

**UNIVERSITY OF FLORIDA**  
 Department of Geography  
 GEOG 3454 People and Plagues  
 SYLLABUS: Fall 2020

**INSTRUCTOR INFORMATION:**

<b>Instructor:</b>	Dr. Gabriela Hamerlinck Turlington 3122   352.294.7513
<b>Office Hours:</b> All office hours will be held via Zoom. Link will be provided in our Canvas course.	Monday 2:00 pm – 3:30 pm Wednesday 10:00 am – 1:00 pm Thursday 3:00 pm – 4:30 pm (or by appointment)
<b>E-Mail:</b>	<a href="mailto:ghamerlinck@ufl.edu">ghamerlinck@ufl.edu</a>

**COURSE INFORMATION:**

<b>Time:</b>	Tu/Th 5-6; 6 (Tu: 12:50 pm – 2:45 pm; Thurs: 1:55 pm – 2:45 pm)
<b>Location:</b>	All class sessions will be held via Zoom. Link will be provided in our Canvas course

**COURSE DESCRIPTION:** This course is an introduction to emerging infectious diseases (EIDs) in the context of previous outbreaks, focusing on geography, origin, and management response. We will explore basic models of infectious disease processes, transmission cycles and life-histories of host-vector systems, and the ecological and landscape conditions that favor emergence. We will also explore the social, demographic, economic, and environmental context of historical and modern epidemics. The course will comprise lecture style introductions to weekly themes, which will center around a disease, or group of diseases, as illustrations of the impact of outbreaks, responses, or environmental context. These lecture style sessions will be complemented with student-led discussions and/or group activities, based on the readings and exercises provided by the instructor. Readings and supporting materials are taken from a wide variety of sources such as academic journals, popular news sources and magazines, agency factsheets, documentaries, and popular literature and movies. Both assigned and optional readings will be made available to students to develop thoughts and discussions. Accordingly, students will be expected to have read the assigned reading and be prepared to comment and participate in discussion.

**COURSE OBJECTIVES/STUDENT LEARNING OUTCOMES:**

- Define and learn terminology used to discuss and describe emerging infectious diseases (EIDs): hosts, reservoirs, vectors, accidental hosts, dead-end hosts, viral chatter, micro- and macroparasites.
- Describe and discuss EID history and management: Case histories, previous management responses, successes and failures, public perceptions, social impacts and education, the role of veterinary, agricultural and public health players and agencies.
- Explore EIDs and Ecology: how emergence interacts with the landscape from ecological, demographic and climate perspectives, and what that will mean in the future.

After completing this course students should be able to:

1. Define what an emerging infectious disease (EID) is, and discuss how this differs from endemic and chronic diseases.
2. Describe and discuss past outbreaks of infectious diseases, particularly of zoonotic origin, their impact and management.
3. Describe the ecological conditions that favor disease emergence and how this fits into our current understanding of the domestic-agricultural-wildlife interfaces, and future global change predictions.

4. Define and learn fundamental EID terminology, such as: hosts, reservoirs, vectors, accidental hosts, dead-end hosts, viral chatter, micro- and macroparasites.
5. Explore *basic* quantitative models of infectious disease processes, understanding of  $R_0$  and compartmental modeling.
6. Describe the direct and indirect transmission cycles for several EIDs of concern, and several aspects of their in-host immunological and cellular biology.
7. Discuss potential intervention and management strategies for different scenarios of EIDs, from veterinary cordons to economic strategies to public health plan implementation.

**REQUIRED TEXTS:** *None*. Students will be assigned a set of weekly readings, made available to them online, or in hard copy from the instructor.

### **GRADE DISTRIBUTION:**

#### **1. Class Participation (100 points - 10%)**

Students are expected to participate in discussions, and will lead specific discussions in groups of 2-3 via a short presentation of the discussion topic (<10 minutes), and introducing questions based on the readings, for the class to explore. Students will be assigned a date and a specific discussion topic to lead following the drop/add date once the number of students in the class is finalized.

#### **2. Reading comprehension homework (100 points - 10%)**

Students are expected to complete reading comprehension homework questions prior to each class discussion. These assignments are to be completed and submitted via Canvas

#### **3. In-class Tests (300 points - 30%)**

Three short (one-period) tests will be administered throughout the course, in class. These will comprise a mix of multiple choice, short answer, diagramming, and short essay responses. Each test is worth 100 points. The third exam will occur during finals week.

#### **4. Review/Critique short paper (100 points - 10%)**

Students will write a short essay (ca. 1,000 words, 3-5 pages), on a book, movie, documentary, or set of articles, related to the course themes. Topic approval by the instructor is required.

#### **5. Final paper (400 points - 40%)**

Students will work in pairs to take one of the diseases we discuss, or another EID of choice, and go into much greater depth. This paper will address multiple facets of the EID, such as economic and social impacts, biological detail beyond the scope of the course, management history or potential options, etc. Length is 4,000-4,500 words, and must have proper references. We will approach this in stages, with a final copy due date of December 8<sup>th</sup>, 2020 although you can turn it in early.

The stages of paper development will be graded and returned to the student pair, to ensure progress:

Outline – 50 points, Draft – 50 points, Peer review of 2 classmate’s drafts – 100 points (50 points each), Final paper – 200 points. Rubrics will be provided at least 3 weeks in advance of deadlines.

### **CLASSROOM POLICIES:**

- **Attendance & makeup policy:** Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.
- **Late Policy:** A class roll will be passed around at the beginning of class. If a student is late, he or she will have to sign the roll after class. Such lateness distracts other students and the instructor and will affect the student’s final participation grade. Students will lose 1% from their final grade each time they arrive late.
- **Cell phone and texting policy:** Students must turn cell phones to silent before coming to class. Each time a

student's cell phone rings or each time that a student texts during class, 1% will be deducted from that student's final grade for each instance.

- **Grade Disputes:** Should a student wish to dispute any grade received in this class (other than simple addition errors), the dispute must be in writing and be submitted to the instructor within a week of receiving the grade. The dispute should set out very clearly, the grade that the student believes the assignment should have received as well as why he or she believes that he or she should have received such a grade.

Grading Scale (& GPA equivalent):

A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E
100-93	92-90	89-87	86-83	82-80	79-77	76-73	72-70	69-67	63-66	62-60	59-
(4.0)	(3.67)	(3.33)	(3.0)	(2.67)	(2.33)	(2.0)	(1.67)	(1.33)	(1.0)	(0.67)	(0)

**Note:** A grade of C- is not a qualifying grade for major, minor, Gen Ed, or College Basic distribution credit. For further information on UF's Grading Policy, see:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx#hgrades>

<http://www.isis.ufl.edu/minusgrades.html>

**Academic Honesty:** UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

**Accommodations for Students with Disabilities:** Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation. Contact the Disability Resources Center (<http://www.dso.ufl.edu/drc/>) for information about available resources for students with disabilities.

**Counseling and Mental Health Resources:** Students facing difficulties completing the course or who are in need of counseling or urgent help should call the on-campus Counseling and Wellness Center (352-392-1575; <http://www.counseling.ufl.edu/cwc/>).

**Online Course Evaluation Process:** Students are expected to provide feedback on the quality of instruction in this course based on 10 criteria. These evaluations are conducted online at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results>.

**COVID-19 Statement** Our class sessions may be audio-visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate verbally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

## COURSE SCHEDULE

Students should note that the syllabus is a guideline and that there may be changes to the class schedule.

	<b>Tues 5-6</b>	<b>Topic</b>		<b>Thurs 6</b>	<b>Topic</b>	<b>Landmarks</b>
<b>Week 1</b>	09/01/2020	Introduction to EIDs and course overview	EIDs Overview, and Basic Disease Models	09/03/2020	Basic Disease Models	
<b>Week 2</b>	09/08/20	Basic epidemiology, outbreak investigation	Plague	09/10/20	Plague	
<b>Week 3</b>	09/15/20	<i>Watch Contagion</i>		09/17/20	Discussion: Plague	Choose Review topic
<b>Week 4</b>	09/22/20	MDR-TB, XDR-TB, TB-HIV	TB, BTB, etc	09/24/20	Pox - smallpox etiology, history, vaccinia vaccination	
<b>Week 5</b>	09/29/20	The other poxes (monkeypox, coralpox, etc)	Discussion: TB & Poxes	10/01/20	<b>First Test</b>	First Test
<b>Week 6</b>	10/06/20	Vaccination - simple herd immunity,	Vaccination - scandals, compliance, privacy	10/08/20	Discussion: Vaccinations	Choose topic for final paper Review Report Due
<b>Week 7</b>	10/13/20	Flu, old and new	Flu, old and new	10/15/20	Discussion: Flu	
<b>Week 8</b>	10/20/20	Wildlife EIDs	Wildlife EIDs	10/22/20	Discussion: Wildlife EIDs	Paper Outline due
<b>Week 9</b>	10/27/20	HIV/AIDS	HIV/AIDS	10/29/20	Discussion: HIV	
<b>Week 10</b>	11/03/20	VBD I: Malaria	VBD I: Malaria	11/05/20	<b>Second Test</b>	Second Test
<b>Week 11</b>	11/10/20	VBD II: Yellow Fever, Dengue, Zika	VBD II: Yellow Fever, Dengue, Zika	11/12/20	Discussion: Flaviviruses	Paper draft due
<b>Week 12</b>	11/17/20	VBD III: Chagas	VBD III: African Sleeping Sickness	11/19/20	Discussion: Trypanosomes	
<b>Week 13</b>	11/24/20	VBD IV: Lyme and other tick-borne diseases	VBD IV: Lyme and other tick-borne diseases	11/26/20	No class: Thanksgiving	
<b>Week 14</b>	12/01/20	VHFs: Hanta, Ebola, Sin Nombre	VHFs: Hanta, Ebola, Sin Nombre	12/03/20	Discussion: VHFs	Peer review due
<b>Week 15</b>	12/08/20	COVID-19	Review for final exam	12/10/20	No class – Reading days	Final paper due
<b>Comprehensive Final exam: 12/14/20 10:00 am – 12:00 pm</b>						

**Readings: Note that this is a preliminary list, with likely updates as outbreaks progress during the course**

**NOTE: READING SHOULD BE DONE PRIOR TO THE WEEK LISTED**

### **Intro to EIDs**

1. Quammen D (2007) Deadly contact. *Natl Geogr* 212: 78–105.
2. Daszak P, Cunningham AA, Hyatt AD (2000) Emerging infectious diseases of wildlife—threats to biodiversity and human health. *Science* 287: 443–449.
3. Jones KE, Patel NG, Levy MA, Storeygard A, Balk D, et al. (2008) Global trends in emerging infectious diseases. *Nature* 451: 990–993. doi:10.1038/nature06536.
4. Dobson AP, Carper ER (1996) Infectious Diseases and Human Population History. *BioScience* 46: 115–126. doi:10.2307/1312814.

### *Optional/Additional*

5. Scott ME (1988) *The impact of infection and disease on animal populations: implications for conservation biology*. *Conserv Biol* 2: 40–56.
6. Cleaveland S, Laurenson MK, Taylor LH (2001) Diseases of humans and their domestic mammals: pathogen characteristics, host range and the risk of emergence. *Philos Trans R Soc Lond B Biol Sci* 356: 991–999. doi:10.1098/rstb.2001.0889.
7. Hubalek Z (2003) *Emerging human infectious diseases: anthroponoses, zoonoses, and sapronoses*. *Emerg Infect Dis* 9: online.
8. Morens DM, Folkers GK, Fauci AS (2004) The challenge of emerging and re-emerging infectious diseases. *Nature* 430: 242–249.
9. Roberts M, Heesterbeek H (1993) Bluff your way in epidemic models. *Trends Microbiol* 1: 343–348.
10. Scott ME, Dobson A (1989) The role of parasites in regulating host abundance. *Parasitol Today* 5: 176–183.

### **Plague**

1. Gage KL, Kosoy MY (2005) Natural History of Plague: Perspectives from More Than a Century of Research. *Annu Rev Entomol* 50: 505–528. doi:10.1146/annurev.ento.50.071803.130337.
2. Stenseth NC, Atshabar BB, Begon M, Belmain SR, Bertherat E, et al. (2008) Plague: past, present, and future. *PLoS Med* 5: e3.

### *Optional/Additional*

3. Salkeld DJ, Salathe M, Stapp P, Jones JH (2010) Plague outbreaks in prairie dog populations explained by percolation thresholds of alternate host abundance. *Proc Natl Acad Sci* 107: 14247–14250. doi:10.1073/pnas.1002826107.

### **TBs**

1. Barnes DS (1995) *Introduction. The making of a social disease: Tuberculosis in nineteenth-century France*. Univ of California Press.
2. Cosivi O, Grange JM, Daborn CJ, Raviglione MC, Fujikura T, et al. (1998) Zoonotic tuberculosis due to *Mycobacterium bovis* in developing countries. *Emerg Infect Dis* 4: 59.
3. Lienhardt C (2001) From exposure to disease: the role of environmental factors in susceptibility to and development of tuberculosis. *Epidemiol Rev* 23: 288–301.

### *Optional/Additional*

4. Grange JM, Daborn C, Cosivi O (1994) HIV-related tuberculosis due to *Mycobacterium bovis*. *Eur Respir J* 7: 1564–1566. doi:10.1183/09031936.94.07091564.
5. Kaye K, Frieden TR (1996) *Tuberculosis control: the relevance of classic principles in an era of acquired immunodeficiency syndrome and multidrug resistance*. *Epidemiol Rev* 18: 52–63.
6. Sánchez MS, Lloyd-Smith JO, Williams BG, Porco TC, Ryan SJ, et al. (2009) Incongruent HIV and tuberculosis co-dynamics in Kenya: Interacting epidemics monitor each other. *Epidemics* 1: 14–20. doi:10.1016/j.epidem.2008.08.001.

## Pox

1. BBC News (2003) Monkeypox traced to Africa shipment. BBC. Available: <http://news.bbc.co.uk/2/hi/americas/3041012.stm>. Accessed 6 June 2013.
2. Center for Disease Control and Prevention (2004) Smallpox Fact Sheet. Department of Health and Human Services. Available: [http://www.atranceu.com/pdf/97\\_NV\\_Terror.pdf](http://www.atranceu.com/pdf/97_NV_Terror.pdf). Accessed 6 June 2013.
3. Wolfe ND, Dunavan CP, Diamond J (2007) Origins of major human infectious diseases. *Nature* 447: 279–283. doi:10.1038/nature05775.

### Optional/Additional

4. Jones-Engel L, Engel GA, Heidrich J, Chalise M, Poudel N, et al. (2006) Temple monkeys and health implications of commensalism, Kathmandu, Nepal. *Emerg Infect Dis* 12: 900.
5. Karesh WB, Cook RA (2005) The Human-Animal Link. *Foreign Aff* 84: 38–50. doi:10.2307/20034419.
6. Rosen GE, Smith KF (2010) Summarizing the Evidence on the International Trade in Illegal Wildlife. *EcoHealth* 7: 24–32. doi:10.1007/s10393-010-0317-y.

## Vaccines

1. Associated Press (2011) Study Linking Vaccine to Autism was Fraud, Journal Reports. N Y Times. Available: <http://query.nytimes.com/gst/fullpage.html>. Accessed 7 June 2013.
2. Godlee F, Smith J, Marcovitch H (2011) Wakefield's article linking MMR vaccine and autism was fraudulent. *BMJ* 342: c7452–c7452. doi:10.1136/bmj.c7452.
3. Center for Disease Control and Prevention (2012) Measles Outbreak Associated with an Arriving Refugee—Los Angeles County, California, August–September 2011. *Morb Mortal Wkly Rep* 61: 385–389.
4. Center for Disease Control and Prevention (2006) Progress in Reducing Global Measles Deaths 1999–2004. *Morb Mortal Wkly Rep* 55: 247–249.
5. Elliman D, Bedford H (2007) MMR: where are we now? *Arch Dis Child* 92: 1055–1057.

### Optional/Additional

6. Hall L (2010) Whooping-cough outbreak brings tighter law in 2011. *Orange Cty Regist*. Available: <http://www.ocregister.com/articles/booster-282357-disease-school.html>. Accessed 7 June 2013.
7. Keeling MJ (1997) Disease Extinction and Community Size: Modeling the Persistence of Measles. *Science* 275: 65–67. doi:10.1126/science.275.5296.65.
8. Keeling MJ, Grenfell BT (2002) Understanding the persistence of measles: reconciling theory, simulation and observation. *Proc R Soc B Biol Sci* 269: 335–343. doi:10.1098/rspb.2001.1898.
9. Lin R-G (2011) Measles cases rising in California, health officials say. *Los Angel Times*. Available: <http://latimesblogs.latimes.com/lanow/2011/05/measles-outbreak-california-whooping-cough.html>.
10. Weise E (2012) Measles outbreak could hit the USA. *USA TODAY*. Available: [http://www.usatoday.com/NEWS/usaedition/2012-03-20-Measles\\_ST\\_U.htm](http://www.usatoday.com/NEWS/usaedition/2012-03-20-Measles_ST_U.htm).

## Flu

1. The New York Times (1918) New York Times articles as the 1918 Flu hit.
2. Glezen WP (1996) Emerging infections: pandemic influenza. *Epidemiol Rev* 18: 64–76.
3. Meltzer MI, Cox NJ, Fukuda K (1999) The economic impact of pandemic influenza in the United States: priorities for intervention. *Emerg Infect Dis* 5: 659–671.
4. Webby RJ, Webster RG (2003) Are we ready for pandemic influenza? *Science* 302: 1519–1522.

## Wildlife EIDs

1. Daszak P, Cunningham AA, Hyatt AD (2003) Infectious disease and amphibian population declines. *Divers Distrib* 9: 141–150.
2. Dhondt AA, Badyaev AV, Dobson AP, Hawley DM, Driscoll MJL, et al. (2006) Dynamics of Mycoplasmal Conjunctivitis in the Native and Introduced Range of the Host. *EcoHealth* 3: 95–102. doi:10.1007/s10393-006-0019-7.
3. Fischer JR, Stallknecht DE, Luttrell P, Dhondt AA, Converse KA (1997) Mycoplasmal conjunctivitis in wild songbirds: the spread of a new contagious disease in a mobile host population. *Emerg Infect Dis* 3: 69.
4. Sutherland KP, Shaban S, Joyner JL, Porter JW, Lipp EK (2011) Human Pathogen Shown to Cause Disease in the Threatened Eklhorn Coral *Acropora palmata*. *PLoS ONE* 6: e23468. doi:10.1371/journal.pone.0023468.

### Optional/Additional

5. Hansen WR (2005) Avian Influenza. *Field Manual of Wildlife Diseases*. USGS. pp. 181–184.
6. Schrenzel MD, Tucker TA, Stalis IH, Kagan RA, Burns RP, et al. (2011) Pandemic (H1N1) 2009 virus in 3 wildlife species, San Diego, California, USA. *Emerg Infect Dis* 17: 747.
7. Daszak P, Cunningham AA, Hyatt AD (2000) Emerging infectious diseases of wildlife—threats to biodiversity and human health. *Science* 287: 443–449.

8. Swei A, Rowley JLL, Rödder D, Diesmos MLL, Diesmos AC, et al. (2011) Is Chytridiomycosis an Emerging Infectious Disease in Asia? *PLoS ONE* 6: e23179. doi:10.1371/journal.pone.0023179.

#### **HIV/AIDS**

1. Hahn BH, Shaw GM, De KM, Sharp PM (2000) AIDS as a zoonosis: scientific and public health implications. *Science* 287: 607–614.
2. Markel H (2005) No One's Idea of a Tropical Paradise: Haitian Immigrants and AIDS. When Germs Travel: Six Major Epidemics That Have Invaded America and the Fears They Have Unleashed. Vintage. pp. 142–176.
3. The Economist (2008) The American Association for the Advancement of Science: And now here is the virus forecast. *The Economist*. Available: <http://www.economist.com/node/10717931>. Accessed 7 June 2013.
4. Wolfe ND, Daszak P, Kilpatrick AM, Burke DS (2005) Bushmeat hunting, deforestation, and prediction of zoonotic disease. *Emerg Infect Dis* 11: 1822.

#### *Additional/Optional*

5. Wolfe ND, Heneine W, Carr JK, Garcia AD, Shanmugam V, et al. (2005) Emergence of unique primate T-lymphotropic viruses among central African bushmeat hunters. *Proc Natl Acad Sci* 102: 7994–7999.

#### **Malaria**

1. Breman JG, Alilio MS, Mills A, Breman JG, Alilio MS (2004) Conquering the intolerable burden of malaria: what's new, what's needed: a summary. Available: <http://www.ncbi.nlm.nih.gov/books/NBK3750/>.
2. Keiser J, De Castro MC, Maltese MF, Bos R, Tanner M, et al. (2005) Effect of irrigation and large dams on the burden of malaria on a global and regional scale. *Am J Trop Med Hyg* 72: 392–406.
3. Mordecai EA, Paaijmans KP, Johnson LR, Balzer C, Ben-Horin T, et al. (2013) Optimal temperature for malaria transmission is dramatically lower than previously predicted. *Ecol Lett* 16: 22–30. doi:10.1111/ele.12015.
4. Smith DL, McKenzie FE, Snow RW, Hay SI (2007) Revisiting the Basic Reproductive Number for Malaria and Its Implications for Malaria Control. *PLoS Biol* 5: e42. doi:10.1371/journal.pbio.0050042.

#### *Additional/Optional*

5. White NJ (2004) Antimalarial drug resistance. *J Clin Invest* 113: 1084–1092. doi:10.1172/JCI200421682.
6. Yasuoka J, Levins R (2007) Impact of deforestation and agricultural development on anopheline ecology and malaria epidemiology. *Am J Trop Med Hyg* 76: 450–460.

#### **Dengue, Zika, Yellow Fever**

1. Clarke T (2002) Dengue virus: break-bone fever. *Nature* 416: 672–674.
2. Gubler DJ (2011) Emerging vector-borne flavivirus diseases: are vaccines the solution? *Expert Rev Vaccines* 10: 563–565. doi:10.1586/erv.11.35.
3. Gubler DJ (2002) Epidemic dengue/dengue hemorrhagic fever as a public health, social and economic problem in the 21st century. *Trends Microbiol* 10: 100–103.

#### *Additional/optional*

4. Stewart Ibarra AMS, Ryan SJ, Beltrán E, Mejía R, Silva M, et al. (2013) Dengue Vector Dynamics (*Aedes aegypti*) Influenced by Climate and Social Factors in Ecuador: Implications for Targeted Control. *PLoS One* 8: e78263.

#### **Trypanosomiasis**

1. Lewinsohn R (1981) Carlos Chagas and the discovery of Chagas' disease (American trypanosomiasis). *J R Soc Med* 74: 451.
2. Moore S, Shrestha S, Tomlinson KW, Vuong H (2011) Predicting the effect of climate change on African trypanosomiasis: integrating epidemiology with parasite and vector biology. *J R Soc Interface* 9: 817–830. doi:10.1098/rsif.2011.0654.
3. Zeledón R, Calvo N, Montenegro VM, Lorosa ES, Arévalo C (2005) A survey on *Triatoma dimidiata* in an urban area of the province of Heredia, Costa Rica. *Mem Inst Oswaldo Cruz* 100: 507–512.

#### **Tick-borne diseases**

1. Halperin JJ, Baker P, Wormser GP (2011) Lyme Disease: the Great Controversy. In: Halperin JJ, editor. *Lyme Disease: An Evidence-based Approach*. CAB International. pp. 259–270.
2. Steere AC, Coburn J, Glickstein L (2004) The emergence of Lyme disease. *J Clin Invest* 113: 1093–1101. doi:10.1172/JCI200421681.

#### **VHFs**

1. *TBD readings focusing on Ebola [taken from recent news sources, to discuss in context of course themes and previous readings]*
2. Rabinowitz P, Conti L (2013) Links among human health, animal health, and ecosystem health. *Annu Rev Public Health* 34: 189–204.

**COVID-19** readings will be updated near the end of the semester and made available on Canvas