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<p><b>Interoperability Between Academic Health Center Research Informatics Systems: Awakening Investigators to the Possibilities</b></p>	

<p><b>The Interoperability Challenge</b></p>	 
<ul style="list-style-type: none"><li>● Technical barriers<ul style="list-style-type: none"><li>● Electronic Babel, within &amp; outside of institution</li><li>● Compliance with security, privacy, &amp; subject protection regulations</li></ul></li><li>● Organizational barriers<ul style="list-style-type: none"><li>● Organizational Silos</li><li>● Prisoner's Dilemma</li><li>● Difficulty of distance-based team building</li></ul></li><li>● Psychological barriers<ul style="list-style-type: none"><li>● Inability to envision personal role in 'big science' initiatives</li><li>● <b><u>Belief it is too difficult or expensive</u></b></li></ul></li></ul>	

## A Little Demonstration



- Let's imagine a collaborative cardiology study between Duke & Michigan
  - Observation of interrelationship between familial hypercholesterolemia and myocardial infarcts
  - Two different clinical trials underway, one at each institution, with a lot of common data points

## A Little Demonstration



- No central data coordinating center needed—peer-to-peer sharing of data between heterogeneous systems
- A real life study would not require a data entry form- data would be transmitted when captured at the institution

## A Little Demonstration



- Standards-based protocol stack
  - Transport protocol: TCP/IP
  - Session protocol: Web Services (SOAP/WSDL)
  - Presentation protocol: HL7v3 Clinical Document Architecture
  - Datum encoding protocol: SNOMED-CT

## A Little Demonstration



- Duke-to-UMHS data interchange mediated by Michigan's automated Honest Broker
  - PHI protection
  - Master patient index
  - Routing
  - Workflow support
- Data management systems are different
  - Michigan uses Velos
  - Duke uses in-house developed CTMS

## On to the demo...



### Duke data entry page:

<http://demo.dcrimich.dcri.duke.edu/cgi-bin/client-form-controller-duke.py>

### Michigan data entry page:

<https://cric.cacr.med.umich.edu/cgi-bin/client-form-controller-umich.py>

### Velos CTMS:

<https://silas.msis.med.umich.edu/eres/jsp/ereslogin.jsp>



## Level of Effort Required (for this demo)



- ~16 hours preparing data interchange concept document
- 3 meetings @ 2 hours each refining concept & discussing strategy
  - Max ~4 faculty & ~8 staff – ~16 faculty hours & ~40 staff hours
- Faculty develop scenario 2 hours
- Design & document message data structures & encodings
  - Re-using existing message (80-90%)
  - ~4 hours of additional effort
- Design, coding, and testing software
  - Pre-existing code foundation provides >50% of code
  - ~40 Hours MICHHR
  - ~15 hours DCRI
- Developing presentation 8 hours

## Level of Effort Required (real-life collaborations)



- Major real-life efforts are not shown here
  - Developing the project concept
  - Getting funded
  - Navigating institutional politics & multiple IRB applications
- Up-front infrastructure investment frees investigator to do what s/he does best
- Dependencies that must be met to achieve economies of scale:
  - Enterprise-level centralized research data processing and communications systems
  - Mutual agreement on standards-based comm protocols, messages, and common data elements
  - Establish “boilerplate” data interchange agreements between institutions

## Discussion...

