

AAVMC One Health Case Study Student Materials

***Brucella suis*: A re-emerging pathogen at the human, livestock, and wildlife interface.**

Case overview. One Health is an integrated, trans-disciplinary approach to solving complex problems at the interfaces between people, animals, and the environment. The challenge of working across disciplines is developing an understanding and appreciation for diverse viewpoints focused on a common problem and the impacts of that problem on multiple stakeholders. The common problem in this case study is brucellosis. *Brucella suis* is an example of a re-emerging zoonotic disease in the United States that illustrates how different professions and the public encounter this bacteria and respond to its presence. Three **simulated** case presentations are provided representing how *Brucella suis* impacts feral swine, domestic pigs, and humans. Using a **jigsaw** approach, students are assigned to one of these case scenarios to learn how *Brucella suis* is ultimately recognized and managed in either a free-range, farm, or medical setting. The student groups are then re-configured to include “experts” for each scenario, who then share their insights and interconnect the pieces of the *Brucella suis* puzzle. The entire class ultimately reconvenes to compare and contrast problem-solving challenges within disciplines and disseminating information across disciplines.

Learning objectives.

- 1) Describe commonality of approaches for solving problems within disciplines.
- 2) Explain the challenges of communicating information across disciplines.
- 3) Recommend strategies for more effective communication across disciplines in this case study and more effective dissemination of information to stakeholders such as farmers, hunters, and the general public.
- 4) Practice effective team communication during case study discussions.

Background/preparatory materials. Students review the information related to their assigned case scenarios at the provided links below prior to class. The pre-class assignment should take no more than 30 minutes to complete. There is enough information at each website to follow the case scenarios in class. Additional information embedded throughout the case scenarios will also help.

Case scenario - Human. <http://www.cdc.gov/brucellosis/index.html>

Case scenario – Livestock. <http://vetmed.iastate.edu/vdpam/new-vdpam-employees/food-supply-veterinary-medicine/swine/swine-diseases/brucellosis-swine-bru>

Case scenario – Wildlife. https://www.aphis.usda.gov/publications/aphis_pubs.php

Copy and paste address to internet browser. Scroll down list of publications and download Feral Swine: Damage and Disease Threats.

Class organization and key questions for class discussion. A facilitator will be available for each working group.

First hour: Students meet in their assigned working groups to review their case scenario and answer questions within the narrative. One student reads the case scenario aloud to their group. Questions at the end of each page are addressed and answered before turning to the next page. Another student captures the answers, preferably on a white board or electronically, so all students have a record of the responses. Each student is expected to be able to summarize the case scenario at the end of the hour.

Second hour: Once the scenarios are completed, the three working groups are reformed to include “experts” from each of the case scenarios. The student “experts” share a summary of their case scenarios. The following tasks and questions are then addressed.

1. Develop a timeline between the three scenarios to link the cases together. Enough information is provided in each scenario to accomplish this. Why is this important to do?
2. Discuss the challenges of sharing information in a timely manner across disciplines. For each scenario, an appropriate agency is notified and the information recorded into a database. How can this information be accessed better?
3. How does this case study exemplify a One Health approach for problem solving?

Third hour: The working groups formed during the second hour remain together to discuss questions that (1) address challenges of communicating across disciplines as posed in the case study and (2) challenges of communicating within their working groups. The facilitator will lead these discussions. Fifteen minutes should be reserved at the end so each working group can share their conclusions with the entire class.

About the authors.

Suzanne Kennedy-Stoskopf (Lead Author) is a Professor of Wildlife Health and Diseases at North Carolina State University in the College of Veterinary Medicine. She received her DVM from Michigan State University in 1976 and her PhD in Immunology and Infectious Diseases from Johns Hopkins University in 1986. She is boarded in the American College of Zoological Medicine. Her clinical expertise with free-ranging and captive wildlife combined with her research background in infectious diseases makes her an advocate for sustainable, healthy wildlife populations that in turn benefit humans and livestock. She was a founding member of the One Health Intellectual Exchange Group in 2008, and has been a member of the NC One Health Collaborative Steering Committee since 2010, and a member of the NC One Medicine Symposium Steering Committee since 2006. She teaches and coordinates numerous classes related to One Health and

wildlife health for undergraduate, graduate, and veterinary students including the One Health course offered through Duke University, UNC-Chapel Hill, and NC State. Her research interests include identifying factors that facilitate disease transmission in wildlife and spillover into other animals and humans.

Glen Almond is a professor of Pig Health and Production at NC State University. He joined the faculty in 1987 as a graduate research assistant while completing his Ph.D. at NC State University. He received his doctorate in veterinary medicine from the Ontario Veterinary College, Guelph, Canada. Prior to initiating his PhD, he was a food animal practitioner in Lethbridge, Alberta. His research has focused on reproductive physiology, urogenital disease and interactions between disease and growth. Recent research includes projects on the use of water medications in pig production and understanding the influence of stress on immunity in the pig. Teaching commitments include veterinary, graduate and undergraduate courses. As coordinator of a senior swine medicine course, he has provided educational opportunities for students from twelve veterinary colleges and seven countries. Interdisciplinary research and international exchange of knowledge are priorities in Dr. Almond's academic endeavors. In addition to serving on the NC Pork Council's Board of Directors, Dr. Almond is a member of the Council's research committee, summer student internship committee, and the National Pork Board's Welfare Committee.

Christopher S. DePerno earned a Bachelor of Science (Pre-Graduate Biology/Chemistry) from Central Michigan University (1990), a Master of Science (Behavioral Ecology) from Purdue University (1994), and a Doctorate (Wildlife Management) from South Dakota State University (1998). From 1999-2004, he worked as a research scientist for the Minnesota Department of Natural Resources. Since 2004, he has been employed as a Professor and Wildlife Extension Specialist at North Carolina State University. His research interests include population ecology, management, and habitat selection of a variety of species, animal damage management, wildlife and zoonotic diseases, and public education. He is a member of The Wildlife Society (National, Southeastern Section, and North Carolina Chapter), Great Plains Natural Science Society, North Carolina Prescribed Fire Council, and the North Carolina Herpetological Society. In 2002, he became a 'Certified Wildlife Biologist' via The Wildlife Society. Currently, he is an Associate Editor for the Great Plains Natural Science Society. He served as the Assistant and Associate Editor for the 2010 and 2011 Proceedings of the Southeastern Association of Fish and Wildlife Agencies, and was Past-President of the North Carolina Chapter of The Wildlife Society and the Great Plains Natural Science Society.

Gregory C. Gray, MD, MPH, FIDSA is a Professor at Duke University with affiliations in the Division of Infectious Diseases in Duke University's School of Medicine, Duke Global Health Institute, and Duke Nicholas School of the Environment. His medical boards are in Preventive Medicine and Public Health. Dr. Gray has conducted diverse epidemiological studies of infectious diseases for 25 years and has more than 260 peer-reviewed scientific reports or book chapters. Currently, he is running multiple year NIH-funded research in China and Mongolia. A strong supporter for the One Health approach,

he has won multiple One Health research and training grants, established two centers of One Health (USA & Romania) and developed 4 graduate programs in One Health (PhD, MHS, Certificate and Program).

April A. Kedrowicz (Ph.D. 2005, University of Utah) is Assistant Professor of Communication at the North Carolina State University College of Veterinary Medicine. She is currently developing and implementing the three-year, pre-clinical communication curriculum and conducting applied communication research. Dr. Kedrowicz has over 15 years of experience teaching interdisciplinary communication. Research interests include communication in the disciplines, communication education, and socialization and professional identity.

Danielle Stanek earned a Bachelor of Science in Microbiology from University of Florida (UF) in 1985, and her doctorate of veterinary medicine (D.V.M.) from UF College of Veterinary Medicine in 1989. She has experience with mixed and small animal veterinary practices, human and veterinary diagnostics at Organon Teknika, Washington State and Cornell Universities, and avian wildlife disease investigations in Florida prior to working at Florida Department of Health. Her work with agents having negative impacts on both animals and people led her to her current position as Medical Epidemiologist with the Zoonotic and Vectorborne Disease Program at the state health department, where she works with endemic and emerging zoonotic disease issues ranging from rabies, brucellosis and novel influenzas to dengue, babesiosis and chikungunya.

Chris Woods, MD, MPH is an associate professor in the Departments of Medicine and Pathology at Duke University and the Co-Director of the Hubert-Yeargan Center for Global Health. Clinically, he serves as Chief of Infectious Diseases and Clinical Microbiology, and hospital epidemiologist for the Durham VA Medical Center. Dr. Woods is board-certified in internal medicine, infectious diseases, and medical microbiology. His research focuses on the development of novel diagnostic approaches to infectious disease and the potential for interspecies transmission of pathogens. His genomic approach to harnessing the host response for diagnosis of infectious diseases has been called a paradigm shift in the field.

Asher Wright has been studying sustainable agriculture systems and farming now for over 10 years. He received his M.S. in Animal Science from Clemson in 2013. He is currently the farm manager of the Warren Wilson College Farm, a 275-acre mixed-crop and livestock farm in the Swannanoa Valley, right outside of Asheville, North Carolina. The student-run farm specializes in 100% grass-fed beef and lamb, as well as pastured pork and poultry. In addition to the farm's number one crop, forage, the farm also grows and harvests its own corn and barley, which is then used for pig and chicken feed. Asher's interests are systems-thinking, meat-quality as it relates to human nutrition, organic cropping systems and strengthening the farm-to-table movement.

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