Introduction to Informatics: What You Should Know as a Health Services Researcher

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Outline of talk

- Why it's important to understand informatics; why informatics is a core competency for researchers
- Different areas of informatics – what the field includes
- How it started and where it's going in the future, including employment opportunities
- How you got involved in the field and what you're most proud of
- How to learn more about the field, including a few key resources
- Questions from the audience

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Informatics is a core competency for all who work in health and research

Health Informatics

Domains	Task statements	KS statements
Domain 1. Foundational Knowledge and Skills	NA	31
Domain 2. Enhancing Health Decision-making, Processes, and Outcomes	11	21
Domain 3. Health Information Systems	26	36
Domain 4. Data Governance, Management, and Analytics	17	28
Domain 5. Leadership, Professionalism, Strategy, and Transformation	20	28
Total	74	144

Clinical Informatics Subspecialty (CIS)

Domains	Task statements	KS statements
Domain 1. Foundational Knowledge and Skills	NA	26
Domain 2. Improving Care Delivery and Outcomes	7	28
Domain 3. Enterprise Information Systems	16	33
Domain 4. Data Governance and Analytics	10	27
Domain 5. Leadership and Professionalism	9	28
Total	42	142

(Silverman, 2019; Gadd, 2020)

1. Find, search, and apply knowledge-based information to patient care and other clinical tasks
2. Effectively read from, and write to, the electronic health record for patient care and other clinical activities
3. Use and guide implementation of clinical decision support (CDS)
4. Provide care using population health management approaches
5. Protect patient privacy and security
6. Use information technology to improve patient safety
7. Engage in quality measurement selection and improvement
8. Use health information exchange (HIE) to identify and access patient information across clinical settings
9. Engage patients to improve their health and care delivery though personal health records and patient portals
10. Maintain professionalism through use of information technology tools
11. Provide clinical care via telemedicine and refer patients as indicated
12. Apply personalized/precision medicine
13. Participate in practice-based clinical and translational research
14. Apply machine learning applications in clinical care

(Hersh; 2013; Hersh, 2022)

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What is "informatics?"

- I get asked so often that I keep a Web site
  - http://informatics.health/
- And a blog
  - https://informaticsprofessor.blogspot.com
- The discipline focused on the use of information, aided by technology, to improve individual health, healthcare, public health, and research in biomedicine and health (Hersh, 2022)
  - More about information than technology
- Sometimes defined as activity at the intersection of people, information, and technology
- The science of "sociotechnical systems" (Coiera, 2007)

People
Information   Technology

(SUNY Buffalo)

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It has a "fundamental theorem" and a "golden rule"

Fundamental Theorem (Friedman, 2009) – based on "relentless pursuit of assisting people"

Goal of informatics is

$$(\text{🧠} + \text{💻}) > \text{🧠}$$

Goal is not

$$\text{💻} > \text{🧠}$$

Golden Rule (Kuperman, personal communication, 2013):

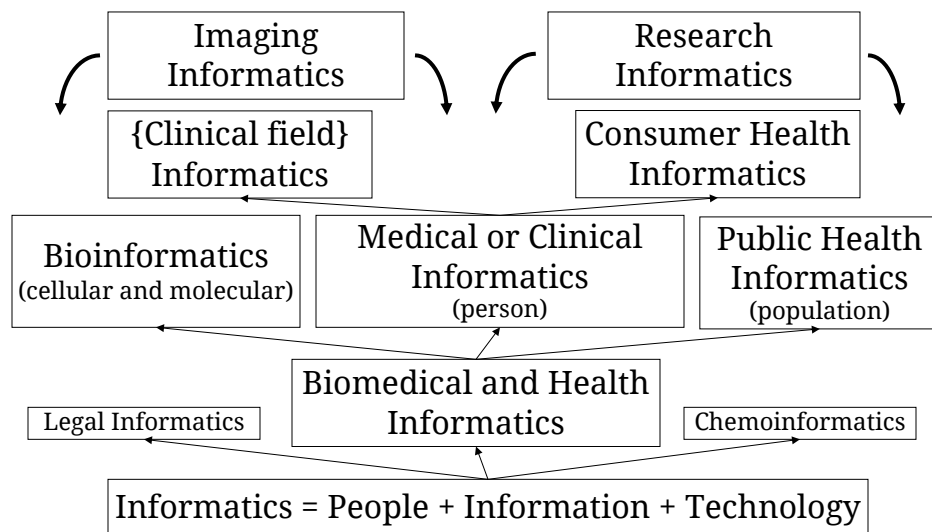"Never implement unto others that which you would not implement unto yourself"

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Informatics also has an "adjective problem"

Imaging Informatics		Research Informatics

| {Clinical field} Informatics | | Consumer Health Informatics |

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

Biomedical and Health Informatics

Legal Informatics   Chemoinformatics

Informatics = People + Information + Technology

(Hersh, 2022)

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How informatics started

- Origin of term attributed to Dreyfus in 1962 (Fourman, 2002)
- Achieved widespread use in France (*informatique*), Russia, and later rest of Europe in 1960s to denote computing issues related to information use
- "Medical informatics" first used in 1974 (Collen, 1994)
  - More European history from Moehr (2004)
  - History of field documented by Collen (2015)
- At present, most significant use is in biomedical arena, but it is used by other domains, such as law, chemistry, social sciences, etc.
- Major early focus was AI, though first era did not have much impact on larger biomedicine (Shortliffe, 1987; Shortliffe, 2019)

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Where informatics is going and employment opportunities

- Some watershed events for field
  - HITECH Act – incentives for adoption of EHR (Washington, 2017)
  - NIH CTSA and other initiatives – leading to field of clinical research informatics (Richesson, 2019)
  - Certification for physicians (Detmer, 2014) and others (Gadd, 2016)
- Employment opportunities
  - Chief Clinical Information Officers and units they lead in healthcare and public health (Kannry, 2016)
  - Academic units with research and education (Cox, 2021)
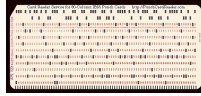 - Growth of data science (Payne, 2018)

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How I got involved

- Initial exposure to computers in high school in 1970s
- Started college as computer science major
- Shifted to medicine, culminating in internal medicine residency
- Pursued informatics fellowship after completing medical training

What I am most proud of

- Oregon Health & Science University (OHSU)
  - Started as Assistant Professor in 1990
  - Established graduate program with MS in 1996, adding online learning and PhD programs later
  - Launched department in 2003 and served as inaugural Chair through 2022
  - Involvement in many federal informatics education initiatives – HITECH, Fogarty, BD2K, Data Science Initiative for Africa, Bridge2AI, etc.
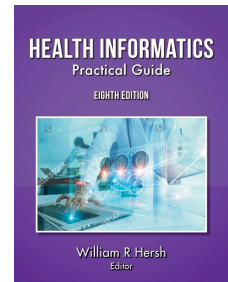

MEDICAL INFORMATICS & CLINICAL EPIDEMIOLOGY

How to learn more about the field

- Books
  - Hersh, W.R., 2022. *Health Informatics: Practical Guide, 8th Ed.* Lulu.com
    - http://www.informaticsbook.info
  - Shortliffe, E.H., Cimino, J. (Eds.), 2021. *Biomedical Informatics: Computer Applications in Health Care and Biomedicine, 5th Ed.* Springer
- Web sites
  - What is informatics? – http://informatics/health
  - AMIA – https://amia.org/
- Courses
  - Standalone – 10x10 ("ten by ten") adaptation of introductory graduate course
    - https://amia.org/education-events/10x10-virtual-courses/10x10-oregon-health-science-university
    - https://dmice.ohsu.edu/hersh/10x10.html
  - Degree and certificate programs
    - https://amia.org/careers-certifications/informatics-academic-programs
    - https://www.ohsu.edu/school-of-medicine/medical-informatics-and-clinical-epidemiology/prospective-students

Questions from the audience

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