INVITED COMMENTARY

A recent study in the USA identified significant deficits in adherence to recommended processes for basic patient care across preventive, acute and chronic conditions[1]. Overall, almost half of the study participants (46%) fell in the category of underuse where they did not receive recommended treatments. Overuse, defined as care that was not recommended or potentially harmful, was 11%. With respect to the treatment of hypertension, three interventions were found to be underused:

- Lifestyle modification for patients with mild hypertension
- Pharmacotherapy for uncontrolled mild hypertension
- Change in treatment for persistently uncontrolled blood pressure

These results, a measure of the quality of care currently delivered in the United States, is discouraging. For more than twenty-five years, organisations have worked to develop and utilise disease-specific clinical content, expressed in various forms of guidelines, in an effort to influence clinical and financial outcomes. Developers of clinical content varied from academic medical centres and speciality societies, to managed care organisations, insurers and government entities trying to deliver quality within a realistic workflow and cost environment. During this period, most organisations struggled to implement effective clinical decision support (CDS) tools to take advantage of that content.

Broadly defined, CDS is any process that enhances the ability of a person engaged in clinical care to make clinical decisions in the treatment of a patient. The first type of CDS probably took form as a medical record used by all care providers to both document and obtain patient medical information. Today, as we take for granted access to such data, CDS more appropriately refers to access to clinical information at the point of care and within the workflow of caring for a patient. This takes the form of both patient and disease-specific medical information.

Numerous types of CDS exist and Metzger and colleagues describe in great detail the types available and the value of each[2]. Generally CDS falls into two categories: passive (e.g. showing results) and active (e.g. editing and checking of input, treatment plan suggestions). Although much attention has focused on active CDS such as Computerised Provider Order Entry (CPOE) with clinical content, great value is available from smartly deployed passive CDS. In addition, passive CDS has higher rates of initial clinician adoption and its successful implementation can be leveraged to implement various types of active CDS.

Although some clinical content such as InterQual® criteria was widely adopted by nursing professionals and put into use in acute care settings, there are few examples of successful deployment of clinical content across a wide spectrum of physicians. Although anaesthetists and some surgical specialities can be cited as having laudable success stories with guideline use, few other organisations or specialities can make such a claim.

The publication in 1999 of the Institute of Medicine's report *To Err is Human* placed great emphasis on the application of CDS at the point of care using CPOE tools[3]. In addition, the influence of the Leapfrog Group (payers) and the Joint Commission for the Accreditation of Health Care Organizations (regulatory) is forcing hospitals in the United States to take steps to deliver CDS tools to their healthcare professionals. Fortunately, this increasing momentum to deploy these tools has coincided with the development of information technology that can overcome the physician adoption obstacles identified in past efforts[4].

Clinical content combined with a mechanism to deliver that content within the workflow of the clinician forms practical CDS. For example, a paper-based guideline distributed to physicians is not a valuable CDS tool. In contrast, effective CDS tools link guideline clinical content with actionable information specific to a patient, and then present it in a way that parallels physician workflow.

As reported in this paper, the Department of Veterans Affairs is trying to achieve success in improving adherence to treatment guidelines by using electronic hypertension reminders within their Computerised Patient Record System. The deployment of the reminders within the clinical workflow, as enabled by the established computerised record system, permits the delivery of disease-specific clinical content to the clinical caregiver at the point of care. Although the hypertension treatment guidelines are not new, nor the acknowledgement of their potential role in achieving best practices in treating hypertensive patients, the process utilised to deliver the clinical knowledge demonstrates an advancement in CDS. The results achieved in this pilot study, and the lessons learned in developing and deploying the CDS program, provide important guideposts to others as they attempt to take advantage of CDS.

For organisations that strive to utilise CDS to enhance patient safety, reduce medical errors and improve financial outcomes, both a broad and practical view of CDS must exist. Using knowledge of their organisation as a guide, senior management must incorporate both passive and active CDS tools within a timeline to achieve intended outcomes. Irrespective of the recent enthusiasm for the incorporation of CDS into CPOE, all solutions must fit the capabilities, culture and needs of the organisation. Nothing delivers results from CDS better than a well planned and implemented deployment of chosen technology.

The effectiveness of clinical decision support is outlined in great detail in a report prepared by the Agency for Healthcare Research and Quality (AHRQ)[5]. Results cited in the review include:

- Improvement in the ordering of appropriate medications by house staff
- Decrease in preventable adverse drug events
- Decrease in medication errors
- Improvement in prescribing practices
- Improvement in patient outcomes
- Better choices made in antibiotic treatment regimens

- Alerts to prevent adverse drug events
- Better management of high risk drugs (e.g. heparin and warfarin)

Most of the studies cited by AHRQ focused on outcomes associated with CPOE/CDS. Benefits of other types of CDS noted in the report included drug–drug interaction checking using medication knowledge bases, and protocols for high risk drugs.

Although studied for decades, the daily use of CDS in healthcare is just beginning. New technologies offer huge flexibility in delivering CDS in multiple forms and on a huge number of devices. The use of Web technology coupled with the expansion of Internet access in both private and public spaces, offers options for CDS never seen before. Over the next ten years, the use of CDS will expand exponentially and documentation of its benefit to both patients and clinicians will become commonplace.

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