Meaningful Use and All That: Update in Clinical Informatics

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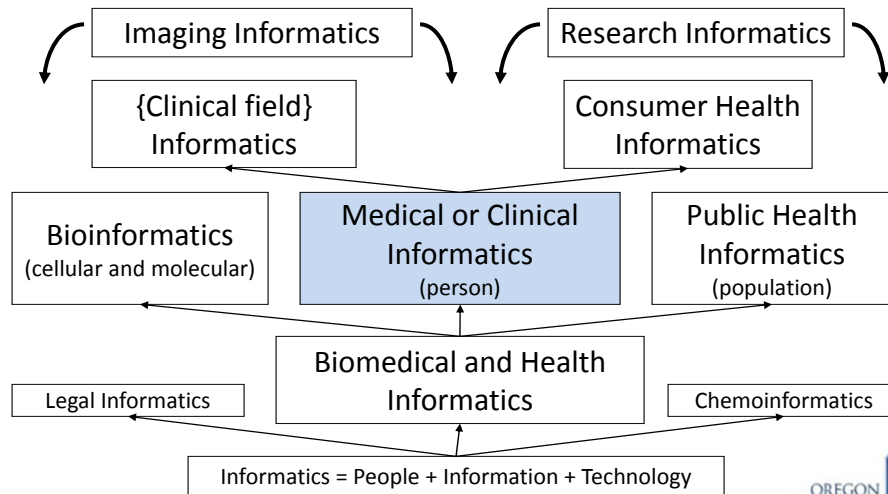Blog: informaticsprofessor.blogspot.com

1

Outline of talk

- Biomedical and health informatics defined
- Meaningful use
- Clinical informatics subspecialty
- Where is the evidence for all this?
- Secondary use of clinical data and clinical research informatics

2

Informatics is science underlying the use of information to improve {x}

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   ↶    │  Imaging Informatics │  ↷  ↷ │ Research Informatics │  ↷
        └─────────────────────┘        └─────────────────────┘
        ┌─────────────────────┐        ┌─────────────────────┐
        │   {Clinical field}   │        │   Consumer Health    │
        │     Informatics      │        │     Informatics      │
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│    Bioinformatics     │ │  Medical or Clinical  │ │    Public Health     │
│(cellular and molecular)│ │     Informatics       │ │    Informatics       │
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│ Legal Informatics ││                           ││ Chemoinformatics │
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           ┌──────────────────────────────────────────┐
           │ Informatics = People + Information + Technology │
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3   (Hersh, 2009)

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Received a big boost in 2009 with arrival of a new US president

CNN.com

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updated 7:42 a.m. EST, Mon January 12, 2009

Obama's big idea: Digital health records

President-elect Barack Obama, as part of his effort to revive the economy, is proposing a massive effort to modernize health care by making all health records standardized and electronic. The government estimates about 212,000 jobs could be created by this program, CNNMoney reports. full story

"To lower health care cost, cut medical errors, and improve care, **we'll computerize the nation's health records in five years,** *saving billions of dollars in health care costs and countless lives."*

First Weekly Address
Saturday, January 24, 2009

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Leading the US to enter a new "ARRA"

- Health Information Technology for Economic and Clinical Health (HITECH) Act of the American Recovery and Reinvestment Act (ARRA) (Blumenthal, 2010)
  - Incentives for electronic health record (EHR) adoption by physicians and hospitals (up to $27B)
  - Direct grants administered by federal agencies ($2B)
- Other provisions in other areas of ARRA, e.g.,
  - Comparative effectiveness research
  - NIH and other research funding
  - Broadband and other infrastructure funding

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What is "meaningful use" of an EHR (Blumenthal, 2010; Stark, 2011)?

- Driven by five underlying goals for healthcare system
  - Improving quality, safety and efficiency
  - Engaging patients in their care
  - Increasing coordination of care
  - Improving the health status of the population
  - Ensuring privacy and security
- Consists of three requirements – use of certified EHR technology
  - In a meaningful manner
  - Connected for health information exchange (HIE)
  - To submit information on clinical quality measures

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Implemented in three stages

2009   **2011**   **2013**   **2015**

HIT-Enabled Health Reform

Meaningful Use Criteria

HITECH Policies

Stage 1 Meaningful Use Criteria (**Capture/share data**)

Stage 2 Meaningful Use Criteria (**Advanced care processes with decision support**)

Stage 3 Meaningful Use Criteria (**Improved Outcomes**)

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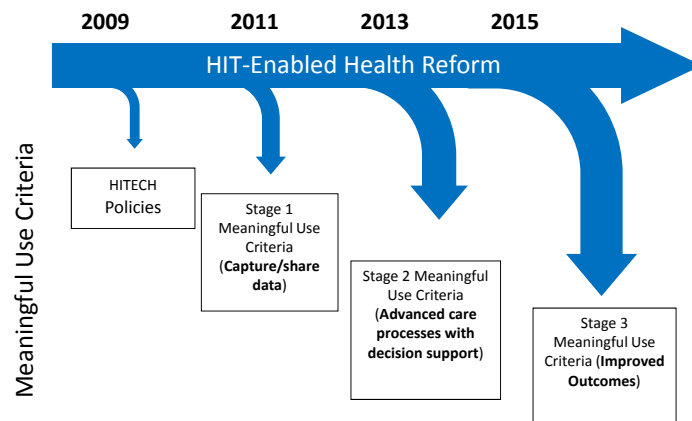
Implementation of MU

- Implemented through Medicare or Medicaid reimbursement to
  - Eligible professionals (EPs)
    - $44-63K (differs based on Medicare vs. Medicaid)
    - Must achieve 15 core and 5 of 10 menu objectives (one in public health)
  - Eligible hospitals (EHs)
    - $2-9M (based on size as measured by number of discharges)
    - Must achieve 14 core and 5 of 10 menu objectives (one in public health)

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Stage 1 core criteria (14 EH, 15 EP)

Objective	Measure
Core set of objectives to be achieved by all eligible professionals, hospitals, and critical access hospitals to qualify for incentive payments	
Record patient demographics (sex, race, ethnicity, date of birth, preferred language, and in the case of hospitals, date and preliminary cause in the event of death)	Over 50% of patients' demographic data recorded as structured data
Record vital signs and chart changes (height, weight, blood pressure, body-mass index, growth charts for children)	Over 50% of patients 2 years of age or older have height, weight, and blood pressure recorded as structured data
Maintain up-to-date problem list of current and active diagnoses	Over 80% of patients have at least one entry recorded as structured data
Maintain active medication list	Over 80% of patients have at least one entry recorded as structured data
Maintain active medication allergy list	Over 80% of patients have at least one entry recorded as structured data
Record smoking status for patients 13 years of age or older	Over 50% of patients 13 years of age or older have smoking status recorded as structured data
For individual professionals, provide patients with clinical summaries for each office visit; for hospitals, provide an electronic copy of hospital discharge instructions on request	Clinical summaries provided to patients for over 50% of all office visits within 3 business days; over 50% of all patients who are discharged from the inpatient department or emergency department of an eligible hospital or critical access hospital and who request an electronic copy of their discharge instructions are provided with it
On request, provide patients with an electronic copy of their health information (including diagnostic-test results, problem list, medication lists, medication allergies, and for hospitals, discharge summary and procedures)	Over 50% of requesting patients receive electronic copy within 3 business days
Generate and transmit permissible prescriptions electronically (does not apply to hospitals)	Over 40% are transmitted electronically using certified EHR technology
Computer provider order entry (CPOE) for medication orders	Over 30% of patients with at least one medication in their medication list have at least one medication ordered through CPOE
Implement drug-drug and drug-allergy interaction checks	Functionality is enabled for these checks for the entire reporting period
Implement capability to electronically exchange key clinical information among providers and patient-authorized entities	Perform at least one test of EHR's capacity to electronically exchange information
Implement one clinical decision support rule and ability to track compliance with the rule	One clinical decision support rule implemented
Implement systems to protect privacy and security of patient data in the EHR	Conduct or review a security risk analysis, implement security updates as necessary, and correct identified security deficiencies
Report clinical quality measures to CMS or states	For 2011, provide aggregate numerator and denominator through attestation; for 2012, electronically submit measures

Stage 1 menu criteria (5 of 10)

Objective	Measure
Eligible professionals, hospitals, and critical access hospitals may select any five choices from the menu set	
Implement drug formulary checks	Drug formulary check system is implemented and has access to at least one internal or external drug formulary for the entire reporting period
Incorporate clinical laboratory test results into EHRs as structured data	Over 40% of clinical laboratory test results whose results are in positive/negative or numerical format are incorporated into EHRs as structured data
Generate lists of patients by specific conditions to use for quality improvement, reduction of disparities, research, or outreach	Generate at least one listing of patients with a specific condition
Use EHR technology to identify patient-specific education resources and provide those to the patient as appropriate	Over 10% of patients are provided patient-specific education resources
Perform medication reconciliation between care settings	Medication reconciliation is performed for over 50% of transitions of care
Provide summary of care record for patients referred or transitioned to another provider or setting	Summary of care record is provided for over 50% of patient transitions or referrals
Submit electronic immunization data to immunization registries or immunization information systems	Perform at least one test of data submission and follow-up submission (where registries can accept electronic submissions)
Submit electronic syndromic surveillance data to public health agencies	Perform at least one test of data submission and follow-up submission (where public health agencies can accept electronic data)
Additional choices for hospitals and critical access hospitals	
Record advance directives for patients 65 years of age or older	Over 50% of patients 65 years of age or older have an indication of an advance-directive status recorded
Submit electronic data on reportable laboratory results to public health agencies	Perform at least one test of data submission and follow-up submission (where public health agencies can accept electronic data)
Additional choices for eligible professionals	
Send reminders to patients (per patient preference) for preventive and follow-up care	Over 20% of patients 65 years of age or older or 5 years of age or younger are sent appropriate reminders
Provide patients with timely electronic access to their health information (including laboratory results, problem list, medication lists, medication allergies)	Over 10% of patients are provided electronic access to information within 4 days of its being updated in the EHR

## Quality measures – differ for EP and EH but required for both

- EP (outpatient) – three required or alternate measures plus three of 13 others, e.g.,
  - Hypertension – blood pressure measurement
  - Tobacco use assessment and cessation intervention
  - Adult weight screening and follow-up
- EH (inpatient) – 15 required measures, e.g.,
  - Diabetes: Hemoglobin A1c, low-density lipoprotein, and blood pressure control
  - Influenza immunization for patients > 50 years old
  - Pneumonia vaccination status for older adults
  - Breast cancer screening
  - Colorectal cancer screening

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MU is just one of several challenges

http://www.aha.org/advocacy-issues/hit/mu/overvw-time.shtml
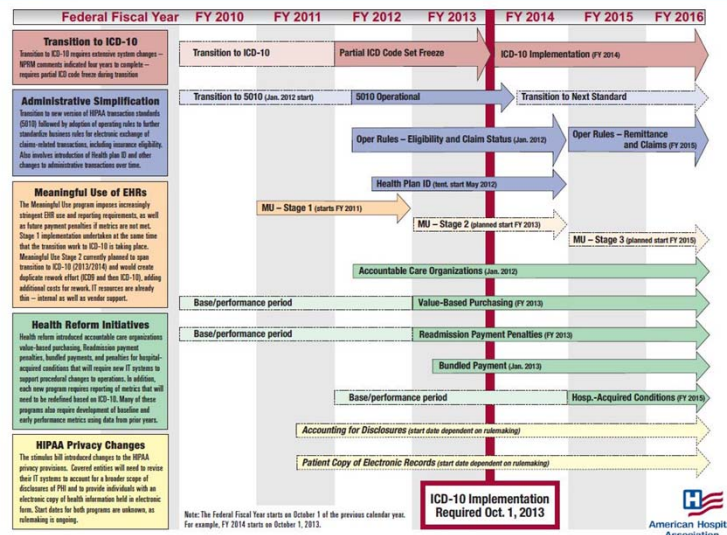
Other HITECH funding initiatives

- HIT Regional Extension Centers (RECs)
  - $677 million to fund 62 RECs that will provide guidance, mainly to small primary care practices and critical access hospitals, in achieving meaningful use (Maxson, 2010)
- State-based health information exchange (HIE)
  - $547 million in grants to states to develop HIE programs (Kuperman, 2010)
- Beacon communities
  - $250 million to fund 17 communities that provide exemplary demonstration of the meaningful use of EHRs (McKethan, 2011)
- Strategic health information advanced research projects (SHARP)
  - $60 million for four collaborative research centers

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ONC Workforce Development Program

Based on estimated need for 51,000 professionals in 12 workforce roles

- Five universities funded to develop curricula for community college programs
- OHSU funded to develop curricula and to serve as National Training & Dissemination Center (NTDC)
- Curriculum available at www.onc-ntdc.info

- Nine universities funded, with emphasis on short-term training using distance learning
- OHSU funded to enroll trainees in existing programs

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Subspecialty of clinical informatics

- Recognition of importance of electronic health records and other IT applications focused on facilitating clinical care, clinical and translational research, quality improvement, etc. (Detmer, 2010)
- Growing number of health care organizations hiring physicians into informatics roles, exemplified by (but not limited to) the Chief Medical Informatics Officer (CMIO), e.g., Tom Yackel
- Approval by ABMS in Sept., 2011 to apply to <u>all</u> specialties (Shortliffe, 2011)
  - Administrative board: American Board of Preventive Medicine (ABPM) with cooperation from American Board of Pathology (ABP)

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Qualifications

- MD degree from LCME-accredited institution
- Current valid license to practice medicine
- ABMS member board certification
- Training pathway, one of
  - ACGME-accredited fellowship
    - None yet; criteria soon
  - Practice pathway (first five years)
    - Minimum of 25% time over 36 months
  - Non-accredited fellowship (first five years)

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Next steps

- ABPM
  - Define explicit criteria for "grandfathering" of training requirements
  - Develop certification exam, with first likely administration in late 2012 or early 2013
- ACGME
  - Define criteria for accredited fellowships
- Institutions like OHSU with existing graduate programs and research fellowships
  - Adapt programs to new requirements

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Where's the evidence?

- What are the problems motivating information-driven solutions?
  - Quality – not as good as it could be (McGlynn, 2003; Schoen, 2009; NCQA, 2010)
  - Safety – errors cause morbidity and mortality; many preventable (Kohn, 2000; Classen, 2011; van den Bos, 2011)
  - Cost – rising costs not sustainable; US spends more but gets less (Angrisano, 2007)
  - Inaccessible information – missing information frequent in primary care (Smith, 2005)

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Growing evidence that information interventions are part of solution

- Systematic reviews (Chaudhry, 2006; Goldzweig, 2009; Buntin, 2011) have identified benefits in a variety of areas, although
    - Quality of many studies could be better
    - 18-25% of studies come from a small number of "health IT leader" institutions

(Buntin, 2011)
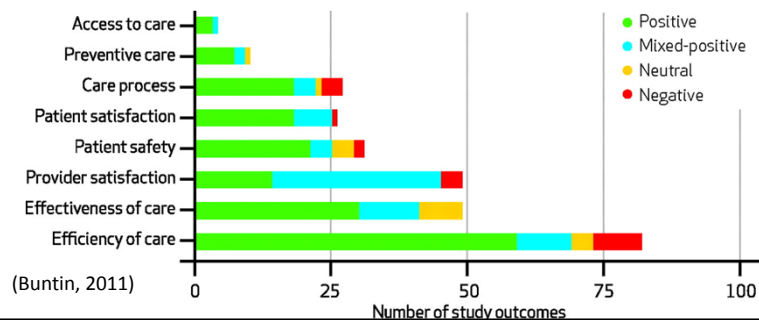
But it has been difficult to get there (Hersh, 2004)

Health Care Information Technology
Progress and Barriers

William Hersh, MD

- Cost
- Technical challenges
- Interoperability
- Privacy and confidentiality
- Workforce

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See also p 2255.

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US has low rates of adoption in inpatient and outpatient settings

- Adoption in the US is low for both outpatient (Hsiao, 2011) and inpatient settings (Jha, 2010) though improving
- By most measures, US is a laggard and could learn from other countries (Schoen, 2009)
- Most other developed countries have undertaken ambitious efforts, e.g.,
  - England (Hayes, 2008)
  - Denmark (Protti, 2010)
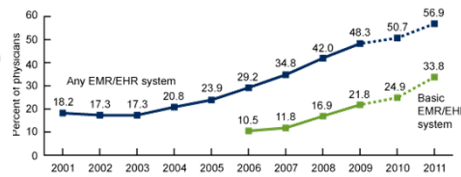
(Hsiao, 2011)
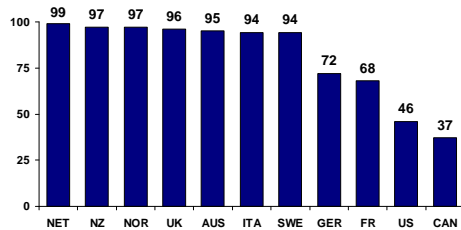
(Schoen, 2009)

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EHRs also allow and align "secondary use" (or "re-use") of clinical data

- Additional uses of EHR data include (Safran, 2007)
  - Clinical and translational research – generating hypotheses and facilitating research
  - Healthcare quality measurement and improvement
  - Personal health records (PHRs)
  - Health information exchange (HIE)
  - Public health surveillance for emerging threats
- One important tool for re-use of clinical data is *natural language processing* (NLP), which has been challenging but is seeing growing successes (Stanfill, 2010; Nadkarni, 2011; Chapman, 2011)
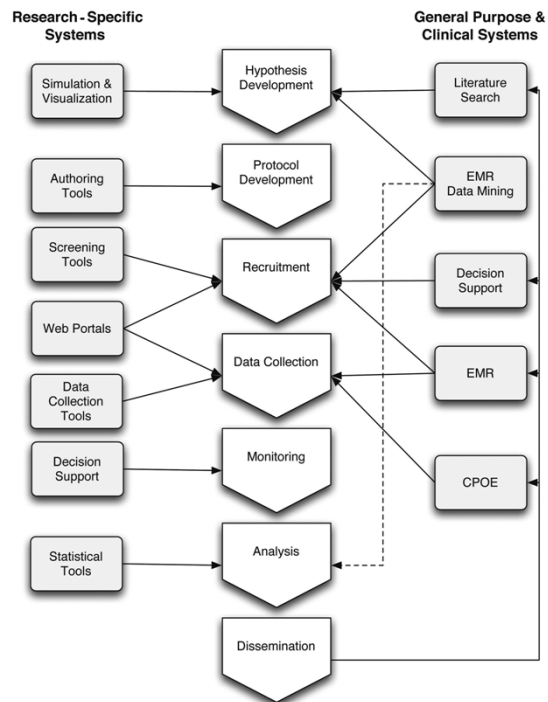
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Clinical research informatics (CRI) helps achieve integration of
• Research systems
• Research activities
• Clinical systems
(Payne, 2005; Embi, 2009)

6.6a

NIH initiative especially critical to CRI

- Clinical & Translational Science Award (CTSA) Program (Zerhouni, 2007)
  - www.ctsacentral.org
  - Goal is to accelerate translation of research into clinical care and community
- Funding 60 centers around country in pursuit of goal
  - OHSU among first 12 centers funded in 2006; renewed in 2011
- Is informatics important? (Bernstam, 2009)
  - All CTSA centers required to have a biomedical informatics component
  - Data point: the word "informatics" appeared 34 times in original Request for Applications (RFA)!

CTSA Clinical & Translational Science Awards ®

6.6a

Motivations for CRI

- Increased digitization of clinical data provides new opportunities for its secondary use (Safran, 2007)
- A growing "cyberinfrastructure" of distributed, standards-based systems for all biomedical research is enabling progress (Buetow, 2005)
- Practice-based research networks can more closely address pertinent research questions and are enabled by informatics (Westfall, 2007; DeVoe, 2011)
- Informatics can enable the "learning health care system" – learning from data collected in care (Eden, 2008), leveraging HITECH investment (Friedman, 2010)

6.6a   25

Opportunities for CRI

- Convergence of technologies in informatics, genomics, imaging, and other areas providing great opportunity, e.g.,
  - Development of registries (Wright, 2009; Backus, 2009; Fleurant, 2011; Navaneethan, 2011) to support research (Dreyer, 2009), converging into national data networks (Maro, 2009)
  - Biorepositories, aka biolibraries, that facilitate retrieval of biological specimens and link to with clinical data (Ginsburg, 2008; Prokosch, 2010)
  - Development of tools that create "honest brokers" (Boyd, 2009) to create "federated" query mechanisms across distributed databases (e.g., SHRINE; Weber, 2009)
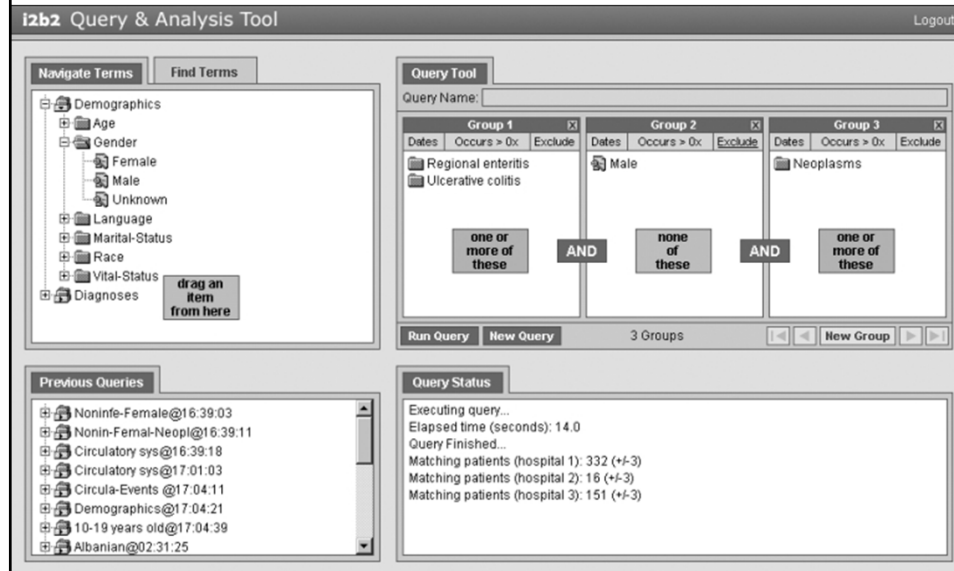
6.6a   26

SHRINE i2b2 query tool (Weber, 2009)

Conclusions

- BMHI is an important science and profession for improving health, healthcare, public health, and biomedical research with data and information
  - Most resources in clinical informatics but plenty of other opportunity in bioinformatics, public health informatics, consumer health informatics, clinical research informatics, imaging informatics, etc.
- The grand experiment of HITECH is going on in the US – results not yet in
- There are many opportunities for practitioners, researchers, and others in BMHI

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For more information

- Bill Hersh
  - http://www.billhersh.info
- Informatics Professor blog
  - http://informaticsprofessor.blogspot.com
- OHSU Department of Medical Informatics & Clinical Epidemiology (DMICE)
  - http://www.ohsu.edu/informatics
  - http://www.youtube.com/watch?v=T-74duDDvwU
  - http://www.informatics-scholarship.info
  - http://oninformatics.com
- What is Biomedical and Health Informatics?
  - http://www.billhersh.info/whatis
- Office of the National Coordinator for Health IT (ONC)
  - http://healthit.hhs.gov
- American Medical Informatics Association (AMIA)
  - http://www.amia.org
- National Library of Medicine (NLM)
  - http://www.nlm.nih.gov

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