

# Opportunities to Increase the Effectiveness of EHR-Based Diabetes Clinical Decision Support

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## Summary

There are many opportunities to improve diabetes care through more effective use of EHR-based CDS. The report of Kantor et al. [16] is encouraging because it demonstrates sustained efforts by leading health care organizations to implement diabetes-related EHR-based CDS. However, lack of sophisticated treatment-specific CDS and lack of prioritized recommendations are a cause for concern. Even more disturbing is the substantive heterogeneity in content of diabetes CDS recommendations now in the field. Some of CDS recommendations described by Kantor et al. [16] are clearly not evidence-based and could increase costs while not improving clinical benefits. The timely identification of these problems is an awkward but necessary first step towards improvement. The health care organizations that are pioneers in the field should be congratulated and encouraged to continue their collaborative efforts to increase the efficiency and effectiveness of EHR-based CDS. Attending to the modest proposals put forward here and by others may help translate the massive investments that we have made in EHR technology into clinical benefits for our patients.

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Billions of dollars have been invested in electronic health records (EHRs) in recent years, but the impact of this technology on quality of outpatient chronic disease care has been limited [1–5]. Efforts to provide clinical decision support through EHRs in order to improve the quality of outpatient chronic diseases such as diabetes, asthma, hypertension, depression, and heart disease care have often increased test ordering, but failed to improve key intermediate outcomes of care such as better blood pressure (BP), LDL-cholesterol, or glucose control (A1c), fewer hospitalizations, and better quality of life [1–4].

These early failures do not presage continued failure. As Thomas Edison famously noted, every experiment that fails teaches us something useful, and offers us an opportunity to be more insightful and innovative in subsequent efforts. After 20 years of failure, we have learned a great deal about the potential of EHR-based clinical decisions support (CDS), and about factors that limit the impact of EHR-based CDS systems on quality of outpatient chronic disease care. The lessons we have learned point to new challenges we need to address if we are to improve EHR-based CDS systems, and move forward towards the important goal of better quality outpatient diabetes care. Among these challenges are the following:

### 1. We need fewer but more nuanced prompts and reminders.

Prompts and reminders are the most widespread form of CDS and these have led to higher rates of blood tests and some preventive care services such as mammograms, immunizations, and eye exams [1–3]. However, EHR systems too often identify a large number of prompts and reminders, display the prompts towards the end of the clinical encounter, and do not indicate which among the many offer a particular patient the greatest health benefit. CDS prompts and reminders would likely be more effective if they were fewer in number, limited to those with the highest potential benefit to a given patient at that encounter, and presented early on in the encounter to facilitate visit planning by providers.

### 2. We need personalized clinical decision support algorithms that integrate multiple data sources and identify patient-specific, data-driven treatment options.

We need to develop more sophisticated clinical algorithms to guide treatment decisions when a patient has not reached desired A1c, BP, or LDL goals. This approach requires programming that (a) quickly retrieves all available EHR data needed to assess a patient's clinical state, current treatments, allergies, comorbid conditions, renal function, and cardiac status; and (b) feeds these data into evidence-based clinical algorithms that identify patient-specific, data-driven treatment options. This approach has recently been shown to be feasible and to improve important intermediate outcomes of diabetes care, such as A1c and BP control (5). These early successes should encourage researchers and medical groups to invest the resources required to develop and implement sophisticated EHR-based CDS algorithms for diabetes and other conditions.

### 3. We need prioritized clinical decision support recommendations that enable efficient visit planning.

“Prioritized” clinical decision support that is transparent, evidence-based, and validated is not yet available. Such prioritized CDS requires a “risk-engine” that can quantify and compare the relative benefits of competing treatment options and accurately prioritize those with the greatest incremental benefit to a particular patient at a given point in time. For example, the relative importance of A1c, BP, and LDL control in a given patient with type 2 diabetes depends upon how far the patient is from goal in each of these clinical domains, comorbid conditions, current treatment, baseline risk of various complications, and other factors. This approach is the holy grail of CDS systems, and ultimately

might be extended to prioritize a broad range of potential clinical actions (multiple chronic diseases and preventive care services) that may be relevant at a particular clinical encounter. A short prioritized list of high-value treatment options, identified before the clinical encounter begins, will provide a powerful “visit planning” tool that may be valued and widely used.

#### **4. We need CDS output designed to elicit patient preferences and facilitate shared decision making.**

Most CDS output is now designed for providers, but there is growing interest in providing patient-centered CDS output that facilitates shared decision making between patients and providers. To do this effectively, we need to have a better understanding of how patients think about risk and probability, and develop verbal and visual tools to communicate such information to patients with variable levels of health literacy and numeracy. Effective and systematic communication of such clinical information to patients could greatly facilitate elicitation and discussion of a patient’s preferences for specific lifestyle changes and pharmacologic treatments not only at office visits, but also via patient health records, case management encounters, and in population health applications.

#### **5. We need to design clinic workflows and organizational strategies that support consistent and frequent provider use of EHR-based CDS systems.**

Even excellent CDS systems that provide patient-specific, data-driven recommendations will not improve care if they are not used. Multiple studies suggest that non-use is the reason that most EHR-based CDS have thus far failed to improve intermediate outcomes of diabetes care [5–6]. Providers may be more inclined to use CDS when it saves them time, is not overwhelming in its detail, appears early in the encounter, and offers a number of options designed to supplement, rather than supplant, clinical judgment. Medical group policy, leadership expectations, incentives, feedback, and accountability reporting are strategies that may help create a default expectation that providers will use CDS – although providers not wishing to use CDS at a specific encounter could “opt-out.” Note that forcing providers to use CDS has sometimes led to untoward consequences [7]. Effective but more subtle strategies to increase provider use of CDS are needed.

#### **6. We need web-based clinical decision support algorithms that can be accessed through multiple EHR systems.**

Developing and maintaining accurate and up-to-date CDS algorithms in multiple care systems with varying degrees of resources, programmer skill, and quality oversight is a major challenge. Costs can be decreased and the accuracy and timeliness of CDS algorithms increased by developing them collaboratively within regional networks of care delivery organizations, and deploying them through a shared web service that is accessed through multiple EHR platforms. Shared web-based CDS presupposes that participating organizations can agree on clinical algorithms. One example of successful regional diabetes clinical guideline development is the Institute for Clinical Systems Improvement in Minnesota, which includes Mayo Clinic and most medical groups in Minnesota [8]. Once consensus regional web-based CDS algorithms for diabetes (and other chronic diseases) are developed by regional care networks (or Accountable Care Organizations), EHR vendors could provide links to the web service, without assuming the cost or potential legal liability of developing sophisticated clinical algorithms.

## 7. We need guidelines we can trust.

The scientific integrity of clinical guidelines is a matter of such serious concern that the U.S. Institute of Medicine (IOM) issued a major report in 2011 laying out ground rules for organizations and individuals involved in sponsoring or writing clinical practice guidelines [9]. Current “evidence-based” diabetes care guidelines differ in dramatic ways in their recommendations [8, 10–13]. Several prominent organizations that promulgate diabetes guidelines do not meet the basic IOM standards for guidelines we can trust. For example, the American Diabetes Association [10] and the American Association of Clinical Endocrinologists [14] appear to have organizational conflicts of interest because they directly or indirectly receive millions of dollars of pharmaceutical industry support each year. Moreover, 12 of the 17 ADA-appointed authors of the 2011 ADA guidelines reported receiving either honoraria/speaker bureau or consultation/advisory board income from industries whose sales could be directly affected by guideline recommendations [15]. It is possible that lack of trust in some leading diabetes care guidelines may be one source of the wide variation in clinical recommendations for diabetes care reported by six care delivery organizations [16].

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