

Clinical Decision Support: A practical guide to developing your program to improve outcomes



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Improving Outcomes with Clinical Decision: An Implementer's Guide



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Goals / Objectives



- Understand how to use the Clinical Decision Support Implementers' Guide to initiate a clinical decision support project within your practice.
- Understand the key issues in developing Clinical Decision Support Interventions in small to mid size practices.
- Describe multiple clinical decision support intervention types.

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CDS Guide Approach



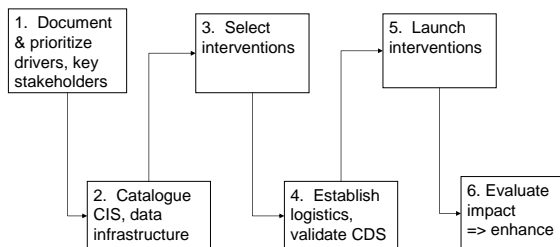
• CDS Definition:

“Providing clinicians or patients with clinical knowledge and patient-related information, intelligently filtered or presented at appropriate times, to enhance patient care.”

Includes and builds on what's already being done...

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The Clinical Decision Support Implementation Steps



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Identifying CDS Goals



- CDS emerges from & supports key organizational performance improvement initiatives
- External Drivers
 - Quality measures and pay-for- performance programs
- Internal drivers
 - organizational commitment to disease management
 - Improve overall care safety
 - Optimize cost-effectiveness of care
 - Address clinician/patient questions



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Ideal targets for CDS interventions

- Patient management issues occur frequently;
- Activities with a significant gap in performance or a missed opportunity to optimize care;
- Care events that reduce clinical costs or increase quality and safety;
- Performance can be improved through better distribution of knowledge, improved communication or heightened awareness.

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Factors affecting CDS desirability

Clinical Objective Value Score = (P+O+C+N+G)-(D+C)

P= Patient impact: quality, safe, cost-effective care; improved morbidity and mortality, of interest to patients

O= Organizational impact: regulatory or audit compliance, appropriate resource use, liability

C= Clinician impact: enhanced workflow; consistent with consensus, local standards, feasible to address, of interest to clinicians

N= Number of patients positively affected

G= Gap between ideal and actual behavior re: intervention

D= Difficulty associated with addressing the objective

C= Cost of addressing the objective

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Identifying Stakeholders

- People: the key to success
- Governance and management structures and process need to be established
 - CDS is **NOT** an IS project
- Champions – key supporters – are important for cultivating 2-way communication about, and support for, the CDS program.

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Cataloging Available Information Systems



- CDS is dependent on a reliable, fast, usable CIS infrastructure.
- Data types and features provided in your CIS determine the types of CDS interventions available
 - Availability of coded data, use of standard vocabularies, and ability to aggregate data from multiple sources.
- 6 major types of CDS interventions
 - Understanding different types, their advantages and disadvantages, is critical in selecting and designing optimal interventions.

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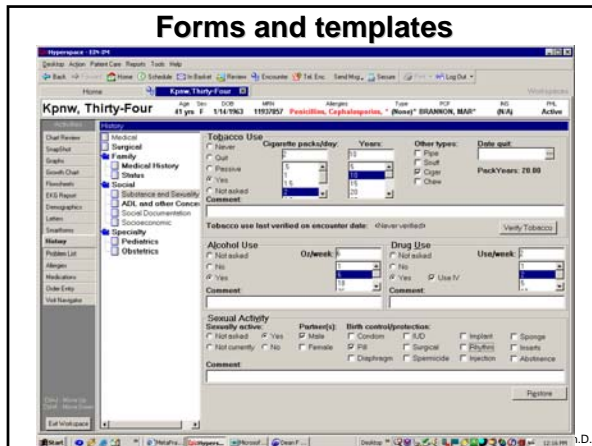
Hardware/software	<ul style="list-style-type: none"> • number of workstations/terminals, handheld/portable devices, printers, including per bed, per clinician • quality: age, software/operating system version • reliability: e.g., percent uptime, maintenance issues • performance: speed of the core applications, as perceived by users
Network connectivity	<ul style="list-style-type: none"> • number and proportion of computers connected to internet and high-speed internal communications
Wireless/remote systems	<ul style="list-style-type: none"> • number and use of wireless devices: smart phones, wireless PDA, alphanumeric pager, wireless laptops • telemedicine infrastructure (e.g., remote monitoring or data gathering from patients at home via machines that measure blood pressure and blood sugar) • remote access to information systems by clinicians
Medical Devices that generate patient data	<ul style="list-style-type: none"> • number and type of medical instruments that gather and can deliver data about patients, e.g. electrocardiogram machines, automated blood pressure monitors.
Integration among clinical systems	<ul style="list-style-type: none"> • number of different terminals/workstations/windows required to access the full portfolio of available applications

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CDS intervention types

- **Documentation forms/templates** -- complete documentation for quality/continuity of care, reimbursement, legal; complete orders; reduces errors of omission; provides coded data for other CDS.
 - More concentrated your practice the more they help (e.g., upper respiratory tract infections, diabetics)
 - Common forms, return to work, camp / sports physicals, vaccination history, etc.
 - Allow patients to enter history on-line (in office or home) (medicalhistory.com or medfusion.net)
 - Automate condition identification – depression, alcohol abuse,
 - Print patient-specific information resources – car safety reminders, asthma medication instructions

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CDS intervention types

CAUTION
WET PAINT

- **Relevant data presentation** -- optimize decision making by ensuring all pertinent data are considered; organize complex data collections to promote understanding of overall picture and to highlight needed actions
 - Identify all patients on particular medications for recalls
 - Condition-specific graphs for patients – blood glucose or LDL and medication, or weight or BP

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Relevant Data Display

Clinical Workstation		Diabetes Worksheet	
PERCENTAGE	NO	YES	Diabetes with renal manifestations
Active Medications			
1. Lantus (Insulin, 100 Units, 100 U/ml) 1 TABLET QD 2. Simvastatin (Simvastatin, 40 mg) 1 TABLET QD 3. Lisinopril (Lisinopril, 10 mg) 1 TABLET QD 4. Cankva (Canagliflozin, 300 mg) 1 TABLET QD 5. Cankva (Canagliflozin, 300 mg) 1 TABLET QD 6. Cankva (Canagliflozin, 300 mg) 1 TABLET QD 7. Cankva (Canagliflozin, 300 mg) 1 TABLET QD 8. Cankva (Canagliflozin, 300 mg) 1 TABLET QD 9. Cankva (Canagliflozin, 300 mg) 1 TABLET QD 10. Cankva (Canagliflozin, 300 mg) 1 TABLET QD			
Glucose Laboratory Data			
HgbA1c (H7A1c)	UA Protein	LABSD (V08)	24 Hr Urine Albumin (U08)
12/12/2001 9.8 %	10/12/2001 Negative	No Data	10/02/2000 47 mg/dl
10/12/2001 8.8 %	06/02/2000 Negative		10/11/2001 1.6
10/02/2000 7.2 %	11/12/1999 Negative		10/11/2001 2.3
09/12/2000 6.8 %	06/02/2000 Negative		10/02/2000 1.3
10/04/1999 6.8 %	10/10/1999 Negative		10/02/2000 2.2
06/02/1999 7.6 %	06/02/1999 Tr		
04/05/1999 8.1 %			
Lipid Profile (HDL (H08))			
Trig (H08)	HDL (H08)	CHOL (H08)	
11/12/2001 170 mg	57	24	217
06/02/2001 84	28	25	133
04/05/1999 82	36	24	153
Clinic Data			
Blood Pressure (H12000)		Weight	
01/02/2002 100/74 mmHg	01/02/2002 243	Last test exam: 10/20/01 Normal	
11/12/2001 100/62 mmHg	11/12/2001 248	Last stated renal exam: 10/20/01 Abnormal	
06/02/2000 100/70 mmHg	06/02/2000 250		
10/02/2000 100/70 mmHg	10/02/2000 250		
06/02/1999 100/70 mmHg	06/02/1999 250		
Admission			
Suggested follow-up for Triglycerides > 400 = Test HgbA1c to >= 7.0			
Suggested follow-up for eGFR < 30 = Monitor UTA every 2 months for 12 months			
Suggested follow-up for eGFR < 30 = Monitor UTA every 2 months for 12 months			
Suggested follow-up eye exam in 3 months - Contacts			

CDS intervention types

- **Order creation facilitators** -- promotes adherence to standards of care by making the right thing the easiest to do.
 - Drug-drug interactions, drug-allergy interactions
 - Subsequent or corollary orders for routine laboratory monitoring based on evidence-based guidelines
 - Allow patients to request refills online
 - Standing orders so RN's enter orders for standard health maintenance tests (microalbumin for diabetics)

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Order Creation

This screenshot shows the 'Add Medication' interface for a patient named Shah, James. The medication selected is 'aspirin'. The interface includes:

- Med Name:** aspirin, Route: PO
- Select strength and Form:** 81 mg enteric coated capsule
- Dose Units:** 30 capsules
- Frequency:** QD
- Duration:** For 30 day(s)
- Start Date:** 1/20/2004
- Other Dose Options:** Take As Directed, Instruction, PRN

Order sets

This screenshot shows an order set configuration interface for a patient named Kpnw, Thirty-Four. The interface displays a list of orders and their details:

- DIAGNOSIS:** Asthma (multiple)
- INTERNAL ORDER:** Asthma
- INTERNAL ORDER:** CDC-w/CRF Workflows ordered
- INTERNAL ORDER:** RIVFALOXIMIN PULVIC LAB
- MEDICATIONS:**
 - Albuterol MDI 2 inhaler - Regular use can be discontinued
 - QVARX 81 2 puff bid - Low Dose, for initial therapy
 - QVARX 81 2 puff bid - Medium Dose, for low dose failure
 - QVARX 81 2 puff bid - High Dose, for medium dose failure
 - Prednisone - for treatment of acute exacerbation
- LEVEL OF SERVICE:**
 - Alert Health (single)
 - Phonics (single)
 - SMARTTEXT
 - Asthma Action Plan (single)
 - Asthma Action Plan - No Fill (single)

CDS intervention types



- **Time-based checking and protocol support** -- provides support for multi-step care plans, pathways and protocols that extend over time.
 - Return appointment reminders – veterinarian, oil change, dentist
 - Routine physicals, if orders online, mammograms, pap smears, etc.

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CDS intervention types



- **Reference information and guidance** -- address information needs of patients and clinicians
 - Access to information resources
 - Up-to-date (www.uptodate.com)
 - Micromedex (www.micromedex.com)
 - Patient-focused information resources, Healthwise (www.healthwise.org)

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Reference information

Alternative Selection
ASTHMA, ADULT, EXACERBATION

* Administer repetitive doses of inhaled beta agonist (albuterol) for exacerbations. albuterol may be dosed 2-4 puffs every 20 minutes X3.
 * Add or increase (double) dose of inhaled beta agonist (albuterol) every 20 minutes X3.
 * For severe exacerbations, start prednisone 40mg daily (or 10mg q12h) for 5-7 days.
 * Make sure patient has Asthma Action Plan with directions for self-management.

Web Links
 Adult Asthma Practice Resource

Alternative
 ALBUTEROL INHALER 80MG/200UG AER
 QVAR AER 80MG INHALER 7.3G
 QVAR AER 80MG INHALER 7.3G
 QVAR AER 80MG INHALER 7.3G
 PREDNISONE 20MG TABLET [23]

Asthma

Management Highlights

- Ask about typical symptoms of asthma (e.g., cough, wheezing, chest tightness, breathlessness), duration of symptoms, and possible exacerbating or relieving factors.
- To assess severity, ask about the frequency of daytime symptoms, nocturnal awakening, and use of a rescue inhaler or nebulizer. Also ask whether the patient has ever gone to an emergency room, been hospitalized, or stayed in an intensive care unit because of an asthma attack.
- Auscultate the chest for prolonged expiration and diffuse wheezes and look for signs of allergic rhinitis, sinusitis, and atopic dermatitis.
- Perform basic spirometry at the initial assessment for asthma and at least every 1 to 2 years thereafter. To support the diagnosis of asthma, confirm that airflow obstruction is at least partially reversible (e.g., an improvement in forced expiratory volume in 1 second (FEV₁) of >=12% following the inhalation of a beta-agonist such as albuterol).
- If reversibility is questionable, consider spirometry before and after an exercise challenge (e.g., in a young, historically healthy person), or consider referral to an asthma specialist for bronchoprovocation studies. The inhalation of methacholine will

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CDS intervention types



- **Reactive alerts and reminders (i.e. unsolicited by patient or clinician recipient)** -- provides notification of errors and hazards related to new data or orders or passage of time. Helps enforce standards of care
 - Reminders on abnormal values
 - Alternative medication suggestions -- formulary

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Reactive alerts

Alternative Selection
EFFEXOR 100MG TABLET

* Non-formulary, enhanced criteria-based drug.
 * If ordered this way, patient will pay full price regardless of comments.
 * If intent is for copay to apply, back out and fill out criteria form.
 * See Web links for criteria and cost information; see Web link for practice resource on treatment of neuropathic pain.
 * Data do not support the use of venlafaxine as a first-line agent for the treatment of depression.
 * The initial drugs of choice for management of depression are SSRIs (fluoxetine, paroxetine, sertraline) or TCAs (nortriptyline, desipramine).
 * Venlafaxine has little serotonergic advantage over other antidepressants; its side effect profile is similar to that of SSRIs.
 * [Scroll for more detail]
 * In comparison with TCAs venlafaxine has a more desirable ADR profile, but the use of

Web Links
 Enhanced Criteria-Based Prescribing
 Criteria Questions-Venlafaxine
 Member Price-Venlafaxine

Alternative	Sig	Disp	Refill	End Date	Class	Cost
PROZAC 100MG CAPSULE [18361]	TCPO QAM X100; THEN START 20M	10	0			1
PROZAC 100MG CAPSULE [19381]	TCPO QAM	30	5			1
PROZAC 20MG CAPSULE [5571]	TCPO QAM	30	5			1

Accept Alternative Continue With Original Order Cancel Filing Process

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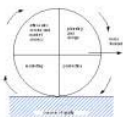
Clinical objectives/classes

Types of things CDS can help with:

- **Assess** – history, examination, testing
- **Plan and document** - care
- **Prescribe** – “best” therapy
- **Educate** - patients
- **Control** – disease risk/severity indicators

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Specific Quality Measures




Assess

- Tobacco use, pain, NSAID risk assessed
- BP, weight recorded
- Foot, eyes examined
- Depression, breast/colon CA screened
- HbA1C, urine protein, LV function, lipids tested

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Specific Quality Measures



Plan/document


- Non-Rx care/follow-up – hypertension

Prescribe

- ACEI, beta-blocker, warfarin – heart failure
- anti-platelet/lipid, ACEI, beta-blocker – CAD
- pneumonia/flu vaccination – prevention

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Specific Quality Measures



Educate

- Dz. mgt./behavior change – CHF
- Smoking cessation – prevention

Control disease/risk

- Blood pressure - hypertension
- HbA1C – diabetes
- LDL – coronary artery disease, diabetes

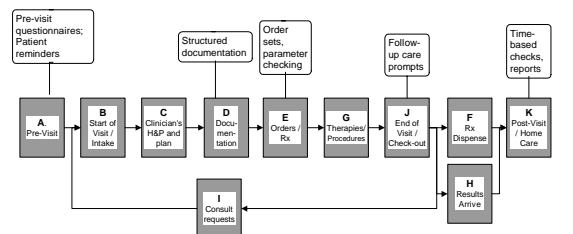
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Map Objective Classes to CDS Interventions

Screen/assess	➔	questionnaires, flow sheets
Plan/document	➔	guidelines, protocols, templates
Prescribe	➔	order sets, flow sheets, alerts
Educate	➔	patient references
Control disease/risk	➔	flow sheets, audits, patient reminders

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Consider CDS Opportunities in Clinical Workflow



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Put it all Together

Objective Class	Intervention type	Workflow Step
Improve compliance with simple care guidelines (e.g., health maintenance, dz mgt.)	Clinical data flowsheets Show screening tests over time; disease registries	Start of visit (B); Documentation (D); Ordering (E); Discharge (J) Results arrive (H)
	Alerts and reminders to foster best care Reminders for needed items	Ordering (E)
	Order sets Contain appropriate interventions	Ordering (E)
	Multidisciplinary documentation forms	Documentation (D)
	Clinician encounter forms	Documentation (D)
	Patient self-assessment forms Health maint. questionnaires	Pre-encounter (A) Office check-in (B)
	Reference information (context-sensitive preferred) Recommendations based on problem list.	Pre-visit (A); Clinician H and P (C); Ordering (E); End of visit (J)

From CDS Guide, fig 3-3

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IV. Specify and Build Interventions



- Involve all the stakeholders
 - Design (champions/resistors)
 - Validation
- Establish implementation details
 - **Exactly** who, when, where, what, how - Use cases!
 - Workflow/other changes required
 - Caution re: alert/intervention overload!
 - Feedback channels

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V. Test and Launch Interventions



- Verify content/software perform as expected
- Keep stakeholders informed!
 - Convey goals, strategies, tactics
 - Listen to concerns, opportunities to improve
- Anticipate/address training needs
 - Training resources
 - Train the trainer
- Consider capacity to absorb change

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VI. Evaluate and Enhance



- Monitor intervention use and effects
 - Quantitative: impact on target objectives?
 - Qualitative: +/- on process, satisfaction, etc.
 - Set reasonable intervals/expectations
- Make iterative refinements to enhance value
 - To launched interventions
 - By cycling through 6 implementation steps

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VI. Maintain Knowledge Assets



- Manage proactively and consider:
 - What intervention types are deployed?
 - How many of each type is deployed and what domains/topics are covered? Sources?
 - Currency, quality, appropriateness
 - Are the clinical information and recommendations consistent across interventions?
 - What is the monitoring and maintenance plan/responsibility for each intervention? Review/expiration dates?

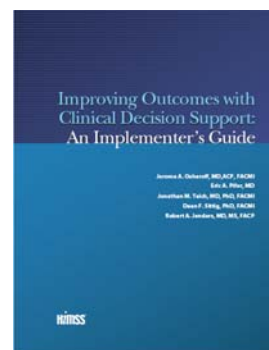
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Final CDS Selection



- Different interventions are effective for achieving different objectives
- Selection of the best intervention based on:
 - availability of the intervention in your CIS
 - ease of implementation,
 - user acceptability, and
 - impact of intervention
- Solicit input, validate, refine, interventions before roll-out.

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www.himss.org/cdsworkbook

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