EDITORIAL

How EHR-based clinical decision support promotes patient-centered care

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Delivering patient-centered care is a national healthcare priority, as articulated by the Institute of Medicine and others [1]. In our roles as clinicians of various disciplines and roles, we aspire to deliver care that is not only patient-centered, but also safe, timely, effective, efficient and equitable. To do this 20 or more times a day is no small challenge, and shortcomings in our efforts to deliver patient-centered care have been widely noted for a long time [2].

Models intended to guide improved care for patients with diabetes and other chronic conditions emphasize the need for team care that can be aided substantially by innovative use of health information technology [3]. Relatively new tools, especially the electronic health record (EHR), can enable us to provide patient-centered care in a more consistent and coordinated way than any of us could have even imagined just a few years ago.

How EHR-based clinical decision support works

Current diabetes clinical guidelines are lengthy and include dozens of evidence-based recommendations that may improve clinical outcomes for patients in certain circumstances. As the patient's clinical state changes over time, the safest and most appropriate clinical response may also change. It takes approxiamtely 4 min of provider time and over 40 clicks on the computer to gather all the clinical data needed to identify clinical actions that are available and appropriate for a given diabetes patient at a given encounter. However, by deploying clinical algorithms within EHRs to gather and interpret relevant clinical information needed to guide diabetes care, complete information can be displayed automatically, or by a single click, along with specific 'what drug, what dose' clinical decision support recommendations.

While this capacity may sound a bit futuristic, it is available today and has already been shown in randomized trials to improve glucose control and some aspects of blood pressure (BP) control even in settings with a relatively good baseline quality of diabetes care [4]. It is important to note that these clinical algorithms actually constitute an adaptive care plan that automatically responds to changes in patient state with new, and clinically appropriate recommendations.

Which evidence-based clinical recommendations are of greatest benefit?

There are many evidence-based (class A) recommendations in the American Diabetes

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Association Standards of Diabetes Care, but it is clear from the medical literature, as well as from clinical experience, that not all 'evidence-based' clinical actions are equally beneficial to a given patient at a given point in time. Some actions will be of much greater benefit to a patient than others. For example, depending on the distance from goal, intensity of therapy and overall risk of complications, intensification of glucose control may be more beneficial for Mr Jones than additional efforts to control BP. However, if Mr Jones is a smoker, tobacco cessation would confer more benefit than either better glucose or BP control would. Risk equations embedded in the clinical decision support system can take all of these factors into account instantly, and provide the clinician with a prioritized list of clinical actions that would benefit Mr Jones, from most to least benefit, among those clinical actions that are evidence based and would confer at least some risk reduction.

Moreover, some evidence-based recommendations may actually harm a given patient at a given point in time. For example, the UKPDS demonstrated that metformin as a first-line therapy in Type 2 diabetes substantially reduces macrovascular complications [5]; but in patients with congestive heart failure or chronic kidney disease, the use of metformin may be dangerous. The clinical algorithms can quickly identify potentially risky medication combinations, or medication–condition combinations, and alert the care team to remedy the situation.

Patient-centered care
Patient-centered care involves more than adaptive clinical algorithms that personalize and prioritize care recommendations. Patient-centered care must consider and respond to the preferences of a patient for particular clinical actions (or nonaction). It is extremely useful to present prioritized care recommendations to patients at the point of care. Patients have different levels of health literacy and numeracy, and strategies to tailor the presentation of risk and benefit information to individuals are still very much in flux. This is an area where readers of this article may wish to use clinical experience and insights to help move diabetes care forward. Many novel approaches including patient dashboards, websites, social media networks and others are being developed and implemented. It is likely that 'one size will not fit all' and that multiple strategies will be needed to inform patients of the risks and benefits of available clinical options and elicit informed patient preferences.

Implications for clinical roles & coordination of care
EHR-based clinical decision support provides a useful, adaptive care plan for individual patients. In developing a set of treatment recommendations, clinical algorithms consider many patient-specific factors such as age, gender, comorbidities, current treatment, distance from goal, medication allergies and renal function. However, one may appreciate that while recommendations are personalized, they are also standardized. Another patient, in the same scenario, will get the same set of recommendations. Moreover, no matter which team member the patient may be in contact with, the EHR-based clinical decision support systems will always update the patient state and provide consistent recommendations. This feature represents a powerful new tool to coordinate care. No matter who is seeing the patient, once the clinical goals are agreed upon, the algorithms will assure that the care plan will be logical, tailored to goals and will produce consistent results.

The clinical algorithms embedded in the EHR (or loaded in a website linked to the EHR) are designed to consider not only glucose control, but also BP control, lipid control, tobacco use, aspirin use and overweight/obesity. These are the major cardiovascular risk factors, and the clinical action with the most benefit will not necessarily be glucose control – improved control of BP, lipids and smoking may be the clinical action that is most beneficial or that is preferred by the patient in many instances.

Therefore, the clinical team must include clinical competency in control of a whole range of risk factors beyond glucose control. In this milieu, the value that diabetes educators and other diabetes care team members bring to a medical group or patient population is directly proportional to the range of risk factors for which they may competently provide care. If nutritionists and diabetes educators and other care team members developed the clinical competency to manage not only glucose, but also lipids, elevated BP, aspirin use, BMI and tobacco use then care would probably become less expensive and more effective.

Finally, it is worth pointing out that the use of EHR-based clinical decision support tools is not limited to supporting better care for adults

with diabetes. We started with a tool that was oriented to adults with Type 1 or Type 2 diabetes, dubbed Diabetes Wizard. But we have subsequently developed Cardiovascular Wizard, which prioritizes care, applies to all adults regardless of diabetes status and includes a patient interface as well as a provider interface to convey a prioritized list of clinical actions that will substantively reduce risk of complications [6]. Many medical groups and researchers are racing to add additional clinical domains to the Wizards of the world, with the likely addition of depression, chronic kidney disease and chronic pain management high on the list of conditions that merit attention and adaptation to this clinical decision support tool.

Conclusion

Widespread adoption of EHR across the USA is ushering in an era of new approaches to diabetes care. EHR systems often provide a workable platform for sophisticated clinical decision support algorithms that are a major component of patient-centered healthcare. Other key components are prioritization of actions based on clinical benefits to patients, and the development of methods to accurately convey risk and benefit information about alternative treatments to patients in a nonbiased way. Finally, for patient-centered care to become a reality, expanding the

skill set of diabetes educators to include basic management of other major risk factors for complications is urgently needed. These risk factors include glucose, but also extend to BP, lipids, smoking cessation, aspirin use and proteinuria. The expansion of the skill set of certified diabetes educators to include these additional dimensions may be easy for some, and more challenging for others, but there is little doubt that as we move towards truly patient-centered care, old clinic routines will go by the wayside and new routines, new responsibilities and a broader and multi-talent skill set across all primary are health team members (rooming nurses, diabetes educators, practice-oriented pharmacists, primary care physicians and others) will increasingly become the norm, rather than the exception.

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