The One Health Newsletter is a

collaborative effort by a diverse group of scientists and health professionals

committed to

promoting One Health.

Editor:

Elizabeth Radke, MPH

University of Florida

Proud Partner of:

Subscribe:

OH@doh.state.fl.us

Submit articles,

contact the editor:

ohnleditor@gmail.com

Fall 2012 Volume 5 Issue 4

One Health and Polio Eradication

Danielle Tack, DVM, MPVM, DACVPM

After smallpox eradication was certified in 1979, the 1988 World Health Assembly declared polio as the next human disease to eradicate. Great strides towards polio eradication have been made across the world and, as of January 2012, only three countries are considered to have circulating wild polio virus (WPV): Afghanistan, Nigeria and Pakistan. Unfortunately, in many of the countries that had been polio-free, WPV has been reintroduced due to low immunization coverage, which is often found in migrant human populations. Kenya is one such country.

In February 2009, WPV was found in Turkana, Kenya, and through sequencing was found to be genetically similar to WPV identified in Sudan in 2004. Genetically-related WPV was detected in Mayuge, Uganda, in 2010 and again in Rongo, Kenya, in 2011. The continued circulation of this virus suggested that surveillance and immunization coverage could be strengthened. I was a member of a team consisting of personnel from the Centers for Disease Control and Prevention (CDC), World Health Organization (WHO), United Nations Children's Fund (UNICEF), and Kenya's Ministry of Public Health and Sanitation (MoPHS) that conducted an evaluation of the polio program in Kenya to provide recommendations, including opportunities for collaboration and integration of services. This evaluation identified that pastoral communities are a hard-to-reach population for childhood vaccinations, because of their nomadic lifestyles and tendency to cross international borders. The Kenyan MoPHS and their polio eradication partners are planning to use these findings to develop

This quarterly newsletter is dedicated to enhancing the integration of animal, human, and environmental health for the benefit of all by demonstrating One Health in practice.

http://www.onehealthinitiative.com

Photo credit: Danielle Tack

approaches to reach nomadic communities.

One Health is generally considered in the context of zoonotic diseases and the complex dynamics associated with disease transmission among people, wildlife, livestock, and the environment. However, in this situation, it is not only the disease but also the population and nomadic pastoralists that are of interest. Nomadic pastoralists consist of numerous tribes each with their own customs and traditions, but sharing one thing in common—livestock. The livestock are such an integral part of pastoralist life that food, water and health needs of livestock are the priority factors, dictating household movement. Therefore, improving vaccination coverage for nomadic pastoralist populations could be enhanced by working with organizations involved in animal health. During the evaluation in Turkana, where pastoralism is practiced by the majority of the population, I looked for opportunities to help ensure Kenya remains polio-free.

Through interviews with veterinarians working for CDC-Kenya, African Union – Interafrican Bureau for Animal Resources (AU-IBAR), and United Nations – Food and Agricultural Organization (UN-FAO) as well as an epidemiologist working with the International Union for Conservation of Nature (IUCN) Regional Drylands Programme, I found numerous opportunities for collaboration on promoting human disease surveillance and vaccination and learned more about the pastoral culture in Kenya. Nomadic pastoralists move over large areas to obtain pasture and water for their herds. Typically the whole household is involved in the care of the livestock, so the household moves as pasture and water availability dictate. Movement is based on experience within the tribe and factors such as rainfall patterns, geography, forage quality, disease risk, land rights, and tribal conflicts. Unfortunately, maps of nomadic movement patterns have not been documented. A better understanding of these patterns could help MoPHS in reaching the nomadic population with polio vaccine, and could also assist the Ministry of Livestock Development (MoLD) in reaching the livestock for vaccinations especially during disease outbreaks.

Another opportunity for collaboration exists with the Community Based Animal Health Workers (CBAHWs). Prior to changes in the Kenyan Veterinary Practice Act, communities chose respected animal owners to become CBAHWs. The CBAHWs received training in animal husbandry and disease recognition to help communities with their livestock when veterinary resources are difficult to reach and to aide veterinarians in disease surveillance. Although CBAHWs are no longer being appointed, trained, or recognized as part of the veterinary infrastructure, they are leaders within their community with basic training who could assist with human disease surveillance and efforts to mobilize communities to get vaccinated.

In This Issue

Finally, linking of veterinary and human health service resources could help during vaccination campaigns, by offering animal vaccination or veterinary services as an incentive for vaccinating children or by scheduling joint human and animal vaccination campaigns. By offering human and animal services together, the importance of animal and human health to the household is recognized.

Since providing these findings to the Kenyan MoPHS, steps have been taken to further engage the animal health sector, including laying the foundation for collaboration during upcoming polio vaccination campaigns and for promoting routine immunization activities. CDC/WHO Stop Transmission of Polio program volunteers in Turkana have been meeting with veterinary non-governmental organizations like Vétérinaires Sans Frontiere, local MoLD veterinarians, and other animal-sector partners to create advocacy, communication, and social mobilization plans for the upcoming polio vaccination campaign. Additionally, a project to map the primary pastoral communities in three Kenyan Provinces has started. This project is bringing together information from multiple human, animal, conservation, and land management organizations and sectors to develop a "base map" and database of stock routes, water points, buffer zones during wet and dry seasons, food distribution centers, temporal residency indicators, and other "nomadic points of interest." This map could then be used by multiple sectors to address pastoralist health, animal health, and resource management needs. After validating and addressing knowledge gaps in communities, the data can be used to create an algorithm to help prioritize more detailed activities and resource allocation.

In addition to contributing to polio eradication, these efforts to link human health and veterinary services will contribute to developing and strengthening partnerships, which can be used in a broader context for identifying emerging disease threats, responding to outbreaks in animals and/or humans, and for developing health infrastructure to improve access to care. The interaction of people, animals, and the environment continues to evolve and change. The One Health approach offers a forum for developing and applying novel methods for addressing new and old human and animal health issues.

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Danielle Tack was an Epidemic Intelligence Service Officer assigned to the Poxvirus and Rabies Branch at the Centers for Disease Control and Prevention. She is currently a Preventive Medicine Fellow assigned to the Georgia Department of Public Health.

Linking of veterinary and human health service resources could help during vaccination campaigns, by offering animal vaccination or veterinary services as an incentive for vaccinating children or by scheduling joint human and animal vaccination campaigns.

File:Poliodrops.jpg
Photo credit: USAID

Role of Zoos in One Health

Sharon L. Deem, DVM, PhD, DACZM and Pam Dennis, MS, DVM, PhD, DACZM

Biodiversity, which encompasses all the ecosystems, species,

and genetic material on earth, is the ultimate source of the resources on which humans depend. The food we eat, material we use for building shelter, medicines for healing, and ecosystem services which include purification of water and cleansing of air, are only possible because of the Earth's biodiversity. At the very time that the importance of biodiversity for human survival has become better appreciated, we are witnessing an unprecedented loss of species. Recent analyses demonstrate rates of species extinctions that are currently 100-1,000 times pre-human levels, with these rates increasing steadily. These extinctions are concurrent with human-driven (anthropogenic) changes resulting in what many contend is the new Anthropocene epoch.

It is estimated that since 1970 global population sizes of wildlife species have decreased by 30%. Wildlife taxa threatened with extinction include 12% of birds, 21% of mammals, 32% of amphibians, and 27% of reef-building corals. In response to this dramatic decline, the 1990s welcomed the field of conservation medicine. In this transdisciplinary field, we strive to understand the relationship between human, animal, and ecosystem health to ensure the conservation of all biodiversity. More recently, One Health, which is an initiative that aims to merge animal and human health science to benefit both, has become widely accepted within the human and animal medical professions with the focus of ensuring public health and the conservation of species. Although often branded as new approaches, these initiatives are built on decades (and some might argue centuries) of previous work that operated with the same guiding principles. This may have been most eloquently phrased in the 1800s by Rudolf Virchow with his statement "between animal and human medicine there is no dividing line – nor should there be." More recently, Calvin Schwabe first coined the term One Medicine in the 1984 third edition of his book entitled Veterinary Medicine and Human Health.

The One Health Initiative has gained wide support due to recent global changes that include the rise in emerging infectious diseases, many of which are

The food we eat, material we use for building shelter, medicines for healing, and ecosystem services which include

purification of water and cleansing of air, are only possible because of the Earth's biodiversity.

Conservation medicine strives to understand the relationship between human, animal, and ecosystem health to ensure the conservation of all biodiversity.

Drs. Deem and Emmons assess the health of a maned wolf as part of a zoo-led study in Noel Kempff Mercado National Park, Bolivia. Photo credit: Sharon Deem.

zoonotic and diseases of conservation concern that challenge species survival. For example, of 335 emerging disease events in humans, 60% were zoonotic and 72% of these originated in wildlife. Additionally, disease in wildlife species have been increasingly documented to impact on species survival with both population extirpations and even species extinctions.

In this article we review five roles that zoos have in the emerging field of One Health, and the benefits that zoos offer to both biodiversity conservation and human health. These roles include: 1) providing healthcare of zoo wildlife, thus ensuring the sustainability of biodiversity; 2) conducting studies on diseases of conservation concern; 3) understanding diseases in zoo wildlife as sentinels for emerging diseases of humans and animals in urban areas; 4) surveillance of disease in wild animals at the interface of wildlife, domestic animals and humans; and 5) contributing to the field of comparative medicine and the discovery of life.

1) Providing healthcare for zoo wildlife, thus ensuring the sustainability of biodiversity.

Zoological institutions are recognized as organizations dedicated to the conservation of animal species. Of the 68 species whose IUCN threat level has been reduced, 17 (25%) had captive breeding at zoological institutions play a role in the threat level reductions. Advances in veterinary care were essential for the propagation of these species. Additionally, a number of species that were once on the brink of extinction are no longer so due to reintroduction efforts, many of which were zoo led. These biodiversity conservation efforts provide preventive disease control associated with the “dilution effect” in which a larger assembly of species, each with different disease susceptibilities, may minimize the emergence of infectious diseases in human and other animals.

2) Conducting studies on diseases of conservation concern

Health professionals in zoos are leading research efforts to understand many of the infectious diseases that threaten the long-term survival of wildlife species, such as chytridiomycosis in amphibians. Disease-related conservation challenges are not solely linked to infectious diseases, as evident from the near extinction of three Gyps spp. in India associated with the use of an anti-inflammatory drug in livestock. These diseases can have impacts that occur on multiple scales, affecting individuals (fitness costs), populations (population size and connection), communities (changes in species composition), and ecosystems (structure, function, and resilience). The epidemiology, pathology, and clinical implications of many of these significant wildlife diseases are studied by zoo health professionals, both in situ and ex situ.

A number of species that were once on the brink of extinction are no longer so due to reintroduction efforts, many of which were zoo led.

Gayle Albers and Dr. Pam Dennis (right) completing stream habitat assessment as part of a zoo-led study examining the effect of water quality on an Ohio state endangered fish, the big mouth shiner (Notropis dorsalis).

Photo credit: Sharon Deem.

3) Understanding diseases in zoo wildlife as sentinels for emerging diseases of humans and other animals

Often located in urban settings, zoos with diverse species collections may serve as sentinels of emerging diseases. The species housed at zoological collections vary in susceptibilities to pathogens, are observed daily, and receive regular health examinations; all factors that allow the early detection of emerging or introduced pathogens. The most recent and well-known example of zoo animals serving as sentinels was the detection of West Nile virus at a New York City zoo, alerting human and animal health communities to the new arrival of this vector-borne pathogen. Today, the network of accredited North American zoos has surveillance programs for zoonotic pathogens including avian influenza, tuberculosis and West Nile virus. Additionally, many zoos have local surveillance programs for urban wildlife on and near zoo grounds for zoonotic pathogens such as rabies virus and Bayliascaris procyonis.

4. Surveillance of disease in wild animals at the interface of wildlife, domestic

animals and humans

In 2001, it was estimated that between all the zoos accredited by the World Association of Zoos and Aquariums (WAZA) there were approximately 1,100 field-based projects in 80 countries. Zoo-funded and zoo-led in situ conservation projects occur in both biodiversity and pandemic pathogen hotpots. The often long-term commitment to field conservation and research from these programs allows zoo staff to perform health surveillance studies on wildlife and domestic animals.

5. Contributing to the field of comparative medicine and the discovery of all life forms

Comparative medicine is a long-established field within the veterinary and medical professions, based on comparison and contrasts of the anatomy, physiology and pathophysiology of diseases between species. For example, advances in human medicine are largely due to comparative studies using animal models. Today, there is growing application of human studies that help with our understanding of diseases in animals (e.g., cancers, arthritis) and the use of sentinel animals and humans for the health of the other.

Zoos with diverse species collections may serve as sentinels of emerging diseases.

Zoo-funded and zoo-led in situ conservation projects occur in both biodiversity and pandemic pathogen hotspots.

People in a village in Bolivia bring their dogs to a mobile clinic as part of a zoo-led health assessment to understand disease risks at the interface of wild carnivores and domestic dogs in the region.

Photo credit: Sharon Deem.

Until recently, conservation of biodiversity emphasized the discovery of vertebrate species with lesser emphasis on invertebrate and parasite species. The metagenomic nature of individuals, composed of their own gene complements and those of all their associated microbes, is now appreciated for humans and other animals. Each species, in fact each individual, is known to have unique microbiomes. Zoos, with collections of animals and a global footprint of projects working with free-living wildlife

populations, offer the discovery of life forms down to the microbial level.

Conclusion

For decades zoos have played significant roles in One Health, and they will continue to do so for years to come. Annual attendance at zoos accredited by the American Association of Zoos and Aquariums (AZA) is 175,000,000 visitors, including people from a few weeks of age to 100 years old! Zoos will continue to educate people on the importance of healthy animal populations and ecosystems for biodiversity conservation and human health.

In conclusion, zoos accredited by AZA are education, research, and conservation centers and many have multidisciplinary One Health teams. Zoos may staff epidemiologists, veterinary clinicians, nutritionists, reproductive physiologists, pathologists, endocrinologists, geneticists, animal behaviorists, and animal care providers, all working to advance the One Health concept. The collaborative efforts of zoos as they work closely with other organizations that have disciplines not traditionally present on zoo staffs (e.g. human medical personnel, economists, sociologists), strengthen their One Health teams.

References: http://myfloridaeh.com/medicine/One_Health/RoleofZoosReferences.pdf

Sharon L. Deem is the Director of the Institute for Conservation Medicine at the Saint Louis Zoo. Pam Dennis works in Conservation Medicine at the Cleveland Metroparks Zoo.

Zoos may have staff epidemiologists, veterinary clinicians, nutritionists, reproductive physiologists, pathologists, endocrinologists, geneticists, animal behaviorists, and animal care

providers, all working to advance the One Health concept.

Dr. Pam Dennis performing an insulin ELISA on black rhinoceros serum, as part of a zoo-led study examining insulin resistance as a risk factor for health problems seen in black rhinoceros.

Photo credit: Pam Dennis.

Kenyan nationals and international students work on a zoo-led camel study in Kenya to better understand disease threats at the camel-wildlife-human interface. Photo credit: Sharon Deem.

Lemur disease ecology: linking ecosystem viability and conservation in Madagascar

Meredith A. Barrett, PhD and Randall Junge, DVM

Human population growth and the rapid destruction of forested habitat are bringing humans and wildlife into ever-increasing contact. What does this elevated interaction mean for global public health and biodiversity? Concern has grown in recent years as the threat of emerging infectious disease (EID) has become a tangible risk. Zoonotic pathogens, or those stemming from animal origin, comprise 60.3% of EID, and of these, 71.8% have originated from wildlife hosts (Jones et al. 2008). Occurrences of zoonotic disease transmission, such as with Nipah virus, Ebola, and HIV (from SIV), have occurred more frequently as humans have moved into uninhabited forest areas. It is very important to approach simultaneously the issue of human, animal and ecosystem health with a One Health approach.

Disease risk is important to consider for Madagascar, an island nation rich in wildlife diversity and high in human-wildlife interaction. Madagascar is considered one of the world's top conservation priorities due to its unparalleled species diversity and endemism, yet development has taken its toll, with nearly 90% of

original forest cover already lost to deforestation for resource extraction, rice cultivation, and cattle grazing. Village expansion has spread into previously uninhabited areas, increasing wildlife contact.

Lemurs are particularly emblematic of Madagascar's biodiversity, as they comprise more than 15% of the world's extant primate species (Mittermeier et al. 2008; Wilme et al. 2006).

Lemur survival is currently threatened by intense anthropogenic pressure from growing human populations, shifting land use patterns, increasing deforestation and a changing climate (Allnutt et al. 2008; Dufils 2003; Elmqvist et al. 2007; Harper et al. 2007; Myers et al. 2000). Lemurs are currently considered to be some of the most endangered primates in the world. In fact, 91% of the world's lemur species are now listed as critically endangered, endangered or vulnerable on the Internation-

Lemur survival is currently threatened by intense anthropogenic pressure from growing human populations, shifting land use patterns, increasing deforestation and a changing climate.

91% of the world's lemur species are now listed as critically endangered, endangered or vulnerable on the International Union for the Conservation of Nature's Red List of Threatened Species.

Conducting a health evaluation in the field on an Indri indri. Photo credit: M. Barrett.

al Union for the Conservation of Nature's Red List of Threatened Species. These numbers represent a sharp increase from a previous assessment in 2005.

Disease transmission risk is especially relevant when considering primate hosts, such as lemurs, because of the close phylogenetic relationship to humans. Researchers have documented cases of West Nile Virus and toxoplasmosis within lemur populations, which could potentially be transferred among human, domestic and wildlife hosts. Thus far, no documented case of disease transmission from lemurs to humans has been recorded.

Consistent baseline health monitoring provides an effective tool for evaluating lemur health and also serves as an early warning sign in the occurrence of an epizootic outbreak. These data provide information the managers and policymakers need to approach human and animal health with a

multidisciplinary perspective. The Prosimian Biomedical Survey Project (PBSP) has been operating in Madagascar since 2000, and has assessed over 631 lemur individuals of 32 different lemur species at 20 sites. This project is structured to provide collaboration among field biologists, ecologists and veterinarians involved in conservation projects throughout Madagascar. Veterinarians provide basic medical assistance as needed, and collect standard biomedical samples and health information from animals anesthetized or captured for other purposes. A detailed description of sample collection methodology can be found in the these cited references (Dutton et al. 2003, 2008; Irwin et al. 2010; Junge et al. 2011; Junge et al. 2008; Junge and Garell 1995; Junge and Louis 2002; Junge and Louis 2005a, b, 2007; Junge and Sauther 2007).

By capturing the lemurs, we can conduct health evaluations on a number of different species within their appropriate habitats. When evaluating the lemur individual, we assess the general body condition of the lemur (teeth, coat, eyes, ears) and also collect useful specimens, including: fecal samples, hair samples, blood samples and a small amount of tissue. With these data, we can assess body condition, examine the parasite diversity within a population, measure the amount of stress that the population is experiencing, and figure out how population genetic diversity influences health. A complete description of both our field and laboratory methodology can be found in the aforementioned references.

Consistent baseline health monitoring provides an effective tool for evaluating lemur health and also serves as an early warning sign in the occurrence of an epizootic outbreak.

Collected hair, skin, and fecal samples ready for processing. Photo credit: M. Barrett.

An indri, the largest of the lemurs.
Photo credit: M. Barrett.

A number of studies have been published from this work, and several more studies are in preparation. We will discuss one study here, in which we focused on the impacts of increasing environmental degradation on lemur health in Madagascar. We compared two distinct indri (Indri indri) populations from two forest reserves that differ in their exposure to anthropogenic disturbance (Junge et al. 2011). We compared the health status of 36 indri individuals from these two sites: one population from a protected, undisturbed area of lowland evergreen humid forest and the other population from a reserve exposed to frequent tourism and forest degradation. Comparison of indri health parameters between these two sites suggested an important impact of anthropogenic disturbance, as seen in significant differences in leukocyte count and differential, 12 serum parameters, six trace minerals, and a higher diversity of parasites, with a significant difference in the presence of the louse, Trichophilopterus babakotophilus. These data suggest that indri living in disturbed forests that have undergone human influence may experience physiological changes and increased susceptibility to parasitism, which may ultimately impair reproductive success and survival.

Other published studies have focused on comparing different sites and lemur species (see PBSP references), and new studies have predicted the effect of climate change on spatial patterns of lemur parasites (Barrett et al. in press). Climate change will likely alter spatial patterns of parasitism and disease, as parasite distributions are directly influenced by environmental conditions such as temperature and precipitation (Brooker et al. 2006; Guernier et al. 2004). We will address these issues in future One Health Newsletter articles.

In order to address the viability of lemur populations in Madagascar, conservation planners must address their health as well as their interactions with human populations and the quality of their habitats. The PBSP and other lemur health studies have made essential progress in first documenting, and now analyzing, important patterns of lemur health throughout Madagascar. We look towards One Health principles to guide a collaborative and multidisciplinary approach to this difficult issue.

References: http://myfloridaeh.com/medicine/One_Health/LemurReferences.pdf

Meredith Barrett is a Robert Wood Johnson Foundation Health & Society Scholar at the University of California San Francisco and Berkeley. Randall Junge is Vice President for Animal Health at the Columbus Zoo and The Wilds.

Data suggest that indri living in disturbed forests that have undergone human influence may experience physiological changes and increased susceptibility to parasitism, which may ultimately impair reproductive success and survival.

A gray mouse lemur (Microcebus murinus). Photo credit: M. Barrett.

The Wildlife-Pet Interface

Reprinted with permission from the National Science Foundation

Domestic cats, wild bobcats, and pumas that live in the same area share the same diseases. And domestic cats may bring them into human homes, according to results of a study of what happens when big and small cats cross paths.

Initial results of the multi-year study were published in the scientific journal PLoS One by a group of 14 authors. The joint National Science Foundation (NSF) and National Institutes of Health (NIH) Ecology and Evolution of Infectious Diseases (EEID) Program funded the study. Scientists at Colorado State University and other institutions conducted the research. It provides evidence that domestic cats and wild cats that share the same outdoor areas in urban environments also can share diseases such as Bartonellosis and Toxoplasmosis. Both can be spread from cats to people.

"Human-wildlife interactions will continue to increase as human populations expand," said Sam Scheiner, program director for EEID at NSF. "This study demonstrates that such interactions can be indirect and extensive," said Scheiner. "Through our pets we are sharing their diseases, which can affect our health, our pets' health and wildlife health."

The study looked at urban areas in California and Colorado. Its results show that diseases can spread via contact with shared habitat. All three diseases the scientists tracked--Toxoplasmosis, Bartonellosis and FIV, or feline immunodefiency virus--were present in each area. The research also demonstrates that diseases can be clustered due to urban development and major freeways that restrict animal movement.

"The results are relevant to the big picture of domestic cats and their owners in urban areas frequented by wild cats such as bobcats and pumas," said Sue VandeWoude, a veterinarian at Colorado State and co-leader of the project.

"The moral of this story is that diseases can be transmitted between housecats and wildlife in areas they share, so it's important for pet owners to keep that in mind."

The researchers followed wild and domestic cats in several regions of Colorado and California to determine whether the cats had been exposed to certain diseases. The effort includes data from 800 blood samples from felines of all sizes, including 260 bobcats and 200 pumas, which were captured and released, and 275 domestic cats. "As human development encroaches on natural habitat,

Domestic cats and wild cats that share the same outdoor areas in urban environments can share diseases such as Bartonellosis and Toxoplasmosis that can also be spread to people.

Bobcat with cottontail rabbit on a motion-activated camera at the Colorado Front Range. Photo credit: Jesse Lewis, CSU.

Domestic cat on a motion-activated camera. Photo credit: Jesse Lewis, CSU.

wildlife species that live there may be susceptible to diseases we or our domestic animals carry and spread," said Kevin Crooks, a biologist at Colorado State and co-leader of the project. "At the same time, wildlife can harbor diseases that humans and our pets can in turn get. Diseases may be increasingly transmitted as former natural areas are developed."

The project also looked at whether bobcats in southern California were segregated into different populations by major highways. By analyzing genetic and pathogen data, the scientists found that bobcats west or east of Highway 5 near Los Angeles rarely interbred, but that the bobcats did cross into each other's territory often enough to share diseases such as FIV.

"The evidence suggests that bobcats are moving across major highways, but are not able to easily set up new home territories," said VandeWoude. "They can, however, spread diseases to one another when they cross into each other's territories. This could result in inbreeding of the bobcats trapped by urban development and end up in the spread of diseases." VandeWoude and Crooks say that the results don't necessarily mean that all domestic cats that are allowed to roam outdoors are at a high level of risk. They plan further studies to better assess that risk. It does mean that domestic cats and wild cats who share the same environment--even if they do not come into contact with each other--also can share diseases.

The findings show that pumas are more likely to be infected with FIV than bobcats or domestic cats. While FIV cannot be transmitted to people, it is highly contagious among felines. The rate of Toxoplasmosis was high in pumas and bobcats across Colorado and California. Toxoplasmosis is caused by a parasite that, when carried by healthy people, has no effect but that can cause complications for infants and adults with compromised immune systems. Cats only spread Toxoplasmosis in their feces for a few weeks following infection with the parasite. Like humans, cats rarely have symptoms when first infected. Bartonellosis is a bacterial infection also called cat scratch disease. If someone is scratched by a cat

Bobcats can move across major highways, but are not able to easily set up new home territories. They can, however, spread diseases to one another when they cross into each other's territories.

Photographing the spot pattern of a bobcat to help identify individual bobcats. Photo credit: Lisa Lyren, USGS

with Bartonellosis, the scratch may become infected, but the infection is usually a mild one.

Other studies underway include a fine-scale analysis of urban landscape features that affect disease incidence; evaluation of pathogen exposure and transmission in bobcats; and a survey of domestic cat owners about their attitudes toward risks for pets from wildlife. Large-scale projects looking at movement patterns of bobcats and pumas in Colorado, and a motion-activated camera analysis of human and wildlife interactions along urban areas, are also in progress. The take-home message, the researchers say, is that life in the wild may not be so wild after all.

The National Science Foundation (NSF) is an independent federal agency that supports fundamental research and education across all fields of science and engineering. NSF Home Page: http://www.nsf.gov/

Baylisascaris procyonis distribution and prevalence in Florida: research update

Dan Wolf, DVM and Michael Milleson

Baylisascaris procyonis is a species of roundworm whose definitive host is the raccoon (Procyon lotor). Infected raccoons rarely show signs of disease. Roundworms live in the raccoon's intestines, where they reproduce and shed eggs in the host's feces. When the eggs are accidentally ingested by intermediate hosts, including humans, the B. procyonis larvae migrate beyond the intestinal tract, causing damage to the brain, eyes or other organs, with severe and often fatal results.

The Florida Fish and Wildlife Conservation Commission (FWC), Southeastern Cooperative Wildlife Disease Study (SCWDS, Athens, GA), and USDA Wildlife Services (WS) National Wildlife Disease Program (NWDP) began a joint study in the summer of 2010 to investigate the prevalence of Baylisascaris procyonis in Florida. The study was initiated following the detection of Baylisascaris in Leon and Wakulla counties (Yabsley et al., 2010), Broward County (Blizzard et al., 2010b), and in a pet kinkajou in Tennessee that had been raised in a South Florida (Dade County) breeding facility (Kazacos et al., 2011). The goal of the project is to obtain information about B. procyonis distribution in Florida to improve our understanding of the health risks to humans and other wildlife species. Since this surveillance project began, the NWDP has initiated a national scale surveillance effort, and data from the Florida study will supplement the national data set.

Other studies underway include a fine-scale analysis of urban landscape features that affect disease incidence, evaluation of pathogen exposure and transmission in bobcats; and a survey of domestic cat owners about their attitudes toward risks for pets from wildlife.

Photo credit: Maria Zondervan.

Our objective is to collect 20-30 raccoons from each county in Florida. Carcasses are collected opportunistically from a variety of sources including nuisance or depredating raccoons euthanized by county animal control agencies or USDA-WS, road-kills, and wildlife rehabilitation centers (as long as de-wormers have not been used in the treatment process).

Procedure

All raccoons are necropsied by FWC and NWDP staff at the FWC Fish and Wildlife Research Institute Wildlife Research Lab in Gainesville, Florida. In addition to collecting digestive tracts for B. procyonis surveillance, other samples, such as hearts, spleens, and lymph nodes are collected for ongoing and future research. The intestinal tracts are examined under a Nuaire Class II Type A2 biosafety cabinet for the presence of adult B. procyonis. The presence of other intestinal parasites is also recorded. Presumptive B. Procyonis are preserved in ethanol and sent to the SCWDS for confirmation.

Results

As of August 2012, we have collected over 500 samples from 35 counties in Florida. Preliminary results, combined with data from other studies (Yabsley et al., 2010; (Blizzard et al., 2010b), indicate B. procyonis is present in Bay, Broward, Hernando, Hillsborough, Leon, Pasco, and Wakulla counties. Our results so far also indicate a prevalence of approximately 4%, which is much lower than many other states where prevalence rates ranged from 27%-58%. However, B. procyonis is not well studied in Florida, and it may simply have a lower prevalence than in other areas where B. procyonis has been studied. One study found no B. procyonis in Key Largo (McCleery et. al., 2005), and Blizzard et. al. (2010a) found a

Prevalence of B. procyonis is approximately 4% in Florida, which is much lower than many other states where prevalence rates ranged from 27-58%.

Examination of intestinal tract. This image shows an adult B. procyonis protruding from the tract where the incision is being made. Photo credit: D. Wolf.

Map of Florida showing sample collection effort and counties with B. procyonis positives.

low prevalence (approx. 9%) in a similar study in Georgia, so our results to date seem to fit geographically with existing research.

Conclusion

Baylisascaris is an emerging helminthic zoonosis and, according to the CDC, “the risk for human exposure and infection may be greater than is currently recognized” (Sorvillo et al. 2002). B. procyonis is also a threat to wildlife species feeding in and around raccoon latrines. People should be discouraged from feeding raccoons, or any wildlife, and possible food sources, such as pet food, should be made inaccessible. Always use proper hygiene including washing hands well when handling animals, animal waste, or material contaminated with animal waste. Raccoon latrines in proximity to people and pets should be eliminated. Contaminated soil is difficult to disinfect. Rapid removal of feces is recommend, followed by heat treatment of the affected surface. This can be accomplished by either steam cleaning or pouring boiling water on the area.

To date, we are a quarter of the way into the study. To achieve our goal

we are seeking assistance from animal control agencies, nuisance wildlife trappers, and wildlife rehabilitators for the collection of study specimens.

References: http://myfloridaeh.com/medicine/One_Health/BaylisascarisReferences.pdf

Dan Wolf is a wildlife veterinarian with Florida Fish and Wildlife Conservation Commission. Michael Milleson is the wildlife disease biologist for the state of Florida with the USDA, Wildlife Services, National Wildlife Disease Surveillance and Emergency Response Program.

Investigating invasive species from a One Health perspective

Samantha Wisely, PhD

They can spread disease to livestock and humans, damage crops, and ruin water quality. Each year, farmers and ranchers lose ~$800 million in revenue due to damage and disease caused by wild pigs. Feral swine also transmit pathogens to humans including those responsible for brucellosis, hepatitis, and influenza, and they threaten food security by infecting food crops with dangerous bacteria. These animals adapt to almost any environment and reproduce prolifically, making them one of the most destructive invasive mammals in the US. Their population size is estimated to be greater than 4 million individuals and growing, and their impact is so great they can alter the health and function of entire ecosys-

Baylisascaris represents a risk for humans as well as wildlife species. People should not feed wildlife and should use proper hygiene when handling animals, animal waste, or material contaminated with animal waste.

tems by altering nutrient flow, introducing exotic pathogens, denuding vegetation, and preying on threatened species.

Feral swine present a political as well as biological dilemma. In many states, particularly in the southeastern U.S., wild pigs are considered a game animal and hunting pigs is a treasured past-time. In some states, feral swine have ambiguous protection status and simply are not managed at all. The result is that many hunters transport feral swine to create hunting opportunities, and in the process aid in the spread of this highly destructive species. While many land management agencies have given up on the idea of eradication, it is imperative that society better understands the impacts of feral pigs throughout the agro- urban-ecological landscape to control their damage and disease threats through management.

Understanding how invasive species alter ecosystem function and the services that healthy ecosystems provide is a critical first step in managing the problem of invasions. This approach may be particularly critical when eradication is no longer an option because the species is decisively established. Feral swine in the southeastern United States, Burmese pythons in Florida, and stoats in New Zealand are examples of invaded systems in which management rather than eradication is the goal. In these scenarios, using a One Health framework to investigate the consequences of exotic species invasions provides a holistic approach and a prescriptive framework for restoring ecological health to the system even when eradication is not possible.

Along with USDA APHIS Wildlife Services National Wildlife Research Center and Archbold Biological Station, the University of Florida is leading a One Health collaboration to investigate the impact of feral pigs on ecosystem health

and sustainability in the southeastern United States. The research partnership seeks to understand how invasive vertebrate species, such as feral swine, utilize a complex landscape that includes a mosaic of urban areas, cattle ranching, timber production, row crop agriculture and conserved wilderness in this area. Using a combination of remote sensing, animal movement data, and noninvasive monitoring, the team is investigating the ecological context of this species in order to better understand the threat to human and animal health.

The collaborative has also teamed with scientists at the Lawrence Livermore National Laboratory to conduct state-of-the-art pathogen surveillance across the southeastern United States. Using high throughput microarray technology, the team will survey for > 20,000 known pathogenic viruses, bacteria, fungi and protozoa from feral swine collected across the region. Additional detailed spatial and molecular sampling allows the team to investigate how differ-

Understanding how invasive species alter ecosystem function and the services that healthy ecosystems provide is a critical first step in managing the problem of invasions.

A research partnership between University of Florida, USDA APHIS Wildlife Services National Wildlife Research Center, and Archbold Biological Station is investigating the ecological context of feral pigs to better understand the threat to human health.

File:Python molurus ....jpg
Burmese python. Photo credit: Mariluna.

ent land management practices and their configuration across the landscape can buffer the prevalence and virulence of pathogens important to domestic animals and humans.

By adopting an ecosystem approach to monitoring feral swine and the pathogens they carry, the team will be able to assess how wild pigs affect the ecological health of the landscape and the risks that this invasive species poses to animals and humans. The project seeks to develop ecological indicators of disruption to ecosystem functioning due to damage caused by wild pigs that can be used as an early warning system, and to develop proactive management that includes the use of animal damage control and habitat modification to further the goals of One Health and maintain a healthy, functioning ecosystem.

Samantha Wisely is an Associate Professor in the Department of Wildlife Ecology and Conservation at the University of Florida. She co-directs the UF Conservation Genetics and Molecular Ecology Lab and is the Associate Director of the Ordway-Swisher Biological Station.

ProMED highlights 2012

Jack Woodall, PhD

The One Health Initiative website carries a selection of outbreak reports from ProMED chosen by the author for their One Health interest. Through August of this year it has included, among others: reports on two new tick-borne viruses causing human disease in the USA and China, a new midge-borne virus causing abortions in livestock in Europe, the disastrous spread of African swine fever in Europe, a bizarre anthrax-by-mail scare in Pakistan, a new Ebola virus disease outbreak in Africa, and the spread of a previously unknown virus attacking soybeans in the USA.

At the beginning of August, it was reported that a deadly tick-borne disease had struck Xinyang City in central China's Henan Province, causing overcrowding of hospitals. The etiological agent in these cases was probably Severe Fever

with Thrombocytopenia Syndrome (SFTS) virus, a newly identified member of the Bunyaviridae, a family of viruses that includes the hantaviruses and the viruses causing many hemorrhagic fevers. The virus is present in Henan and in at least five other provinces; in 2010, the presence of the virus was confirmed in 171 patients from six provinces in China, resulting in at least 36 deaths by September of that year (case fatality rate 20%). SFTS virus has been isolated from the blood of two patients and from Haemaphysalis longicornis ticks collected from dogs. Presuma-

The partnership also seeks to develop ecological indicators of disruption to ecosystem functioning due to damage caused by wild pigs that can be used as an early warning system.

ProMED includes many outbreak reports relevant to One Health. This article presents some of the highlights for 2012.

bly the virus has its reservoir in wildlife, like other tick-borne diseases.

At the end of August, it was reported for the first time that back in 2009, two Missouri farmers with a history of tick bites had been struck down with fever, fatigue, nausea and loss of appetite, but recovered. A new virus was found in their specimens, closely related to but different from the one causing severe fever with thrombocytopenia syndrome virus (SFTSV) in China. It has been provisionally named Heartland virus.

The death toll in a new outbreak of Ebola Sudan virus infection in western Uganda rose to 17 out of 24 probable and confirmed cases on 24 August, with only one other case remaining in the isolation facility and receiving treatment. Human immunodeficiency virus (HIV) infection may have been a contributing factor in the death of the 17th case. It will be relevant to establish the HIV-status of the other fatal cases in this outbreak. Three additional possible cases remain under surveillance. The outbreak can be declared over when twice the disease's incubation period of 21 days has passed after the last case. It is in a remote area, so WHO does not recommend that any travel or trade restrictions be applied to Uganda. There is an unrelated outbreak in the Democratic Republic of the Congo caused by Ebola subtype Bundibugyo. As of 2 Sep 2012, there had been 29 confirmed or probable cases with 14 deaths, a mortality rate of around 48 percent.

Africa is continuing to produce outbreaks of other weird and dangerous diseases. A rare and unexplained brain disease has affected hundreds of Ugandan children, health workers say. The "nodding disease" causes seizures, and affected

children become physically and mentally stunted, which can lead to blindness and even death. The seizures normally occur when the sufferers start to eat, or when it is particularly cold. Other symptoms include: severe stunting, poor sexual development, and mental retardation. The age of onset was mostly found to be 9-16 years. No post mortem results have been reported. Cases of the disease are now being found among adults, with Kitgum Woman MP Beatrice Anwyar placing the figure at about 49. The best-known concentration of "nodding disease" cases had previously been in the southern Sudan, where cases have been reported dating back to the 1980s. A link with onchocerciasis (river blindness) has been suggested. It was observed that no further cases were recorded in Uganda after elimination of the onchocer-

Outbreaks in ProMED include thrombocytopenia syndrome virus (SFTSV) in China, Ebola Sudan virus in Uganda, and an unexplained "nodding disease" in Uganda.

Child victim of nodding disease tethered to house to prevent wandering off. Photo credit: Global Health Frontline News

ciasis insect vector from the Jinja focus was achieved in the late 1960s.

Sporadic cases of Avian influenza (H5N1) in humans and poultry continue to be reported from around the world this year, since June several due to the H7 strain in Mexico and the Netherlands. In mid-August, the Wisconsin, USA, state Department of Health Services reported Wisconsin's first human case of a new strain of swine flu, since when a total of 14 people, mostly children, have been documented with the A(H3N2)v ("v" for variant) influenza virus infection. All of the cases were in people who were near pigs at the state or county fairs. One

victim has since died.

First detected in the Netherlands in August 2011 and classified in Germany, Schmallenburg virus (SBV), which causes diarrhea, abortions and birth defects, has been detected in several European countries in cattle, sheep, goats and a bison. In addition, SBV antibodies have been detected in deer, but no other species is known to be affected. Expert assessment is that it is very unlikely that SBV poses a risk to humans. The vector, a midge of the Culicoides obsoletus species group, feeds preferentially on cattle and wildlife; roe deer, horse, mallard and wood pigeon were identified as hosts in Denmark. In France, only one percent of C. obsoletus tested had fed on human blood, so the chances of a pregnant woman being infected are very low. This year, SBV has been detected in several more European countries, with an infection rate of up to 100% in herds, which then become immune and will bear normal offspring in future. The disease may have gone unnoticed on some farms because mild clinical signs such as fever, diarrhea and a drop in milk yield are more difficult to spot than birth defects.

A fourth case of bovine spongiform encephalitis (BSE) was confirmed in the USA since the first case, found in 2005. A California cow that tested positive for the disease was never destined for the meat market, and some scientists believe it had developed atypical BSE from a random mutation, since investigation of the sources of its feed did not reveal any irregularity.

Additionally, African swine fever (ASF) is sweeping across Russia. Denis Kolbasov, director of the National Research Institute for Veterinary Virology and Microbiology of Russia in Pokrov, says that officials often have little appetite for expensive countermeasures such as widespread culling and quarantine

Other outbreaks include avian influenza (H5N1) around the world, Schmallenburg virus in the Netherlands and Germany, bovine spongiform encephalitis (mad cow disease) in the U.S., and African swine fever in Russia.

Mass culls and vigilant hygiene are the main forms of defense against African swine fever. Photo credit: Nature.

that could disrupt Russia's billion-dollar pork industry. Meanwhile, backyard farmers often do not report suspected cases for fear of losing their livelihood. Following the first-ever detection of ASF in Ukraine, the Food and Agriculture Organization (FAO) is warning that while control measures appear to have temporarily halted the disease's spread, it has established a firm foothold in the Caucasus and poses an ongoing risk to neighboring areas. Nearby countries like Moldova, Kazakhstan and Latvia -- which have large pig populations raised on household or family farms, and oftentimes weak biosecurity protocols -- are also now at high risk of disease introduction and spread through the wild boar population. "National and local authorities in the entire region should scale up their prevention measures and be ready to respond in case of further outbreaks," said Juan Lubroth, FAO's Chief Veterinary Officer. "This could be the first of more outbreaks to come, according to our disease analyses." ASF does not affect humans, but mortality in domestic pigs can be extremely high. In 2011, up to 300,000 pigs died or were culled as a result of ASF outbreaks in the Russian Federation, incurring an estimated USD 240 million in economic losses. There will be a worldwide impact on pork-belly futures and prices in the shops.

Soybean vein necrosis virus (SVNV), a previously unknown virus, was first identified in

Tennessee and Arkansas in 2008. Since then, it has been confirmed in New York as the cause of a new disease of soybeans, spread by thrips, a minute black-winged sap-sucking insect. By the next year it had spread north to Illinois and Kentucky, and in 2010 the disease was found throughout Illinois and is the most prevalent virus found in Illinois soybean fields, next to Bean pod mottle virus. That is an extraordinarily rapid spread for a new crop pathogen. In 2011, it was confirmed to have spread to Delaware, Maryland, and Virginia. Although not particularly destructive alone, in combination with other soybean pathogens it could be affecting yields, in turn affecting the soybean component of food and livestock feed.

These and many other early warnings from ProMED of outbreaks of emerging infectious diseases and toxins may be found on the One Health Initiative website <http://www.onehealthinitiative.com> by clicking on ProMED in the margin, with an archive going back to February 2009. The ProMED site is at <http://www.promedmail.org>, with archives from August 1994.

Jack Woodall is the Co-founder and Associate Editor of ProMED-mail. He is also a member of the One Health Initiative team.

The outbreaks described here as well as many others are important illustrations of the purpose of ProMED, which is to monitor emerging diseases worldwide and assist local, national, and international organizations in disseminating reports of outbreaks of infectious disease.

SVNV Photo credit: University of Arkansas.

Jack Woodall

University of Florida students seek One Health PhD

John Arnst

"In zoonotic diseases you have animals, you have humans, and then you have the environment. You have to have a pathogen, you have to have a host or some type of animal reservoir, and a transmission pathway." While the disease triad, described above by Ben Anderson, M.P.H., is elegant in its flow-chart simplicity, the task of piecing it together is less straightforward. When dealing with newly recognized emerging disease threats, emergency response often requires a team of professionals from a wealth of scientific backgrounds. This includes public and animal health, agricultural sciences, wildlife biology, social and behavioral science, biostatistics, microbiological sciences, news media, and public administrators, in order to investigate and plan interventions to reduce the threat.

These multi-disciplinary collaborations are fundamental to a One Health philosophy, where complex problems require such efforts; however, professionals from individual disciplines are seldom trained to coordinate these efforts.

To meet this training need, the University of Florida's Environmental and Global Health (EGH) department has partnered with professionals from seven UF colleges in developing two new graduate programs of One Health training: a 40-credit Masters in Health Science program, and a 90-credit doctoral degree program. This summer, the first cohort of Ph.D. students – Anderson among them – began their work in the One Health Ph.D. program.

A native of Gainesville, Ben Anderson received both his B.S. in Entomology and M.P.H. in Environmental and Global Health from the University of Florida, and is currently doing work with dengue fever and the emerging Zika and Usutu viruses. This past March, Anderson travelled to China for an internship at the Chinese National Influenza Center (CNIC), a subset of the Chinese Centers for Disease Control and Prevention, which is modeled after the U.S. Centers for Disease

Control and Prevention. During his internship, Anderson observed various disease surveillance systems employed by the CNIC, including sentinel surveillance – a process which enrolls different clinics, hospitals, and treatment centers – wherein any patient who comes in with a temperature greater than 101.3 degrees and symptoms of cough or sore throat is characterized as having an influenza-like illness (ILI).

Due to the large array of pathogens that may cause an ILI, the clinics then take a subset sampling of the patients, in which nasal swabs are gathered to perform serological testing. This will determine whether the sample is influenza positive, and if so, what specific type (A or B) and subtype (H5N1, H1N1, etc.), with the goal of keeping a tab on what influenza viruses are circulating in the popula-

To meet the need for multi-disciplinary collaborations fundamental to a One Health philosophy, the University of Florida's Environmental and Global Health department has developed two new graduate programs of One Health training.

Ben Anderson, MPH

tion at any given point.

"They can then create a report every week showing [that] we had this many ILI cases, and out of the samples that were received, [there were] 60% for H1N1 and 30% for H3N2, and the last 10% were unidentified," Anderson said, "and if the next week they see that 60% were unidentified, this would be a red flag that a new strain is circulating."

While Anderson's time abroad was relatively short at six weeks, another Ph.D. student, Salah Uddin Khan, had spent several years working at the International Centre for Diarrheal Disease Research (ICDDR) in Bangladesh prior to his enrollment in the One Health program. While at the ICDDR, he studied outbreaks of various zoonoses, including anthrax, rotavirus, avian influenza virus, and Nipah virus, among others. Khan received his D.V.M. and M.S. in 2000 and 2003 from Bangladesh Agricultural University, later followed by a certificate course in emerging infectious disease epidemiology (CEID) from the University of Iowa in 2010.

Khan's work with Nipah virus (which spreads from bats to humans) during a outbreaks in 2006-2011 in Bangladesh focused on identifying pathways for the zoonotic transmission of the virus, and breaking the transmission cycle by limiting bats' access to date palm trees. It was found that the virus was passed between bats through their common food source, the tree sap, and then passed from the tree sap to humans upon consumption of raw date palm sap. In humans, Nipah virus causes encephalitis, whereas it has virtually no adverse effects in large fruit bats, its reservoir species. From 2001-2010, nine outbreaks were detected in Bangladesh, reporting 153 cases, in which 111 (73%) of them died. In 2011, an outbreak in the Lalmonirhat district reported 20 cases, with an unsettling 100% fatality rate. Nipah virus first appeared in Singapore and Malaysia in 1997-1998 in livestock workers handling swine, and is spread between people via direct contact with bodily secretions. Khan is currently involved in ongoing research to determine the efficacy of bamboo skirts as physical barriers to prevent bats from feeding on the trees, thus preventing the virus transmission to human. His work in Bangladesh has also included live bird market surveillance to detect avian influenza viruses circulating in poultry and in wild birds, reservoir identification in cross-species transmission of swine-borne diseases (Japanese encephalitis, Hepatitis E, rotavirus), and examining risk factors for zoonotic anthrax outbreaks in agricultural workers in Bangladesh.

To meet the training need for multidisciplinary collaboration, the University of Florida's Environmental and Global Health (EGH) department has partnered with professionals from seven UF colleges in developing two new graduate programs of One Health training: a 40-credit Masters in Health Science program, and a 90-credit doctoral degree program.

Salah Uddin Khan, DVM, MPH

Jessica Rowland, who received her B.S. in microbiology from Kansas State University, has also worked extensively with animal diseases, spanning both her undergraduate career (with Porcine Reproductive and Respiratory Virus) and her subsequent five-year stint at the Plum Island Animal Disease Center (PIADC). Located off the northeast coast of Long Island, NY, PIADC is a facility of the Oak Ridge Institute for Science and Education (ORISE). Rowland worked with the USDA foreign animal diagnostic laboratory, performing animal

diagnostics with exotic diseases such as foot-and-mouth disease and classic swine fever virus.

"After doing that for a little bit, I decided that I wanted to go back to school and get my Ph.D.," Rowland said. "While working with the USDA, I had first heard about the One Health concept and started getting interested in that and my research interests started to move towards emerging zoonotic diseases, as opposed to just animal diseases…so I wanted to broaden the scope a little bit, and also get into the field of public health. The biggest thing that I'm learning that's important in doing multi-disciplinary work is learning [an expert's] aspect and what they're interested in, and in some ways learning how to effectively communicate with each other," Rowland said, "and also to understand what their ideas are, and how your interests and expertise can merge together."

With Anderson, Khan, and Rowland, the One Health Ph.D. program has already succeeded in bringing together colleagues of diverse experiences, and will continue to do so as it welcomes future students into both the M.H.S. and Ph.D. programs.

One Health

Newsletter

Contributors:

Steven W. Atwood, VMD, MD, MRCVS, MPH

University of Pennsylvania School of Veterinary Medicine

Philip J. Bergman, DVM, MS, PhD

BrightHeart Veterinary Centers

David L. Heymann, MD

Editor, Control of Communicable Diseases Manual; Health Protection Agency, London, UK

William D. Hueston, DVM,

The One Health Newsletter is interested in publishing articles from a variety of view points and perspectives, and thus any opinions or statements made in the Newsletter's articles belong solely to the respective author(s), not the Editor, Editorial Board, or Newsletter Contributors.

Contributors
(continued):

Glenn Morris, Jr. MD, MPH,
TM

Emerging Pathogens Institute,

University of Florida

Michael T. Osterholm, PhD,
MPH

University of Minnesota

Peter M. Rabinowitz, MD,
MPH

Yale University

Ralph C. Richardson, DVM,
Dipl. ACVIM

Kansas State University

James Steele, DVM, MPH

Professor Emeritus,

University of Texas

Jedd D. Wolchok, MD, PhD

Memorial Sloan-Kettering Cancer
Center

John (Jack) Woodall

Director (retd),

Nucleus for the Investigation of
Emerging Infectious Diseases;

Institute of Medical Biochemistry,
Federal University, Rio de Janeiro,
Brazil

Coming Events

2nd International One Health Congress

“A world united against infectious diseases: cross-sectoral solutions”

Bangkok, Thailand

January 29-February 2, 2013

http://www.pmaconference.mahidol.ac.th/

Medical Library Association Conference

“One Health: Information in an Interdependent World”

Boston, MA

May 3-8, 2013

http://www.mlanet.org/am/am2013/

National Institute for Animal Agriculture Antibiotics Symposium

“A One Health Approach to Antimicrobial Use and Resistance”

Columbus, OH

November 13-15, 2012

http://animalagriculture.org/Solutions/Symposia/2012_antibiotics/index.html

North Carolina One Medicine Symposium

“Bugs vs. Drugs: A One Medicine Approach to Antimicrobial Resistance”
Durham, NC

December 5-6, 2012

http://www.onemedicinenc.org/

International Meeting on Emerging Diseases and Surveillance

Vienna, Austria

February 15-18, 2013

http://imed.isid.org/

IMED logo

One Health

Newsletter

Carina Blackmore, DVM, PhD

Florida Department of Health

Jenifer Chatfield, DVM

4 J Conservation Center

Lisa Conti, DVM, MPH,

Dipl. ACVPM

One Health Solutions

Mary Echols, DVM, MPH

Palm Beach County

Health Department

Recent One Health Publications

The One Health Solution. Laura Kahn. Bulletin of the Atomic Scientists column. October 2012. http://thebulletin.org/web-edition/columnists/laura-h-kahn/the-one-health-solution

Vets and physicians find research parallels. William Grimes. New York Times. September 2012. http://www.nytimes.com/2012/09/11/science/vets-and-physicians-find-parallels-in-medical-research.html?_r=1&hpw

Does pet arrival trigger prosocial behaviors in individuals with autism? Marine Grandgeorge, Sylvie Tordjman, et al. PLOS ONE. August 2012. http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0041739

Both ends of the leash—the human links to good dogs with bad genes. Elaine Ostrander. New England Journal of Medicine. August 2012. http://www.nejm.org/doi/full/10.1056/NEJMra1204453

Drug-resistant human Staphylococcus aureus in sanctuary apes pose a threat to endangered wild ape populations. Frieder Schaumburg, Lawrence Mugisha, et al. American Journal of Primatology. August 2012. http://onlinelibrary.wiley.com/doi/10.1002/ajp.22067/full

DOD has running start on biosurveillance strategy. Cheryl Pellerin. American Forces Press Service. http://www.globalsecurity.org/security/library/news/2012/08/sec-120822-afps01.htm

New virus found in Missouri; ticks suspected. Saundra Young. CNN. http://thechart.blogs.cnn.com/2012/08/30/new-virus-found-in-missouri-ticks-suspected/

Stepping up to one-health challenge. Andrew Stas. JAVMA News. October 2012. https://www.avma.org/News/JAVMANews/Pages/121001j.aspx

Beware the fair (and petting zoos). Geni Wren. Bovine Veterinarian Magazine. September 2012. http://www.bovinevetonline.com/news/industry/Beware-the-fair-and-petting-zoos-170049516.html

Pets share our environment and our diseases; doctors and vets investigating risks. Lindsey Konkel. Environmental Health News. September 2012. http://www.environmentalhealthnews.org/ehs/news/2012/pets-and-environmental-health

Prevalence of chronic kidney disease and progression of disease over time among patients enrolled in the Houston West Nile virus cohort. Melissa Nolan, Amber Podoll, et al. PLOS ONE. July 2012. http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0040374

One Health

Newsletter

Gary L. Simpson, MD, PhD,
MSc, MPH

Texas Tech University

Health Science Center

Danielle Stanek, DVM

Florida Department of Health

Kendra Stauffer, DVM,
DACVPM

USDA APHIS

Recent One Health Publications (continued)

Chicken as reservoir for extraintestinal pathogenic Escherichia coli in humans, Canada. Catherine Racicot Bergeron, Catharine Prussing, et al. Emerging Infectious Diseases. March 2012. http://wwwnc.cdc.gov/eid/article/18/3/11-1099_article.htm

Precautions for tick-borne disease extend “beyond Lyme.” National Science Foundation. September 2012. http://www.nsf.gov/news/news_summ.jsp?cntn_id=124286&org=NSF&from=news

Nigeria: “Ground Zero” for the high prevalence neglected tropical diseases. Peter Hotez, Oluwatoyin Asojo, et al. PLOS Neglected Tropical Diseases. July 2012. http://www.plosntds.org/article/info%3Adoi%2F10.1371%2Fjournal.pntd.0001600

Japanese Encephalitis: on the One Health agenda. Daniel Impoinvil, Matthew Baylis, Tom Solomon. Current Topics in Microbiology and Immunology (book chapter). 2012. http://link.springer.com/chapter/10.1007%2F82_2012_243

doh.state.fl.us/Environment/medicine/One_Health/OneHealth.html

Or visit us on Facebook: www.facebook.com/OneHealthNewsletter

For other One Health publications, please visit the One Health Initiative website:

http://www.onehealthinitiative.com/publications.php