Designing for Medication Safety

A Sociotechnical Perspective on Medication Reconciliation

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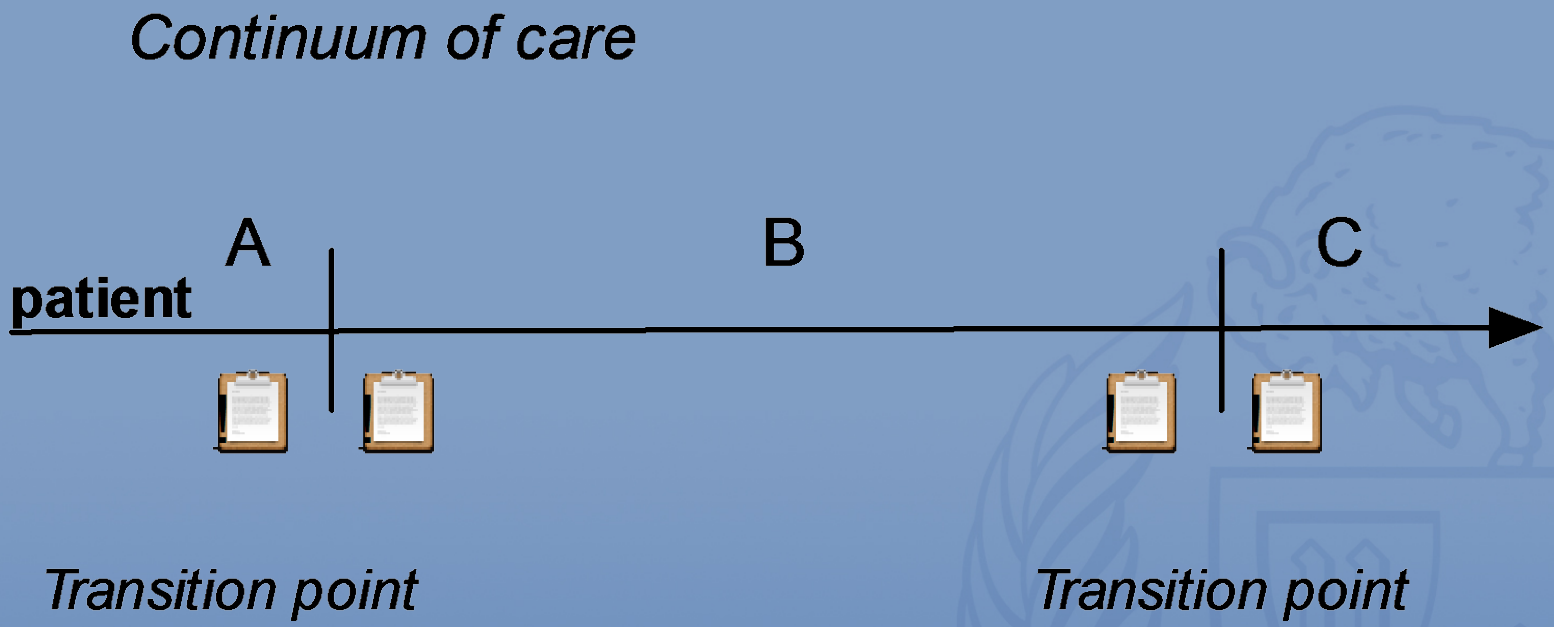
Medication Reconciliation (MedRec)

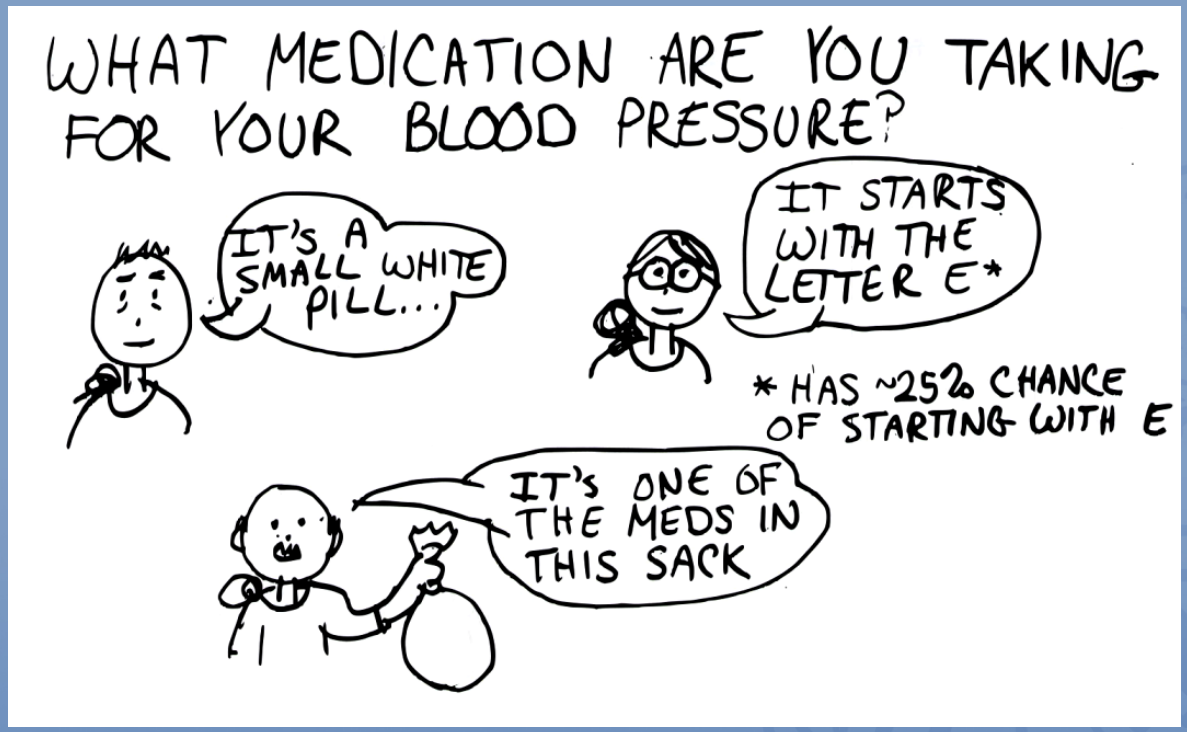
MedRec is a process of identifying the most accurate list of all medications a patient is taking—including name, dosage, frequency, and route—and using this list to provide correct medications for patients *anywhere* within the health care system

Bassi et al., Ann Pharmacother 2010;44:885-97

MedRec


Continuum of care
A
B
C
patient
Transition point
Transition point

MedRec


WHAT MEDICATION ARE YOU TAKING FOR YOUR BLOOD PRESSURE?
IT'S A SMALL WHITE PILL...
IT STARTS WITH THE LETTER E*
* HAS ~25% CHANCE OF STARTING WITH E
IT'S ONE OF THE MEDS IN THIS SACK

MedRec

- Medication omissions and dosing failures are frequent during transitions
  - *Clay et al., J Hosp Med 2008;3:465-72*
- Source:
  - Interviews
  - Chart review

MedRec: Rush to the Tools

- Formal process mandated by Joint Commission (2006); part of requirements of Meaningful Use
- Checklists
  - *Pronovost et al., J Crit Care 2009;18:201-5*
- Specific IT applications
  - *Schnipper et al., Arch Intern Med 2009;169:771-80*
- CPOE / EHR
  - *Lee et al., Ann Pharmacother 2010;44:1887-95*

MedRec Process (Tools): Do They Impact Clinical Outcomes?

- Some evidence
  - *Pronovost; Schnipper*
- Scant evidence
  - *Lehnbom et al., Ann Pharmacother 2014;48:1298-312*

Methodological Challenges

- Defining errors
  - *Aronson, Br J Clin Pharmacol 2009;67:599-604*
- Finding errors
  - *Ferner, Br J Clin Pharmacol 2009;67:614-20*
- Is a study that attempts to correct errors doomed to fail?
- Optimists: accurate drug history key to medication safety
  - *FitzGerald, Br J Clin Pharmcol 2009;67:671-5*

MedRec Challenges

- Health care system is fragmented
  - System A: process D, (IT) tool X
  - System B: process E, (IT) tool Y
  - System C: process F, (IT) tool Z
- Processes and tools are not compatible
- Patient falls through the cracks

A Sociotechnical Perspective on MedRec

- MedRec is a process, not a tool
- MedRec is embedded in health care practices
- Health care practices are facilitated and constrained by organizational structures, norms and values, and technological affordances
- So is MedRec

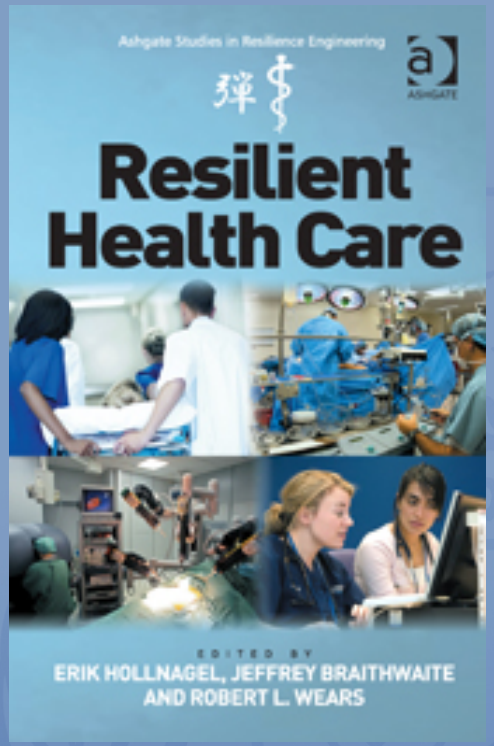
Challenging Some Wisdoms of Safety

- Human error is the largest single cause of incidents and accidents
- Systems will be safe if people comply with procedures
- Safety can be improved by barriers and protection
- Root cause analysis can identify why mishaps happen in complex sociotechnical systems
- Accident investigation is the logical and rational identification of causes based on facts
  - *Besnard and Hollnagel, Cogn Technol Work 2014;16:13-23*

Concept of Resilience

Resilience is a property of sociotechnical systems that confers on them to remain intact and functional despite the presence of threats to their integrity and function.

Hollnagel et al., 2013



MedRec is Resilient

- Most of the time MedRec goes well
- Humans are excellent in mitigating unexpected and unanticipated events by workarounds
- People complain, but get their work done
- MedRec is suboptimal

Aim of the Study

What are the requirements of safe health information technology to support medication reconciliation as a resilient process?

Outcomes of the Study

- A process model of medication reconciliation across organizational boundaries
- Focus on providers and patients and their families
- An analysis of required IT support
  - Organizational infrastructures
- A toolbox for appropriate IT support

Empirical Research Methods

- Understanding MedRec as a process requires qualitative research methods
- Qualitative research is about fieldwork (naturalistic settings)
- Data collection:
  - Observations
  - Interviews
  - Documents

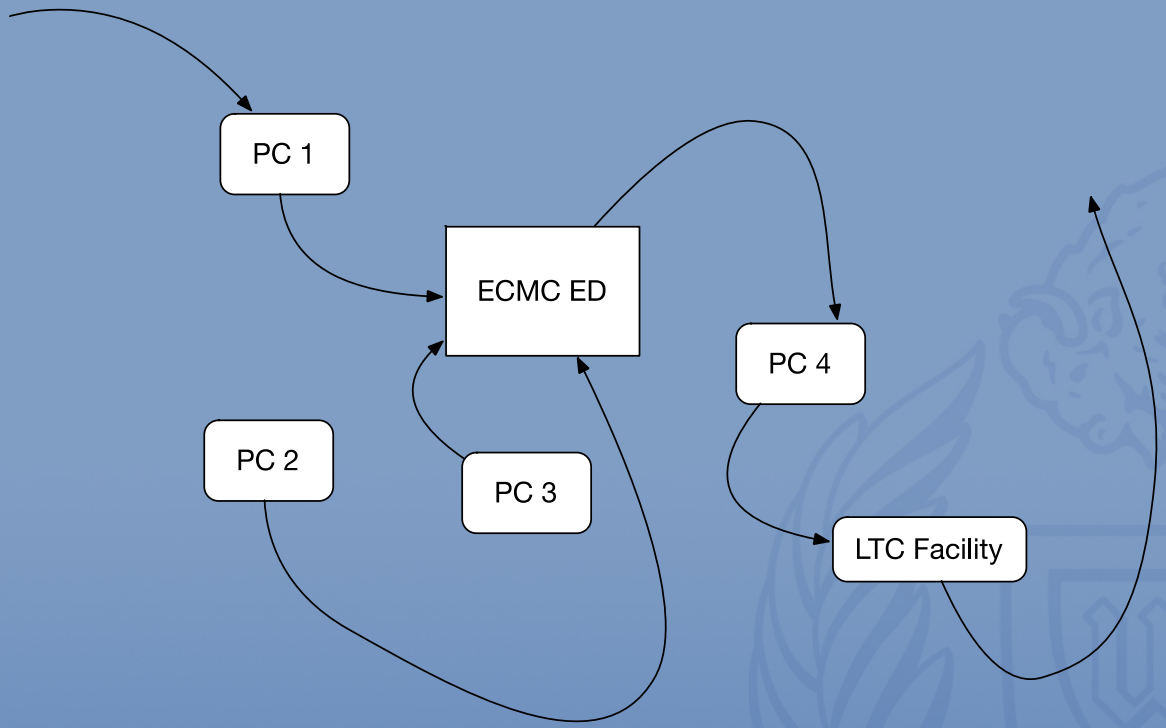
Methodological Rigor of Qualitative Studies

- Theory driven
  - *Bruins, Ruijs, Wolfhagen, Bloembergen, Aarts, BMC Med Inform Decis Making 2011;11:19*
  - *Van der Sijs, Aarts, et al. J Am Med Inform Assoc 2006;13;138-47*
- Thematic analysis by concept coding
- Mapping of results on theory

Research Setting and Sites

- Naturalistic settings: ECMC Emergency Department and primary care practices
- Providers are focus of analysis
- Tracking patients
  - Eligibilty: >75 years; polypharmacy

ECMC sites



Research Funding

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Research Collaborators

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Suggestions, Ideas, Questions, Discussions

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