

Clinical Decision Support (CDS)

An application that analyzes data to help healthcare providers make decisions. While CDS does not require an electronic health record (EHR), for the purposes of this special issue, CDS will be considered in the context of EHR systems. There are three types of CDS: passive, asynchronous and active. Passive decision support generally consists of references, guidance sheets and point of care educational materials that are available to users in the EHR either through a search function or library or through context-specific links such as infobuttons. Asynchronous decision support consists of information that is aggregated and presented to a clinician outside of a specific clinical encounter. An example of this is a monthly report on the care parameters for a panel of patients with a condition like diabetes used for quality improvement purposes. Active (or synchronous) CDS is generally assumed to imply a workflow in which a process, such as prescribing a medication, is monitored in real-time by rules logic and clinician behavior is influenced based on the logic embedded in a rule. The most widely recognized approach is pop-up alert windows warning the user of a potentially risky decision, such as an allergy or drug-drug interaction.

Clinical Document Architecture (CDA)

A CDA document is readable by both humans and computers without loss of meaning. Standards for CDA have been developed by HL7 (see below) and these are increasing used for communication within and between EHR systems.

Clinical Workflow

Clinical Workflow is an established process describing:

A series of tasks

How they are accomplished

By whom

In what sequence

At what priority

that accomplishes a defined step in an activity in the clinical care of patients.

Electronic Data Warehouse (EDW)

An EDW is a database used for reporting and data analysis. It is a central repository of data which is created by integrating data from one or more disparate sources. Data warehouses store current as well as historical data and are used for creating reports for a variety of end uses. It can also be used as a central access point to store data needed for CDS and other clinical applications. The data stored in the warehouse are uploaded from the operational systems (such as the EHR, radiology and Laboratory information systems). The data may pass through an operational data store for additional operations before they are used in the EDW.

Electronic Health Record (EHR)

The EHR (also known as Electronic Medical Record or EMR) is a longitudinal electronic record of patient health information generated by one or more encounters in any care delivery setting. Included in this information are patient demographics, progress notes, problems, medications, vital signs, past medical history, immunizations, laboratory data and radiology reports. The EHR automates and streamlines the clinician's workflow. A **fully functional** EHR is able to aggregate data, provide clinical decision support and create patient registries. While there is not an operational definition of a fully functional (or full-featured) EHR, the health information technology industry generally agrees that any EHR system that is fully compliant with the meaningful use requirements is fully functional. An **enterprise** EHR integrates various components (registration, billing, laboratory, ED, inpatient, outpatient, etc.) into a single product, which uses a common data repository for all functions.

Electronic Medical Records and Genomics (eMERGE) Network-

A national consortium organized by the National Human Genome Research Institute (NHGRI) to develop, disseminate, and apply approaches to research. It combines DNA biorepositories with electronic medical record (EMR) systems for large-scale, high-throughput genetic research with the ultimate goal of returning genomic testing results to patients in a clinical care setting.

Granular Data

See structured data.

Health information exchange (HIE)

HIE is the electronic movement of health-related information among organizations according to nationally recognized standards. The goal of health information exchange is to facilitate access to and retrieval of clinical data to provide safer, timelier, efficient, effective, equitable, patient-centered care.

Health Information Technology for Economic and Clinical Health Act (HITECH Act)

Legislation created to stimulate the adoption of EHR and supporting technology in the United States. President Obama signed HITECH into law on February 17, 2009 as part of the American Recovery and Reinvestment Act of 2009 (ARRA). The HITECH act stipulates that, beginning in 2011, healthcare providers will be offered financial incentives for demonstrating meaningful use of electronic health records (EHR). Incentives will be offered until 2015, after which time penalties may be levied for failing to demonstrate such use. The Act also establishes grants for training centers for the personnel required to support a health IT infrastructure.

Health Level Seven International (HL7)-

Founded in 1987, Health Level Seven International (HL7) is a not-for-profit, American National Standards Institute-accredited standards developing organization dedicated to providing a comprehensive framework and related standards for the exchange, integration, sharing, and retrieval of electronic health information that supports clinical practice and the management, delivery and evaluation of health services. Its mission is to provide standards for interoperability that improve care delivery, optimize workflow, reduce ambiguity and enhance knowledge transfer among all of our stakeholders, including healthcare providers, government agencies, the vendor community, fellow standards development organizations and patients.

Infobutton

InfoButtons build and run queries against electronic resource collections based on **patient data** and **clinical context** in order to take the user to the most appropriate section(s) within a content collection with a minimum number of clicks. In EHR with this capability, InfoButtons or equivalent capabilities appear in locations relevant to the most commonly asked questions—usually the Problem list, laboratory results and medication list (including medication ordering).

Implementation Science

The scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice, and, hence, to improve the quality and effectiveness of health services and care.

Laboratory Information Management System (LIMS or LIS)

The LIMS is an electronic record of laboratory results. The LIMS must interact with the EHR but is generally a separate system.

Logical Observation Identifiers Names and Codes (LOINC®)

LOINC is a database and universal standard for identifying medical laboratory observations. It was developed and is maintained by the Regenstrief Institute, a US non-profit medical research organization, in 1994. LOINC was created in response to the demand for an electronic database for clinical care and management and is publicly available at no cost.

Meaningful Use-

Meaningful use is the set of standards defined by the Centers for Medicare & Medicaid Services (CMS) Incentive Programs that governs the use of electronic health records and allows eligible providers and hospitals to earn incentive payments by meeting specific criteria. The goal of meaningful use is to promote the spread of electronic health records to improve health care in the United States.

Massachusetts General Hospital Utility Multi-Programming System (MUMPS)

Originally designed in 1966 for the health care industry, MUMPS is a general-purpose programming language that provides ACID (Atomic, Consistent, Isolated, and Durable) transaction processing.

Natural Language Processing (NLP)

NLP is a field of computer science, artificial intelligence, and linguistics concerned with the interactions between computers and human (natural) languages. In the context of EHR, NLP is used to identify desired information located in narrative documents (such as a progress note, or radiology interpretation) and convert it to structured electronic data that can be used to define a clinical phenotype, populate an electronic database or a decision support rules engine.

Office of the National Coordinator of Health Information Technology (ONCHIT)

The ONCHIT is a division of the Office of the Secretary under the U.S. Department of Health and Human Services that is devoted to the implementation of health information technology and facilitating the exchange of electronic health information. The use of EHR was enacted through the American Recovery and Reinvestment Act (ARRA), and ONCHIT supports IT health requirements for the nationwide shift from paper to electronic health records. ONCHIT is also charged with the promotion, assistance and governance of the health information exchange (HIE) process as it pertains to protected health information.

Patient Portal

A patient portal is a secure, HIPAA-compliant connection that allows a patient to view portions of their EHR and perform limited functions such as messaging their clinician or requesting a prescription refill through a web service or by smart device.

Personal Health Record

A PHR is a collection of health-related information that is documented and maintained by the individual it pertains to. Some PHRs will interact with a patient's EHR (called a tethered-PHR), but this is the exception at the present time.

Picture Archiving and Communication System (PACS)

See Radiology Information System

Radiology Information System (RIS)

Like the laboratory system the RIS is an electronic system that manages radiology data and reports that is separate from but interacts with the EHR. The actual image files are generally stored in a separate ancillary system, the Picture Archiving and Communication System (PACS).

GLOSSARY

Service-oriented architecture (SOA)

SOA is a software design methodology based on structured collections of discrete software modules, known as services, that collectively provide the complete functionality of a large or complex software application. Each service that makes up an SOA application is designed to provide a tightly defined set of functions. As a result, each service is built as a discrete piece of code. This makes it possible to reuse the code in different ways throughout the application by changing only the way an individual service interoperates with other services that make up the application, versus making code changes to the service itself.

Structured Data

Data can be designated as structured (aka discrete) or unstructured for classification within an organization. The term structured data refers to data that is identifiable because it is organized in a structure. Structured data is also searchable by data type within content. Structured data is understood by computers and is also efficiently organized for human readers. In contrast, unstructured data has no identifiable structure. Examples of structured data would include a list of diseases accompanied by the appropriate SNOMED code, or a medication list with the associated National Drug Code (NDC) that provides information

about the medication, dose and packaging. Unstructured data would be text blobs such as progress notes or narrative reports. Some reports (such as laboratory reports) can contain both structured (the test result and reference range) and unstructured information (the interpretation).

Synoptic Reporting

Synoptic reporting uses an electronic report in discrete data field format (i.e., each type of information has a specific place and format in the report) that allows for the standardized collection, transmission, storage, retrieval and sharing of data between clinical information systems.

Systematized Nomenclature of Medicine

Clinical Terms (SNOMED-CT)—SNOMED-CT is a standardized, multilingual vocabulary of clinical terminology that is used by physicians and other health care providers for the electronic exchange of clinical health information. By using numbers to represent medical concepts, SNOMED CT provides a standard by which medical conditions and symptoms can be referred, eliminating the confusion that may result from the use of regional or colloquial terms. The numerical reference system also facilitates the exchange of clinical information among disparate health care providers and EHR systems.