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**HMP 611 - SI 611**
**Population Health Informatics**
**Fall, 2021**


Wednesday 1:00pm – 3:50pm
Room 1152 SPH2

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**Professor:**           Kevin Dombkowski
Research Professor
Office: 300 North Ingalls Building (Division of General Pediatrics)
        Room 6D05

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Phone: (734) 615-6758

Office Hours:
Thursday 2:00 - 3:30 and by appointment
Office hours by Zoom only; see Canvas posting

*(Important note: Office hours may be rescheduled in some weeks. Updates will be sent via email.)*

Assistant to Dr. Dombkowski:
Alexis Henderson healexis@med.umich.edu
(734) 615-3139

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## Course Description:

This course explores the foundations of population health informatics, including information architecture; data standards and databases as they pertain to population health management. This course examines key concepts related to registries, electronic health records, epidemiological databases, biosurveillance, health promotion, and quality measurement in population health management.

## Course Materials:

This course will use a textbook as reference for adjunct material: *Public Health Informatics and Information Systems* (3rd Edition) Editors: J.A. Magnuson, Brian E. Dixon.

Do not purchase the textbook. This textbook is **free** to all students in pdf which can be accessed here: https://link-springer-com.proxy.lib.umich.edu/book/10.1007%2F978-3-030-41215-9

The University of Michigan's Canvas system will host the course website. Unless otherwise noted, all other course materials will be available on Canvas. Any changes in schedule and procedures will be both posted on Canvas and pushed as an e-mail message to all students.

**Prerequisites:**
HMP 668 / SI 542 / BIOINF 668 Introduction to Health Informatics or permission of instructor.

**Course Goals:**
At the end of this course, students will be able to:

- Demonstrate and apply a working knowledge of population health terminology;
- Understand and apply health informatics concepts that are salient to population health;
- Apply data concepts, standards and architectures for sharing information to meet population health objectives;
- Demonstrate how various information technology tools and strategies are applied in the practice of population health; and
- Understand current challenges in population health and evaluate potential informatics solutions.

**Competencies:**
This course provides training toward the following Health Management and Policy <u>major competencies</u>:

A.3   Develop, understand and use data from performance, surveillance or monitoring systems.

A.8   Operational analysis:  Analyze, design, or improve an organizational process, including the use of quality management, process improvement, marketing and information technology principles and tools.

A.9   Population health assessment:   Understand and apply basic epidemiologic principles, measures, and methods to assess the health status of a population; identify risk factors in individuals and communities; evaluate the impact of population-based interventions and initiatives.

This course also addresses the following Master of Health Informatics (MHI) competencies:

1.   Assess the needs and resources of individuals, organizations, and communities where individuals live and work to ensure that information technology deployed to improve health will sustainably meet these needs.

2.   Appropriately utilize theories of individual behavior, social science, health management, and organizational change in the design and implementation of socio-technical interventions.

3.   Evaluate socio-technical interventions to ascertain their effects on health and healthcare.

In addition, the following HMP <u>minor competencies</u> will be also addressed:

> B.1      Convey: Speak and write in a clear, logical, and grammatical manner in formal and informal situations; prepare cogent business presentations; facilitate an effective group process.
>
> E.1      Actively seek feedback from others, reflecting and learning from successes and failures.
>
> E.2      Develop an accurate view of own strengths and developmental needs, including the impact one has on others.

## Course Requirements:

The course will meet in person in **1152 SPH2** on Wednesdays, 1-3:50pm. Class sessions will start promptly at 1:00pm. At the first class session each student will create a "name tent"; please bring your name tent to each class or leave it in class. Unless otherwise noted, will meet in-person at the indicated time and SPH location.

### *COVID-19 and Classroom Etiquette*

Proper masking use is required for all persons in the classroom. This is a long class session and so we'll aim for hourly breaks. If you need to take an additional break to eat or drink, please find one of the designated spaces outside the classroom.

### *Classroom Sessions*

In-person class participation is expected through attendance and discussion; attendance will be recorded. If you know you cannot attend class for some reason, please contact me in advance.

Often, the first ~60 minutes of each session will be a lecture to provide basic information and context for the topics. We may discuss various "Fun Finds" that students have identified in during the preceding week to explore population health informatics in the context of the real-world current events.

Following a 10-minute break, we will frequently switch to a more interactive mode using case studies or hands-on group exercises drawn from local, state, and national population health perspectives.

Although not required, additional readings for each session will be provided from textbook chapters as well as published papers from peer reviewed literature or other sources. The textbook chapters associated with each session are shown on the course schedule.

*Assignments*

This course requires in-class participation, two written case studies, a mid-term exam, and an in-class presentation:

1. Class participation

This course requires in-class participation.  <u>Attendance and discussion participation will be tracked</u>; 20% of your grade will reflect the degree to which you regularly participate in class discussions and contributions to weekly discussion in **Yellowdig** and in class.  If you are not familiar with Yellowdig, start here:
https://www.youtube.com/playlist?list=PLPoeq1OfO6sOyLP3m-D9I62dq0pUeN49S
Yellowdig provides us with a discussion community that will help further our understanding of key topics and provide context for the concepts we'll cover this semester.   The Yellowdig participation is 10% and in-class participation is the remaining 10% of your grade.  The quality of class discussion will weigh heavily on the degree to which students actively participate in Yellowdig, in-class discussions and in-class exercises.

2. Assignment #1: Information Standards

Given their importance to population health informatics, the first assignment will be a case study conducted to illustrate how data standards are applied to support interoperability within any aspect of population health management.  Case studies can be drawn from any aspect of population health management and may describe the uses of standards for clinical data classifications, person / provider identifiers, or electronic data interchange.  Students will research the selected case study topic area which will be summarized in a paper (6-8 pages, double spaced, not including figures or tables).  Assignment 1 will be posted on Canvas by **September 15, 2021** and will be due before midnight on **September 29, 2021**.

3. Midterm exam

There will be a take-home midterm exam comprised of essay questions aimed at the primary concepts discussed in class.  Additional details about the midterm exam will be provided during the semester.  The midterm exam will be posted on Canvas on **October 13, 2021** and will be due at 8am on **October 21, 2021**

4. Assignment #2: Information Architectures

Our second assignment will explore the information architectures that are currently being used in the context of a real-world example of population health informatics.   This assignment will be completed by <u>teams comprised of 2 students</u>; teams will be determined by students.

Your case studies for this paper can be drawn from any aspect of population health management illustrating how information architectures support health assessment, policy development, assurance of health services, or program evaluation.   Examples include (but are not restricted to):

- vital records
- medical device registries
- epidemiological investigations
- biosurveillance / disease surveillance
- chronic disease registries
- disaster follow-up registries
- chronic disease management
- GIS / geospatial analysis

Your case study will describe the databases, applications, data standards, procedures, and applications being used.  The case study will be summarized in a paper (10-12 pages, double spaced, not including figures or tables).  Each team must have their team and topic approved by **October 15, 2021**.  More details will be provided on Canvas.  Paper must be submitted on Canvas by midnight **November 12, 2021**.

5.  Assignment #2 Class Presentation

This assignment will be completed by the same teams for Assignment #2.  Your team's Assignment #2 material will be <u>summarized</u> in PowerPoint and presented by each team to the class.  The content of the presentation will be drawn directly from information gathered to conduct the 2<sup>nd</sup> Assignment.

Presentations will be <u>limited to 20 minutes</u> followed by 5 minutes of questions and class discussion.  Each team must decide how best to share the preparation and presentation.  It is very important to <u>rehearse your presentation</u> to ensure that you & your teammate can clearly present the material <u>in 20 minutes</u>.  An outline and grading rubric for the presentation will be provided on Canvas.

### *Grading*
Grades will be determined based on a total of 100 points:

| Assignment | Class Week | Date | Value (% of final grade) |
|---|---|---|---|
| Class participation – attendance and discussion | All | All | 10% |
| Yellowdig discussion community | All | All | 10% |
| Assignment #1:  Information Standards | 5 | September 29 | 25% |
| Mid-term exam | 8 | October 21 | 20% |
| Assignment #2: Information Architectures | | | |
| Topic approval (required) | 8 | October 15 | - |
| Paper submission | 11 | November 19 | 25% |
| Class Presentations | 13-14 | 12/1 – 12/8 | 10% |

Appraisals of class participation will include evidence of preparedness with regard to the assigned reading and class discussions.  Primary emphasis will be on quality as opposed to quantity of participation.  Letter grades will be determined as follows:

| Letter Grade | Points | Interpretation |
|---|---|---|
| A+ | 97-100 | Extraordinary achievement. Rarely given. |
| A | 94-96 | Consistently distinguished performance in all course aspects, such qualities as analytical ability, creativity, and originality are exhibited at a very high level. |
| A- | 90-93 | Strong, solid achievement in most aspects of the work. |
| B+ | 87-89 | Good performance.  Consistent with performance expected of students in a graduate degree program. |
| B | 84-86 | Acceptable. |
| B- | 80-83 | Borderline. |
| C+ | 77-79 | Poor performance. This is a marginal grade which alerts students to their limited performance in a particular course. |
| C | 74-76 | Very poor performance. |
| C- | 70-73 | Minimal. Performance not at a graduate student level. Student should review their progress in the program with the associate dean for academic affairs. |

**Academic Integrity:**
Unless otherwise specified in an assignment, all submitted work must be your own, original work. Any excerpts from the work of others must be clearly identified as a quotation, and a proper citation provided. Any violation of the School's policy on Academic and Professional Integrity (stated in the Master's and Doctoral Student Handbooks) will result in severe penalties, which might range from failing an assignment, to failing a course, to being expelled from the program, at the discretion of the instructor and the Associate Dean for Academic Affairs.

**Student Well-being:**
SPH faculty and staff believe it is important to support the physical and emotional well-being of our students. If you or someone that you know is feeling overwhelmed, depressed or in need of support, the University of Michigan Counseling and Psychological Services (CAPS) has counselors embedded at both the School of Information (Ashley Evearitt, Psy.D.; evearitt@umich.edu ) and the School of Public Health (Meaghan Narula, LMSW; mbnarula@umich.edu ) to provide assistance.

**Student Accommodations:**
If you think you need an accommodation for a disability, please let the instructor know at your earliest convenience.  Some aspects of this course, the assignments, the in-class activities, and the way we teach may be modified to facilitate your participation and progress.  As soon as you make us aware of your needs, we can work with the Office of Services for Students with Disabilities (SSD) to help us determine appropriate accommodations. SSD typically recommends accommodations through a Verified Individualized Services and Accommodations (VISA) form.  Any information you provide is treated as confidential.

**Feedback:**
My goal is to provide objective, helpful feedback on all assignments in a timely manner.  Please feel free to follow-up with me if you can't follow a particular comment I've written, or if points were miscalculated.  Class participation is 20% of your grade, halfway through the semester I will individually let any students know if they are not participating at an acceptable level. Please also use it as an opportunity to let me know if there are things I can do to facilitate your participation.

Feedback is bi-directional! I would greatly appreciate your feedback on the content, structure, presentation methods, guest speakers – anything.  There will be two formal opportunities for evaluation.  I will conduct an anonymous mid-semester evaluation and there will also be a formal university-sponsored evaluation at the end of the semester.  In addition to these opportunities, I welcome you to share feedback with me informally and via whichever channel is most comfortable to you.

| Unit | Session Number | Date | Session Title |
|---|---|---|---|
| **Unit 1 — Introduction to Population Health and Information Technology** | 1 | September 1 | A: Introduction to population health informatics course (course outline & syllabus) <br><br> B: Population health informatics: overview of key concepts, data sources and data tools <br><br> **Class exercise**: *IT Supporting COVID-19 Response* |
| **Unit 2 — The Science of Population Health Informatics** | 2 | September 8 <br><br> **\*\* via Zoom \*\*** | A: Information Architecture <br><br> **Class exercise:** Case study illustrating silos and interoperability in public health; logical data models <br><br> B: Privacy, Confidentiality and Security of Public Health Information |

| | | | |
|---|---|---|---|
| | 3 | September 15 | A: Information Standards I:  Data standards, types of standards, benefits of standards, standards organizations<br><br>B: Information Standards II A case study of chronic disease classification<br><br>***Overview of Assignment #1: Information Standards*** |
| | 4 | September 22 | A: Administrative claims data in population health management<br><br>B: Class exercise: Hands on analysis of administrative claims data |
| **Unit 3 — Epidemiological Databases and Registries** | 5 | September 29 | ***Guest speaker*** – Jeff Duncan, PhD<br>State Registrar and Director<br>Division for Vital Records and Health Statistics<br>Michigan Department of Health and Human Services<br><br>Vital records and registries in public health<br><br>***Assignment #1 due September 29 before midnight*** |
| | 6 | October 6 | A: Registries and population health management<br><br>B: EHR interoperability with registries |
| | 7 | October 13 | ***Guest speaker*** *– Sarah Reeves, PhD, MPH, Assistant Professor, University of Michigan Department of Pediatrics, Department of Epidemiology*<br><br>*Chronic disease epidemiology and management*<br><br>***Mid-term exam distributed*** |
| **Unit 3 — Epidemiological Databases and Registries** | 8 | October 20 | A: Health information exchange<br><br>B: Quality Measurement<br><br>***Mid-term exam due October 21 by 8am***<br>***Assignment #2 topic approval - due October 15*** |

| | | |
|---|---|---|
| | 9 | October 27 | *Guest speaker* – Anne Fischer, Senior Director of Data Science and Methods<br>*springbuk*<br><br>*Population Health Analytics* |
| | 10 | November 3 | *Guest speaker* – Ed Hartwick (Michigan Department of Health and Human Services, Michigan Disease Surveillance System (MDSS) biosurveillance* |
| | 11 | November 10 | A: Geographic information systems (GIS)<br>B: GIS exercise [TBD]<br>*Assignment #2 due November 19 by midnight* |
| **Unit 4 —**<br>**Case Study**<br>**Presentations** | 12 | November 17 | *** NO CLASS *** |
| | | November 24 | *** NO CLASS *** |
| | 13 | December 1 | Class presentations, 1 - 5 |
| | 14 | December 8 | Class presentations, 6 - 9 |

# Unit 1 — Introduction to Population Health and Information Technology

This unit provides an overview of public health organization and services in the United States and highlights how information technology and informatics applications intersect with public health practice.  Fundamental concepts of data as they pertain to population health are reviewed.

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## Session 1

- Introduction to population health informatics course (course outline & syllabus)
- Population health informatics key concepts: population vs. public health; informatics
- Overview of data concepts; data sources; data tools; data quality

**Topics:**  What is population health informatics and how does it relate to public health?  How can it be applied in the 'real world'?  Who are the main stakeholders?  What are the fundamental types of data?  How is data quality assessed?  What tools are used in population health to manage and access data?

**Class exercise:** *IT Supporting COVID-19 Response* - information technologies that impact our response to the COVID-19 pandemic

**Readings:**

Rowley, J. (2007). The wisdom hierarchy: representations of the DIKW hierarchy. *Journal of Information Science, 33* (2). Retrieved from http://jis.sagepub.com/content/33/2/163.refs

**References:**

1. *Public Health Informatics and Information Systems* (3rd Edition) Editors:  J.A. Magnuson, Brian E. Dixon. https://link-springer-com.proxy.lib.umich.edu/book/10.1007%2F978-3-030-41215-9
    - Public Health Informatics: An Introduction (Chapter 1)
    - History of Public Health Information Systems and Informatics (Chapter 2)
    - Public Health Informatics in the Larger Context of Biomedical and Health Informatics (Chapter 3)
    - Governmental and Legislative Context for Informatics (Chapter 4)
    - Role of Informatics in Bridging Public and Population Health (Chapter 5)
    - Public Health Analytics and Big Data (Chapter 12)

2. Gamache, R., Kharrazi, H., & Weiner, J. P. (2018). Public and population health informatics: the bridging of big data to benefit communities. Yearbook of medical informatics, 27(01), 199-206.  https://www.thieme-connect.com/products/ejournals/html/10.1055/s-0038-1667081

3. Hu, H., Galea, S., Rosella, L., & Henry, D. (2017). Big data and population health: focusing on the health impacts of the social, physical, and economic environment. Epidemiology, 28(6), 759-762. https://pubmed.ncbi.nlm.nih.gov/28682850/

4. Brino, A. (2014, Jun 10). What can big data do for public health? *Healthcare IT News*. Retrieved from http://www.healthcareitnews.com/news/what-can-big-data-do-public-health

5. Liyanage, H., de Lusignan, S., Liaw, S.T., Kuziemsky, C.E., Mold, F., Krause, P., Fleming, D., & Jones, S. (2014 Aug). Big Data Usage Patterns in the Health Care Domain: A Use Case Driven Approach Applied to the Assessment of Vaccination Benefits and Risks. Contribution of the IMIA Primary Healthcare Working Group. *Yearb Med Inform., 9* (1):27-35. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/25123718

6. Mooney, S. J., Westreich, D. J., & El-Sayed, A. M. (2015). Epidemiology in the era of big data. Epidemiology (Cambridge, Mass.), 26(3), 390. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4385465/

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# Unit 2 — The Science of Population Health Informatics

This unit details the automated systems used in population health.  The information architectures used to support population health are explored, as well as data standards and logical data models. Electronic health records (EHRs) as they pertain to population health are reviewed.

### Session 2

- Information Architecture; silos and interoperability in public health
- Privacy, Confidentiality and Security of Public Health Information

**Topics:**  What are information 'silos' and the implications?  What are information architectures?  How can data sharing be maximized in population health applications?  How do *privacy, confidentiality, and security* differ?  How can the practice of public health balance the rights of individuals with the needs of the community?

**Class exercise:** Exploration of data silos and interoperability using public health as a case study

**References:**

1. *Public Health Informatics and Information Systems* (3rd Edition) Editors:  J.A. Magnuson, Brian E. Dixon. https://link-springer-com.proxy.lib.umich.edu/book/10.1007%2F978-3-030-41215-9
   - Information Infrastructure to Support Public Health (Chapter 6)
   - Privacy and Confidentiality of Public Health Information (Chapter 9)
   - New Means of Data Collection and Accessibility (Chapter 17)

2. Office of the National Coordinator for Health Information Technology. (2014). Connecting health and care for the nation: a 10-year vision to achieve an interoperable health IT infrastructure. https://www.healthit.gov/sites/default/files/hie-interoperability/nationwide-interoperability-roadmap-final-version-1.0.pdf

3. Krisberg, K. (2014). Work to join public health, primary care moves ahead: Breaking down silos. The Nation's Health, 44. Retrieved from http://thenationshealth.aphapublications.org/content/44/5/1.2.short/reply#nathealth_el_8841

4. Government Accountability Office (GAO), Electronic Health Records: Nonfederal Efforts to Help Achieve Health Information Interoperability, GAO-15-817 (Washington, D.C.: September 16, 2015). https://www.gao.gov/assets/gao-15-817.pdf

5. Hagan, C. N., Holubowich, E. J., & Criss, T. (2020). Driving public health in the fast lane: the urgent need for a 21st century data superhighway. 2019. https://debeaumont.org/wp-content/uploads/2019/09/DSI-White-Paper_v15-Spreads.pdf

6. Mello, M. M., & Wang, C. J. (2020). Ethics and governance for digital disease surveillance. Science, 368(6494), 951-954 https://science.sciencemag.org/content/sci/368/6494/951.full.pdf

7. Master Person Index (MPI) example: https://www.ihs.gov/hie/masterpatientindex/ Indian Health Service, US Department of Health and Human Services.

8. Just, B. H., Marc, D., Munns, M., & Sandefer, R. (2016). Why patient matching is a challenge: research on master patient index (MPI) data discrepancies in key identifying fields. *Perspectives in health information management*, *13*(Spring). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4832129/

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## Session 3

- Information Standards Part I:  Data standards; types of standards, benefits of standards, standards organizations

**Topics:** What are information standards?  Who establishes standards? Why are standards essential to interoperability?  How are they applied in population health settings?

**Class Exercise**: Case study of chronic disease classification

**Overview of Assignment:** Case Study #1: Information Standards

**References:**

1. *Public Health Informatics and Information Systems* (3rd Edition) Editors:  J.A. Magnuson, Brian E. Dixon. https://link-springer-com.proxy.lib.umich.edu/book/10.1007%2F978-3-030-41215-9
   - Data Sources and Data Tools: Preparing for the Open Data Ecosystem  (Chapter 7)
   - Public Health Information Standards (Chapter 8)

**CPT:**

- American Medical Association (AMA). The CPT® code process. Retrieved from https://www.ama-assn.org/about/cpt-editorial-panel/cpt-code-process

**ICD-9 CM:**

- Centers for Disease Control and Prevention (CDC). (2013). International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM). In *Classification of Diseases, Functioning, and Disability.* Retrieved from http://www.cdc.gov/nchs/icd/icd9cm.htm

**ICD-10:**

- Centers for Disease Control and Prevention (CDC). (2014). International Classification of Diseases, Tenth Revision (ICD-10). In *Classification of Diseases, Functioning, and Disability.* Retrieved from http://www.cdc.gov/nchs/icd/icd10.htm

**NDC:**

- U.S. Food and Drug Administration (FDA). (2014). National Drug Code Directory. In *Drugs*. Retrieved from http://www.fda.gov/drugs/informationondrugs/ucm142438.htm

**HL7:**

- Health Level Seven International. (2014). Health Level Seven International. Retrieved from http://www.hl7.org/

**Bar codes:**

- Centers for Disease Control and Prevention (CDC). (2014). Two-Dimensional (2D) Vaccine Barcodes.  In *Immunization Information Systems (IIS).* Retrieved from http://www.cdc.gov/vaccines/programs/iis/2d-vaccine-barcodes/

- DENSO ADC. (2011). QR Code Essentials. Retrieved from http://www.nacs.org/LinkClick.aspx?fileticket=D1FpVAvvJuo%3D&tabid=1426&mid=4802

- U.S. Department of Health and Human Services, Food and Drug Administration, Center for Drug Evaluation and Research, & Center for Biologics Evaluation and Research. (2011). Bar Code Label Requirements: Questions and Answers.  Retrieved from http://www.fda.gov/downloads/biologicsbloodvaccines/guidancecomplianceregulatoryinformation/guidances/ucm267392.pdf

**LOINC:**

- Regenstrief Institute, Inc. (2014). LOINC from Regenstrief: A universal code system for tests, measurements, and observations. A universal code system for tests, measurements, and observations. Retrieved from http://loinc.org/

**SNOMED:**

- International Health Terminology Standards Development Organization. (2014). SNOMED CT. Retrieved from http://www.ihtsdo.org/snomed-ct/
- U.S. National Library of Medicine. (2014). Unified Medical Language System® (UMLS®): SNOMED Clinical Terms® (SNOMED CT®). Retrieved from http://www.nlm.nih.gov/research/umls/Snomed/snomed_main.html

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## Session 4

- Administrative claims data in population health management

**Topics:** What are claims data? How are they used in population health? Why are they useful and who uses them?

**Class Exercise:** Hands-on claims data analysis group challenges

**References**

1. *Public Health Informatics and Information Systems* (3rd Edition) Editors: J.A. Magnuson, Brian E. Dixon. https://link-springer-com.proxy.lib.umich.edu/book/10.1007%2F978-3-030-41215-9
   - Public Health Analytics and Big Data (Chapter 12), page 207.
   - Informatics in Disease Prevention and Epidemiology (Chapter 14), page 243.
   - National Public Health Informatics, United States (Chapter 24), pages 441, 447-449.
2. Use of administrative data to predict opioid overdose. Lo-Ciganic, W. H., Huang, J. L., Zhang, H. H., Weiss, J. C., Wu, Y., Kwoh, C. K., ... & Gellad, W. F. (2019). Evaluation of machine-learning algorithms for predicting opioid overdose risk among medicare beneficiaries with opioid prescriptions. *JAMA network open*, *2*(3), e190968-e190968. https://pubmed.ncbi.nlm.nih.gov/30901048/

# Unit 3 — Epidemiological Databases and Registries

This unit defines the functions of epidemiology and how epidemiological reasoning can be applied to public health practice.  The unit also describes the purpose of epidemiological databases and registries and explores applications illustrating how information can be exchanged with clinical entities to promote public health and assist in chronic disease management.  This unit also summarizes concepts relating to quality data reporting and how it can impact population health through the use of clinical preventive services in primary care.

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## Session 5

- Vital records and registries in public health

**Topics:**  Registries, including births, deaths, cancer registry and birth defects.  What information is collected by vital statistics systems?  How is information collected?  Where does this information originate and how is it used in the US?

***Guest speaker*** *– Vital records;  Jeff Duncan, PhD; State Registrar and Director Division for Vital Records and Health Statistics, Michigan Department of Health and Human Services*

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## Session 6

- Registries and population health management
- EHR interoperability with registries: Real-time connectivity to immunization registries

**Topics:**  What are registries and how are they used in public health?   How are vital records data integrated into other registries?  What information is collected by vital statistics systems?  How is information collected?  How is information collected?  Where does this information originate and how is it used in the US and globally?

**References**

1. *Public Health Informatics and Information Systems* (3rd Edition) Editors:  J.A. Magnuson, Brian E. Dixon. https://link-springer-com.proxy.lib.umich.edu/book/10.1007%2F978-3-030-41215-9
   - Information Infrastructure to Support Public Health (Chapter 6), pages 100-101.
   - Privacy and Confidentiality (Chapter 9), page 157.
   - Advancing Informatics Policy and Practice: A State Perspective (Chapter 23), pages 424, 430-435.
   - Public Health Laboratories (Chapter 15), pages 260-261, 267.

- MDCH vital records
- Immunization registries; MCIR background:  www.mcir.org
- Cancer registries, e.g., SEER
- Newborn screening registries
- Device registries

**In-class case study**:  EHR interoperability with the Michigan Care Improvement Registry (MCIR):  real-time HL7 reporting objectives, benefits, data quality issues, and future considerations.

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## Session 7

- Informatics in chronic disease epidemiology and management

**Topics:**  What is epidemiology and how are databases used to chronic disease management?   How can administrative claims, newborn screening, vital records, and clinical data used to identify and manage sickle cell disease?

*Guest speaker – Sarah Reeves, PhD, MPH, Assistant Professor, University of Michigan Department of Pediatrics, Department of Epidemiology*

**References:**

Sickle Cell Data Collection (SCDC) Program:
https://www.cdc.gov/ncbddd/hemoglobinopathies/scdc.html

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## Session 8

- Health information exchange
- Quality Measurement and Reporting in Population Health

**Topics:** what are Health information exchanges (HIEs)?  How do are HIEs instrumental in population based health management?  What is quality measurement in the context of population health?

**References:**

1. *Public Health Informatics and Information Systems* (3rd Edition) Editors:  J.A. Magnuson, Brian E. Dixon. https://link-springer-com.proxy.lib.umich.edu/book/10.1007%2F978-3-030-41215-9
   - Health information exchange (Chapter 18)
   - Stoto MA. *Population Health Measurement: Applying Performance Measurement Concepts in Population Health Settings*. eGEMs. 2014;2(4):1132. doi:10.13063/2327-9214.1132.

## Session 9

- Population health analytics

**Topics:** What is epidemiology and how are databases used to support population health? How are population health databases applied to meet epidemiological objectives?

*Guest speaker – Population Health Analytics; Anne Fischer, Senior Director of Health Intelligence springbuk*

## Session 10

- Biosurveillance

**Topics:** What is biosurveillance data? How is biosurveillance data monitored, reported, and analyzed in the US and globally? What are health information exchanges (HIE) and how can they be used to support population health management?

*Guest speaker – Ed Hartwick (Michigan Department of Health and Human Services, Michigan Disease Surveillance System (MDSS)) - biosurveillance*

**References:**

1. *Public Health Informatics and Information Systems* (3rd Edition) Editors: J.A. Magnuson, Brian E. Dixon. https://link-springer-com.proxy.lib.umich.edu/book/10.1007%2F978-3-030-41215-9
   - Syndromic Surveillance: A Practical Application of Informatics (Chapter 16)

## Session 11

- Geographic information systems (GIS)
- GIS Exercise – to be determined

**Topics:** How do health plans collect information to assess quality of care? What are geographic information systems (GIS)? How are they applied in population health? How can mobile devices and social networking play a role in population health management?

**References:**

1. *Public Health Informatics and Information Systems* (3rd Edition) Editors: J.A. Magnuson, Brian E. Dixon. https://link-springer-com.proxy.lib.umich.edu/book/10.1007%2F978-3-030-41215-9

   - Geographic Information Systems (Chapter 19)
2. ESRI white paper march 2020: Geographic Information Systems for Coronavirus Planning and Response. https://www.esri.com/content/dam/esrisites/en-us/media/pdf/geographic-information-systems-for-coronavirus-planning-response-white-paper.pdf
3. Zhou, C., Su, F., Pei, T., Zhang, A., Du, Y., Luo, B., ... & Xiao, H. (2020). COVID-19: challenges to GIS with big data. Geography and sustainability, 1(1), 77-87. https://www.sciencedirect.com/science/article/pii/S2666683920300092