Importance of NIST Laboratory Research Programs to Support Healthcare IT Standards

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The Health IT Domain

- The Health IT Domain is a big place...
- Challenges include:
  - Interoperability
  - Security
  - Emerging technologies
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NIST research:
- Standards Testing Infrastructure Project

NIST
National Institute of Standards and Technology
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NIST research:
- Standards and Guidelines
- Identity Management Program
- Authentication Research
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NIST research:
- Medical Device Communications Project
- Pervasive IT Program (sensors & implants)
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NIST research:
- Standards Testing Infrastructure Project
NIST research in testing focuses on ‘effective’ testing
  ◦ Definition, delivery, real-world context, coverage, etc.
NIST conformance & interoperability tests & test tools are used by various industry domains
  ◦ Correctness
  ◦ Coverage; alignment with real-world use
  ◦ Alignment & feedback to standards processes
We are often asked to update our tools to suit a new testing paradigm, constrained/extended standard, etc.
NIST solution: move towards collaborative testing framework
Requirements for a Health IT Testing Infrastructure

- Perform conformance and interoperability testing for healthcare information systems
- Support self-test to third-party testing models
- Support multiple healthcare messaging, data, infrastructure, and security standards
- Support various tool delivery mechanisms
- Provide Flexibility, Modularity, Scalability, and Extensibility
NIST Testing Infrastructure: A Framework for Building Test Systems

- Supports use of test tools from many sources (green/blue boxes)
- NIST provides the ‘glue’ definitions (brown boxes)
- NIST develops reusable purple boxes
- Research in scalability, coverage, semantic info testing, etc.
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National Institute of Standards and Technology
NIST Standards and Guidelines Support Health IT Security

NIST Standards and Guidelines

- Access Control
- Audit Logging
- E-Authentication
- Encryption
- Media Sanitization
- Secure Communications
- Security Assessments
- Risk Management

Health Information Technology Security
Identity Management & Authentication

- Who is Jeff really?
  - Is the person (really) Jeff?
  - Is the user Jeff?
  - Do I trust my partner organization who says it is Jeff?

- NIST Special Publication 800–63 “Electronic Authentication Guideline”
  - Considered by HITSP for trust model
  - Basis of trust models for federal agencies

- ITL Identity Management Program
  - Develops models, technologies & input to standards
  - Explores issues as barriers to trust
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Research on semantic interoperability of information
  ◦ Modeling & representation
  ◦ Determination (business use & technical definition)

Wireless networks & sensor technologies
  ◦ Performance, impedance, security
  ◦ Measurement definition

In medical devices/sensors/implants
  ◦ Semantic interoperability: vital sign data, device configuration, status data
  ◦ Wireless network/RF signal
    • Signal strength, interference among devices, security of device
    • Input to IEEE 802.15 Task Group 6 (Body Area Networks)
Operating Scenarios and the Corresponding Channel Models
Sample Result
(RSS Upper Stomach Implant)
Summary

- NIST research efforts contribute to the documentary standards necessary to achieve the healthcare vision in the U.S.
  - Interoperability – exchange & understanding of information
  - Security – confidentiality and privacy needs
  - Future Healthcare technologies & environments