The Ohio State University College of Veterinary Medicine Department of Veterinary Preventive Medicine

Veterinary Public Health Specialization

VETPREV 7722 - Foodborne Diseases, Food Animal Production Systems, and Food Safety 3 Credit Hours - Fall Semester 2023

# Instructors:

Gregory Habing, (614) 292-1206, [habing.4@osu.edu,](mailto:habing.4@osu.edu) A100D Sisson Hall Ting-Yu Cheng, [cheng.1784@osu.edu,](mailto:cheng.1784@osu.edu)

# Class Time and Location:

Monday (12:00-12:55) Goss Auditorium Wednesday (1:00 – 2:55pm) 215 VMAB Wenger

# Instructor’s Office Hours:

Dr. Habing: By Appointment.

**Communication with the Instructor:** For questions and concerns about the course material or requirements, please contact the instructor. E-mail is preferred. Expect a response within 1 business day. I will generally communicate to the class via Carmen Announcements.

# Carmen

All relevant materials and instructions or links to materials will be posted on Carmen.

# Course Description:

This course is designed to provide public health professionals with the overarching concepts and critical details about the control of foodborne hazards. It is divided into three sequenced modules: food animal production systems, foodborne pathogens, and food safety control systems. These three modules are designed to sequentially provide students with an understanding of the animal reservoirs of food safety pathogens (especially food animal production systems), the epidemiology and public health aspects of significant food safety pathogens, and mechanisms for interrupting the transmission of these pathogens to people through food.

In the first module, you will receive an overview of animal production systems, including how animal-derived food products (milk, meat, eggs) get from the farm to the table. On-farm control points for foodborne pathogens and other hazards will be reviewed. In the second module, the most common food-borne bacterial and viral diseases will be described in detail, with special emphasis on the epidemiology and transmission of pathogens that cause the largest burden of illness in the United States. Lastly, the third module will focus on mechanisms for interrupting the transmission of these pathogens to people. These mechanisms include application of hazard analysis in pre- and post- harvest food systems, safe food handling, and foodborne outbreak detection and response. You will gain an overview of the regulations designed to improve food safety in domestic and international food trade. Other topics critical for veterinary public health professionals include food defense, antimicrobial use and resistance, animal welfare, and organic production systems.

# Course Format:

This course will use a combination of online asynchronous content and in-person discussion sessions. Attendance and participation are required, except where otherwise noted by the course instructors. You will need to visit the course site on CARMEN: <https://carmen.osu.edu/> regularly. Throughout the course, several faculty members from the Veterinary Preventive Medicine Department and invited guest lecturers will teach the different classes. Their names and contact information can be found in the Course Schedule. Assigned readings prior to the lecture will be required for each topic.

# Course Objectives:

* Describe the structure of food animal production systems and the current food safety issues that are associated with each production system.
* Describe the most common foodborne hazards emanating from animal production systems with respect to their etiology, epidemiology, relative impact on public health, and specific preventive and control measures.
* Identify food safety systems and mechanisms that are used to interrupt the transmission of foodborne hazards to people.

**Competencies -** This course addresses the following competencies:

MPH Core

1. Apply epidemiological methods to the breadth of settings and situations in public health practice
2. Design a population-based policy, program, project or intervention
3. Evaluate policies for their impact on public health and health equity
4. Communicate audience-appropriate public health content, both in writing and through oral presentation

VPH Specialization

1. Identify the major pathways for transmission of zoonotic agents and foodborne hazards to humans, as well as the reservoirs for many common pathogens.
2. Identify methods and programs utilized to prevent, control and/or eradicate zoonotic and foodborne diseases, including pre- and post-harvest interventions.
3. Review and apply methods for planning, initiating, and conducting case and outbreak investigations of zoonotic and foodborne diseases.
4. Recognize applicable regulations and laws governing zoonotic diseases, food safety and security, or foreign animal diseases, and the agencies with authority to enforce these laws.
5. Define the role of epidemiology in maintaining human and animal health; and identify strategies in the design and conduct of surveillance, monitoring, and epidemiological studies that assess the prevalence and distribution of zoonotic and foodborne diseases.
6. Analyze approaches for assessing and controlling environmental and biological agents and strategies for reducing risks to human and animal health, especially in agricultural settings.

# Recommended Reading:

Textbooks

* + Dodd, C. et al. Foodborne Diseases ([e-book available through OSU](https://library.ohio-state.edu/search/X?SEARCH=QR201.F62%2B.F66%2B2017eb&SORT=D&searchscope=7&submit=Submit))
  + Heymann, D. et al. Control of Communicable Diseases Manual
  + Hubbert WT. et al. Food Safety and Quality Assurance. Foods of Animal origin. Second edition. Iowa State University Press. Ames, IA. 1996.

Online Resources

* + Technical Fact sheets – Iowa State University <http://www.cfsph.iastate.edu/DiseaseInfo/>
  + Food and Drug Administration (FDA) <http://www.foodsafety.gov/>
  + Centers for Disease Control and Prevention – Food Safety <http://www.cdc.gov/foodsafety/> <http://www.cdc.gov/outbreaks/>
  + United States Department of Agriculture Food Safety and Inspection Service [http://www.fsis.usda.gov](http://www.fsis.usda.gov/)
  + World Health Organization (WHO) -Department of Food Safety, Zoonoses and Foodborne Diseases (FOS) <http://www.who.int/foodsafety/en/>
  + World Health Organization (WHO) - Foodborne Disease Surveillance Program <http://www.who.int/foodborne_disease/en/>

# Grading:

The grade points will be distributed over three exams and assignments, which will be based on the didactic and other content within in the modules. Grades will not be curved. Grades will be based on one of the following assessment types. Type 1: An examination, quiz, or graded activity administered in class, and taken individually with no notes,

resources, or collaboration. This is the most common form of midterm and final examination.

Type 2: An examination, quiz, or graded activity administered in class and taken individually with open notes or resources. Some faculty allow students to use notes during midterms, finals, and quizzes.

Type 3: An in-class, collaboratively taken examination, quiz, or graded activity that may involve open notes or

resources.

Type 4: An out-of-class, open-resource, and collaborative examination or quiz. Students may be working in assigned groups or groups of their choosing and assessments may be turned in as a group or individually.

Type 5: A graded out-of-class written paper, longer case study analysis and/or illustrated project. The faculty member determines if the graded activity is done individually or in groups.

Final course grades will be composed as follows:

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| **Item** | **Type** | **Percent of Grade** | **Date** |
| 1st Exam | Type 2 | 20% | 9/25/23 |
| 2nd Exam | Type 1 | 20% | 10/30/23 |
| 3rd Exam (cumulative) | Type 1 | 20% | 12/11/23 (tentative) |
| Discussion Posts | Type 5 | 15% | As specified on Carmen |
| Student presentations | Type 5 | 20% | 12/6/23 |
| Participation and attendance |  | 5% |  |

The OSU standard grade scheme will be used ≥ 93.0 (A), ≥ 90.0 and < 93.0 (A-), ≥ 87 and < 90.0 (B+), ≥ 83 and < 87 (B), ≥ 80 and < 83 (B-), ≥ 77 and < 80 (C+), ≥ 73 and < 77 (C), ≥ 70 and < 73 (C-), ≥ 67 and < 70.0 (D+), ≥ 60 and < 67 (D), Below 60 (E).

# Exams:

The written exams will be given in-class and will be a combination of short answer and problem-solving questions. The final exam may include material covered at any portion of the course but will emphasize material in the third module. In the event of a planned absence the day of the exam, the student should notify the course instructor at least 24 hours in advance. If the student has an unplanned absence the day of the exam, he/she must contact the team leader as soon as possible. The decision on whether an exam may be made up will be on a case-to-case basis which the student will arrange with the team leader after the justification for the absence is approved.

# Discussion Posts

Instructions for completing the discussion post will be detailed within each module. Discussion posts are due as indicated by the instructor on the Carmen site. Late submissions receive zero credit.

# Group Presentation:

You will be assigned a group project to be presented to the class at the end of the semester. The project will be based on the application of Hazard Analysis and Critical Control Points or other prevention tools to realistic scenarios. More details on the assignment will be presented in class and a grading rubric will be provided. Reusing work from previous classes is not acceptable. Citations of resources are expected. Late submissions for the assignment will be result in a reduction of the grade by ten percentage points.

# Participation

In-person class attendance is expected for synchronous classes, with occasional exceptions as described by the course instructors. Unexcused absences may result in deductions in the participation component of the grade. Additionally, active participation and attention is expected for in-class discussions.

# Class Policies

*DVM students - you are also responsible for reviewing and observing* [*college and program policies and procedures*](https://go.osu.edu/dvm-preclinical-program-syllabus)

Absences and Make-Up Policy:

* + Class attendance is required. Lack of attendance may be reflected within the course participation component of the grade. Students missing 25% or more of the class times (excusable or not) will be dismissed from the class.
  + You should inform the instructor of a planned absence at least 24 hours in advance.
  + If an unexpected absence occurs, let the instructor know within 48 hours to justify the absence.
  + If there is an excusable conflict with an exam date, let the instructor know as soon as possible.

# Office of Student Life: Disability Services

Any student who feels s/he may need an accommodation based on the impact of a disability should contact me privately to discuss your specific needs. Please contact the Office of Student Life: Disability Services at 614-292-3307 in room 150 Pomerene Hall to coordinate reasonable accommodations for students with documented disabilities ([http://www.ods.ohio-state.edu/).](http://www.ods.ohio-state.edu/))

# Mental Health Services:

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 or reduce a student’s ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life’s Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling 614-- 292--5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on call counselor when CCS is closed at 614--292--5766 and 24 hour emergency help is also available through the 24/7 National Suicide Prevention Hotline at 1-- 800--273--TALK or at suicidepreventionlifeline.org.

# Academic integrity

The following applies to College of Public Health Students. A separate document includes the policies for College of Veterinary Medicine students. Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University, the College of Public Health, and the Committee on Academic Misconduct (COAM) expect that all students have read and understood the University’s *Code of Student Conduct* and the School’s *Student Handbook*, and that all students will complete all academic and scholarly assignments with fairness and honesty. The *Code of Student Conduct* and other information on academic integrity and academic misconduct can be found at the COAM web pages (<http://oaa.osu.edu/coam.html>).

Students must recognize that failure to follow the rules and guidelines established in the University’s *Code of Student Conduct*, the *Student Handbook*, and in the syllabi for their courses may constitute “Academic Misconduct.”

The Ohio State University’s *Code of Student Conduct* (Section 3335-23-04) defines academic misconduct as: “Any activity that tends to compromise the academic integrity of the University, or subvert the educational process.” Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Please note that the use of material from the Internet without appropriate acknowledgement and complete citation is plagiarism just as it would be if the source were printed material. Further examples are found in the *Student Handbook*. Ignorance of the *Code of Student Conduct* and the *Student Handbook* is never considered an “excuse” for academic misconduct.

If I suspect a student of academic misconduct in a course, I am obligated by University Rules to report these suspicions to the University’s Committee on Academic Misconduct. If COAM determines that the student has violated the University’s *Code of Student Conduct* (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in the course and suspension or dismissal from the University. If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

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| **Guest lecturers from The Ohio State University** | | |
| Name | Affiliation | Topics |
| [Geoffrey Lossie](https://vet.osu.edu/about-us/people/geoffrey-lossie) | Department of Veterinary Preventive Medicine, CVM | Poultry production |
| [Melvin Pascall](https://fic.osu.edu/members/directory/p/pascall-melvin.html) | Food Science and Technology | Food Regulation in the U.S. |
| Antoinette Marsh | Department of Veterinary Preventive Medicine, CVM | Protozoal foodborne infections |
| Ting-Yu Cheng | Department of Veterinary Preventive  Medicine, CVM | Swine Production Systems |
| Rafael Portillo-Gonzalez | Department of Veterinary Preventive  Medicine, CVM | Antimicrobial Use in Livestock |

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| **External Guest Lecturers** | | |
| Name | Affiliation | Topics |
| [Colin](https://www.cdc.gov/ncezid/index.html) Schwensohn | HHS - Centers for Disease Control and Prevention, Atlanta, GA | Detection and response to foodborne outbreaks |
| Kelsey Travis | Food Safety and Inspection Service, USDA | Regulatory inspection in slaughter plants |
| Steven Reichley | Global Center for Aquatic Food Security Department of Pathobiology and Population Medicine, Mississippi State  University | Aquaculture |

**Course Outline**

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| **Module 1- Food Animal Production Systems** | | | |
| **Date** | **Time** | **Lecture Topic** | **Lecturer** |
| 8/23/2023 | 1:00 pm - 1:50 pm | Introduction to Food Safety | Habing |
| 8/23/2023 | 2:00 pm - 2:50 pm | Dairy Production systems | Habing |
| 8/28/2023 | 12:00 pm - 12:50 pm | Dairy Production systems - Discussion | Habing |
| 8/30/2023 | 1:00 pm - 1:50 pm | Pork production systems | Cheng |
| 8/30/2023 | 2:00 pm - 2:50 pm | Pork production systems - Discussion | Cheng |
| 9/4/2023 | 12:00 pm - 12:50 pm | **Labor Day – No Class** |  |
| 9/6/2023 | 1:00 pm - 1:50 pm | Poultry production | Lossie |
| 9/6/2023 | 2:00 pm - 2:50 pm | Poultry production- Discussion | Lossie |
| 9/11/2023 | 12:00 pm - 12:50 pm | Animal Welfare and Food Safety | Habing |
| 9/13/2023 | 1:00 pm - 1:50 pm | Aquaculture | Reichley |
| 9/13/2023 | 2:00 pm - 2:50 pm | Aquaculture - Discussion | Reichley |
| 9/18/2023 | 12:00 pm - 12:50 pm | Hot Topic: Organic production | Habing |
| 9/20/2023 | 1:00 pm - 1:50 pm | Beef Production systems | Garcia |
| 9/20/2023 | 2:00 pm - 2:50 pm | Beef Production systems - Discussion | Habing |
| 9/25/2023 | 12:00 pm - 12:50 pm | Module 1 Exam | Habing |
| **Module 2- Foodborne Hazards** | | | |
| 9/27/2023 | 1:00 pm - 1:50 pm | Food Safety Microbiology | Habing |
| 9/27/2023 | 2:00 pm - 2:50 pm | Chemical hazards. Residues in meat and milk | Habing |
| 10/2/2023 | 12:00 pm - 12:50 pm | Enteric viruses | Hoet |
| 10/4/2023 | 1:00 pm - 1:50 pm | Campylobacter | Arevalo |
| 10/4/2023 | 2:00 pm - 2:50 pm | Shiga-toxin producing E. coli | Habing |
| 10/9/2023 | 12:00 pm - 12:50 pm | Protozoal foodborne hazards | Marsh |
| 10/11/2023 | 1:00 pm - 1:50 pm | Salmonella in livestock production systems | Habing |
| 10/11/2023 | 2:00 pm - 2:50 pm | Listeria Monocytogenes | Habing |
| 10/16/2023 | 12:00 pm - 12:50 pm | Susceptible Populations | Stull |
| 10/18/2023 | 1:00 pm - 2:50 pm | Antimicrobial Use in livestock | Habing |
| 10/18/2023 | 1:00 pm - 2:50 pm | Antimicrobial Resistance | Habing |
| 10/23/2023 | 12:00 pm - 12:50 pm | Foodborne pathogen surveillance | Arevalo |
| 10/25/2023 | 1:00 pm - 2:50 pm | Hazard Jeopardy! | Habing |
| 10/30/2023 | 12:00 pm – 12:50 pm | Module 2 Exam |  |
| **Module 3- Food safety Control Systems** | | | |
| 11/1/2023 | 1:00 pm - 1:50 pm | Risk Assessments | Habing |
| 11/1/2023 | 2:00 pm - 2:50 pm | Hazards Analysis and Critical Control Points | Habing |
| 11/6/2023 | 12:00 pm - 12:50 pm | Foodborne outbreak detection and response | Schwenson |
| 11/8/2023 | 1:00 pm - 2:50 pm | Food safety Epidemiology | Habing |
| 11/13/2023 | 12:00 pm - 12:50 pm | Safe Food Handling | Habing |
| 11/15/2023 | 1:00 pm - 1:50 pm | Domestic food regulatory agencies | Pascall/Habing |
| 11/15/2023 | 2:00 pm - 2:50 pm | International Food Regulations | Hoet |
| 11/20/2023 | 12:00 pm - 12:50 pm | Virtual Slaughter plant tour | Habing |
| 11/22/2023 | 1:00 pm - 1:50 pm | **Thanksgiving Break** |  |
| 11/22/2023 | 2:00 pm - 2:50 pm |
| 11/27/2023 | 12:00 pm - 12:50 pm | Division of Meat Inspection | TBD |
| 11/29/2023 | 1:00 pm - 2:50 pm | Food safety in slaughter plants | Travis |
| 12/4/2023 | 12:00 pm - 12:50 pm | Regulation Jeopardy! | Habing |
| 12/6/2023 | 1:00 pm - 2:50 pm | Student presentations | Habing/Arevalo |