Clinical Decision Support (CDS)
to improve colorectal cancer screening

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Outline

- Biomedical informatics
  - Putting data in context
- Clinical decision support (CDS)
  - What & how
- STOP CRC Study
  - Overview of study aims & interventions
- Application of CDS to STOP CRC
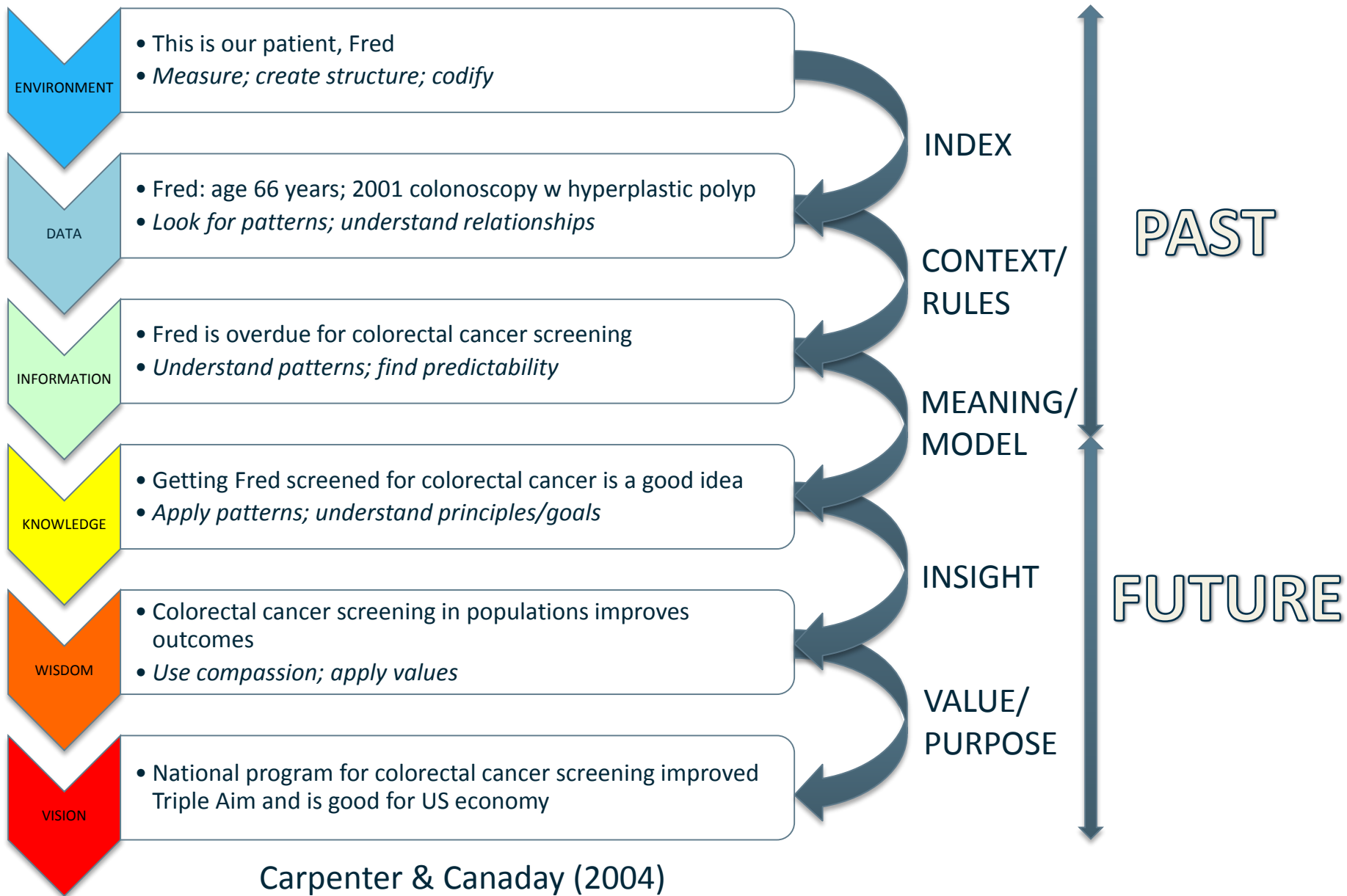 - Leveraging informatics & CDS in an NIH study
- Discussion

Biomedical Informatics

Clinical Informatics/Medical Informatics

- **Biomedical Informatics** is the interdisciplinary, scientific field that studies and pursues the effective uses of biomedical data, information, and knowledge for scientific inquiry, problem solving and decision making, motivated by efforts to improve human health.

- **Clinical Informatics** is the application of informatics and information technology to deliver healthcare services. It is also referred to as applied clinical informatics and operational informatics.

http://www.amia.org/applications-informatics/clinical-informatics

ENVIRONMENT	• This is our patient, Fred • *Measure; create structure; codify*
DATA	• Fred: age 66 years; 2001 colonoscopy w hyperplastic polyp • *Look for patterns; understand relationships*
INFORMATION	• Fred is overdue for colorectal cancer screening • *Understand patterns; find predictability*
KNOWLEDGE	• Getting Fred screened for colorectal cancer is a good idea • *Apply patterns; understand principles/goals*
WISDOM	• Colorectal cancer screening in populations improves outcomes • *Use compassion; apply values*
VISION	• National program for colorectal cancer screening improved Triple Aim and is good for US economy

INDEX

CONTEXT/ RULES

MEANING/ MODEL

INSIGHT

VALUE/ PURPOSE

PAST

FUTURE

Carpenter & Canaday (2004)

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Clinical Decision Support – Not just pop-ups

Clinical Decision Support

- "CDS provides clinicians, staff, patients and other individuals with knowledge and person-specific information, intelligently filtered at appropriate times, to enhance health and healthcare." (1)
- CDS Tool Box:
  - Alerts
  - Structured flowsheets
  - Documentation forms, note templates
  - Order sets
  - Display of data, guidelines, recommendations, risk scores
  - List of patients, registries
  - Tools for facilitating population health improvement (batch orders, batch letters)
  - Tools for facilitating communication (messages, alerts, patient portals)

(1) Ong K. Clinical Decision Support. Chapter 10 in: Medical Informatics: An Executive Primer (2nd Edition). Ong K (Ed.). HIMSS, Chicago, IL. 2011. pp 181-198.

CDS Design: 5 Rights – In context of STOP CRC

- <u>Right information</u>
  - Evidence-based guidelines
  - Applicable to situation (patient age, sex, <u>*problem list*</u>, risks)
- <u>Right person</u>
  - Who sees the alert? (front staff, MA, student, clinician, care coordinator?)
- <u>Right CDS intervention and format</u>
  - List of patients, alert, order, letter & address label, etc
- <u>Right channel</u>
  - Provider or staff: within EHR In Basket, RWB, visit
  - Patient: portal, letter, text message, phone call, during visit
- <u>Right time in workflow</u>
  - During or outside or office visit (asynchronous)?

Osheroff JA (Ed.) Improving medication use and outcomes with clinical decision support: A step-by-step guide. Health Information & Management Systems Society. Chicago, IL. 2009 (273pp)

Definitions of NQF CDS Taxonomy Categories

- **Trigger:** events or actions that initiate a CDS rule

- **Input Data:** the additional data, from the patient record or other source, used as background to modify or constrain the CDS rule

- **Interventions:** the possible actions taken by decision support to provide information when the conditions specified in a rule are met

- **Action Step:** any action or event presented to the user of a clinical system that could lead to successful completion (or realization) of the intended mission of the rule

National Quality Forum (NQF), *Driving Quality and Performance Measurement—A Foundation for Clinical Decision Support: A Consensus Report,* Washington, DC: NQF; 2010.

STOP CRC Study

STOP CRC Study Design

- Strategies and Opportunities to Stop Colorectal Cancer in Priority Populations
  - NIH UH3 AT007782
  - Co-PI: Gloria Coronado, PhD (Kaiser Permanente Center for Health Research)
  - Co-PI: Bev Green MD, MPH (Group Health)
- Design: Cluster-randomized pragmatic clinical trial
- Intervention: Usual care *vs* IT tools + mailed outreach approach (mailed FIT kit) + practice improvement cycle;
  - Phase 1 involved a pilot in 2 clinics;
  - Phase 2 involves 26 clinics.
- Primary outcomes: fecal testing at 12 months; any CRC screening at 12 months; effectiveness by population subgroup (age, race/ethnicity); cost, cost effectiveness, return on investment

Eligible population

- Inclusions
  - Men and women
  - Ages 50 – 74 years
  - At least one office visit in prior year
  - Due for CRC screening in 2014
  - Have a valid address
- Exclusions
  - Prior diagnosis of colon cancer, IBD, ESRD
  - Recent colon cancer screening
    - colonoscopy (9 years), or flex sig (4 years), or FOBT (11 months)
  - Prior referral to Colonoscopy (12 months)
  - Order for fecal test (6 months)

Applied Clinical Informatics – CDS & STOP CRC
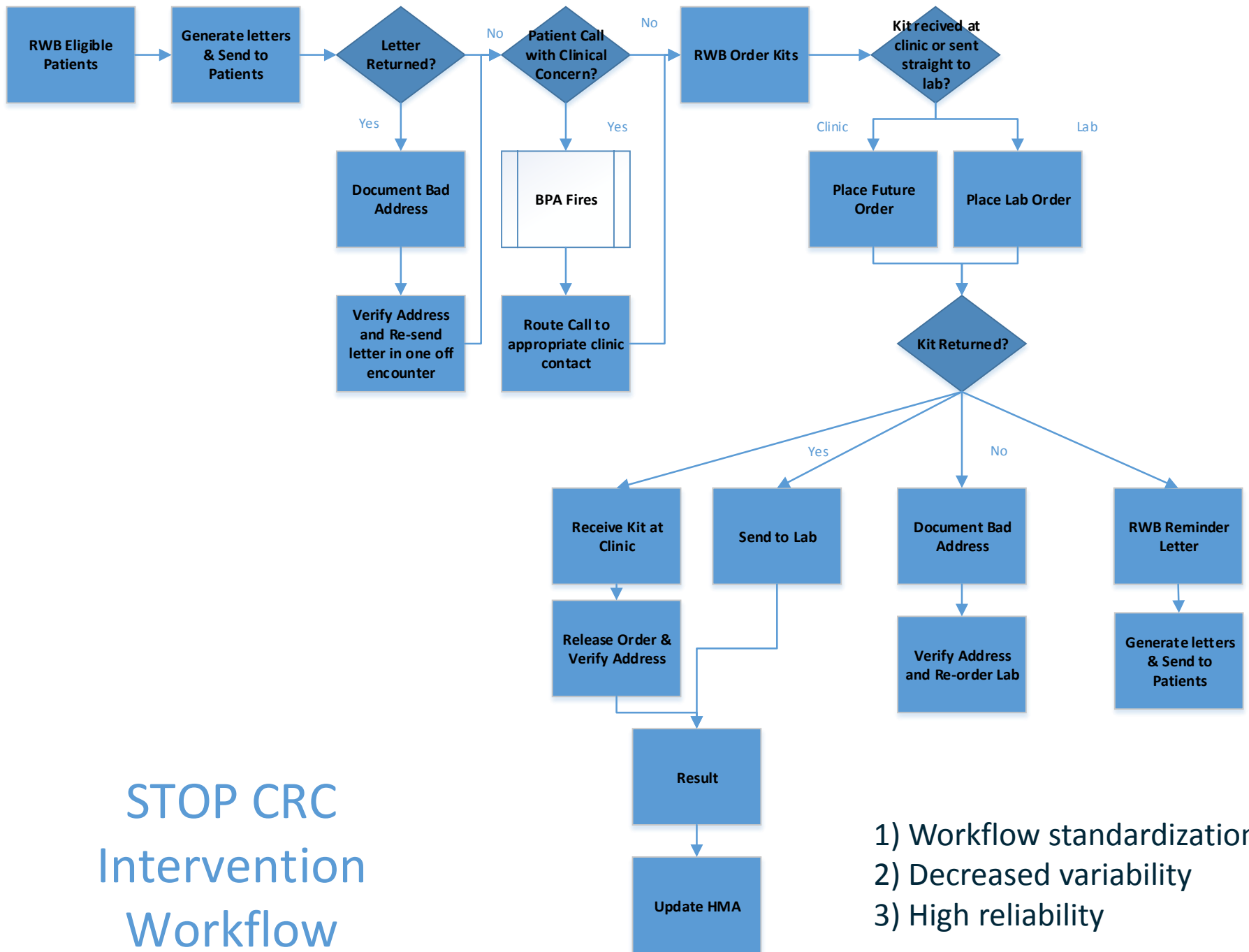
STOP CRC Intervention Workflow

1) Workflow standardization
2) Decreased variability
3) High reliability

CDS Tools

- ✓ Limited to intervention sites

- ✓ Serve clinical, operational, and research purposes

- ✓ Reportable audit trail of use in EHR database for researchers

CDS Tools

1) Actionable reports for identifying eligible patients
   – Query: evaluated inclusion and exclusion criteria
   – Display: demographics, prior screening, portal status, etc
   – Actions:
     • Send batched message to many patients
       – patient portal; or
       – Print letters and mailing labels

- Reports:
   – Initial letter
   – FIT kit mailing
   – Reminder

CDS Tools

2) Tracking wrong addresses
- – If letter or kit returned by USPS
- – Patient chart is manually flagged for reports

3) Tracking patient phone calls
- – Select Reason for Call of "STOP CRC" triggers pop-up alert
- – Pop-up acknowledge reasons: "Clinical questions" or "Mail new kit"

CDS Tools

4) Ordering FIT kits

- Batch orders for multiple patients in actionable reporting screen
  - Prints address label for mailing envelope
  - Places open order released when patient returns FIT kit to clinic
- Order set for individual orders
  - Prints specimen label for FIT kit and prints address label for mailing envelope

CDS Tools

5) Health Maintenance

Tracks CRC screening status for patients
- Patients default into category of FIT/FOBT kit needed every 1 year after age 50 years
  - Manual options for colonoscopy at 1, 3, 5, 10 years
  - Manual options for "not candidate for CRC" or "declines"

- Rules look back at prior tests and dates to determine whether patient is overdue for CRC

- STOP CRC
  - Improvements to HM tools
  - Improvement to EHR process for manually entering prior colonoscopy results

Initial Results

Phase 1 (2 clinics)

✓ 213 letters mailed

✓ 206 FIT kits mailed, *90% completed*, 7 positive screens

  ➢ 6 colonoscopies, none cancerous

  ➢ 1 patient declined follow-up

✓ *CRC Screening (FIT completion) increased from baseline 3% of eligible patients to 38% with intervention tools.*

Phase 2 (26 clinics)

✓ Introductory letters mailed in 1 month: 1,179

✓ Colonoscopy records updated in 6 months: 1,389

Discussion?

Thank you!

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