Clinical decision support tools:

Do they support clinicians?

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A search of today's electronic health marketplace for tools to support clinical decision-making yields an overwhelming number, variety and complexity of products. It is obvious that there is confusion, uncertainty and lack of clarity about clinical decision support (CDS). What constitutes CDS? Who should guide the development and deployment of CDS tools? How should CDS relate to electronic health records? And how can researchers, vendors, professionals and institutional stakeholders cooperate to provide seamless health information environments for busy clinicians?

In Alberta, where a province-wide electronic health record and pharmacy information network is being rolled out, physicians have recently focused on CDS and its place in the new electronic health environment. Supported by the Alberta Medical Association and Alberta Health and Wellness, clinicians have developed principles to guide the deployment of CDS in the province. The principles provide a common language about the functional specifications which will help physicians incorporate CDS into their practices. These principles have been fortified by a provincial initiative that clearly defines the technical expectations for health information vendors and sets timeframes for specific levels of CDS-readiness to be achieved. This Vendor Conformance and Usability Requirements process, managed by the Physician Office System Program (POSP), emphasizes how health information products should cooperate to support decision-making by clinicians.

Our first challenge was to define what CDS means to Canadian clinicians, as a quick literature review revealed that the term means many things to many people. Some authors include electronic texts, drug information and practice guideline databases in their definition of CDS, while others restrict the term to rules-based guidance systems that direct clinicians about exactly what to do for specific clinical problems.

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We elected to consider all ways in which health care knowledge is represented in health information systems, whether expressed through expert systems, evidence-based guidance or clinical continuing professional development. Knowledge may be found in references (e.g., electronic textbooks or drug information databases), the health care literature (bibliographic databases), practice guidelines, care pathways, patient education resources and research news. But CDS is also about how health information systems link knowledge to clinical events. Examples include linking patient records and electronic libraries; automatically generating patient education handouts; and connecting drug lists with information about medication costs. Similarly, reminders and alerts may connect knowledge to clinical data entry tools or even patient appointment schedulers.

As the number of physicians working in electronic environ-

ments increases, there is growing interest in shifting the focus on CDS from theory to practice. However, despite the explosion of useful health information available on the Internet and in other electronic formats, physicians often lack the skills and time to find and assess the information they need. Physicians suffer from information hunger in the midst of plenty.

CDS may be the missing link in new health infosystems that translates better health information into better health. Although large-scale data repositories, drug prescribing databases, and clinical information portals are emerging in health regions like Alberta, it is not evident that these systems will, in and of themselves, significantly improve the health of the populations served. Mishaps like duplicate lab tests and drug orders might be avoided. But to significantly improve diagnosis, treatment, palliation and rehabilitation, we need to shift how physicians respond when presented with clinical information. Indeed, without straightforward and engaging CDS, it is conceivable that the health infostructure investments will simply entrench current practice patterns.

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A common approach to deploying electronic health systems has been to build clinical data and office management systems sequentially. This requires huge investments at the regional level, and later there is comparable local investment to install the requisite hardware, software and telecommunications equipment. Further expenses are incurred in the myriad of changes that must be managed before the processes really "go electronic." Sometime later consideration is given to adding CDS, even though there has been no strategic plan to include this element and few resources remain to pay for it.

It could be argued that the choice, configuration and deployment of clinical and administrative information systems should follow, not lead, CDS planning. The CDS strategic plan should clarify how all types of information will be managed, and how each will contribute to better health outcomes through improved decision-making. Information alone does not change practice; good decisions about information change practice.

A strategic approach to CDS might start with getting physicians accustomed to using computers, handhelds and other electronic devices to access relevant clinical knowledge, to confirm drug prescribing, to refer to practice guidelines, to communicate with peers and to access quality patient education resources. Such activities support the decision-maker without requiring a lot of data input, staff training or workflow change. The resulting information culture shift can greatly ease the introduction of more labour-intensive clinical information systems.

In any case it is critically important to get the CDS element right. If, for example, a clinician's first experience with a drug prescribing system is soured by dosing "rules" that are not tuned to the clinical context, the physician is likely to push back against the system and resist change. It is better to introduce simple, unequivocal, physician-controlled CDS capabilities and gradually build up to more evidence-based approaches.

The organization and deployment of health knowledge is extraordinarily complex. It takes years of planning, strict adherence to health information exchange protocols, and coordination among all stakeholders to effectively link knowledge-based and clinical information systems. This is a team sport that medical record vendors cannot play in isolation. Ideally, the capacity to integrate health knowledge should be built in from the start so that physicians can help fashion effective CDS before the clinical systems are deployed.

CDS has many diverse stakeholders, including professional associations, licencing and credentialing bodies, libraries, health authorities, quality improvement initiatives, patient safety programs, academia and a variety of knowledge product vendors. As with any rapidly emerging domain, there may be no clear champion for physicians' needs.

However, the balkanization of CDS products wastes information resources and squanders physicians' patience. Some products may be licenced for physicians by provincial medical associations, and others by national associations, licencing bodies, subspecialty societies, hospitals or health regions. Physicians cross-appointed with a university may have duplicate library subscriptions. As a patchwork of rural or remote initiatives emerges, there will be further duplication of services for certain physicians. Each different computer a physician is likely to use will have different access points, user IDs and passwords.

Drug prescribing information databases, for example, are available from multiple vendors in multiple ways for many Alberta physicians. One product is embedded in the provincial electronic pharmacy system. A different product, with a different approach to evidence, is licenced by a large health region. Yet another is embedded in the most popular physician knowledge repository. The national medical association licences a fourth product and the PDA application most commonly found in physicians' pockets comes from a fifth vendor. The CDS components, such as they are, are not coordinated, and the drug interaction rules, disease indications, and even drug naming conventions differ among all the products.

By contrast, when these tools are coordinated, advantages

emerge: the total cost of knowledge services is reduced by volume purchasing; vendors can be persuaded to configure their products to physicians' unique needs; standards can be declared; and it is more likely that knowledge products will integrate with clinical information products.

While CDS is being promoted under the guise of patient safety and quality care improvement, the shifts in societal expectation have not been matched by investment in the appropriate systems. With the proliferation of electronic medical record systems in Canada, demand will intensify for chronic disease management systems, guideline implementation tools, patient safety improvement and other elements which depend on an integrated and effective clinical decision support environment.

Anticipating this, our CDS principles were penned in the hope of triggering productive dialogue among all stakeholders. Because no single vendor is likely to address all clinical decision support information needs, multiple products must work in concert and linkages are needed among complementary products. The principles emphasize the need for communication channels among different products, and adoption of standards by vendors of clinical and knowledge-based software. The principles also emphasize the patient-care goals of CDS and the need for physicians to have CDS packages highly attuned to their practice settings. Clinical information must be organized and linked to relevant knowledge in a way that serves the needs of physicians and the choices they make about patient care.

Against this background there is clearly an urgent need for clear thinking and coordinated efforts to ensure that physicians can use better information to facilitate better health. ***FP***

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