

2018 Nursing Knowledge: Big Data Science Conference

**Pre-Conference Data Science Workshop:
Deployment and Implementation in Clinical Practice**

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Objectives

- Identify the purpose and features of clinical decision support (CDS) tools.
- Describe types of CDS tools and best practices.
- Review CDS exemplars.
- Examine model design and ways that the model can be made usable by clinicians by implementing it in the EHR workflow.
- Discuss barriers and facilitators to CDS deployment and efficacy.


Definition

- “A process for enhancing health-related decisions and actions with pertinent, organized clinical knowledge and patient information to improve health and healthcare delivery.”
 - Osheroﬀ, J.A., Teich, J. M., & Levick, D. (2012). Improving outcomes with clinical decision support: An implementer’s guide, second ed. Healthcare Information and Management Systems Society (HIMSS), Chicago, IL.

Purpose of CDS

- The 5 Rights
 - Deliver the right information to the right person in the right format through the right channel at the right time in the workflow.
- Create a clinician-technology feedback loop.
- Increase adherence to clinical practice guidelines.
- **“Making the right thing the easy thing to do.”**


Greenes, R. A., Bates, D. W., Kawamoto, K., Middleton, B., Osheroff, J., & Shahar, Y. (2018). Clinical decision support models and frameworks: Seeking to address research issues underlying implementation successes and failures. *Journal of Biomedical Informatics*, 78, 134-143.



Key Features

- A 2-stream model: clinical stream (reasoning about the **patient**) and cognitive-behavioral stream (reasoning about the **user**)
 - **Interface, information, interaction**
- **Streamline** work flow as much as possible - *minimal interruptions*
- **Match** best tool for the situation
- Clear about **Who** needs to act on it
- **Active vs passive**- “Hard stop or soft stop” - *must act before doing else*

Miller et al. (2018). Interface, information, interaction: A narrative review of design and functional requirements for clinical decision support. JAMIA., 25, 585-592.



Objective of Timely Intervention

- Provides a handy list of tasks at the time expected in the clinical workflow and can be enacted.
- Provides a check list for important tasks, so as not overlooked.
- Educational function –reinforce recognition of the need to address each of the aspects of care (VS, diet restrictions, etc.).
- Provides customization within its framework, enabling it to be readily adapted to nuances of the patient's status.
- Helps to ensure best practice.

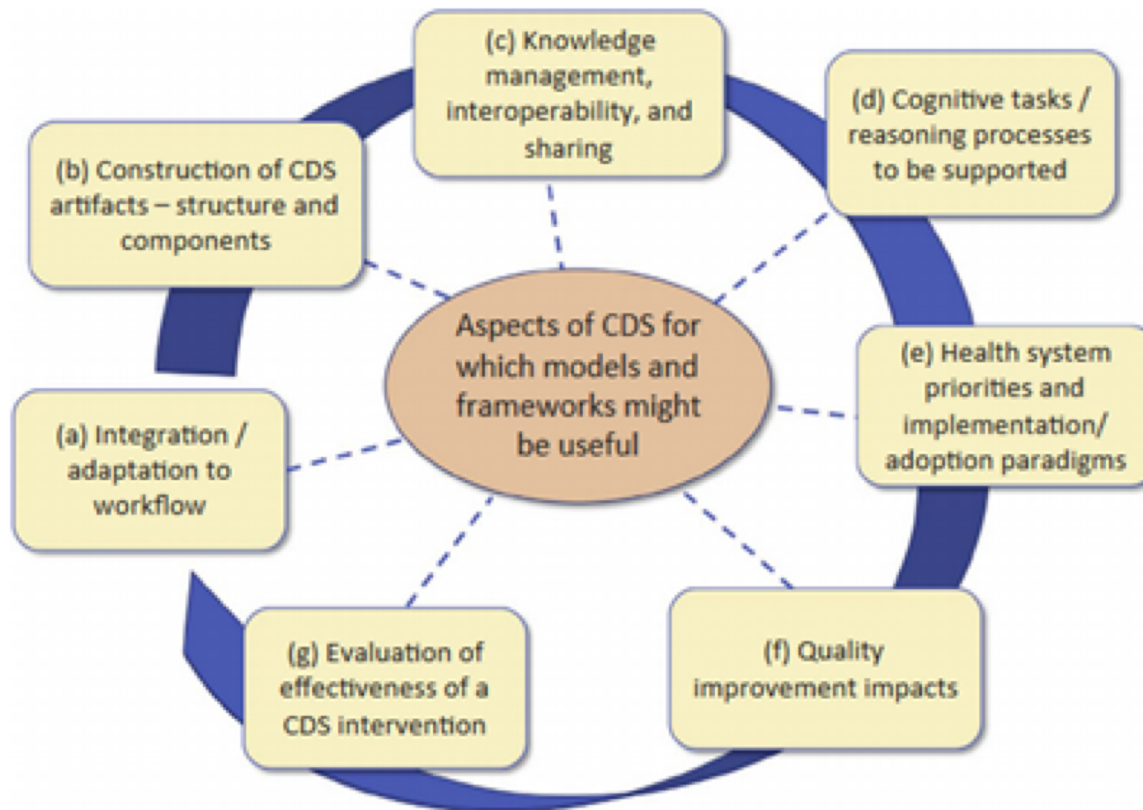
(Greenes et al., 2018)



CDS System Effectiveness

- The CDS system's impact on clinical care
- The CDS system's impact on the user
 - system use,
 - effect on work process, and
 - whether it facilitates appropriate decisions by clinicians and patients.

CDS Models and Frameworks



(Greenes et al., 2018)

CDS Intervention Types

Type	Examples
Documentation forms/templates	Previsit questionnaires; structured physical exam template; immunization flowsheet
Relevant data presentations	Drug \$ when ordering meds; ADE tracking; key parameters prior to adm. meds (HR, BP)
Order/prescription creation facilitators	Guided dose algorithms based on weight, body surface area, renal fx, etc.; TPN formulas; pre/post order sets
Protocol/pathway support	Tools to monitor support clinical pathways (pneumonia); chemo protocols
Reference information & guidance	Calculators/nomograms for drug dosing
Alerts and reminders	Drug allergy; drug alerts; High risk med

CDS Exemplars

- CDS Hooks
 - A tool that connects apps or can provide notifications for CDS; running the right app at the right time
- SMART on FHIR
 - An ecosystem of apps that can be plugged into EHR systems
 - A set of open specifications to integrate apps with EHRs, portals, Health Information Exchanges, and other Health IT systems
 - Helps make structured healthcare data available to 3rd-party applications
- CDS Connect
 - AHRQ-supported online web presence that functions as a repository of CDS artifacts and create prototype infrastructure for sharing CDS across health care settings & technologies
 - A project to demonstrate how evidence-based care can be more rapidly incorporated into clinical practice through interoperable decision support
 - MITRE corporation; <https://cds.ahrq.gov/cdsconnect>

Design and Implementation

- Tool selection
- Model building
- Usability testing
- Assessment of results
- Clinical technology feedback loops

Barriers and Facilitators to Implementation - Organizational

- Governance
- Timely Involvement of Organizational IT
- Awareness of EHR Capabilities and CDS Systems Available
- Physician, Nursing and Other Disciplines' Involvement in Design Process
- Implementation and Roll Out Strategy
- Find Champions and Cheerleaders!!!

Barriers and Facilitators to Implementation - Clinician

- Training
- Impacts of CDS on Alert Fatigue
- Information Overload at the Bedside
- Balancing Decision Support and Critical Thinking – Are Clinicians Over Reliant on CDS to Trigger Responses
- Interface Between CDS Tool and Clinician for Successful Function

Barriers and Facilitators to Implementation - Technology

- Time and Resources to Complete the Build
- Limitations of the EHR
- Testing using Silent Deployment
- Expertise and Ability to Capture Data for Sensitivity and Specificity Testing
- Understanding Conceptual Development and Technical Build Time Requirements