I. Course Description

Vaccines are one of the most powerful tools of public health ever developed. They have successfully prevented hundreds of millions of cases of disease worldwide. Yet, numerous controversies surrounding the efficacy, safety, and use of vaccines limit our ability to maximize their potential to protect vulnerable populations from disease.

In this course, we will examine key epidemiological concepts including infectious disease transmission dynamics, herd immunity, maternal immunity, and waning/boosting of immune responses to understanding how and why vaccines protect both individuals and populations, and how individuals interact with populations in complex ways. In parallel, we will consider ethical principles that underlie controversies in vaccine research and policy through case studies. Should vaccination be voluntary, compulsory, required for school entry or some combination? How best can vaccine myths and misinformation be identified and addressed? Should vaccine clinical trials be conducted in resource-limited settings even though individuals will be unable to afford the vaccine once licensed? How should we encourage the development of vaccines that could protect millions from neglected diseases despite lack of financial incentive?

Throughout, we will apply principles of epidemiology and ethical theory to assess how personal choices, political will, public policy, and industry priorities shape these challenges.
II. Course Prerequisites

None

III. Course Goals and Objectives

At the end of this course, students will be able to:

1. Describe key concepts in infectious disease epidemiology including transmission dynamics and herd immunity.
2. Understand the regulatory process by which vaccines are developed and licensed, as well as the political process by which vaccination programs are implemented.
3. Use ethical principles to balance concerns about individual rights, public goods, and incentives.
4. Examine controversies at the intersection of the epidemiology and ethics of vaccines.
5. Communicate evidence-based messages to the public

In addition, this course addresses the following Council on Linkages Competencies:

Communications Skills:
3.2.6 Communicates information to influence behavior and improve health (e.g., uses social marketing methods, considers behavioral theories such as the Health Belief Model or Stages of Change Model)

Public Health Sciences Skills:
6.2.3 Applies public health sciences (e.g., biostatistics, epidemiology, environmental health sciences, health services administration, social and behavioral sciences, and public health informatics) in the delivery of the 10 Essential Public Health Services

Leadership and Systems Thinking Skills:
8.2.1 Incorporates ethical standards of practice (e.g., Public Health Code of Ethics) into all interactions with individuals, organizations, and communities
8.2.5 Analyzes internal and external facilitators and barriers that may affect the delivery of the 10 Essential Public Health Services (e.g., using root cause analysis and other quality improvement methods and tools, problem solving)

IV. Methods of Instruction and Work Expectations

The course will consist of a mixture of lectures, case studies, small group work, class debates, and partner activities. Students will:

1. Learn to calculate epidemiological measures such as direct and indirect vaccine efficacy, herd immunity thresholds, and cases averted and understand how these measures relate to the spread of disease
2. Examine case studies that exemplify controversies in vaccines and consider how ethical and epidemiologic concerns are intertwined
3. Evaluate scientific evidence and develop sound arguments to be able to engage in respectful debate about key vaccine controversies

V. Course Text and Readings

The required and optional readings are available through the UMN Library, which can be accessed through the course Moodle site.
Access Course Moodle Site

- go to www.umn.edu click on the “myU” button
- login with your University ID and password
- scroll to your course and click on the Moodle site link

References:

1. Infectious Disease Epidemiology: Theory and Practice 3rd Edition  
   http://www.amazon.com/Infectious-Disease-Epidemiology-Theory-Practice/dp/1449683797/ref=reader_auth_dp


VI. Course Outline/Weekly Schedule/

<table>
<thead>
<tr>
<th>Date</th>
<th>Topics and Daily Schedule</th>
<th>Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5pm</td>
<td>Key Concepts in Infectious Disease Epidemiology</td>
<td>3) Salmon DA et al. Compulsory vaccination and conscientious or philosophical exemptions: past, present, and future. The Lancet. 2006 Feb 4;367(9508):436-42.</td>
</tr>
<tr>
<td></td>
<td>Case Study: History of compulsory vaccination</td>
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| **Day 2:**  
**Wed - June 1 1-5pm**  
**Individuals vs. populations: All for one or one for all?**  
- Vaccine Risks and Benefits to Individuals: Direct Protection  
- Vaccine Risks and Benefits to populations: Herd Immunity  
- Exercise: Analogies to vaccination policy: cigarette smoking in public places, mandatory seat belt or bicycle helmet law, and speed limits  
- Ethical Considerations for Collective Action Problems  
- Exercise: Weighing risks and benefits from individual, community, and policy perspectives: Flu vaccines, Polio vaccines, and Rotavirus vaccines  
| **Day 3:**  
**Thurs - June 2 1-5pm**  
**Vaccine hesitancy and vaccine refusal in the US: The role of public health practitioners**  
- Vaccine hesitancy and vaccine refusal: Ethical challenges, epidemiologic implications  
- Exercise: Vaccine Myths, Misconceptions, and Reality: Exploring and evaluating online resources  
- Addressing public concerns about vaccines: Practical consideration and challenges  
- Exercise: Responding to Vaccine Hesitancy and vaccine refusal: Crafting evidence-based, thoughtful public health messaging  
<table>
<thead>
<tr>
<th>Day 4: Friday, June 3 1-4pm</th>
<th>Stages of Clinical Trial Design, Vaccine Development Pipeline, and Setting the Vaccine Development Agenda</th>
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<tbody>
<tr>
<td>Controversies on the international stage</td>
<td>Case Study: The economics of pneumococcal and meningococcal vaccines</td>
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<td></td>
<td>Exercise: Prioritizing limited vaccine supplies</td>
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<td></td>
<td>Ethical conduct in research: participant harms and benefits</td>
</tr>
<tr>
<td></td>
<td>Wrap-up</td>
</tr>
<tr>
<td>4) Ezekiel E. and Wertheimer A. Who should get influenza vaccine when not all can? Science. 2006 May 12;312(5775):854-5.</td>
<td></td>
</tr>
</tbody>
</table>

VII. Evaluation and Grading

This course is offered A/F or S/N

25 points/25% of grade: Pre-course reading assignments, attendance, and participation
30 points/30% of grade: Reading Responses
45 points/45% of grade: In class exercises

- A/F letter grade will be determined by total effort as follows:
- S Represents achievement that is satisfactory, which is equivalent to a C- or better.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Points/Percent</th>
<th>Description</th>
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<tbody>
<tr>
<td>A</td>
<td>4.000</td>
<td>Represents achievement that is outstanding relative to the level necessary to meet course requirements. <strong>94-100 points/percent</strong></td>
</tr>
<tr>
<td>A-</td>
<td>3.667</td>
<td>90-93 points/percent</td>
</tr>
<tr>
<td>B+</td>
<td>3.333</td>
<td><strong>87-89 points/percent</strong></td>
</tr>
<tr>
<td>B</td>
<td>3.000</td>
<td>Represents achievement that is significantly above the level necessary to meet course requirements. <strong>83-86 points/percent</strong></td>
</tr>
<tr>
<td>B-</td>
<td>2.667</td>
<td><strong>80-82 points/percent</strong></td>
</tr>
<tr>
<td>C+</td>
<td>2.333</td>
<td><strong>77-79 points/percent</strong></td>
</tr>
<tr>
<td>C</td>
<td>2.000</td>
<td>Represents achievement that meets the course requirements in every respect. <strong>73-76 points/percent</strong></td>
</tr>
<tr>
<td>C-</td>
<td>1.667</td>
<td><strong>70-72 points/percent</strong></td>
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</table>
### D+ – 1.333
65-69 points/percent

### D – 1.000
Represents achievement that is worthy of credit even though it fails to meet fully the course requirements. **60-64 points/percent**

### F = below 60%
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.

**For additional information, please refer to:**
http://policy.umn.edu/Policies/Education/Education/GRADINGTRANSCRIPTS.html.

**Course Evaluation**

The SPH will collect student course evaluations electronically using a software system called CoursEval: www.sph.umn.edu/courseval. The system will send email notifications to students when they can access and complete their course evaluations. Students who complete their course evaluations promptly will be able to access their final grades just as soon as the faculty member renders the grade in SPHGrades: www.sph.umn.edu/grades. All students will have access to their final grades through OneStop two weeks after the last day of the semester regardless of whether they completed their course evaluation or not. Student feedback on course content and faculty teaching skills are an important means for improving our work. Please take the time to complete a course evaluation for each of the courses for which you are registered.

**Incomplete Contracts**

A grade of incomplete "I" shall be assigned at the discretion of the instructor when, due to extraordinary circumstances (e.g., documented illness or hospitalization, death in family, etc.), the student was prevented from completing the work of the course on time. The assignment of an “I” requires that a contract be initiated and completed by the student before the last official day of class, and signed by both the student and instructor. If an incomplete is deemed appropriate by the instructor, the student in consultation with the instructor, will specify the time and manner in which the student will complete course requirements. Extension for completion of the work will not exceed one year (or earlier if designated by the student’s college). For more information and to initiate an incomplete contract, students should go to SPHGrades at: www.sph.umn.edu/grades.

**University of Minnesota Uniform Grading and Transcript Policy** - A link to the policy can be found at onestop.umn.edu.

**VIII. Other Course Information and Policies**

**Grade Option Change** (if applicable)

For full-semester courses, students may change their grade option, if applicable, through the second week of the semester. Grade option change deadlines for other terms (i.e. summer and half-semester courses) can be found at onestop.umn.edu. The grading option for Public Health Institute courses may not be changed after the second day of class for 4-day courses. Grading options for 2 day courses may not be changed after the first day class.

**Course Withdrawal**

Students should refer to the Refund and Drop/Add Deadlines for the particular term at onestop.umn.edu for information and deadlines for withdrawing from a course. As a courtesy, students should notify their instructor and, if applicable, advisor of their intent to withdraw.

Students wishing to withdraw from a course after the noted final deadline for a particular term must contact the School of Public Health Office of Admissions and Student Resources at sph-ssc@umn.edu for further information.
WITHDRAWAL POLICY FOR PUBLIC HEALTH INSTITUTE COURSES

School of Public Health students may withdraw from a 4-day course through the second day of class without permission and no "W" will appear on the transcript. Students enrolled in 2-day courses may withdraw only through the first day of class. After these withdrawal deadlines pass 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 e-mail to the SPH Student Services Center (SSC) at sph-ssc@umn.edu. 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.

Student Conduct Code

The University seeks an environment that promotes academic achievement and integrity, that is protective of free inquiry, and that serves the educational mission of the University. Similarly, the University seeks a community that is free from violence, threats, and intimidation; that is respectful of the rights, opportunities, and welfare of students, faculty, staff, and guests of the University; and that does not threaten the physical or mental health or safety of members of the University community.

As a student at the University you are expected adhere to Board of Regents Policy: Student Conduct Code. To review the Student Conduct Code, please see: http://regents.umn.edu/sites/default/files/policies/Student_Conduct_Code.pdf.

Note that the conduct code specifically addresses disruptive classroom conduct, which means "engaging in behavior that substantially or repeatedly interrupts either the instructor's ability to teach or student learning. The classroom extends to any setting where a student is engaged in work toward academic credit or satisfaction of program-based requirements or related activities."

Use of Personal Electronic Devices in the Classroom

Using personal electronic devices in the classroom setting can hinder instruction and learning, not only for the student using the device but also for other students in the class. To this end, the University establishes the right of each faculty member to determine if and how personal electronic devices are allowed to be used in the classroom. For complete information, please reference: http://policy.umn.edu/Policies/Education/Education/STUDENTRESP.html.

Scholastic Dishonesty

You are expected to do your own academic work and cite sources as necessary. Failing to do so is scholastic dishonesty. Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis. (Student Conduct Code: http://regents.umn.edu/sites/default/files/policies/Student_Conduct_Code.pdf) If it is determined that a student has cheated, he or she may be given an "F" or an "N" for the course, and may face additional sanctions from the University. For additional information, please see: http://policy.umn.edu/Policies/Education/Education/INSTRUCTORRESP.html.
The Office for Student Conduct and Academic Integrity has compiled a useful list of Frequently Asked Questions pertaining to scholastic dishonesty: [http://www1.umn.edu/oscai/integrity/student/index.html](http://www1.umn.edu/oscai/integrity/student/index.html). If you have additional questions, please clarify with your instructor for the course. Your instructor can respond to your specific questions regarding what would constitute scholastic dishonesty in the context of a particular class—e.g., whether collaboration on assignments is permitted, requirements and methods for citing sources, if electronic aids are permitted or prohibited during an exam.

### Makeup Work for Legitimate Absences

Students will not be penalized for absence during the semester due to unavoidable or legitimate circumstances. Such circumstances include verified illness, participation in intercollegiate athletic events, subpoenas, jury duty, military service, bereavement, and religious observances. Such circumstances do not include voting in local, state, or national elections. For complete information, please see: [http://policy.umn.edu/Policies/Education/Education/MAKEUPWORK.html](http://policy.umn.edu/Policies/Education/Education/MAKEUPWORK.html).

### Appropriate Student Use of Class Notes and Course Materials

Taking notes is a means of recording information but more importantly of personally absorbing and integrating the educational experience. However, broadly disseminating class notes beyond the classroom community or accepting compensation for taking and distributing classroom notes undermines instructor interests in their intellectual work product while not substantially furthering instructor and student interests in effective learning. Such actions violate shared norms and standards of the academic community. For additional information, please see: [http://policy.umn.edu/Policies/Education/Education/STUDENTRESP.html](http://policy.umn.edu/Policies/Education/Education/STUDENTRESP.html).

### Sexual Harassment

"Sexual harassment" means unwelcome sexual advances, requests for sexual favors, and/or other verbal or physical conduct of a sexual nature. Such conduct has the purpose or effect of unreasonably interfering with an individual's work or academic performance or creating an intimidating, hostile, or offensive working or academic environment in any University activity or program. Such behavior is not acceptable in the University setting. For additional information, please consult Board of Regents Policy: [http://regents.umn.edu/sites/default/files/policies/SexHarassment.pdf](http://regents.umn.edu/sites/default/files/policies/SexHarassment.pdf).

### Equity, Diversity, Equal Opportunity, and Affirmative Action

The University will provide equal access to and opportunity in its programs and facilities, without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression. For more information, please consult Board of Regents Policy: [http://regents.umn.edu/sites/default/files/policies/Equity_Diversity_EO_AA.pdf](http://regents.umn.edu/sites/default/files/policies/Equity_Diversity_EO_AA.pdf).

### Disability Accommodations

The University of Minnesota is committed to providing equitable access to learning opportunities for all students. Disability Services (DS) is the campus office that collaborates with students who have disabilities to provide and/or arrange reasonable accommodations.

If you have, or think you may have, a disability (e.g., mental health, attentional, learning, chronic health, sensory, or physical), please contact DS at 612-626-1333 to arrange a confidential discussion regarding equitable access and reasonable accommodations.

If you are registered with DS and have a current letter requesting reasonable accommodations, please contact your instructor as early in the semester as possible to discuss how the accommodations will be applied in the course.

For more information, please see the DS website, [https://diversity.umn.edu/disability/](https://diversity.umn.edu/disability/).
Mental Health and Stress Management

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance and may reduce your ability to participate in daily activities. University of Minnesota services are available to assist you. You can learn more about the broad range of confidential mental health services available on campus via the Student Mental Health Website: http://www.mentalhealth.umn.edu.

The Office of Student Affairs at the University of Minnesota

The Office for Student Affairs provides services, programs, and facilities that advance student success, inspire students to make life-long positive contributions to society, promote an inclusive environment, and enrich the University of Minnesota community.

Units within the Office for Student Affairs include, the Aurora Center for Advocacy & Education, Boynton Health Service, Central Career Initiatives (CCE, CDes, CFANS), Leadership Education and Development – Undergraduate Programs (LEAD-UP), the Office for Fraternity and Sorority Life, the Office for Student Conduct and Academic Integrity, the Office for Student Engagement, the Parent Program, Recreational Sports, Student and Community Relations, the Student Conflict Resolution Center, the Student Parent HELP Center, Student Unions & Activities, University Counseling & Consulting Services, and University Student Legal Service.

For more information, please see the Office of Student Affairs at http://www.osa.umn.edu/index.html.

Academic Freedom and Responsibility: for courses that do not involve students in research

Academic freedom is a cornerstone of the University. Within the scope and content of the course as defined by the instructor, it includes the freedom to discuss relevant matters in the classroom. Along with this freedom comes responsibility. Students are encouraged to develop the capacity for critical judgment and to engage in a sustained and independent search for truth. Students are free to take reasoned exception to the views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled.*

Reports of concerns about academic freedom are taken seriously, and there are individuals and offices available for help. Contact the instructor, the Department Chair, your adviser, the associate dean of the college, or the Vice Provost for Faculty and Academic Affairs in the Office of the Provost.

OR:

Academic Freedom and Responsibility, for courses that involve students in research

Academic freedom is a cornerstone of the University. Within the scope and content of the course as defined by the instructor, it includes the freedom to discuss relevant matters in the classroom and conduct relevant research. Along with this freedom comes responsibility. Students are encouraged to develop the capacity for critical judgment and to engage in a sustained and independent search for truth. Students are free to take reasoned exception to the views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled.*

When conducting research, pertinent institutional approvals must be obtained and the research must be consistent with University policies.

Reports of concerns about academic freedom are taken seriously, and there are individuals and offices available for help. Contact the instructor, the Department Chair, your adviser, the associate dean of the college, or the Vice Provost for Faculty and Academic Affairs in the Office of the Provost.

* Language adapted from the American Association of University Professors "Joint Statement on Rights and Freedoms of Students".

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