in cost savings (Metzger, et al., 2008; Kaushal, et al., 2003; Birkmeyer, et al., 2002).

However, some of the challenges with such patient-specific clinical decision support systems are that the clinical alerts they generate are frequently overridden (49-96%) (Van der Sijs, et al., 2006) and often result in ‘alert fatigue,’ also known as ‘pop-up’ fatigue (Weingart, et al., 2003). Use of a parsimonious set and tailoring warnings to the needs of the particular clinical environment would help reduce the problem of too many warnings and resulting alert fatigue (Shah, et al., 2006). However, most CPOE are neither parsimonious nor tailored to the clinical environment (Kuperman, et al., 2007). Personalized decision support can help patients and/or providers make better decisions about preventing, managing, or treating disease, taking into consideration specific aspects of that patient that distinguishes them from an ‘average’ patient or the population at large. It can also help patients be more active partners in decision making, potentially helping to promote what is termed ‘shared decision making’ or ‘informed decision making,’ thus helping to support more patient-centered care. Shared decision making is defined as ‘involvement of both the patient and doctor, a sharing of information by both parties, both parties taking step to build a consensus about the preferred treatment, and reaching an agreement about which treatment to implement’ (Charles, et al., 1997).

Clinical Decision Support has been defined as “the act of providing clinicians, patients, and other health care stakeholders with pertinent knowledge and/or person-specific information, intelligently filtered at appropriate times, to enhance health and health care.” (Osherooff, et al., 2006). It encompasses a broad range of clinical tools and interventions, including computerized alerts and reminders, clinical guidelines, order sets, patient data reports and dashboards, documentation templates, clinical workflow tools, diagnostic support, risk prediction models, and patient decision aids. Though some of these tools have improved some outcomes at some health care institutions, their

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