Introduction to Biomedical and Health Informatics (3)

What is Biomedical & Health Informatics?
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From “dot-com” to “dot-gov” (Kleinke, 2007)

• Bush Administration
  – Recognized value of health information technology (HIT)
  – Actions: Office of the National Coordinator for Health IT (ONC), American Health Information Community (AHIC), etc.

• Obama Administration
  – The American Recovery & Reinvestment Act (ARRA) of 2009 provided incentives for “meaningful use” of electronic health records (EHRs) and the infrastructure to achieve it through provisions of the Health Information Technology for Economic and Clinical Health (HITECH) Act (Blumenthal, 2011; Blumenthal, 2011)
The Bush Administration started promotion of the field

- President Bush State of the Union – mentioned every year from 2004 to 2008
  - January, 2004 – “Computerizing health records [can] reduce costs, improve care, and lower the risk of medical mistakes.”
  - January, 2007 – “We need to reduce costs and medical errors with better information technology.”
- Bush also set goal of electronic health records (EHRs) for half of all Americans by 2014 (White House, 2005)

The Obama Administration upped the ante

“To improve the quality of our health care while lowering its cost, we will make the immediate investments necessary to ensure that within five years, all of America’s medical records are computerized ... It just won’t save billions of dollars and thousands of jobs – it will save lives.”

January, 2009
Other US government agencies and entities involved in health IT

  - NLM leader in funding research and training in informatics
  - Reaffirmed with appointment of new leader and incorporation of NIH data science activities (Brennan, 2016; Brennan, 2016)
- Agency for Healthcare Research & Quality (AHRQ, [www.ahrq.gov](http://www.ahrq.gov))
  - Funds research and policy development, produces health IT information resources
- Centers for Medicare and Medicaid Services (CMS, [www.cms.hhs.gov](http://www.cms.hhs.gov))
  - Payor for Medicare and Medicaid, including HITECH incentives
- National Committee for Vital & Health Statistics (NCVHS, [www.ncvhs.hhs.gov](http://www.ncvhs.hhs.gov))
  - Government advisory board, including issues related to health IT

The Obama Administration led us into a new “ARRA” of health IT

- Viewed by some as a “down payment” on healthcare reform
- ARRA included the HITECH Act
  - Incentives for “meaningful use” of EHRs by physicians and hospitals starting in 2011 (up to $27B)
  - Direct grants administered by federal agencies ($2B)
- Also HIT-related provisions in other areas of ARRA, e.g.,
  - Comparative effectiveness research
  - NIH and other research funding
  - Broadband and other infrastructure funding
ONC enhancements during Obama Administration

- Appointed Dr. David Blumenthal as third National Coordinator for HIT
  - A well-known Harvard health policy leader with informatics research credentials
  - Led initial implementation of HITECH Act (Blumenthal, 2011; Blumenthal, 2011)
  - Followed by subsequent others
  - Current strategic plan (2015)
- “Putting the I in Health IT” – www.healthit.gov

What is “meaningful use?”

- Concept introduced in the 2007-2008 Congress, HR 6898: Health-e Information Technology Act of 2008 but not passed at that time by Stark (2011)
- It is not enough to use EHRs but must use them in meaningful ways to achieve goals of healthcare system
- Essentially focused on
  - Achieving criteria tied to five goals for healthcare
  - EHRs must be certified, able to exchange information, and able to report on clinical quality measures
HITECH infrastructure

- [http://www.healthit.gov/policy-researchers-implenters/health-it-adoption-programs](http://www.healthit.gov/policy-researchers-implenters/health-it-adoption-programs)
- HIT Regional Extension Centers (RECs) (Maxson, 2010)
- State-based health information exchange (HIE)
- Workforce development (Hersh, 2014)
  - Including development of curricular materials updated in 2017 – [https://www.healthit.gov/providers-professionals/health-it-curriculum-resources-educators](https://www.healthit.gov/providers-professionals/health-it-curriculum-resources-educators)
- Strategic Health IT Advanced Research Projects (SHARP) Program
  - Four collaborative research centers; most persevering was Substitutable Medical Applications, Reusable Technologies (SMART) project (Mandl, 2012)
- Beacon Program
  - Funding for advanced demonstration projects (Maxson, 2010; McKethan, 2011)

HITECH future

- Recent retrospectives show mixed interpretations of results
  - Former ONC directors note success at “digitizing” healthcare system (Washington, 2017)
  - Others note systems implemented with problems in usability and interoperability (Halamka, 2017)
- Future unclear, especially with current more conservative US political leadership
There is still plenty of room for free-marketeers

- HIT industry estimated to reach
  - $280B overall globally by 2022, with 16% annual growth rate (Markets & Markets, 2017)
  - $91B for mobile solutions globally by 2022, with 34% annual growth rate (Markets & Markets, 2017)
  - $30B for data analytics globally by 2022, with 27% annual growth rate (Markets & Markets, 2017)
  - $8.0B for artificial intelligence globally by 2022, with 53% annual growth (Markets & Markets, 2017)
- Many investment activities, e.g.,
  - Rock Health – [http://rockhealth.com](http://rockhealth.com)
  - Massachusetts Digital Health Initiative – [http://massdigitalhealth.org](http://massdigitalhealth.org)
  - Cambia Grove – [www.cambiagrove.com](http://www.cambiagrove.com)

HIT is not limited to the United States

- England – NHS Connecting for Health
  - Most ambitious in world but ultimately failed after spending $18 billion for developing nationwide EHRs and HIE (Brennan, 2007; Hayes, 2008; Payne, 2011; NHS, 2011)
  - More recent approaches based on scaled-back goals (Wachter, 2016)
- Denmark
  - Near-universal adoption of EHRs and other technologies (Protti, 2010)
- Canada Health Infoway
  - [http://www.infoway-inforoute.ca/](http://www.infoway-inforoute.ca/)  
- Singapore National EHR (Accenture, 2012)
- Argentina (Quiros, 2009)
- Australia My Health Record
US has been a laggard but is now catching up

(Osborn, 2015)

(Henry, 2016)

Informatics also requires us to address harms and limitations

- IOM HIT safety report documented concerns about dangers (2012)
- Key issues to address are workflow (Carayon, 2010) and usability (Lowry, 2012)
- EHR must move from being a transaction-based application to a platform (Glaser, 2012; Mandl, 2012)
- Has EHR undermined medicine or are we in “transitional chaos” (Rosenbaum, 2015)?