

Introduction to Medical Informatics

Clinical Decision Support System
(CDSS)

Lecture: 8



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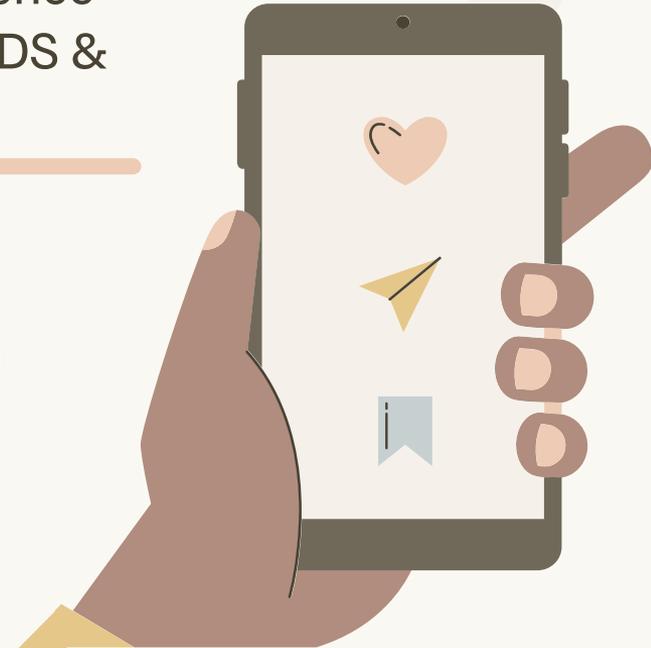
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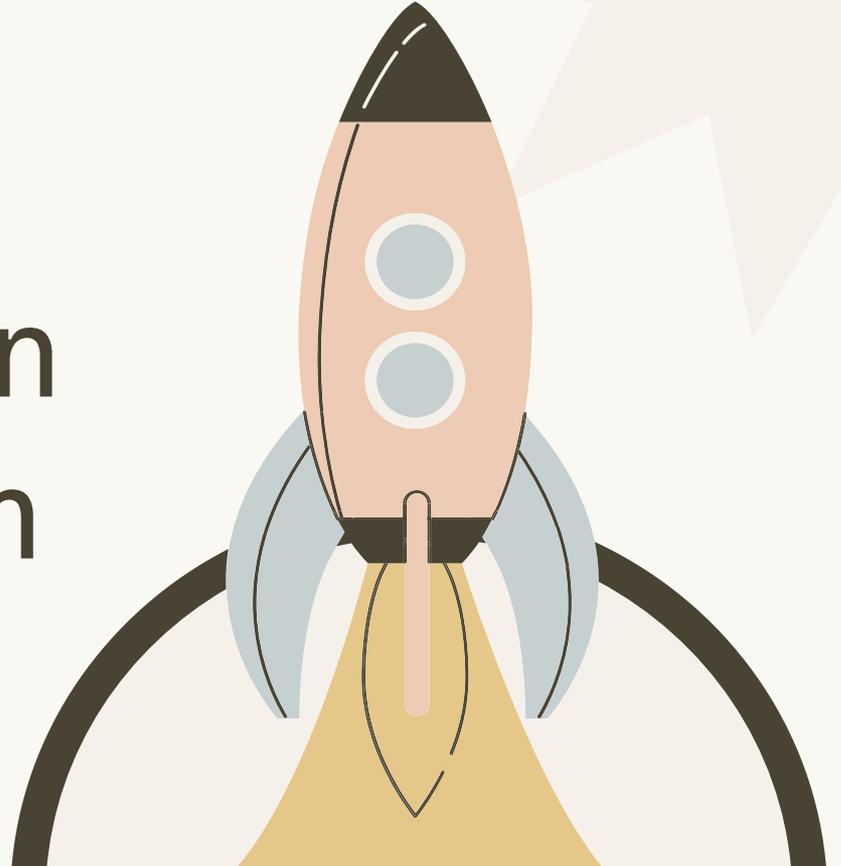
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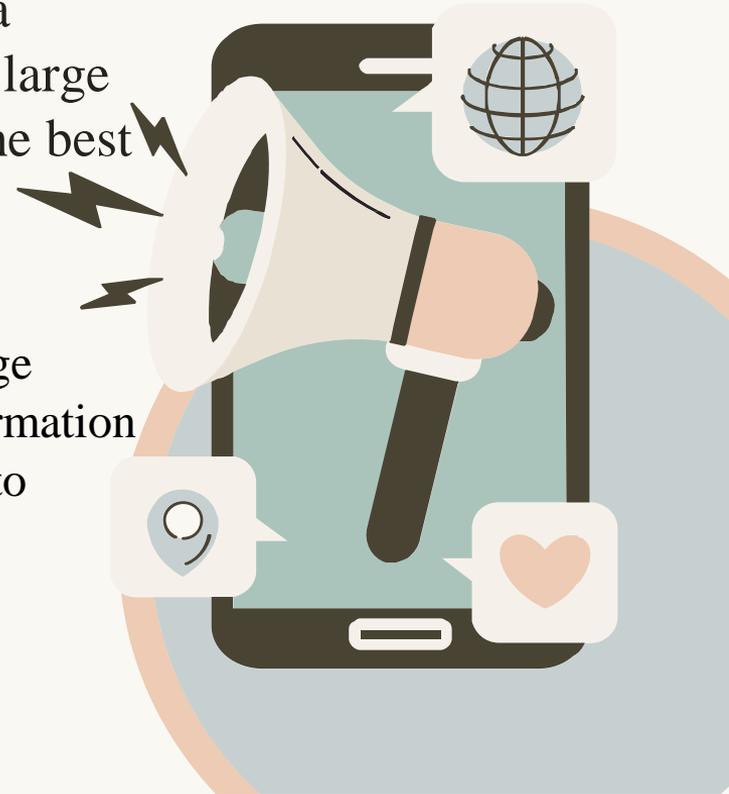
Clinical Decision Support System (CDSS)



Decision Support System

is a computer program application used to Improve a company's decision-making capabilities. It analyzes large amounts of data and presents an organization with the best possible options available.

Decision support systems bring together data and knowledge from different areas and sources to provide users with information beyond the usual reports and summaries. This is intended to help people make decisions.





Clinical Decision Support System (CDSS)

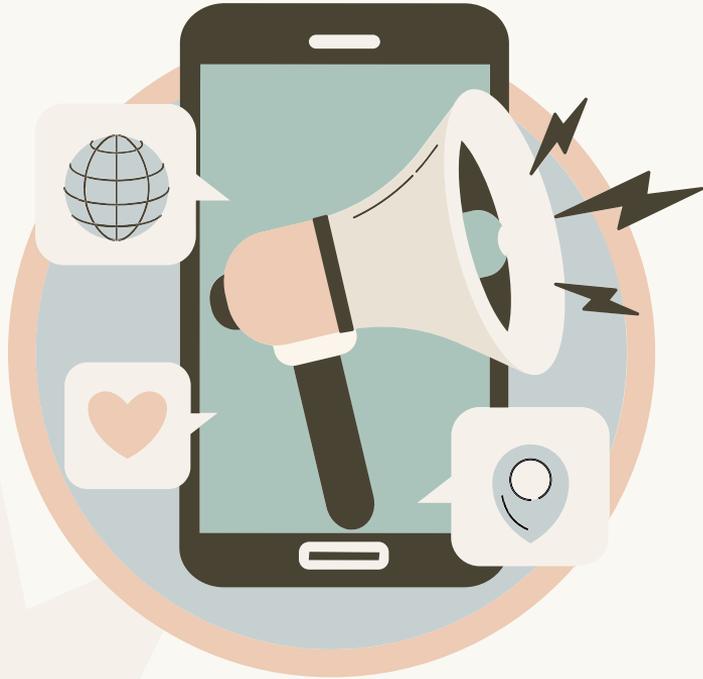
are interactive computer programs, which are designed to assist physicians and other health professionals with decision making tasks. The basic components of a CDSS include a dynamic (medical) knowledge base and an inference mechanism (usually a set of rules derived from the experts and evidence-based medicine) and implemented through medical logic modules.



Clinical Decision Support System (CDSS)

A clinical decision support system use two or more items of patient data to generate case-specific advice. CDSS is simply a decision support system that is focused on using knowledge management in such a way to achieve clinical advice for patient care based on some number of items of patient data.





02

The Difference Between CDS & CDSS



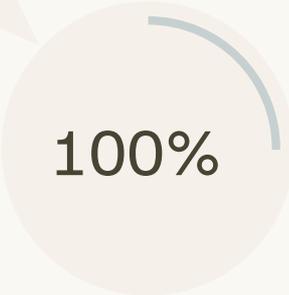
The Difference Between CDS & CDSS

Clinical decision support (CDS) can significantly impact improvements in quality, safety, efficiency and effectiveness of health care. Complete records allow CDS systems to help with diagnoses and track for negative drug by having a better view of a patient's whole health.

Clinical decision support systems (CDSS) are computer-based programs that analyze data within (EHRs) to provide prompts and reminders to assist health care providers in implementing evidence-based clinical guidelines at the point of care. CDSS help clinicians improve complex decision-making processes.

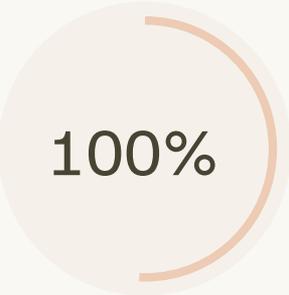


CDSS Provide the right information



100%

To the right person



100%

In the right format



100%

At the right time

Example:

The physician trying to order a drug gets an alert on her computer screen, indicating a potential interaction with a current drug at the time of ordering.



03

Types of CDSS



Types of CDSS

There are two main types of clinical decision support systems:

➤ knowledge base

applies rules to patient data using an inference engine and then displays the results. Most knowledge-based CDSS consist of a data repository, an inference engine and a mechanism to communicate, and they commonly operate under if-then rules.

For example:

if the knowledge-based CDSS is trying to assess potential drug interactions, then a rule might be that *if* drug A is taken and drug B is prescribed, *then* an alert should be issued.



Types of CDSS

➤ Non-knowledge base

relies on machine learning to analyze clinical data. An example of a non-knowledge-based CDSS is an artificial neural network, which learns how to perform certain tasks by considering specific examples, usually without being programmed with if-then or other task-specific rules. The artificial neural network instead analyzes patterns found in patient data to determine relationships between symptoms and a diagnosis.



Example: Problem A

Patient has a high blood pressure reading of 170/100 mmHg

- Data: 170/100
- Information: BP of Patient A = 170/100 mmHg
- Knowledge: Patient A has high blood pressure
- Decision (or Wisdom):
 -  Patient A needs to be investigated for cause of HT
 -  Patient A needs to be treated with anti hypertensive drug
 -  Patient A needs to be referred to a cardiologist



Example: Problem B

Patient B is allergic to penicillin. He was recently prescribed amoxicillin for his sore throat

- Data: Penicillin, amoxicillin, sore throat

- Information:



Patient B has penicillin allergy



Patient B was prescribed amoxicillin for sore throat

- Knowledge: Patient B may/will have allergic reaction to his prescription

- Decision (or Wisdom): Patient Should not take amoxicillin!!



The benefits of CDSS



Reduce the risk of medication errors.

Reduce misdiagnoses.

Improve efficiency and patient throughput.

Support clinical research

Reduction in healthcare costs

Monitoring clinical details

Thank You

Are there any questions?

