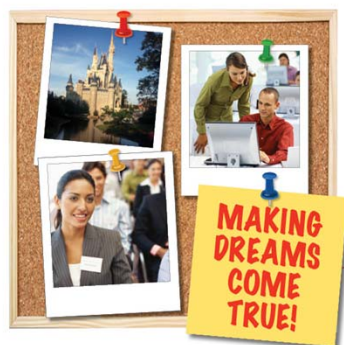# The Clinical Informatics Workforce and its Education: The OHSU Experience

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Objectives

- Describe workforce needs for clinical informatics
- Describe educational programs in clinical informatics
- Describe and share the experience of the Oregon Health & Science University Biomedical Informatics Graduate Program and the 10x10 course
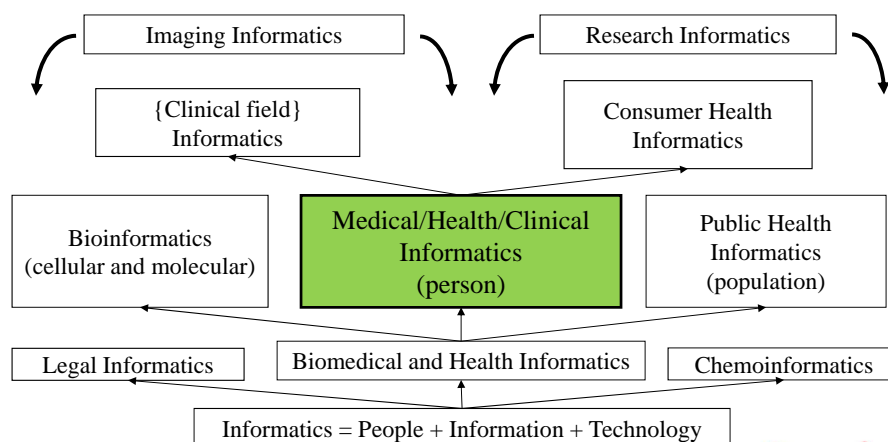
Biomedical and health informatics (BMHI) (Hersh, 2009)

- "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
- Its optimal usage also requires people (Hersh, 2010)
  - Academics/researchers
  - Practitioners/professionals
  - Users

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BMHI has many sub-areas

Imaging Informatics	Research Informatics

| {Clinical field} Informatics | Consumer Health Informatics |

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

| Legal Informatics | Biomedical and Health Informatics | Chemoinformatics |

Informatics = People + Information + Technology

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What do we know about the informatics workforce?

- Largest (but not only) need now in healthcare/clinical 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, changing with technology
  - Clinical informatics (CI) – often from healthcare backgrounds; focus on use of clinical information
- Most research about workforce has focused on counts of professional groupings

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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™ analysis found need for more than 40,000 more with increased level of adoption (Hersh, 2008)
  - HIM – Bureau of Labor Statistics data continues to show growth (2012)
  - CI – mostly estimates, but known needs (Hersh, 2008), including among physician leadership (Leviss, 2006, Shaffer, 2010)

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ONC estimated 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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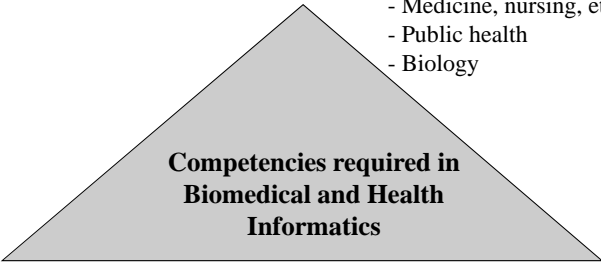
How do we build the workforce?

- Historically most education at graduate level
  - Informatics is inherently multidisciplinary and there is no single job description or career pathway
- More information on informatics 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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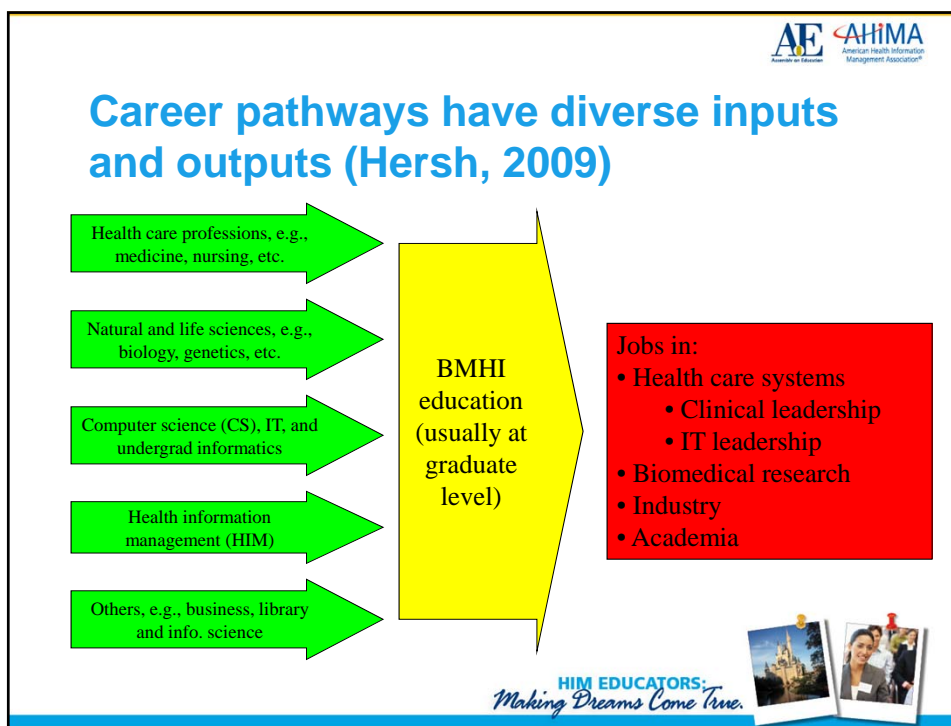# Inventory of competencies for various groups (Hersh, 2010)

- 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

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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 [35]	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

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

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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

BMHI education (usually at graduate level)

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

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Experience of the OHSU program

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- 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
  - Distance learning through master's level, though no distinction from on-campus programs
- 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)

10x10™
Training Next-Generation Informatics Leaders

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Overview of OHSU graduate programs

Master's
- Tracks:
    - Clinical Informatics
    - Bioinformatics & Computational Biology
    - Health Information Management

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

10x10
- Or introductory course

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

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Opportunities for HIM education at OHSU
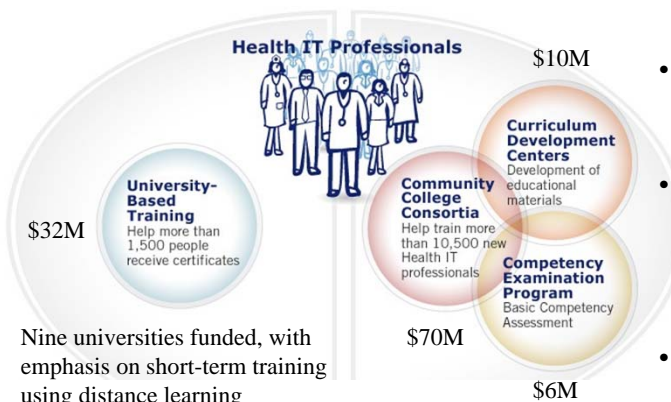
- Our view: substantial overlap of HIM and clinical informatics, as reflected in curriculum
- Already have RHIA
    - Can follow clinical informatics track at Graduate Certificate, Master's, or PhD levels
- Want to pursue RHIA
    - Can pursue CAHIIM-accredited postbaccalaureate HIM track at Graduate Certificate, Master's, or PhD levels

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ONC Workforce Development Program

$10M

- 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

$32M

$70M

$6M

- Nine universities funded, with emphasis on short-term training using distance learning
- OHSU funded to enroll trainees in existing programs

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
  - Public health – definition of competencies (Karras, 2007), some funding by UBT program, and designation as DOL apprenticeship (for forthcoming SOC code)
  - Nursing – TIGER initiative (Gugerty, 2009)
- International developments – informatics challenges and solutions are truly global in nature

Conclusions

- 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 essential
  - Growing synergy between HIM and informatics
- Stay tuned for the results of the HITECH "experiment" in the years ahead

For more information

- Bill Hersh
  - hersh@ohsu.edu
  - 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.ohsu.edu/informatics-education
  - http://oninformatics.com
- What is BMHI?
  - http://www.billhersh.info/whatis