### Instructor Information
Andrea Bersamin, Ph.D.
Email: aberdam@alaska.edu
Office: 234 AHRB
Telephone: (907)474-6129

### Office Hours
Tues/ Thurs 2-3p or by appt.

If you have questions about the class or would like to discuss your class performance, I encourage you to come and see me during my office hours (or by appointment).

### Course description
Epidemiology is the study of the distribution and determinants of disease, or other health-related outcomes, in human and animal populations. *Fundamentals of Epidemiology* introduces the basic concepts of epidemiology, with examples from human and veterinary medicine, including chronic and infectious disease epidemiology, social epidemiology, outbreak investigation, properties of tests, and an introduction to study design and surveillance.

### Course goals
To provide students with an overview of the fundamentals of epidemiology.

### Learning objectives
Upon completion of this course, you will be able to do the following:
- Understand the contributions of epidemiology to clinical research, medicine and public health
- Identify key sources of data for epidemiological purposes.
- Explain the population perspective and describe public health problems
- Apply and interpret measures of disease occurrence and correlates in populations
- Explain the concept of risk
- Use basic methods for investigating disease outbreaks
- Explain relative strengths and limitations of different epidemiologic study designs
- Identify and control major sources of error in epidemiological studies
- Evaluate epidemiologic evidence by applying criteria for causal inference
- Use epidemiologic methods to evaluate public health interventions
- Appreciate complexities in applying scientific evidence in making policy
Instructional Methods

The course will include lectures, class discussions, case studies, text book and journal article readings, and assignments. **Student participation is important and this requires that all students come prepared having read the required readings in advance.**

Course Readings

**Required:**

- Additional readings will be assigned to supplement the main textbook or as part of various homework assignments; these will be made available on Blackboard.

**Optional** (if you are particularly interested in a topic and desire additional information, these are excellent texts that can be used to supplement the primary text and lectures):

- Giesecke J. *Modern Infectious Disease Epidemiology*.

**Some useful websites:**


The Cochrane Library [http://www.cochrane.org/reviews/index.htm](http://www.cochrane.org/reviews/index.htm)


US Preventive Services Task Force (USPSTF) [http://www.ahrq.gov/clinic/upsstfix.htm](http://www.ahrq.gov/clinic/upsstfix.htm)
Demographic and health surveys (DHS) [http://www.measuredhs.com/](http://www.measuredhs.com/)
Alaska Health and Social Services Department of Epidemiology: [http://www.epi.hss.state.ak.us/](http://www.epi.hss.state.ak.us/)

### Student Evaluation

**Points Possible:**

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<tbody>
<tr>
<td>Exams</td>
<td>3 @100 points</td>
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<tr>
<td>Assignments</td>
<td>10 @ 10 points each</td>
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<tr>
<td>Content Reviews</td>
<td>50 points</td>
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**Total Possible Points: 450**

*Grades will be on a straight percentage basis.*

- A = 94-100%; A− = 90-93.9%
- B+ = 87-89.9%; B = 84-86.9% ;B− = 80-83.9%
- C+ = 77-79%; C = 74-76.9% ;C− = 70-73.9 %
- D+ = 67-69%; D = 64-66.9%; D− = 60-63.9%
- F = 59% and below

### Instructor and course evaluation:

Teaching is a learning process and it is impossible to facilitate learning without student feedback. I will be gathering feedback throughout the semester will allow me to address problems or difficulties while the course is on-going. Unsolicited constructive feedback is welcome anytime.

### Course Requirements

**Exams:** There will be 3 in-class exams. Exams will include T/F, multiple-choice, matching, short answer and essay questions. Exams will be based on lectures, readings, and assignments. There will be NO make-up exams. Under very unusual circumstances early exams will be offered with approval from the instructor; arrangements must be made well in advance.

**Assignments:** There will be 10 assignments over the course of the semester. Assignments will be posted on Blackboard and detailed instructions will be provided in class. Paper copies of your completed assignments are due at the beginning of the class indicated on the class schedule. No late assignments will be accepted. If you are not able to turn in an assignment due to extenuating circumstances (i.e. medical emergency for which you have a doctor’s note), please come and see me during my office hours or by appointment. Each assignment is worth ten points.

**Readings:**

In-class discussions and activities will require that you have completed the required readings. The course reading list is included in the syllabus. Additional readings (e.g. newspaper articles, journal articles, policy briefs, etc.) will be assigned throughout the semester and will be provided as
hand-outs or posted on Blackboard. **Student participation is important and this requires that all students come prepared having read the required readings in advance.**

**Content Reviews:**
Students will be required to give one 20 minute presentation that reviews the content from an earlier lecture. This presentation will not just be a review of the lecture, but should incorporate examples from outside readings or sources (e.g. journal articles, textbooks, government websites). Students will also provide the class with an **in-class activity** that supports the learning and understanding of the concept as well as **one-page review sheet.** These presentations will be done in groups. Sign-ups will occur the second week of class. This is worth 50 points.

**Reaction cards:**
At the end of each class session on Thursdays, please write a short (two to three sentences) question or comment pertaining to the class discussion or provide feedback on how the class is going for you. Write your comment or question on a 3x5 card with your full name and date printed clearly at the top of the card. Please give your card to me before leaving the class. You are responsible for buying (or sharing with a friend) a pack of 3x5 cards to use for this purpose.

**Current events:**
Throughout the course, you have the opportunity to earn five extra credit points by bringing a newspaper or internet article related to the topic covered in class that day and summarizing its contents for the class. Current events must have been published within the last six months. You will earn one point for each current event article and summary.

**Course Policies**

**Communication:** Announcements and schedule changes will be made by e-mail or on Blackboard. It is your responsibility to check your e-mail or Blackboard at least twice weekly. I encourage you to contact me with any comments or questions. If you don’t understand something please ask.

**Attendance:** Daily attendance and participation are expected.

**Withdrawal:**
Jan. 28: Deadline for 100 percent refund of tuition and fees
Feb. 4: Deadline for student-initiated and faculty-initiated drops (course does not appear on academic record)
Feb. 4: Deadline for 50 percent refund of tuition (tuition only, no fees refunded)
Mar. 25: Deadline for student-initiated and faculty-initiated withdrawals (W grade appears on academic transcript)

**Honor Code and Plagiarism:** You are expected to uphold the UAF standard of conduct for students relating to academic dishonesty. You assume full responsibility for the content and integrity of the academic work you submit. For the student code or additional information, please use the following URL: [http://www.uaf.edu/catalog/current/academics/regs3.html](http://www.uaf.edu/catalog/current/academics/regs3.html)
UAF Disability Services
Disabilities Services: The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. I will work with the Office of Disabilities Services (208 WHIT, 474-5655) to provide reasonable accommodation to students with disabilities. **If you require any assistance due to documented disability, please let me know by the 2nd week of classes and I will be happy to make whatever accommodations are necessary.
**Detailed schedule of topics, concepts, key terms, readings, and assignments**

Concepts and key terms are provided for each week of the course, and these should be used to ensure that you’ve understood the reading materials and lectures.

### Introduction to Epidemiology  
**January 20 and 25**

**Concepts and key terms:**
- Definition of epidemiology and its contribution to other disciplines
- Role of epidemiology in public health and prevention
- Applications of epidemiology in public health practice vs. clinical practice
- Epidemiological approach
- Primary, secondary and tertiary prevention
- Exposure and outcome

**Readings:**
Chapter 1

### Studying Populations  
**January 25**

**Concepts and key terms:**
- Population vs. an individual perspective
- Epidemiological transition
- Heterogeneity of populations
- Dynamic population factors: birth rate, fertility and mortality rates
- High risk populations

**Readings:**
Rose. 1985. Sick individuals and sick populations

### Dynamics of Disease Transmission  
**January 27**

**Concepts and key terms:**
- Stages of disease
- Epidemiologic triad
- Modes of transmission of communicable disease in a population
- Endemic, epidemic and pandemic
- Herd immunity
- Attack rate
- Acute outbreak investigation

**Readings:**
Gordis, Chapter 2
Measuring Disease: Morbidity
February 1

Concepts and key terms:
- Calculate and interpret the following measures of morbidity:
  - ratios
  - proportions
  - incidence rates, including attack rate
  - prevalence
- Relationship between incidence and prevalence
- Surveillance in public health

Readings:
Gordis, Chapter 3

Measuring Disease: Mortality
February 3

Concepts and key terms:
- Calculate and interpret the following measures of morbidity:
  - Mortality rate
  - Case-fatality rate
  - Proportionate mortality
- Direct and indirect age adjustment
- Years of potential life lost
- Cohort effect

Readings:
Gordis, Chapter 4

Disease Detection and Population Screening: validity and reliability
February 8 and 10

Concepts and key terms:
- True positive, false positive, true negative and false negative test results
- Consequences of false positive and false negative test results
- Sensitivity, specificity, positive and negative predictive value
- Effect of prevalence on predictive value
- Validity and reliability

Readings:
Gordis, Chapter 5

EXAM I
***** February 15 *****

Intervention Studies
February 17 and 22

Concepts and key terms:
- Double-blind randomized controlled trial
- Placebo or control group
- Purpose of randomization and blinding
- Generalizability
- Non-compliance
- Strengths and limitations of trials
- Ethical considerations of conducting trials
- Three major US randomized trials

Readings:
CONSORT guidelines
Gordis, Chapters 7 and 8

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Cohort, Cross-sectional, and Ecological Studies
February 24 and March 1

Concepts and key terms:
- Cohort study design, strengths and limitations
- Cross-sectional study design, strengths and limitations
- Ecological study design, strengths and limitations
- Ecological fallacy
- Prospective and retrospective studies

Readings:
Gordis, Chapter 9 and 10

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Case-Control Studies
March 3

Concepts and key terms:
- Case-control study design, strengths and limitations
- Selection of cases and controls
- Matching
- Recall bias

Readings:
Gordis, Chapter 10 and 13

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Estimating Risk
March 8 and 10

Concepts and key terms:
• Relationship between exposures and outcomes
• Odds ratio and a relative risk
• Absolute risk
• Attributable risk

Readings:
Gordis, Chapter 11 and 12

Spring Break
March 15 and 17

Causal Inference
March 22

Concepts and key terms:
• Association vs. causation
• Criteria for causality, Koch’s postulates
• Real or spurious association
• Necessary and sufficient

Readings:
Gordis, Chapter 14

Bias, Confounding and Interaction
March 24 and 29

Concepts and key terms:
• Bias, confounding and error
• Interaction
• P-value

Readings:
Gordis, Chapter 15

Exam II
March 31

Role of Genetic and Environmental Factors
April 5 and 7

Concepts and key terms:
• Diseases with known genetic origin
• Use of genetic markers
• Family studies, twin studies, adoption studies, migrant studies
• Gene X environment interactions
Readings:
Gordis, Chapter 16

Translating Epidemiological Evidence in Practice
April 12 and 14

Concepts and key terms:

- Efficacy, effectiveness, and efficiency
- Steps involved in health planning
- Examples of disease prevention and health promotion strategies
- Examples of interventions to address the social determinants of health
- Vertical and horizontal approaches for improving health
- Methodological issues in epidemiology: volunteer bias, lead time bias, overdiagnosis bias
- Cost benefit analysis

Readings:
Gordis, Chapter 17 and 18

Social Determinants of Health
April 21 and 26

Concepts and key terms:

- Social epidemiology and social determinants of health
- Discrimination
- Biological expressions of social inequality
- Ecosocial theory of disease distribution
- Social justice

Readings:

Film:
Unnatural Causes: In Sickness and in Wealth

Epidemiology and Public Policy
April 28

Concepts and key terms:

- Population vs. high-risk approach to prevention
- Epidemiology and clinical medicine
- Risk assessment
• Publication bias
• Sources and impact of uncertainty

Readings:
Gordis, Chapter 19

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<th>Ethical and professional issues in Epidemiology</th>
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Concepts and key terms:
• Privacy and confidentiality
• Geneva convention and Belmont report
• Race and ethnicity in epidemiological studies
• Conflict of interest

Readings:
Gordis, Chapter 20

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