University of Maryland College Park
School of Public Health

EPIB 650: Biostatistics I

Semester: Fall 2010
Classroom and Time: 0305 SPH Building / Wednesday 7:00 PM – 9:45 PM
Instructor: Xin He, Ph.D.
Office: 2234H SPH Building
Office Hours: Tuesday and Thursday 12:00 PM – 2:00 PM or by appointment
Phone: 301-405-2551
Email: xinhe@umd.edu

Required Texts and Other Readings:

Required:

Recommended:

Course Description:
This course is intended to provide students with comprehensive introduction to basic statistical concepts and procedures used in public health research. The course focuses on applications, hands-on experience, and interpretations of statistical findings.

Course Learning Objectives:
Upon completing this course, the student will be able to:
1. Describe basic concepts of probability, random variation, and commonly used statistical probability distributions.
2. Describe and apply appropriate descriptive statistical methods for summarizing public health data.
3. Apply descriptive and inferential statistical methods that are appropriate to the different study designs used in public health research.
4. Critically review and summarize statistical analyses presented in public health literature.
5. Draw appropriate inferences based on statistical analyses used in public health research.
6. Use computer software such as SAS to conduct data analysis.

Program Competencies Addressed in this Course:
The following competencies for the Master of Public Health with concentration in Biostatistics are addressed in this course:
1. Describe basic concepts of probability, random variables, and commonly used statistical probability distributions.
2. Describe and apply appropriate descriptive statistical methods for summarizing public health data.
3. Apply descriptive and inferential statistical methods that are appropriate to the different study designs used in public health research.
4. Critically review and summarize statistical analyses presented in public health literature.
5. Draw appropriate inferences based on statistical analyses used in public health research.
6. Describe statistical theory as applied to public health data, research study designs, and tests of inference.
7. Describe and apply appropriate inferential statistical methods to answer research questions relevant to public health research.
8. Communicate results of statistical analyses to lay and professional audiences.

Course Requirements:

Homework:
The there will be eight homework assignments in this class, and each of them will be due at the beginning of the due date class. Late homework will NOT be accepted without a reasonable and advance notice.

Exams:
Exams will be in class, closed book and closed note. The content of the exam will be cumulative, but the emphasis will be on the materials not covered in the previous exams. For the midterm exam #1, you are allowed to bring one page of letter-size formula sheet; for the midterm exam #2, you are allowed to bring two pages of letter-size formula sheet; for the final exam, you are allowed to bring a maximum of three pages of letter-size formula sheet. You also need to bring a calculator to facilitate the computation.

As a general rule, make-up exams and advance exams will NOT be given. Exceptions to this rule are evaluated on a case-by-case basis. Students must submit the request before the exam takes place with valid supporting document. No post-exam request will be considered except the student is hospitalized during the exam period.

Course Website:
Course announcements, lecture notes, data sets, homework assignments, and homework solutions will be distributed on the ELMS (Enterprise Learning Management System). Please check it on a regular basis. Lecture notes will be posted before class. You may wish to print these notes prior to each lecture and use them as an outline for taking notes during the class. You can access the website by following these directions:
- Direct your URL to https://elms.umd.edu/.
- Enter your Directory ID and Password.
- Click “Course Sites” on the ELMS home tab.
- Click “201008_EPIB650_xinhe: EPIB650 Sec - 0101 Fall 2010: Biostatistics I”.

Course Policies:

Email – The Official University Correspondence:
Verify your email address by going to www.my.umd.edu.

All enrolled students are provided access to the University’s email system and an email account. All official University email communication will be sent to this email address (or an alternate address if
provided by the student). Email has been adopted as the primary means for sending official communications to students, so email must be checked on a regular basis. Academic advisors, faculty, and campus administrative offices use email to communicate important and time-sensitive notices.

Students are responsible for keeping their email address up to date or for redirecting or forwarding email to another address. Failure to check email, errors in forwarding email, and returned email (from “full mailbox” or “unknown user” errors for example), will not excuse a student from missing University announcements, messages, deadlines, etc. Email addresses can be quickly and easily updated at http://www.my.umd.edu or in-person at the Student Service Counter on the first floor of the Mitchell Building.

For technical support for University email: www.helpdesk.umd.edu or call 301-405-1400.

Religious Observances:
The University System of Maryland policy provides that students should not be penalized because of observances of their religious beliefs; students shall be given an opportunity, whenever feasible, to make up within a reasonable time any academic assignment that is missed due to individual participation in religious observances. It is the student’s responsibility to inform the instructor in advance of any intended absences for religious observance.

Special Accommodations / Disability Support Services:
If you have a documented disability and wish to discuss academic accommodations for test taking or other needs, you will need documentation from Disability Support Service (301-314-7682). If you are ill or encountering personal difficulties, please let the instructor know as soon as possible. You can also contact Learning Assistance Services (301-314-7693) and/or the Counseling Center (301-314-7651) for assistance.

Academic Integrity:
The University's code of academic integrity is designed to ensure that the principle of academic honesty is upheld. Any of the following acts, when committed by a student, constitutes academic dishonesty:

- **CHEATING**: intentionally using or attempting to use unauthorized materials, information, or study aids in an academic exercise.
- **FABRICATION**: intentional and unauthorized falsification or invention of any information or citation in an academic exercise.
- **FACILITATING ACADEMIC DISHONESTY**: intentionally or knowingly helping or attempting to help another to violate any provision of this code.
- **PLAGIARISM**: intentionally or knowingly representing the words or ideas of another as one's own in any academic exercise.

For more information see: http://www.shc.umd.edu/code.html.

The Honor Pledge is a statement undergraduate and graduate students should be asked to write by hand and sign on examinations, papers, or other academic assignments. The Pledge reads:

I pledge on my honor that I have not given or received any unauthorized assistance on this assignment/examination.
The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit http://www.shc.umd.edu.

Inclement Weather / University Closings:
In the event that the University is closed for an emergency or extended period of time, the instructor will communicate to students regarding schedule adjustments, including rescheduling of examinations and assignments due to inclement weather and campus emergencies. Official closures and delays are announced on the campus website (http://www.umd.edu) and snow phone line (301-405-SNOW), as well as local radio and TV stations.

Grading Procedures:
Grade of this course will be determined as follows:
• Homework: 30%
• Midterm Exam #1: 20%
• Midterm Exam #2: 20%
• Final Exam: 30%

Course Outline / Course Calendar:

<table>
<thead>
<tr>
<th>Lecture Number</th>
<th>Date</th>
<th>Topic</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>09/01/2010</td>
<td>Overview; Types of Numerical Data; Data Presentation; Introduction to SAS.</td>
<td>Chapters 1 &amp; 2</td>
</tr>
<tr>
<td>2</td>
<td>09/08/2010</td>
<td>Numerical Summary; Introduction to Probability.</td>
<td>Chapters 3 &amp; 6</td>
</tr>
<tr>
<td>3</td>
<td>09/15/2010</td>
<td>Probability Laws; Bayes’ Theorem and Applications; Application to Diagnostic Tests.</td>
<td>Chapter 6</td>
</tr>
<tr>
<td>4</td>
<td>09/22/2010</td>
<td>ROC Curves; Random Variable; Probability Distributions; Discrete Random Variables; Reading Binomial Probability Table.</td>
<td>Chapters 6 &amp; 7</td>
</tr>
<tr>
<td>5</td>
<td>09/29/2010</td>
<td>Midterm Exam #1.</td>
<td></td>
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<tr>
<td></td>
<td>Date</td>
<td>Topic</td>
<td>Chapter(s)</td>
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<tr>
<td>6</td>
<td>10/06/2010</td>
<td>Reading Poisson Probability Table; Continuous Random Variables; Reading Normal Probability Table.</td>
<td>Chapter 7</td>
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<tr>
<td>7</td>
<td>10/13/2010</td>
<td>Normal Approximation to Binomial Distribution; Population and Sample; Sampling Distributions; Central Limit Theorem.</td>
<td>Chapters 7 &amp; 8</td>
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<td>8</td>
<td>10/20/2010</td>
<td>Basics for Statistical Inference; Point and Interval Estimation; Sample Size Determination based on Interval Estimation; Student’s t Distribution; Reading Student’s t Distribution Table.</td>
<td>Chapter 9</td>
</tr>
<tr>
<td>9</td>
<td>10/27/2010</td>
<td>Hypothesis Testing Framework; Types of Errors; P-values; Decision Rule; One-Sample Z Test.</td>
<td>Chapter 10</td>
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<td>10</td>
<td>11/03/2010</td>
<td>Midterm Exam #2.</td>
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<tr>
<td>11</td>
<td>11/10/2010</td>
<td>One-Sample t Test; Relationship with Confidence Intervals; Power.</td>
<td>Chapter 10</td>
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<tr>
<td>12</td>
<td>11/17/2010</td>
<td>Sample Size Determination via Power; Comparison of Two Means for Paired Samples and Independent Samples.</td>
<td>Chapters 10 &amp; 11</td>
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<tr>
<td>13</td>
<td>11/24/2010</td>
<td>Analysis of Variance.</td>
<td>Chapter 12</td>
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<td>14</td>
<td>12/01/2010</td>
<td>Simple Linear Regression.</td>
<td>Chapter 18</td>
</tr>
<tr>
<td>16</td>
<td>12/15/2010</td>
<td>Final Exam.</td>
<td></td>
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* This is a tentative schedule, and the actual materials covered in each lecture might not be exactly the same.