

What is Biomedical and Health Informatics? (1/7)

Copyright, 2011
William Hersh, MD
Professor and Chair
Department of Medical Informatics & Clinical Epidemiology
Oregon Health & Science University
Portland, OR, USA
Email: hersh@ohsu.edu
Web: www.billhersh.info
Blog: informaticsprofessor.blogspot.com

1



Overview

- Overview of discipline and profession
- Definitions of important terms
- Medical (or clinical) informatics
 - Person-specific applications
 - Knowledge-based applications
- Bioinformatics
- Education and training

2



A field with supporters in high places



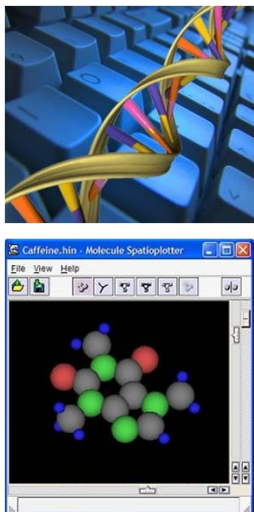
“To improve the quality of our health care while lowering its cost, we will make the immediate investments necessary to ensure that within five years, all of America’s medical records are computerized ... It just won’t save billions of dollars and thousands of jobs – it will save lives by reducing the deadly but preventable medical errors that pervade our health care system.”
- January, 2009

Health Information Technology for Economic and Clinical Health (HITECH) Act of American Recovery and Reinvestment Act (ARRA) of 2009 invested up to \$30 billion in health information technology



3

Opportunities are not limited to healthcare



“Modern biomedical scientists use computers and robots to separate molecules in solution, read genetic information, reveal the three-dimensional shapes of natural molecules like proteins, and take pictures of the brain in action. All of these techniques generate large amounts of data, and biology is changing fast into a science of information management. There is no way to manage these data by hand. What researchers need are computer programs and other tools to evaluate, combine, and visualize these data.”
- <http://nihroadmap.nih.gov/bioinformatics/>

Vision for integration into healthcare: Stead, 2010



4

Other areas of opportunity

- Public health – protecting the public and promoting health
 - e.g., disease surveillance, such as for H1N1 or bioterrorism
- Consumer health – enabling better management of health
 - Personal health records for engaged patients and consumers
- Imaging – use of images and their analysis for biomedical research and clinical care
- And more...



5

It is one of ten “ahead of the curve” careers

Careers that are “relatively new, already viable, and promise further growth...”
(Nemko, 2007)

The screenshot shows the U.S. News & World Report website interface. At the top, it says 'U.S. News & World Report' and 'Wednesday, February 6, 2008'. Below the navigation bar, the main heading is 'Best Careers'. The article title is 'Ahead of the Curve: Health Informatics Specialist' by Marty Nemko, posted December 19, 2007. The article text begins with 'Health Informatics Specialist/Manager. "The job market for health informatics people is absolutely out of sight," exclaims Merida Johns, founding director of the graduate program in Health Informatics at the University of Alabama-Birmingham. And it's no surprise: Hospitals, insurers, and regional collaboratives are switching to electronic medical records. Nurses and doctors, urged to do more evidence-based medicine, are using computerized expert systems to guide their diagnoses and treatment recommendations. Healthcare providers are also collecting more data to evaluate quality of care.'

What is biomedical and health informatics?

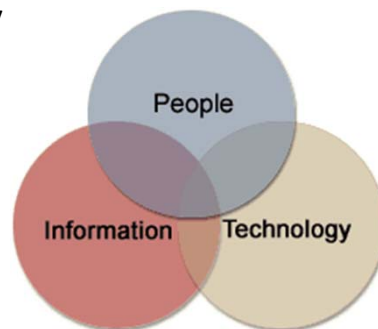
- I get asked this so often that I keep a Web site
 - <http://www.billhersh.info/whatis/>
- I have also written about it
 - Overview of “medical informatics” (Hersh, 2002)
 - But there are barriers (Hersh, 2004)
 - Characterization of and changes in the profession (Hersh, 2006)
 - Many career opportunities as well (Hersh, 2008)
 - Definitions of field (Hersh, 2009)
 - Workforce needs (Hersh, 2010)

7



Let us start by defining “informatics”

- Field concerned with how people use information, usually aided by technology, to improve aspects of the world
- More about information than technology, but technology is essential
- “The science of health service design must be a science of sociotechnical systems, and today that science is called informatics.” (Coiera, 2007)



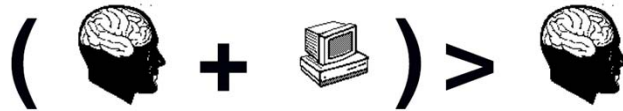
(SUNY Buffalo)

8



It has a “fundamental theorem” (Friedman, 2009)

Goal of informatics is:



and not:



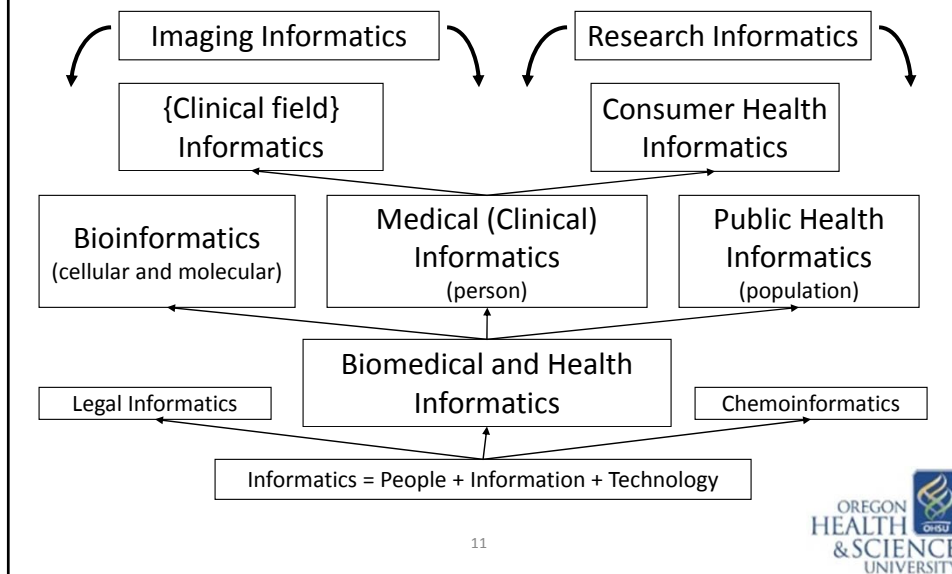
9

My current preferred terminology (Hersh, 2009)

- *Biomedical and health informatics* (BMHI) is the field concerned with the optimal use of information, often aided by technology, to improve individual health, healthcare, public health, and biomedical research
 - Differs from information technology (IT) in that
 - Is strongly rooted in domains (e.g., health)
 - IT is one (of many) tools employed
- Practitioners of BMHI are usually called *informaticians* (sometimes *informaticists*)
- Disagreements over terminology in both noun and adjectives preceding it
 - Has an “adjective problem”

10

Categories of BMHI (Hersh, 2009)

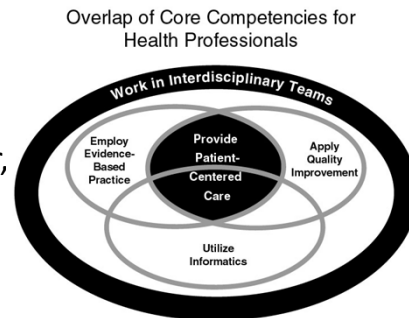


Categories of BMHI (cont.)

- *Bioinformatics* – application of informatics in cellular and molecular biology, often with focus on genomics
- *Medical/clinical informatics* – application of informatics to individuals
 - Informatics applied in a more specific healthcare domain is *{X} informatics*, e.g., nursing, dental, pathology, primary care, etc.
- *Public health informatics* – application of informatics in public health
- Over-arching aspects of BMHI
 - *Imaging informatics* – focus on images in all categories
 - *Research informatics* – focus on research in all categories

Informatics now viewed as a core competency for health professionals

- According to Institute of Medicine report, the modern health professional must have competency in informatics as part of larger goal to provide patient-centered care (Greiner, 2003)
- Informatics competency is not just computer literacy!
 - The “Google generation” (aka, “digital natives”) does not necessarily have good information skills (CIBER, 2008)



Some historical perspective on informatics (Collen, 1994)

- Origin of term from Russia in late 1960s
- Achieved widespread use in France (*informatique*) and later rest of Europe in 1960s to denote computing issues related to information use
 - “Medical informatics” first used in 1974
 - European perspective documented by Hasman (1996) and Moehr (2004)
- At present, most significant use is in biomedical arena, but it is used by other domains, such as law, chemistry, social sciences, etc.