

# Clinical Decision Support

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## KEY DEFINITIONS

**Alert**—an urgent notice generated by a computerized clinical decision support system (CDSS). These are usually in the form of a just-in-time, patient-specific message directed to one or more clinicians. It may be a warning regarding a clinician’s documented action (or lack thereof) or a documented decision. Or it may be an urgent informational notification of a new clinical condition, circumstance, or change in patient status that requires immediate attention. Some alerts require a response before the clinician can continue.

**Alert Fatigue**—a state of irritability, exhaustion, or bewilderment triggered in clinicians who have been exposed to too many alerts, or alerts with a perceived history of irrelevance, which cause the user to ignore some or all of the alerts, thereby reducing the safety benefit of the decision support system.<sup>1</sup>

**American National Standards Institute (ANSI)**—coordinates the development and use of voluntary consensus standards including Health Level Seven’s (HL7) Arden Syntax standard. More information is available at the ANSI website: <http://www.ansi.org>.

**Arden Syntax Standard**—an HL7 standard designed to allow clinicians to program medical logic into a clinical rule or guideline. The American Society for Testing and Materials first approved the Arden Syntax as a standard in 1992 (E-1460-92). Ownership was transferred to HL7 and ANSI in 1999 with the approval of version 2.0 of the standard. The Arden Syntax is the only approved standard for clinicians to encode medical logic into clinical rules known as medical logic modules (MLM).

**Bar Code Medication Administration (BCMA)**—an inpatient CDSS to assist nurses with the five-rights of medication administration (right patient, right drug, right dose, right route, and right time). BCMA systems provide warnings if any of the five-rights are violated and most BCMA systems require the nurse to enter an override reason if he or she chooses to proceed. In addition, BCMA systems promote right-documentation (some hospitals call this the sixth right of medication administration).

**Centers for Medicare and Medicaid Services (CMS)**—the federal healthcare programs for the elderly and indigent. For more information go to: <http://www.cms.hhs.gov/>

**Clinical Decision Support (CDS)**—refers broadly to providing clinicians or patients with clinical knowledge and patient-related information, intelligently filtered or presented at appropriate times, to enhance patient care. Clinical knowledge of interest could range from simple facts and relationships to best practices for managing patients with specific disease states, new medical knowledge from clinical research, and other types of information.

**Clinical Decision Support System (CDSS)**—a system (computer or otherwise) intended to provide CDS to clinicians, caregivers, and healthcare consumers. Automated CDSS are usually just-in-time, point-of-care messages in the form of an alert, reminder, recommendation, or informational notification regarding a patient. Automated CDS systems typically include a knowledge base (which contains stored facts and some method of algorithmic logic), an event monitor (to detect data entry or the storage of data from a laboratory or other system), and a communication system to the end user (unidirectional or bidirectional).<sup>2</sup>

**Computerized Provider Order Entry (CPOE)**—automated portion of a clinical information system that enables a patient's care provider to enter an order for a medication, clinical laboratory, radiology test, or procedure directly into the computer. The system then transmits the order to the appropriate department, or individuals, so that it can be carried out.

**e-latrogenesis**—patient harm caused at least in part by the application of health information technology.<sup>3</sup>

**Health Level Seven (HL7)**—an important standards development organization for health information technology (HIT). For detailed information, see the HL7 website: <http://www.hl7.org>

**Healthcare Information Technology (HIT)**—any computer system designed to automate and/or enhance a healthcare process or workflow. HIT can be a small apparatus such as an IV infusion pump or a glucometer, a departmental information system such as a pharmacy or laboratory informa-

tion system. It can be an institutional information system such as an admissions, discharge, and transfer (ADT) system, which may interface or interoperate with other departmental systems. HIT can also be a multi-institutional system, such as a regional health information organization (RHIO), or even a national health information network (NHIN).

**Information Systems (IS)**—(1) Computerized systems for workflow management such as a pharmacy computer system, or an information retrieval system such as a library. The defining characteristic is a database and specialized features and functions for a dedicated purpose. (2) A department of HIT or computer professionals. When designating a department, IS usually stands for Information Services.

**Informational Notice**—may be a patient-specific automated rule, such as an MLM, to inform of a change in patient status. This type of informational notice may be urgent (e.g., to report a change in renal function) or non-urgent (e.g., to report a hospital admission of a potential study patient). An informational notice may also be product-specific such as a pop-up box during order entry to announce a look-alike, sound-alike (LASA) drug.

**Knowledge Base**—a collection of stored facts, rules, algorithms, heuristics, and models for problem solving.<sup>2,4</sup> Knowledge base data may be organized in a database or even a simple table in which explicit relationships exist. Familiar examples of commercial knowledge bases that incorporate databases are drug-drug interaction and drug-allergy alerting systems.

**Logical Observation Identifiers Names and Codes (LOINC)**—a standard to facilitate the exchange of clinical laboratory results. The Regenstrief Institute, Inc. maintains the LOINC database of about 41,000 terms, and its supporting documentation. For more information, see the LOINC website at: <http://www.regenstrief.org/medinformatics/loinc/>

**Look-Alike, Sound-Alike (LASA)**—a medication safety designation to prevent confusion between drugs with similar spelling or pronunciation.

**Medical Logic Module (MLM)**—a rule for an Arden Syntax based clinical rules engine. HL7 defines a MLM as an encoded clinical rule that contains enough logic to make a single clinical