

## Life After Go-Live

### Part 4: Preventing Error with an EMR

*Eric Rose, MD*

*This column is the last in a four-part series providing observations and insights from the author's experiences with ambulatory electronic medical record (EMR) implementation. It is intended to provide a glimpse "behind the veil" of an EMR-based care environment, with a particular focus on issues that have hitherto received little attention in the literature.*

#### **The Rationale for Decision Support**

The causes of medical errors are many (and the subject of considerable controversy). Although poor judgment and lack of knowledge are popularly thought of as the main causes, it is clear from recent research that insufficient access to, or management of, information plays a substantial role.

Numerous studies have shown that physicians often fail to adhere to well-substantiated principles of good medical care (such as prescribing aspirin for patients after a heart attack or avoiding use of beta-blockers in patients with asthma), even though those same physicians are highly familiar with those principles. The nature of human cognition is such that physicians will rarely recall all the standards of care that might apply to a particular patient, especially in a time-limited encounter focused on a particular complaint.

Fortunately, where human brains fall short, computers excel. The automated cross-checking of patient information against formally expressed "rules," and the provision of feedback to the user of an EMR, is a rapidly developing area in medical informatics. It has been given the rather confusing name of "automated decision support" (DS).

DS tools within an EMR can take many forms. They vary in their degree of intrusiveness — from tools that the user must actively access without any prompting from the software, to "pop-up" style alerts that require some action on the part of the user before the user can return to what he or she was doing. DS tools may be contact-dependent, where the user will only see the alert when he or she accesses a patient's record, or contact-independent, where the alert is delivered to the provider (e.g., through a virtual "in basket") regard-

tions in EMRs that incorporate medication order entry.

#### **The Challenges of Decision Support**

In our organization, we have made extensive use of the DS tools within our EMR. We believe these to be valuable for ensuring high-quality care and preventing medical errors. However, we also find they pose certain challenges.

The most significant problem with DS tools we have encountered is that they add to the information that the provider must deal with (see also the spring issue's column, "So Good It's Bad" Information Management"). At best, this slows down the provider; at worst, it distracts him or her from the patient's immediate problem. Our providers have described a resulting phenomenon, which we term "pop-up fatigue," where, after receiving a number of alerts on a given patient or on a given day, providers simply stop paying attention to them.

Another difficulty with DS tools is the problem of false-positive alerts, i.e., alerts that appear but, for some reason, do not apply to a particular patient. This might occur, for instance, with an alert suggesting an intervention (like a vaccine), which the patient has received outside our organization. Our EMR allows users to record data on care delivered elsewhere in ways that can be "seen" by its DS components.

However, providers often elect to record such information in free text (e.g., typing in "Joe got a tetanus booster last July" into a visit note), rather than entering the information, in a structured format, into the appro-

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less of whether the patient's record is accessed. Many commercial EMRs offer DS tools at various levels of intrusiveness and in contact-dependent and contact-independent forms.

EMR vendors usually leave it to the client institution to program DS tools with the medical "rules" they feel appropriate. However, commercial databases are available for certain types of DS tools, such as databases that drive alerts for drug-drug interac-

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appropriate section of the patient record. The result, of course, is a false-positive alert the next time the record is accessed. Other causes of false-positive alerts include a patient's prior informed refusal of a recommended intervention, clinical inappropriateness of a recommended intervention (e.g., routine cholesterol screening for a terminally ill patient), or any situation in which the logical rule driving the alert is not adequate to incorporate all the relevant aspects of the patient's situation.

The underlying rules driving DS tools require ongoing maintenance. As we implement more and more DS reminders and alerts, this work has grown substantially. One aspect of this involves maintaining the clinical appropriateness of the rules, so that they remain consistent with the most current evidence-based standards of care. In addition, any changes in the standardized terminology systems, which we use for the structured data on which these rules operate (e.g., ICD-9-CM and CPT), must be

reviewed, so that pertinent new entries from these terminology systems are incorporated into the DS rules.

For instance, recent updates in CPT added new codes for certain types of hysterectomy procedures. Since we allow our users to make entries on patients' "surgical history" records using the most current CPT codes, and patients who have had a hysterectomy do not (in general) require pap smears, these new CPT codes had to be added to the list of codes that would prevent the pap smear alert from appearing.

The implementation of DS tools also requires careful attention to organizational politics. It is important to select the rules on which DS tools will be based with great care, and to obtain organizational consensus before turning them on. In our organization, we have used three criteria in this selection process:

- The rule is supported by an unsailable foundation of evidence
- The rule is intended to promote good clinical outcomes (rather than,

for instance, cost considerations)

- There exists structured data in the EMR sufficient to support a high level of accuracy in performance of the DS tool (in particular, a low rate of false-positives)

We also take pains to inform our providers as to what patient data drives the application and what the underlying rules are, and to train them in how to interact with the DS tool, e.g., to order the recommended intervention. With this approach, we have seen a high degree of acceptance on the part of our providers.

### What Lies Ahead

DS tools, as they exist in most commercial EMRs, are an evolving technology, and will likely grow in flexibility and usefulness. At present, they rarely go beyond a binary indicator (alert applies/does not apply) based on simple Boolean manipulation of structured patient data.

In some cases, linkage to the EMR's order-entry functionality enables the

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provider to respond immediately to a DS alert by placing an order for the recommended intervention. Our EMR also enables some user-level customization, such as the ability for providers to adjust the drug-drug interaction warning system so that only warnings above a specified level of "seriousness" appear. A growing trend is for DS tools to be more "transparent," i.e., to display (or link to) the specific patient data that triggered the alert, the underlying rule, and/or extensive background information, along with the recommended action.

There are several ways that present DS functionality could be enhanced. For instance, broader user-level cus-

tomization might be useful, e.g., allowing a provider to choose whether he or she receives a particular alert in a contact-dependent or contact-independent context.

In addition, DS tools should provide a simple way, when displaying an alert, for providers to specify that a particular alert does not apply to a particular patient, thus suppressing the alert (either temporarily or permanently, as warranted). There is also a need for DS tools to enable direct feedback from providers to system administrators if they feel an alert is not based on the best available evidence.

Another major advance in DS will hopefully occur with the emergence

of systems for standardized representation of clinical practice guidelines. Such systems (GLIF, ProForma, Asbru, and others) have mushroomed in recent years. They offer the promise of DS tools that will base recommendations not on simple rules, but on an overarching plan of care that, among other subtleties, recognizes complex time relationships between events.

### About the Author

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## ARTICLE RESPONSE

### A Cat's Perspective: Being a Vendor in a Selection Process

*Mark Groper*

An article in the Summer 2003 issue of JHIM regarding herding cats and vendor selection described the enormous complexities associated with selecting an EMR. I empathized with the healthcare organization's challenges; the current vendor had stopped supporting the installed EMR, clinical features were missing from the product, and more.

As the context of the article became clearer, I realized that the author's organization was my company's customer, the vendor in question was me, and the EMR product was mine.

Upon investigation, I was relieved to discover that while the article was published recently, it was written and focused on events that took place three years ago, before my company acquired Oacis, which was then owned and managed by another vendor. During that time, the customer was uncertain about the previous vendor's commitment to support and continue developing the product. For that and other reasons, the customer decided to evaluate other EMR products.

The customer has publicly indicated that the vendor reference was to the previous vendor of Oacis, that the capabilities of Oacis have been significantly enhanced by DINMAR, and that customer service has improved as well.

While I can certainly relate to the author's metaphor of "herding cats," it reinforced for me the significant challenges our industry faces. It also reminds me of the high costs vendors carry for the public relations and sales aspects of an EMR. These higher costs hurt the industry at large.

Although vendors can improve in many areas, we should avoid the tendency to oversell and should focus our message on what our products can realistically achieve. Our company's sales team possesses strong working knowledge of what clinicians and other HCO personnel really need, enabling them to focus on building long-term relationships as well as addressing important requirements, rather than focusing on "winning a deal."

For providers, increased emphasis on establishing a long-term partnership

with their vendor will help reduce costs and improve outcomes. A common attribute of successful EMR implementations is that the buyer spent as much effort defining how they would work with the vendor as they did evaluating the product. The product itself is not always the solution.

HIMSS, as the industry's primary professional association, also can be a place where vendors and buyers collaborate on tangible methods to reduce excessively long and complicated RFP cycles, and the associated costs. For the well-being of our industry, we must come together and streamline the EMR selection process.

### About the Author

Mr. Groper is the President and CEO of DINMAR, a leading North American healthcare IT solutions company. In November 2000, after DINMAR's successful five-year track record as a certified Oacis implementation partner, it acquired Oacis Healthcare Systems Inc., which included the Oacis EMR product suite.