

# Meaningful Use of Health Information Technology Requires a Competent Workforce

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## Overview of talk

- Biomedical and health informatics
- Why we need more of it (and health information technology, or HIT)
- What we know about the HIT workforce
- How we can/should build the HIT workforce
- The HITECH workforce development program



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## Biomedical and health informatics (BMHI) (Hersh, 2009)

- “The field that is concerned with the optimal use of information, often aided by the use of technology, to improve individual health, health care, public health, and biomedical research”
  - It is more about information than technology
- Assertion: Its optimal usage also requires people (Hersh, 2010)
  - Academics/researchers
  - Practitioners/professionals
  - Users

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## Why do we need more of it?

- In health care
  - Quality – not as good as it could be (McGlynn, 2003; Schoen, 2009; NCQA, 2010)
  - 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)
  - Empowering clinicians, e.g., nursing (Gugerty, 2009)

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## Why do we need more? (cont.)

- In research
  - A “learning health care system” (Eden, 2008; Friedman, 2010; Olsen, 2011)
  - Improving clinical and translational research (Embi, 2009)
  - In public health (Araujo, 2009), especially with growing public health value of clinical information (Bonander, 2010)
- For patients and consumers
  - Personal health records (Miller, 2009)
  - Other empowering applications (Gibbons, 2009)

## In 2009, a new advocate entered



“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.”

President-Elect Barack Obama, January 5, 2009

## Health Information Technology for Economic and Clinical Health (HITECH) Act

- Portion of the American Recovery and Reinvestment Act (ARRA) that allocates up to \$29 billion to the Office of the National Coordinator for Health IT (ONC) to provide incentives for “meaningful use” of health information technology (HIT) through (Blumenthal, 2010; Blumenthal, 2010)
  - Adoption of electronic health records (EHRs)
  - Health information exchange (HIE)
  - Infrastructure
    - Regional extension centers – 62 across country
    - Research centers – four centers in specific areas
    - Beacon communities – 17 “beacon” demonstration projects
    - Workforce development programs – develop and implement it all

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## The people of informatics are a necessary component

- Focus on where we have data or recommendations
  - HIT workforce
  - Informatics competencies
- Research and development challenges for where we don't

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## What do we know about the HIT workforce?

- 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; certified as
    - Registered Health Information Administrator (RHIA)
    - Registered Health Information Technologist (RHIT)
    - Clinical Coding Specialist (CCS)
  - 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, i.e., meaningful use

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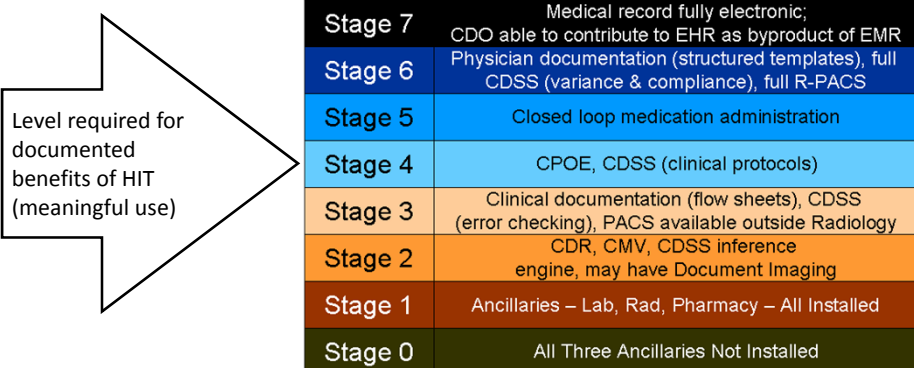


## HIMSS Analytics study (Hersh and Wright, 2008)

- Assessed current and anticipated HIT workforce needs using HIMSS Analytics Database™ ([www.himssanalytics.com](http://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™

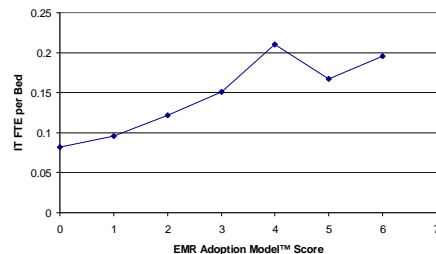


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## Results

- 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 (RHIAAs)

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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, 2010)
  - Limitation: Lack of Standard Occupational Code (SOC)

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## ONC estimates 51,000 needed for HITECH agenda in 12 workforce 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)

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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
  - ONC Workforce Development Program

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## What competencies should informaticians 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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## Inventory of competencies for various groups (Hersh, 2010)

- Competencies differ by group
  - Informaticians
    - Developing, implementing, and evaluating systems
    - Making optimal use of information
  - Clinicians
    - Applying informatics in delivery of care
  - Patients
    - Health information literacy

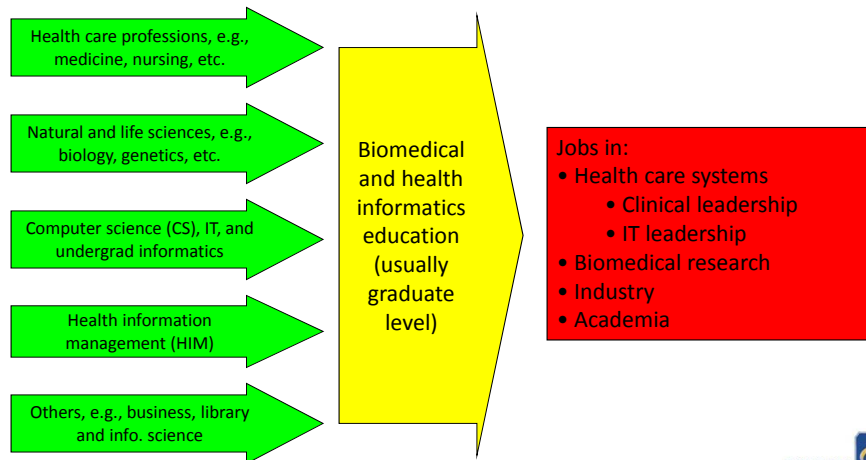
Review

ACI Applied Clinical Informatics 207

Table 2 Inventory of competencies in biomedical and health informatics.

Organization or Journal [Reference]	Year	Discipline	Title
Association for Computing Machinery [49]	1978	Computer science	Health Computing: Curriculum for an Emerging Profession
[50]	1992	Informatics	Recommendations of the German Association for Medical Informatics, Biometry and Epidemiology
Association of American Medical Colleges [51]	1999	Medical students	Medical School Objectives Project: Medical Informatics
International Medical Informatics Association [52]	2000	Informatics	Recommendations of the International Medical Informatics Association (IMIA) on education in health and medical informatics (updated in 2010)
UK National Health Service [53]	2001	Informatics	Health Informatics Competency Profiles for the NHS
American Nurses Association [54]	2001	Nursing	A Delphi Study to Determine Informatics Competencies for Nurses at Four Levels of Practice
...			
Nursing Clinics of North America [68]	2008	Nursing	Technology and informatics competencies
AMIA-OHSU 10x10 Course [69]	2009	Informatics	AMIA-OHSU 10x10 Program - Detailed Curriculum, Learning Objectives
AMIA Core Content for Clinical Informatics [95]	2009	Informatics	Core content for certification of physicians (with others to follow later)
TIGER Nursing Informatics [70]	2009	Nursing Informatics	TIGER Informatics Competencies Collaborative (TICC) Final Report
Office of the National Coordinator for Health IT [71]	2009	Electronic health record adoption	HIT Workforce Competencies by Role
Centers for Disease Control and Prevention, [72]	2009	Informatics	Public Health Informatics Competencies
International Medical Informatics Association [73]	2010	Informatics	Recommendations of the International Medical Informatics Association (IMIA) on education in biomedical and health informatics

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



## Experience of the OHSU program

- <http://www.ohsu.edu/informatics>
- 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)



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## Overview of OHSU graduate programs

		<u>PhD</u> <ul style="list-style-type: none"><li>- Knowledge Base</li><li>- Advanced Research Methods</li><li>- Biostatistics</li><li>- Cognate</li><li>- Advanced Topics</li><li>- Doctoral Symposium</li><li>- Mentored Teaching</li><li>- Dissertation</li></ul>
<u>Masters</u> <ul style="list-style-type: none"><li>- Tracks:<ul style="list-style-type: none"><li>- Clinical Informatics</li><li>- Bioinformatics</li></ul></li><li>- Thesis or Capstone</li></ul>		
<u>Graduate Certificate</u> <ul style="list-style-type: none"><li>- Tracks:<ul style="list-style-type: none"><li>- Clinical Informatics</li><li>- Health Information Management</li></ul></li></ul>		
<u>10x10</u> <ul style="list-style-type: none"><li>- Or introductory course</li></ul>		

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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 82 community colleges to develop short-term programs to train 10,000 individuals per year in the six community college workforce 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 (courses)
  - 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
- Version 2 of curriculum delivered to community colleges in May, 2011, with release to all institutions of higher education in July, 2011
  - Can be downloaded from [www.onc-ntdc.info](http://www.onc-ntdc.info)

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## Components of the ONC HIT curriculum

1. Introduction to Health Care and Public Health in the U.S.
2. The Culture of Health Care
3. Terminology in Health Care and Public Health Settings
4. Introduction to Information and Computer Science
5. History of Health Information Technology in the U.S.
6. Health Management Information Systems
7. Working with Health IT Systems
8. Installation and Maintenance of Health IT Systems
9. Networking and Health Information Exchange
10. Fundamentals of Health Workflow Process Analysis & Redesign
11. Configuring EHRs
12. Quality Improvement
13. Public Health IT
14. Special Topics Course on Vendor-Specific Systems
15. Usability and Human Factors
16. Professionalism/Customer Service in the Health Environment
17. Working in Teams
18. Planning, Management and Leadership for Health IT
19. Introduction to Project Management
20. Training and Instructional Design

(Lab components using VA VistA EHR)

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## Another outcome of project: VistA for Education

Vista CPRS in use by: Doctor/One (BROKERSERVER)

File Edit View Tools Help

**EIGHT.PATIENT** Visit Not Selected Primary Care Team Unassigned  
666-00-0008 Apr 07.1935 (75) Provider: DOCTOR.ONE

Active Problems: Headache, Hypertension, Hyperlipidemia, Acute Myocardial Infarction, Unspecified Site, Episode Of Care Unspecified, Chronic Systolic Heart Failure, Diabetes Mellitus Type II Or Unspecified

Allergies / Adverse Reactions: Penicillin, Chocolate

Postings: Allergies, Crisis Note (May 21, 2000), Advance Directive Completed (May 16, 2007), Advance Directive (Oct 18, 2000), Advance Directive (Oct 18, 2000)

Active Medications: Metoprolol Tartrate 50mg Tab (Active), Simvastatin 40mg Tab (Active), Non-VA Aspirin 81mg Ec Tab (Active)

Clinical Reminders: Depression Screening (DUE NOW), PC Nutritional Screening (DUE NOW), Diabetes - Urinalysis (DUE NOW), Influenza Vaccine (DUE NOW), Pneumococcal vaccine (Pneumovax) (DUE NOW)

Recent Lab Results: No Orders Found

Vitals: T 98.5 F (Mar 05.2010 09:00 (36.9 C)), P 74 (Mar 05.2010 09:00), R 22 (Aug 31.2009 10:00), BP 134/81 (Mar 05.2010 09:00), HT 70 in (Aug 31.2009 10:01 (177.8 cm)), WT 178 lb (Mar 05.2010 09:00 (80.7 kg)), PN 1 (Mar 05.2010 09:00), POX 98 (Dec 01.2009 08:53), BMI 25.59 (Mar 05.2010 09:00)

Appointments/Visits/Admissions: Aug 26.10 21:19 Cardiology (Action Required), Aug 12.10 08:00 General Medicine (Action Required), Aug 11.10 08:00 General Medicine (Action Required), Aug 10.10 08:00 General Medicine (Action Required), Aug 09.10 08:00 General Medicine (Action Required)

Cover Sheet | Problems | Meds | Orders | Notes | Consults | Surgery | DIC Summ | Labs | Reports

## Program of Assistance for University- Based Training (UBT)

- Funding for education of individuals in workforce 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 run as "tuition assistance" program for existing programs
  - [www.informatics-scholarship.info](http://www.informatics-scholarship.info)



## Other important workforce developments

- Physicians
  - Recent approval of a new medical subspecialty in clinical informatics (Detmer, 2010; Shortliffe, 2011) based on core curriculum (Gardner, 2009) and training requirements (Safran, 2009)
    - Initial “grandfathering” of training requirements to enable eligibility for certification; later to require fellowship training
- Other health professions
  - Nursing – TIGER initiative (Gugerty, 2009)
  - HIM (Wilhelm, 2007; Dimick, 2008)
  - Nutrition (Hoggle, 2010)

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## Conclusions: What we know

- Informatics is maturing as a discipline and profession
  - 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 the HITECH “experiment” in the years ahead

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## Conclusions: What we still need to know

- What is the optimal role of people in informatics?
  - Especially in areas beyond clinical informatics and HIT
- How can people best use information to improve health?
  - Empowering the learning health care system
  - Advancing informatics professionals to lead

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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/informatics>
  - <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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