Reactor Panel:

EMR Integration of Genomic Results and Automated Decision Support

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emerge network
ELECTRONIC MEDICAL RECORDS & GENOMICS

EMR Integration of Genomic Results and Automated Decision Support

- **Questions:**
  - What new or enhanced **data standards** are needed to enable electronic medical record (EMR) integration and automated decision support?
  - How can eMERGE make a **knowledge representation** that can support multiple levels of health literacy through tools (e.g., SMART apps) so that the same knowledge contained in the system will be available and useable by a genomic medicine specialist, primary care provider, patients, and their families?
  - What tools can eMERGE develop to ensure that patients and providers are **kept up-to-date** as the interpretation of genomic findings rapidly evolves?

Inputs to Framework for Discussion/Reactions

IOM Report Building Safer Systems for Better Care

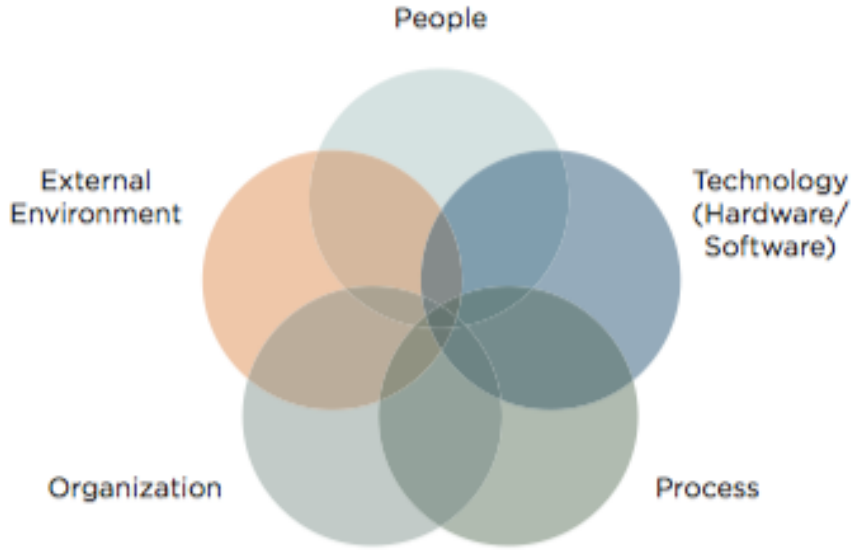

FIGURE 3-1
Sociotechnical system underlying health IT-related adverse events.

SOURCE: Adapted from Harrington et al. (2010), Sittig and Singh (2010), and Walker et al. (2008).

Recent Review of CDS

Clinical Decision Support: a 25 Year Retrospective and a 25 Year Vision

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Six dimensions of CDS: data, knowledge, inference, architecture and technology, implementation and integration, and users

Comments/Reactions

- data,
  - Requisite data standards
  - Patient preferences data
  - Genomic test result data
  - Clinical outcomes data
- knowledge,
  - representation of complex hierarchical knowledge objects (rules, value sets, terminologies, ontologies)
  - Knowledge management (metadata, provenance)
  - Feedback loops – learning
  - Health literacy considerations (reports; providers and patients)
- inference,
  - Certainty management, confidence limits
  - Decision-theoretic concerns re patient preferences
- architecture and technology,
  - Externalized CDS services (e.g. FHIR plan definitions, SMArt apps)
  - Computable knowledge object I/O
  - Messaging std(s) (FHIR profiles; 2.X syntax)
- implementation and integration,
  - Workflow domain ontologies, setting specific factors
  - Provider facing v. Patient-facing CDS
- users,
  - Human-computer interaction(s) – static v. dynamic
  - Patient and provider preference models?

Summary assessment

- Data – move toward standards where feasible / possible
  - FHIR, CIMI, IHMI… OMOP
  - Work to develop standard transforms, semantic mapping
- Knowledge – embrace standards that are emerging
  - CQL
  - Work towards standardizing all the component parts of the K stack – recognize the hierarchical nature of the knowledge stack (and various relevant knowledge sources)
    - Controlled terminologies, ontologies, value sets
  - Recognize the potential of networked knowledge
    - Both in Authoring CDS artifacts
    - Executing CDS artifacts
- Recognize the need for implementation at scale – across multple instances of an EHR and multiple EHRs – a ‘system of insight’
  - Patients have multiple sites of care across time and space
  - Implement knowledge assets at scale to promote reusability
- Work toward standardized CDS PGx presentation layer / applications / web services
- Recognize 90% of healthcare systems will NOT build it… will want to buy it

Research questions for CDS PGx

- Method of capturing and representing patient preferences and utilities
- Transitive semantic closure on data mapping
  - -> more automatic semantic mapping
- Contextual factors / setting specific factors influence on PGx CDS
- Evaluation – impact on patient and provider KAP (knowledge, attitudes, and practice)

Next steps

- Consider knowledge engineering / knowledge management infrastructure at scale
  - Buillding upon success with PheKB, CDS_KB, etc.
  - Promote open sourcing core knowledge assetts
- Conduct more CDS PGx pilots / demonstrations
  - With build in evalution component
  - SMArt on FHIR, Web services, web apps
  - At scale across multiple EMRs