Health IT Workforce of the Future

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Bio

- Title
  - Professor and Chair
  - Department of Medical Informatics & Clinical Epidemiology
  - School of Medicine
  - Oregon Health & Science University
  - Portland, Oregon, USA
- Education and Training
  - MD, University of Illinois at Chicago, 1984
  - Residency in Internal Medicine, University of Illinois Hospital, 1984-1987
  - Fellowship in Medical Informatics at Harvard University, 1987-1990

- Innovator and leader in research and education for informatics workforce
  - Developed and implemented Graduate Program in Biomedical Informatics at OHSU
  - Conceptualized and still leads largest offering in AMIA 10x10 program
  - Has published over 200 research papers, authored one book, and contributed to a dozen others in biomedical informatics

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Past, present, and future

- Identification of the problems
- HITECH solutions
- Workforce issues going forward

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Identification of the problems

- "Who are the informaticians?" (Hersh, 2006)
  - Growing role for "professional" informaticians and need to focus on their training
- What is the needed workforce? (Hersh, 2008)
  - Analysis of HIMSS Analytics Database found as hospitals reached Stage 4 of HIMSS EMR Adoption Model, an additional >40,000 IT professionals would be required

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
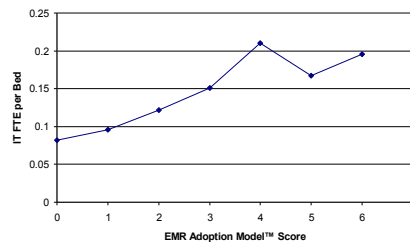
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HITECH solutions

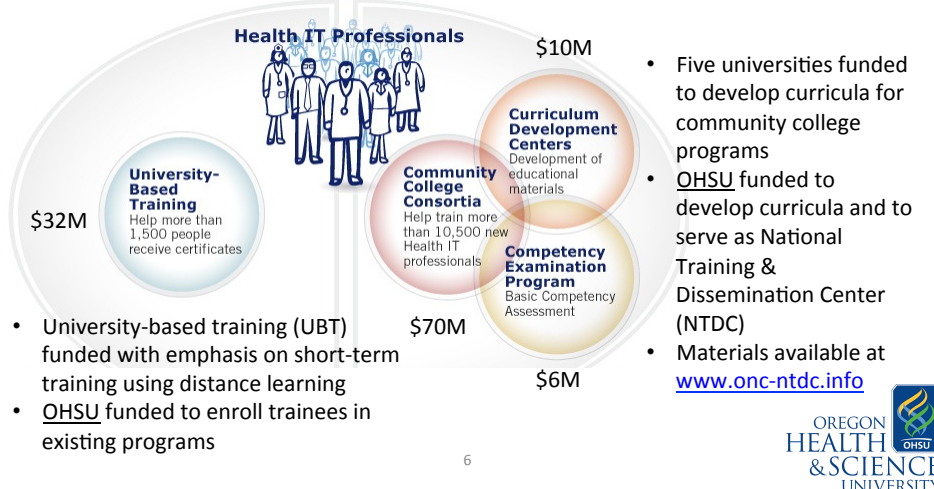- ONC Workforce Program
- Health IT Curriculum
- University-Based Training (UBT) Program

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Workforce growth aided by ONC Workforce Development Program

Investment of $118M based on estimated need for 51,000 health IT professionals in 12 workforce roles (Hersh, 2012)

Health IT Professionals

$10M

Curriculum Development Centers
Development of educational materials

University-Based Training
Help more than 1,500 people receive certificates

$32M

Community College Consortia
Help train more than 10,500 new Health IT professionals

Competency Examination Program
Basic Competency Assessment

$70M

$6M

- Five universities funded to develop curricula for community college programs
- OHSU funded to develop curricula and to serve as National Training & Dissemination Center (NTDC)
- Materials available at www.onc-ntdc.info

- University-based training (UBT) funded with emphasis on short-term training using distance learning
- OHSU funded to enroll trainees in existing programs

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Components of ONC HIT curriculum

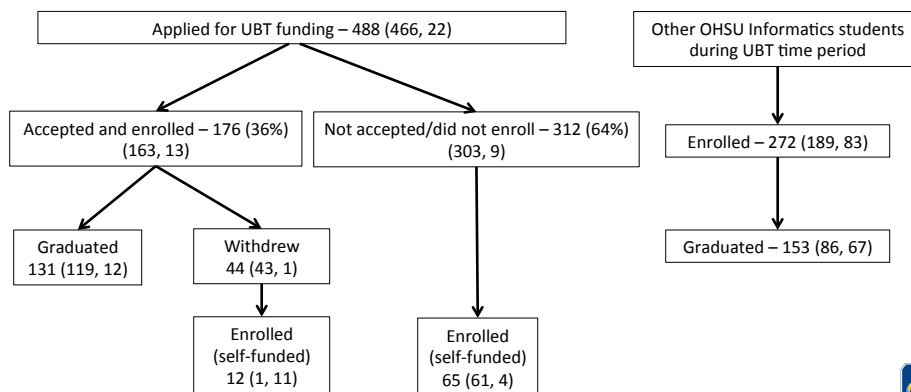| Component	Component Name
1	Introduction to Health Care and Public Health in the U.S.
2	The Culture of Health Care
3	Terminology in Health Care and Public Health Settings
4	Introduction to Information and Computer Science
5	History of Health Information Technology in the U.S.
6	Health Management Information 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

*Includes laboratory exercises based on VistA for Education

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UBT program allowed expansion of informatics education

OHSU UBT Experience

Applied for UBT funding – 488 (466, 22)

Other OHSU Informatics students during UBT time period

Accepted and enrolled – 176 (36%) (163, 13)

Not accepted/did not enroll – 312 (64%) (303, 9)

Enrolled – 272 (189, 83)

Graduated 131 (119, 12)

Withdrew 44 (43, 1)

Enrolled (self-funded) 12 (1, 11)

Enrolled (self-funded) 65 (61, 4)

Graduated – 153 (86, 67)

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UBT also allowed increased innovation and reach

- Practicum/internship program
  - Allows hands-on experiences with healthcare organizations, vendors, government agencies, etc. in settings local to students
 - Internship coordinator handles logistical aspects while OHSU faculty provide academic oversight

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HITECH outcomes

- Job growth under-predicted; actual numbers hired have been even higher (Furukawa, 2012; Schwartz, 2013)
- Despite growth of jobs and number trained, shortfalls persist that undermine success of IT projects, including achievement of meaningful use (CHIME, 2012; HIMSS Analytics, 2013; Towers-Watson, 2013)

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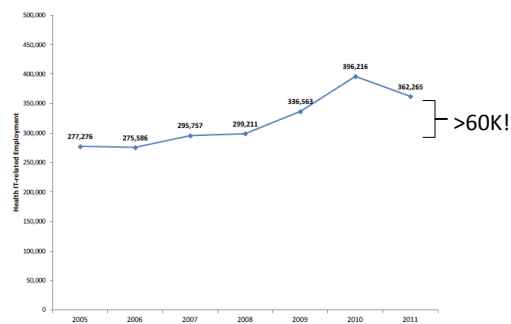
Workforce issues going forward

- Nature of work shifting from implementation to optimization and analytics (Hersh, 2012) – requiring expertise in
  - Statistics
  - Data-related programming
  - Understanding healthcare
  - Communications
- Professional certification, starting with medical subspecialty of clinical informatics (Detmer, 2010)

■ ONC HIT workforce development program roles
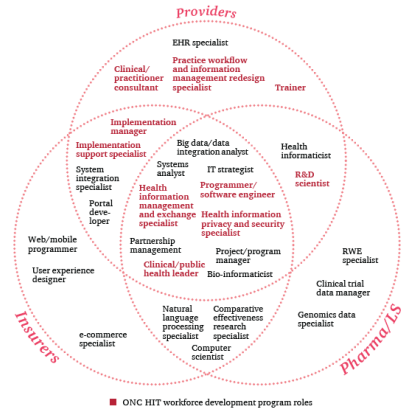
Growing need for expertise in clinical informatics in many new workforce roles (PwC, 2012; PwC, 2013)

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Core content for clinical informatics (Gardner, 2009)

1. Fundamentals
1.1. Clinical Informatics
1.1.1. The discipline of informatics
1.1.2. Key informatics concepts, models, theories
1.1.3. Clinical informatics literature
1.1.4. International clinical informatics practices
1.1.5. Ethics and professionalism
1.1.6. Legal and regulatory issues
1.2. The Health System
1.2.1. Determinants of individual and population health
1.2.2. Primary domains, organizational structures, cultures, and processes
1.2.3. The flow of data, information, and knowledge within the health system
1.2.4. Policy & regulatory framework
1.2.5. Health economics and financing
1.2.6. Forces shaping health care delivery
1.2.7. Institute of Medicine quality components

2. Clinical Decision Making and Care Process Improvement
2.1. Clinical Decision Support
2.1.1. The nature and cognitive aspects of human decision making
2.1.2. Decision science
2.1.3. Application of clinical decision support
2.1.4. Transformation of knowledge into clinical decision support tools
2.1.5. Legal, ethical, and regulatory issues
2.1.6. Quality and safety issues
2.1.7. Supporting decisions for populations of patients
2.2. Evidence-based Patient Care
2.2.1. Evidence sources
2.2.2. Evidence grading
2.2.3. Clinical guidelines
2.2.4. Implementation of guidelines as clinical algorithms
2.2.5. Information retrieval and analysis
2.3. Clinical Workflow Analysis, Process Redesign, and Quality Improvement
2.3.1. Methods of workflow analysis
2.3.2. Principles of workflow re-engineering
2.3.3. Quality improvement principles and practices

3. Health Information Systems
3.1. Information Technology Systems
3.1.1. Computer Systems
3.1.2. Architecture
3.1.3. Networks
3.1.4. Security
3.1.5. Data
3.1.6. Technical approaches that enable sharing data
3.2. Human Factors Engineering
3.2.1. Models, theories, and practices of human-computer (machine) interaction (HCI)
3.2.2. HCI Evaluation, usability testing, study design and methods
3.2.3. Interface design standards and design principles
3.2.4. Usability engineering
3.3. Health Information Systems and Applications
3.3.1. Types of functions offered by systems
3.3.2. Types of settings where systems are used
3.3.3. Electronic health/medical records systems as the foundational tool
3.3.4. Telemedicine
3.4. Clinical Data Standards
3.4.1. Standards development history and current process
3.4.2. Data standards and data sharing
3.4.3. Transaction standards
3.4.4. Messaging standards
3.4.5. Nomenclatures, vocabularies, and terminologies
3.4.6. Ontologies and taxonomies
3.4.7. Interoperability standards
3.5. Information System Lifecycle
3.5.1. Institutional governance of clinical information systems
3.5.2. Clinical information needs analysis and system selection
3.5.3. Clinical information system implementation
3.5.4. Clinical information system testing, before, during and after implementation
3.5.5. Clinical information system maintenance
3.5.6. Clinical information system evaluation

4. Leading and Managing Change
4.1. Leadership Models, Processes, and Practices
4.1.1. Dimensions of effective leadership
4.1.2. Governance
4.1.3. Negotiation
4.1.4. Conflict management
4.1.5. Collaboration
4.1.6. Motivation
4.1.7. Decision making
4.2. Effective Interdisciplinary Teams
4.2.1. Human resources management
4.2.2. Team productivity and effectiveness
4.2.3. Group management processes
4.2.4. Managing meetings
4.2.5. Managing group deliberations
4.3. Effective Communications
4.3.1. Effective presentations to groups
4.3.2. Effective one-on-one communication
4.3.3. Writing effectively for various audiences and goals
4.3.4. Developing effective communications program to support system implementation
4.4. Project Management
4.4.1. Basic principles
4.4.2. Identifying resources
4.4.3. Resource allocation
4.4.4. Project management tools (non-software specific)
4.4.5. Informatics project challenges
4.5. Strategic and Financial Planning for Clinical Information Systems
4.5.1. Establishing mission and objectives
4.5.2. Environmental scanning
4.5.3. Strategy formulation
4.5.4. Action planning and strategy implementation
4.5.5. Capital and operating budgeting
4.5.6. Principles of managerial accounting
4.5.7. Evaluation of planning process
4.6. Change Management
4.6.1. Assessment of organizational culture and behavior
4.6.2. Change theories
4.6.3. Change management strategies
4.6.4. Strategies for promoting adoption and effective use of clinical information systems

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Other topics

- Health professionals education – 21st century clinicians and others need competence in applying informatics to improve health and care delivery
  - OHSU augmenting medical school curriculum in informatics, funded in part by AMA Accelerating Change in Education grant
- New care delivery models will require new professionals (community health workers) and new competencies for existing professionals (physicians, nurses, etc.)
- As genomics and personalized medicine advance into clinical care, all of workforce will need knowledge and skills in appropriate bioinformatics and related topics

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