
VIBS 681 Epidemiology Seminar

Animal sentinels: Wild and domestic animal surveillance to inform human risk of disease

Overview

Animals have long been used to provide an indication of human threats in the environment. Zoonotic diseases- caused by infectious agents shared by humans and animals- are responsible for the majority of emerging human diseases. In this context, the strategic surveillance of animals has the potential to provide many benefits, including: (i) detection of a pathogen in a new area, (ii) detection of changes in the prevalence or incidence of a pathogen or disease over time, (iii) determining the rates and direction of pathogen spread, (iv) testing specific hypotheses about the ecology of a pathogen, and (v) evaluating the efficacy of potential disease control interventions (McCluskey 2003). Animal sentinels can range from individual animals deliberately placed in to an environment for monitoring to herds or populations of free-ranging or captive animals on farms or in the wild. Regardless of the type of animal sentinel, the information they provide must be acted upon in order to protect human and animal health, requiring surveillance program infrastructure.

This graduate student journal club will explore diverse literature on animal sentinels of zoonotic human disease. **We will study the ecology and epidemiology of diseases to arrive at attributes of disease systems that either facilitate or complicate a sentinel surveillance approach.** We will conclude the course with recommendations for enhancing the utility of animal sentinels.

Learning Outcomes

- Understand the circumstances under which the level of disease in animals may be predictive of risk to humans
- Critically review published studies that link animal disease to human disease in the context of biases and data sources.
- Identify the relationships between candidate sentinel populations and target populations that facilitate or complicate the sentinel approach.
- Explain the modeling approaches that have been used to predict human disease based on empiric data from animals or vectors.
- Compare the ecology of various zoonotic pathogens in the context of risk factors for transmission
- Synthesize course concepts by leading the presentation of research articles.

Spring 2019; 1 credit hour
Mondays 12-12:50; 278 VRB (Building 1811)

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Materials

Weekly course readings will be distributed via email.

Evaluation

Your grade for this course will be S/U and will be based on attendance, participation in discussions and presentation of research articles. The presentations will involve reading the article, preparing and distributing 5-10 questions, and using the questions to facilitate discussion and learning at the meeting.

Students are expected to attend at least 10 discussion periods. An oral exam will be available to students unable to attend at least 10 presentations if absences were excused (<http://student-rules.tamu.edu/rule07>)

ADA Policy Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit <http://disability.tamu.edu>.

Academic Integrity Statement

"An Aggie does not lie, cheat, or steal or tolerate those who do". Refer to the Aggie Honor System website at <http://www.tamu.edu/aggiehonor>.

TOPICS ARE SUBJECT TO CHANGE BASED ON STUDENT INTEREST AND NEW PAPERS

Week	Date	Topic	Presenter	Readings (others may be substituted or added)
1	Jan 14 (meet at 12:30- short class)	Orientation; Sign up for weekly presentations	Sarah Hamer	None
2	Jan 21	NO CLASS (MLK DAY)		
3	Jan 28	Framework for sentinel animal surveillance	Sarah Hamer	Halliday JE, Meredith AL, Knobel DL, Shaw DJ, Bronsvoort BM, Cleaveland S. A framework for evaluating animals as sentinels for infectious disease surveillance. <i>J R Soc Interface</i> . 2007;4(16):973-84. Rabinowitz P, Scotch M, Conti L. Human and animal sentinels for shared health risks. <i>Vet Ital</i> . 2009;45(1):23-4.
4	Feb 4	Ebola		Rouquet P, Froment JM, Bermejo M, Kilbourn A, Karesh W, Reed P, Kumulungui B, Yaba P, Délicat A, Rollin PE, Leroy EM. Wild animal mortality monitoring and human Ebola outbreaks, Gabon and Republic of Congo, 2001-2003. <i>Emerg Infect Dis</i> . 2005 Feb; 11(2):283-90.
5	Feb 11	West Nile virus		Eidson M, Komar N, Sorhage F, Nelson R, Talbot T, Mostashari F, McLean R, West Nile Virus Avian Mortality Surveillance Group. Crow deaths as a sentinel surveillance system for West Nile virus in the northeastern United States, 1999. <i>Emerg Infect Dis</i> . 2001 Jul-Aug; 7(4):615-20. Ward MR, Stallknecht DE, Willis J, Conroy MJ, Davidson WR. Wild bird mortality and West Nile virus surveillance: biases associated with detection, reporting, and carcass persistence. <i>J Wildl Dis</i> . 2006 Jan; 42(1):92-106.
6	Feb 18	National Animal Health Reporting System (NAHRS); National Animal Health Monitoring System (NAHMS)	Dr. Keri Norman faculty moderator	
7	Feb 25	Animal sentinels of Zika?		Izabela K. Ragan, Emily L. Blizzard, Paul Gordy, and Richard A. Bowen. Investigating the Potential Role of North American Animals as Hosts for Zika Virus. <i>Vector-Borne and Zoonotic Diseases</i> . 2017.161-164.
8	Mar 4	Tuberculosis		Nugent G, Whitford J, Young N. Use of released pigs as sentinels for <i>Mycobacterium bovis</i> . <i>J. Wildl. Dis</i> . 2002;38:665–677.
9	Mar 11-15	SPRING BREAK		

10	Mar 18	Chagas disease	Castillo-Neyra R, Chou Chu L, Quispe-Machaca V, et al. The potential of canine sentinels for reemerging <i>Trypanosoma cruzi</i> transmission. <i>Prev Vet Med.</i> 2015;120(3-4):349-56. Estrada-Franco J.G, Bhatia V, Diaz-Albiter H, Ochoa-Garcia L, Barbabosa A, Vazquez-Chagoyan J.C, Martin-Perez M.A, Guzman-Bracho C, Garg N. Human <i>Trypanosoma cruzi</i> infection and seropositivity in dogs, Mexico. <i>Emerg. Infect. Dis.</i> 2006;12:624–630.
11	Mar 25	High Path Avian Influenza	Coman A, Maftai DN, Chereches RM, et al. Avian influenza surveillance in the danube delta using sentinel geese and ducks. <i>Influenza Res Treat.</i> 2014;2014:965749. Rabinowitz PM, Galusha D, Vegso S, Michalove J, Rinne S, et al. Comparison of Human and Animal Surveillance Data for H5N1 Influenza A in Egypt 2006–2011. (2012) Comparison of Human and Animal Surveillance Data for H5N1 Influenza A in Egypt 2006–2011. <i>PLOS ONE</i> 7(9): e43851.
12	Apr 1	Tick-borne encephalitis	Katharina Achazi, Daniel Růzek, Oliver Donoso-Mantke, et al. Rodents as sentinels for the prevalence of tick-borne encephalitis virus. <i>Vector-Borne and Zoonotic Diseases.</i> 2011 11.
13	Apr 8	Arthropod vectors as sentinels- 'entomologic risk'	Brown HE, Yates KF, Dietrich G, et al. An acarologic survey and <i>Amblyomma americanum</i> distribution map with implications for tularemia risk in Missouri. <i>Am J Trop Med Hyg.</i> 2011;84(3):411-9. Pepin KM, Eisen RJ, Mead PS, Piesman J, Fish D, Hoen AG, Barbour A, Hamer SA, Diuk-Wasser MA. 2012. Geographic variation in the relationship between human Lyme disease incidence and the density of infected host-seeking <i>Ixodes scapularis</i> nymphs in the US. <i>Am J Trop Med Hyg.</i> 86:1062-1071.
14	Apr 15	Anthrax	Meselson M, Guillemin J, Hugh-Jones M, Langmuir A, Popova I, Shelokov A, Yampolskaya O. The Sverdlovsk anthrax outbreak of 1979. <i>Science.</i> 1994 Nov 18; 266(5188):1202-8.
15	Apr 22	STUDENT CHOICE	
*There will be NO FINAL EXAM during finals week for VIBS 681			