Meaningful Use of Health Information Technology Requires a Competent Workforce

Invited presentation at The IASTED African Conference on Health Informatics

~AfricaHI 2010~

September 6, 2010

Gaborone, Botswana

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Overview of talk

- Why we need more health information technology (HIT)
- What we know about the HIT and health informatics workforce in the US, Africa, and elsewhere
- How we can/should build the HIT and health informatics workforce
- The HITECH workforce development program

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Our biggest advocate for HIT

CNN.com

HOME WORLD U.S. POLITICS CRIME ENTERTA

Hot Topics » U.S. Economy » Movies » Gaza » Consume

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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Health Information Technology for Economic and Clinical Health (HITECH) Act
(Blumenthal, 2010)

- Portion of the American Recovery and Reinvestment Act (ARRA) that allocates $29 billion to the Office of the National Coordinator for Health IT (ONC) to provide incentives for "meaningful use" of HIT through
  - Adoption of electronic health records (EHRs)
  - Health information exchange (HIE)
  - Infrastructure
    - Regional extension centers – 60 across country
    - Research centers – four centers in specific areas
    - Beacon communities – 17 "beacon" demonstration projects
    - Workforce development – four programs

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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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What do we know about the HIT workforce? US perspective

- Largest (but not only) need now in healthcare settings
- Traditional groupings of professionals in healthcare
  - 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; focus on use of clinical information
- Most research about workforce has focused on counts of professional groupings (usually IT or HIM staffing)

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What do the data show?

- Mostly done in hospital settings; usually focused on one (of three main) groups
  - IT – HIMSS Analytics Database™ study
  - HIM – Bureau of Labor Statistics data
  - CI – mainly estimates
- Recent work focused on needs for the ARRA EHR agenda

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HIMSS Analytics study
(Hersh and Wright, 2008)

- Assessed current and anticipated HIT workforce needs using HIMSS Analytics Database™ (www.himssanalytics.com), which contains
  - Self-reported data from about 5,000 US hospitals, including number of beds, total staff FTE, total IT FTE, applications, and vendors used for 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*)
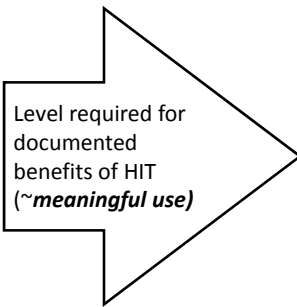
Stage 7	Medical record fully electronic; CDO able to contribute to EHR as byproduct of EMR
Stage 6	Physician documentation (structured templates), full CDSS (variance & compliance), full R-PACS
Stage 5	Closed loop medication administration
Stage 4	CPOE, CDSS (clinical protocols)
Stage 3	Clinical documentation (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!
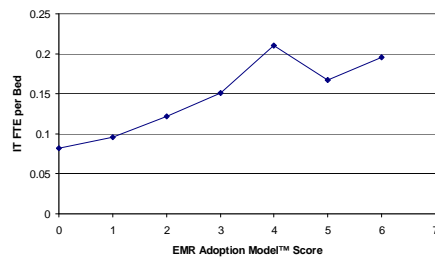
Limitations of study:
- Extrapolations
- Data incomplete
- Does not include CI or HIM
- Current practices, not best practices

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HIM data from US Bureau of Labor Statistics

- 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)
- Also employed as managers and in a variety of other occupations (RHIAs)

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Clinical informatics

- 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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ONC estimates 51,000 needed for HITECH agenda in 12 job roles

- 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) (Monegain, 2009)

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Workforce – Perspective of Sub-Saharan Africa

- Changing landscape
  - Successes built on collaboration (Braa, 2007)
  - Transition of need from acute to chronic care (Beaglehole, 2008)
  - Emergence of new technologies, especially open source (Tierney, 2010) and mobile (Blaya, 2010)
  - Emerging curricula and technologies to deliver them (Hersh, 2010; Otero, 2010)
- American Medical Informatics Association (AMIA) Global Partnership Program (GPP)
  - Funded by planning grant from Gates Foundation
  - Training Approaches and Contents Committee carried out preliminary needs assessment of informatics workforce needs for EHR implementation
    - Open-ended Web-based survey administered to 16 sites

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Mentions of needs at sites – comparable to developed world informatics

Rank	Knowledge or skill	Frequency
1	Methods of practical informatics (programming languages, database management systems, software engineering etc.)	23
2	Characteristics of information systems to support patient and public	14
3	Data representation and Data analysis	12
4	Health data management principles	12
5	Information systems in health care	12
6	Basic IT (HW, SW, networking etc.)	10
7	Architectures of information systems	8
8	Project/ Change management	5
9	Evaluation and assessment	4
10	Evolution of informatics	4
11	Technical informatics (networking architectures and topologies, wireless technology etc.)	4
12	Biometry and Epidemiology	3
13	Health administration, health economic	3
14	Nomenclatures, vocabularies, terminologies	3
15	Ethical and security issues	2
16	Management of information systems	2
17	Mathematics (algebra, probability, statistics etc)	2
18	Decision Support for patient management	1
19	Fundamentals of what constitutes health	1
20	Methods to support education	1
21	Organization of health institutions	1

Workforce development considerations in developing countries

- Development of career ladders – work should be applicable toward degrees and other formal credentials
- Programs must be sustainable
- Sensitivity to language and cultural norms and requirements
- Leverage what has already been done, locally and internationally
- Be complementary to other programs (WHO, CDC, Fogarty, Rockefeller, etc.)
- Adhere to informatics competencies and its role in "bridging fields" (i.e., clinicians, IT, managers)
- Remembering the "people" aspects of training, such as mentorship and networking
- Being cognizant that leaders in low-resource settings have broader responsibilities
- Recognizing that trainees might not be able to take absence from projects

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How do we build the workforce?

- Historically most education at graduate level
  - Informatics is inherently multidisciplinary and there is no single job description or career pathway
- More information on programs on AMIA web site
  - http://www.amia.org/informatics-academic-training-programs
- Commentary at
  - http://informaticsprofessor.blogspot.com
- Let's look at
  - Competencies
  - Career pathways
  - OHSU program experience

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What competencies should the (informatics) workforce have? (Hersh, 2009)

Health and biological sciences:
- Medicine, nursing, etc.
- Public health
- Biology

Competencies required in Biomedical and Health Informatics

Management and social sciences:
- Business administration
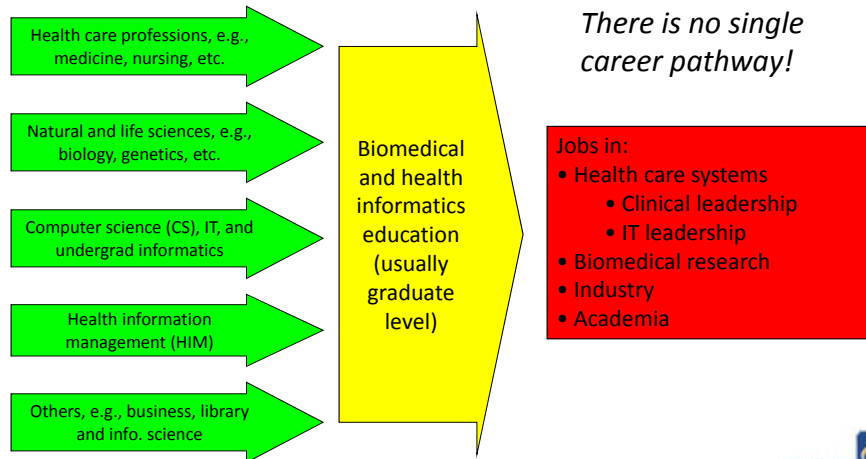- Human resources
- Organizational behavior

Computational and mathematical sciences:
- Computer science
- Information technology
- Statistics

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Career pathways have diverse inputs and outputs (Hersh, 2009)

Health care professions, e.g., medicine, nursing, etc.

Natural and life sciences, e.g., biology, genetics, etc.

Computer science (CS), IT, and undergrad informatics

Health information management (HIM)

Others, e.g., business, library and info. science

Biomedical and health informatics education (usually graduate level)

There is no single career pathway!

Jobs in:
- Health care systems
  - Clinical leadership
  - IT leadership
- Biomedical research
- Industry
- Academia

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Experience of the OHSU program

- http://www.ohsu.edu/dmice/
- Graduate-level programs at Certificate, Master's, and PhD levels
  - "Building block" approach allows courses to be carried forward to higher levels
- Two "populations" of students
  - "First-career" students more likely to be full-time, on-campus, and from variety of backgrounds
  - "Career-changing" students likely to be part-time, distance, mostly (though not exclusively) from healthcare professions
- Many of latter group prefer "a la carte" learning
  - This has led to the successful 10x10 ("ten by ten") program that began as OHSU-AMIA partnership (Hersh, 2007; Feldman, 2008)

AMIA 10x10
10,000 Trained by 2010

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Overview of OHSU graduate programs

PhD
- Knowledge Base
- Advanced Research
  Methods
- Biostatistics
- Cognate
- Advanced Topics
- Doctoral Symposium
- Mentored Teaching
- Dissertation

Masters
- Tracks:
  - Clinical Informatics
  - Bioinformatics
- Thesis or Capstone

Graduate Certificate
- Tracks:
  - Clinical Informatics
  - Health Information Management

10x10
- Or introductory course

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ONC workforce development program

- Community College Consortia to Educate Health Information Technology Professionals Program ($70M)
- Curriculum Development Centers Program ($10M)
- Program of Assistance for University-Based Training ($32M)
- Competency Examination for Community College Programs ($6M)

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Community College Consortia to Educate HIT Professionals Program

- Five regional consortia of 84 community colleges to develop short-term programs to train 10,000 individuals per year in the six community college job roles
- Anticipated enrollment of people with healthcare and/or IT backgrounds – probably baccalaureate or higher degrees

Curriculum Development Centers Program

- Five universities to collaboratively develop (with community college partners) HIT curricula for 20 components (topics)
  - Oregon Health & Science University (OHSU)
  - Columbia University
  - Johns Hopkins University
  - Duke University
  - University of Alabama Birmingham
- One of the five centers (OHSU) additionally funded as National Training and Dissemination Center
  - Training – event for about 200 community college faculty held in August, 2010
  - Dissemination – Web site and feedback collection for curricula

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Program of Assistance for University-Based Training (UBT)

- Funding for education of individuals in job roles requiring university-level training at nine universities with existing programs
  - Oregon Health & Science University (OHSU)
  - Columbia University
  - University of Colorado Denver College of Nursing
  - Duke University
  - George Washington University
  - Indiana University
  - Johns Hopkins University
  - University of Minnesota (consortium)
  - Texas State University (consortium)
- Emphasis on short-term certificate programs delivered via distance learning
- OHSU program being run as "scholarship" program for existing programs

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Conclusions

- Informatics is maturing as a discipline and profession worldwide
  - Field has emerging identity as one with expertise in using information to solve biomedical and health problems
- There are tremendous opportunities now and in the future
  - A competent and well-trained workforce is an essential requirement
- Stay tuned for the results of exciting "experiments" in the US and elsewhere in the years ahead!

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Another US activity: clinical informatics specialization in medicine

- Proposal has been submitted to American Board of Medical Specialties (ABMS) to develop subspecialty in clinical informatics
  - Physicians board-certified in other areas will be able to sub-certify
  - Curriculum (Gardner, 2009) and training requirements (Safran, 2009) described in Mar/Apr 2009 JAMIA
- Initial effort focused on physicians; other efforts to follow in other doctoral-level professions in future

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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
  - http://www.ohsu.edu/dmice
  - http://www.ohsuscholarships.info
  - http://oninformatics.com
- What is BMHI?
  - http://www.billhersh.info/whatis
- Office of the National Coordinator for Health IT
  - http://healthit.hhs.gov
- American Medical Informatics Association
  - http://www.amia.org

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