

7.1.2 Clinical Decision Support

Clinical decision support systems (CDSS) are designed to assist clinicians at the point of care on decision making tasks. Examples of applications of clinical decision support include:

- Checking conformance with clinical guidelines and protocols
- Guide clinicians through complex care pathways
- Protect against errors in prescribing (e.g. drug-drug and allergy-drug contraindication checking)
- Highlight critical laboratory results
- Display clinical knowledge resources upon request, that are relevant to the given patient's diagnosis, symptoms, procedures or medications

Most CDSSs consist of three parts:

1. The knowledge base, with rules and guidelines – for example:
 - a. IF drug = << 48603004 |warfarin| AND 77386006 |pregnant| THEN alert user
 - b. IF drug has active ingredient = << 387494007|codeine| AND past history of 292055008 |codeine adverse reaction| THEN alert user
 - c. IF diagnosis = << 195967001 |asthma| THEN display Asthma Management Guidelines
2. The inference engine, which uses the data from the patient record to determine which rules from the knowledge base should be executed – for example:
 - a. When a patient, with finding 77386006 |pregnant| is prescribed 375374009 |warfarin sodium 4mg tablet|, the inference engine triggers Rule a. above.
 - b. When a patient, with past history of 292055008 |codeine adverse reaction| is prescribed 412575004 |aspirin 325mg/codeine 30mg tablet|, the inference engine triggers Rule b. above.
 - c. When a patient's primary diagnosis is entered as "195949008 |chronic asthmatic bronchitis|" the inference engine triggers Rule c. above.
3. A mechanism to communicate, which allows the system to display alerts or clinical knowledge to the user

Using a combination of SNOMED CT techniques, including [mapping](#), [subsets](#), [subsumption](#) and [defining relationships](#), SNOMED CT helps to support the inference engine in determining the appropriate rules to execute.

For example, [Kaiser Permanente's](#) HealthConnect system uses SNOMED CT to support efficient translation of its business rules into decision support rules. The National Board of E-Health in Denmark is developing a centralized decision support service based on the Danish SNOMED CT drug extension, which utilizes the hierarchical and defining relationships of SNOMED CT.

A number of commercial tools also use the capabilities of SNOMED CT to implement Clinical Decision Support. For example, [Cambio's](#) COSMIC tool binds GDL (Guideline Definition Language) rules to SNOMED CT concepts to support the triggering of appropriate rules. [Allscript's](#) Sunrise InfoButton™ feature provides relevant medical reference content to clinicians wherever patient care decisions are made, by using SNOMED CT encoded patient problem lists and medication data to query third-party medical content. The [Epic](#) system provides decision support alerts (called 'Best Practice Advisories'), which are able to use the SNOMED CT hierarchy to help define their criteria. And [First DataBank](#) delivers clinical decision support solutions linked to SNOMED CT, primarily to detect safety issues arising from certain combinations of medications, diagnoses and drug adverse reaction histories.