Meaningful Use and All That: Update in Clinical Informatics

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References


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

Informatics = People + Information + Technology

(Hersh, 2009)

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

“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
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

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
Implemented in three stages

2009 2011 2013 2015

HIT-Enabled Health Reform

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)

Meaningful Use Criteria

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)
Stage 1 core criteria (14 EH, 15 EP)

<table>
<thead>
<tr>
<th>Objective</th>
<th>Measure</th>
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</thead>
<tbody>
<tr>
<td>Core set of objectives to be achieved by all eligible professionals, hospitals, and critical access hospitals to qualify for incentive payments</td>
<td></td>
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<tr>
<td>Record patient demographics (sex, race, ethnicity, date of birth, preferred language, and, in the case of hospitals, date and preliminary cause of the event of death)</td>
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<tr>
<td>Record vital signs and chart changes (height, weight, blood pressure, body mass index, growth charts for children)</td>
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<tr>
<td>Maintain up-to-date problem list of current and active diagnoses</td>
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<tr>
<td>Maintain active medication list</td>
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<tr>
<td>Maintain active medication allergy list</td>
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<tr>
<td>Record smoking status for patients 13 years of age or older</td>
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<tr>
<td>For individual professionals, provide patients with clinical summaries for each office visit; for hospitals, provide an electronic copy of hospital discharge instructions on request</td>
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<tr>
<td>Generate and transmit permissible prescriptions electronically (does not apply to hospitals)</td>
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<tr>
<td>Computer provider order entry (CPOE) for medication orders</td>
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<tr>
<td>Implement drug and drug allergy interaction checks</td>
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<tr>
<td>Implement capability to electronically exchange key clinical information among providers and patient-authorized entities</td>
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<tr>
<td>Implement clinical decision support rule and ability to track compliance with the rule</td>
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<tr>
<td>Implement systems to protect privacy and security of patient data in the EHR</td>
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<tr>
<td>Report clinical quality measures to CMS or states</td>
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Stage 1 menu criteria (5 of 10)

<table>
<thead>
<tr>
<th>Objective</th>
<th>Measure</th>
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</thead>
<tbody>
<tr>
<td>Implement drug formulary checks</td>
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<tr>
<td>Incorporate clinical laboratory test results into EHRs as structured data</td>
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<tr>
<td>Generate lists of patients by specific conditions to use for quality improvement, reduction of disparities, research, or outreach</td>
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<tr>
<td>Use EHR technology to identify patient specific education resources and provide those to the patient as appropriate</td>
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<tr>
<td>Perform medication reconciliation between care settings</td>
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<tr>
<td>Submit electronic immunization data to immunization registries or immunization information systems</td>
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<tr>
<td>Additional choices for hospitals and critical access hospitals</td>
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<tr>
<td>Record advance directives for patients 65 years of age or older</td>
<td></td>
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<tr>
<td>Submit electronic data on reportable laboratory results to public health agencies</td>
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<tr>
<td>Additional choices for eligible professionals</td>
<td></td>
</tr>
<tr>
<td>Send reminders to patients per patient preference for preventive and follow-up care</td>
<td></td>
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<tr>
<td>Provide patients with timely electronic access to their health information (including laboratory results, problem list, medication list, medication allergies)</td>
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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/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

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
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 all specialties (Shortliffe, 2011)
  – Administrative board: American Board of Preventive Medicine (ABPM) with cooperation from American Board of Pathology (ABP)

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)
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

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)
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

![Bar chart showing outcomes of study](Buntin, 2011)

But it has been difficult to get there

(Hersh, 2004)

Health Care Information Technology
Progress and Barriers

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

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)
Clinical research informatics (CRI) helps achieve integration of:
- Research systems
- Research activities
- Clinical systems
(Payne, 2005; Embi, 2009)

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)!
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)

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)
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
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-74duD0wU
  - http://www.informatics-scholarship.info
  - http://ioninformatics.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)