BPMN A "KNOWLEDGE ARTIFACT"

Emory Fry, MD
Cognitive Medical Systems
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COGNITIVE MEDICAL SYSTEMS

- A San Diego based healthcare company that may or may not use technology to change patient, provider, behavior
- Services: Federal contractor specializing in clinical informatics research, decision support, standards development
- Products: Developing a decision support platform for representing and deploying clinical and administrative knowledge
DECISION SUPPORT AS A PLATFORM

- Numerous efforts to develop health IT platforms
- Common set of characteristics:
  - Data subscription
  - Model and terminology translation
  - Access control
  - Business logic
    - Process execution
    - Production rules
  - Reporting and analysis
  - Communicating ”advice” or results
CORA

CLINICAL OPTIMIZATION & REASONING PLATFORM

Security Service
Terminology Service
Reporting & Analytics Service
Data Service
Decision Support Service
Unified Communication Service

Clinical Knowledge Bases
Guidelines
Position Statements
Calculators
Hospital Policies
Workflow Procedures
Locatizations

Administrative Knowledge Bases

Medical Devices
real-time device data
EMR
Medical history
Medications, I&Os, Labs, etc
Other Data Sources

Reports & Registries
Bedside Workstation
(Companion App)
Attending Inbox
(Mobile)
ACCEPTABLE VS. EXCEPTIONAL CARE

- **Acceptable:** evidence-based care without significant errors of omission/logic/application that advances the health of the patient
- **Exceptional:** evidence-based, individualized care that optimizes an agreed-upon set of goals within a particular healthcare context
SUITABILITY OF CURRENT CAPABILITIES

- Current implementations suitable for "simple" operational or clinical knowledge
- "Simple" defined as well knowledge that can be deconstructed into understood process steps/tasks/logical operations (typically rule-based)
- No assumptions regarding the **number** of elements – only that the problem space and its acceptable solution sets are limited
- Arguably better suited to operational knowledge than clinical knowledge
CHALLENGE: REAL-TIME, PATIENT-SPECIFIC CARE
UTILITY OPTIMIZATION

Current platforms are not good at is optimizing, de-conflicting orthogonal utilities:
- outcomes
- cost
- patient/providers preferences
- regulatory mandates
- administrative policies
SUPPORTING DIFFERENT TYPES OF REASONING

- Current platforms are not good at is optimizing, de-conflicting, prioritizing heterogeneous type of logic
- Neonatal Use Case: ”Come quick – my baby isn’t doing well”
  - Data aggregation
  - Classification / pattern
  - Reasoning with uncertainty
  - Hypothesis generation
  - Plan optimization
SUPPORTING DEGREES OF FREEDOM

- Current platforms are not good at supporting increasing degrees of freedom
  - $n$ is severely restricted = policy or procedure
  - $n$ is restricted = guideline, care pathway
  - $n$ is loosely constrained = position statement, clinical goals, general guidance
- Acceptability of solution critically dependent on whether the system create cognitive dissonance
STATE OF AFFAIRS ASSESSMENT

- Systems today can address the who, what, when and how of limited, well-define, imperative knowledge representations
- We are in our infancy of understanding how to optimize the orthogonal concerns that are critical to exemplary care
- We have yet to fully understand the patterns of decision making or the logical operations in clinical care
- We have yet to fully understand what technologies are best applied to what solution set
QUESTIONS?