

HITECH: Advancing the Adoption of Electronic Health Records in the United States

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1

Topics covered

- Information-related problems and solutions in healthcare
- Why do we need more informatics?
- Why are we not there?
- Details of HITECH Act programs
- The workforce need for informatics
- Educational and career opportunities in informatics



2

Many problems in healthcare have information-related solutions

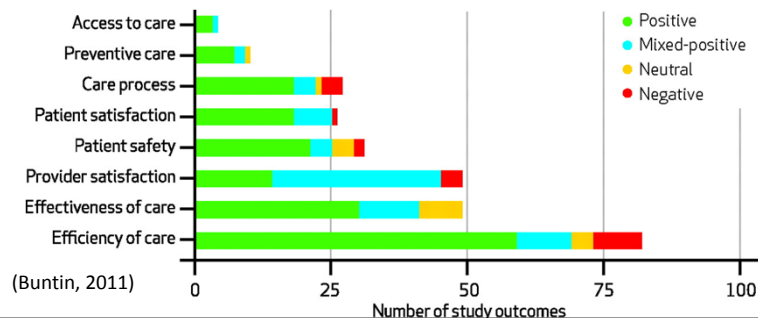
- Quality – not as good as it could be (McGlynn, 2003; Schoen, 2009; NCQA, 2010)
- Safety – errors cause morbidity and mortality; many preventable (Kohn, 2000; Van Den Bos, 2011)
- Cost – rising costs not sustainable; US spends more but gets less (Angrisano, 2007)
- Inaccessible information – missing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

3



Growing evidence shows information interventions are part of the solution

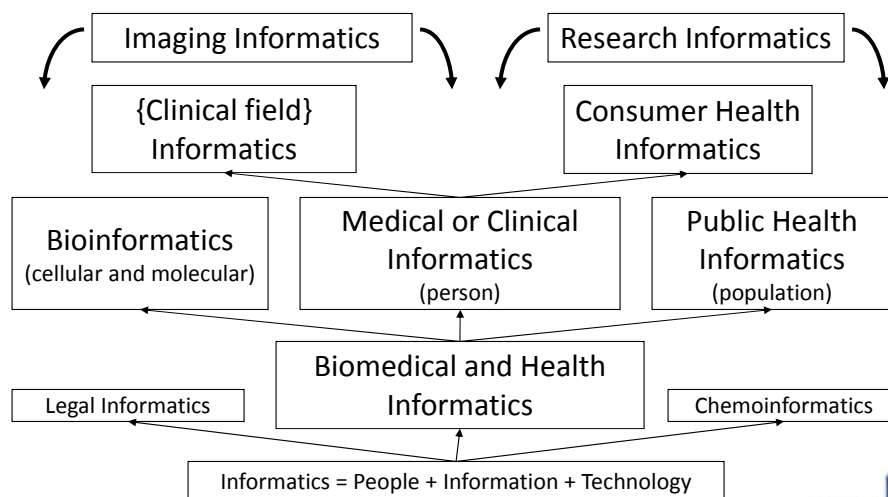
- Systematic reviews (Chaudhry, 2006; Goldzweig, 2009; Buntin, 2011) have identified benefits in a variety of areas
 - Although 18-25% of studies come from a small number of 'health IT leader' institutions



Biomedical and health informatics is the science underlying the solutions

- *Biomedical and health informatics* (BMHI) is the science of using data and information, often aided by technology, to improve individual health, health care, public health, and biomedical research (Hersh, 2009)
 - It is about information, not technology
- Practitioners in BMHI are usually called *informaticians* (sometimes *informaticists*)

BMHI has many sub-areas



Informatics before the Obama era

- Growing recognition of value in healthcare
 - Evidence for improved safety, quality, and cost of healthcare
 - Widespread usage worldwide (Schoen, 2009; Protti, 2010)
 - Research and demonstration funding by NLM, AHRQ, and others
 - 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 (Zerhouni, 2007; Bernstam, 2009)
 - Genomics – bioinformatics, personalized medicine (Hamburg, 2010)
 - Individual health – growth of personal health records (PHRs) (Detmer, 2008), including from companies – e.g., Microsoft HealthVault – and EHR vendors



7

But then a new US president came along...



"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



8

...and the US 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 (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

9



Why has it been so difficult to get there? (Hersh, 2004)

Health Care Information Technology Progress and Barriers

William Hersh, MD

IN THE 3 DECADES SINCE THE TERM “MEDICAL INFORMATICS” was first used, individuals working at the intersection of information technology (IT) and medicine have developed and evaluated computer applications aimed

at improving patient care. In this issue of JAMA, Slack demonstrates the value that patient-physician e-mail can have in improving patient care, and also catalogs the incomplete but encouraging underlying evidence.¹¹ As with many applications of IT, the technology can improve the existing situation but also empower clinicians and patients to think more fundamentally about how inno-

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

care IT.¹² It is no exaggeration to declare that the years ahead portend the “decade of health information technology.”¹³ Informatics is poised to have a major impact in patient-clinician communication. In the Clinical Crossroads article

See also p 2255.

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ment. The rest goes to those who typically do not pay for

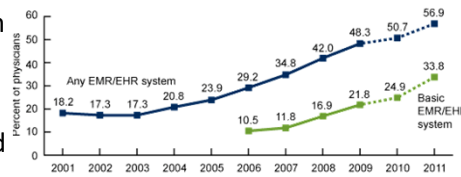
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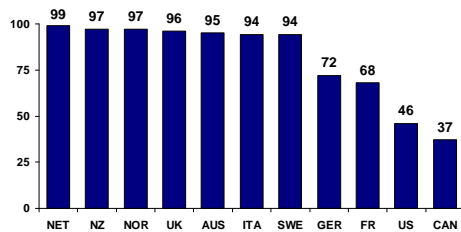


US has low rates of adoption in inpatient and outpatient settings

- Adoption in the US is low for both outpatient (Hsiao, 2011) and inpatient settings (Desroches, 2012) 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)

11

The new “ARRA” of health information technology (HIT) in the US

- HITECH provides financial incentives for “meaningful use” of HIT (Blumenthal, 2010; Blumenthal, 2010)
 - Incentives for EHR adoption by physicians and hospitals (up to \$27B)
 - Direct grants administered by federal agencies (\$2B)
 - All initiatives administered by the Office of the National Coordinator for Health IT (ONC, <http://healthit.hhs.gov/>)

12



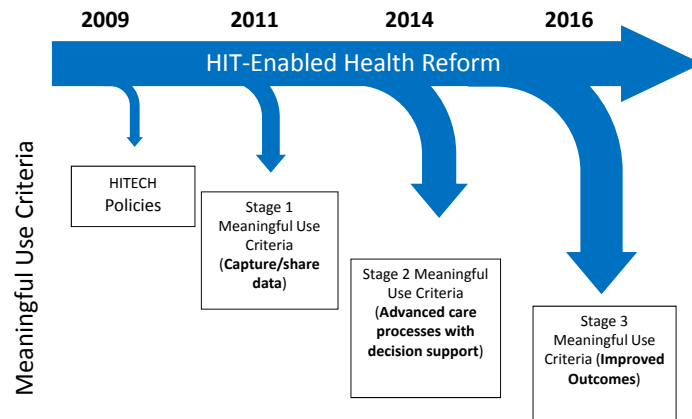
What is “meaningful use” (MU) of an EHR? (Stark, 2010; Blumenthal, 2010)

- 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

13



MU being implemented in three stages



14



Implementation of MU (Marcotte, 2012)

- Implemented through increased Medicare or Medicaid reimbursement over five years to
 - Eligible professionals (EPs) – up to \$44K
 - Eligible hospitals (EHs) – \$2-9M
- There are differences in definitions of above as well as amounts for Medicare vs. Medicaid reimbursement
- Stage 1 final rules released in July, 2010
 - Must achieve 14-15 core and 5 of 10 menu criteria

15



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)

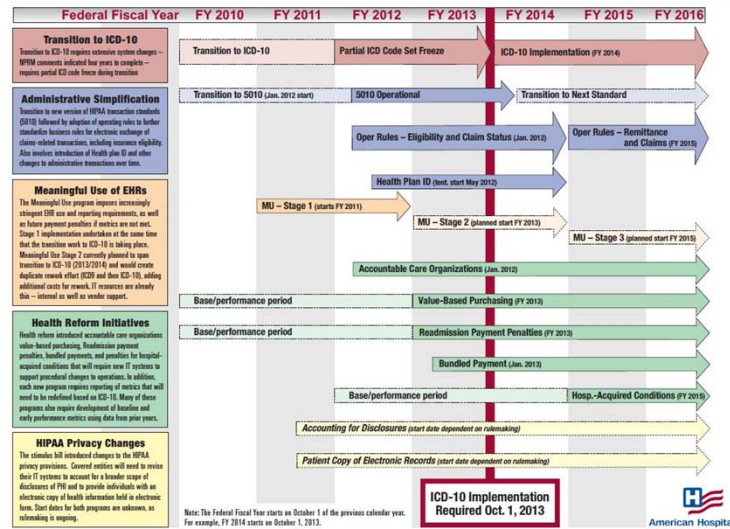
Objective	Measure
Eligible professionals, hospitals, and critical access hospitals may select any five choices from the menu set	
Implement drug formulary checks	Drug formulary check system is implemented and has access to at least one internal or external drug formulary for the entire reporting period
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

MU is just one of several challenges

Overlapping Timelines of ICD-10, Meaningful Use of EHRs, and Health Reform Initiatives



<http://www.aha.org/advocacy-issues/hit/mu/overw-time.shtml>

Other funding initiatives for the HIT infrastructure

- HIT Regional Extension Centers (RECs)
 - \$677 million to fund 62 RECs that will provide guidance, mainly to small primary care practices, in achieving meaningful use (Maxson, 2010)
- State-based health information exchange (HIE)
 - \$547 million in grants to states to develop HIE programs (Kuperman, 2011)
- 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

Other funding for the infrastructure: HIT workforce

- A competent workforce is essential to achieve meaningful use of HIT
- ONC estimates 51,000 workers needed to implement federal HIT agenda (Monegain, 2009)
- ONC is funding \$118 million for
 - Community college consortia (\$70M)
 - Curriculum Development Centers (\$10M)
 - Competency testing (\$6M)
 - University-based training grants (\$32M)

21



ONC workforce roles to implement the HITECH agenda

- 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)

22



ONC workforce development program

- Community College Consortia to Educate Health Information Technology Professionals Program (\$70M)
 - Five regional consortia of 82 community colleges developing short-term programs to train 10,000 individuals per year in the six community college workforce roles
- Curriculum Development Centers Program (\$10M)
 - Five universities collaboratively developing (with community college partners) HIT curricula for 20 components (topics)
 - One of the five ([OHSU](#)) additionally funded as National Training and Dissemination Center
- Competency Examination for Community College Programs (\$6M)
 - Developing competency examinations based on the six community college workforce roles
- Program of Assistance for University-Based Training (\$32M)
 - Funding education of individuals in workforce roles requiring university-level training at nine universities (including [OHSU](#))
 - Emphasis on short-term certificate programs delivered via distance learning

23



Who are the HIT workforce and what do know about them? (Hersh, 2010)

- Three historical groups of professionals in HIT
 - 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
- Problematic HIT implementations often attributable to lack of understanding of clinical environment and use of IT within it (Leviss, 2010)

24



How many IT personnel does the US have and need?

- IT – to reach level of known benefit and meaningful use, may need 40,000 (Hersh, 2008)
- HIM – from US Bureau of Labor Statistics occupational employment projections 2008-2018 (BLS, 2009)
 - Medical Records and Health Information Technicians (RHITs and coders) – about 172,500 employed now, increasing to 207,600 by 2018 (20% growth)
- CI – estimates less clear for this emerging field
 - 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, 2010)

25



Other important workforce developments

- Physicians
 - Proposal to establish a clinical informatics subspecialty (Detmer, 2010; Shortliffe, 2011) based on core curriculum (Gardner, 2009) and training requirements (Safran, 2009)
- Other health professionals
 - Nursing – TIGER initiative (Gugerty, 2009)
 - HIM (Wilhelm, 2007; Dimick, 2008)

26



Conclusions

- The grand experiment of HITECH is going on in the US – results not yet in
- 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.
- There are many opportunities for practitioners, researchers, and others in BMHI

27



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://oninformatics.com>
- OHSU financial aid for informatics training
 - <http://www.informatics-scholarship.info>
- What is BMHI?
 - <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>

28

