Health Policy and Management 401
Biomedical and Public Health Informatics
Winter 2017

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Class Time:	**Wednesdays, 2:00-4:50 pm**
Class Location:	**SPH 31-262**
Class CCLE:	**https://ccle.ucla.edu/course/view/17W-HLTPOL401-1**

Office Hours: **Please call/e-mail for appointment**

Introduction

An ***information system*** is comprised of computerized data as well as procedures to collect, store, analyze, transfer, and retrieve that data. ***Information technology*** supports these systems and consists of computers, the networks and telecommunications systems that connect them, and the software that operates the computers and networks. Over the past two decades, rapid advances in computing technologies have led to tremendous growth in the development and implementation of ***health care information systems*** and ***public health information systems***. Today, there are applications of technology in every field, including: small, targeted applications for basic community health programs and services; electronic medical record systems serving small physician offices and large national IDNs; regional systems tasked with the support of HMO business intelligence needs; and vast national population health databases for health services research.

Biomedical informatics is the scientific field that deals with biomedical data, information, and knowledge--especially focusing upon their storage, retrieval, and optimal use for problem-solving and decision-making. ***Public health informatics*** is the area of study that has arisen to investigate and support the continued integration of technology and public health through the application of information science and technology to public health science, practice, and research. By design, it is broad in scope and is both an academic discipline as well as a practical one.

This course will introduce students to the fields of biomedical and public health informatics, as well as examine the impact of information technology upon the practice of healthcare and public health.

These broader applications of information systems offer the promise of better health care system performance - improved quality, increased efficiency, and enhanced access. They must also ensure the privacy and security of personal health information stored and transmitted electronically.

Course Outcomes/Competencies

Learning Objectives	*FSPH Competency*
1. Students will develop a comprehensive understanding on the basics of biomedical and public health informatics	F4 – Collaborate with communication and informatics specialists in the process of design, implementation, and evaluation of public health programs
2. Students will understand the theoretical framework for the design, development and implementation of public health information systems	F6 – Use information technology to access, evaluate, and interpret public health data
3. Students will apply selected tools and techniques for project management of health information technology initiatives	K2.5 – Information Management: Understands the use of electronic clinical and management information systems and decision support tools K5.9 - Articulates the principles of leading organizational change, including assessment and measurement of organizational change efforts
4. Students will understand how current biomedical and public health informatics research issues impact the health information technology agenda and current health policy	K4.1 - Prepares well-written, effective, convincing managerial reports, including brief and precise executive summaries K4.2 - Prepares and delivers logical, concise, persuasive oral presentations that can convince, influence or impress others to agree with your preferences K4.10 - Analyzes the effects of political, social and economic policies on health systems, community health, and access to care
5. Students will become familiar with the ethical issues related to the use of health information, including privacy, confidentiality, security, data and information ownership and secondary use	E2 - Describe the legal and ethical bases for public health and health services F1 - Understand the concepts of human subject protection and confidentiality F3 - Apply legal and ethical principles to the use of information technology and resources in public health settings
6. Students will understand the ideas and value of health information technology, data, and biomedical and public health informatics as it pertains to quality and process improvement	E7 - Apply quality and performance improvement concepts to address organizational performance issues L2.5 - Quality and Performance Management: Understands and uses methodologies to assess, improve and monitor organizational quality and performance on diverse indicators; analyzes and designs or improves an organizational process, incorporating principles of quality measurement and customer satisfaction

Assignments and Suggested Readings

Reading assignments and exercises will be posted on the CCLE site (http://bit.ly/HPM401-17W). Materials should be read before class so that students can participate fully in the discussions. The core textbooks are:

1. JA Magnuson and PC Fu Jr, eds. Public Health Informatics and Information Systems, 2nd edition (2014).
2. Edward Shortliffe and James Cimino, eds. Biomedical Informatics, 4th edition (2014).

Links to the chapters will be available on CCLE. Additional reading materials will be noted during class and URLs (or PDFs) will be posted on CCLE.

Course Methodology
Theory and conceptual frameworks will be presented by the instructors using lectures, case studies, and class exercises/demonstrations. Discussions and article discussions will be used to facilitate the application of these concepts and frameworks to real organizational examples. Exercises require the student to apply the knowledge gained in the course.

Prerequisites
The student is expected to have a general familiarity and understanding of basic information technologies and terms. It is recommended that students take HPM 440A Healthcare Information Systems and Technology, but is not required.

Grading
Grades will be assigned based upon class participation and performance on exercises:

Class Participation (10%)
Exercise 1: Medical record (20%)
Exercise 2: Process workflow and modeling exercise (20%)
Exercise 3: Online query systems (20%)
Final Project (report 15% + presentation 15% = 30%)

Notes
- Guidelines and instructions for the exercises will be distributed via e-mail and posted on the CCLE site (http://bit.ly/HPM401-17W).
- Written exercises must be submitted by the beginning of class on the due date by email or hardcopy.

Calendar

Session 1 (January 11, 2017): Biomedical and Public Health Informatics (Fu)

- Informatics Definitions, History, and Context

- ***Assignment of Exercise 1*** (Medical Record): Contact your healthcare provider to request a copy of your medical records. Report back on process, timeline, and cost.

- **Reading**
- JA Magnuson and PC Fu, Jr., eds. Public Health Informatics and Information Systems (2014).
  1. Chapter 1: Introduction to Public Health Informatics. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4237-9_1.pdf
  2. Chapter 2: History and Significance of Information Systems and Public Health. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4237-9_2.pdf
  3. Chapter 3: Context and Value of Biomedical and Health Informatics. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4237-9_3.pdf

Session 2 (January 18, 2017): Clinical Information Systems (Tomines)

- Core Electronic Medical/Health Record (EMR/EHR) Concepts; Proposed Benefits; Adoption and Meaningful Use; Clinical Decision Support

- **Reading:**
- JA Magnuson and PC Fu, Jr., eds. Public Health Informatics and Information Systems (2014).
  1. Chapter 23: Decision Support and Expert Systems in Public Health. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4237-9_23.pdf
- Edward Shortliffe, James Cimino, eds. Biomedical Informatics (2014).
  1. Chapter 12. Electronic Health Record Systems. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4474-8_12.pdf
  2. Chapter 22. Clinical Decision-Support Systems. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4474-8_22.pdf

Session 3 (January 25, 2016): Modeling and Information Architecture (Fu)

- Data and Process Modeling; Infrastructure and Architecture; Complexity; Managing Change

- ***Assignment of Exercise 2*** (Process Workflow and Modeling)

- **Reading:**
- JA Magnuson and PC Fu, Jr., eds. Public Health Informatics and Information Systems (2014).
  1. Chapter 5: Public Health Informatics Infrastructure. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4237-9_5.pdf
  2. Chapter 6: Information Architecture. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4237-9_6.pdf
  3. ***(OPTIONAL)*** Chapter 12: Project Management and Public Health Informatics http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4237-9_12.pdf

- Vimla Patel, ed. Cognitive Informatics in Health and Biomedicine (2014).
  1. A Framework for Understanding Error and Complexity in Critical Care. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-5490-7_2.pdf
  2. ***(OPTIONAL)*** Adaptive Behaviors in Complex Clinical Environments. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-5490-7_8.pdf

Session 4 (February 1, 2017): Public Health Information Systems (Tomines)

- Surveillance Information Systems; Registries; Info-Aids

- **Reading**
- JA Magnuson and PC Fu, Jr., eds. Public Health Informatics and Information Systems (2014).
  1. (OPTIONAL) Chapter 15: Informatics in Toxicology and Environmental Public Health. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4237-9_15.pdf
  2. (OPTIONAL) Chapter 17: The National Vital Statistics System. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4237-9_17.pdf
  3. (OPTIONAL) Chapter 18: Risk Factor Information Systems. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4237-9_18.pdf
  4. Chapter 29: National Public Health Informatics, United States. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4237-9_29.pdf

Session 5 (February 8, 2017): The New Democracy: Personal and Consumer Health (Fu)

- Quality, mHealth, PHRs, social media, telehealth; innovation

- **Reading**
- JA Magnuson and PC Fu, Jr., eds. Public Health Informatics and Information Systems (2014).
  1. Chapter 24: Delivery of Preventive Medicine in Primary Care. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4237-9_24.pdf
- Edward Shortliffe, James Cimino, eds. Biomedical Informatics (2014).
  3. Chapter 17. Consumer Health Informatics and Personal Health Records. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4474-8_17.pdf

Session 6 (February 15, 2017): The Era of Big Data (Fu)

- Standards/Interoperability; HIE; genomics; translational informatics; Big Data; NLP

- ***Exercise 2 Due***

- **Reading**
- HIMSS Health Information Exchange Wiki. Common HIE Technical Architectural Models. https://himsshie.pbworks.com/w/page/4777793/HIEModels
- JA Magnuson and PC Fu, Jr., eds. Public Health Informatics and Information Systems (2014).
  1. Chapter 22: Public Health Informatics and Health Information Exchange. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4237-9_22.pdf
- Alain Venot, Anita Burgun, Catherine Quantin, eds. Medical Informatics, e-Health (2014).

1. Chapter 2. Medical Vocabulary, Terminological Resources and Information Coding in the Health Domain. http://link.springer.com/content/pdf/10.1007%2F978-2-8178-0478-1_2.pdf

- Edward Shortliffe, James Cimino, eds. Biomedical Informatics (2014).
  1. ***(OPTIONAL)*** Chapter 8. Natural Language Processing in Health Care and Biomedicine. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4474-8_8.pdf
  2. Chapter 25. Translational Bioinformatics. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4474-8_25.pdf
  3. Chapter 26. Clinical Research Informatics. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4474-8_26.pdf

Session 7 (February 22, 2017): Information Security, Ethics, and Secondary Use (Fu)

- Information Security, HIPAA, HITECH; Secondary Use; Ethics

- ***Exercise 1 in-class reporting and written report***

- **Reading**
- JA Magnuson and PC Fu, Jr., eds. Public Health Informatics and Information Systems (2014).
  1. Chapter 4: Governmental and Legislative Context of Informatics. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4237-9_4.pdf
  2. Chapter 9: Privacy, Confidentiality, and Security of Public Health Information. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4237-9_9.pdf
  3. Chapter 11: Ethics, Information Technology, and Public Health: Duties and Challenges in Computational Epidemiology. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4237-9_11.pdf
- Edward Shortliffe, James Cimino, eds. Biomedical Informatics (2014).
  1. ***(OPTIONAL)*** Chapter 10. Ethics in Biomedical and Health Informatics: Users, Standards, and Outcomes. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4474-8_10.pdf

Session 8 (March 1, 2017): Human Factors (Tomines)

- User-Centered Design and Usability; Unintended Consequences of Health Information Technology; Evaluation

- ***Assignment of Exercise 3*** (Online Query Systems)

- **Reading**
- Alain Venot, Anita Burgun, Catherine Quantin, eds. Medical Informatics, e-Health (2014).
  1. Chapter 18. Human Factors and Ergonomics in Medical Informatics. http://link.springer.com/content/pdf/10.1007%2F978-2-8178-0478-1_18.pdf
- JA Magnuson and PC Fu, Jr., eds. Public Health Informatics and Information Systems (2014).
  1. Chapter 13: Evaluation for Public Health Informatics. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4237-9_13.pdf

Session 9 (March 8, 2017): Data Visualization and Information Literacy and Numeracy (Tomines)

- Information Literacy and Numeracy; Data Visualization; GIS

- ***Exercise 3 due***

- **Reading**
- JA Magnuson and PC Fu, Jr., eds. Public Health Informatics and Information Systems (2014).
  1. Chapter 21: Geographic Information Systems. http://link.springer.com/content/pdf/10.1007%2F978-1-4471-4237-9_21.pdf

Session 10 (March 15, 2017): Final Project Presentations

- Course Recap
- Final Project Presentations