Clinical Decision Support Systems

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Clinical Decision Support Systems (CDSS) seem to be a hot topic for conference presentations and discussion lists these days. CDSS is the technology designed to improve outcomes and patient safety, reduce reliance on memory, decrease errors, and facilitate a rapid response. There are two types of CDSS: (1) **Active** (also called “executable”) CDSS are found in computer software that integrates predetermined rules with patient data to automatically deliver information to the clinician. (2) **Passive** CDSS consists of optional links for the clinician to seek information. Decision-support knowledge tools provide information at the point-of-care (also called “at arms length”), where decision-making occurs. CDSS products may be commercial, produced by a professional or government organization, or “homegrown” by a particular institution.

**How Decision Support Works**

The basic components of active “executable” CDSS include an expert knowledge base, individual patient data, and an inference engine. The knowledge base is program rules (algorithms, flow charts, decision trees) built from expert consensus, practice standards, and research evidence. Software rules can be customized and updated. The expert knowledge base is embedded into the workflow through screen design, assessment forms, pick list, or order sets. The patient data are contained in a comprehensive, real-time database drawn from nursing documentation, physiologic monitors, laboratory results, provider orders, and pharmacy. The inference engine compares the expert knowledge and the patient data, executes “if-then” production rules, and detects events that trigger the system to generate information for the clinician. An active CDSS may assist with surveillance and assessment data (such as alarms or alerts for critical values in physiologic monitoring, laboratory reports, interpretations of images or FHR waveforms, or allergy alerts), diagnosis (such as differential diagnoses), interventions (such as reminders for pediatric immunizations, plans of care, standard medication prescribing, calculations, or drug interactions), or documentation (such as prompts for missing clinical data, or regulatory compliance). Although CDSS may generate a recommendation regarding care, it is the clinician who decides on the intervention.

In contrast to the active CDSS, in which a recommendation for care is offered, a passive CDSS provides “referential” links to resources and evidence-based content. The clinician then uses these links and resources to make decisions (such as for agency policies, practice standards, evidence-based guidelines, drug libraries, procedures, bibliographic searches, and textbooks).

**Benefits, Barriers, and Outcomes**

Many organizations recommend the use of CDSS, suggesting that they decrease errors and improve safety. But clinicians on discussion lists are reporting reluctance to use CDSS, especially when the tools are not well integrated into clinical workflow.

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Better performance improvement. Likewise, a review of neonatal CDSS trials yielded few improved outcomes (Tan, Dear, & Newell, 2005).

Nursing input and research on how nurses use decision support are essential for effective integration of knowledge tools into clinical nursing practice (Jenkins, Hewitt, & Bakken, 2006). Collectively, nurse informaticists and target users need to share ways to evaluate CDSS in nursing, determine their effectiveness, and disseminate this information to clinicians.

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**References**

