

BIostatISTICS IN PUBLIC HEALTH

EPID 576a (also CPH 576a) – Fall, 2008

Drachman A 118

Section 1: TR 12:30-1:45

Section 2: TR 4-5:15

Professor James Ranger-Moore

Office: Drachman A238

E-mail: jrangerm@azcc.arizona.edu

Office Hours: 15 min. before/after class,
or by appointment

TAs: Marty Cisneroz martinc@email.arizona.edu
Sibeso Namakando sibeso@email.arizona.edu
Nick Smith mnsmith@email.arizona.edu
Lua Zawacki lua@email.arizona.edu

LAB Office Hours: M: 8am-10am (Cisneroz), 6pm-9pm (Namakando – online)
T: 8:30am-10:30am (Smith)
W: 12noon-2pm (Zawacki), 3pm-5pm (Smith), 6pm-9pm (Namakando – online)
R: 2pm-4pm (Zawacki)
F: 2pm-4pm (Cisneroz)
Or by appointment

Office hours will commence on Wednesday, 8/27/2008.

COURSE DESCRIPTION: This course introduces biostatistical methods and applications, and will cover descriptive statistics, probability theory, and a wide variety of inferential statistical techniques that can be used to make practical conclusions about empirical data. Students will also be learning to use a statistical software package (Stata).

COURSE PREREQUISITES: In order to complete this goal successfully, a prerequisite of at least one year of college mathematics is required. You should be conversant with basic algebra, proportions, frequency tables, basic graphics, and measures of central tendency (to be discussed in the first lecture). Note that I will not check on this prerequisite formally, but you would be well advised to see me if you have doubts about how well your background prepares you for this course.

COURSE LEARNING OBJECTIVES: At the end of the course, you should be able to:

1. Identify the properties of given data sets, including the level of measurement for each variable.
2. Apply appropriate descriptive statistics to the data according to its measurement type.
3. Apply appropriate inferential statistics to the data according to its measurement type.
4. Formulate and test hypotheses.
5. Use a computer statistical software package (Stata) to accomplish objectives 2-4.
6. Apply your statistical knowledge to the design of research studies, including selection of proper research design and determination of sample sizes necessary to show statistical significance
7. Interpret and critique medical and scientific journal articles which frequently rely heavily on statistical procedures.

COURSE NOTES: Notes are available on the D2L website (see below). I will distribute a packet on the first day of class to get you started.

TEXTBOOKS: We will be using the 2nd edition of *Principles of Biostatistics*, by Pagano and Gauvreau, published by Duxbury Press. It is available in the Medical School Bookstore. This text comes with a CD that has data sets for use in homework problems. The data sets used in the homework are not in the chapter

directories, but rather can be found in the exercise directory. A copy of the text will be on reserve at the AHSC library.

COURSE WEBSITE: A webpage has been created for this class using the Desire 2 Learn (D2L) interface. This course website contains the syllabus, class notes, sample Stata do-files, datasets (used in lecture and for the homework), etc.

Class announcements will also be posted on this site, so it is a good idea to check the site regularly to stay current.

To access the 576a website, login at: <http://d2l.arizona.edu/>

- Click the 'UA NetID' Login.
- Enter your NetID and password, as you would to access your UA email account.
- Under 'My Academic Courses', click on the link to EPI/CPH 576a Biostatistics for Public Health

For further information on how to use the D2L interface, go to:

http://www.help.d2l.arizona.edu/tip_sheet

I have configured my D2L account so that any emails you send on D2L will go to my UA account, and I expect that the TAs will do the same. You may well want to do this, too, so that you don't have multiple email accounts to check (I strongly recommend it, in fact). To do this, go to "My Settings" on D2L. Go to Preferences (in the upper left region). Click on the "Email" tab at the top. Near the bottom of the resulting page, check the box under "Forwarding options", and choose any one of the three radio buttons. If you have trouble doing this, check the D2L help documentation above, or drop in on the TA office hours to get help.

Note – if you do not have a UA NetID, please see me as soon as possible so that we can figure out how to get you access to the D2L site.

COURSE REQUIREMENTS: In addition to reading the text (dates listed below indicate when the reading needs to be **done by**) and attending lectures, the primary course requirements consist of homework assignments, data analysis reports, and exams. Homework is due often. The due dates listed at the end of the syllabus indicate when homework needs to be turned in. Answers to homework questions have been posted on the D2L website. TAs will check your homework for completeness, but due to course volume will not correct the homework. Credit will be given for every question which you answer **clearly**, whether or not the answer is correct. The TAs will only make sure that your answer is intelligible, and that you have not copied answers directly from the web or from another student. It will be your responsibility to check your homework against the answer key to make sure that your answers are correct. The TAs will be available during their office hours in order to answer your questions if you are having difficulty understanding why you are not getting an answer right. It is very important that you take advantage of the TA office hours!!

In addition to required homework, feel free to tackle any of the other homework problems in the textbook, or in any other statistics text that you come across that seems relevant to this course. Again, TAs can help you with these during their office hours. There will also be practice exams available, using questions that have appeared on previous exams. Answers to these will be available and TAs will be very happy to work with you on these problems during their office hours. Did I remember to tell you how important it is to take advantage of TA office hours?

DO NOT put off homework until the last minute! Doing the homework as soon as possible after the relevant material has been covered in lecture will make the task easier for you, and will maximally reinforce the material in your mind. Do each problem BEFORE consulting the answer key. The best way to excel on the exams is to master the homework and the practice exams. Given the explicit scheduling of homework due dates and the

logistical difficulty involved in large numbers of detailed answers, **late homework assignments will not be accepted**. Homework must be turned in during class on the due date, or by 5pm in the bin outside my office door. Electronic and faxed submissions will not be accepted unless prior arrangements have been made (eg, due to travel to conferences, illness, etc.). You can drop your lowest two homeworks. It is wise to save these drops for illness or emergencies.

Please be neat and orderly in your homework assignments. **Staple** your homework answers. Remember to put your **name** and your **section** number on the front page at least (all pages if you are paranoid about the staying power of staples). The ‘by hand’ homework can be typed or handwritten (let’s face it, it’s tough to type up all of those mathematical formulas). In order to accommodate hand-writing mathematical formulas for the ‘by hand’ homework, Please put all of the ‘by hand’ problems first, and then the ‘Stata’ problems second. This is a little odd for some problems, where you do part by hand, and part by Stata, but it makes life sane for the TAs. Note, too, that sometimes you have to do a problem both by hand **and** in Stata – those cases are not typos. There are occasions where I want you to do a problem both ways –by hand to make sure you understand the mechanics of the approach; Stata to show you how much easier it is to use the computer! Circle or highlight numeric answers that you calculate by hand. Bold, highlight, or otherwise **emphasize** those that are obtained as computer output (for example, many statistical tests in Stata provide three output results: both one-sided and the two-sided results. You need to indicate which of those is appropriate for your situation). Make copies of all of your homework (whether electronic or hard copy); this enables you to check answers and/or refer to your own work while your submitted work is being processed by the TAs, and it also safeguards you against the possibility of accidental loss of your assignment.

On exams, partial credit is doled out generously; my goal is to see that you are thinking statistically. Therefore, on exams, just as with homework, always show your work (again, be as neat and clear as possible).

GRADING: Exams and homework contribute to your final grade as follows:

Homework	10% (each chapter weighted the same, even if length differs)
Analysis Papers	15% (5% each)
Three Exams	75% (20%, 25%, and 30% respectively)

Final grades are based on the following point system:

A	= 90-100%
B	= 80-89%
C	= 70-79%
D	= 60-69%
E	= 59% or less

Grades will not be curved. Grading is quite straightforward in this class, because statistics is a precise, mathematical endeavour. However, if you have any concerns with your grades, please contact me as soon as the concern arises. Sometimes honest mistakes and oversights occur. If at the end of the semester, you believe that your grade has been awarded unfairly, there is a grade appeal process to follow. You can access it at:

<http://catalog.arizona.edu/2008%2D09/policies/gradappeal.htm>

CLASS ATTENDANCE AND PARTICIPATION: I am not going to keep track of attendance, but you are responsible for everything that goes on in class, including any alterations to the syllabus. You are responsible for reading emails sent to your UA account from your professor (not likely to happen) and the announcements that are placed on the course web site (very common). Information about readings, news events, your grades, assignments and other course related topics will be communicated to you with these electronic methods. The official policy can be found at: <http://www.registrar.arizona.edu/emailpolicy.htm>. I strongly encourage you to

develop a "buddy system" with one or more other students to take notes and announcements down if, for some unavoidable reason, you are unable to make it to class on a particular day. I will start class promptly, so please do not be late. I will try to be in class about 10 minutes early and stay about 10-20 minutes late to handle questions (we may have to shift locations after class in section 1, since another class follows ours). I am also available to meet at my office by appointment.

If you find that you must miss a class, you have a couple of options in addition to the buddy system. Traditionally, I have encouraged students to sit in on the other section if they cannot attend a class in their own. You can also attend both sections if there are some topics where you want to hear me cover the material twice (if you can stand listening to me that much). You can attend the other section as needed without specifically asking my permission to do so. Also, you have permission to tape record any lecture without having to ask me first, and/or you can have another student do so for you. I strongly encourage tape recording if you find that it helps to hear things again a second time or more.

The second option is to watch me online. In Fall of 2005, to provide support to the online version of this class that occurs in the spring, all of my lectures were taped. The class changes at least a little every year, so these lectures are no longer perfectly synchronized; however, much in them will still be quite useful. You can go to http://vala.arizona.edu/vss-bin/vss_SR.exe/torpey/search. You will see a blue box with tabs. The default tab is "Search". If you look on the upper right-hand side of the box there is a drop down menu entitled "Search Class/Title". Left click on the little downward pointer on the right-hand side of the box that says "Other:" and you will get a drop down menu. Select CPH576a, then click the maroon "find videos" button at the bottom center of the blue box. A listing of classes will show up. If you click on a specific date another window will pop up and it will have a video window, key frames, and text. Take it from there. Currently, these video files are only being run with REAL PLAYER. If the video won't play for you, it's probably because you don't have that installed. You can download Realplayer (Or RealplayerOne if in XP) if you click on the "info" tab and go to the appropriate link.

Please ask lots of questions during class. There are no dumb questions. Also, I tend to get excited and race ahead if you do not slow me down with questions. Finally, I will become bored, and therefore boring, if not frequently stimulated with questions. Realize, though, that I also need to keep the pace going. Therefore, while I do not mind re-stating things twice (and 3-4 times for crucial concepts), I do reserve the right to ask folks to bring basic questions to the TAs during office hours if it feels like the majority of the class is ready to move on. Also, if you have questions that are more advanced, feel free to ask those – occasionally I will answer those in class because I think everyone will learn something interesting, but I also reserve the right to defer those until after class, especially if time is short (which it usually is).

Stata AND COMPUTER LABS: Stata is available for public use at two locations:

Drachman Hall Computing Lab: Drachman A 319, open weekdays, from 8-5.

There are printers available free of charge if you want to print homeworks, etc, but you must supply your own paper.

Arizona Health Sciences Library Computer Lab: AHSC 2150, open every day 6am-midnight.

These computers are behind the information/reference desk on the main floor. The first couple of banks of machines are not part of the lab, but are rather used for lit searching, etc. The lab is the 'walled off' section of computers behind the first couple of banks. You may print output here at the rate of 10 cents per page for black and white and 75 cents per page for color.

NOTE: Students in AHSC can access these computers simply by swiping their CatCards. Non-AHSC students have to be added to the master system. If you are a non-AHSC student

who wants to take advantage of this facility, please let me know during the first week of class, so I can get you added to the system.

Note that these are public facilities, and may or may not be crowded on a given day. Realize, too, that when learning a new computer package, procedures that seem simple in hindsight appear confusing on the first pass. PLEASE DO NOT POSTPONE WORKING ON Stata ASSIGNMENTS UNTIL THE NIGHT BEFORE THEY ARE DUE! If you follow this advice, you will spare yourself the necessity of learning it from painful experience. To assist you, the lab TAs will be available as noted in the header information at the beginning of the syllabus.

If you don't want to print at the public facilities, you can run Stata and format the appropriate results into Word or another word processing document, save to disk, and print at home or elsewhere. Another option is to obtain a personal copy of Stata (although this would certainly cost more than 10 cents, you will have the copy of Stata to keep). We will be using intercooled Stata 10 in the classroom and labs, and if ordering your own copy, you should obtain intercooled Stata 10. Stata 10 can be ordered at a graduate class rate of \$95.00 for a one-year license or \$155 for a perpetual license, and a basic set of manuals for \$179 by calling Stata directly at 1-800-782-8272 with a credit card. Basic manuals will be available at the lab locations, and a Stata version 9 set (which is fine for what we'll be doing in this class) will be available in the Epi/Biostats library on the 2nd floor of Drachman Hall. Moreover, there is reasonable electronic help with the package, so you won't need the basic manuals unless you are working at home and/or want to continue with the package long-term. If you want to borrow a manual from the library, check it out with Anita Foley or Donna Peterson, the Division's administrative experts.

Alternatively, you can order online at the following link: <http://stata.com/order/new/edu/gradplans/gp-campus.html>. Stata/SE 10 is available for \$335 if you feel that you will be doing large data set analysis in the future (most of you won't, even if continuing in Epi/Biostats – large means HUGE). Be sure to mention that you are ordering from the GRADPLAN. Purchases can be picked up just outside my office from Anita Foley (626-7914), Drachman Hall A206GG, usually the next day but no later than 3 days after ordering.

ACADEMIC INTEGRITY: All students are expected to do their own work. For homework, feel free to ask each other questions about concepts and procedures. When you teach each other, you teach yourselves. However, when it comes time to write down the homework to turn in, do that on your own. Duplicate homeworks will be considered a breach of academic integrity. Likewise, for analysis projects, feel free to ask each other questions and bat around ideas, but the actual analysis and report generation needs to be your own work.

No communication between students of any sort is allowed during exams. If there is a question during an exam, bring it to my attention by raising your hand. Anyone detected in violation of these guidelines will receive a failing grade for the course, as well as disciplinary action at the college level. You are responsible for knowing and abiding by all aspects of the University of Arizona Code of Academic Integrity, available through the office of the Dean of Students and online at: <http://dos.web.arizona.edu/uapolicies/scc5308abcd.html> and <http://dos.web.arizona.edu/uapolicies/cai1.html>.

CLASSROOM BEHAVIOR: All students are expected to behave respectfully during class. If you arrive late or must leave early, please take a seat near the door to minimize disruption. Please turn off cell phones and pagers unless there is great need (eg, if you are a practicing physician on call, or a family crisis is unfolding). If you must allow for such contact, set cell phones and pagers to vibrate if at all possible, and sit near an exit. Students are expected to be familiar with the UA Policy on Disruptive Behavior in an Instructional Setting found at <http://policy.web.arizona.edu/~policy/disruptive.pdf>. Threatening behavior of any kind is forbidden, and students are also expected to be familiar with the Policy on Threatening Behavior by students found at

<http://policy.web.arizona.edu/threatening.pdf>. I am currently functioning as the alpha male for two sons and four dogs (all spirited), so I don't expect this will be a problem.

GRIEVANCE POLICY: If you have any problems with the course, please feel free to talk to me about it. I supervise the TAs, so I am the next person of recourse if you have difficulties there. If you have a complaint about me, and informal discussion with me does not resolve the problem, you can talk to Dr. Douglas Taren, the Associate Dean for Academic Affairs. If the problem cannot be resolved through these channels, you can file a formal grievance with the Graduate College. See <http://grad.arizona.edu/catalog/policies/academic-policies/grievance-policy>.

DISABILITY RESOURCE CENTER: If you anticipate issues related to the format or requirements of this course, please meet with me. I would like us to discuss ways to ensure your full participation in the course. If you determine that formal, disability-related accommodations are necessary, it is very important that you be registered with Disability Resources (621-3268; drc.arizona.edu) and notify me of your eligibility for reasonable accommodations. We can then plan how best to coordinate your accommodations. The official policy can be found at: <http://catalog.arizona.edu/2008%2D09/policies/disability.htm>

CHANGES TO THIS SYLLABUS: The information contained in this syllabus is subject to change, other than the grading policy, in which case I will give advance notice via the D2L website. Exam dates will not change, although the content covered by them might.

SCHEDULE: Any changes to the following schedule will be announced in lecture. You are responsible for obtaining information on any changes, even if you miss class. Remember, assigned readings are due on the day they are listed.

Date	Topic	P&G Reading	Homework by Hand	Stata Homework	HW Due Date
8/26, 8/28	Introduction, Data Types, Inferential Statistical Tests, Stata, Tables and Graphs	Chs. 1-2	2: 1-7, 16a, handout: levels of measurement	2: 8, 16b-c, 17-19	9/2
9/2, 9/4	Measures of Tendency & Dispersion	Ch. 3 (skip 3.3, 3.4)	3: 1-3, 7	3: 7, 12 (not 12b), 13, 15	9/9
9/9, 9/11	Probability	Ch. 6 (skip 6.5)	6: 1-5, 7-9, 13-15		9/18
9/16	NO CLASS				
9/18, 9/23	Probability Distributions	Ch. 7 (skip 7.3)	7: 1-3, 6-10, 13 (not 13c), 17-18		9/25
9/25	Sampling Distributions	Ch. 8	8: 1-6, 8, 11, 13		9/30
9/30	Confidence Intervals	Ch. 9	9: 1-5, 8	9: 8, 10, 12, 13	10/2
10/2	EXAM 1	Ch. 2,3,6-9			
10/7, 10/9, 10/14	Hypothesis Testing	Ch. 10	10: 1-9, 14, 15	10: 10, 11, 16	10/16
10/16	Comparison of 2 Means	Ch. 11	11: 1-4	11: 5-6, 9-10, 13	10/21
10/21, 10/23	ANOVA	Ch. 12	12: 1-6	12: 10, 11, handout	10/28
10/28	Non-parametric Methods	Ch. 13	13: 1-5	13: 8, 10, 11, 13-14	10/30
10/30, 11/4	Relative Risk & Odds Ratio, Contingency Tables	Ch. 6.5, 15	6: 18, 19 15:1-6	15: 8-10, 14, 19-20	11/6
11/6	EXAM 2	Ch. 6.5, 10-13, 15			
11/11	Veteran's Day-no class				
11/13	Correlation	Ch. 17	17:1-4	17:5-6	11/18

11/18, 11/20, 11/25	Regression	Ch. 18	18:1-7	18:10-13	12/2
12/2, 12/4, 12/9	Multiple Regression	Ch. 19	19:1-7	19:8-11	12/12
Varies by section	Final Exam			Section 1: 12/18, 11am-1pm Section 2: 12/16, 5pm-7pm	