Office of the National Coordinator for Health Information Technology

ONC Tech Forum
Clinical Decision Support Series
Session #2

The Future of CDS (part 2)

Sept. 27, 2023

Upcoming workshop

Session #3 Creating Value by Modernizing and Measuring Clinical Decision Support

- **Wednesday, Nov. 8, 2023, 12 p.m. – 3 p.m. ET**
- This session will discuss how new technologies can add value to CDS and how the impact of CDS can be measured and evaluated.
- Registration is open.

More information about workshops here

Agenda

- Future of patient-centered CDS

The Future of Patient-Centered CDS

CDS Innovation Collaborative (CDSiC) Introduction

September 27, 2023

James Swiger, MBE

Agency for Healthcare Research and Quality (AHRQ)

Center for Evidence and Practice Improvement

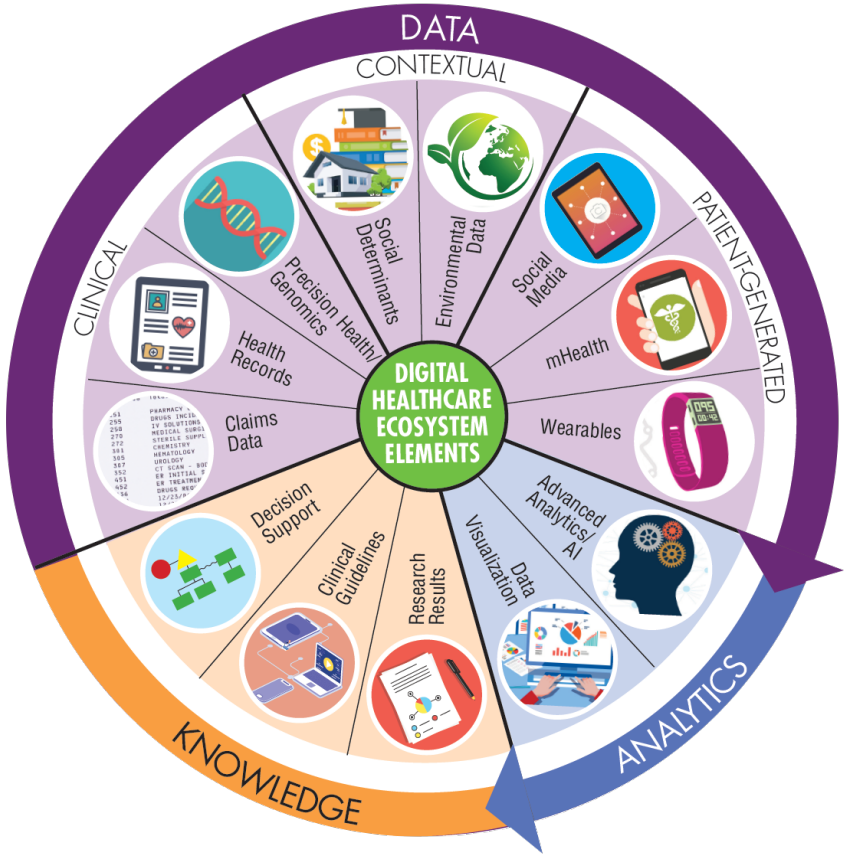
Division of Digital Healthcare Research

Disclosure

I have no relevant relationships with commercial interests to disclose.

Agency for Healthcare Research and Quality

- **AHRQ's Mission:**
  - To produce evidence to make health care safer, higher quality, more accessible, equitable, and affordable, and to work within HHS and with other partners to make sure that the evidence is understood and used.
- **Division of Digital Healthcare Research's (CEPI/DDHR) Mission:**
  - DDHR's mission, within the Center for Evidence and Practice and Improvement, is to determine how the various components of the ever-evolving digital healthcare ecosystem can best come together to positively affect healthcare delivery and create value for patients and their families.
  - http://digital.ahrq.gov



AHRQ Clinical Decision Support in Legislation

- **Since 2016, DHR's Initiative has been based on patient-centered outcomes research and ACA legislative requirements (Sec 6301).**

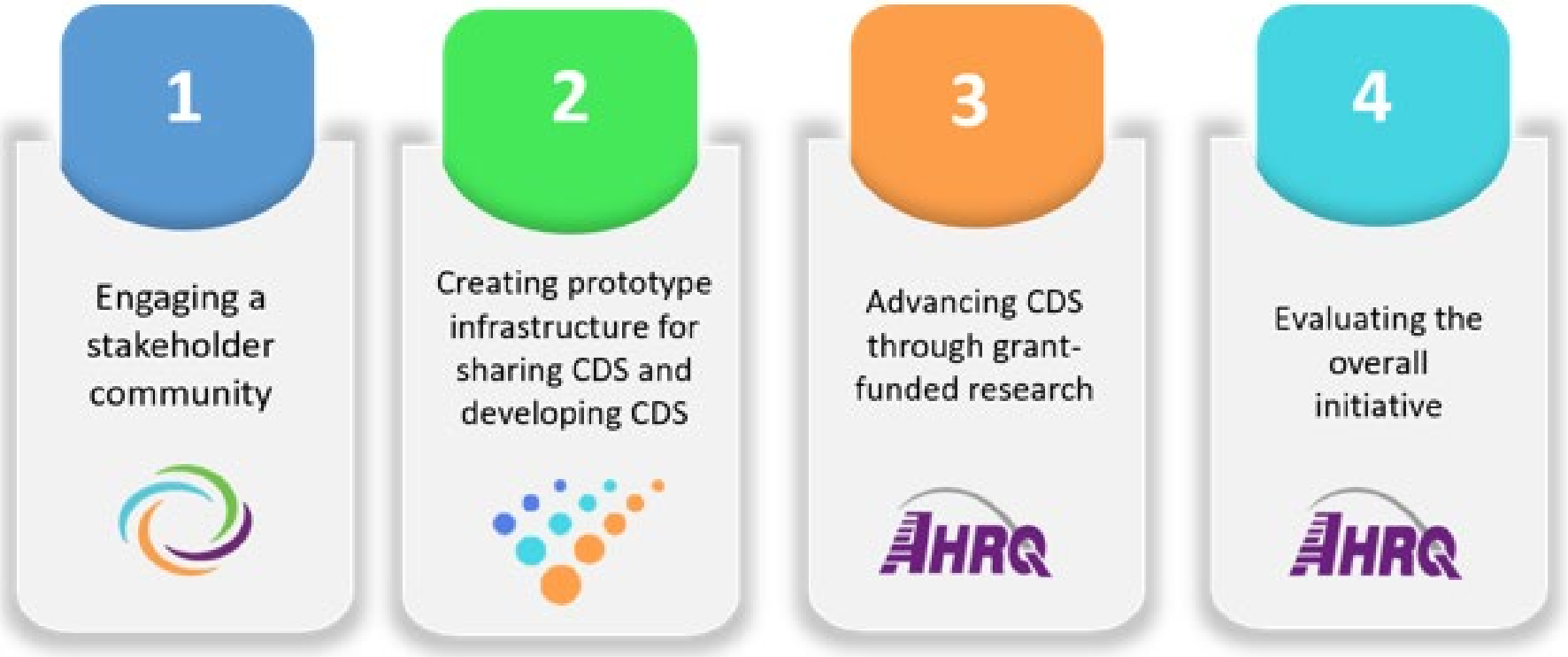
  - (b) INCORPORATION OF RESEARCH FINDINGS.—The Office [AHRQ], in consultation with relevant medical and clinical associations, shall assist users of health information technology focused on **clinical decision support** *to promote the timely incorporation of research findings* disseminated under subsection (a) into clinical practices and to promote the ease of use of such incorporation.
  - (c) FEEDBACK - The Office shall establish a *process to receive feedback* from physicians, health care providers, **patients**, and vendors of health information technology focused on clinical decision support, appropriate professional associations, and Federal and private health plans about the value of the information disseminated and the assistance provided under this section.

Re-authorized in 2019 for 10 years.

AHRQ PCOR CDS Initiative (2016-present)

Two basic goals: (1) to advance evidence into practice through CDS and; (2) to make CDS more shareable, standards-based, and publicly-available.

http://cds.ahrq.gov



AHRQ PCOR CDS Initiative (2016-present)

Two basic goals: (1) to advance evidence into practice through CDS and; (2) to make CDS more shareable, standards-based, and publicly-available.

Patient-Centered Clinical Decision Support Learning Network	CDS Connect
CDS Innovation Collaborative	CEDAR
Grant	Evaluation: NORC at the UNIVERSITY of CHICAGO

CDS Innovation Collaborative (CDSiC)

Goal

- To engage a wide stakeholder community, including patients and clinicians, on how best to disseminate evidence into practice through patient-centered CDS.

Stakeholder Center

- Gather experts from the field around 4 key PC CDS areas to produce products and contribute to a research foundation for PC CDS.

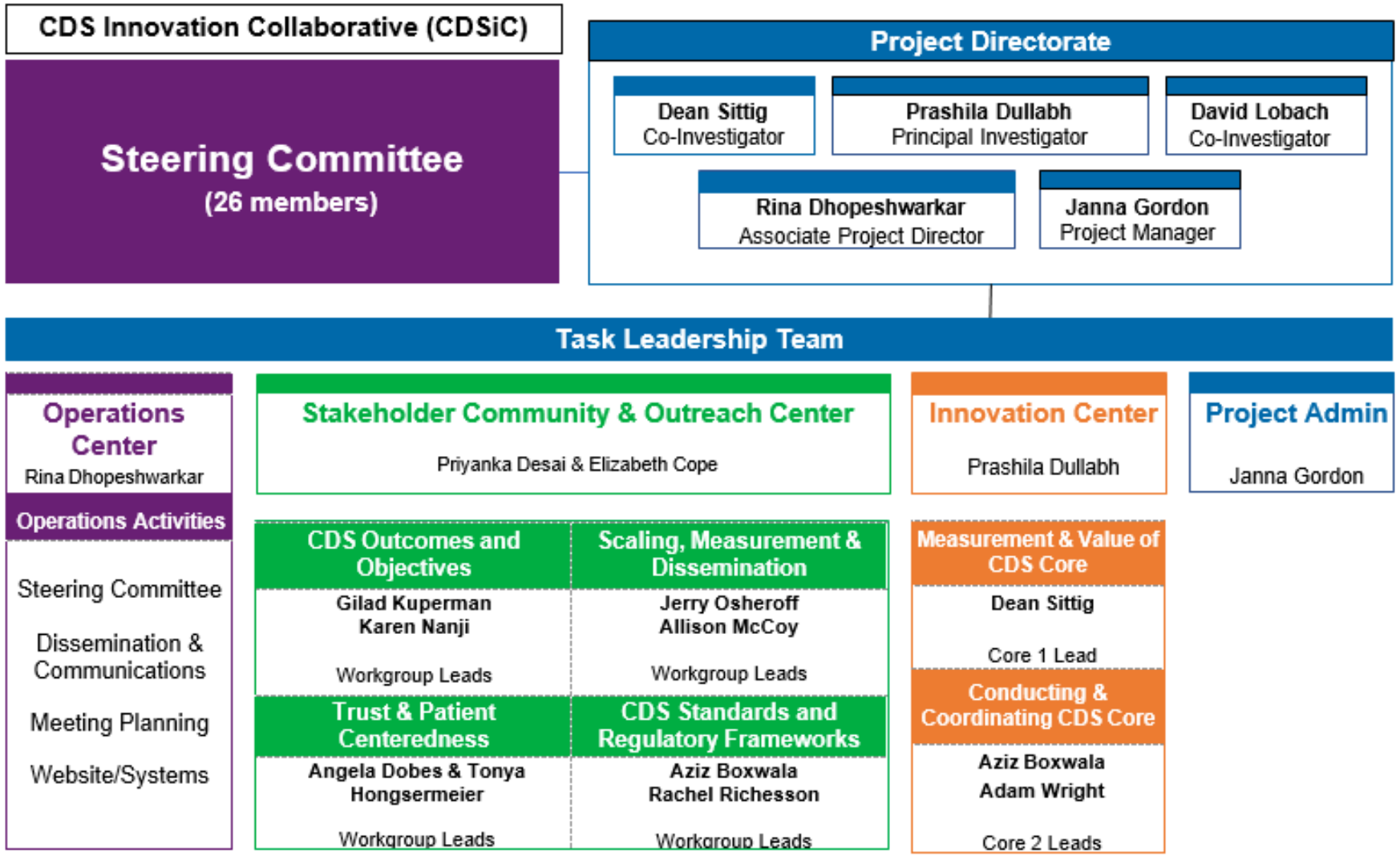
Build upon prior AHRQ Patient-Centered CDS Learning network

- *Definition of patient-centered CDS*
- Build a research foundation for PC CDS and defining the value and how to measure it.

Innovation Center

- Research hub for the CDSiC to conduct innovative real-world applications for PC CDS.
- Measurement and value of PC CDS; coordinating PC CDS projects

CDSiC Structure



What is Patient-Centered Clinical Decision Support?

- **Patient-centered clinical decision support (PC CDS) is CDS that supports care for individual patients (or specific patient populations) that significantly incorporates one or more of the following patient-centered factors:**

Knowledge

Evidence-based research findings (CER and PCOR)

Data

PGHD, PROs, patient preferences, patient-specific data; an/or SDOH data that affect individual patient health

Delivery

Directly engages patients or caregivers (patient-facing) via apps or patient portals in different settings (e.g., at home, community, or doctor's office)

Use

Patient and/or caregiver involvement in understanding and applying the decision support provided

Source: Dullabh P, Sandberg SF, Heaney-Huls K, et al. Challenges and opportunities for advancing patient-centered clinical decision support: findings from a horizon scan. J Am Med Inform Assoc. 2022 Jun 14;29(7):1233-1243.

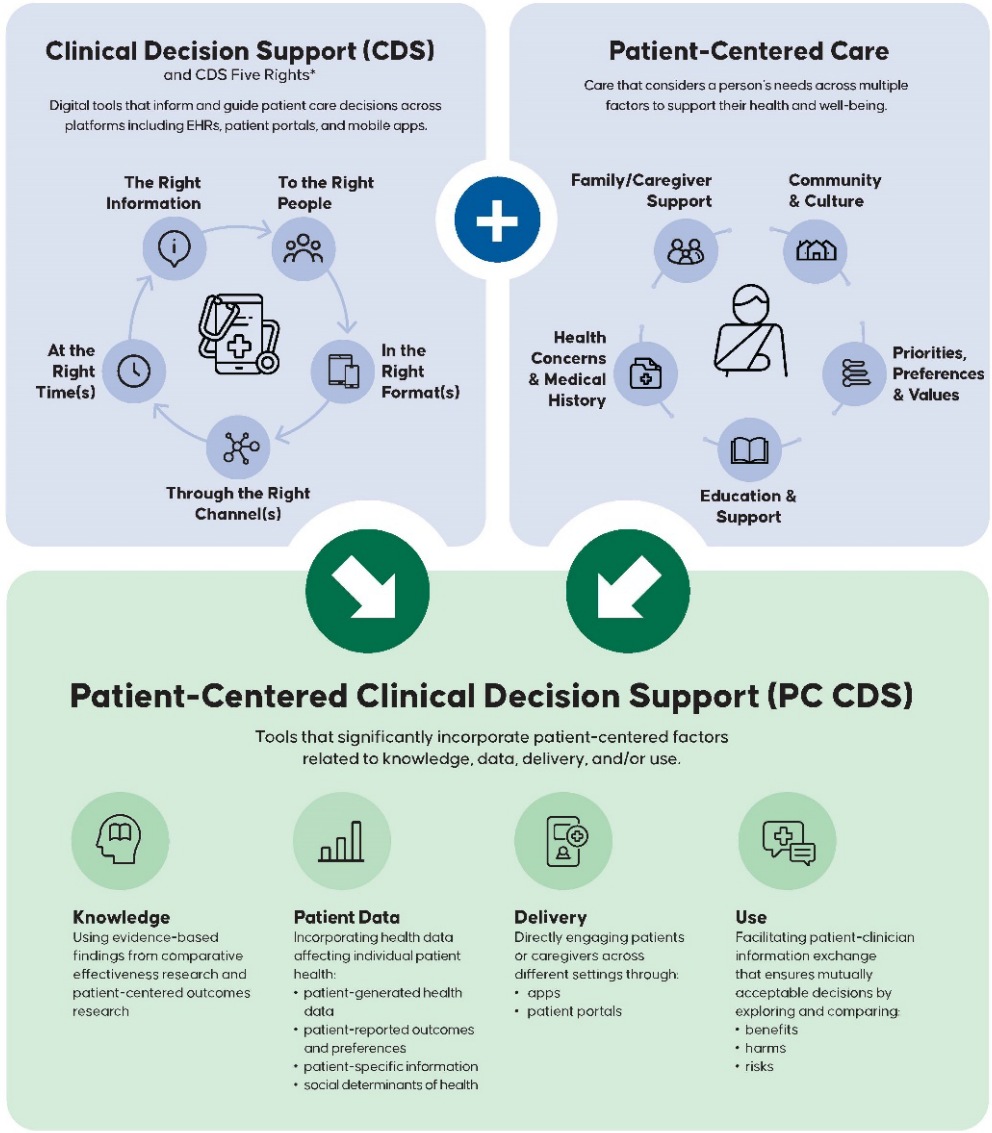
AHRQ Agency for Healthcare Research and Quality | Clinical Decision Support Innovation Collaborative

PC CDS Explained

- "Traditional" CDS (and CDS Five Rights): are digital tools that inform and guide patient care decisions across platforms including EHRs, patient portals, and mobile apps.

- Patient-Centered Care: Care that considers a person's needs across multiple factors to support their health and well-being

- https://cdsic.ahrq.gov/cdsic/patient-centered-clinical-cds-infographic

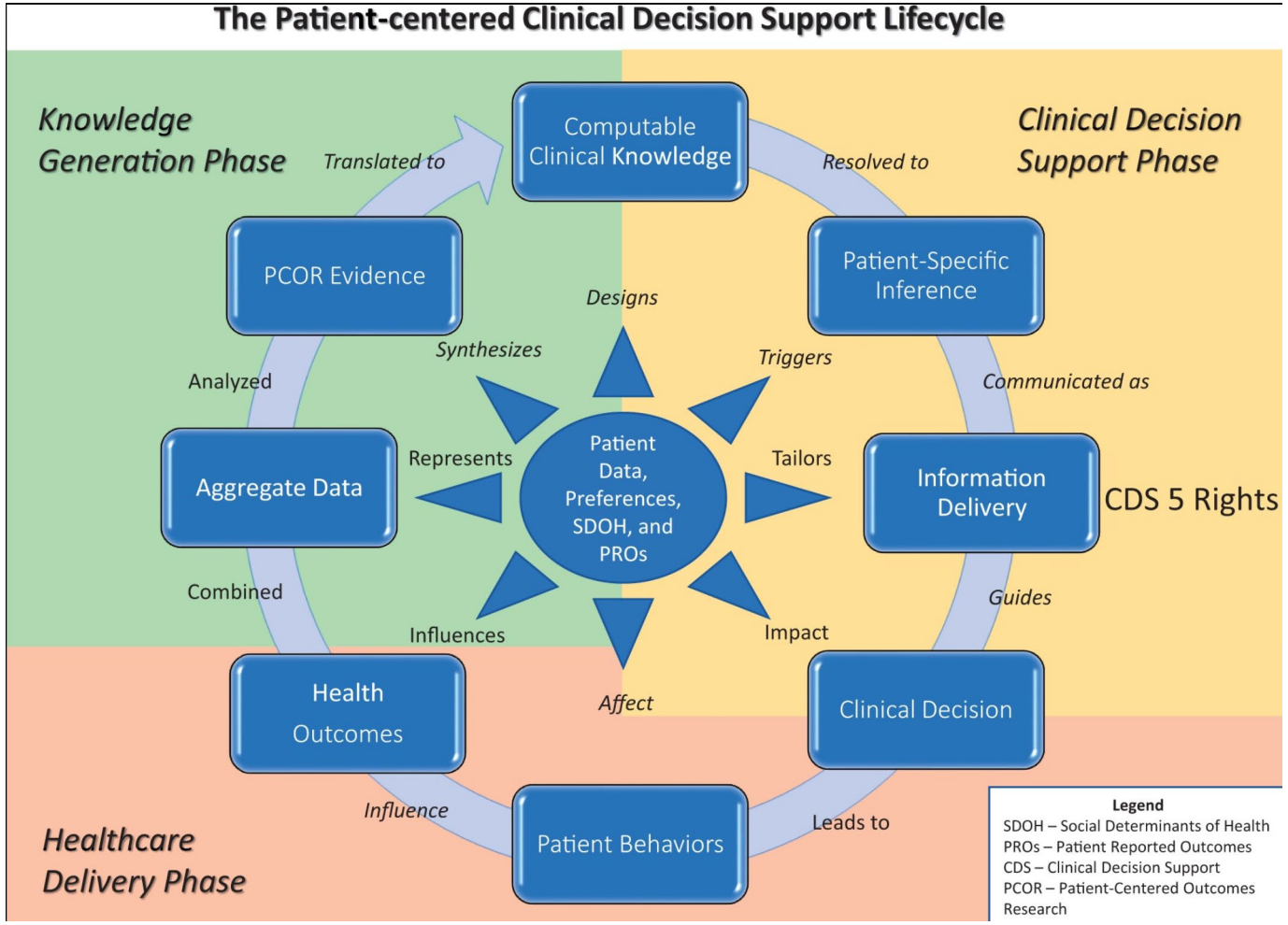


* Osheroff, Teich, Levick et al., 2012. Improving outcomes with CDS: an implementer's guide, Second Edition.

Patient-Centered Clinical Decision Support Lifecycle

Developed by the CDSiC Innovation Center and CDSiC team, this graphic[1] illustrates the eight stages necessary for realizing the benefits of patient-centered CDS.

- Published in the Journal of the American Medical Informatics Association (JAMIA).
- Describes the work that must be completed and data that must be collected, analyzed, or transmitted for healthcare stakeholders to implement and benefit from PC CDS.
- Identifies opportunities for patient and/or caregiver participation at each stage of the process.
- Used as a roadmap for stakeholder center product development.



[1]Citation: Sittig DF, Boxwala A, Wright A, Zott C, Desai P, Dhopeshwarkar RV, Swiger J, Lomotan EA, Dobes A, Dullabh P. A lifecycle framework illustrates eight stages necessary for realizing the benefits of patient-centered clinical decision support [published online ahead of print, 2023 Jul 6]. J Am Med Inform Assoc. 2023;ocad122. doi:10.1093/jamia/ocad122

Stakeholder Center Workgroups: Scope and Objectives

CDS Outcomes and Objectives (O&O)

What is CDS (or CDSiC) trying to achieve and what outcomes do we need to measure to support this?

Standards and Regulatory Frameworks (SRF)

What is needed to advance the adoption and use of standards for the development of PC CDS?

Scaling, Measurement, and Dissemination (SMD)

How do we advance the implementation and use of CDS and ensure that we have standardized measures to track this?

Trust and Patient-Centeredness (TPC)

How do we foster trust and transparency in the processes of PC CDS design, development, testing, implementation, and use?

► Each Workgroup:

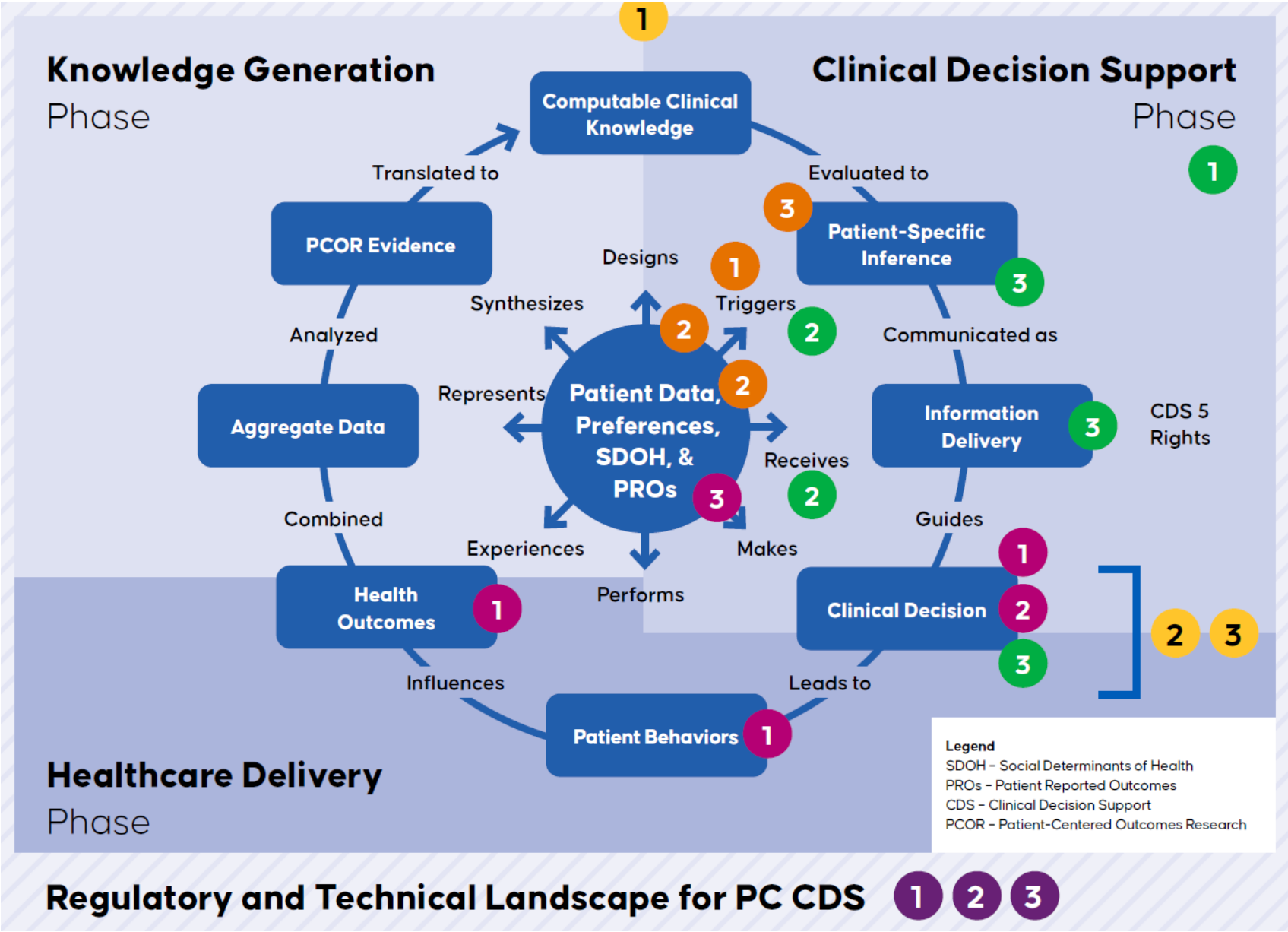
- Has a specific PC CDS focus area within the Stakeholder and Outreach center.
- Developed 3 products that supported their focus area.
- Final products are available on the CDSiC website: http://cdsic.ahrq.gov

CDS Innovation Collaborative – gaps identified

- **O&O WG**
  - Lack of PC CDS measurement tools
  - PC CDS and shared decision-making
  - Patient preferences relevant to PC CDS
- **SMD WG**
  - Lack of guide/framework describing PC CDS key dimensions
  - PC CDS: clinical workflow; patient “life flows”
  - Strategies/measures for evaluating PC CDS
- **SRF WG**
  - Environmental scan
  - Lack of interoperability b/t EHR and other Health IT systems
  - Current state, adoption/use for collecting patient preferences
- **TPC WG**
  - Patient data inputs related to artifact development
  - Best practices for co-design and co-deployment
  - Source credibility

PC CDS Lifecycle diagram: product roadmap

Each workgroup developed three products that aligned with a key area of the PC CDS Lifecycle roadmap.



List of completed products from the WGs

As of 9/27/2023, all products are now complete.

Full text for all products is available on the project website:

- https://cdsic.ahrq.gov/cdsic/cdsic-stakeholder-community-outreach-center
- http://cdsic.ahrq.gov

Outcomes & Objectives Workgroup

1. Identifying the most appropriate outcome measures for patient-centered CDS
2. Developing a taxonomy that identifies patient preferences relevant to patient-centered CDS
3. Developing a research framework that describes how patient-centered CDS can be used to support shared decision-making

Standards & Regulatory Frameworks Workgroup

1. Developing an Action Plan to address gaps in existing patient-centered CDS standards and regulatory frameworks to advance patient-centered CDS
2. Examining the potential approaches to integrating patient provided information into the electronic health record and other health IT systems
3. Developing an Action Plan for standardizing the capture and use of patient preference data for patient-centered CDS

Scaling, Measurement, & Dissemination Workgroup

1. Developing a guide for describing how patient-centered CDS interventions are designed, developed, deployed, used, maintained, and evaluated
2. Compiling a catalog of approaches used to measure the effects of patient-centered CDS interventions on clinician workflows and patient "life flows"
3. Developing recommendations on strategies and measures for evaluating the performance and value of patient-centered CDS

Trust & Patient-Centeredness Workgroup

1. Creating a handbook on best practices for incorporating patient-centered inputs into CDS development
2. Compiling best practices to promote patient partnerships in co-design and co-deployment of patient-centered CDS
3. Developing recommendations for increasing source credibility of patient-centered CDS artifacts among providers and patients

CDSiC Innovation Center

The Innovation Center is the research hub for the CDSiC. It consists of two Cores that will conduct innovative projects regarding real-world applications for patient-centered CDS, and a Planning Committee to provide strategic input and guidance.

Core 1: Measurement and Value of CDS

- Conducts projects to standardize the measurement of all aspects of CDS
- Reviews CDS implementations to evaluate utility

Core 2: Conducting and Coordinating CDS Projects

- Implements patient-centered clinical decision support projects in real-world settings
- Tests CDS design, development, monitoring, and evaluation strategies to identify best practices

Project #1

Developed a comprehensive patient-centered CDS measurement framework; 3 phase lifecycle of PC CDS.

Project #2

Created a patient-centered CDS clinical performance dashboard.

Code is available in github.

Project #3

Created a prototype dashboard that shows best practices for presentation and analysis of selected PGHD.

CDSiC: First period complete

CDSiC REACH AND ENGAGEMENT

The Operations Center has publicly disseminated information about PC CDS and the CDSiC to the CDS community.

CDSiC Newsletter

535 subscribers

CDSiC Website

11,000+ views by **2,300** unique visitors between March 2023 and August 2023

Social Media

1,000,000+ combined Twitter/X Impressions

CDSiC ACTIVITIES

The CDSiC engaged stakeholders from the patient-centered clinical decision support (PC CDS) community across its three Centers.

The CDSiC community represented **a diverse group of stakeholders**, including: Patients and Patient Representatives | Caregivers | Informaticians | Medical and Academic Institutions | Researchers | Standards Developers | Clinicians | CDS Content Developers | EHR Developers | Federal Agencies and Policymakers | Health System Representatives

26 Steering Committee members engaged in providing strategic guidance through participation in **9** meetings.

49 Workgroup members who provided thought leadership through **59** Workgroup meetings.

7 Planning Committee members who provided strategic input on developing real-world implementation projects

The CDSiC team synthesized **1,200** peer-reviewed and grey literature resources.

The CDSiC team engaged **78** PC CDS experts in key informant interviews, focus groups, and technical expert panels.

CDSiC OUTPUTS

The CDSiC team developed **15 products and projects** under the Stakeholder Center and Innovation Center, as well as **17 resources and 6 conference presentations** to increase awareness of PC CDS.

- The four CDSiC Workgroups developed **12 unique PC CDS products**.
- The Innovation Center developed **3 unique PC CDS implementation projects**, spanning **10 deliverables,** including **2 manuscripts** for publication in peer-reviewed journals.
- The Operations Center published **10 AHRQ CDSiC Insider Newsletters, 3 leadership viewpoint** pieces, the **public-facing CDSiC website**, an **infographic** explaining the definition of PC CDS, and **a vignette** describing the real-world application of PC CDS.
- The CDSiC team **presented on PC CDS** at **AcademyHealth's 2023 Annual Research Meeting** and **MedInfo 2023**.
- The CDSiC team will have **4 presentations** at the **American Medical Informatics Association (AMIA) 2023 Annual Symposium.**

CDSiC: Potential future areas of focus

New Resources

- Resources that can guide new workflows, policies, procedure, and standards that need to be developed for patient-centered clinical decision support (PC CDS) to successfully collect and integrate patient-provided data (PGHD).

Expand the Evidence base

- Help build the value proposition for PC CDS tools by conducting evaluations, demonstration projects, and pilot projects.

Artificial Intelligence

- Explore patient and clinical perspectives on AI with respect to PC CDS tools.

Health Equity

- Explore how to address health equity concerns in the development and implementation of PC CDS and examine how social determinants of health (SDOH) data should be used to drive decision making and health-related behaviors.

Real-world Testing

- Field test CDSiC products developed in the base period, as well as other relevant PC-CDS resources, with external partners.

Scalability

- Leverage public/private partnerships to increase scalability and address challenges with widespread use of PC CDS.

Want to get involved?

Please submit your interest here: https://cdsic.ahrq.gov/cdsic/contact-form

AHRQ Agency for Healthcare Research and Quality | Clinical Decision Support Innovation Collaborative

AHRQ Funding Opportunities

- **Please visit our Digital Healthcare research website (digital.ahrq.gov) and click on 'Funding Opportunities' for available funding mechanisms that may support your research (R21/R33, R01, R18, etc.)**
  - For specific questions about a NOFO, email the Scientific/Research Contact(s) at the bottom of each notice.
- **Now available! Please view our 2022 Digital Healthcare Research Program Year in Review that showcases our funded projects.**

https://digital.ahrq.gov/program-overview/research-reports/2022-year-review

Thank You!

Questions or comments?
Email address

James Swiger, MBE
james.swiger@ahrq.hhs.gov

Edwin Lomotan, MD
edwin.Lomotan@ahrq.hhs.gov

AHRQ
Agency for Healthcare Research and Quality

Clinical Decision Support Innovation Collaborative

Co-design and Measurement in the Context of CDS

Prashila Dullabh, MD, FAMIA, IAHSI

Angela Dobes, MPH

September 27, 2023

AHRQ
Agency for Healthcare Research and Quality

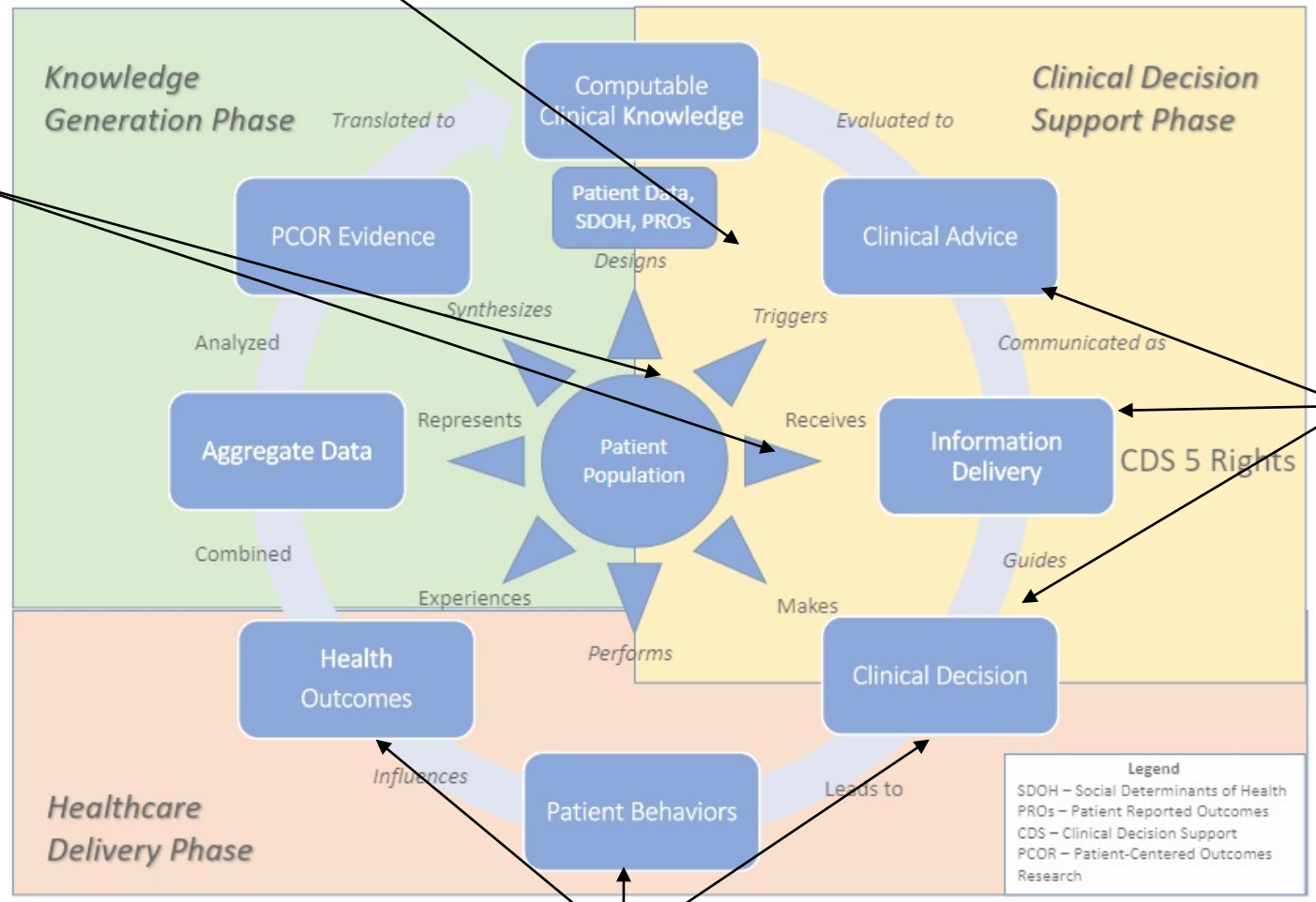
Clinical Decision Support Innovation Collaborative

Today's Goals

- **Purpose:**
  - Share approaches for building co-design and trust in patient-centered CDS, and
  - Discuss patient-centered measures for PC CDS and involving patients in measurement practices
- **We hope you take away the following from today's talk:**
  - Understanding of how patients, caregivers, clinicians, and other partners can be engaged at various stages of the PC CDS lifecycle
  - Learning why co-design matters and how to operationalize co-design approaches
  - Learning about best practices for engaging patients in PC CDS measurement
  - Gain familiarity with available patient-centered measures for evaluating PC CDS

T&C Product 1: An Introductory Handbook for Patient Engagement Throughout the PC CDS Lifecycle (Level 3)

T&C Product 2: Methods for Involving End-users in PC CDS Co-design (Level 1)



SMD Product 3: CDS Performance Measurement Inventory and User Guide (Level 1)

O&O Product 1: Patient-Focused Outcome Measures for Patient-Centered CDS (Level 1)

AHRQ Agency for Healthcare Research and Quality | Clinical Decision Support Innovation Collaborative

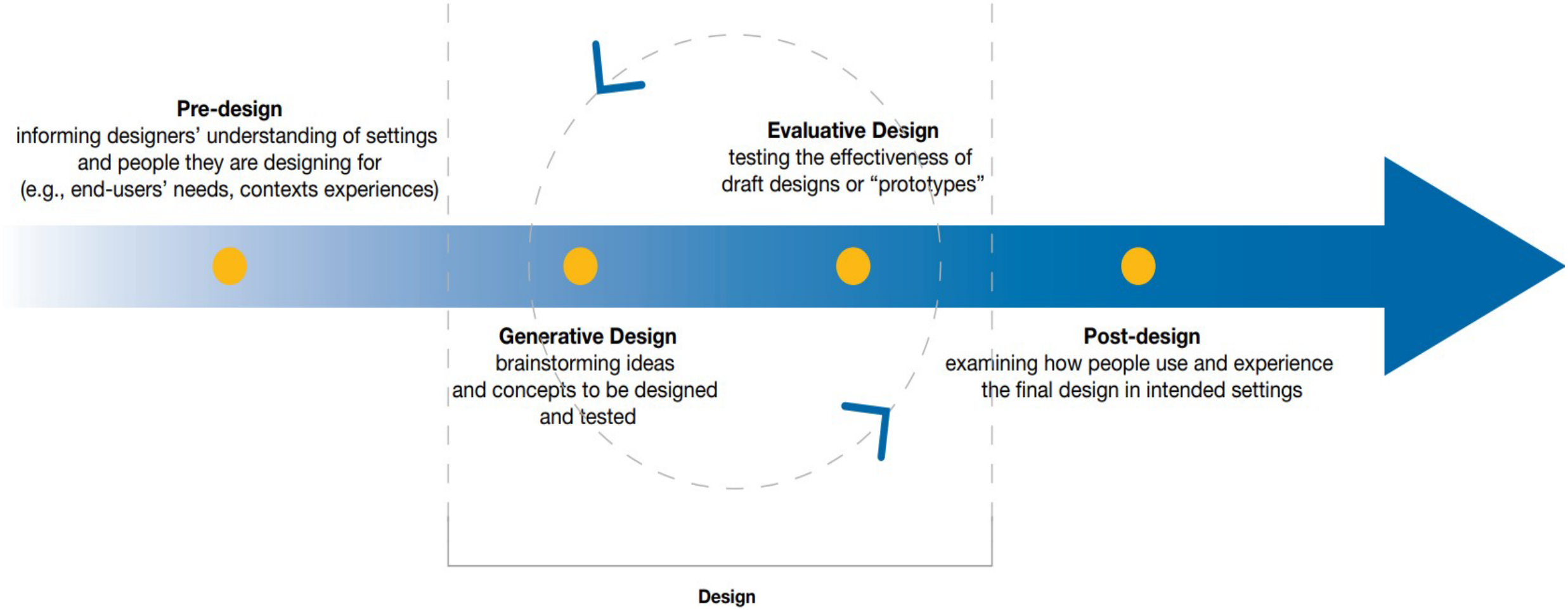
Co-design in PC CDS - Why it matters?

- **Co-design**
  - Brings PC CDS into better alignment with end-users' needs
  - Facilitates shared decision making and recommendations in line with end-user needs, improving patient-centeredness
  - Improves trust and resulting PC CDS effectiveness

- **Addresses need for patient involvement in CDS development**
  - Currently we lack end-user, and patient in particular, involvement in CDS design
  - When involved: rarely at early stages of development (offering more opportunities to truly shape PC CDS)

Note: Using co-design methods to develop CDS alone will not result in PC CDS.

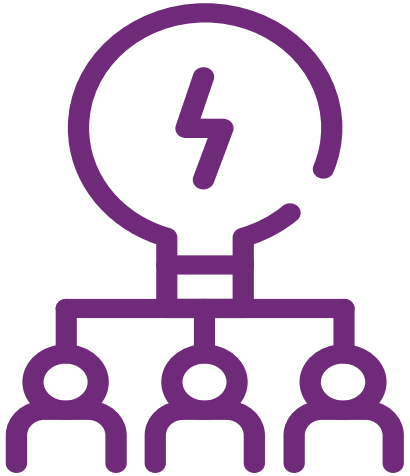
Sequence of Steps in Co-design



Co-design Methods: One Size Does Not Fit All

- There are three broad approaches for engaging end-users in co-design:

Inform



Co-create

Consult

Intensity →

← ***Reach***

Choosing the Right Co-design Method

- To pick which co-design methods to use, you must understand the aims of involving various stakeholder perspectives in co-design. Consider:

What information or outputs do you need from end-users' involvement?

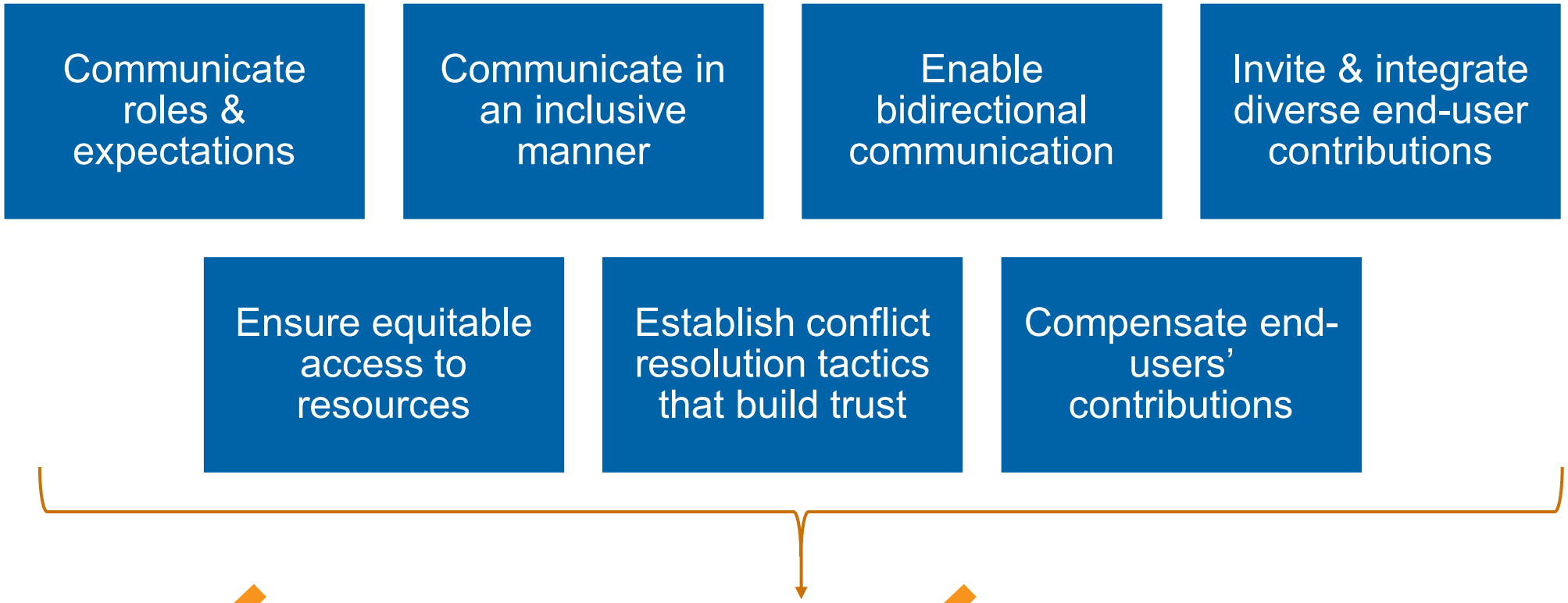
Where are you in your design process? Where in the process will it be most beneficial and appropriate to involve end-users?

What existing or anticipated constraints (e.g., time, capacity, financial and/or human resources) must be considered as you select your methods?

- Combining co-design methods throughout development can ensure the tool addresses the needs of CDS developers, researchers, end users, and design partners

Setting up for Success

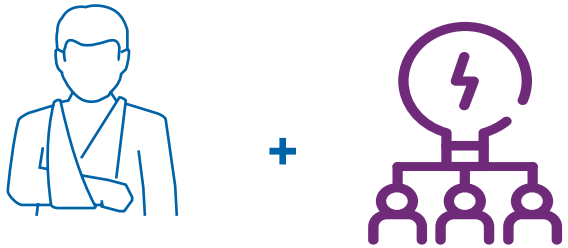
- Steps to successfully engage in co-design:



Examples of Co-design in CDS

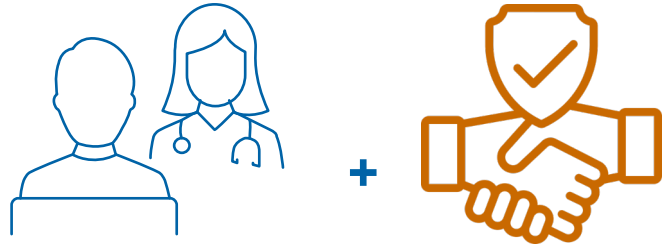
Clinician-facing CDS + **Inform**

- Conducted **empathy interviews**
- To understand high override rates for drug-drug interaction alerts and prescribing behavior
- Informed redesign of an existing alerts



Patient-facing CDS + **Co-create**

- Children built low-tech **prototypes**
- To represent using a table explain their symptoms to a clinician
- Informed design elements of the eventual tool



Patient- & Clinician-facing CDS + **Consult**

- **Community of practice** with patients, clinicians, researchers, specialists, delivery system leaders
- To provide input throughout the co-design process

Luna D, Otero C, Almerares A, Stanziola E, Risk M, González Bernaldo de Quirós F. Participatory design for drug-drug interaction alerts. *Stud Health Technol Inform*. 2015;210:45-49.

Ruland CM, Slaughter L, Starren J, Vatne TM. Children as design partners in the development of a support system for children with cancer. *Stud Health Technol Inform*. 2006;122:80-85.

Paskins Z, Bullock L, Crawford-Manning F, et al. Improving uptake of Fracture Prevention drug treatments: a protocol for Development of a consultation intervention (iFraP-D). *BMJ Open*. 2021;11(8):e048811. Published 2021 Aug 18. doi:10.1136/bmjopen-2021-048811

AHRQ Agency for Healthcare Research and Quality | Clinical Decision Support Innovation Collaborative

Patient Engagement in PC CDS Measurement

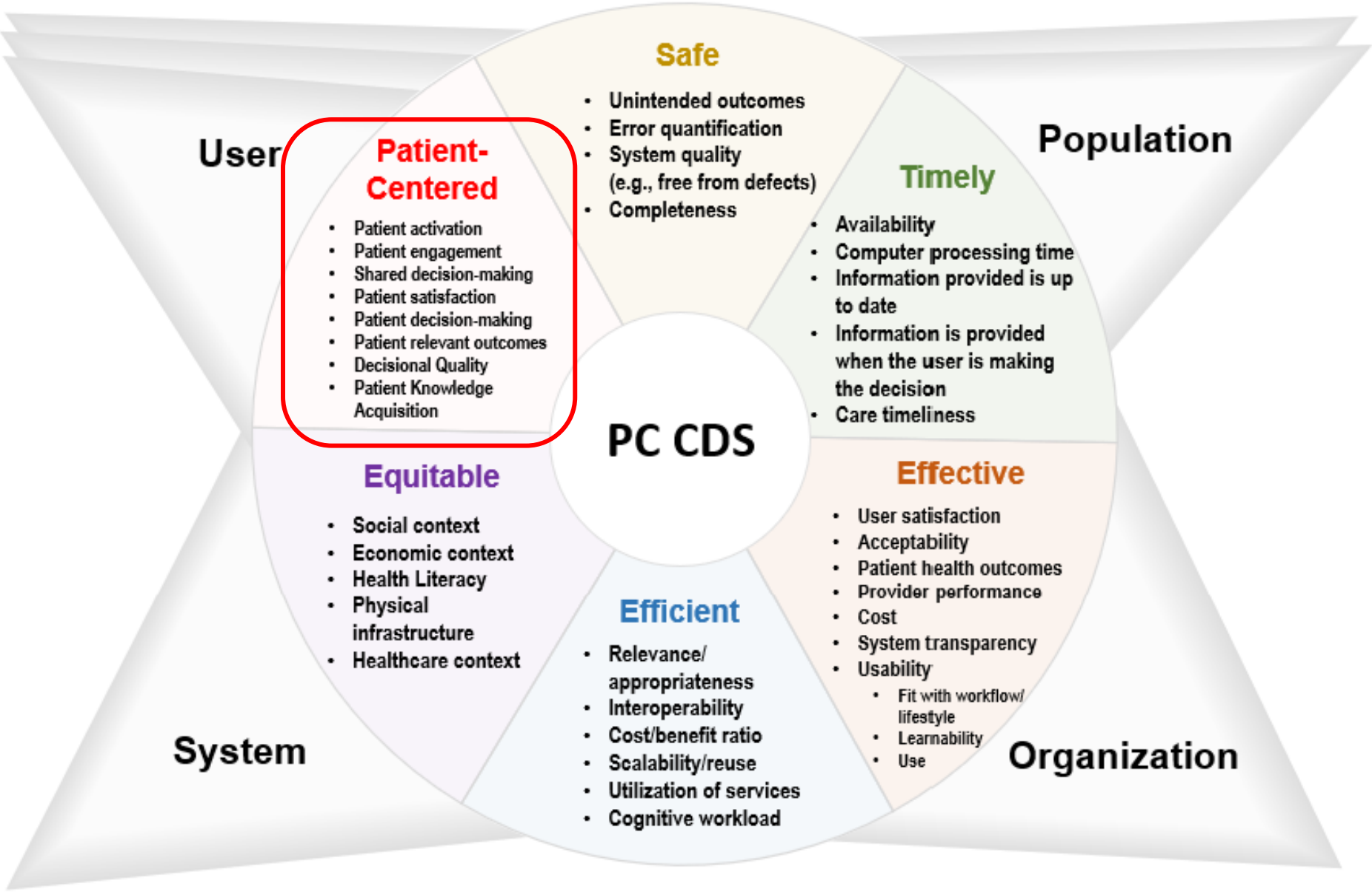
- **Involve patients in the identification and selection of measures to assess PC CDS performance and impact**
  - Ensures PC CDS evaluation captures outcomes that are most relevant and meaningful to patients and caregivers
  - Can lead to PC CDS that presents appropriate information and identifies resources needed to support patient decision making

Example: In a treat-to-target approach for the management of inflammatory bowel disease, clinicians treat patients to achieve deep remission to better align with treatment goals that address top patient concerns and reflect the patient experience.

Approaches to engaging patients in measure selection:

- Delphi consensus methods
- Community engagement studios
- Concept mapping

PC CDS Performance Measurement Framework



PC CDS Performance Measures

Implementation Phase	Measure Category
What PC CDS Did You Design?	• User-centered Design
What PC CDS Did You Use?	• Adoption • Patient Lifeflow Integration
What Were the Results?	• Usability • ***User Satisfaction*** • ***Patient Knowledge*** • ***Patient Engagement and Participation*** • ***Shared Decision Making Processes***

PC CDS Health Journey Measures

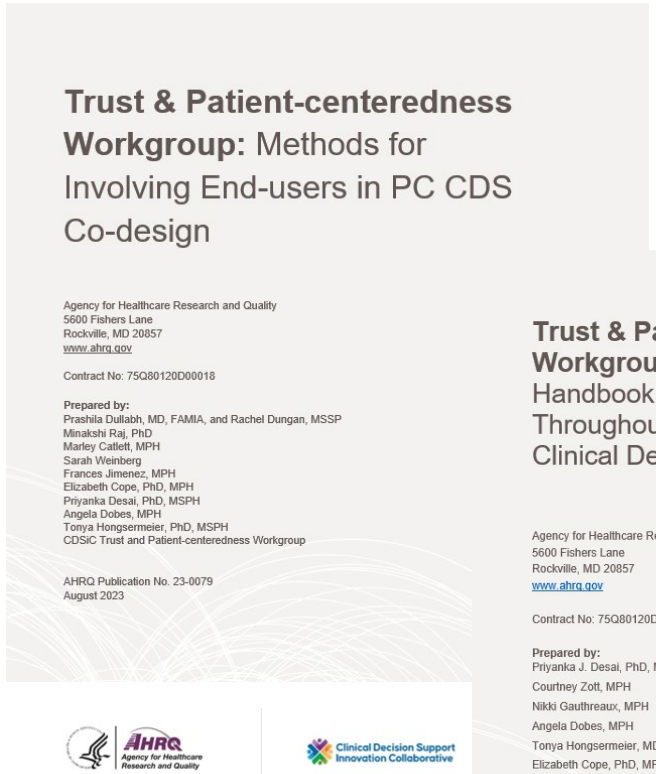
Sub-domain	Measure Category
Decision Making	***Decision Quality***
	Decision Regret
	Shared Decision Making (SDM) Experience
	Decisional Conflict
Engagement	***Knowledge***
	Activation
	Adherence
	Self-Management
	Discharge Preparedness
	Trust in Clinician
Care Experience	Timeliness
	Information Access
	Communication
	Coordination
	Satisfaction (Care)

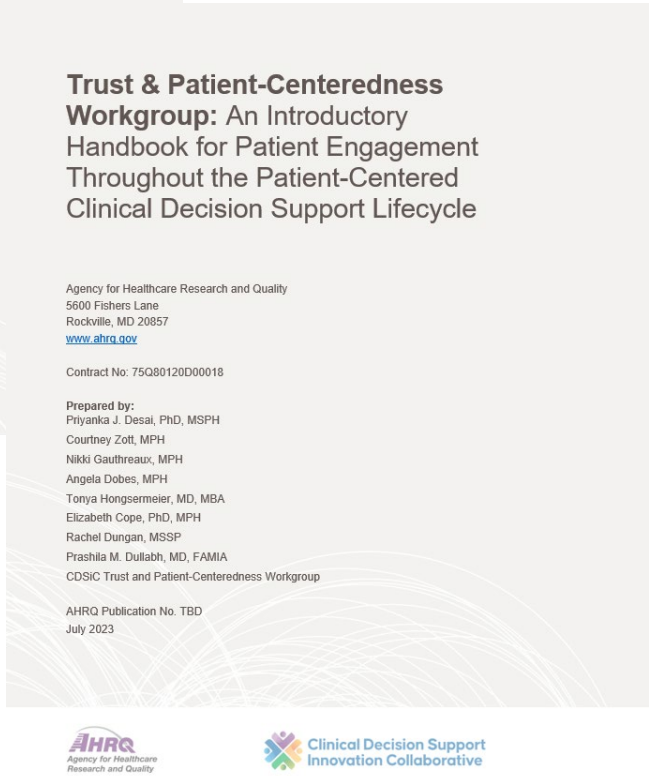
In Summary

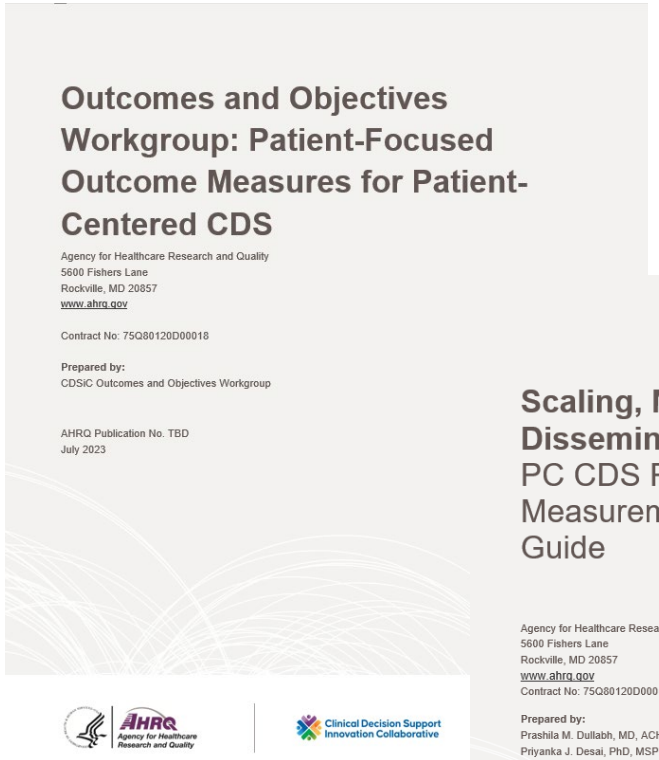
- We learned how patients, caregivers, clinicians, and other partners can be engaged at various stages of the PC CDS lifecycle.
- We discussed the importance of co-design and how to operationalize co-design approaches.
- We shared existing best practices for engaging patients in PC CDS measurement.
- We presented measurement areas and ways of organizing patient-centered measures to evaluate the impact of PC CDS on patient-centered outcomes.

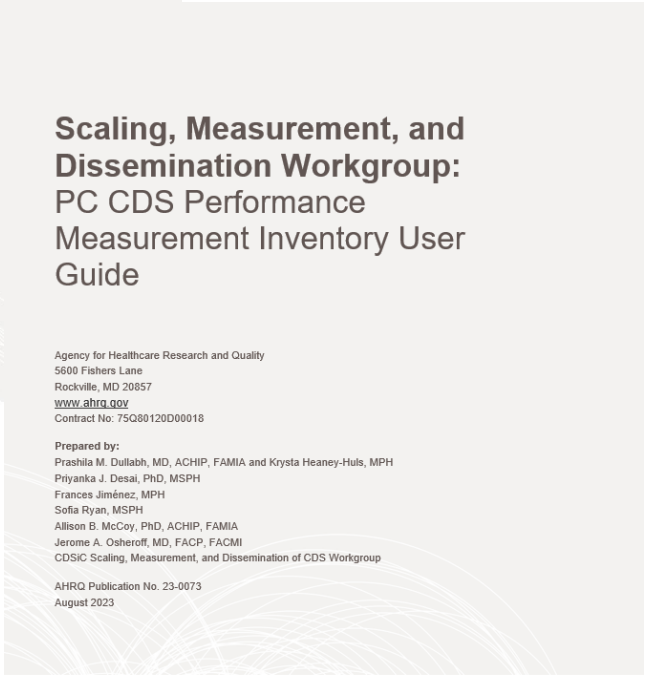
Access the Full Reports Online!

Scan the QR code to access reports on the CDSiC Website.









Thank You!

Questions or comments?
Email address

Dullabh-Prashila@norc.org

adobes@crohnscolitisfoundation.org

Follow us on X (formerly known as Twitter): @ImpSciNORC

Visit our website: https://cdsic.ahrq.gov/cdsic/home-page

AHRQ
Agency for Healthcare Research and Quality

Clinical Decision Support Innovation Collaborative

The Fall TIPS Program: Engaging Patients and Family in Fall Prevention

Patricia C. Dykes PhD, RN, FAAN, FACMI
Program Director Research, Center for Patient Safety, Research & Practice
Brigham and Women's Hospital;
Associate Professor of Medicine
Harvard Medical School

*Tailoring Interventions for Patient Safety

Patient Falls in Hospitals

- Hospitalization increases fall risk
  - Leading cause of preventable injury.
  - Associated with increased costs
- Most falls in hospitals are preventable
  - Fall-related costs are not reimbursable by Medicare

The Evidence-based Fall TIPS* Program

*Tailoring Interventions for Patient Safety

Fall TIPS Toolkit Requirements

Dykes PC, Carroll DL, Hurley AC, Benoit A, Middleton B. Why do patients in acute care hospitals fall? Can falls be prevented? *J Nurs Adm*. 2009 Jun; 39(6):299-304.

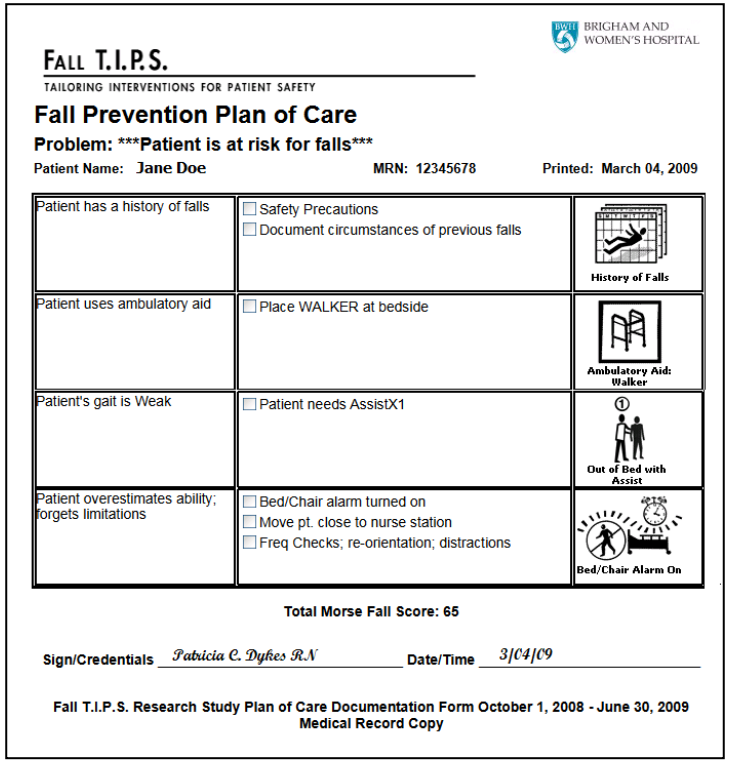
Carroll DL, Dykes PC, Hurley AC. Patients' perspectives of falling while in an acute care hospital and suggestions for prevention. *Appl Nurs Res*. 2010 Nov; 23(4):238-41.

Fall risk assessment

Tailored plan

The Fall TIPS Toolkit

Tailoring Interventions for Patient Safety



BRIGHAM AND WOMEN'S HOSPITAL

FALL T.I.P.S.

TAILORING INTERVENTIONS FOR PATIENT SAFETY

Fall Prevention Plan of Care

Problem: ***Patient is at risk for falls***

Patient Name: Jane Doe **MRN:** 12345678 **Printed:** March 04, 2009

Patient has a history of falls	☐ Safety Precautions ☐ Document circumstances of previous falls	History of Falls
Patient uses ambulatory aid	☐ Place WALKER at bedside	Ambulatory Aid: Walker
Patient's gait is Weak	☐ Patient needs AssistX1	Out of Bed with Assist
Patient overestimates ability; forgets limitations	☐ Bed/Chair alarm turned on ☐ Move pt. close to nurse station ☐ Freq Checks; re-orientation; distractions	Bed/Chair Alarm On

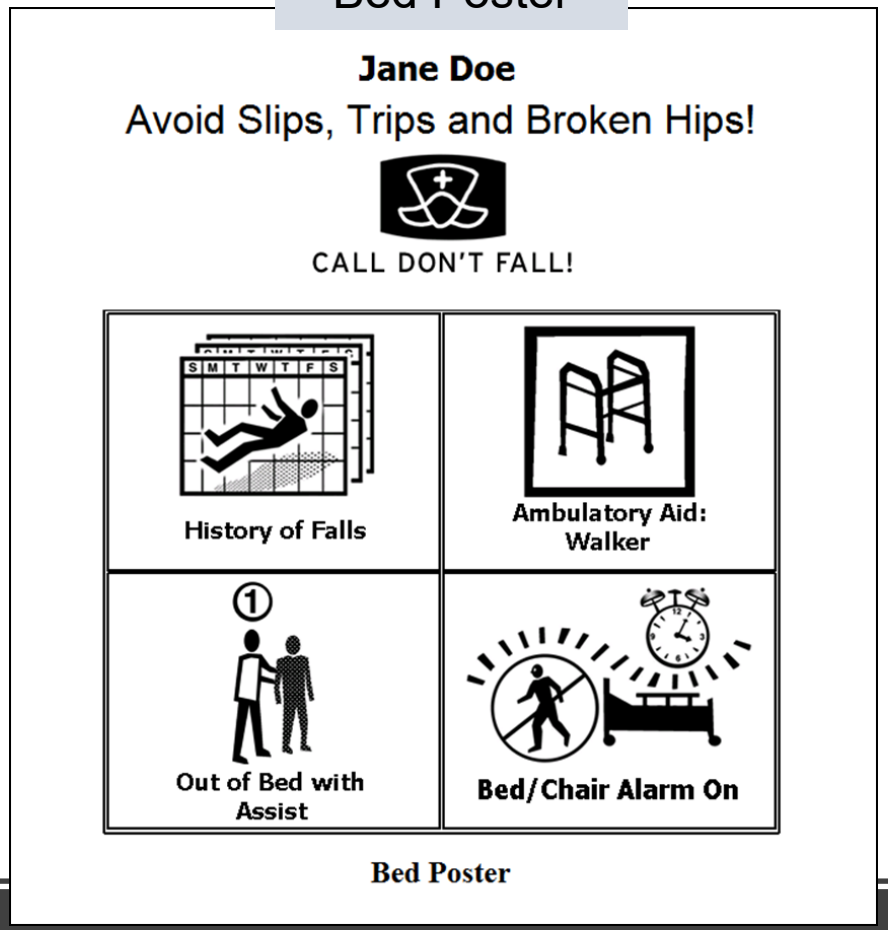
Total Morse Fall Score: 65

Sign/Credentials *Patricia C. Dykes RN* **Date/Time** *3/04/09*

Fall T.I.P.S. Research Study Plan of Care Documentation Form October 1, 2008 - June 30, 2009
Medical Record Copy

Plan of Care

Bed Poster



Jane Doe

Avoid Slips, Trips and Broken Hips!

CALL DON'T FALL!

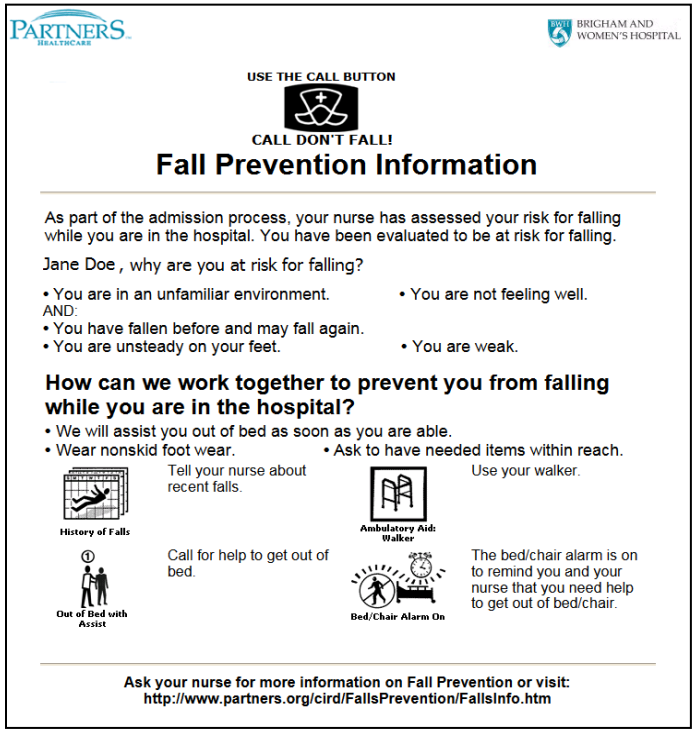
History of Falls

Ambulatory Aid: Walker

Out of Bed with Assist

Bed/Chair Alarm On

Bed Poster



PARTNERS HEALTHCARE

BRIGHAM AND WOMEN'S HOSPITAL

USE THE CALL BUTTON

CALL DON'T FALL!

Fall Prevention Information

As part of the admission process, your nurse has assessed your risk for falling while you are in the hospital. You have been evaluated to be at risk for falling.

Jane Doe , why are you at risk for falling?

- You are in an unfamiliar environment.
- You are not feeling well.

AND:

- You have fallen before and may fall again.
- You are unsteady on your feet.
- You are weak.

How can we work together to prevent you from falling while you are in the hospital?

- We will assist you out of bed as soon as you are able.
- Wear nonskid foot wear.
- Ask to have needed items within reach.

History of Falls — Tell your nurse about recent falls.

Ambulatory Aid: Walker — Use your walker.

Out of Bed with Assist — Call for help to get out of bed.

Bed/Chair Alarm On — The bed/chair alarm is on to remind you and your nurse that you need help to get out of bed/chair.

Ask your nurse for more information on Fall Prevention or visit:
http://www.partners.org/cird/FallsPrevention/FallsInfo.htm

Patient Education

The Fall TIPS Toolkit

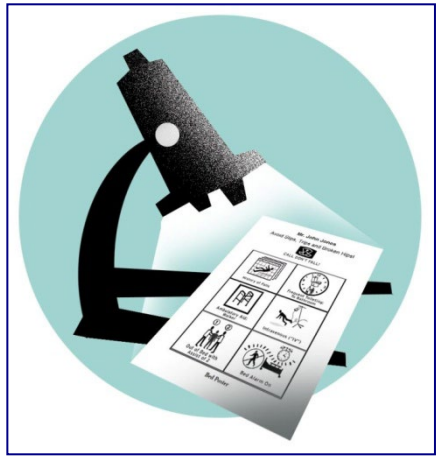
Tailoring Interventions for Patient Safety

46

- 2010: Patient falls were significantly reduced on intervention units

There were 25% fewer falls in intervention units than in control units

No significant effect was noted in fall-related injuries




JAMA The Journal of the American Medical Association

Home Current Issue All Issues Online First Collections CME Multimedia

November 2010, Vol 304, No. 17 >

< Previous Article Next Article >

Original Contribution | November 3, 2010

Fall Prevention in Acute Care Hospitals

A Randomized Trial

Patricia C. Dykes, RN, DNSc; Diane L. Carroll, RN, PhD, BC; Ann Hurley, RN, DNSc; Stuart Lipsitz, ScD; Angela Benoit, BComm; Frank Chang, MSE; Seth Meltzer; Ruslana Tsurikova, MSc, MA; Lyubov Zuyov, MA; Blackford Middleton, MD, MPH, MSc

Patients aged 65 or older benefited most from the Fall TIPS toolkit

Fall TIPS Evidence

Dykes PC, Carroll DL, Hurley A, Lipsitz S, Benoit A, Chang F, Meltzer S, Tsurikova R, Zuyov L, Middleton B. Fall prevention in acute care hospitals: a randomized trial. *JAMA*. 2010 Nov 03; 304(17):1912-8.

*This study included 10,264 patients and 48,250 patient-days

47

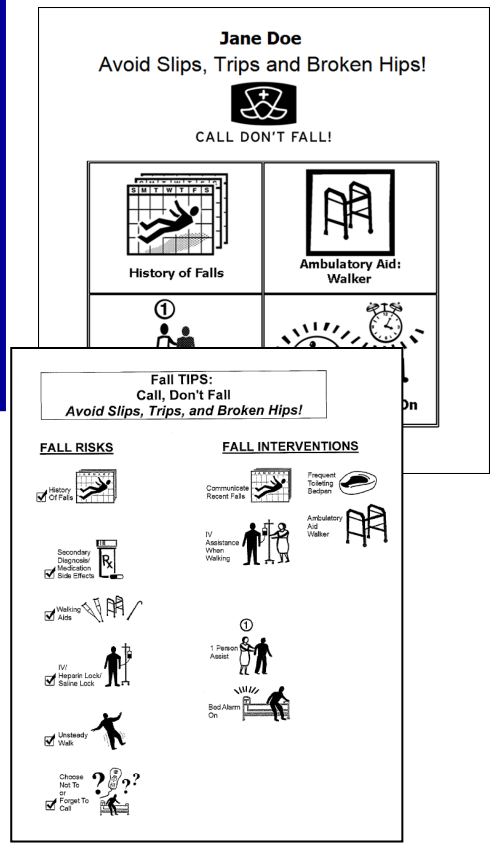
Fall TIPS Toolkit Requirements

- Identify ways to disseminate Fall TIPS outside of the electronic health record
  - Must be available to be used in any hospital
  - Must provide clinical decision support
- Develop tools and strategies to engage patients and families in the 3-step fall prevention process.

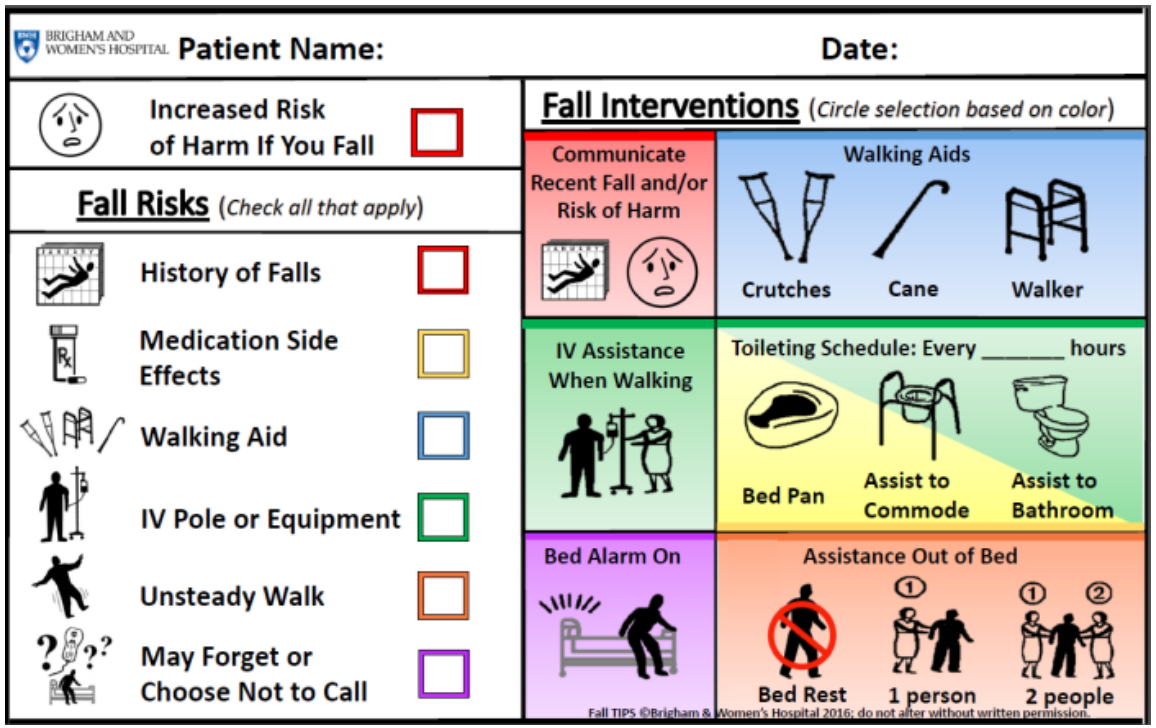
EHR Fall Risk Assessment and Dynamically Generated Bed Poster

Fall risk assessment

Tailored plan



The Laminated Paper Fall TIPS Toolkit



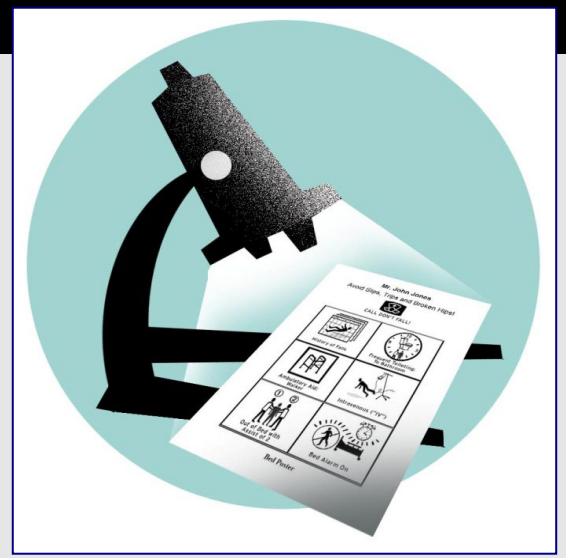
Fall T.I.P.S.: Patient Room Screensaver

The Fall TIPS Toolkit

Tailoring Interventions for Patient Safety

Fall TIPS Evidence 2020: Reduced Falls and Injurious Falls (3 Health Systems)*

Fall rates decreased 15% from 2.92 to 2.49 falls/1000 patient days



Patients younger than 65 had greatest reduction in falls (18%) versus patients 65 or older (10%)

Fall injury rates decreased 34% from .73 to .48 injuries/1000 patient days

Patient aged 65 or older had greatest reduction in injury (48%) vs. patient younger than 65 (19%)

**Study included 37,231 patients and 277,655 patient-days*

Dykes PC, Burns Z, Adelman J, et al. Evaluation of a Patient-Centered Fall-Prevention Tool Kit to Reduce Falls and Injuries: A Nonrandomized Controlled Trial. *JAMA Netw Open*. 2020;3(11):e2025889. doi:10.1001/jamanetworkopen.2020.25889.

Fall TIPS Evidence: Interrupted Time Series 2023

Research Questions

- *Did patients in health systems using the Fall TIPS toolkit have fewer falls and related injuries?*

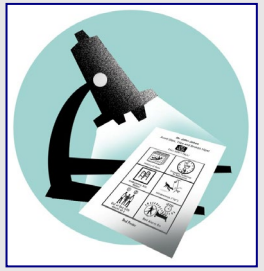
2 Healthcare Systems 2013-2019

- 8 Hospitals, Northeast USA
- 33 Medical/Surgical Units

Findings*:

The rate of falls was lower during intervention period (19%)

The rate of fall injuries was lower during intervention period (20%)



*Dykes PC, Curtin-Bowen M, Lipsitz S, Franz C, Adelman J, Adkison L, Bogaisky M, Carroll D, Carter E, Herlihy L, Lindros ME, Ryan V, Scanlan M, Walsh MA, Wien M, Bates DW. Cost of Inpatient Falls and Cost-Benefit Analysis of Implementation of an Evidence-Based Fall Prevention Program. JAMA Health Forum. 2023 Jan 06; 4(1):e225125. PMID: 36662505.

Fall TIPS Evidence: Cost Benefit Analysis 2023

Research Questions

What are the costs of falls and related injuries?

What are the costs and benefits associated with implementing Fall TIPS program?

Fall TIPS Intervention Cost: .88/patient

Prevented 567 falls

425 without injury

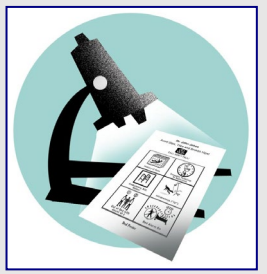
142 with injury

Total Cost savings: $22,036,714

Findings:

Average total cost of a fall: $62,521 ($35,365 direct costs)

Average total cost of a fall with injury: $64,526 ($36,776 direct costs)



*Dykes PC, Curtin-Bowen M, Lipsitz S, Franz C, Adelman J, Adkison L, Bogaisky M, Carroll D, Carter E, Herlihy L, Lindros ME, Ryan V, Scanlan M, Walsh MA, Wien M, Bates DW. Cost of Inpatient Falls and Cost-Benefit Analysis of Implementation of an Evidence-Based Fall Prevention Program. JAMA Health Forum. 2023 Jan 06; 4(1):e225125. PMID: 36662505.

Fall TIPS Evidence Summary: Patient Engagement in 3-step Fall Prevention Process

- Facilitates patient understanding of personal fall risk status and the plan to prevent a fall.
- Promotes patient understanding of their role in fall prevention.
- Facilitates patient (and family) partnership in ensuring that the plan is carried out consistently.

A common reason why patients fall is that planned interventions are not followed consistently by the patient (most frequently) or the team*

*Dykes PC, I-Ching EH, Soukup JR, Chang F, Lipsitz S. A case control study to improve accuracy of an electronic fall prevention toolkit. AMIA Annu Symp Proc. 2012; 2012:170-9.

Fall TIPS Evidence Summary

- The Fall TIPS toolkit links patient-specific risk factors to interventions most likely to prevent falls
  - Various tool kit modalities allow for integration into diverse clinical workflows
  - Facilitates patient engagement in 3-step fall prevention process
- Patient and family engagement are key to fall and injury prevention
- Fall TIPS is effective in preventing falls, injuries and reducing fall-related costs.

Dykes PC, Burns Z, Adelman J, et al. Evaluation of a Patient-Centered Fall-Prevention Tool Kit to Reduce Falls and Injuries: A Nonrandomized Controlled Trial. JAMA Netw Open. 2020;3(11):e2025889. doi:10.1001/jamanetworkopen.2020.25889.

Christiansen TL, Lipsitz SR, Scanlan M, Yu SP, Lindros ME, Leung WY, Adelman JS, Bates DW, MD, Dykes PC. Patient Activation Related to Fall Prevention: A Multi-Site Study. 2019. Under review.

The Fall TIPS Website*

- Resources based on over a decade of research and practice
- Foundation for an effective and sustainable fall prevention program
  - Training and implementation resources
  - Fall TIPS Toolkit Laminated Poster Template
  - Fall TIPS evidence and resources
  - Quality reporting

*www.FallTIPS.org

Thank you
pdykes@bwh.Harvard.edu

Charts on FHIR: Open-source software for visualizing PGHD

May 16, 2023

Aziz Boxwala, MD, PhD

AHRQ
Agency for Healthcare Research and Quality

Clinical Decision Support Innovation Collaborative

Overview

- **Integrating PGHD into healthcare decision-making requires that clinicians and patients be able to visualize data for *optimal* decision-making**
- **PGHD can present unique challenges for visualization**
- **What is the state of the art in presenting PGHD to clinicians and patients**
- **Charts on FHIR: An open-source library for incorporating PGHD visualizations in clinician and patient apps**

Challenges with visualizing PGHD

- **Frequency and volume**
  - Unlike typical (ambulatory) clinical data, PGHD can be reported at high frequency resulting in large volumes of data
    - E.g., data from wearables

- **Evidence**
  - Insufficient/evolving guidelines for interpretation of PGHD
    - Compare to guidelines for interpreting clinical data
- **Data integration**
  - PGHD is insufficiently integrated into EHRs and clinical workflows today

Assessing the state of the art

- **We conducted a literature review to**
  - Understand needs of and approaches to visualizations of physiologic measurement PGHD
    - e.g., heart rate, blood pressure, weight, step counts
    - Exclude PROs
  - Extract principles and best practices of visualization of PGHD
    - To inform development of a visualization library and apps to be used for PC-CDS

Findings: Key Desired Features

- **Fewer than 20 manuscripts**
- **Longitudinal data display:** almost universal usage of line graphs
- **Aggregation of multiple data types:** integration with EHR data
- **Interpretation and actionability:** categorization and summary statistics
- **Customization of visualization and multiple options:** to tailor to individual or specialty needs
- **Availability for other purposes:** e.g., documentation
- **Speed:** compatible with existing EHRs and integrated into workflow

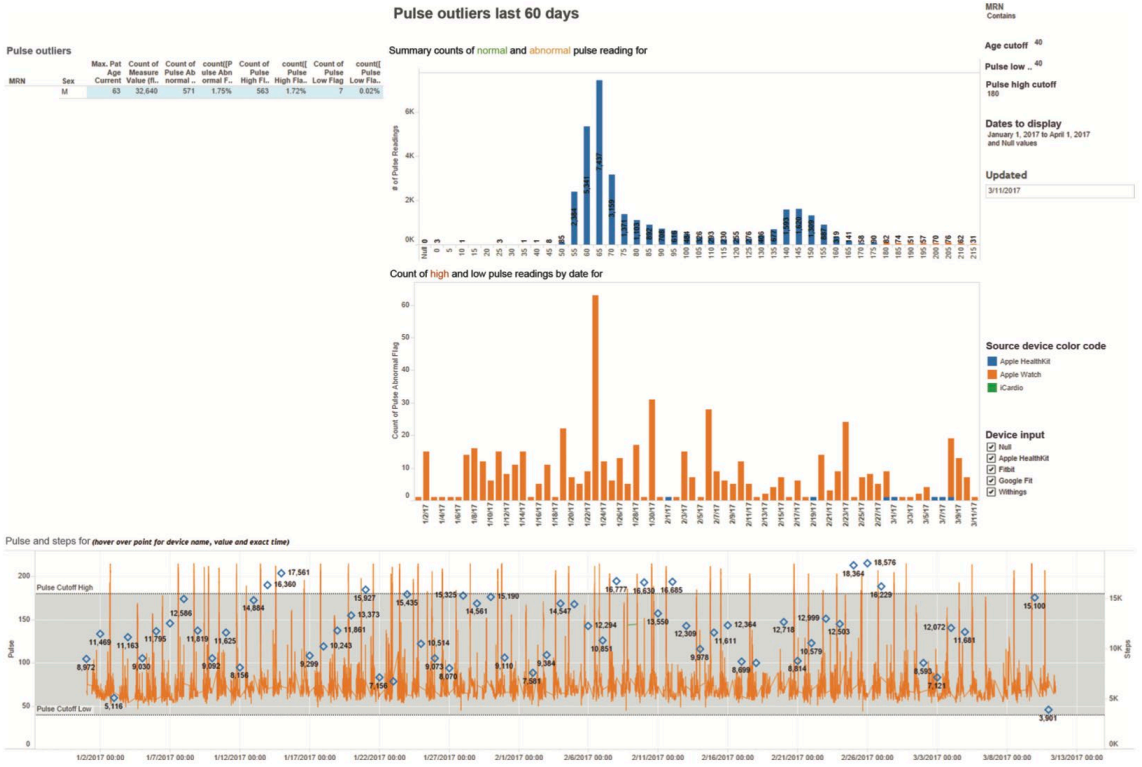


Fig. 4 Example of abnormal heart rate patterns due to atrial fibrillation.

Cassarino N, Bergstrom B, Johannes C, Gualtieri L. Monitoring Older Adult Blood Pressure Trends at Home as a Proxy for Brain Health. *Online J Public Health Inform.* 2021;13(3):e16. doi:10.5210/ojphi.v13i3.11842

Charts on FHIR

- **A software library for visualizing PGHD**
  - Timeline and summary views of PGHD informed by literature review findings
  - Integrates with FHIR
  - Open-source and available from github
    - https://github.com/elimuinformatics/charts-on-fhir/
- **Demonstrations**
  - Prototype cardiovascular app for clinicians
  - Prototype BP app for patients
  - Showcase app to explore visualizations for new requirements
  - Library

Demonstration

Publications, presentations, downloads

- Shenvi EC, Boxwala A, Sittig DF, Zott C, Lomotan E, Swiger J, Dullabh P. Visualization of Patient-Generated Health Data: A Scoping Review of Dashboard Designs. Appl Clin Inform. 2023 Sep 13. doi: 10.1055/a-2174-7820. PMID: 37704021.

- Shenvi E, Boxwala A, Stynes C, Sittig F, Zott C, Leaphart D, Lomotan E, Swiger J, Dullabh P. A Dashboard for Shared Decision-Making: Putting Patient-Generated Health Data and Clinical Decision Support Together. AMIA Annu Symp, 2023, New Orleans, LA.

- https://github.com/elimuinformatics/charts-on-fhir/

Credits

- **Elimu Informatics**
  - Colin Stynes – Engineer
  - Edna Shenvi, MD – Informatician
- **NORC**
  - Courtney Zott
  - Desirae Leaphart
  - Nikki Gauthreaux
  - Kiran Correa
- **Participants (anonymous) in usability study**

Thank You!

Questions or comments?
Email address

Questions

Office of the National Coordinator for Health Information Technology

Contact ONC

Alison Kemp alison.kemp@hhs.gov

Phone: 202-690-7151

Health IT Feedback Form: https://www.healthit.gov/form/healthit-feedback-form

Twitter: @onc_healthIT

LinkedIn: Office of the National Coordinator for Health Information Technology

Youtube: https://www.youtube.com/user/HHSONC

HealthIT.gov

Subscribe to our weekly eblast at healthit.gov for the latest updates!