. . .working with industry to develop and apply technology, measurements and standards

NIST's Activities in Health Information Technology: Past, Present, and Future

Bettijoyce Lide

bettijoyce.lide@nist.gov

National Institute of Standards and Technology (NIST)

Gaithersburg, Maryland

June 18, 2009

The Importance of Health IT

- The U.S. healthcare industry lacks a comprehensive nationwide information infrastructure.
  - A standards-based, secure, interoperable nationwide healthcare infrastructure is needed.
- From both economic and quality of life perspectives, this is of critical importance to individual citizens and to our nation.
  - Healthcare spending is $1 of every $6 spent in the U.S.;
  - Up to 98,000 people die annually due to medical errors;
  - The U.S. ranks 24th in life expectancy though we spend more money per capita ($5.7K) per year on healthcare than any other country;
  - Healthcare costs put U.S. industry at a global disadvantage.
- "…lives can be saved, outcomes of care improved, and costs reduced … through the appropriate use of information technology." (Healthcare Information and Management Systems Society (HIMSS) Call for Action, Dec 2008.)
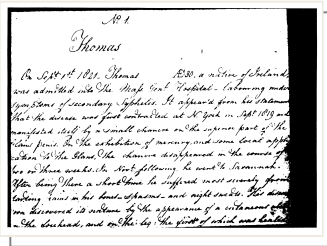
The first medical record from Mass General

Today's environment

The vision of the infrastructure

National Institute of
Standards and Technology

NIST

National Priorities

- Administration Priorities
  - "Use health information technology to lower the cost of health care. Invest $10 billion a year over the next five years to move the U.S. health care system to broad adoption of standards-based electronic health information systems, including electronic health records." – whitehouse.gov
  - "Our health care is too costly" and we will "wield technology's wonders to raise health care's quality and lower its cost." – President Obama's inaugural address
  - "Obama, who has advocated for healthcare reform based on the use of electronic health records (EHRs), […], said his administration will "make the immediate investments necessary to ensure that within five years all of America's medical records are computerized." – *Telemedicine and e-Health News Alerts*, Liebert Inc.
  - At a White House summit on healthcare reform, the President referred to health IT as "the low hanging fruit." – www.ihealthbeat.org/Articles/2009/3/6/

- Congressional Initiatives
  - Numerous Health IT bills in the past several sessions of Congress;
  - The American Recovery and Reinvestment Act (ARRA), Feb 2009;

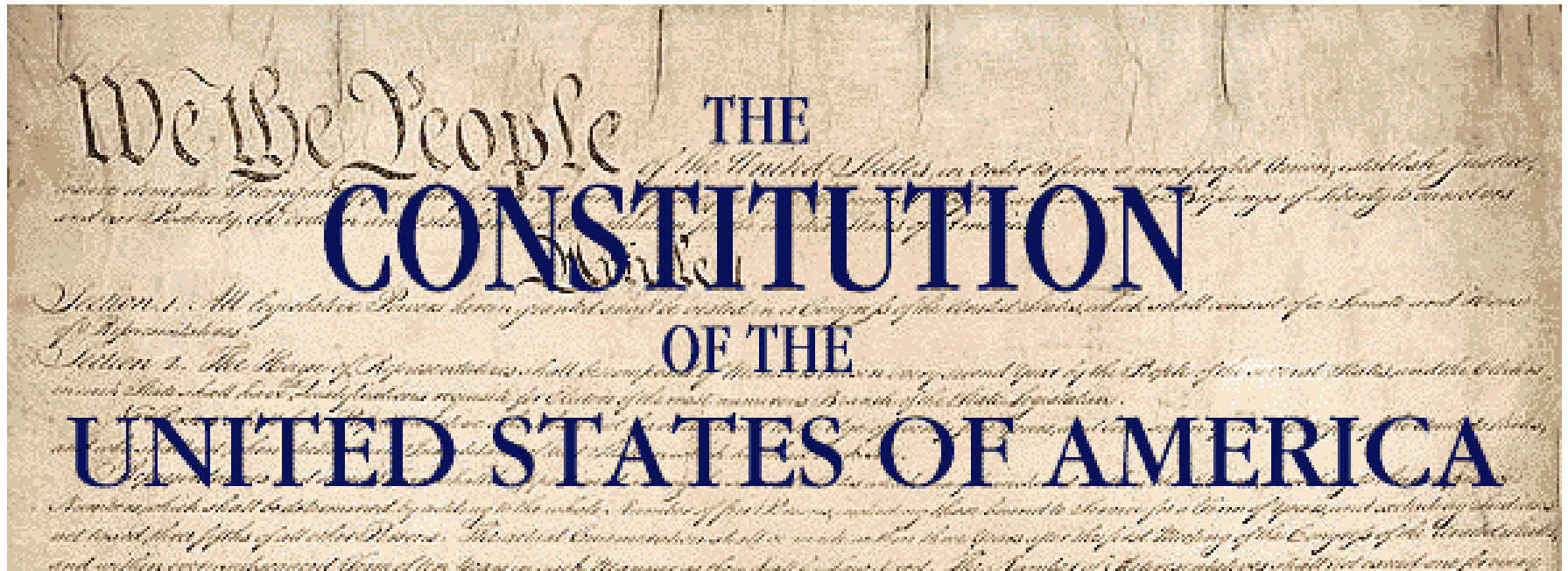# NIST's Mission

To promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology …

… in ways that enhance economic security and improve our quality of life.

Constitutional Authority

Article I, Section 8: The Congress shall have the power to … *coin money, regulate the value thereof, and of foreign coin, and fix the standard of weights and measures*

NBS Established in 1901

"It is therefore the unanimous opinion of your committee that no more essential aid could be given to **manufacturing, commerce**, the makers of scientific apparatus, the **scientific work** of the Government, of schools, colleges, and universities than by the establishment of the institution proposed in this bill."

House Committee on Coinage, Weights and Measures,
May 3, 1900,
on the establishment of the
National Bureau of Standards
(now NIST)

THE EVENING STAR, MONDAY, MARCH 11, 1901

CORRECT MEASURES

Function of the New Bureau of Standards.

LABORATORY TO BE ERECTED

Prof. Stratton, the Director, Details Need of Establishment.

A HANDICAP REMOVED

A new bureau of the government, authorized by the last Congress, will be established in this city in the near future and will give employment to a number of persons. It is to be known as the national bureau of standards and is to be under the control of the Treasury Department. A separate building for a laboratory, to cost not to exceed $250,000, is to be erected on a site to be purchased at a cost of $25,000.

Mr. Samuel W. Stratton of Chicago has been appointed by the President to be chief of the bureau at an annual salary of $5,000. Prof. Stratton is to have the following assistants, to be appointed by the Secretary of the Treasury: One physicist, at annual salary of $3,500; one chemist, two assistant physicists or chemists at an annual salary of $2,200; one assistant, at $1,800; one laboratory assistant, at $1,200; one secretary, at $2,000; one messenger, at $720.

Director Stratton.

Early Driver for Standards

1904
- **Out-of-town fire companies arriving at a Baltimore fire cannot couple their hoses to the hydrants. 1526 buildings razed.**

1905
- **National Fire Protection Association adopted NBS-developed national hose coupling standard**

Train Derailments …
Poor Quality Control

1912

41,578 train derailments in the previous decade led to NBS measurement and test program at the request of the Interstate Commerce Commission

Why NIST? Why Now?

- NIST is successful in applying emerging IT standards into national priority domains.

- NIST has built a global reputation in the health IT SDO community for its standards and testing leadership.

- NIST efforts leverage collaborations with industry and other federal efforts.

- NIST's roles are articulated in the Federal Health IT Strategic Plan 2008 – 2012.
  - Interagency agreement with HHS/ONC since 2005.

- Now is the time to build on the momentum of public-private collaborations.

Goals

- Electronic health records (EHRs) and a nationwide health information network (NHIN) by 2014 that will

- Improve the quality and accessibility and reduce costs of healthcare, and

- Accelerate adoption.

- NIST/ITL pursues critical measurements, standards, and technology toward these goals. Specific activities include:
  - Accelerating standards development and harmonization;
  - Developing a conformance testing infrastructure;
  - Establishing robust certification criteria;
  - Expanding R&D and deployment of security protocols.

- To enable an emerging health IT network that is correct, complete, testable, and secure.

Project: Standards Development and Harmonization

- NIST provides technical expertise to accelerate industry-led, consensus-based standards development and harmonization.

- Technical accomplishments include:
  - Active participation in ANSI's Health Information Technology Panel (HITSP) dedicated to healthcare standards;
  - Defining conformance for healthcare messaging standards, for example, HL7 messages and Electronic Health Record and Personal Health Record Functional Model standards;
  - Development of standard reference software XDS, Cross Document Enterprise Sharing Profile, to allow doctors to securely share health information: with the patient's consent; wherever the records may be; whatever the format;
    - Selected by HITSP, was recognized by HHS, and incorporated into several vendor prototypes for the Nationwide Health Information Network (NHIN).

Project: Conformance Testing

- NIST develops conformance test tools for fully integrated health IT systems, to assure that the standards are implemented consistently, for use by developers and implementers alike.

- Technical accomplishments include:
  - Leading the development of an integrated virtual testbed that incorporates NIST-developed tools to provide interoperability testing of standards of standards-based health systems;
  - Cochair for the NHIN Collaborative testing strategy and working group;
    - Hosted testing event (November 2008), in which approximately two dozen organizations exchanged healthcare information
  - NIST test tools served as the basis for industry Connectathon testing (February 2009) for over 140 vendors and over 400 systems;
  - Leads the testing effort within IEEE Medical Device communication committee and IHE Patient Care Domain;
  - Developed the Clinical Document Validation Tool for testing the correct generation of 20 different types of clinical documents.

Project: Security

- NIST provides security specifications for enabling communicating parties to transmit health information securely and to ensure privacy and confidentiality.

- Technical accomplishments include:
  - Development of a harmonized set of security concepts for use by architecture prototypes, Health Information Exchanges, etc.;
  - Participated in the development of the HITSP Security and Privacy constructs;
    - Prime author of the secure communication construct
    - Collaborated on the HITSP TN900 Security and Privacy CORE Document
  - Issued an implementation resource guide for covered entities implementing the HIPAA Security Rule;
  - Cosponsors, with the Centers for Medicare and Medicaid Services, workshops to discuss challenges, tips, techniques and issues surrounding implementing, adhering to, and auditing HIPAA Security Rule requirements.
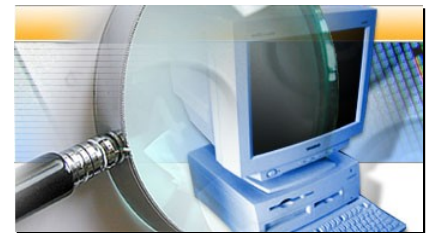
NIST Responsibilities in the ARRA

- The American Recovery and Reinvestment Act (ARRA) substantiates NIST's current roles in health IT; the additional funding provides an opportunity to increase our activities in health IT standards development and harmonization and testing.
  - Specifically, the funding is "… for continued work on advancing health care information enterprise integration …"

- The ARRA also directs NIST to:
  - Consult on updating the Federal Health IT Strategic Plan;
  - Consult on voluntary certification programs;
  - Consult on assistance on health IT implementation;
  - Provide pilot testing of standards and implementation specifications, as requested; and
  - Establish a grants program for health enterprise integration centers..

Moving Forward …

- Future opportunities include:
  - expanding the health IT infrastructure to other environments, such as home health care;
  - applying NIST-wide competencies to meet future clinical needs, such as personalized medicine, and cognitive reasoning;
  - advancing usability and accessibility of health information technologies; and
  - Researching standards and testing needs for evolving technologies.

Questions?

"Hang in there, we are trying to find your chart."