

1.1. Overview

What is Clinical Decision Support?

Clinical Decision Support (CDS) is a service that enables healthcare providers to make well-informed decisions by supplying guidance, knowledge, and patient-specific information at relevant points in the patient journey, such as diagnosis, treatment, and follow-up. CDS uses a range of mechanisms to assist users in this process. Examples of these mechanisms include automated alerts or reminders, clinical guidelines, contextually relevant reference information, conditional order sets, diagnostic support, and patient-focused reports, forms, or templates. The beneficiaries of the information derived from CDS may include patients, clinicians, and others involved in the delivery of health care.

It is important to distinguish the general practice of clinical decision support from the application of tools designed to enhance decision support practices. One is performed by humans who make decisions based on knowledge they possess and information they consume. The other is computed by systems and engines using rules and predefined conditions. Although both are important, the technical components of CDS are designed to assist rather than replace the subtle judgment and guidance provided by the clinician.

Applications and tools that provide clinical decision support are known as Clinical Decision Support Systems¹ (CDSS) and these are defined as follows:

A [clinical decision support system](#) is defined as a computer system or software application designed to assist clinicians, caregivers, or patients in healthcare and/or treatment decisions.

Notes

- Typically a clinical decision support system responds to triggers, such as specific signs or symptoms, diagnoses, laboratory test results, medication selections, or complex combinations of such triggers. The system then provides information or recommendations relevant to the specific patient.

History

It has been suggested that the origins of clinical decision support (CDS) can be traced back to the 1950s and 1960s. In an early example from 1961, Dr. Homer Warner, a cardiologist from the University of Utah developed a mathematical model which was used to diagnose heart disease.² Since then, there have been countless developments and advancements in the area of decision support. Many theories have been proposed as to how CDS should be approached and applied in clinical practice.

The Five Rights

When implemented properly, CDS has the potential to enhance patient care, reduce errors and duplication of effort, and introduce efficiencies to the clinical workflow. Conversely, CDS tools can also be distracting and disruptive, even producing unwanted consequences. It is therefore important to consider the lessons learned from previous implementations of CDS and conduct thorough requirements analysis prior to designing or procuring a CDSS. One of the best practice frameworks that has been developed to guide those considering a CDS implementation is the "CDS Five Rights".³ "The Five Rights" suggests that to realize the full potential of CDS, solutions should:

- Supply the *right information* (evidence-based guidance, address the clinical need)
- To the *right people* (entire care team, including the patient)
- Using the *right channels* (e.g., EHR, mobile devices, patient portals)
- In the *right intervention formats* (e.g., order sets, flow-sheets, dashboards, patient lists)
- At the *right points in the workflow* (for decision making or action)

Example

A typical application of CDS is shown in the diagram below:



Figure 1.1-1: Example of simple application of CDS

The clinical setting in which this hypothetical tool has been applied is the prescribing of a medication. In this example, the patient has previously had an 91936005 |Allergy to penicillin| recorded. When prescribing a new drug, such as 27658006 |Amoxicillin|, an alert is displayed to remind the clinician of the previously diagnosed allergy. The application may also provide a mechanism to search for alternative medications. Note that the mechanics of this workflow uses a predefined rule which specifies a condition to be evaluated and an action to be taken if the condition evaluates to true.

¹ Definition based on content from [U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality](#)

² [Timeline of the Development of Clinical Decision Support \(OHSU\)](#)

³ Osheroff, Teich, Levick et al., 2012. Improving outcomes with CDS: an implementer's guide, Second Edition