

Decision Support for Quality Improvement

Unit 6a: Clinical Decision Support System (CDSS) basics

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Objective

- Define decision support, its importance, and why it is difficult to implement

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Clinical Decision Support Systems

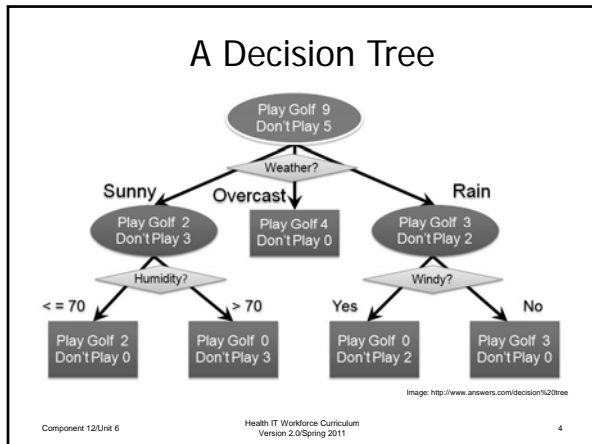
Definition: "...active knowledge systems which use two or more items of patient data to generate case-specific advice."

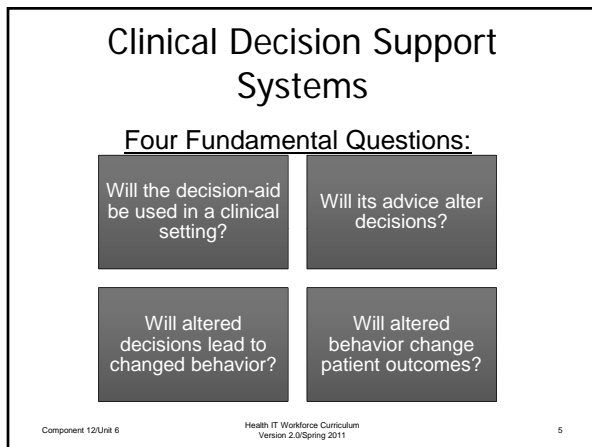
Wyatt, J. & Spiegelhalter, D. (1991)

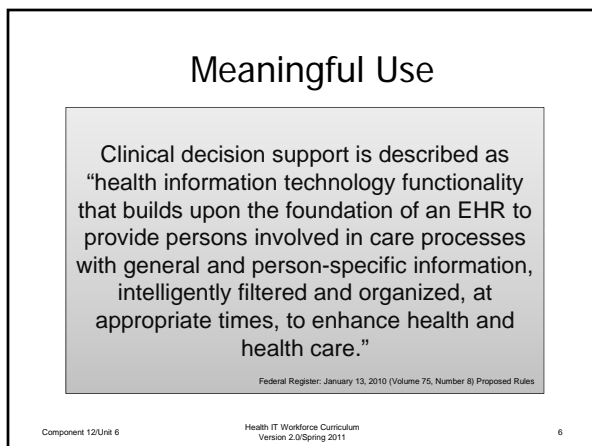
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Clinical Decision Support Systems Effects on Medication Safety

- CDSS combined with CPOE can improve medication safety & reduce medication-related expenditures
 - Introduces automation at the time of ordering
 - Increases legibility
 - Assures that the order is safe and compliant with guidelines

Kuperman, Bobb, Payne et. al., 2007

Seidling and colleagues (2010) created a comprehensive software-algorithm that extracted relevant patient information e.g., age, renal function, co-medications and adjusted upper dose limits to these patient characteristics. This highly specific algorithm-based CDSS significantly improved electronic prescription quality & reduced prescription of excessive doses.

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Clinical Decision Support Systems Are They Being Used?

- Despite potential usefulness, lack of widespread acceptance

Myths

- “Diagnosis is the dominant decision-making issue in medicine.”
- “Clinicians will use knowledge-based systems if the programs can be shown to function at the level of experts.”
- “Clinicians will use stand-alone decision-support tools.”

Edward (Ted) E. Shortliffe, Conference on Medical Thinking
University College, London, June 23, 2006

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Clinical Decision Support Systems Are They Being Used?

- Provision does not guarantee uptake
- Factors that have an impact on CDSS use
 - Availability of hardware
 - Technical support and training
 - Integration of systems into workflows
 - Relevance/timeliness of clinical messages
 - Endorsement by colleagues
 - Degree of perceived threat to autonomy
 - Degree of interference with doctor-patient interactions

Moxey et al, 2010

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Clinical Decision Support Systems Are They Being Used?

- Integration with workflow
 - Ease of navigation and use
 - Timing and frequency of prompts
 - Perception of time
- Presentation
- Content
 - Relevance
 - Information quality
 - Information type
 - Links to supportive information
 - Local constraints

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Moxey et al., 2010

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CDSS and CPOE Recommendations for Success

- Seamless integration of CPOE with CDSS into systems and workflow
- Access to Internet-based and other online support material
- Designing systems specifically for clinical area
- Measuring CDSS impact to ensure overall benefit
- Ensuring that CPOE systems provide error and interaction checking
- Ensuring that CPOE systems facilitate weight- and physiology-based dosing

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Handler et. al., 2004

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Clinical Decision Support Systems Recommendations for Success

- Using interruptive alerts discriminately (only for high severity events)
- Providing a simple, vendor-independent interface for institutional customization of CPOE alert thresholds
- Maximizing use of automated systems and passive data capture
- Ensuring widespread availability of CPOE and CDSS using secure wireless and portable technologies, where appropriate

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Handler et. al., 2004

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Decision Support Key Functions

Administrative	Managing clinical complexity and details
Cost control	Decision support

Perreault & Metzger, 1999

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Decision Support Administrative Function

- Supports clinical coding and documentation
- Example: authorization of procedures and referrals

“Choosing diagnosis codes is a non-intuitive operation for the practitioner. Mistakes are frequent with severe consequences on healthcare evaluation and funding”

Lecornu et. al, 2009

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Decision Support Complexity Management Function

- Assists with the details of managing clinical complexity
- Examples:
 - Keeping patients on research and chemotherapy protocols
 - Tracking orders
 - Referral follow-up
 - Preventive care

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Decision Support Cost Control Function

- Supports control of costs
- Examples:
 - Monitoring medication orders
 - Avoiding duplicate or unnecessary tests

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Decision Support Decision Support Function

- Supports clinical diagnosis and treatment plan processes and promotes use of best practices
- Examples:
 - Condition-specific clinical practice guidelines
 - Population-based management
 - Clinical calculation
 - Disease registries and patient tracking tools
 - Summary screens
 - Order sets

Metzger, J. and Macdonald, K. (2002).

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Summary

- CDSS integrate a medical knowledge base, patient data, and an inference engine to generate care-specific advice.
- Despite potential usefulness, there has not been widespread clinician acceptance of CDSS
- Use of CDSS by clinicians will alter clinical decision-making, change behaviors, and improve patient outcomes.
- Key functions of CDSS are: administrative, managing clinical complexity/details, cost control, and decision support.

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