



EMORY

ROLLINS
SCHOOL OF
PUBLIC
HEALTH

DEPARTMENT: Global Health and Environmental Health

COURSE NUMBER: GH580/EH546

SECTION NUMBER 000

SEMESTER: Spring 2017

CREDIT HOURS: 2 academic credit hours for matriculating graduate students at Emory University. Surveillance public health physicians, veterinarians and nurses may take the course for Continuing Medical Education (30 contact hours), and Continuing Education (3.0 units) respectively. Veterinarians may also take the course for credit for the AAVSB requirements. Other surveillance practitioners may take the course for Continuing Education or professional development*

MEETING TIMES: January 3-7, 2017 (Tuesday-Saturday) from 8:30 am – 5:30 pm.
Lecture Room: CNR Auditorium

COURSE INSTRUCTORS

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Coordinator for non-matriculating students

Kathleen Peters

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BRIEF COURSE DESCRIPTION

This is a course on the microbiology and surveillance of foodborne and waterborne diseases designed for public health practitioners and other students interested in the safety of food and water. It provides a broad overview of the major foodborne and waterborne diseases. The course describes how information from surveillance is used to improve public health policy and practice in ways that contribute to the safety of our food and water. We focus on the pathogens responsible for food- and water-transmitted diseases. We discuss the diseases they cause, the pathogenesis, clinical manifestations, reservoirs, modes of transmission, and epidemiology. We cover the transport, survival, and fate of pathogens in the environment, the concept of indicator organisms as surrogates for pathogens, the removal and inactivation of pathogens and indicators by water and wastewater treatment processes.

SCHOOL LEVEL, DEPARTMENT, AND/ OR PROGRAM COMPETENCIES

At the conclusion of this course students will be able to:

- Identify leading host and environmental factors in food and waterborne diseases (F&WBD)
- Identify leading etiological agents and their biological properties affecting their transmission, and the diseases they cause
- Describe how foodborne and waterborne disease surveillance systems operate and how the data from these systems are used; and how public policies have evolved from surveillance and outbreak investigations.
- Identify strategies and health infrastructures for the control of F&WBD
- Recognize the role of the hazardous analysis and critical control points (HACCP) strategy to identify risks in the production of food and water
- Describe the economic consequences of contaminated food products and outbreaks
- Facilitate networking among surveillance practitioners and CDC surveillance coordinators

LEARNING OBJECTIVES ASSOCIATED WITH THE COMPETENCIES

Infectious Disease Concentration:

Basic microbiology of pathogens, major transmission routes of infectious diseases, pathogen virulence factors, relative burden of morbidity and mortality, and appropriate prevention and control strategies for infectious diseases.

ACADEMIC HONOR CODE

The RSPH Honor Code requires that all material submitted by a student in fulfilling his or her academic course of study must be the original work of the student.

EVALUATION

This course is offered for two academic credit hours for matriculating graduate students at Emory University.

Surveillance public health physicians, veterinarians and nurses may take the course for Continuing Medical Education (30 contact hours), and Continuing Education (3.0 units) respectively. Veterinarians may also take the course for credit for the AAVSB requirements. Other surveillance practitioners may take the course for Continuing Education or professional development*

Pre-course Exam. Students enrolled for Continuing Education Credit are required to take a pre-course examination to provide a quantitative measure of pre-course knowledge. This will be compared to the results of the final exam, to assess whether a knowledge gap has been eliminated or narrowed. Continuing Education students will be asked to take this examination on Tuesday, January 3rd at 7:30am before the first class meets. Further details will be sent by email. **Students enrolled for degree credit DO NOT need to be present for the pre-course exam.**

Final Exam for Emory students will be a take-home, open-book comprehensive exam that will focus on problem solving and will consist of true/false, matching and multiple choice questions. The exam will be posted on Canvas on Tuesday January 3rd, 2017.

Emory students must turn in their final exams by 11:59pm on Monday Jan 16th via Canvas.

All other students must turn in their final exams by email to Kat Peters by 11:59on Monday, Jan 16th.

*Only Emory degree candidates are required to go on the field trip and must take the final exam. Others must take the pre- test and post-test.

Two reading responses. There will be discussion threads available pertaining to different topics in the recommended reading section. Students are asked to contribute 2 posts to any of the recommended readings (two different readings). Posts should consist of a thoughtful response (at least 3-5 sentences), suggest additional resources (webpages, articles, news stories, etc.) or respond to another student's post. All posts are due the last day of class (under the assignment section – discussion posts). **(JAN 7 AT 11:59 PM)**

ALL OF THESE ARE INDIVIDUAL ASSIGNMENTS AND SHOULD BE COMPLETED WITHOUT THE ASSISTANCE OF OTHERS.

Grade Breakdown

LAPTOP/CELL PHONE POLICY: No open laptops during class. Please keep your cell phones off or on vibrate. STRICTLY ENFORCED.

10% Two reading responses on Canvas – **DUE JAN 7 at 11:59 pm via Canvas)**

20% “The Ghost Map” Quiz (take home – **DUE JAN 16 at 11:59 pm via Canvas)**

20% Enteric Virus, Bacteria and Protozoa Table Assignment (take home – **DUE JAN 16 11:59 pm via Canvas)**

50% Final Exam (take home - **DUE JAN 16 at 11:59 pm via Canvas)**

TEACHING ASSISTANTS:

Julia Brennan

Office Hours: 8:00-8:30 AM and 5:30-6:00 PM
Location: Claudia Nance Rollins (CNR) Auditorium
Email: jbren22@emory.edu
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Nicole Merino Tsui

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Amrita Mahtani

Email: amrita.mahtani@emory.edu

FIELD TRIP (required of all degree-seeking students; optional for continuing education students)
Thursday January 5, 2017, 10:15 am – 3:30 pm “Water and Wastewater Treatment” RM Clayton Water Reclamation Plant and the Chattahoochee Water Treatment Plant.

REQUIRED TEXTBOOK AND READINGS

The Ghost Map: The Story of London’s Most Terrifying Epidemic and How it Changed Science, Cities, and the Modern World, by Steven Johnson

- **New and used copies available at Amazon. Please read BEFORE the first day of class**

Diagnosis and Management of Foodborne Diseases: Primer for PH Practitioners. Revised by E.J. Gangarosa for Public Health Practitioners

- **Available on Canvas. Please read BEFORE the first day of class**

Control of Communicable Diseases Manual, edited by David L. Heymann, American Public Health Association, Washington DC 20th edition.

- (Previous editions are also acceptable)

Foodborne Infections and Intoxications, by Glenn Morris and Morris E. Potter. 2013.

- **Chapter 2, 4, and 35 available on Canvas**

Foodborne Diseases. D. O. Cliver and H. P. Riemann, Academic Press. 2nd edition, 2002.

- **HACCP Chapter required reading - Available on Canvas**

MMWR Surveillance Summaries/June 26, 2015 / Vol. 64 / No. 24 / Pg. 668 – 672

- Surveillance for Waterborne Disease Outbreaks and Other Health Events Associated with Recreational Water — United States, 2011–2012
 - **Available on Canvas**

MMWR Surveillance Summaries/August 14, 2015 / Vol. 64 / No. 31 / Pg. 842 – 848

- Surveillance for Waterborne Disease Outbreaks Associated with Drinking Water —United States, 2011–2012
 - **Available on Canvas**

AND

Centers for Disease Control and Prevention (CDC). Surveillance for Foodborne Disease Outbreaks, United States, 2013, Annual Report. Atlanta, Georgia: US Department of Health and Human Services, CDC, 2015.

- **Available on Canvas**

Students will be expected to read, prior to each lecture, the sections of the required text corresponding to each lecture topic. Students are also asked to bring to class course handouts, readings, and *this syllabus*. We also recommend printing the final exam and bringing it with you to class as several of the lectures go over questions in the exam.

RECOMMENDED PUBLICATIONS, READINGS, AND MOVIES:

All readings are available on Canvas unless marked otherwise.

- Aliabadi N, Lopman BA, Parashar UD, Hall AJ. Progress toward norovirus vaccines: Considerations for further development and implementation in potential target populations. *Expert Reviews in Vaccines* 2015;14(9):1241-1253.
- Atmar R. et al. Norovirus vaccine against experimental human Norwalk virus illness. *N Engl J Med*

2011;365:2178-87.

- Barclay L, Park GW, Vega E, Hall A, Parashar U, Vinjé J, Lopman B. Infection control for norovirus. *Clin Microbiol Infect*. 2014 Aug;20(8):731-40
- Bernstein DI, Atmar RL, Lyon GM, Treanor JJ, Chen WH et al. 2014 Norovirus vaccine against experimental human GII.4 virus illness: a challenge study in healthy adults *Journal of Infectious Diseases*. [Epub ahead of print] Sep 9. pii: jiu497
- Crump, J. A. and E. D. Mintz (2010). "Global trends in typhoid and paratyphoid Fever." *Clin Infect Dis* **50**(2): 241-246.
- Cutler D and Miller G, "The Role of Public Health Improvements in Health Advances: The Twentieth-Century United States" *Demography*, Vol. 42- Number 1, February 2005: 1-22
- De Gruchy, S. "Water and Spirit: Theology in the Time of Cholera". *The Ecumenical Review*, 2010.
- Drinking Water and Disease: What Health Care Providers Should Know. Physicians for Social Responsibility. 2000.
- Eyler, JM "Victorian Social Medicine: The Ideas and Methods of William Farr." Johns Hopkins University Press, 1979.
- Glass RI. Beyond discovering the viral agents of acute gastroenteritis. *Emerg Infect Dis*. 2013 Aug. DOI: 10.3201/eid1908.130773
- Guerrant RL, Van Gilder T, Steiner TS, et al. Practice guidelines for the management of infectious diarrhea. *Clinical Infectious Diseases*. Feb 1 2001;32(3):331-351. Guidelines currently undergoing revision.
- Hall AJ, Lopman BA, Payne DC, Patel MM, Gastanaduy PA, Vinje J, Parashar UD. Norovirus disease in the United States. *Emerg Infect Dis*. 2013 Aug;19(8):1198-205.
- Hall AJ, Wikswo ME, Manikonda K, Roberts VA, Yoder JS, Gould LH. Acute gastroenteritis surveillance through the National Outbreak Reporting System, United States. *Emerg Infect Dis*. 2013 Aug;19(8):1305-9.
- Hall AJ, Eisenbart VG, Etingue AL, Gould LH, Lopman BA, Parashar UD. Epidemiology of foodborne norovirus outbreaks, United States, 2001-2008. *Emerg Infect Dis*. 2012 Oct;18(10):1566-73.
- Hall AJ, Wikswo ME, Pringle K, Gould LH, Parashar UD. Vital signs: foodborne norovirus outbreaks – United States, 2009–2012. *MMWR Morb Mortal Wkly Rep*. 2014 Jun 6;62(22):491–5.
- Jackson, JR, Tarr, C, Strain, E, Jackson, KA, Conrad, A Implementation of Nationwide Real-time Whole-genome Sequencing to Enhance Listeriosis Outbreak Detection and Investigation, *Clin Infect Dis*. (2016)doi: 10.1093/cid/ciw242
- Levy, K., K. L. Nelson, et al. Rethinking indicators of microbial drinking water quality for health studies in tropical developing countries: case study in northern coastal Ecuador. *Am J Trop Med Hyg* 2012; 86(3): 499-507.
- Loharikar, A., et al. (2015). "Cholera in the United States, 2001-2011: a reflection of patterns of global epidemiology and travel." *Epidemiol Infect* **143**(4): 695-703.
- Moe, CL Waterborne Transmission of Infectious Agents. In: *Manual of Environmental Microbiology*. Eds. J Hurst, RL Crawford, AL Mills, JL Garland, DA Lipson and LD Stetzenbach. ASM Press, 2007 3rd Edition. pg. 222 – 248.
- Moeller, DW. Water and Sewage. pgs. 56-79, In: Moeller DW (ed): *Environmental Health*. Cambridge, Mass, Harvard University Press, 1992.
- Mungai EA, Behravesh CB, Gould LH. Increased outbreaks associated with nonpasteurized milk, United States, 2007–2012. *Emerg Infect Dis* [Internet]. 2015 Jan.
- Nakao JH, Pringle J, Jones RW, Nix BE, Borders J, Heseltine G, Gomez TM, McCluskey B, Roney CS, Brinson D, Erdman M, McDaniel A, Behravesh CB. One Health investigation: outbreak of human *Salmonella* Braenderup infections traced to a mail-order hatchery - United States, 2012-2013. *Epidemiol Infect*. 2015 Feb 23:1-9.
- National Association of State Public Health Veterinarians Animal Contact Compendium Committee 2013. Compendium of Measures to Prevent Disease Associated with Animals in Public Settings, 2013. *J Am Vet Med Assoc*. 2013. Nov 1;243(9):1270-88.
- Painter, JA, Hoekstra RM, Ayers T, Tauxe RV, Braden CR, Angulo FA, Griffin PM. Attribution of

foodborne illnesses, hospitalizations, and deaths to food commodities by using outbreak data, United States, 1998—2008, *Emerg Infect Dis*, 2013 .

- Patel MM et al. Noroviruses: A comprehensive review. *J Clin Virology* 2009 44:1-8.
- Payne DC, Parashar UD. Rapid advances in understanding viral gastroenteritis from domestic surveillance. *Emerg Infect Dis*. 2013 Aug. DOI: 10.3201/eid1908.130449
- Pringle K, Lopman B, Vega E, Vinje J, Parashar UD, Hall AJ. Noroviruses: Epidemiology, immunity, and prospects for prevention. *Future Microbiology* 2015;10:53-67.
- Scallan et al. Foodborne illness acquired in the United States – Major pathogens. *Emerging Infectious Diseases* 2011 17(1):7-15
- Scallan et al. Foodborne illness acquired in the United States – Unspecified agents. *Emerging Infectious Diseases* 2011 17(1):16-22
- Shane AL, Tucker NA, Crump JA, Mintz ED, Painter JA. Sharing *Shigella*: risk factors for a multi-community outbreak of shigellosis. *Archives of Pediatrics & Adolescent Medicine*. Jun 2003;157(6):601-603.
- USEPA. Water on Tap: What you need to know. EPA 816-K-09-002, December 2009.
- Vega et al. Genotypic and Epidemiologic Trends of Norovirus Outbreaks in the United States, 2009-2013. *Journal of Clinical Microbiology* Jan;52(1):147-55.
- World Health Organization. (2015). Cholera, 2014. *Weekly Epidemiological Record*, 90(40), 517-544.
- World Health Organization 2011, Guidelines for drinking-water quality, fourth edition.
- World Health Organization. (2015, December 3). *WHO estimates of the global burden of foodborne diseases* (Rep.).
- **Movie:** Curran, J., *The Painted Veil* (based on the novel by W. Somerset Maugham), 2006: United States.
- **Movie:** Dieterle, William. *Dr. Ehrlich's Magic Bullet*, 1940: United States.
- **TED talk:** Steven Johnson: how the “Ghost Map” helped end a killer disease
 - http://www.ted.com/talks/steven_johnson_tours_the_ghost_map

Additional selected readings may be announced; those will be available to students on the Canvas site or in print.

OPTIONAL TEXTBOOKS

- Aiello AE, EL Larson and R. Sedlak. *Against Disease: The impact of hygiene and cleanliness on health*. The Soap and Detergent Association. 2007 (Strongly recommended, **Available on Canvas**)
- *Bacterial Infections of Humans: Epidemiology and Control*, 4th ed, Eds P. S. Brachman and E. Abrutyn, Springer, NY, 2009

COURSE SCHEDULE

The class will meet from 8:30am – 12:00pm and 1:00pm – 5:30pm daily, with a 10-minute break in each morning session and two-10 minute breaks during the afternoon session. Select faculty will be available to meet with students in the classroom from 5:30pm – 6:00pm each day.

Program for DAY 1 – Tuesday, January 3th

- 9:00 – 9:20** Course overview and discussion of syllabus – Dr. Christine Moe
9:20 – 10:30 Introduction to Foodborne and Waterborne Pathogens and Infectious Diseases Principles – Dr. Christine Moe
10:30 – 10:40 Break
10:40 – 12:00 Cholera as a Prototype for Diarrheal Diseases: a perspective of its “legacy”, its impact on public health, and research it stimulated culminating in a new paradigm for the treatment of life-threatening diarrheal diseases. Includes a video segment entitled ‘Cholera Today’ – Dr. Gene Gangarosa
12:00 – 1:00 Lunch Break
1:00 – 2:30 Introduction to Public Health Surveillance – Dr. Jenn Hunter
2:30 – 2:40 Break
2:40 – 3:50 Progress Toward Building a Better U.S. System for Decreasing Foodborne Illnesses – Dr. Patricia Griffin
3:50 – 4:00 Break
4:00 – 5:30 Estimates of the Number and Sources of Foodborne Illness Acquired in the United States– Dr. Patricia Griffin

Program for DAY 2 – Wednesday, January 4th

- 8:30 – 9:50** Overview of Emerging Foodborne Pathogens and Trends – Dr. Rob Tauxe
9:50 – 10:00 Break
10:00 – 11:20 Campylobacter and Salmonellosis: Epidemiology and Control – Dr. Rob Tauxe
11:20 – 12:20 Video: “Modern Meat” (extends into regularly scheduled lunch break)
12:20 – 1:00 Lunch Break
1:00 – 2:20 Investigation of a Listeriosis Outbreak – Dr. Brendan Jackson
2:20 – 2:30 Break
2:30 – 4:00 Waterborne Diseases Surveillance History and Overview – Dr. Michael Beach
4:00 – 4:10 Break
4:10 – 5:30 Waterborne Protozoan Diseases – Dr. Michael Beach

Program for DAY 3 – Thursday, January 5th

- 8:30 – 10:00** Water and Wastewater Treatment – Dr. Christine Moe
10:00 – 10:10 Break and board buses for field trip. **BUSES LEAVE AT 10:15 AM. Bring your own bag lunch.**
10:15 – 3:30 Field Trip: *Water and Wastewater Treatment* - Dr. Christine Moe
3:30 – 5:30 Investigating Outbreaks of Enteric Zoonoses using a One Health Approach – Dr. Megin Nichols

Program for DAY 4 – Friday, January 6th

- 8:30 – 9:15** Introduction to Enteric Viruses – Dr. Christine Moe
9:15 – 10:30 Norovirus Epidemiology: Burden, Attribution, and Surveillance– Dr. Aron Hall
10:30 – 10:40 Break
10:40 – 12:00 CaliciNet surveillance network and targeted interventions against enteric viruses (antiviral agents, norovirus vaccine) – Dr. Jan Vinjé
12:00 – 1:00 Lunch Break
1:00 – 2:15 Sharing Shigella – Dr. Andi Shane
2:15 – 2:25 Break
2:25 – 3:40 Overview of Diagnostic Approaches for Enteric Infections – Dr. Mark Gonzalez
3:40 – 3:50 Break
3:50 – 5:30 Overview of Vaccines for Enteric Infections: Rotavirus, Typhoid, Cholera – Dr. Andi Shane

Program for DAY 5 – Saturday, January 7th

- 8:30 – 9:50** Pathogen Virulence Factors – Dr. Gene Gangarosa and Dr. Andi Shane
9:50 – 10:00 Break
10:00 – 10:10 TED talk: “Steven Johnson: How the “ghost map” helped end a killer disease”
10:10 – 11:30 Ghost Map case study. Interactive discussion about The Ghost Map (Discussion based on Ghost Map Case Study Presentation) – Dr. Gene Gangarosa
11:30 – 12:00 Environmental transmission of cholera – Dr. Christine Moe
12:00 – 1:00 Lunch Break
1:00 – 2:20 Environmental Transmission of Enteric Pathogens; Microbial Indicator Organisms – Dr. Christine Moe
2:20 – 2:30 Break
2:30 – 3:50 Remembering the Global Burden of Food and Waterborne Diseases – UNICEF’s Children’s Summit video – Dr. Gene Gangarosa CHECK VIDEO DURATION
3:50 – 4:00 Break
4:00 – 5:30 *Final exam review*. Time for Q&A about specific exam questions, on-line course evaluation and to provide comments about course to instructors.

ACCREDITATION STATEMENTS:

CME activities with Joint Providers: This activity has been planned and implemented in accordance with the Essential Areas and policies of the Accreditation Council for Continuing Medical Education through the joint providership of the Centers for Disease Control and Prevention and Emory University, Rollins School of Public Health. The Centers for Disease Control and Prevention is accredited by the (ACCME®) to provide medical education for physicians. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

The Centers for Disease Control and Prevention designates this **live activity** for a maximum of (34.5) *AMA PRA Category 1 Credits™*.

CNE: The Centers for Disease Control and Prevention is accredited as a provider of Continuing Nursing Education by the American Nurses Credentialing Center's Commission on Accreditation.

This activity provides **(34.5)** contact hours.

CEU: The Centers for Disease Control and Prevention is authorized by IACET to offer **(3.5)** CEU's for this program.

AAVSB/RACE: This program was reviewed and approved by AAVSB RACE program **41.1** for hours of continuing education. Participants should be aware that some boards have limitations on the number of hours accepted in certain categories and/or restrictions on certain methods of delivery of continuing education. Please contact the AAVSB RACE program if you have any comments/concerns regarding this program's validity or relevancy to the veterinary profession.

DISCLOSURE: In compliance with continuing education requirements, all presenters must disclose any financial or other associations with the manufacturers of commercial products, suppliers of commercial services, or commercial supporters as well as any use of unlabeled product(s) or product(s) under investigational use.

CDC, our planners, presenters, and their spouses/partners wish to disclose they have no financial interests or other relationships with the manufacturers of commercial products, suppliers of commercial services, or commercial supporters. Planners have reviewed content to ensure there is no bias.

Planning committee reviewed content to ensure there is no bias.

Content will not include any discussion of the unlabeled use of a product or a product under investigational use.

The Centers for Disease Control and Prevention and Emory University, Rollins School of Public Health are jointly providing the CNE for this activity.

CDC did not accept commercial support for this activity.

To receive continuing education (CE):

Complete the activity X

Complete the Evaluation X at www.cdc.gov/TCEOnline

Pass the posttest at 70 % at www.cdc.gov/TCEOnline (if applicable)

FEES: There are no fees for CE. There is a Registration Fee of \$1000 (covers tuition and field trip expenses).