Principles of Population Health Science
Population Health 795

A course in the Program in Population Health

**Fall 2012**

University of Wisconsin-Madison, School of Medicine and Public Health

---

**Course Director:** Whitney P. Witt, PhD, MPH  
**Office address:** Rm. 503 WARF (610 N. Walnut St., Madison 53726)  
**Office phone:** 608-265-6290  
**Office fax:** 608-263-2820  
**Email:** wwitt@wisc.edu  
**Web:** http://www.pophealth.wisc.edu/faculty/wwitt.html  
**Office hours:** Generally available following class; or, by appointment.

**Teaching Assistant:** Debanjana Chatterjee (Deb)  
**Office address:** Rm. 550 WARF (557 N. Walnut St., Madison 53726)  
**Email:** dchatterjee@wisc.edu  
**Office hours:** Generally available following class; or, by appointment.

The lecture will be held in **HSLC 1345** on **Tuesday/Thursday 9:30-10:45am**. A **required discussion session** ("lab") will be held prior to lecture in 1345 HSLC on **Tuesdays from 8:30-9:20am**.

**OVERVIEW**

Despite significant advances in medicine and public health, inequities in health persist. Understanding health on a population level is an approach that seeks to improve the health of the whole population, unravel variations in health outcomes, and to identify effective strategies for reducing or eliminating inequities both within and between population groups.

The purpose of this course is to provide students with a foundation for understanding: 1) how population health is defined and measured; 2) the biological, cultural, social, economic, and
healthcare determinants of population health; 3) research development and design for studying population health; and 4) prevention and intervention strategies for improving population health.

This course will be divided into four distinct modules. The first module will explain how population health is defined and measured. The second module will examine the multiple determinants of population health and their complex inter-relationships. The third module will help students understand how to approach population health research questions and how to design studies to answer these questions. The fourth and final module will focus on how research can be effectively translated into practice. The course will consist of two weekly lectures and a weekly discussion group session (or “lab”). The weekly discussion session will allow students to further explore and apply the concepts raised in the lectures.

COURSE OBJECTIVES

By the end of this course, students will be able to:

- Discuss various definitions of population health
- Describe methodological approaches for measuring population health
- Identify and explain the multiple determinants of population health and their interrelationships
- Understand and discuss research design and development in population health
- Explain various preventive and intervention strategies for improving population health

COURSE ADMINISTRATION

Dr. Witt will be responsible for all administrative issues and grading. A course website is set up on the LEARN@UW system. This is the electronic course home. A main purpose of this website is that it will be a repository of downloadable copies of the course readings and, where appropriate, copies of lecture slides (not all lectures will have slides made available in this manner, so good note taking will be important). Occasionally, announcements will be posted under the "News" heading on the course homepage. Students should check the course website frequently. Students may audio record lectures for their own personal use (i.e. not for distribution) with permission of the lecturer.

The lecture will be held in HSLC 1345 on Tuesday/Thursday 9:30-10:45am. A required discussion session (“lab”) will be held prior to lecture in 1345 HSLC on Tuesdays from 8:30-9:20am.

COURSE ENVIRONMENT AND ACADEMIC INTEGRITY/MISCONDUCT

Civility Policy
Members of the University of Wisconsin-Madison community are expected to deal with each other with respect and consideration. The civility policy for this course promotes mutual respect, civility and orderly conduct among the faculty, teaching assistants, and students. We do not intend this policy to deprive any person of his or her right to freedom of expression. Rather, we seek to maintain a safe, harassment-free work-place for the students, faculty, and teaching assistants. Positive
communication is encouraged and volatile, hostile, or aggressive actions and language will not be tolerated. If the civility policy for this course is violated, then the individual is subject to removal from the class and possibly the course altogether. In addition, the proper authorities at the UW Departmental, School, and University levels will be notified of such behavior accordingly and further action may be taken if necessary.

Collaborative Environment & Academic Misconduct
Students are encouraged to discuss course material and content with each other. However, unless otherwise indicated, assignments, exams, and quizzes should be representative of your own work. Please refer to this website if you have questions about student misconduct: http://www.wisc.edu/students/saja/misconduct/misconduct.html

Non-Discrimination Policy
The UW–Madison is committed to creating a dynamic, diverse and welcoming learning environment for all students and has a non-discrimination policy that reflects this philosophy. Disrespectful behaviors or comments addressed towards any group or individual, regardless of race/ethnicity, sexuality, gender, religion, ability, or any other difference is deemed unacceptable in this class.

Special Needs or Disabilities
We wish to fully include persons with special needs or disabilities in this course. Please let Dr. Witt or Kristin Litzelman know if you need any special accommodations in the curriculum, instruction, or assessments of this course to enable you to fully participate.

STUDENT EVALUATION
The grading for the course is based on three elements:

1. **Exams** (65% of course grade)
   - Two exams will be given in the course-- a midterm will given in place of the lab on **Oct 16 (8:30-9:20 AM)** in HSLC 1345 and there would be a take home final exam from **12/13/12-12/18/12**.

2. **Quizzes** (20% of course grade)
   - There will be a quiz for each module of the course (6.67% for each quiz).

3. **Participation** in discussion group, lab exercises, and lectures (15% of grade)

<table>
<thead>
<tr>
<th>Grading Mechanism</th>
<th>Date</th>
<th>Percent of Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quiz 1</td>
<td>Posted on 09/25/12, due 09/28/12</td>
<td>5%</td>
</tr>
<tr>
<td>Quiz 2</td>
<td>Online quiz (Learn@UW)</td>
<td>5%</td>
</tr>
<tr>
<td>MIDTERM</td>
<td>10/16/12 from 8:30-9:20am</td>
<td>25%</td>
</tr>
<tr>
<td>Quiz 3</td>
<td>Online quiz (Learn@UW)</td>
<td>5%</td>
</tr>
<tr>
<td>Lab Writeup</td>
<td>Throughout semester</td>
<td>5%</td>
</tr>
<tr>
<td>Take home FINAL</td>
<td>12/13/12-12/18/12 (due at 9AM in WARF 550)</td>
<td>40%</td>
</tr>
<tr>
<td>Participation in labs and lectures</td>
<td>See dates below</td>
<td>15%</td>
</tr>
</tbody>
</table>
READINGS

Required and additional readings for each particular lecture or module will be posted on the course webpage at Learn@UW. Most readings will be available for download from the course webpage or will be available electronically from UW-Madison Libraries.

The following books are \textit{required} for the course. They are available for purchase at University Book Store Health Sciences (located inside HSLC) and on course reserve in Ebling Library.


The following book is \textit{recommended} for the course. It is available for purchase at University Book Store Health Sciences (located inside HSLC) and on course reserve in Ebling Library.

<table>
<thead>
<tr>
<th>Module #:</th>
<th>Week</th>
<th>Session</th>
<th>Date</th>
<th>Topic</th>
<th>Lecturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>9/4/2012</td>
<td>Population Health Terminology and Frameworks</td>
<td>Kindig</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LAB 1</td>
<td>9/11/2012</td>
<td>Discussion Session/Lab: Defining Health</td>
<td>WW/DC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>9/11/2012</td>
<td>Traditional Measures of Health</td>
<td>Skinner</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>9/13/2012</td>
<td>Defining Health in Individuals and Populations</td>
<td>Witt</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LAB 2</td>
<td>9/18/2012</td>
<td>Discussion Session/Lab: Developing Measurable Objectives</td>
<td>WW/DC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>9/18/2012</td>
<td>Health and Healthcare Disparities</td>
<td>Witt</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>9/20/2012</td>
<td>Modeling Population Health</td>
<td>Witt</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LAB 3</td>
<td>9/25/2012</td>
<td>Discussion Session/Lab: (1) group quiz (2) view and discuss “Unnatural Causes”</td>
<td>WW/DC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>9/25/2012</td>
<td>Molecular/Genetic Determinants</td>
<td>Skinner</td>
<td></td>
</tr>
<tr>
<td>2: Determinants of Population Health—From Cell to Society</td>
<td>8</td>
<td>9/27/2012</td>
<td>Biopsychosocial Determinants</td>
<td>Creswell</td>
<td></td>
</tr>
<tr>
<td>Non-Medical Determinants</td>
<td>LAB 4</td>
<td>10/2/2012</td>
<td>Discussion Session/Lab: Conceptual Models</td>
<td>WW/DC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>10/2/2012</td>
<td>Behavioral and Cultural Determinants</td>
<td>Martinez-Donate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>10/4/2012</td>
<td>Social Determinants (I) —Gender, Race, and Socioeconomic Determinants</td>
<td>Nobles</td>
<td></td>
</tr>
<tr>
<td>Module #:</td>
<td>Week</td>
<td>Session</td>
<td>Date</td>
<td>Topic</td>
<td>Lecturer</td>
</tr>
<tr>
<td>----------</td>
<td>------</td>
<td>---------</td>
<td>----------</td>
<td>--------------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-Medical Determinants</td>
<td>6</td>
<td>MIDTERM REVIEW</td>
<td>10/9/2012</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td></td>
<td>10/9/2012</td>
<td>Social Determinants (II )</td>
<td>Catlin</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td></td>
<td>10/11/2012</td>
<td>Environmental Determinants (I) — U.S.</td>
<td>Kanarek</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-Medical Determinants</td>
<td>7</td>
<td>MIDTERM EXAM</td>
<td>10/16/2012</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td></td>
<td>10/16/2012</td>
<td>Environmental Determinants (II) — Global</td>
<td>Malecki</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td></td>
<td>10/18/2012</td>
<td>Global Health: Focus on Women and Children</td>
<td>Deb</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td></td>
<td>10/23/2012</td>
<td>POST-REVIEW OF MIDTERM</td>
<td>WW/DC</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
<td>10/23/2012</td>
<td>Medical Care as a Determinant</td>
<td>Kindig</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Medical Determinants</td>
<td></td>
<td>LAB 5</td>
<td>10/30/2012</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td></td>
<td>10/25/2012</td>
<td>Type 2 Translational Research</td>
<td>Smith</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td></td>
<td>10/30/2012</td>
<td>Access and Quality</td>
<td>Pandhi</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td></td>
<td>11/1/2012</td>
<td>Economics of Health (I)</td>
<td>Vanness</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>Medical/Economic</td>
<td></td>
<td>LAB 6</td>
<td>11/6/2012</td>
</tr>
<tr>
<td>Module #:</td>
<td>Week</td>
<td>Session</td>
<td>Date</td>
<td>Topic</td>
<td>Lecturer</td>
</tr>
<tr>
<td>----------</td>
<td>------</td>
<td>---------</td>
<td>------------</td>
<td>----------------------------------------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Determinants</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>19</td>
<td></td>
<td>11/6/2012</td>
<td>Economics of Health (II)</td>
<td>Kreling</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td></td>
<td>11/8/2012</td>
<td>Economics of Health (III)</td>
<td>Vanness</td>
</tr>
<tr>
<td>Economic Determinants</td>
<td>11</td>
<td>LAB 7</td>
<td>11/13/2012</td>
<td>Discussion Session/Lab: Economics of PHS</td>
<td>WW/DC/Mullahy</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td></td>
<td>11/13/2012</td>
<td>Asking and Operationalizing Population Health Questions (I)</td>
<td>Witt</td>
</tr>
<tr>
<td>3: Research Development and Design for Studying Population Health</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>22</td>
<td></td>
<td>11/15/2012</td>
<td>Asking and Operationalizing Population Health Questions (II)</td>
<td>Witt</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>LAB 8</td>
<td>11/20/2012</td>
<td>Discussion Session/Lab: Research Design &amp; Dev’t (pre and post work required)</td>
<td>WW/DC</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td></td>
<td>11/20/2012</td>
<td>Community Intervention Trials</td>
<td>Remington</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NO CLASS</td>
<td>11/22/2012</td>
<td>THANKSGIVING HOLIDAY</td>
<td></td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>LAB 9</td>
<td>11/27/2012</td>
<td>Discussion Session/Lab: Design and Level of Analysis for Population Health Studies</td>
<td>WW/DC</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td></td>
<td>11/27/2012</td>
<td>Strategies and Applications of Population Health Studies</td>
<td>Nieto</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td></td>
<td>11/29/2012</td>
<td>Levels of Analyses for Population Health Studies</td>
<td>Gangnon</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>LAB 10</td>
<td>12/4/2012</td>
<td>Final Review</td>
<td>WW/DC</td>
</tr>
<tr>
<td>4: Implications for Improving Population Health</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>26</td>
<td></td>
<td>12/4/2012</td>
<td>Translating Evidence Into Practice</td>
<td>Feder</td>
</tr>
<tr>
<td></td>
<td>27</td>
<td></td>
<td>12/6/2012</td>
<td>Perspectives on Pop. Health Improvement and Interventions</td>
<td>Timberlake</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>LAB 11</td>
<td>12/11/2012</td>
<td>Discussion Session/Lab: Translating Evidence Into Practice</td>
<td>Feder</td>
</tr>
<tr>
<td></td>
<td>28</td>
<td></td>
<td>12/11/2012</td>
<td>Health Policy</td>
<td>Oliver</td>
</tr>
<tr>
<td>Module #:</td>
<td>Week</td>
<td>Session</td>
<td>Date</td>
<td>Topic</td>
<td>Lecturer</td>
</tr>
<tr>
<td>----------</td>
<td>------</td>
<td>---------</td>
<td>--------------</td>
<td>------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>29</td>
<td>12/13/2012</td>
<td>Drop in session for clarification</td>
<td>WPW/DC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>12/13/12-12/18/12</td>
<td>TAKE HOME FINAL (DUE BY 9AM)</td>
<td>WPW/DC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
READINGS (Not Final)

Please read all required readings prior to the class session. Readings listed as “additional” are not required and their content will not be included on exams or quizzes.

MODULE 1: Defining and Measuring Population Health

Sept. 4  **Session 1:** Population Health Terminology and Framework (Lecturer: KINDIG)

**Required:**

Sept. 6  **Session 2:** Population Health: An Overview (Lecturer: Witt)

**Required:**
- CHAPTER 1 POP HEALTH: CONCEPTS AND METHODS

Sept. 11  **LAB 1:** Defining Health

**Session 3:** Traditional Measures of Population Health (Mortality and Morbidity) (Lecturer: SKINNER)

**Required:**
- CHAPTER 2 POP HEALTH: CONCEPTS AND METHODS

**Additional:**
- Healthy People 2010 web site: http://www.healthypeople.gov/About/

Sept. 13  **Session 4:** Defining Health in Individuals and Populations (Lecturer: WITT)

**Required:**
• CHAPTER 3 POP HEALTH: CONCEPTS AND METHODS
• Kindig, D.A. A Population Health Framework for Setting National and State Health Goals. JAMA May 7 2008 pp 2081-2083
• Chapter 1:”Measures of Health and Disease in Population”, inMeason, Black and Mills(3rd edition). Global Health: Diseases, Programs, Systems and Finances, Jones and Bertlett Learning.

Additional:

Sept. 18 LAB 2: Developing Measurable Objectives
Session 5: Health and Healthcare Disparities (Lecturer: WITT)

Required:

Sept. 20 Session 6: Modeling Determinants of Population Health (Lecturer: WITT)

Required:
• CHAPTER 4 POP HEALTH: CONCEPTS AND METHODS
• Carpiano RM, Daley DM. A guide and glossary on post-positivist theory building for population health. J Epidemiol Community Health 2006;60(7):564-570.


MODULE 2: Determinants of Population Health—From Cell to Society

Part A: Non-Medical Determinants

Sept. 25 LAB 3: Unnatural Causes

Session 7: Molecular/Genetic Determinants (Lecturer: SKINNER)

Required:

- CHAPTER 2 POP HEALTH: CONCEPTS AND METHODS

Additional:

- Healthy People 2010 web site: http://www.healthypeople.gov/About/

Sept. 27 Session 8: Biopsychosocial Determinants (Lecturer: CRESWELL)

Required:


Additional:


Oct. 2 LAB 4: Conceptual Model

Session 9: Behavioral and Cultural Determinants (Lecturer: MARTINEZ-DONATE)
Oct. 4  

**Session 10:** Social Determinants (I)—Gender, Race, & Socioeconomic determinants (Lecturer: NOBLES)

**Required:**
- TBA

Oct. 9  

**Review Session for Midterm (during lab session)**

**Session 11:** Social Determinants (II)—Neighborhood/Community Context (Lecturer: CATLIN)

**Required:**

Oct. 11  

**Session 12:** Environmental Determinants (I)—US (Lecturer: KANAREK)

**Required:**
- TBA

Oct. 16  

**MIDTERM EXAM (administered during the lab session)**

**Session 13:** Environmental Determinants (II)—Global (Lecturer: Malecki)

**Required:**
- TBA

Oct. 18  

**Session 14:** Global Health: Focus on Women and Children (Lecturer: Chatterjee)

**Required:**
- Koplan et. al, Towards a common definition of global health, Lancet 2009; 373: 1993–95
Part B: Medical Determinants

Oct. 23  
Post-Review of Midterm (during lab session)

Session 15: Type 2 Translational Research (Lecturer: SMITH)

Required:


Oct. 25  
Session 16: Medical Care as a Determinant (Lecturer: KINDIG)

Required:

- McGinnis JM, Williams-Russo P and Knickman JR. The case for more active policy attention to health promotion. Health Affairs 2002;March-April;21(2)78-93.

Oct. 30  
LAB 5: Earthquakes in Haiti and Chili

Session 17: Access and Quality (Lecturer: PANDHI)

Required:

- TBA
**Part C: Economic Determinants**

**Nov. 1  Session 18:** Economics of Health (I) (Lecturer: VANNESS)

- **Required:**  
  - TBA

**Nov. 6  LAB 6:** Discussion Session/Lab: Cost, Quality and Access

**Session 19:** Economics of Health (II) (Lecturer: Kreling)

- **Required:**  
  - TBA

**Nov. 8  Session 20:** Economics of Health (III) (Lecturer: VANNESS)

- **Required:**  
  - TBA

---

**MODULE 3: Research Development and Design for Studying Population Health**

**Nov. 13  LAB 7:** Economics of Population Health Science

**Session 21:** Asking and Operationalizing Population Health Questions (I)  
(Lecturer: WITT)

- **Required:**  
  - Chapter 5: Experimental and quasi-experimental designs for research: Donald T. Campbell and Julian C. Stanley  
  - Chapter 7: Specific research design for randomized experimental and quasi experimental approach: Research Methods in Applied Settings, An integrated approach in design and analysis.

**Nov. 15  Session 22:** Asking and Operationalizing Population Health Questions (II) (Lecturer: WITT)

- **Required:**  
Nov. 20  LAB 8: Research Design & Dev’t (pre and post work required)  
  
  Session 23: Community Intervention Trials (Lecturer: REMINGTON)  
  
  Required:  
  • TBA  

Nov. 22  
  Thanksgiving recess (NO CLASS)  

Nov. 27  LAB 9: Design and Level of Analysis for Population Health Studies  
  
  Session 24: Strategies and applications of population health studies (Lecturer: NIETO)  
  
  Required:  
  • TBA  

MODULE 4: Implications for Improving Population Health  

Nov. 29  Session 25: Levels of analyses for population health studies (Individual, Dyad, Family, Neighborhood, System, Policy, State) (Lecturer: GANGNON)  
  
  Required:  

Dec. 4  LAB 10: Final Review  
  
  Session 26: Translating Evidence into Practice (Lecturer: FEDER)  
  
  Required:  
  TBA  

Dec. 6  Session 27: Perspective on Population health: Improvement and Intervention (Lecture: TIMBERLAKE)  
  
  Required:  
  TBA  

Dec. 11  LAB 11: Translating Evidence into Practice
Required:

Session 28: Health Policy (Lecturer: OLIVER)

Required:
- TBA

Dec. 13 Drop in Session for exam clarification

Dec. 13- Dec 18: Take Home Final Exam