SNOMED CT and Clinical Decision Support

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What is Clinical Decision Support?

• Clinical Decision Support (CDS) is a service that enables healthcare providers to make well-informed decisions by
  o supplying guidance,
  o 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:

- Automated alerts or reminders
- Clinical guidelines
- Contextually relevant reference information
- Conditional Order Sets
- Diagnostic Report
- Patient-focused reports, forms or templates
• A Clinical Decision Support System (CDSS) is defined as a computer system or software application designed to support clinicians, other health clinical decision support system professionals, carers or patients making decisions related to the health and treatment of a patient.
CDS Five Rights

• 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)
CDS: Functional Areas

• Triggered by rules and designed to interrupt clinicians or patients at the appropriate time.

• Implemented as links to external references which are published by third party, knowledge experts.
CDS: Functional Areas

- A combination of patient data, context-based suggestions and clinical knowledge links to aid the clinician in making a diagnosis.
CDS: Functional Areas

• Include reports and summaries, that are aimed at high quality records, reduction of errors, and more complete information.

• These tools can be triggered when a specific patient condition is detected or when a finding is deemed reportable to a jurisdictional health body.
• Typically designed for complex ordering scenarios.
• They may be comprised of a proposed set of orders or a treatment regimen which is based on an explicit situation or medical condition.
CDS: Clinical Areas

- Medication Management
- Infectious Disease Reporting
- Diagnosis
- Laboratory
- Emergency Department
- Radiology
EHR Components and Key Interactions
CDSS Components and Key Interactions

- **Knowledge Base**: Stores rules and guidelines.
- **Inference Engine**: Uses health records, terminology, and user inputs with CDS rules to execute decision support logic.
- **Communications**: Displays alerts to user interface. Accepts inputs from clinicians.

CDSS communicates with EHR for data exchange.
Knowledge Base Interactions

Clinical Knowledge
Documented

CDS Logic:
Executed

Rules and Guidelines:
Loaded

Machine Readable
Rules and Guidelines:
Processed
CDS Example: Asthma Diagnosis

ON
Clinical Encounter

IF
Diagnosis = Asthma

THEN
Display Asthma Management Guidelines

EVENT
CONDITION
ACTION
CDS Example: Alert

ON
Entry of Drug

IF
Patient Pregnant and
Drug has Active Ingredient=Warfarin

THEN
Alert User AND Present Alternative
CDS Example: Emergency Department

ON

Publishing of
Blood Potassium Result

EVENT

IF

Chest Pain
AND
Current Medication = Digoxin
AND
Potassium Level < 3.0 mmol/L

CONDITION

THEN

Inform Attending Physician

ACTION
Reasoning with SNOMED CT

• Reasoning with SubsFeatures of SNOMED CT can be used in a range of techniques which may then be applied to clinical decision support.

• For example, these techniques can help to execute decision support logic by assisting the inference engine in evaluating the trigger conditions defined in CDS rules.

• SNOMED CT Techniques used by CDS Inference Engine:
  – Reasoning with Subsets
  – Reasoning using Subsumption
  – Reasoning using Defining Relationships
  – Reasoning with Description Logic
References

• Decision Support with SNOMED CT (by SNOMED International)
  – Latest web browsable version: http://snomed.org/cds
  – SNOMED CT Document Library: http://snomed.org/doc
Thank You

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