

COURSE SYLLABUS - DRAFT (details subject to change)

Course number: PubH 7217-101 #89049

Course title: Advances in Molecular Epidemiological Analysis

Credits: 1.0

Course meeting times:	Monday, 6/6; 9:00 a.m. - 12:00 pm Tuesday, 6/7; 8:00 a.m. - 12:00 pm Wednesday, 6/8; 8:00 a.m. - 12:00 p.m. Friday, 6/10; 8:00 a.m. - 12:00 p.m.
Instructor:	Craig W. Hedberg, PhD Associate Professor Jeffrey Bender, DVM, MPH Assistant Professor
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I. Course Description

The rapid development of laboratory techniques to detect, identify, and characterize infectious disease agents has led to explosive growth in the field of molecular epidemiology. Molecular subtyping systems have been incorporated into national surveillance programs, such as PulseNet. Genetic sequencing has been conducted on everything from individual PCR amplicons to whole organisms. Much of the laboratory methods development has focused on issues of sensitivity and specificity. However, discriminatory power does not always equate with epidemiologic usefulness. This course explores the epidemiologic application of these methods to current foodborne and infectious disease problems.

II. Learning Objectives

Upon completion of this course, students will be able to:

1. Identify the major molecular techniques used to detect, identify, and characterize infectious disease agents.
2. Describe the use of molecular subtyping methods as a basis for surveillance and outbreak investigations.
3. Explain why increasing the discriminatory power of a method does not always increase its epidemiologic usefulness.
4. Describe how use of molecular subtyping methods may vary with the epidemiologic situation and the questions being addressed.

- Promote the understanding that applying molecular epidemiology requires close collaboration between laboratorians and epidemiologists.

III. Methods of Instruction and Work Expectations

Lectures, discussions, and group exercises are used to present models for developing effective risk management systems. Outside speakers and discussions highlight the appropriate use and limitations of various management strategies and control measures.

Course grading will be determined on the basis of:

- class participation (50 points, 20% of grade),
- a multiple-choice examination (100 points, 40% of grade), and
- a written assignment due within one week of the last day of class (100 points, 40% of grade).

IV. Grading

- Grading Criteria:** This course is offered A/F or S/N

- A/F letter grade will be determined by total effort as follows:

A = 95-100%	(4.0) Represents achievement that is outstanding relative to the level necessary to meet course requirements.
A- = 90-94%	
B+ = 87-89%	
B = 83-86%	(3.0) Represents achievement that is significantly above the level necessary to meet course requirements.
B- = 80-82%	
C+ = 77-79%	
C = 73-76%	(2.0) Represents achievement that meets the minimum course requirements.
C- = 70-72%	
F =	Represents failure (or no credit) and signifies that the work was either (1) completed but at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I.

- S/N option must complete all assignments to a C- level (70%):

S	Achievement that is satisfactory will be expected to complete all assignments and receive a minimum of 70% to receive a passing score (achievement required for an S is at the discretion of the instructor but may be no lower than a 70%).
F	Represents failure (or no credit) and signifies that the work was either (1) completed but at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I.

- Grading Option** - Students may change grading options during the initial registration period or during the first two days of the term. **The grading option may not be changed after the second day of class.**
- Course Incomplete** - An incomplete grade is permitted only in cases of extraordinary circumstances and following consultation with the instructor. In such cases and "I" grade will require a specific written agreement between the instructor and the student specifying the time

and manner in which the student will complete the course requirements. Extension for completion of the work will not exceed one year.

4. **Scholastic Dishonesty** - This course follows the University of Minnesota Board of Regents' policy on student conduct and scholastic dishonesty which can be found at:
<http://www1.umn.edu/regents/policies/academic/StudentConductCode.pdf>

A grade of "F" or "N" for the entire course will be assigned for scholastic dishonesty as defined in the policy and will be reported to the Office of Student Judicial Affairs
<http://www.sja.umn.edu/>

Plagiarism is an important element of this policy. It is defined as the presentation of another's writing or ideas as your own. Serious, intentional plagiarism will result in an "F" or "N" grade for this course. For more information on this policy and for a helpful discussion of preventing plagiarism, please consult University policies and procedures regarding academic integrity:
<http://cisw.cla.umn.edu/plagiarism/uofmpolicies.html>

Students are urged to be careful that they properly attribute and cite others' work in their own writing. For guidelines for correctly citing sources, go to <http://tutorial.lib.umn.edu/>. In addition, original work is expected in this course. It is unacceptable to hand in assignments for this course for which you received credit in another course unless by prior agreement with the instructor. Building on a dissertation or final project is acceptable.

If you have any questions, consult the instructor.

V. Course Withdrawal

School of Public Health Students may withdraw from a course **through the second day** of the course without permission. No "W" will appear on the transcript. After the second day, students are required to do the following:

- The student must contact and notify their advisor and course instructor informing them of the decision to withdraw from the course.
- The student must send an email to the SPH Student Services Center (SSC). The email must provide the student name, ID#, course number, section number, semester, and year with instructions to withdraw the student from the course, and acknowledgement that the instructor and advisor have been contacted.
- The advisor and instructor must email the SSC acknowledging the student is canceling the course. All parties must be notified of the student's intent.
- The SSC will complete the process by withdrawing the student from the course after receiving all emails (student, advisor and instructor). A "W" will be placed and remain on the student transcript for the course.
- After discussion with their advisor and notification to the instructor, students may withdraw until the end of the second day of class. There is no appeal process.

VI. Disabilities

Any student with a documented disability (e.g. physical, learning, psychiatric, vision, hearing, etc.) who needs to arrange reasonable accommodations must contact the instructor and Disability Services at the beginning of the term. All discussions remain confidential. For further information contact the University of Minnesota Disability Services website at <http://ds.umn.edu/> or call 612-626-1333 (V/TTY).

VII. Course Text and Readings

There is no text for this course. Readings include the following published articles and selections from the listed web-sites. Students should go to the websites via the link provided to download the materials required for this course.

- <http://www.cdc.gov/pulsenet/>
- <http://www.cdc.gov/ncidod/eid/>

Murray M. Sampling bias in the molecular epidemiology of tuberculosis. *Emerg Infect Dis.* 2002 Apr;8(4):363-9. <http://www.cdc.gov/ncidod/EID/vol8no4/00-0444.htm>

Pfaller MA. Molecular approaches to diagnosing and managing infectious diseases: practicality and costs. *Emerg Infect Dis.* 2001 Mar-Apr;7(2):312-8. <http://www.cdc.gov/ncidod/eid/vol7no2/pfaller.htm>

Salamon H, Segal MR, Ponce de Leon A, Small PM. Accommodating error analysis in comparison and clustering of molecular fingerprints. *Emerg Infect Dis.* 1998 Apr-Jun;4(2):159-68. <http://www.cdc.gov/ncidod/eid/vol4no2/salamon.htm>

Jernigan DB, Raghunathan PL, Bell BP, et al. Investigation of bioterrorism-related anthrax, United States, 2001: epidemiologic findings. *Emerg Infect Dis.* 2002 Oct;8(10):1019-28 <http://www.cdc.gov/ncidod/EID/vol8no10/02-0353.htm>

Rota PA, Liffick SL, Rota JS, et al. Molecular epidemiology of measles viruses in the United States, 1997-2001. *Emerg Infect Dis.* 2002 Sep;8(9):902-8. <http://www.cdc.gov/ncidod/eid/vol8no9/02-0206.htm>

Kalish ML, Robbins KE, Pieniazek D, et al. Recombinant viruses and early global HIV-1 epidemic. *Emerg Infect Dis* 2004; 10:904. <http://www.cdc.gov/ncidod/EID/vol10no7/03-0904.htm>

Shopsin B, Kreiswirth BN. Molecular epidemiology of methicillin-resistant *Staphylococcus aureus*. *Emerg Infect Dis.* 2001 Mar-Apr;7(2):323-6. <http://www.cdc.gov/ncidod/eid/vol7no2/shopsin.htm>

Swaminathan B, Barrett TJ, Hunter SB, Tauxe RV. PulseNet: the molecular subtyping network for foodborne bacterial disease surveillance, United States. *Emerg Infect Dis.* 2001 May-Jun;7(3):382-9. <http://www.cdc.gov/ncidod/eid/vol7no3/swaminathan.htm>

Ribot EM, Wierzba RK, Angulo FJ, Barrett TJ. *Salmonella enterica* serotype Typhimurium DT104 isolated from humans, United States, 1985, 1990, and 1995. *Emerg Infect Dis.* 2002 Apr;8(4):387-91. <http://www.cdc.gov/ncidod/EID/vol8no4/01-0202.htm>

Sauders BD, Fortes ED, Morse DL, et al. Molecular Subtyping To Detect Human Listeriosis Clusters *Emerg Infect Dis.* 2003;9: <http://www.cdc.gov/ncidod/EID/vol9no6/02-0702.htm>

Hunter PR, Hughes S, Woodhouse S, et al. Sporadic cryptosporidiosis case-control study with genotyping. *Emerg Infect Dis* 2004;10:582. <http://www.cdc.gov/ncidod/EID/vol10no7/03-0582.htm>

Gupta A, Hunter SB, Bidol SA, et al. Escherichia coli O157 cluster evaluation. Emerg Infect Dis 2004;10:1856-8
<http://www.cdc.gov/ncidod/EID/vol10no10/04-0374.htm>

VIII. Course Outline/Weekly Schedule

Monday, 6/6; 9:00 am - 12:00 pm	<ul style="list-style-type: none">• Overview of molecular laboratory techniques used to detect, identify, and characterize infectious disease agents.• Application of molecular subtyping techniques to surveillance and outbreak investigations.• Assignment of groups to evaluate the application of molecular epidemiology to current foodborne and infectious disease problems.
Tuesday, 6/7; 8:00 am - 12:00 pm	<ul style="list-style-type: none">• Implications for Public Health Practice• Group project activities
Wednesday, 6/8; 8:00 am - 12:00pm	<ul style="list-style-type: none">• Outbreak Investigation Activity• Group Project Activities
Friday, 6/10; 8:00 am -12:00 pm	<ul style="list-style-type: none">• Group Presentations