

Clinical Decision Support to Improve Patient Care



**Key
Health
Alliance**

Regional Extension
Assistance Center for HIT

Paul Kleeberg, MD, FAAFP, FHIMSS
CMIO Stratis Health

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Conflict of Interest

- Dr. Kleeberg is the Clinical Director for the Minnesota - North Dakota Regional Extension Assistance Center for HIT (REACH) – An ONC REC
- Dr Kleeberg also serves on the Physician Advisory Board for Elsevier
- No other conflict of interest

Objectives

- Understand the expanded definition of Clinical Decision Support (CDS)
- Know how “Meaningful Use” provides the Foundation for CDS and quality improvement
- Identify the steps for putting theory into action
- Introduce a tool to organize your strategy

Outline

- **Misconceptions about Clinical Decision Support (CDS)**
- “Meaningful Use” as the foundation of CDS and quality improvement
- Expanding CDS beyond the provider and the EHR
- Putting theory into action
- A tool to organize your strategy
- Closing thoughts

REACH Experience with Small Clients

- Many:
 - Struggle to achieve EHR benefits
 - See MU as an external mandate, separate from effective use
 - Express concerns about Stage 2
 - Feel pressure: ACOs, quality reporting, pay 4 performance
 - Say “Just tell me what I have to do to meet the requirements”



Common misconceptions about Clinical Decision Support (CDS)

- The health care administrators:
 - Pop-up alerts and reminders
 - A forcing function
 - A way to finally get physicians to do something
- EHR Vendors:
 - Numbers:
 - Medication interactions
 - Duplicate alerts
 - Allergy checking
- Providers
 - Cook book medicine
 - Disruptive
 - Done to save the system money



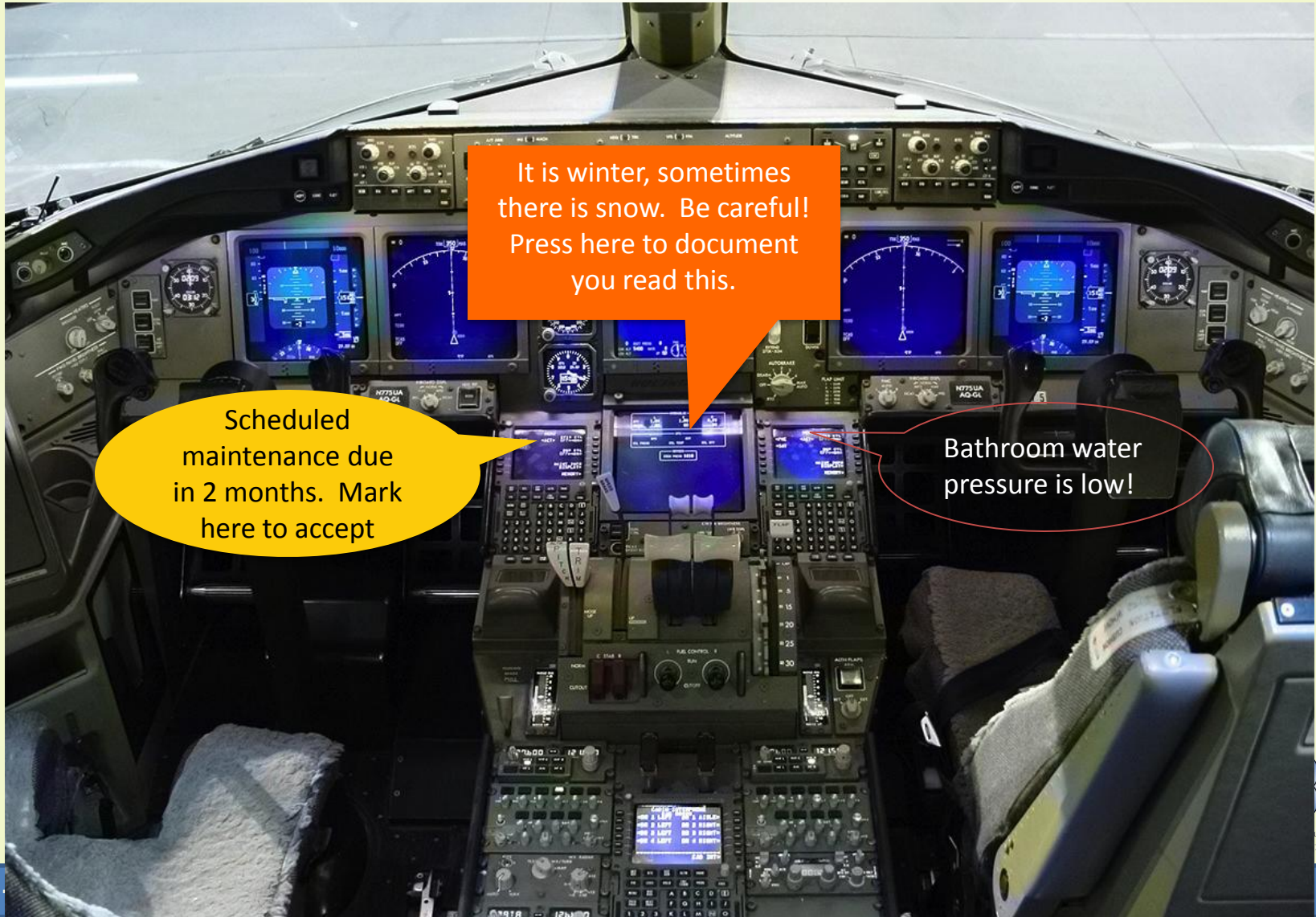
CDS Done Poorly

- Alerts which force a user to stop – disrupting their train of thought
- Imprecise alerts causing multiple false alarms
- Force choices with inappropriate options
- Seemingly important reminders of unnecessary information
- Can cause the user to miss important things



Computer Assisted Flying as CDS

Adopted from a presentation by Dr. Kevin Larsen, Medical Director of Meaningful Use at the ONC



It is winter, sometimes there is snow. Be careful! Press here to document you read this.

Scheduled maintenance due in 2 months. Mark here to accept

Bathroom water pressure is low!

Learnings: Alerts

- There is a tendency to to over alert:
 - A desire to control behavior
 - A convenient way to fix a problem
 - Fear that something very bad might happen if we don't
 - Fear that we will be held liable if we don't
- Plenty of published literature on alert fatigue



Too many alerts are counterproductive

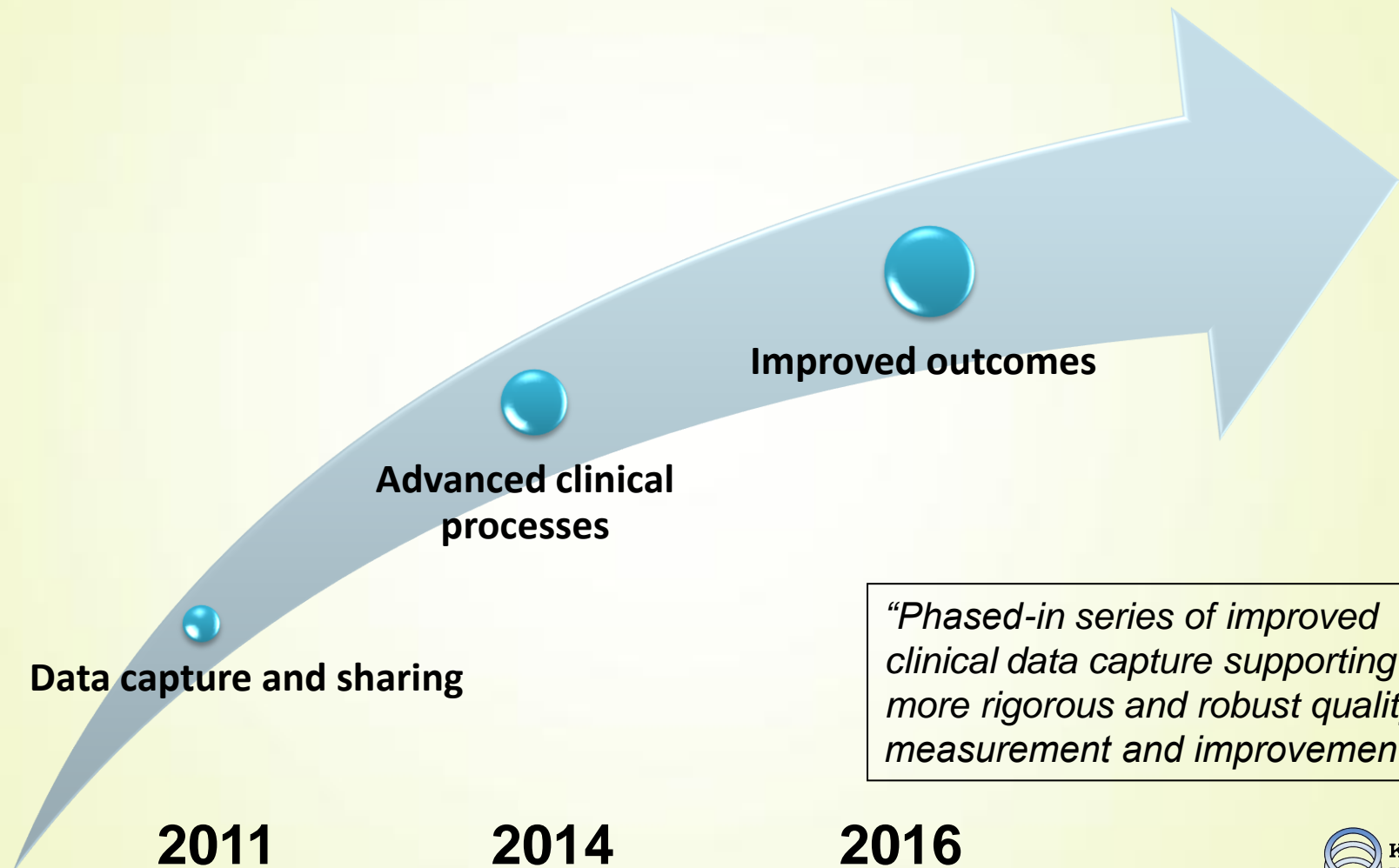
- 90% override rate of drug-allergy and high severity drug interaction alerts (Weingart, 2003)
- Create a strong feelings in the end user (Sittig, 2005)
- Can distract the user from important information or completing an important task
- Complicates an already steep learning curve



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Bending the Curve Towards Transformed Health



“Phased-in series of improved clinical data capture supporting more rigorous and robust quality measurement and improvement.”

Source: Connecting for Health, Markle Foundation “Achieving the Health IT Objectives of the American Recovery and Reinvestment Act” April 2009



CDS as it Relates to Meaningful Use

- Meaningful Use Definition of CDS:
 - HIT functionality that builds upon the foundation of an EHR to provide persons involved in care processes with general and person-specific information, intelligently filtered and organized, at appropriate times, to enhance health and health care.
- The Rule:
 - Implement one clinical decision support rule relevant to specialty or high clinical priority along with the ability to track compliance with that rule.
- Provider Centric

Building a CDS Foundation

- The EHR incentive is the foundation for Clinical Decision Support:
 - Demographics
 - Problems, medications, allergies
 - Labs and vital signs
 - Smoking status, family health history
 - Provider notes
- Freeing information from the confines of paper hidden in a chart room

The Promise of Meaningful Use and 2914 Certified Software

- Problems, medications, allergies, labs and clinical notes that can be shared with your staff, other providers and patients
- Will enable asynchronous communication with your patients and colleagues
- Provide discrete locations for additional elements in the record: care plan, care team, functional status that can be exchanged with and parsed by other EHRs

What Tools would Satisfy the Rule?

- If triggered by patient specific information AND relevant to a quality measure, specialty or high clinical priority:
 - Documentation forms or templates
 - Situation-specific flow sheets
 - Relevant data presentation
 - Referential information
 - Interactive sequential advice
 - Order sets
 - Alerts and reminders
 - Protocols and Pathways
 - Automatic dose calculators
- Not
 - Drug-drug and Drug-allergy interactions



Provider-Centric CDS

- Benefits
 - A simple solution
 - Can be very effective
 - Targets the individual most likely to be able to respond
- Obstacles
 - Leaves all the work to the provider
 - With only one protective layer, the objective risks being missed
 - Does not leverage the health care team
 - Does not leverage the patient
 - The EHR may not be capable or you may not have the expertise or time

Six Opportunities for CDS During an Ordering Session*

- When the ordering session is initiated
- When selecting the patient from the census or list
- When opening the patient's chart
- When initiating orders
- When completing an order
- When signing an order

* Miller RA, Waitman LR, Chen S, Rosenbloom ST. The anatomy of decision support during inpatient care provider order entry (CPOE): empirical observations from a decade of CPOE experience at Vanderbilt. J Biomed Inform. 2005 Dec;38(6):469-85.

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Broadening the Definition of Clinical Decision Support

- A variety of approaches for delivering clinical knowledge, and intelligently filtered patient information, to clinicians and/or patients for the purpose of improving healthcare processes and outcomes*
- Making the right thing to do the easiest thing to do

* Improving Outcomes with Clinical Decision Support: An Implementer's Guide

“CDS Five Rights”

- To improve targeted healthcare decisions and outcomes, information interventions (CDS) must provide:
 1. The right information
 2. To the right people
 3. Via the right channels
 4. In the right formats
 5. At the right times
- The “who, what, when, where, how”

Right Information (“What” Options)

- Provides information that is:
 - Evidence-based
 - Current
 - Responsive to clinical needs
 - At appropriate level (depth and breadth)
 - Useful for guiding action



Right People (“Who” Options)

- The “right people” to receive or provide information:
 - Providers
 - Nurses
 - Pharmacists
 - Front desk / admission staff
 - Other care team members
 - Patients and their caregivers



Assistance Center for HIT

Right Channels (“Where” Options)

- How is the information getting to the “right people”?
 - EHR modules
 - Registries
 - Portals
 - Mobile devices
 - Smart home devices
 - Paper (e.g., patient handout)
 - E-Mail, text messages...



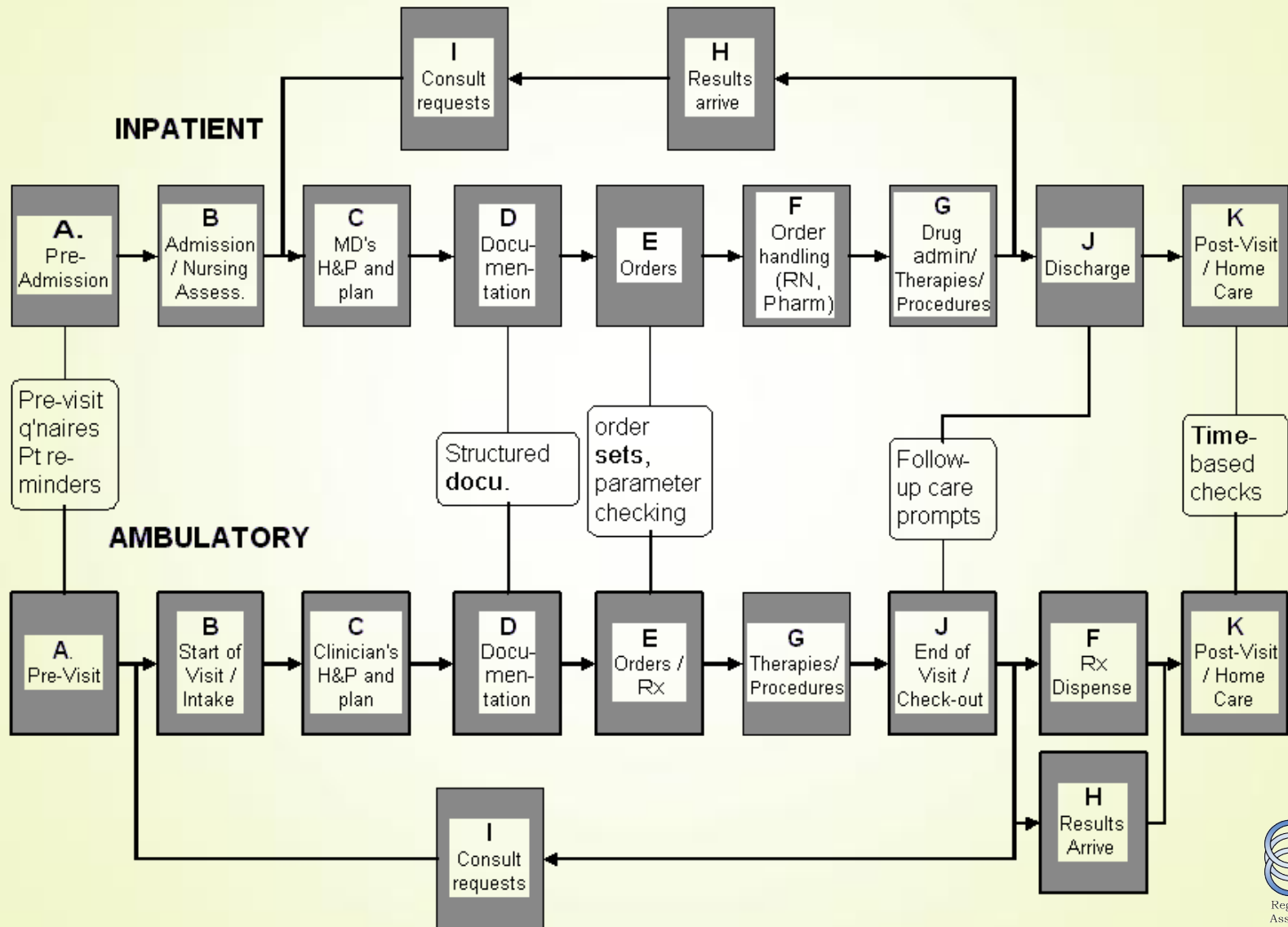
Right Formats (“How” Options)



How is the information presented?

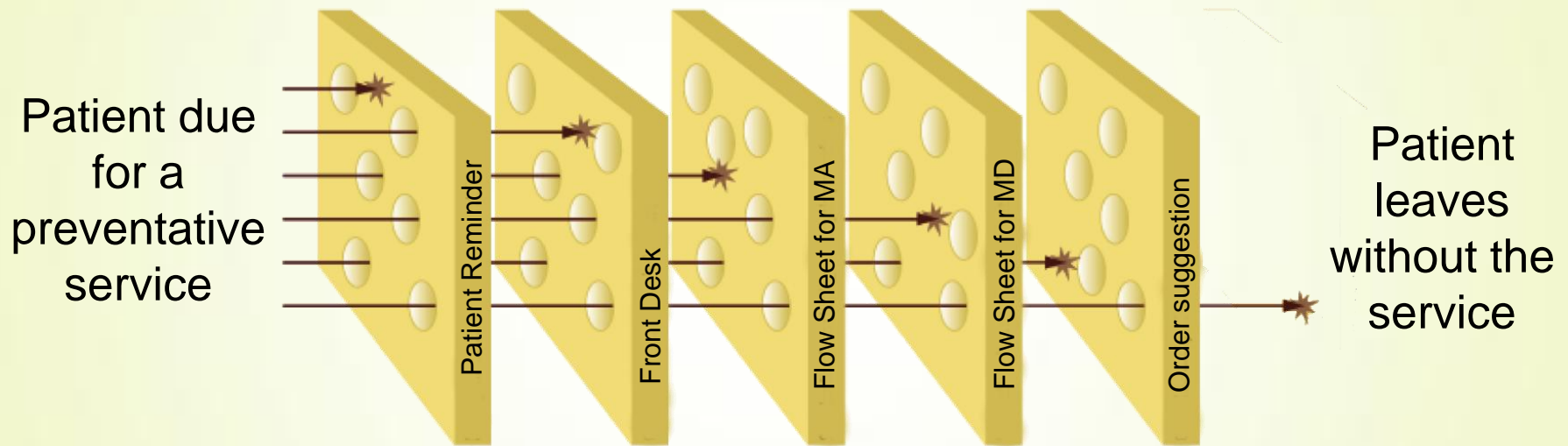
- As an interruptive event
 - Alerts
- A gentle reminder
 - Highlighted material in the workflow
- In a digested format
 - Patient Lists/Provider Scorecards
 - Flow sheets and Graphs
 - Dashboards
- To provide guidance
 - Documentation Templates
 - Order sets
 - Reference information

Right Time (“When” Options)



The earlier in the workflow the better

- Multiple approaches to intervene are more likely to produce the desired outcome



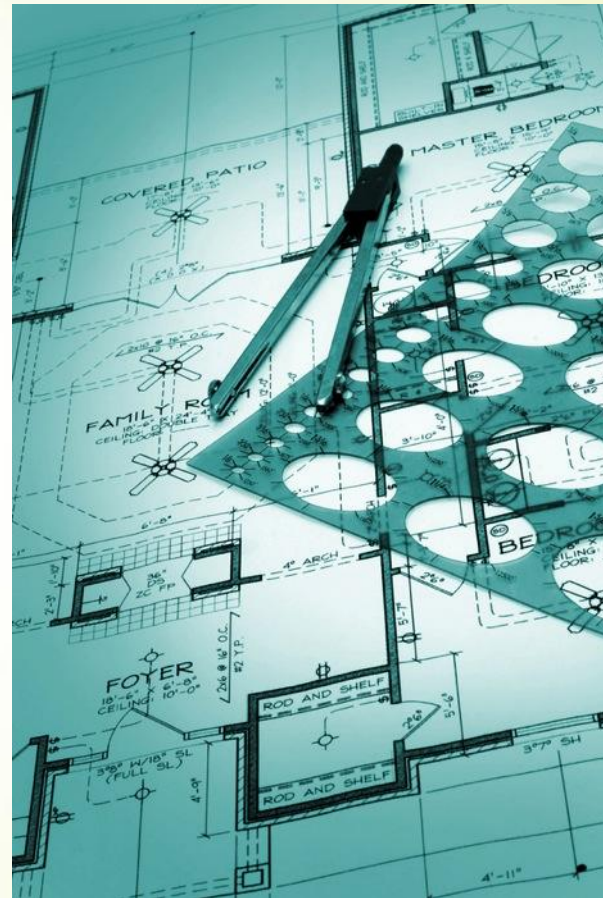
- Be careful to not remind when unnecessary
- Carefully think of the potential interventions at each point of care

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Start With a Strong Foundation

- Identify key stakeholders and have “starter conversations”
- Within these conversations brainstorm goals
- Determine your cultural and organizational readiness for this initiative
- Create a game plan for working on the next set of activities



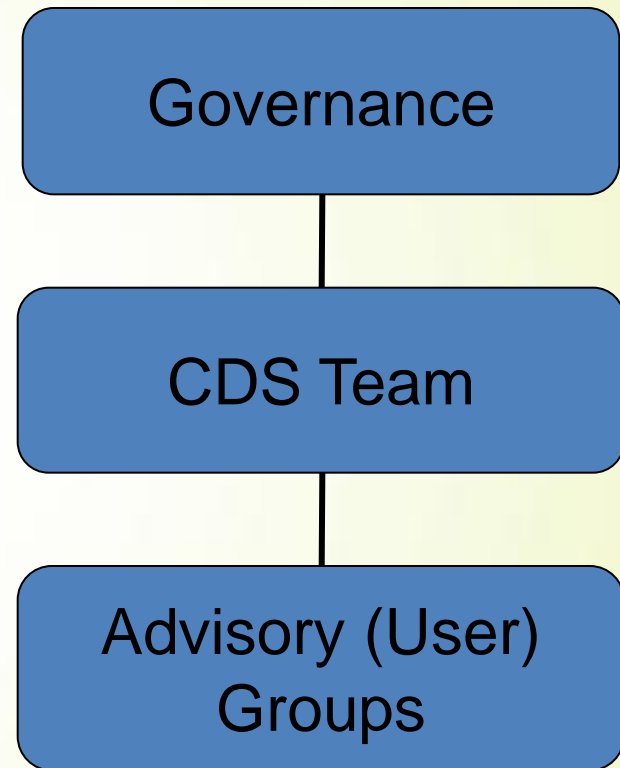
Building the Team

- Understand the roles required for successful implementation
- Recruit your team and cultivate champions
- Consider augmenting team with outside resources
- Convene and begin planning



Subdividing the work

- Governance
 - Final authority in selecting goals and approving interventions
- CDS (implementation) Team
 - Designs, mediates, implements and monitors changes.
- Advisory Groups
 - Provide feedback on design issues both during the planning, pilot and implementation phase as well as the evaluation after the implementation
 - Champion the changes with peers



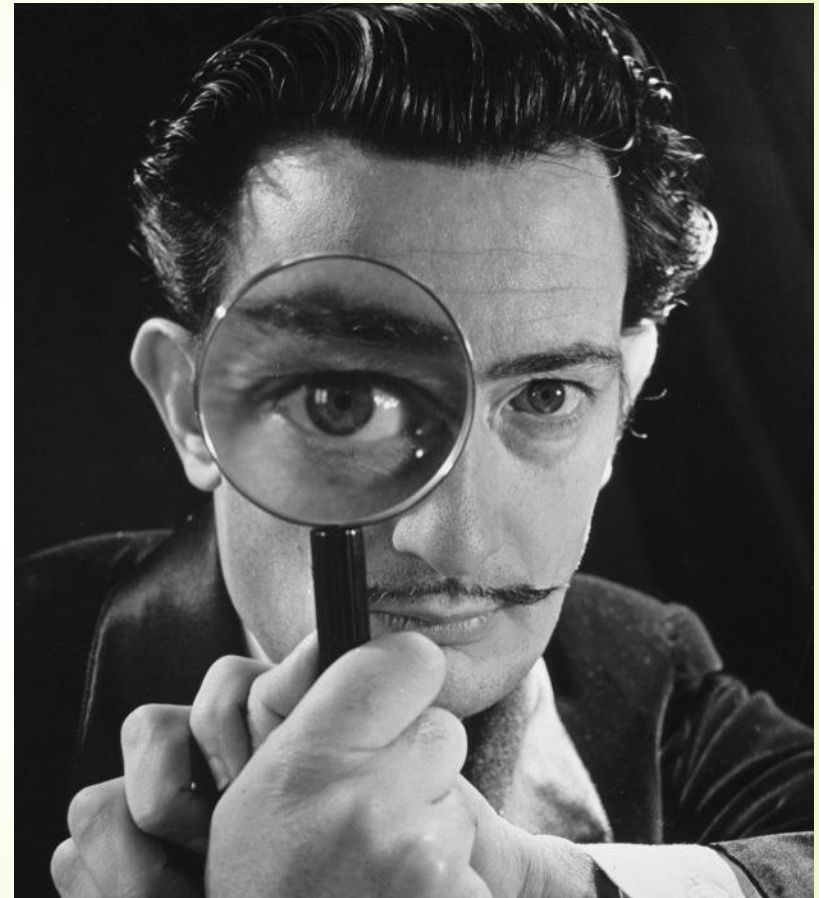
In smaller practices, individuals are likely to take on multiple roles

Work on What is Important

- Identify your clinical goals – that will guide the interventions
- Begin with smaller, compelling projects
 - Easy, likely to succeed, high impact
- Identify clinical, financial, operational measures and baselines
- Determine accountability
- Provide adequate resources
 - People to get the work done
 - Time to plan, meet and troubleshoot

Once You've Identified a Goal

- Identify the needed data elements
 - Find out what is missing
- Examine the workflow
 - Take it apart piece by piece
- Gather baseline metrics



Workflow Analysis: Key to Getting “CDS 5 Rights” Right

- What are people currently doing?
 - Supposed to be doing (policy)
 - Think they’re doing (ask)
 - Actually doing (look)
- What’s working?
 - Problematic?
 - Ripe for improvement?



Educate and Manage Expectations

- Some can jump to early conclusions:
 - “We need to do better on our stroke scores! We need an alert!”
- Builders want to solve a problem the best they know how:
 - “To a man with a hammer, everything looks like a nail.”*
- EHR Envy:
 - “Our EHR won’t allow us to do the things we want”
- Sometimes the best interventions are simple workflow changes



*Commonly attributed to Mark Twain

Assure Their Value

- Keep track of the interventions you have initiated
- Have a system to keep your interventions current
- Take steps to assure their usability



Rolling it out

- Create a roll-out plan
 - Pilot
- Communicate plan to end users
- Train end users on the proper use of the intervention
- Role out with support structures in place



Observe What Happens

- “You can observe a lot by just watching.”*
- What sounds good in a meeting does not always work in reality
- Watch for unintended consequences
- Have the metrics improved?
- Use measurement results and feedback to refine interventions



* Yogi Berra, unknown date, about baseball

Refine Your Process

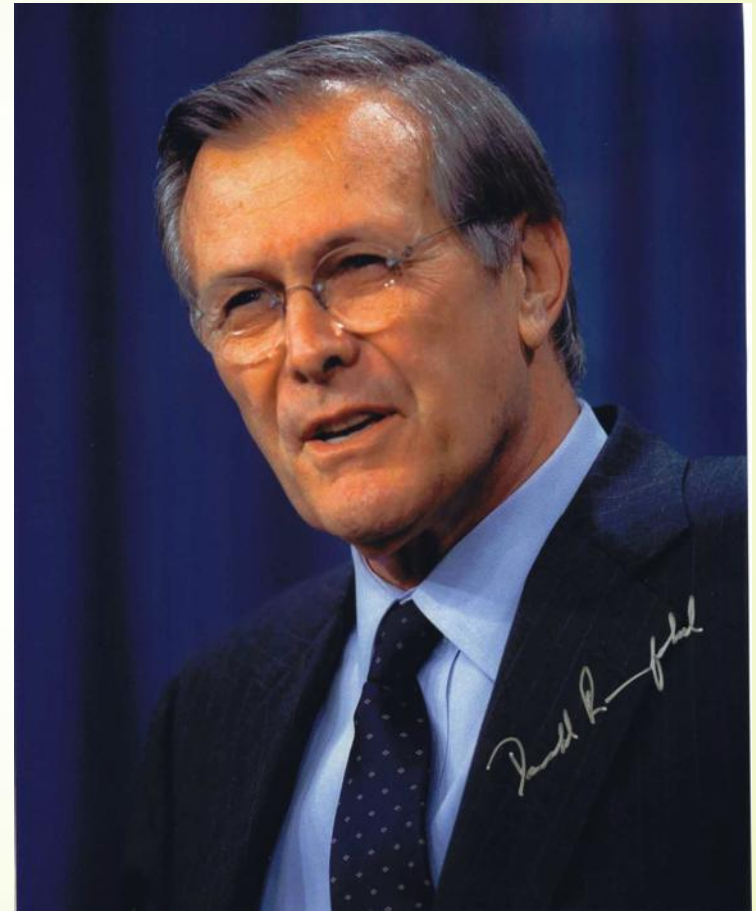
- PDSA: Plan, Do, Study Adjust
- This is a dynamic process, not a static point
- Used widely (see IHI, How to Improve)*
- Works for many initiatives
- Helpful for CDS/QI work
- Complements CDS 5 Rights



*<http://www.ihi.org/knowledge/Pages/HowtoImprove>

Unintended Consequences

- “As we know, there are known knowns. There are things we know we know.
- We also know there are known unknowns. That is to say we know there are some things we do not know.
- But there are also unknown unknowns, the ones we don’t know we don’t know”*
- Unsaid was what can happen when the things we think we know, we didn’t know.



* Donald Rumsfeld, Feb. 12, 2002, Department of Defense news briefing

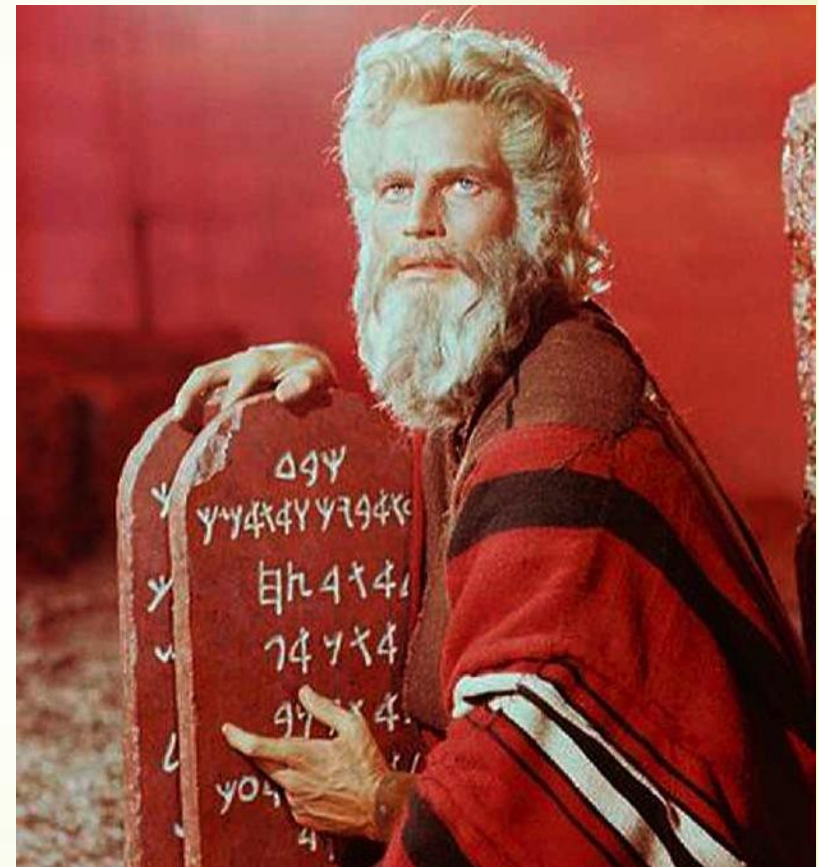
Unintended Consequences

- Seemingly good decisions can have unintended consequences:
 - Requiring allergy checking before med ordering
 - Requiring weights in pediatric ED patients
 - Duplicate medication checking
- Start slowly, test with volunteers in a controlled environment and build gradually



The 10 Commandments of Clinical Decision Support*

- Speed is everything
- Anticipate needs and deliver in real time
- Fit into the user's workflow
- Little things can make a big difference (usability matters)
- Recognize that users will strongly resist stopping
- Changing direction is easier than stopping
- Simple interventions work best
- Ask for additional information only when you really need it
- Monitor impact, get feedback, and respond
- Manage and maintain your knowledge-based systems



* Bates DW, Kuperman GJ, Wang S, et al. Ten commandments for effective clinical decision support: Making the practice of evidence-based medicine a reality. J Am Med Inform Assoc. 2003;10:523-530.

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Clinical Decision Support / Quality Improvement Strategy Worksheet

- Help entire team with structured thought process
- Understand current information/workflows producing results
- Brainstorm and implement enhancements (PDSA)

Clinical Decision Support Configuration Template (Ambulatory, blank)

Target =
Current Performance on

		Optimal State			Current State					
Decision Support Opportunity	Care Activities	Examples of Care Activities	Notes	CDS 5 Rights					Prerequisites for setting up current	
				Who? (people)	What? (information)	Where? (channels)	How? (Formats)	When? (Workflow)		
Patient-specific Activities During Office Visit	Check-in	Review/verify/update patient information	<ol style="list-style-type: none"> 1. Review insurance information to help determine formularies/coverage to minimize patient out-of-pocket expenses and enhance adherence 2. Verify clinical information (Allergies, Medications, Problem list), e.g., by providing patient a 'pre-visit summary' to review 	There are different tools, channels, workflows for handling this information flow, e.g., front desk staff gives electronic forms on tablet computer, patient returns tablet to rooming staff.						
	Waiting	Gather patient data, provide educational info	Patient completes pre-visit health form, reviews educational materials and clinical resources related to their health issues	Can be a continuation of activities started during check-in; e.g., reviewing pre-visit summary						
	Rooming	Clinical support staff documents/reviews key information with patient before provider encounter.	<ol style="list-style-type: none"> 1. Obtain and document vital signs (e.g., blood pressure [repeat if abnormal], height, weight, BMI), chief complaint in patient's words and brief details. 2. Review and compare with EHR data patient-reported allergies (reaction/severity) and medications (dose, route, frequency, pharmacy), including non-prescription medications and 	Clinician/practice-developed protocols help ensure data is collected and entered into EHR properly (e.g., appropriate technique for recording blood pressure, responding to abnormal values, and documenting results).						

Clinical Decision Support / Quality Improvement Strategy Worksheet

- Help entire team with structured thought process
- Identifies all the opportunities for potential interventions
- The top rows deal with the individual patient
- The bottom row deals with the population in general

		Decision Support Opportunity	Care Activities
		Not Visit-related	Patient understands condition and treatment; follows care plan developed in collaboration with care team
		Before Patient Comes to Office	Patient reviews/updates/submits pertinent health status data
		Daily Care Team Huddle	List visit action items and preparations for each patient to be seen during the day
Patient-specific Activities	During Office Visit	Check-in	Review/verify/update patient information
		Waiting	Gather patient data, provide educational info
		Rooming	Clinical support staff documents/reviews key information with patient before provider encounter.
		Provider Encounter	History and Physical
			Documentation
			Assessment/Diagnosis and Care Plan
			Ordering
			Procedures
Encounter Closing	Patient Education		
	Encounter Closing	Additional education and Checkout	
	After Patient Leaves Office	Ensure care plan is executed appropriately	
Population-oriented	Outside Patient-specific Encounters	Identify/address care gaps across the patient panel.	

Clinical Decision Support / Quality Improvement Strategy Worksheet

- Allows you to identify a target
- Document your current performance
- Provides examples of activities that you may consider

Clinical Decision Support		Configuration Template (Ambulatory, blank)			
Target =		80% of patients 18-85, BP<140/90			
Current Performance on		68% of patients 18-85, BP<140/90			
Optimal State					
Decision Support Opportunity	Care Activities	Examples of Care Activities	Notes		
Patient-specific Activities	During Office Visit	Check-in	Review/verify/update patient information	<ol style="list-style-type: none"> 1. Review insurance information to help determine formularies/coverage to minimize patient out-of-pocket expenses and enhance adherence 2. Verify clinical information (Allergies, Medications, Problem list), e.g., by providing patient a 'pre-visit summary' to review 	There are different tools, channels, workflows for handling this information flow, e.g., front desk staff gives electronic forms on tablet computer, patient returns tablet to rooming staff.
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<https://sites.google.com/site/cdsforpiimperativespublic/cds-for-pi-imperatives-users-guide/cds-configuration-template>

Clinical Decision Support / Quality Improvement Strategy Worksheet

- Assists you in thinking of the 5 CDS Rights during each of the activities
- Document what is currently done
- Provides a framework of what could be done
- Helps you identify prerequisites

Clinical Decision Support Configuration Template (Ambulatory, blank)							
Target =		80% of patients 18-85, BP<140/90					
Current		68% of patients 18-85, BP<140/90					
Decision Support Opportunity	Current State						Prerequisites for setting up current state
	Who? (people)	What? (information)	Where? (channels)	How? (Formats)	When? (Workflow)		
Patient-specific Activities	During Office Visit	Check-in					
		Waiting					
		Rooming					

<https://sites.google.com/site/cdsforpiimperativespublic/cds-for-pi-imperatives-users-guide/cds-configuration-template>

Clinical Decision Support / Quality Improvement Strategy Worksheet

- It also contains cells where you can record desired EHR enhancements
- And cells for other notes to consider as future options to consider

Clinical Decision Support Configuration Template (Ambulatory, blank)

		Enhancement State	
Decision Support Opportunity		Proposed Enhancements (locally or by EHR vendor)	Notes
Patient-specific Activities	During Office Visit	Check-in	
		Waiting	
		Rooming	

<https://sites.google.com/site/cdsforpiimperativespublic/cds-for-pi-imperatives-users-guide/cds-configuration-template>

Clinical Decision Support / Quality Improvement Strategy Worksheet

Decision Support Opportunity		Care Activities	Examples of Care Activities	Notes
Population-oriented Activities	Outside Patient-specific Encounters	Identify/address care gaps across the patient panel.	<ol style="list-style-type: none"> 1. Use patient lists generated from registry to identify prevention and chronic care management gaps for individual patients 2. Address gaps, e.g., contact patients overdue for indicated visits/interventions and arrange appropriate action 	Build needed capabilities for addressing gaps broadly across patients. For example: new/enhanced activities such as group visits for diabetes patients, more robust materials such as diet/exercise/BP/weight logs and plans for weight/HTN/DM management. Understand/address implications of Payer condition management outreach to patients.

- Finally, the bottom row can be used to think more broadly about this goal and this population
- Helps you to think how you might leverage the “CDS 5 Rights” to improve the outcomes of this population

<https://sites.google.com/site/cdsforpiimperativespublic/cds-for-pi-imperatives-users-guide/cds-configuration-template>

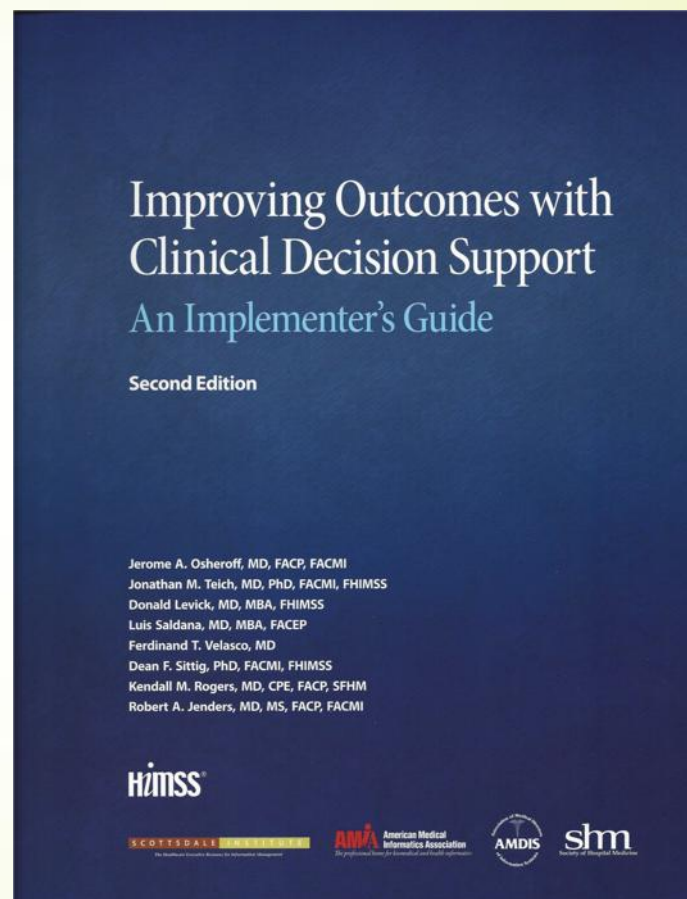
HealthIT.gov Resources

- Provides guides for:
 - Starting with a strong foundation
 - Assembling a team
 - Plan for development, design and deployment
 - Roll out
 - Measuring effects and refining
- Contains much of the information in the guidebook
- Free and open to the public
- <http://www.healthit.gov/policy-researchers-implementers/cds-implementation>

The screenshot shows the HealthIT.gov website interface. At the top, there is a navigation bar with links for Blog, Consumer Toolkit, Contact, Get Email Updates, and social media icons. Below this is a search bar and a main navigation menu with categories: Providers & Professionals, Patients & Families, and Policy Researchers & Implementers. The Policy Researchers & Implementers section is expanded, showing sub-categories: Policymaking, Regulation, & Strategy; Research & Innovation; Privacy & Security Policy; Certification Programs & Policy; Standards & Interoperability; and HITECH Programs & Advisory Committees. The main content area is titled 'Clinical Decision Support (CDS)' and features a sidebar with a table of contents. The main text is titled 'CDS Implementation' and includes a section for 'How-To Guides for Clinical Decision Support (CDS) Implementation'. It lists five guides: 1- Start with a Strong Foundation for CDS (PDF - 202 KB), 2- Assemble a CDS Implementation Team (PDF - 158 KB), 3- Plan for Successful CDS Development, Design, and Deployment (PDF - 191 KB), 4- Roll Out Effective CDS Interventions (PDF - 147 KB), and 5- Measure Effects and Refine CDS Interventions (PDF - 173 KB). Each guide includes a brief description of its purpose.

Improving Outcomes with Clinical Decision Support: An Implementer's Guide

- Identify the stakeholders
- Catalog available information systems
- Select and specify CDS interventions
- Specify and validate the details and build the interventions
- Put interventions into action
- Measure results and refine the program
- <http://marketplace.himss.org/OnlineStore/ProductDetail.aspx?ProductId=3318>



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New closing thoughts

- Clinical Decision Support is a more than the bells and whistles in an EHR
- It is a team effort that requires close attention to workflow
- Start slowly, be willing to make mistakes and learn from them
 - “Fail fast, fail often, fail cheap”
 - Protect your users and patients
- Measure and observe impact
- Be prepared for the long haul: the job is never complete
- Well designed CDS is the “secret sauce” that allows health information technology help us achieve the triple aim of health care:
 - Improving the patient experience of care
 - Reducing the cost of care
 - Improving the health of populations

Resources

- HealthIT.gov resources on Clinical Decision Support
 - <http://www.healthit.gov/policy-researchers-implementers/cds-implementation>
- Improving Outcomes with Clinical Decision Support: An Implementer's Guide – Second Edition
 - <http://marketplace.himss.org/OnlineStore/ProductDetail.aspx?ProductId=3318>
- CDS/Process Improvement site with draft CDS Template
 - <https://sites.google.com/site/cdsforpiimperativespublic/cds-for-pi-imperatives-users-guide>
- Stratis Health HIT Toolkits:
 - <http://www.stratishealth.org/expertise/healthit/>
- “Meaningful Use” on the CMS web site:
 - <https://www.cms.gov/EHRIncentivePrograms/>



Key Health Alliance

Regional Extension
Assistance Center for HIT

Paul Kleeberg, MD, FAAFP, FHIMSS

pkleeberg@stratishealth.org

Key Health Alliance—Stratis Health, Rural Health Resource Center, and The College of St. Scholastica.

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