Informatics Now Lives in a HITECH World

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Goals for talk

- Describe why informatics now lives in a HITECH world
  - A new "ARRA"
  - Why do we need informatics?
  - Progress and barriers
  - Details of HITECH
- Drill down on one issue of interest to myself (and many of you): What are the needs for the health information technology (HIT) workforce?

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Informatics BO (before Obama)

- Growing recognition of value in healthcare
  - Evidence for improved safety, quality, and cost of healthcare (Chaudhry, 2006; Goldzweig, 2009)
  - Research and demonstration funding by NLM, AHRQ
  - Actions of Bush Administration – e.g., appointment of first National Coordinator for HIT, establishment of AHIC, HITSP, etc.
- Emerging importance in other areas
  - Clinical and translational research – prominent role in CTSA programs (Bernstam, 2009)
  - Genomics – bioinformatics, e.g., caBIG
  - Individual health – growth of PHRs, e.g., Microsoft HealthVault, Google Health, etc.

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But then a new president came along…

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 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 by reducing the deadly but preventable medical errors that pervade our health care system."

January, 2009

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…and we entered a new "ARRA"

- Health Information Technology for Economic and Clinical Health (HITECH) Act of the American Recovery and Reinvestment Act (ARRA)
  - Incentives for electronic health record (EHR) adoption by physicians and hospitals ($36-40B, offset by $20B in savings)
  - 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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Motivations – why do we need more information technology (IT) in healthcare?

- Quality – not as good as it could be (McGlynn, 2003; NCQA, 2009; Schoen, 2009)

- Safety – IOM "errors report" found up to 98,000 deaths per year (Kohn, 2000)

- 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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Can informatics help?

- Chaudhry (2006) and Goldzweig (2009) systematic reviews have identified benefits
  - Adherence to guideline-based care
  - Enhanced surveillance and monitoring
  - Decreased medical errors
- Caveat: 20-25% of studies came from 4 institutions and there have been few studies of commercial systems
  - Concerns about generalizability
- But one recent study of 41 urban hospitals in Texas found those with EHR and clinical decision support had improved clinical outcomes and lower costs (Amarasingham, 2009)
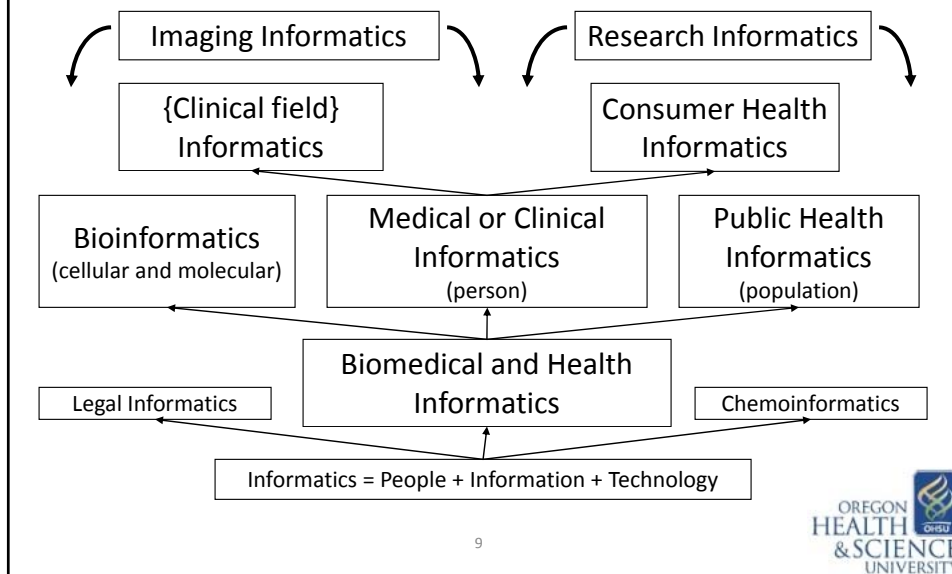
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Just what is "informatics" (Hersh, 2009)?

- *Biomedical and health informatics* (BMHI) is the field concerned with the optimal use of information, often aided by technology, to improve individual health, health care, public health, and biomedical research
  - It is about information, not technology
- Practitioners are BMHI are usually called *informaticians* (sometimes *informaticists*)
- BMHI is the science underlying the application of IT to healthcare (and other disciplines)
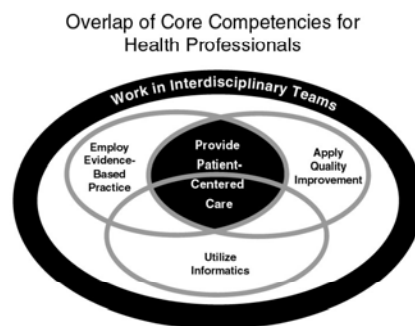
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BMHI has an "adjective problem"

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        Imaging Informatics              Research Informatics

            {Clinical field}               Consumer Health
             Informatics                     Informatics

  Bioinformatics        Medical or Clinical        Public Health
(cellular and molecular)    Informatics             Informatics
                              (person)              (population)

                        Biomedical and Health
Legal Informatics          Informatics            Chemoinformatics

              Informatics = People + Information + Technology
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Informatics is a core competency for health professionals

- According to Institute of Medicine report, the modern health professional must have competency in informatics in order to provide patient-centered care (Greiner, 2003)
- Informatics competency is not just computer literacy!
  – The "Google generation" does not necessarily have good information skills (CIBER, 2008)

Overlap of Core Competencies for Health Professionals

Work in Interdisciplinary Teams

Employ Evidence-Based Practice

Provide Patient-Centered Care

Apply Quality Improvement

Utilize Informatics

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Why are we not there? What are the barriers? (Hersh, 2004)

Health Care Information Technology
Progress and Barriers

William Hersh, MD

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

(Reprinted) JAMA, November 10, 2004—Vol 292, No. 18 **2273**

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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, 2009; Des Roches, 2008) and inpatient settings (Jha, 2009)
- By most measures, US is a laggard and could learn from other countries (Wilson, 2007)
- Most other developed countries undertaking ambitious efforts, e.g.,
  - England (Hayes, 2008)
  - Denmark (Bhanoo, 2010)

(Hsiao, 2009)

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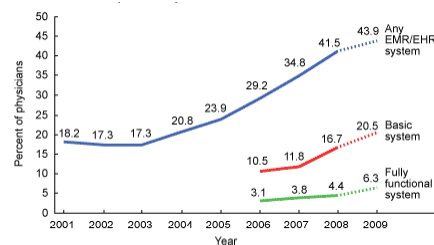
But now we are in a new "ARRA" of HIT

- HITECH provides financial incentives for "meaningful use" of HIT
  - Incentives for EHR adoption by physicians and hospitals ($36-40B)
  - Direct grants administered by federal agencies ($2B)
- All initiatives overseen by Office of the National Coordinator for Health IT (ONC, http://healthit.hhs.gov/)
  - Headed by Dr. David Blumenthal, who has expounded his views (NEJM, 2009; NEJM, 2010)
    - A "down payment" on healthcare reform

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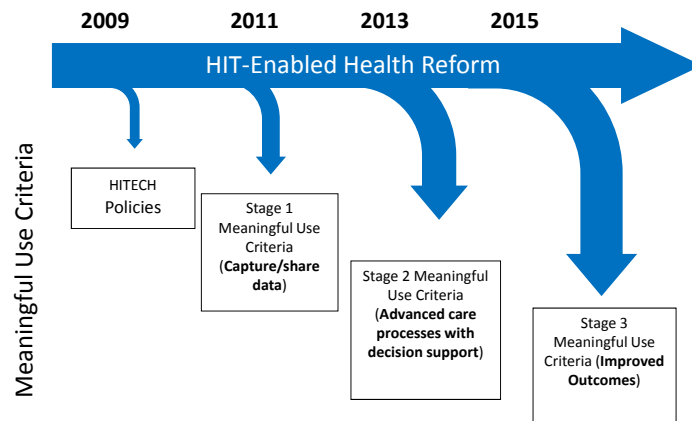&SCIENCE
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What is "meaningful use" of an EHR?

- 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
  - Utilize certified EHR technology connected for health information exchange (HIE)
  - Use of certified EHR technology to submit information on clinical quality measures

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Meaningful use will be 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 meaningful use

- Implemented through Medicare or Medicaid reimbursement to
  - Eligible professionals (EPs) – up to $44K
  - Eligible hospitals (EHs) – $2-9M
- Differences in definitions of above as well as amounts for Medicare vs. Medicaid reimbursement
- See CMS Notice of Proposed Rule-Making (2010) and ONC Interim Final Rule (2010)
  - In comment period now; final rules expected in spring

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Phase 1 meaningful use criteria

- Variety of criteria in areas of
    - Data collection – e.g., problem list, demographics, etc.
    - Functions – e.g., five clinical decision support rules
    - Computerized provider order entry (CPOE) – 80% for EPs, 10% for EHs
    - Health information exchange – test of capability
    - Security – various encryption and network standards
    - Quality reporting – various measures for EPs based on specialty and for EHs

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Other funding initiatives for the health IT infrastructure

- HIT Regional Extension Centers (RECs)
    - $643 million to fund about 70 RECs that will provide guidance, mainly to small primary care practices, in achieving meaningful use
- State-based health information exchange (HIE)
    - $564 million in grants to the states to develop HIE programs
- Beacon communities
    - $235 million to fund 15 communities that provide exemplary demonstration of the meaningful use of EHRs
- Strategic health information advanced research projects (SHARP)
    - $60 million for four collaborative research centers

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Other funding for the infrastructure: health IT workforce

- ONC estimates 50,000 workers needed to implement federal HIT agenda (Monegain, 2009)
- ONC is funding $118 million for
  - Community college consortia ($70M)
  - Curriculum Development Centers ($10M)
  - University training grants ($32M)
  - Competency testing ($6M)

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What doe we know about the health IT workforce?

- Not much, other than it is important!
- Case study: implementation of computerized physician order entry (CPOE) showed adverse consequences
  - Mortality rate increased from 2.8% to 6.6% at Children's Hospital of Pittsburgh Pediatric ICU (Han,2005)
  - Increased mortality not seen at other academic centers (Del Baccaro, 2006; Jacobs, 2006)
  - Pittsburgh adverse outcome may have been avoided with adherence to known "best practices" (Phibbs, 2005; Sittig, 2006)
- Problematic health IT implementations well-known, with failure often attributable to lack of understanding of clinical environment (Leviss, 2010)

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Who is the health IT workforce?

- Three historical groups of health IT professionals
  - Information technology (IT) – usually with computer science or information systems background
  - Health information management (HIM) – historical focus on medical records
  - Clinical informatics (CI) – often from healthcare backgrounds

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How many IT personnel do we have and do we need?

- Assessed using HIMSS Analytics Database (Hersh, 2008), which contains
  - Self-reported data from about 5,000 US hospitals, including number of beds, total staff FTE, total IT FTE (as well as broken down by major IT job categories), applications, and the vendors used for those applications
  - EMR Adoption Model, which scores hospitals on eight stages to creating a paperless record environment

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HIMSS Analytics EMR Adoption Model

Level required for documented benefits of HIT (*meaningful use?*)

Stage 7	Medical record fully electronic; CDO able to contribute to EHR as byproduct of EMR
Stage 6	Physician documentation (structured templates), full CDSS (variance & compliance), full R-PACS
Stage 5	Closed loop medication administration
Stage 4	CPOE, CDSS (clinical protocols)
Stage 3	Clinical documentation (flow sheets), CDSS (error checking), PACS available outside Radiology
Stage 2	CDR, CMV, CDSS inference engine, may have Document Imaging
Stage 1	Ancillaries – Lab, Rad, Pharmacy – All Installed
Stage 0	All Three Ancillaries Not Installed

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Results

- IT per non-IT staff ~ 1:60
- IT FTE per bed rises from stages 0 to 4
- Extrapolating to country as a whole
  - 108,390 IT staff at current adoption levels
  - Would increase to 149,174 if all stages <4 hospitals moved to stage 4
    - Sound bite: Need for >40,000 more!
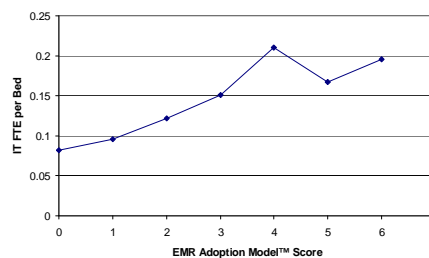
Limitations of study:
- Extrapolations
- Data incomplete
- Does not include CI or HIM
- Current practices, not best practices

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How many HIM personnel do we need?

- From US Bureau of Labor Statistics occupational employment projections 2006-2016 (Dohm, 2007)
    - Medical Records and Health Information Technicians – about 170,000 employed now, increasing to 200,000 by 2016 (17.8% growth)
    - Need 76,000 employed for growth and net replacements

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What about clinical informaticians?

- Individuals who bring skills at intersection of health care and IT (Hersh, 2008; Hersh, 2009)
    - Focus more on information than technology
    - Likely to lead "meaningful use" of HIT
- Estimates of need
    - One physician and nurse in each US hospital (~10,000) (Safran, 2005)
    - About 13,000 in health care (Friedman, 2008) and 1,000 in public health (Friedman, 2007)
    - Growing role of CMIO and other CI leaders (Leviss, 2006; Shaffer, 2009)
    - Limitation: Lack of Standard Occupational Code (SOC) – more important than we think (BLS, 2004)

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HIT job roles for the ARRA agenda (ONC, 2009)

- Mobile Adoption Support Roles
  - Implementation support specialist*
  - Practice workflow and information management redesign specialist*
  - Clinician consultant*
  - Implementation manager*
- Permanent Staff of Health Care Delivery and Public Health Sites
  - Technical/software support staff*
  - Trainer*
  - Clinician/public health leader†
  - Health information management and exchange specialist†
  - Health information privacy and security specialist†
- Health Care and Public Health Informaticians
  - Research and development scientist†
  - Programmers and software engineer†
  - Health IT sub-specialist†

(to be trained in *community colleges and † universities)

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Opportunities for career development and study in BMHI

- Educational programs at many institutions
  - http://www.amia.org/informatics-academic-training-programs
  - OHSU program (Hersh, 2007) one of largest and well-established
- Funding soon from ONC grants
- AMIA 10x10 program – started with aim to educate 10,000 health professionals in informatics by year 2010 (Hersh, 2007)
  - http://www.amia.org/10x10/partners/ohsu/

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Why does informatics now live in a HITECH world?

- EHR adoption and clinical operations financing will be driven by HITECH incentives
- Standards, privacy and security, and other agendas will be set by ONC
- Informatics education, especially clinical informatics, will be driven by ONC workforce funding

- But informatics is not only about EHRs, e.g., bioinformatics, clinical research informatics, etc.

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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/dmice
  - http://oninformatics.com
- Office of the National Coordinator for Health IT (ONC)
  - http://healthit.hhs.gov
- National Library of Medicine (NLM)
  - http://www.nlm.nih.gov
- American Medical Informatics Association (AMIA)
  - http://www.amia.org
- Healthcare Information Management Systems Society (HIMSS)
  - http://www.himss.org
- American Health Information Management Association (AHIMA)
  - http://www.ahima.org

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