

Course number	CSU MPH 604	OU HLTH 674	UA 8300:604	YSU MPH 6904
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Course Director	G. Andy Chang, PhD, (YSU)
Office Hours	By appointment or email at anytime.
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Class meeting times	Meeting dates	Special dates
Class will meet from 9 a.m. to 12 noon.	08/21/10, 9/11/10, 10/02/10, 10/09/10, 10/30/10, 11/13/10, 12/4/10, 12/11/10	08/21/10 - Orientation and first day of class – NEOUCOM (Olson Hall) 09/11/10 - Biostatistics Lab at U. of Akron (Leigh Hall #214) 11/13/10 - Biostatistics Lab at U. of Akron (Leigh Hall #214) 11/27/10 - Thanksgiving holiday - no class 12/04/10 - Student presentations at NEOUCOM (Liebelt Lecture Hall—E-10)

Course Overview

This course will cover principles of biostatistics in the context of public health applications. It will include the basic and advanced statistical techniques for analyzing and investigating public health issues including disparities. Statistical package SPSS will be used.

Course Objectives:

At the end of the course, students should be able to do the following:

1. Understand and explain the basic concepts of descriptive and inferential biostatistics.
2. Organize, identify and retrieve relevant scientific evidence.
3. Select appropriate study designs and statistical methods for public health problems.
4. Apply biostatistical methods to quantify and propose solutions to public health problems.
5. Use statistical software to analyze public health data and interpret results of biostatistical analysis.

Books:

Required textbook: *Principles of Biostatistics* (2000), Pagano M and Gauvreau K, by Duxbury Press.

Optional material: *Student Solutions Manual* for Pagano/Gauvreau's *Principles of Biostatistics* 2nd Edition, by Duxbury Press.

Other references:

Introduction to Statistics and Data Analysis, Peck, Olsen, and Devore, 3rd ed., Brooks/Cole, 2009.

Biostatistics, Forthofer, Lee, and Hernandez, Academic Press, 2007.

Essentials of Biostatistics in Public Health, Lisa Sullivan, Jones and Barlett 2008.

Fundamentals of Biostatistics. Rosner B., Duxbury Press, 2005.

Statistics in Public Health, Stroup & Teutsch, Oxford, 1998.

Online statistics books:

- (1) <http://stattrek.com/AP-Statistics-1/Variables.aspx?Tutorial=ap> (Try AP Statistics or Probability and Statistics.)
- (2) <http://www.stat.berkeley.edu/users/stark/SticiGui/Text/index.htm>, [SticiGui](#)® Text
- (3) <http://davidmlane.com/hyperstat/>, HyperStat Online Statistics Textbook
- (4) <http://faculty.vassar.edu/lowry/webtext.html> , Concepts and Applications of Inferential Statistics.

Some reading materials from British Medical Journal (BMJ)*: (BMJ web address: <http://www.bmj.com/>)

1. How to read a paper: [Getting your bearings](#) (free registration is required)
2. How to read a paper: [Assessing the methodological quality of published papers](#)
3. How to read a paper: [Statistics for the Non-statisticians I](#)
4. How to read a paper: [Statistics for the Non-statisticians II](#)

* The articles in the website above provide good guidance in reading and preparing research paper.

WebAssign Homework Assignment System:

Please register at <http://webassign.net> and sign up for our class using class key and the instruction provided to you by Dr. Lee and Mona.

SPSS (available in your campus labs, check your university web site for lab locations and availability of SPSS)

SPSS Standard GradPack can be leased online from the following e-store: <http://www.onthehub.com/spss/> please check for 6 months. Web address for Download the SPSS demo (14 days free trial):

http://www.spss.com/downloads/Papers.cfm?ProductID=00035&Name=SPSS_Base&DLType=Demo

*You may use other software such as the free software R (see http://www.as.ysu.edu/~chang/R_Inst/R_Instructions.htm)

SPSS Tutorial Videos

- [Dr. Chang's Web Site](http://people.yzu.edu/~gchang/SPSS/SPSSmain.htm). <http://people.yzu.edu/~gchang/SPSS/SPSSmain.htm>
- [Tutorial provided by Texas A&M University](http://www.stat.tamu.edu/spss.php): <http://www.stat.tamu.edu/spss.php> (Videos for data processing and analysis.)

Evaluation*

Item	Assignment Type	Percentage (points)	Tentative Due Dates	Grading Scale/Percent	
Online Quizzes	Individual	10% (100 points)	Te be arranged (all on Wednesdays)	A	90-100
Assignments	Individual	35% (350 points)	9/15, 10/20, 11/17, 11/24	B	80-89
Exams	Individual	40% (400 points)	9/29, 11/3, 11/13, 12/4	C	70-79
Term project	Group	15% (150 points)	Abstract due 12/1, Paper due 12/8	D	60-69
Total		100% (1,000 points)		F	below 60

* All assignments and online exams are due at **11 p.m.** on the due dates.

- **Course Materials:** Course materials are all posted on Dr. Chang’s web site and U. of Akron Springboard. Springboard address is: <http://springboard.uakron.edu>. Additional homework assignments will be given through <http://WebAssign.net>. Students are responsible to read the course materials, assignments and deadlines, exam schedule and other announcements. If you have questions, contact instructor right away. It is strongly recommended that students find few more statistics books for reference.
- **Attendance:** Attendance at all class sessions and participation is expected. If a student is going to be absent for sickness or professional reasons, please let the instructor know ahead of time.
- **Participation:** During class sessions, activities may be given for each site or individuals to work on. The instructor may ask different students to report back to the full class. Professional comportment is also a part of participation: students are expected to arrive on time, stay until the end of class, and be respectful of other students.
- **Make-up exam** will only be given to student who misses an exam due to an extreme emergency and has notified the instructor within 24 hours after the exam, or a sufficient time period before the exam. The student will be expected to provide verification, such as signed statement and phone number, to verify the reason for his or her absence from the exam.
- **Submission of assignments:** Any SPSS assignment will be penalized 10% for each day late. All assignments must be submitted on time.
- **Video viewing:**
 - Video lectures made by instructor for some topics in statistics and SPSS available in Dr. Chang’s web site.
 - A video series on introductory statistics, Against All Odds (AAO) can be found at Annenberg Foundation Web site. The web address is: <http://www.learner.org/resources/resource.html?uid=65>. AAO video viewing is not required. however, it may help you in learning the subject.
- **Incompletes:** A student must receive permission of the course director in order to receive an “Incomplete” grade. If such permission has not been received, the grade that stands on **the last day of class meeting (Saturday of the week 15)** will be given.
- **Calculator:** An inexpensive hand held scientific calculator that has function keys for finding mean and variance may be helpful.

Course Schedule

Date	Subject	Reading & Video Viewing	Instructor
8/21/10 Week 1 Inclass	Introduction & Overview at NEOUCOM	<ul style="list-style-type: none"> • Orientation 	Andy Chang (YSU)
8/28/10 Week 2	Data Presentation, Numerical Summary Measures	<ul style="list-style-type: none"> • Chapters 1, 2, 3, Chapters 22 	Andy Chang (YSU)
9/4/10 Week LD	Probability & Bayes' Theorem	<ul style="list-style-type: none"> • Chapters 6 	Andy Chang (YSU)
9/11/10 Week 3 Inclass	Biostatistics LAB	<ul style="list-style-type: none"> • Descriptive Statistics & SPSS 	Andy Chang (YSU)
9/18/10 Week 4	Theoretical Probability Distribution	<ul style="list-style-type: none"> • Chapters 7 	Andy Chang (YSU)
9/25/10 Week 5	Sampling Distribution Confidence Intervals	<ul style="list-style-type: none"> • Chapters 8, 9 	Andy Chang (YSU)
10/2/10 Week 6 Inclass	Hypothesis Testing	<ul style="list-style-type: none"> • Chapters 10 	Andy Chang (YSU)
10/9/10 Week 7 Inclass	Comparison of Two Means Analysis of Variance	<ul style="list-style-type: none"> • Chapters 11, 12 	Andy Chang (YSU)
10/16/10 Week 8	Nonparametric Methods Inference on Proportions	<ul style="list-style-type: none"> • Chapters 13, 14 	Andy Chang (YSU)
10/23/10 Week 9	Contingency Tables Multiple 2x2 Tables	<ul style="list-style-type: none"> • Chapters 15, 16 	Andy Chang (YSU)
10/30/10 Week 10 Inclass	Correlation, Simple Linear & Multiple Regression	<ul style="list-style-type: none"> • Chapters 17, 18, 19 	Andy Chang (YSU)
11/6/10 Week 11	Logistic regression	<ul style="list-style-type: none"> • Chapters 20 	Andy Chang (YSU)
11/13/10 Week 12 Inclass	Biostatistics LAB	<ul style="list-style-type: none"> • Review materials on regression 	Andy Chang (YSU)

11/20/10 Week 13	Life Tables, Survival Analysis and Applications	<ul style="list-style-type: none"> Chapter 5 & 21 	Richard Steiner (UA)
11/27/10	NO CLASS -THANKSGIVING HOLIDAY	<ul style="list-style-type: none"> Review all materials 	-
12/4/10 Week 14 Inclass	Exam & Term Project Presentations at NEOUCOM	<ul style="list-style-type: none"> Review all materials 	Andy Chang (YSU)
12/11/10 Week 15 Inclass	Course wrap-up		Andy Chang (YSU)

Against All Odds (AAO) Video programs and numbers:

(web site and more detailed descriptions: <http://www.learner.org/resources/resource.html?uid=65>)

1: What is statistics?	14: Samples and surveys
2: Picturing distributions	15: What is probability?
3: Describing distributions	16: Random variables
4: Normal distributions	17: Binomial distributions
5: Normal calculations	18: The sample mean and control charts
6: Time series	19: Confidence intervals
7: Models for growth	20: Significance Tests
8: Describing relationships	21: Inference for one mean
9: Correlation	22: Comparing two means
10: Multidimensional data analysis	23: Inference for proportions
11: The question of causation	24: Inference for two-way tables
12: Experimental design	25: Inference for relationships
13: Blocking and sampling	26: Case study

Course faculty

G. Andy Chang, PhD, Professor (Course Director)

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Webpage: <http://people.ysu.edu/~gchang/>

Address: Department of Mathematics and Statistics, Youngstown State University, Youngstown, OH 44555

Office location: 1036 Cushwa Hall.

Richard Steiner, PhD, MPH, Professor

Work: (330) 972-8010; Fax: (330) 972-2028; E-mail: rps@uakron.edu

Address: The University of Akron, Department of Statistics, Akron, OH 44325-1913

Additional Note

Skype Internet Phone: (Skype is a facility that students may use to communicate with instructor through Internet phone or chat.)

Download at <http://www.skype.com/download/> (free Internet phone and video phone)

Dr. Chang's Skype username is **andychangysu**

PUBLIC HEALTH COMPETENCIES

Below are the public health competencies that we intend on covering in the course. We are using Bloom's taxonomy to indicate the level that the competency is covered in the course. We hope that you can accomplish what we have planned for you!

These competencies are taken from the Master's Degree in Public Health Core Competency Development Project, version 2.3

<http://www.asph.org/document.cfm?page=851>

Bloom's Taxonomy Categories

- **Knowledge (K):** Recall data or information.
- **Comprehension (C):** Understand the meaning, translation, interpolation, and interpretation of instructions and problems. State a problem in one's own words.
- **Application (AP):** Use a concept in a new situation or unprompted use of an abstraction. Applies what was learned in the classroom into novel situations in the work place.
- **Analysis (AN):** Separates material or concepts into component parts so that its organizational structure may be understood. Distinguishes between facts and inferences.
- **Synthesis (S):** Builds a structure or pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure.
- **Evaluation (E):** Make judgments about the value of ideas or materials.

PUBLIC HEALTH COMPETENCIES

	A. BIOSTATISTICS	Lecture/Readings	Videos	Online exercises	Assignments	Exams	Term Project Paper
	<p>Biostatistics is the development and application of statistical reasoning and methods in addressing, analyzing and solving problems in public health; health care; and biomedical, clinical and population-based research.</p> <p>Competencies: Upon graduation a student with an MPH should be able to...</p>						
A.1.	Describe the roles biostatistics serves in the discipline of public health.	K	K	C	AP		
A.2.	Describe basic concepts of probability, random variation and commonly used statistical probability distributions.	K	K	C	AP	C	
A.3.	Describe preferred methodological alternatives to commonly used statistical methods when assumptions are not met.	K	K	C	AP	C	AP
A.4.	Distinguish among the different measurement scales and the implications for selection of statistical methods to be used based on these distinctions.	K	K	C	AP	C	AP
A.5.	Apply descriptive techniques commonly used to summarize public health data.	K	K	C	AP	C	AP
A.6.	Apply common statistical methods for inference.	K	K	C	AP	C	AP
A.7.	Apply descriptive and inferential methodologies according to the type of study design for answering a particular research question.	K	K	C	AP	C	AP
A.8.	Apply basic informatics techniques with vital statistics and public health records in the description of public health characteristics and in public health research and evaluation.	K			AP		
A.9.	Interpret results of statistical analyses found in public health studies.	K	K		AP		
A.10.	Develop written and oral presentations based on statistical analyses for both public health professionals and educated lay audiences.						AP



F. COMMUNICATION AND INFORMATICS							
<p>The ability to collect, manage and organize data to produce information and meaning that is exchanged by use of signs and symbols; to gather, process, and present information to different audiences in-person, through information technologies, or through media channels; and to strategically design the information and knowledge exchange process to achieve specific objectives.</p> <p>Competencies: Upon graduation, it is increasingly important that a student with an MPH be able to...</p>		Lecture/Readings	Videos	Online exercises	Assignments	Exams	Term Project Paper
F.1.	Describe how the public health information infrastructure is used to collect, process, maintain, and disseminate data.	K					
F.2.	Describe how societal, organizational, and individual factors influence and are influenced by public health communications.				AP		
F.3.	Discuss the influences of social, organizational and individual factors on the use of information technology by end users.						
F.4.	Apply theory and strategy-based communication principles across different settings and audiences.						
F.5.	Apply legal and ethical principles to the use of information technology and resources in public health settings.	K					AP
F.6.	Collaborate with communication and informatics specialists in the process of design, implementation, and evaluation of public health programs.	K					
F.7.	Demonstrate effective written and oral skills for communicating with different audiences in the context of professional public health activities.	K			AP		AP
F.8.	Use information technology to access, evaluate, and interpret public health data.	K	K	C	AP	C	
F.9.	Use informatics methods and resources as strategic tools to promote public health.	K					AP
F.10.	Use informatics and communication methods to advocate for community public health programs and policies.				AP		