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# IMPACT OF HEALTH CARE DATA ON WORK PRACTICES

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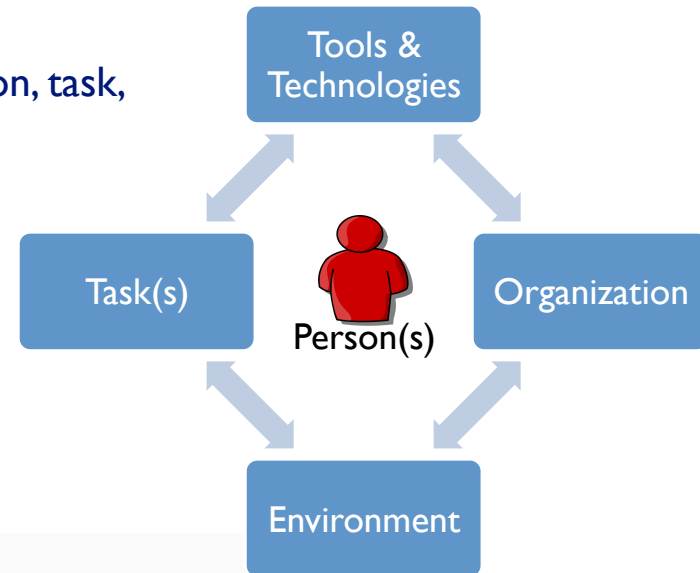
# DISTRIBUTED COGNITIVE SYSTEM

- Work across
  - multiple agents,
  - part of a stream of activity,
  - embedded in larger organization,
  - phases of ebbs and flows,
  - use of tools everywhere



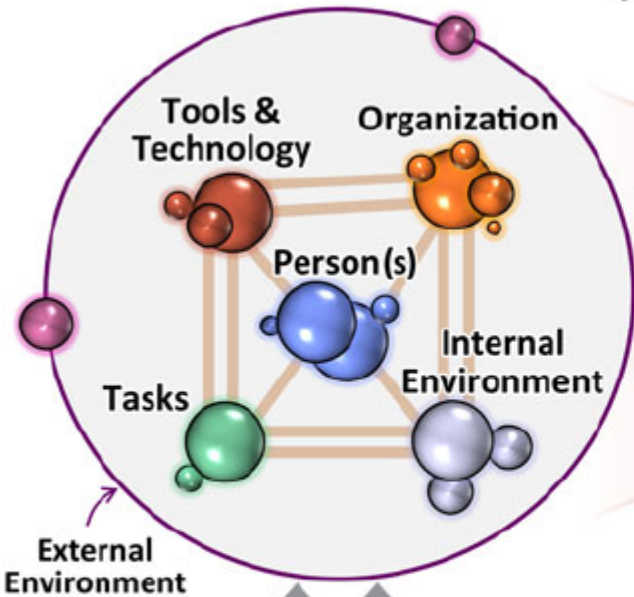
# CONCEPTUAL FRAMEWORK

- **Socio-technical systems**
  - Organizations are complex systems of technology, people and tasks
  - Success or failure lies in understanding the interactions that take place
- **Balance Theory**
  - Understanding the work system as composed: organization, task, environment, person, technology



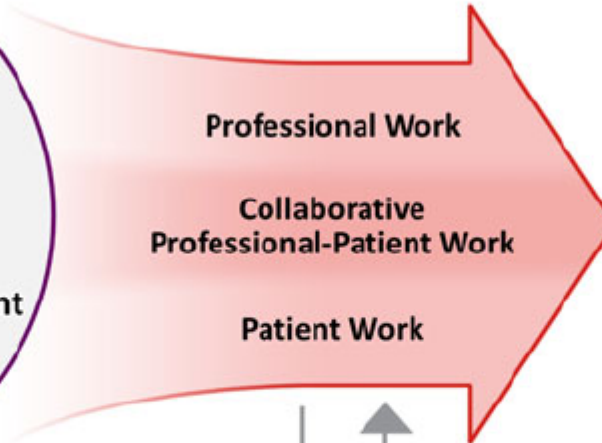


## WORK SYSTEM

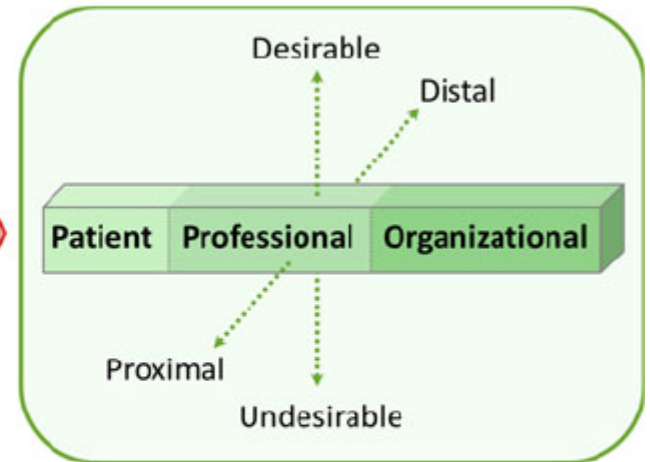


## PROCESSES

- Physical
- Cognitive
- Social/behavioral



## OUTCOMES



- Anticipated or unanticipated
- Short- or long-lasting
- Intermittent or regular

## ADAPTATION

Carayon, 2006



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# NEW DATA SOURCES

## PATIENTS

**Glucometer**

Test Result **+**

John

29/09/13 Current + Reminder

Time	Meal	BG	Notes
08:00 am	Fasting	85 mg/dL	
10:00 am	Before Breakfast	155 mg/dL	
01:30 pm	After Breakfast	203 mg/dL	
10:00 am	Before Lunch	155 mg/dL	
01:30 pm	After Lunch	235 mg/dL	
04:30 pm	Before Dinner	109 mg/dL	
08:00 pm	After Dinner	85 mg/dL	
04:30 pm	At Bedtime	109 mg/dL	

mg/dL

Graph View



## MyNetDiary Diabetes Tracker

The winning formula:

MyNetDiary Pro, the #1 diet app in the world  
+  
Comprehensive diabetes tracking  
(blood glucose, insulin, carbs, meds, charts, reports and more)

**Asthma Tracker**

Enter the results of your Peak Flow test

Date: 4-10-2012

Time: 11:50 am

Peak Flow:  l/min

FEV1:

Treatment:  More

Dose:

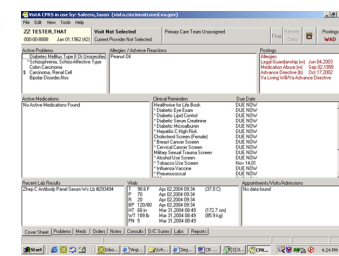
Pre Meds  Post Meds



## CLINICIANS



## INSTITUTIONS



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# BAD NEWS

- Patients with multiple chronic conditions are often the most complex to manage
- As of 2012, no fewer than 40,000 health-related apps
- Not much research on the utility, effectiveness and safety of mHealth interventions
- Use of the Internet to access health information is low and tied to events



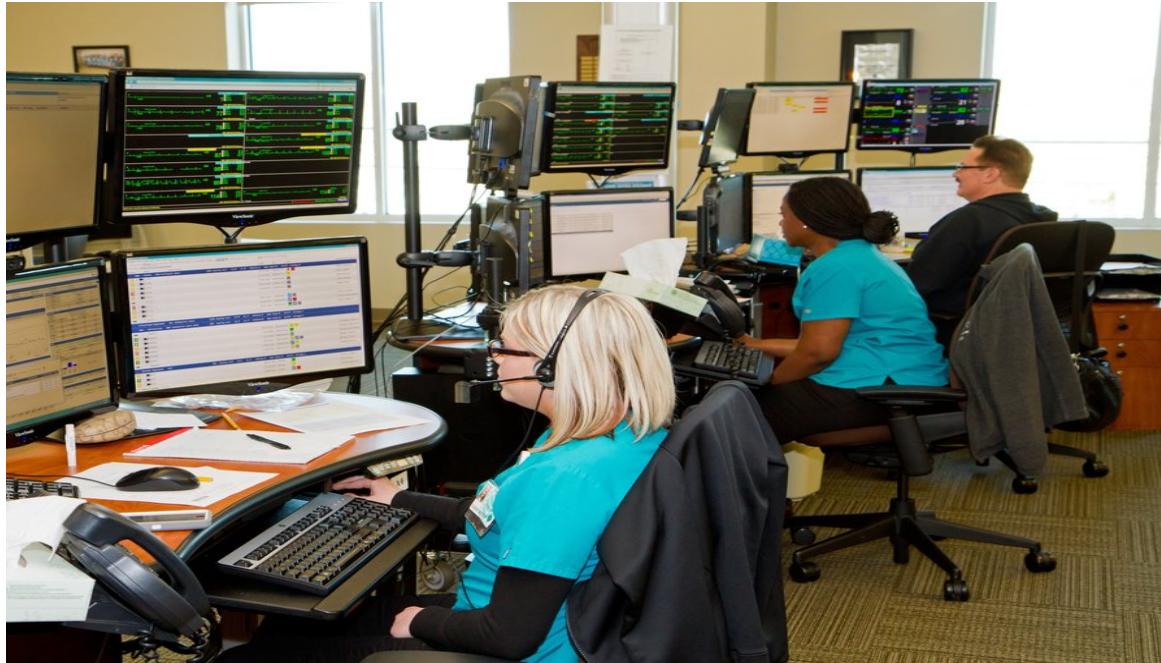
# MULTIDISCIPLINARY TEAMS

- Many skills are needed to build systems that meet users' needs
- Multidisciplinary teams are needed
- Customers/users/patients, too
- Computer science
- Social and organizational psychology
- Cognitive science
- Human factors & ergonomics
- Industrial design
- Graphic design
- Anthropology
- Management science
- Software engineering
- Technical communication





# ELECTRONIC ICU/TELE-MONITORING



Registered nurses Cassie Gregor (from left), Camellia Douglas and Mike Montalto monitor patients in intensive care units scattered around North Carolina.

Kevin McCarthy/Carolinas HealthCare System

## Tasks:

- Visualization of data
- Physical location of screens
- Interface design

## Organization:

- Team communication
- Complexity of systems
- Safety Culture

## Human User:

- Attention issues
- Physical ergonomics
- Role of Fatigue



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# PEOPLE DEVELOP WAYS OF COPING THAT MAY HAVE UNINTENDED IMPACTS

- Trade accuracy for speed
- Reduce performance criteria
- Deviate from procedures
- Batching/Deferring tasks
- Shedding tasks
- Recruiting additional resources
- Work-around's



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# VISUALIZATION/REPRESENTATION TECHNIQUES

- Overcome “keyhole effect” with expanded data views
- Integrated workspace (e.g., longshot displays)
- Overview displays
- Graphically depict data relationships
- Aid event detection



# CASE ~ HEALTH INFORMATION MANAGEMENT IN LOW RESOURCED SETTING



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# IMPLICATIONS OF FINDINGS

- Need to support current practices:
  - For those within the system
  - For those using the system
- Bridge between traditional and modern practices by negotiating
  - Infrastructure challenges (broadband, wi-fi, power)
  - Human Resource challenges (MD, RN, VHT)
  - Poverty challenges (technology, training)
  - Cultural norms



# CHALLENGES

- Clinical, social, behavioral, and environmental factors profoundly affect health outcomes
- Supporting team work – e.g. diagnosis, handoffs
- May be difficult to use more complex health-related applications, such as treatment decision support tools
- Privacy
- Regulation and certification



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# POTENTIAL & OPPORTUNITIES

- Ability to track and manage conditions in between clinical encounters – key for multiple chronic conditions
- The use of health communications best practices
- Use of social networking to enhance access and communication with health care providers

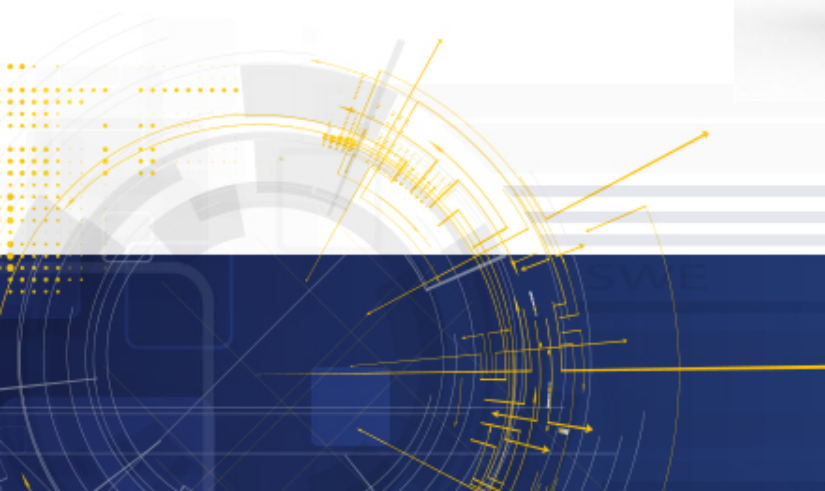


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# QUESTIONS?

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