Jason: a man with one sandal

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The JASON Report

- Sponsored by AHRQ in collaboration with ONC and the Robert Wood Johnson Foundation
- JASON is an independent scientific group that provides consulting services to the US government on matters of science and technology. It was established in 1959.

A Robust Health Data Infrastructure

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JASON Study Charge

• How can complex data handling techniques and Internet-based technologies be applied to health care to promote the development of real-time integrated datasets at a scale seen in other industries?

• How can the various users of health data in the clinical research and public health communities be presented with tailored and highly specific data views in near real time based on routinely collected health data?

• As health data grows from megabits to gigabits per individual, what fine-grained analytics should be made available to patients and health care providers to guide health care decisions?

• What fundamental data management capabilities are needed to support potential future requirements in an open-ended manner?

• What are the national security consequences of not addressing comprehensive health data opportunities in clinical research and public health?
The JASON Report Key Points

- The US has not achieved meaningful interoperability “in any practical sense” for clinical care, research, or patient access
- The lack of an architecture supporting standardized APIs and EHR vendor technology and business practices are impeding progress
- Progress requires an urgent focus on creating a “unifying software architecture” to “migrate” data from these legacy systems to a new centrally orchestrated architecture
- This architecture would be based on the use of “public” APIs for access to clinical documents and discrete data from EHRs coupled with increasing consumer control of data
Office-Based Physicians’ Electronic Health Information Exchange (HIE) With Other Providers, By Organizational Affiliation, 2013.

Furukawa M F et al. Health Aff, 2014
JASON Architecture Core Principles

- The patient owns his or her data
- The patient participates in the management of his or her data
- Be agnostic as to the type, scale, platform, and storage location of the data
- Use published APIs and open standards, interfaces and protocols
- Encrypt data at rest and in transit
- Separate key management from data management
- Include metadata, context, and provenance of the data
- Represent the data as atomic data with associated metadata
- Follow the robustness principle: “Be liberal in what you accept, and conservative in what you send.”
- Provides a migration path from legacy EHR systems
JASON Example Architecture

- User Interface Apps
- Middleware Apps
- Semantics and Language Translation
- Search and Index Functionality
- “chart/record” data
- “atomic” data w/ metadata
- Crypto Layer
- Data Storage (logical)
- Data Transport (logical)
- Data Storage (physical)
- Data Transport (physical)

- Stovepipe Legacy Systems
- Published API
- Identity, Authentication, Authorization
- Patient Privacy Bundle Management
- Key and Certificate Management
JASON Example Architecture
(With proposed mapping to standards)

User Interface Apps
Middleware Apps
Semantics and Language Translation
FHIR Profiles
Search and Index Functionality

“chart/record”
data CCDA/XDS
“atomic” data & metadata FHIR

Crypto Layer (leverage existing approaches)

Data Storage (logical)
Data Transport (logical)

Data Storage (physical)
Data Transport (physical)
Are Meaningful Use Stage 2 certified EHRs ready for interoperability? Findings from the SMART C-CDA Collaborative

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ABSTRACT
Background and objective Upgrades to electronic health record (EHR) systems scheduled to be introduced in the USA in 2014 will advance document interoperability between care providers. Specifically, the second stage of the federal incentive program for EHR adoption, known as Meaningful Use, requires use of the Consolidated Clinical Document Architecture (C-CDA) for document exchange. In an effort to examine and improve C-CDA based exchange, the SMART (Substitutable Medical Applications and Reusable Technology) C-CDA Collaborative brought together a group of certified EHR and other health information technology vendors.

In our study, we apply the operational definition of semantic interoperability to assess structured data within Consolidated Clinical Document Architecture (C-CDA) documents, which certified electronic health record (EHR) systems must produce to satisfy federal regulation of EHR adoption. We study core variation in document samples to examine if reliable semantic interoperability is possible.

EHR adoption and Meaningful Use
EHR use in the USA has risen rapidly since 2009 with certified EHRs now used by 78% of office-based physicians, among the top 500 academic hospitals.3,4
Summary of CCDA Challenges

• Implementation variation across EHR vendors
• Current standards and implementation guides allow too much variability
• Summary documents is left up to EHR vendor discretion, too much information shared
• Certification focuses on the creation and transport of CCDA, not intake
  – Testing terminology conformance
  – Variation in allergy handling
  – CCDA does not handle data versioning
Real Barriers to Interoperability

- Maintaining privacy
- Misaligned incentives
- Competing priorities
- “Same old problems”
  - Semantic variations
  - Patient, provider and location matching
- Missing events model
Unleash the power of mediocrity.