

REPORT OF THE COMMITTEE ON PUBLIC HEALTH AND RABIES

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The Committee met on November 17, 2010 at the Minneapolis Hilton Hotel in Minneapolis, Minn., from 8:00 am to 12:20 pm. There were 18 members and 41 guests present.

Presentations

Impact of Rabies in an Animal Shelter

Jennifer Cope, MD, Epidemic Intelligence Service, Centers for Disease Control and Prevention with the North Dakota Department of Public Health
Susan Keller, DVM, State Veterinarian, North Dakota
Beth Carlson, DVM, Deputy State Veterinarian, North Dakota

After the Earthquake – Challenges for Rabies Prevention and Control in Haiti

Richard Franka, DVM, PhD, Associate Service Fellow, Rabies Team, Poxvirus and Rabies Branch, Division of High-Consequence Pathogens and Pathology (proposed), National Center for Emerging and Zoonotic Infectious Diseases, Centers for Disease Control and Prevention

Implementing the APHIS VS One Health Strategy

Beth Lautner, DVM, MS, Director, USDA National Veterinary Services Laboratories
Tom Gomez, DVM, MS, USDA VS Liaison to Centers for Disease Control and Prevention

VS2015 is a strategic vision developed to better position Veterinary Services (VS) to meet changing animal health challenges and needs in the 21st century. The VS Vision for 2015 states that "As the recognized animal health leader, and trusted partner, Veterinary Services safeguards the health of animals, people and the environment". Within VS2015, the four focused expanded mission areas include "One Health", "Surveillance for Action", "Movement and Marketability", and "Agricultural Emergency Management Preparedness and Response Planning".

As part of its vision for the future, VS is committed to embracing One Health (OH) as part of the solution to address the changes and challenges of the animal health landscape. As the federal government animal health authority, VS will contribute expertise, infrastructure, networks, and systems to partner effectively in a multi-disciplinary, multi-level (local, state, national and international) collaborative approach to promote healthy animals, people, ecosystems, and society.

To this end VS has drafted a strategic plan for implementing one health activities with VS with its one health mission statement "APHIS VS will provide U.S. leadership for the animal health component of one health and, as a dedicated one health partner, will contribute toward improving the global health of people, animals, ecosystems and society".

As part of the strategic plan, the following five goals outline how one health in VS will be implemented:

1. Align APHIS VS policy, programs, and infrastructure with the VS 2015 OH vision
2. Build new collaborations and partnerships, and sustain existing relationships in the OH community
3. Spearhead outreach and communication to build credibility, trust, and respect in the OH community

4. Transform the APHIS VS culture and workforce, and build new skill sets to support and integrate VS 2015 OH principle
5. Apply our unique competencies to support and enhance the OH community

The Global Risk of Disease, Animal Travel, and Mitigating Measures

Cathleen A. Hanlon, VMD, PhD, Dipl ACVPM, Director, The Kansas State University Rabies Laboratory
Authors: Cathleen A. Hanlon, Anna Pees, Celine Corrales, and Susan Moore

In this global community, humans travel and animals are moved, in compliance with regulations and unlawfully, intentionally and unintentionally, making the risk of disease translocation global as well. Despite the forced extinction of dog-to-dog types of rabies viruses in most of Western Europe and the Americas through mandatory vaccination and stray dog control, the risk of re-introduction of related variants remains a compelling reason for continuing to require dog vaccination. Vaccination of an individual animal simplifies prevention from an exposure to endogenous wildlife rabies virus variants; required vaccination of the population provides biosecurity against potential re-introduction of canine rabies virus variants. The recent translocation of dogs from Puerto Rico, Thailand, India, and Iraq, which developed rabies from their places of origin upon movement into the United States, demonstrates the risk of disease introduction. Like many zoonoses and other emerging infections, rabies prevention requires the cooperation of animal control, law enforcement, natural resource personnel, veterinarians, diagnosticians, public health professionals, physicians, and others. The risk of disease translocation can be mitigated through carefully crafted requirements for animal identification, vaccination, serological monitoring, and advance planning essentially equivalent to a quarantine period. A critical component is education of owners and the public as to the importance of these requirements for the prevention of disease. While the methods for measuring immunity to rabies and for diagnosis are powerful, they include some limitations innate to biological assays. For example, measures of antibody activity by the Fluorescent Antibody Virus Neutralization (FAVN) method or the Rapid Fluorescent Focus Inhibition Test (RFFIT) provide estimates of immunity to rabies which are useful but not absolutely predictive for protection from disease. Within a population of animals, the majority responds adequately to parenteral rabies vaccination with qualified vaccines, but there are also low- and non-responders. Historically, rabies diagnosis and prevention has been a core part of public health practice at local and state animal and human health laboratories and agencies. Through effective prevention, diagnostic submissions often decline and hence case numbers concurrently decline creating vulnerability. With declining case numbers and substantial pressure from economic constraints, a number of public health laboratories are moving away from subsidizing rabies diagnosis. Entrepreneurs are clearly engaged in the development of “bedside, point-of-care or a field test” for rabies, both for diagnosis and serological evaluation. Recent efforts have focused on detection of rabies antigen in saliva and strong interest in the development of an immunoblot for the detection of rabies antibodies in sera. Moreover, the enzyme linked immunosorbent assay (ELISA) platform is of potential high utility. Several ELISA tests have been configured and applied for rabies serology. There remains a need for proficiency testing and advancement of quality control practices to optimize human and animal rabies diagnostic and serological practices. Although rabies excites the imagination, current vulnerabilities include the potential for re-introduction of dog-to-dog transmitted rabies, a decline in diagnostic expertise and capacity, commercial enterprises answering a perceived need for diagnosis and serology but with limitations in test accuracy and specificity, and a lack of basic research, especially to understand recent advances towards treatment of clinical rabies. As we increasingly approach the reality of global community with rapid and high volume exchange of animate beings and inanimate products, diligent attention and dedicated effort will be required to maintain and indeed, even advance emerging and zoonotic disease control, with rabies as a tangible “best-practices” template, beyond the major advances made in the last 50 years.

Update on the Status of Oral Rabies Vaccination in the United States

Dennis Slate PhD, Director of UDA APHIS WS Rabies Management Plan

Wildlife Rabies Control in a Complex Residential Environment on Long Island, NY – Preliminary Results

Dr. Laura Bigler, Cornell University, Animal Health Diagnostic Center

Authors: Laura L. Bigler, Donald H. Lein, and Bruce L. Akey

Wildlife rabies control efforts using the RABORAL V-RG® vaccine contained in the fishmeal polymer bait were initiated on Long Island (NY) at the start of the terrestrial rabies epizootic during 2004. In total, 86 of 4003 raccoons have been confirmed rabid in the treatment area. Ten rabid raccoons were diagnosed during 2004, 35 in 2005, 23 in 2006, 16 in 2007, and one case (each) in 2008 and 2009. Thus far, the intervention appears successful; the leading edge of the epizootic front has not advanced since 2006. All positive diagnoses have been restricted to raccoons and terrestrial rabies has not been reported in any other wild or domestic species. During 2009, one rabid animal was identified among 376 raccoons. This year, the NYS Department of Health (NYSDOH) Rabies Laboratory confirmed 262 rabies-negative raccoons through 12 November 2010. Accordingly, terrestrial rabies has not been identified in 628 raccoons (2009-2010) that have been submitted since the last rabid raccoon was diagnosed on 13 January 2009. Skunks, a potential ORV confounder in other areas of the United States and Canada, have not been observed on Long Island since the mid-1970's, when species extirpation was thought to be the result of pesticide applications to control the Colorado potato beetle.

Initially, the NYSDOH and USDA APHIS Wildlife Services implemented population reduction, trap-vaccinate-release, and oral rabies vaccination (ORV) with target bait densities of 125 and 150 baits/km². The bait density was increased to 250 baits/km² during 2006 in response to continuing cases within the enzootic zone, as well as an advancing epizootic front. The evaluation of two applications of 500 baits/km² over the active epizootic front was initiated during 2007, while the existing bait density of 250 baits/km² was continued over enzootic and pre-epizootic areas. A preliminary multivariate regression model indicated that raccoon age, treatment method, achieved bait density, and human population density had significant effects on the probability of raccoon seroconversion. Increasing bait density resulted in a greater probability of seroconversion (P=0.01). As the human population density increased, the probability of raccoon seroconversion decreased (P=0.04). Bait station distribution was comparable to vehicle distribution, while parallel and grid flight lines effected statistically greater levels of seroconversion (P=0.001). Finally, adult raccoons were marginally more likely to seroconvert, when compared to juvenile animals (P=0.06). Capture habitat (i.e., land use/land cover) was not a significant component of the preliminary regression model.

At achieved bait densities approaching 250 baits/km², the probabilities of raccoon seroconversion in vehicle and bait station zones ranged between 20-25%, while comparable aerial distributions with parallel flight lines resulted in seroconversion levels of 40-45%. At achieved bait densities of approximately 500 baits/km², the probability of raccoon seroconversion ranged between 45-50% in parallel flight line zones, while grid flight lines resulted in 60-65% seroconversion probabilities. When two applications of 500 baits/km² were implemented (i.e., one during late July and one during early September), the probability of seroconversion in the parallel flight-line zone ranged between 50-55%, in comparison to 68-71% probabilities of seroconversion within the grid zone.

An evaluation of seroconversion relative to distance from bait station locations demonstrated that raccoons captured in close proximity to bait station sites demonstrated a statistically greater advantage (P=0.0023). The greatest probability of raccoon seroconversion (45%) was observed in animals that were captured within 5 meters of the bait station locations. At a distance of 60 meters, the probability of seroconversion decreased to 35%. At 250 and 500 meters, the probabilities of seroconversion were further reduced to 11% and 2%, respectively.

Thus far, the ORV intervention appears successful on Long Island, albeit with elevated bait and aerial distribution parameters that may not be sustainable over extended contiguous areas of the US. A stringent economical analysis will be necessary to determine if a bait density of 250 baits/km² over enzootic and pre-epizootic areas, concomitant with two applications of 500 baits/km² (i.e., approximately 80,000 baits twice yearly) over the stationary epizootic front during 2007-2009, will prove cost-effective in comparison to permitting the raccoon variant of rabies virus to continue to advance eastward and become entrenched in the heavily-populated, Long Island environment.

Sustaining the One Health Impact of Wildlife Rabies Prevention in the United States

Joanne Maki, DVM, PhD, Rabies Program Manager, Merial Limited

Authors: Joanne Maki, W. Stephen Parker, Nathalie Rotsztajn, Carolin Schumacher

The public health impact of rabies in humans and domestic animals is actively being addressed with a new level of awareness, determination and enthusiasm at the global level. Although the transmission cycle of the rabies virus has been known for centuries, this viral pathogen continues to inflict significant harm worldwide leading to more than 55,000 human deaths each year. Today in the United States (US),

rabies prevention programs are well integrated into the public health system. Mandatory dog vaccination regulations established in the 1960's set the stage for medical and veterinary professionals to work together in the spirit of One Health to prevent human disease and control rabies transmission in domestic animal species. Over the next twenty years, reported cases of dog rabies in the US declined and attention turned to preventing virus transmission between domestic animals and wildlife reservoir species. Beginning in the 1990's, oral rabies vaccination (ORV) programs for raccoons, coyotes and gray foxes were undertaken and proved over time that rabies outbreaks in selected vector species could be controlled. Through state and federal ORV programs, transmission of the canine strain of rabies in south Texas coyote populations was eliminated, the westward expansion of raccoon rabies strain was halted at the Appalachian Mountains, and strategies were developed to address wildlife rabies outbreaks in urban environments. Today, federal and state sponsored ORV programs continue to monitor areas cleared of wildlife rabies while addressing new challenges. All of these programs are now faced with rapidly declining levels of governmental funding and resources. Ironically, as funding levels for US ORV programs decline, societal changes have led to increasing numbers of interactions between humans and wild animals in urban habitats. Today, and in the future, wildlife rabies prevention is, and will continue to be, a key factor in maintaining the integrity of rabies control in the US. As international agencies and non-profit groups around world embrace the One Health/One World concept and renew their commitment to eliminating human rabies, the One Health success story of rabies prevention in the US should be championed by the public health community. Through the talents and expertise shared among its members and in alignment with organizational objectives, USAHA can continue to actively support and promote rabies prevention through a renewed vision of One Health.

Committee Business

The Committee passed one Resolution pertaining to funding for the national oral rabies vaccination program, sent to the Committee on Nominations and Resolutions. The Committee also passed one Recommendation.

Recommendation:

The Northeast United States Animal Health Association unanimously requests that the Committee on Public Health and Rabies sponsor a half-day symposium at next year's annual meeting in Buffalo on Wildlife Rabies Control – A One Health Initiative. This would detail the accomplishments, current status, and future plans of the North American Rabies Management Plan, which would include USDA/APHIS Wildlife Services, the Texas Department of State Health Services, the Navajo Nation Veterinary Program, the Ontario Ministry of Natural Resources, the Quebec Ministry of Natural Resources and Wildlife, the Centers for Disease Control and Prevention, the USDA/APHIS Center for Veterinary Biologics, the Canadian Food Inspection Agency, the Alliance for Rabies Control, and others. Corporate sponsors will be obtained to support the symposium.

The Committee will work with USAHA Program Committee to schedule this symposium in conjunction with next year's committee meeting. With no further business, the Committee adjourned.