The One Health Newsletter is a collaborative effort by a diverse group of scientists and health professionals committed to promoting One Health.

One Health Newsletter

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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.

In this issue:

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Please email our co-editors with questions, comments, or suggestions for articles, upcoming events, or publications to share relevant to One Health.

Please visit http://epi.ufl.edu/onehealth/ to learn more about the One Health Center of Excellence at the University of Florida.

Transition Announcement

The Florida Department of Health—USA (FL DOH) has enjoyed six highly successful years of managing the internationally distributed and widely read One Health Newsletter (OHNL).

The early pioneering Editors, first Mary Echols, DVM, MPH, and then Elizabeth Radke, PhD, in addition to a highly motivated and unselfish editorial board, brilliantly laid the groundwork for this very popular—first and currently the only one of its kind—One Health publication. Several prominent One Health contributors (physicians, veterinarians and other One Health scientists) over the years are testimony to widespread acceptance and appreciation for this unique endeavor; most have graciously agreed to continue to participate. The One Health Newsletter has truly represented a significant educational milestone in the recent history of the One Health movement during the early 21st century.

Beginning with this issue, the Florida Department of Health's OHNL Editorial Staff has decided to transfer the management of the OHNL to the University of Florida's (UF) One Health Center of Excellence. Though this means changes in the coordinating staff of the newsletter, the mission will remain the same, and the OHNL will endeavor to continue delivering high-quality One Health-focused articles each issue, to be shared via the One Health Initiative's website http://www.onehealthinitiative.com/newsletter.php.

The co-equal, all inclusive policy of the FL DOH's newsletter shall continue in the collaborative spirit of "One Health" under the new co-editors, Mary M. Merrill, MHS and Sarah K. White, MPH. Indeed, reputable One Health author(s) from any and all One Health oriented university and/or scientific institutions, organizations, governmental agencies and others from the United States and worldwide are welcome and urged to freely participate by submitting One Health related articles.

The One Health Initiative (OHI) Autonomous pro bono Team: Laura H. Kahn, MD, MPH, MPP ▪ Bruce Kaplan, DVM ▪ Thomas P. Monath, MD ▪ Jack Woodall, PhD ▪ Lisa A. Conti, DVM, MPH, has worked in tandem with the FL DOH during the early establishment years of its management of the OHNL to date. It intends to continue working closely with the UF OHNL editorial staff.

The OHI team strongly supports the transition and transference of the OHNL to the University of Florida's "One Health Center of Excellence." Notably, the Director of the One Health Center of Excellence, Gregory C. Gray, MD, MPH, FIDSA, has been an outstanding and recognized One Health supporter/advocate http://www.onehealthinitiative.com/supporters.php for several years. Dr. Gray is also a distinguished member of the OHI team's Honorary Advisory Board http://www.onehealthinitiative.com/advBoard.php.

The incoming Editorial Staff are very thankful for the guidance and support given to us by the departing Editorial Staff as well as by the OHNL Editorial Board during this time of transition. The OHNL would not be possible without the countless hours of volunteer effort devoted by supporters of the One Health vision and mission. While compiling this Winter issue, we have had the opportunity to view firsthand the dedication, drive, and sincere passion that members of the One Health community have for improving health outcomes in all capacities around the world. This experience has already been humbling and inspiring, and we look forward—with your help—to publishing many quarterly online issues in future.

You may learn more about the UF's One Health Center of Excellence by visiting http://epi.ufl.edu/onehealth/. The One Health Center of Excellence will be posting new issues of the OHNL as well as archives of previous issues at http://epi.ufl.edu/onehealth/news/one-health-newsletter/ in coordination with the OHI team/website—as done in past years.

Mary M. Merrill, MHS, Co-Editor (mleighmorris@epi.ufl.edu), and Sarah K. White, MPH, Co-Editor (sek0005@epi.ufl.edu), One Health Newsletter
in collaboration with Bruce Kaplan, DVM, Contributing Editor, One Health Newsletter and Manager/Editor One Health Initiative website

Texas National Veterinary Stockpile Exercise

Holly Hughes-Garza, DVM, and Michael Poole, MSPH, CPH, MEP

If a highly pathogenic avian influenza outbreak were to occur in Texas poultry, would the state would be ready - not only to protect animal health and industry, but also to ensure the safety of responders who may come in contact with infected animals? This capability was tested as part of a National Veterinary Stockpile exercise in October 2013, which paired animal health response agencies with public health entities.

In Texas, the Texas Animal Health Commission (TAHC) along with the U.S. Department of Agriculture's Animal and Plant Health Inspection Service Veterinary Services (APHIS-VS) would lead efforts to combat any outbreak of a foreign or emerging animal disease threat to livestock or poultry. If that disease were potentially zoonotic, cooperation between animal health, public health, and emergency management agencies would be crucial. Ongoing planning efforts led by the Texas Division of Emergency Management foster an environment where state agencies cooperate and pool their resources whenever a disaster or other emergency situation arises.

Individuals simulate dispensing human antiviral medication in the event of an outbreak

The National Veterinary Stockpile (NVS) is the national repository of critical veterinary supplies, equipment, vaccines, and services that can be deployed by USDA to the site of a damaging animal disease outbreak within 24 hours. The Texas Animal Health Commission began writing plans in 2009 for how Texas would decide that the NVS was needed in response to an outbreak, and how it would request, receive, manage and distribute those resources. From the outset, TAHC assumed that if the outbreak were large enough to require NVS then support, resources, and assistance would also be needed from a variety of other state agencies, industry, and private sector partners.

Protecting the health of the veterinarians and animal health technicians who would respond to a highly infectious disease outbreak in livestock or poultry requires a variety of considerations such as engineering and workplace controls, a respiratory protection program, as well as the potential need for vaccinations or antiviral medications in certain situations. Since most animal health agencies lack in-house medical professionals who can prescribe medications, partnering with public health professionals is a necessity.

Pictured above: Participants in charge of supply distribution execute efficient dispersal of supplies during the exercise.

One of the first agencies TAHC reached out to during NVS planning efforts was the Department of State Health Services. On a national level, the NVS program was modeled after the CDC's

Strategic National Stockpile (SNS) program. Since the SNS program pre-dates the NVS, animal health planners gained valuable insight into how public health planners had organized their plans for the SNS.

The Texas Department of State Health Services (DSHS) participated in all phases of planning for the NVS in Texas. When it came time to exercise, DSHS decided to utilize their First Responder Dispensing Plan. This plan was designed for dispensing of medical countermeasures to first responders such as fire, EMS, and police in the event of a public health emergency. However, the same plan seemed like it would be an efficient way to ensure needed medications could be quickly dispensed to animal health personnel in response to a simulated avian influenza outbreak.

During the simulation, the chain of command (pictured left) was followed and allowed personnel to focus on their tasks and contain the outbreak (pictured center and right)

Personnel from seventeen state and local agencies, industry and non-governmental organizations, and federal entities such as FEMA Region VI and the CDC attended the full-scale NVS exercise in San Antonio, TX in October 2013. The exercise tested a variety of capabilities including receiving, storing, staging, and distributing general supplies and equipment, as well as simulated animal vaccine, and simulated human antiviral medication for responders. Exercise players from DSHS activated their First Responder Plan and successfully practiced dispensing antivirals to TAHC personnel. The exercise validated this approach, and it will be incorporated into Texas Foreign and Emerging Animal Disease plans as a way to help protect the health of agricultural responders. In addition to the antiviral dispensing activities, local DSHS staff volunteered use of one of their response trailers and radio communications equipment, which were extremely useful to the success of the overall exercise.

"Trying to plan on a state-wide level in a state as big as Texas means making the most of local and regional relationships," said Dr. TR Lansford, TAHC Assistant Director for Animal Health Programs and Emergency Management. "This exercise brought together DSHS and TAHC not only on a statewide level, but regionally. It was an excellent opportunity for our personnel to get to know each other better. As an offshoot of this exercise, one of the public health participants also came to speak at a TAHC Regional Management workshop, so we were able to encourage our staff in other parts of the state to build similar relationships."

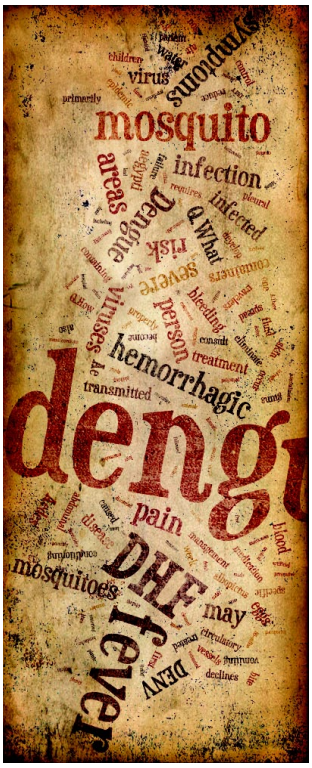
Holly Hughes-Garza, DVM, is a Staff Veterinarian & the Director of Laboratories at the Texas Animal Health Commission.

Michael Poole, MSPH, CPH, MEP, is the Texas Strategic National Stockpile Coordinator for the Texas Department of State Health Services. Prior to his current position, he worked over 5 years with the South Central Center for Public Health Preparedness at the University of Alabama at Birmingham.

Coming (Back) to America? What 2013 Can Teach Us about Dengue in the United States

Tyler M. Sharp, Ph.D.

[Originally printed on the CDC Public Health Matters Blog (http://blogs.cdc.gov/publichealthmatters/) on January 24, 2014]



2013 was a banner year for dengue in the United States: an outbreak with 22 associated cases[1] was identified in Florida; another outbreak was detected in south Texas[2] along the U.S./Mexico border; *Aedes aegypti*, the most efficient mosquito vector of dengue, was detected in central-California[3]; a locally acquired dengue case was detected outside of NYC[4]; and Puerto Rico experienced a sizeable dengue epidemic[5] that had been ongoing since late 2012. So, what's next? Is this par for the course, or was 2013 an anomaly? In this article, I'll discuss the history of dengue in the U.S., what the future might hold, and what you can do to reduce your risk[6] of getting infected while at home or abroad.

History of Dengue in the U.S.

Dengue[7] is a tropical illness that causes fever, body pain, severe headache and eye pain, and sometimes minor bleeding from the nose or gums. Four different but related viruses can cause dengue, all of which are transmitted by mosquitoes of the Aedes genus. Because immunity against one virus does not protect you from infection with the other three, you can get dengue up to four times in your life. Around 5% of dengue cases progress to severe dengue, which can result in severe bleeding, shock, and even death. Although most Americans have never heard of dengue because there is not much of it in the continental United States, dengue is actually quite common throughout the tropics, where 400 million infections[9] occurred in 2010.


Aedes aegypti mosquito

Despite relatively low case counts in recent decades, dengue is no stranger to the United States. Dr. Benjamin Rush, a signatory of the Declaration of Independence, documented a dengue outbreak in Philadelphia in 1780. Ships arriving from foreign ports were bringing mosquitoes and infected people back to port cities in the U.S., where local outbreaks then followed. This continued along the eastern seaboard and Gulf coast for the next 150+ years: an outbreak in 1873[10] affected an estimated 40,000 residents of New Orleans, and another in 1922[10] made its way through the entire Gulf coast. The last recorded dengue outbreak in the continental U.S. occurred in 1945 when a soldier returning from Guyana to Louisiana brought the virus home with him, resulting in an outbreak in which 145 people were affected.

Aedes Eradication Campaign

So why were no dengue outbreaks identified in the U.S. between 1945 and now? Most prominently, the chemical DDT was used beginning in the 1940s to nearly eliminate Aedes[11] mosquitoes, which also transmit yellow fever and chikungunya, from the Americas. However, before the mission was completed, the detrimental

effect of DDT on the environment was made public and elimination efforts were halted[11]. Consequently, over the next several decades mosquito populations gradually re-established themselves in the U.S. and abroad. As the burden of dengue in the tropics began to increase in the 1980s and 1990s and Americans began to travel internationally more frequently, more and more travelers began to return to the U.S. with the unwanted souvenir of dengue.

Spraying of DDT for mosquitocidal purposes

Present-day dengue in the U.S.

Following a large dengue epidemic in Mexico that spilled over into south Texas in 2005[12], an investigation[13] revealed not only that stable populations of Aedes mosquitoes were established along the Texas side of the U.S.-Mexico border, but also that 39% of residents had been previously infected with a dengue virus. Because several of these individuals had never left the United States, this demonstrated that dengue virus had been circulating in south Texas.

On the other side of the Gulf of Mexico, in 2009 a dengue outbreak[14] was detected in Key West, Florida, which was likely caused by importation[15] of the virus in a traveler returning from Central America. The outbreak ultimately resulted in 5% of the small island community being infected[16]. Dengue cases resulting from infection in Florida continued to be detected in the area in 2010 and 2011, and one report suggested that the virus may have become established in the region[15]. Thankfully, no additional locally-acquired cases were reported in Key West in 2012, although dengue did pop up in Florida again[1] in 2013. These outbreaks have made it clear that although rare, conditions do exist for localized outbreaks in parts of the U.S.

In late January of 2014, CDC Dengue Branch[17] and co-investigators in Texas and New Mexico reported a locally acquired, dengue-related death[18] in the continental United States. Although the patient died from a rare complication of dengue called hemophagocytic lymphohistiocytosis[19], this is the third dengue-related death ever in the United States. Although our investigation couldn't confirm where the case-patient was infected, she hadn't traveled out of the country recently, so she must have been infected either in New Mexico, where she was vacationing before she got sick, or in her home state of Texas. This case was a startling demonstration that there may be more dengue in the U.S. than we realize[20], and that physicians should be on the look-out for cases.

What's next

The burden of dengue in the Americas has increased roughly 30-fold[21] since 1950, and one study[22] showed that dengue-related hospitalizations in the United States tripled between 2000 and 2007. So, dengue cases will likely continue to show up in greater numbers in the U.S. until we have a safe and effective dengue vaccine or other intervention to prevent dengue. Moreover, two mosquitoes capable of transmitting dengue, *Aedes aegypti* and *Aedes albopictus*, are present mostly in the southern United States, but have recently been found as far north as Chicago and New York. Therefore the possibility of local outbreaks in the U.S. after infected travelers return home is real. Nonetheless, factors such as population density, frequent use of air conditioning, and other lifestyle differences[23] that limit our exposure to *Aedes* mosquitoes reduce the likelihood of sustained dengue outbreaks in the continental U.S. Therefore, Americans are more likely to get dengue while traveling in

Latin America, for example to large international events like the World Cup[24], than they are to get dengue at home. Nonetheless, new introductions of the virus will continue, some of which will result in local dengue outbreaks.

What to do about it

To protect yourself against getting dengue, be aware[25] of the risk of dengue while at home or traveling to the tropics, as well as the prevention approaches you can take to avoid mosquito bites[6] (regular use of mosquito repellent, staying in buildings with air conditioning and/or window screens, seeking medical care if experiencing a fever during or soon after travel). Residents of states where Aedes mosquitoes are present can reduce their risk of spreading the virus by disposing of, emptying or covering water containers that serve as mosquito breeding sites (e.g., trash, discarded tires, kiddie pools). These strategies reduce the chances that a returning traveler could get bitten in the U.S. and create a local outbreak. Lastly, having a pre-travel health care consultation[26] with your health care provider or a travel medicine specialist can provide additional information about dengue and other travel-associated risks that weren't covered here.

Although the world is preparing for the introduction of a dengue vaccine[27], it is likely to be at least a few years before one is commercially available. Until that time, dengue will become more and more familiar to Americans, both at home and abroad.

Lieutenant Commander Tyler M. Sharp, Ph.D., is an epidemiologist at the Centers for Disease Control and Prevention (CDC) Dengue Branch in San Juan, Puerto Rico.

An Analysis of the Linkages Between Public Health and Ecosystem Integrity Part 2 of 6

Steven A. Osofsky, DVM and Anila Jacob, MD

Health & Ecosystems: Analysis of Linkages (HEAL) is a consortium of more than 25 institutions collaborating to analyze and quantify relationships between the state of ecosystems and public health. The consortium comprises many of the world's premier public health and environmental science institutions working in both developing and developed countries. HEAL's mission is to increase support for integrated public health and environmental conservation initiatives as intimately related, interdependent challenges. The expectation is that a cross-sectoral attitudinal change will ultimately help to improve public health outcomes, equity, and resilience for some of the world's poorest people, often living in the world's most remote areas, while simultaneously conserving some of the most important natural landscapes and seascapes left on earth. It is a mission directly aligned with that of One Health (Barrett and Osofsky, 2013).

The HEAL consortium believes that there are important public health impacts associated with changes in the state of different ecosystems and that, frequently, degradation of these ecosystems leads to negative public health impacts. However, relatively little peer-reviewed literature delves into the mechanisms underlying potential causal relationships between ecosystem degradation and public health outcomes. Policy-makers interested in understanding these relationships are left with largely anecdotal information that is clearly insufficient for informing decision-making in terms of conservation, public health, or both.

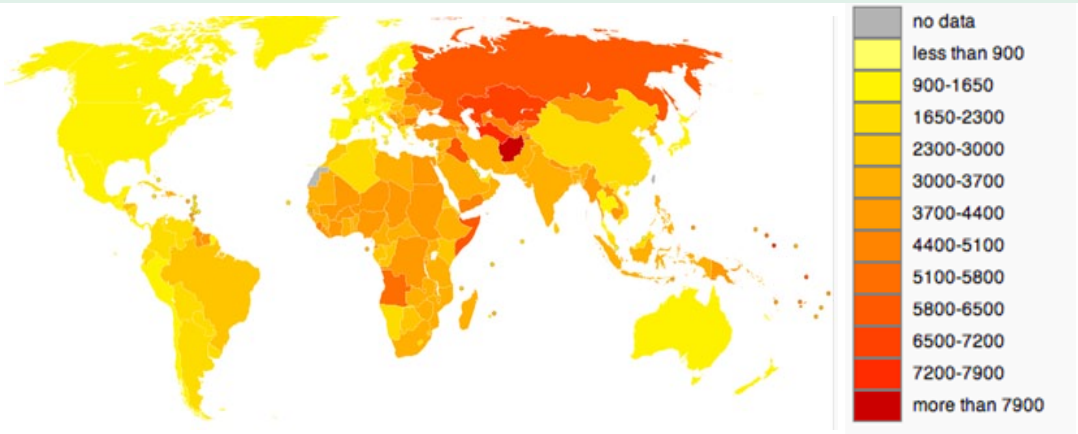
A key component of HEAL's approach is to explore what is currently known regarding linkages between human health and natural ecosystems, as a foundation for prospective applied research. In this 6-part series, we are exploring what is currently understood in terms of linkages between the state of various ecosystems and major public health challenges. We focused on communicable diseases in the Fall 2013 issue of the One Health Newsletter. In this issue we focus on the effect of ecosystem degradation on non-communicable disease. In future issues we'll tackle the connections between ecosystems and nutrition, mental health, the loss of biopharmaceuticals, and vulnerability to extreme events.

Photo Credit: Mike Kock, Wildlife Conservation Society

Currently Understood Linkage #2: Ecosystem degradation, biodiversity loss and non-communicable disease.

Non-communicable diseases (NCDs) such as cardiovascular disease, type 2 diabetes, chronic respiratory disease, and cancer are the most common causes of death globally. It is estimated that 80% of deaths due to NCDs now occur in low- and middle-income countries (Hosseinpoor et al. 2012). In sub-Saharan Africa, the prevalence of cardiovascular disease and type 2 diabetes increased by 10-fold from the 1980's to 2008 (Amuna and Zotor 2008). Risk factors for NCDs in low- and middle-income countries include tobacco and alcohol abuse, inadequate physical activity, excessive weight and obesity, and diets that are low in fresh fruits and vegetables and high in salt, sugar, and saturated fat (Khan et al. 2013).

Inadequate levels of physical activity and obesity are two significant risk factors for non-communicable diseases. Regular physical activity can help maintain a healthy weight and is important in preventing common NCDs such as type 2 diabetes, cardiovascular disease, and certain types of cancer. The availability of and access to recreational green space has been shown to impact levels of physical activity. In one study from Denmark involving over 20,000 adults, researchers found that those living in close proximity to green space were more likely to self-report using the area for physical activity. Furthermore, adults living closer to green space (less than 1km) also had decreased odds of being obese (Toftager et al. 2011).



Age-standardized disability-adjusted life year (DALY) rates of cardiovascular diseases by country (per 100,000 inhabitants).
Map by Lokal_Profil
Wikimedia CC-BY-SA-2.5, 2009.

Ecosystem degradation can also result in the direct release of pollutants that can exacerbate non-communicable diseases such as cardiovascular disease and chronic respiratory disease. For example, the burning of forests for slash and burn agriculture and other agricultural activities can release high levels of particulate matter and other pollutants into the air which, when inhaled, can negatively impact public health. Researchers have found that exposure to smoke (particulates) from wildfires can increase hospital admissions for respiratory diseases such as asthma and chronic obstructive pulmonary disease (COPD). These pollutants can be widely dispersed, as illustrated by periodic Indonesian forest fires set to clear land; people hundreds of kilometers away from the fires, such as in Singapore and Malaysia, experience respiratory impacts (Finlay et al. 2012).

Severe haze affecting Ampang, Kuala Lumpur, Malaysia in August 2005.
Photo by Earth
Wikimedia Commons / CC-BY-SA-3.0

It is imperative that we improve our understanding of the complex and dynamic impacts of ecosystem change on non-communicable disease.

HEAL's applied research program aims to address these critical knowledge gaps through rigorous scientific inquiry; seeking to comprehensively characterize how ecosystem change affects human health in order to progress a science to policy to action agenda.

In the Spring 2014 issue of the One Health Newsletter, the third installment will explore linkages between ecosystem change & nutrition.

Steven A. Osofsky, DVM is the Executive Director of the Wildlife Conservation Society's Wildlife Health & Health Policy Program, overseeing all of their Global Conservation Program's work in the health realm. He is also an adjunct assistant professor at the University of Maryland, College Park. Steve recently launched a new global program called Health & Ecosystems: Analysis of LInkages

Anila Jacob, MD is an internal medicine physician with an MPH in Global Environmental Health. Currently she is a senior technical expert at ICF International, where she works on the Measuring Impact project with USAID's Forestry and Biodiversity Office.

ISAAH-7: One Health Focus on Environmental and Aquatic Animal Health

Andrew S. Kane, MS, PhD

The continued momentum of One Health initiatives spur many academic, agency and private sector institutions to support and convene One Health conferences to bring professionals together. One upcoming conference worth sharing is the 7th International Symposium on Aquatic Animal Health (ISAAH-7). The term "One Health" is not part of the symposium title or defined conference agenda. One Health concepts are, however, integral to the fabric of this unique quadrennial gathering of veterinarians, academic and private sector researchers, chemists, nutritionists, microbiologists, parasitologists, environmental and aquatic health managers, aquaculturists, federal and state agency regulators, educators and students.

The conference functions as a nexus with a buzz of synergy. Attendees come for opportunities to learn what's hot-off-the-bench (or pond) in a variety of sciences at a venue that provides perspectives from a broad range of disciplines focusing on aquatic animal health. And, as the name implies, it is internationally regarded!

As a past organizer for ISAAH symposia I can tell you that it attracts registrants and contributors from over 20 nations around the globe, with support from multiple professional societies including the American Fisheries Society-Fish Health Section, Japanese Society for Fish Pathologists, Asian Fisheries Society, European Association of Fish Pathologists, International Association for Shellfisheries Association. Many of the attendees have been coming to these symposia for decades, and over time this symposium has fostered a novel sense of community, thanks to continuity provided by the hosting organization (AFS Fish Health Section).

For more information about this ISAAH-7 in Portland, Oregon (August 31 - September 4, 2014), check out the symposium website: http://microbiology.science.oregonstate.edu/content/isaah.

Andrew S. Kane, MS, PhD, is an associate professor of Environmental and Global Health in the College of Public Health and Health Professions, University of Florida. Dr. Kane also serves as director of the UF Aquatic Pathobiology Laboratories, and has secondary appointments in UF's College of Medicine, College of Veterinary Medicine and the School of Natural Resources and Environment that support his multidisciplinary research collaborations and teaching.

One Health in Practice: The Florida Interagency Wildlife Disease Working Group

Samantha M. Wisely, PhD

The One Health approach to understanding how diseases impact our world is by definition a holistic, multi-disciplinary effort. In Florida, a unique network of professionals convenes quarterly to discuss hot topics in wildlife diseases and their implications on the health of wild animals, livestock, companion animals, and people. Several dozen professionals from numerous agencies and organizations attend, including the Florida Fish and Wildlife Conservation Commission (FFWCC); United States Department of Agriculture Animal and

Plant Health Inspection Service (USDA APHIS) Wildlife Services and Veterinary Services; University of Florida (UF)'s College of Veterinary Medicine, Aquatic Pathobiology Laboratory, and the Department of Wildlife Ecology; Florida Department of Health; Florida Department of Agriculture and Consumer Services; and the United States Geological Survey. These agencies meet to learn about and discuss wildlife disease issues in Florida and to foster professional relationships.

The working group began informally as a series of lunch meetings among Dr. Mark Cunningham of the FFWCC, and Drs. Jim Wellehan and Darryl Heard of UF's College of Veterinary Medicine. "We initially met to discuss teaching a wildlife disease course at UF, and it just grew from there," explains Dr. Cunningham who maintains the listserv and organizes the quarterly meetings. Of the issues discussed in 2013, harmful algal blooms were among the lead topics of discussion. Blooms within the Indian River Lagoon are suspected to have contributed to die offs of manatees, pelicans, and dolphins in the region. Marine mammal experts, toxicologists, veterinarians, and wildlife biologists combined their efforts to understand the cause of this massive die off in the region. Other topics included chronic wasting disease in deer, Baylisascaris procyonis infection in raccoons, and Newcastle disease virus in cormorants. In addition to updating the group on current issues, the working group serves as a venue to coordinate and report on state-wide surveillance efforts for important wildlife diseases.

The working group plans to continue to meet regularly as long as there is interest. Goals for the upcoming year include securing Gainesville as the venue for a future Wildlife Disease Association Conference.The group is open to anyone who has an interest in wildlife diseases in Florida. Contact Mark Cunningham at mark.cunningham@myfwc.com if you wish to be added to the listserv.

Samantha M. Wisely, PhD, is an associate professor of Wildlife Ecology and Conservation at the University of Florida's Institute of Food and Agricultural Sciences.

ProMED Quarterly Update

Jack Woodall, PhD

Undiagnosed zoonosis

In February (2014) a so far undiagnosed disease with respiratory and some other, unusual symptoms has been allegedly killing young children and donkeys in two widely separated refugee camps in war-torn Central Darfur, Sudan. ProMED posted several hypotheses about the possible agent.

New human príon disease, USA & UK

Variably protease-sensitive prionopathy (VPSPr) is the most recently identified human prion disease, first described in the USA by Gambetti et al in 2008 as "a novel human disease with abnormal prion protein

sensitive to protease." Since then, similar cases have been identified in other countries; the National CJD Research and Surveillance Unit has identified 9 cases in the UK, 3 of which have been identified retrospectively and the others prospectively from samples and data collected since 1991 . Other candidate cases are currently under investigation. Further work is required to fully establish the epidemiology, clinical and pathological diagnostic criteria and transmission characteristics of VPSPr.

Avian flu

Since October 2013, more than 165 new **human H7N9 cases** have been reported, compared with 136 last spring. At least 115 cases (with 25 fatalities) have been confirmed this year. While the mortality rate of H7N9 is not as high as that of H5N1, the total number of H7N9 cases identified in the past month (January 2014) equals the number of H5N1 cases reported in 2006 (the most active calendar year for H5N1).

As of 23 Feb 2014, a total of 357 human H7N9 cases have been confirmed in mainland China since the first human cases were reported there early last year (2013). An imported case occurred in Malaysia in February 2014 in a tourist from China.

The majority of cases of human infection with avian influenza viruses reported since the beginning of 2014 up to the end of February have been infected with the H7N9 strain in China. A detailed epidemiologic study of the first nine months of the H7N9 avian flu outbreak in China reinforces the image of the illness as one that rarely spreads from person to person but may possibly do so when there is prolonged, close contact between the sick and the healthy.

In the quarter under review, **human H5N1 infections** have been reported in Canada (imported from Beijing, China), Egypt, Viet Nam, and Cambodia.

In February 2014, China confirmed a third human case since December 2013 of H10N8, a separate bird flu strain, two of them fatal. ProMED moderator Dr Larry Lutwick commented on ProMED-mail: "Whether this strain of avian influenza will be the 'next big thing' is too early to say. For pandemic influenza to occur, the strain must be new to man without a vaccine available (true for H10N8), cause significant disease in people (true for H10N8), and, finally, be able to cause prolonged person-to-person spread, which has not occurred for H10N8, H7N9, or H5N1.

MERS Coronavirus

MERS continues to sporadically kill immunocompromised people in Saudi Arabia, reportedly many without any contact with camels, in the face of rising evidence of the source being camels (but no smoking gun, i.e. virus isolation from camels). There is suspicion that the reservoir is bats, since they are hosts of other beta-coronaviruses like this one. A new coronavirus has been isolated from camels, but this one with no evidence of human spread.

Yellow fever

This year (2014) there has been a shortage of yellow fever vaccine in the USA, Canada and the UK due to production problems. It is hoped that this will be resolved in time to vaccinate football fans going to Brazil for the World Cup, as some matches will be played in the endemic zone. There is a big problem with fake vaccination certificates being sold in Nigeria. Last year (2013) there were 13 confirmed cases in Peru and 44 cases and 14 deaths in 13 localities in West and South Kordofan, Sudan.

Other arthropod-borne viruses

Tickborne **Crimean-Congo hemorrhagic fever** is spreading in India. Following a confirmed outbreak of Zika fever in French Polynesia, 2 cases have been reported in New Caledonia. This is a dengue-like disease, spread by mosquitoes, last reported in Germany in a tourist returning from Thailand last December (2013), and before that from Micronesia (Yap island) in 2007.

Anthrax and rabies

Reports of anthrax in humans, sometimes without a known animal source, came from Republic of Georgia, Kenya & Zimbabwe, and in livestock without associated human infection from Argentina, Indonesia, Sweden & Togo. Rabies cases were reported from India, Indonesia and South Africa, and in animals without associated human cases in the Congo Republic, Israel, Taiwan and the USA. The Taiwan infections were first discovered last year in Chinese ferret-badgers, which are a species of the mustelid family living in the mountain forests, among which rabies may have been lurking undetected for decades.

Chinese ferret-badger
Photo by Николай Усик
Wikimedia Commons / CC-BY-SA-3.0

Animal disease outbreaks

It was reported that last year, **influenza A(H7N9)** virus was isolated from an apparently healthy tree sparrow in a park in Shanghai. The great similarity of genes from this virus and influenza A(H7N9) viruses from humans and poultry indicate that the strain might be transmitted from poultry to tree sparrows or vice versa. Note that at least 167 wild bird species, including the House sparrow (*Passer domesticus*) and the Eurasian tree-sparrow (*P. montanus*) have been found infected by the more virulent (for poultry) **H5N1** strain.

H7N9 avian flu virus does not kill chickens, but has been detected by isolation from chickens and pigeons in live poultry (wet) markets, only in China.

On a historical note, the first isolation of H7N9 was in the USA (Kentucky) in 2009, in a commercial poultry operation consisting of two broiler-breeder houses with 20 000 birds that were 49 weeks old. None of them showed any signs of illness, but were being tested as part of the National Poultry Improvement Plan (NPIP) Clean Program (H5 and H7) for breeding facilities. No clinical signs, other than a modest drop in egg production, were reported. There was no mortality, but the whole lot were destroyed, and no human or further poultry cases were detected.

The virulent **H5N1** strain, which does kill chickens and has led to the preventive destruction of millions of them in Asia, has been widespread in Viet Nam, where transmission of the virus was allegedly from chickens smuggled through the China border and free range flocks of poultry in the southwest border area with Cambodia. H5N1 has been found in chickens in Cambodia (also ducks), China and Nepal this last quarter.

First isolated in China in 2009, **H5N8** is another avian flu strain that kills chickens, this year in South Korea where 20 suspected cases across the country have been reported, with 13 confirmed to be the H5N8 strain. It also killed 1000 migratory wild duck and three bean geese stopping at reservoirs there, which had probably imported the virus from China. Some 2.5 million ducks and chickens have been slaughtered as a preventive measure.

In other livestock, a new **coronavirus** has been isolated this year from **pigs** with diarrhea in the USA (Ohio). Wild boar, of which there are thousands roaming across frontiers in eastern European forests, have been spreading African swine fever this year from Ukraine through Belarus and Russia to Lithuania, arriving in Poland in February and threatening the Polish sausage industry. At the end of February, Germany notified the OIE of a new case in a cow of **atypical BSE**. This is not known to cause disease in humans.

When wildlife pathologists arrived at Hay Island off the coast of Nova Scotia, Canada, two years ago they found that of the thousands of silver and black-speckled **gray seals** that lay on the rocky outcrop, roughly one fifth were dead, despite showing no outward signs of disease. Necropsies revealed that 406 dead seals were infested with a crescent moon-shaped parasite that had destroyed their livers. Researchers revealed the parasite's identity, ***Sarcocystis***, on 14 Feb. 2014 at the annual meeting of the American Association for the Advancement of Science (AAAS), which publishes the journal *Science*. *Sarcocystis* in humans causes mild diarrhea, fever and muscle pains, which may become severe. Some patients have cardiac involvement.

Recently, the mammalian parasite ***Toxoplasma gondii***, which can cause blindness and abortions, has been found in western Arctic **beluga whale** meat, a staple food for the Inuit (Eskimo) people. Although *Toxoplasma* is most often blamed on cats, it and *Sarcocystis* also infect coyotes, feral dogs, and other carnivores, which during the winter breeding season cross over the ice to feed on seal placentas and live or dead seal pups, and contaminate the ice with their parasite-loaded feces.

Wild and managed **bees**, including bumblebees, are in decline globally. Given their central role in pollinating wildflowers and crops, it is essential that we understand what lies behind these declines. A recent study of wild bees in the UK found that 11% of bumblebees were infected with **Deformed wing virus** (DWV) and 7% with a **microsporidian**. About 35% of honeybees had DWV and 9% had the microsporidian. The **small hive beetle** has been found for the first time in El Salvador. It is a parasite and scavenger of honeybee colonies. Adults and larvae feed on the honeybee brood, honey and pollen, causing brood death, fermentation of the honey and comb destruction. The beetles can promote structural collapse of the nest and cause the adult honeybees to abscond.

Farmed English **oysters** have been having a bad year. Outbreaks of **oyster herpesvirus** and a new species of the **protozoan** *Mikrocytos mimicus* have been reported recently.

Plant disease outbreaks

On the last day of February we posted a report of what may be a new strain of Ceratocystis wilt, a fungus which is decimating kiwifruit vines in the south of Brazil. Also in February there was a report of a new virus, Grapevine Pinot gris virus (GPGV) in Italy (so I suppose the price of Italian ProSecco may go up).

During the quarter under review, alerts were issued for the Warrior strain of wheat stripe rust (UK) and stem rust of wheat (Ethiopia). Suspected new strains of curly top disease appeared in tomato (USA) and target spot disease of sorghum is emerging (Argentina). Undiagnosed diseases were reported in tea (Sri Lanka) and custard apple (Mexico), possibly *Phytophthora*. A plant journal reported the discovery that potato spindle tuber viroid is spread internationally in tomato seed.

Noteworthy was the first report of the virulent TR4 race of Panama disease in banana in Africa (Mozambique), from where it is spreading around the continent. It was already decimating Cavendish bananas throughout Southeast Asia, and in November 2013 was reported in Jordan. It is of particular concern because the Cavendish banana is the main commercialized type of banana, which is resistant to all other races of Panama disease.

Cavendish bananas
Photo by Marlith
Wikimedia Commons / CC-BY-SA-3.0

Other first reports were of black smut in rice (Colombia), cucumber green mottle mosaic virus in melon (USA), tomato leaf curl New Delhi virus in zucchini (Spain), tuber necrotic strains of potato virus Y (Ireland), and thousand canker disease in black walnut (Italy), tomato apical stunt viroid_ (TASVd) (France) and both TASVd and potato spindle tuber viroid (Poland).

Not only staple crops but also fruit and nuts are being attacked by diseases spreading globally. Beside the outbreaks listed above, in the three months ending 28 February 2014 the world has seen outbreaks of other diseases in: wheat (Australia, India), rice (India, Viet Nam), potato (USA), coffee (Mexico), almonds (USA), avocados (Colombia), cashew (Tanzania), little cherry (Australia, USA), grapevines (also Australia, USA), papaya -- two different diseases (Mexico), pecan nuts (USA) and tomato (USA).

Citrus Black Spot
Photo by Florida Division of Plant Industry Archive
Wikimedia Commons / CC-BY-SA-3.0

The European Union has placed a ban on South African citrus for the 2013 season after 36 interceptions when citrus black spot (CBS) was found. Extending the ban into 2014 is crucial to protect the 500 000 hectares (1.24 million acres) of European citrus orchards. The disease has recently been introduced into the USA by unknown means. Once established in a region, eradication of a sporulating fungus such as this one causing CBS is considered impossible.

For more on these and other outbreaks, please go to www.promedmail.org. Click on the Hot Topics tab, or click the Search tab to enter a keyword and date limits.

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

Advancements in One Health

First ever MHS EGH One Health Graduates in the United States

This past December at the University of Florida three students graduated from the first ever Master of Health Science (MHS) Environmental and Global Health (EGH) One Health concentration degree program in the United States.

University of Florida MHS graduates' mortarboards celebrate the focus of their degrees
Photo courtesy of Gregory C. Gray, University of Florida

First Undergraduate One Health Curriculum

Berry College in Rome, GA has become the first college in the United States to offer an undergraduate program in One Health. Students at Berry College can now earn a minor in One Health after completing an interdisciplinary curriculum that includes several novel courses specifically focused upon One Health concepts. The minor also requires that the student complete a One Health related research project as a capstone to his or her program of study.

For more information, please see the Berry College One Health website listed below. Dr. Christopher Hall, the program's director, can be reached at Chall@berry.edu.
http://www.berry.edu/academics/science/page.aspx?id=101816

[originally printed on OHI website (onehealthinitiative.com)]

Publishing help from the Library of Alexandria

The Library of Alexandria and the University of Pittsburg Supercourse team have established a free website with rules and tools from the world's leading scientists to aid students in developing the publication skills needed to advance scientifically. To access this wonderful resource please visit, http://ssc.bibalex.org/helpdesk/introduction.jsf (BA Superhelp desk), https://www.facebook.com/TheBaSuperhelpDesk (BA Superhelp Facebook), and http://www.pitt.edu/~super1/ (Supercourse).

[originally printed on OHI website (onehealthinitiative.com)]

Upcoming Events

Emerging Viral Diseases: The "One Health" Connection
Washington, DC March 18-19, 2014
http://www.iom.edu/Activities/PublicHealth/MicrobialThreats/2014-MAR-18.aspx

One Health Symposia: The Secret Life of Malaria: A Global Journey to Cure and Prevention
hosted by University of Georgia, Athens, GA March 19, 2014
http://onehealth.uga.edu/symposia

Annual Conference on Vaccine Research hosted by National Foundation for Infectious Diseases
Bethesda, MD April 28-30, 2014
http://nfid.org/professional-education/conferences

2nd International Conference on Animal Health Surveillance
Havana, Cuba May 7-9, 2014
http://www.animalhealthsurveillance.org/index.php?n=Main.Welcome

12th Annual Ecology and Evolution of Infectious Disease (EEID) Conference
Hosted by Colorado State University, Fort Collins, CO June 1-3, 2014
http://eeidconference.org/

Second Annual One Health International Symposium
Liverpool, England June 19-21, 2014
http://onehealth.uga.edu/symposium

International Conference of the Wildlife Disease Association - One Health: Transitioning from Theory to Practice
Ana Pueblo, NM July 27-Aug 1, 2014
Abstract Submission Due: 3/28/14
http://www.wildlifedisease.org/wda/CONFERENCES

EcoHealth: The 5th Biennial Conference of the International Association for Ecology & Health
Montreal, Canada August 12-15, 2014
http://ecohealth2014.uqam.ca/en.html

3rd Global Risk Forum One Health Summit
Davos, Switzerland October 5-8, 2014
http://onehealth.grforum.org/home/

3rd International One Health Congress
Amsterdam, the Netherlands March 15-18, 2015
http://www.iohc2015.com/

Recent Publications in One Health

Books

Zoonotic tuberculosis: *Mycobacterium bovis* and other pathogenic mycobacteria, 3rd edition. C.O. Thoen, J.H. Steele, J.B. Kaneene (eds). Wiley-Blackwell; 2014. http://www.wiley.com/WileyCDA/WileyTitle/productCd-1118474295.html

One Health: the human-animal-environment interfaces in emerging infectious diseases. The concept and examples of a One Health approach. J.S. Mackenzie, M. Jeggo, P. Daszak, J.A. Richt (eds). New York: Springer; 2013. http://link.springer.com/book/10.1007/978-3-642-36889-9

Journal Articles

In memoriam: James Harlan Steele (1913–2013). M.G. Schultz. *Emerging Infectious Diseases*. March 2014. 20(3):514-515. http://wwwnc.cdc.gov/eid/article/20/3/im-2003_article.htm

Hendra virus vaccine, a One Health approach to protecting horse, human, and environmental health. D. Middleton, J. Pallister, R. Klein, Y.R. Feng, et al. *Emerging Infectious Diseases*. March 2014. 20(3):372-379. http://wwwnc.cdc.gov/eid/article/20/3/13-1159_article.htm

History of One Health and one medicine. M. Murray, P. Holmes, N. Wright, O. Jarrett, et al. *Veterinary Record*. March 2014. 174(9):227. http://veterinaryrecord.bmj.com/content/174/9/227.2.extract

One Health and paradigms of public biobanking. B. Capps, Z. Lederman. *Journal of Medical Ethics*. February 2014. http://jme.bmj.com/content/early/2014/02/25/medethics-2013-101828.abstract

'One Health' and development priorities in resource-constrained countries: policy lessons from avian and pandemic influenza preparedness in Zambia. K.K. Mwacalimba, J. Green. *Health Policy and Planning*. February 2014. http://heapol.oxfordjournals.org/content/early/2014/02/14/heapol.czu001.abstract

CDC Grand Rounds: discovering new diseases via enhanced partnership between public health and pathology experts. S. Zaki, D.M. Blau, J.M. Hughes, K.B. Nolte, et al. *Morbidity and Mortality Weekly Report*. February 2014. 63(6):121-126. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6306a1.htm

A need for One Health approach - lessons learned from outbreaks of Rift Valley fever in Saudi Arabia and Sudan. O.A. Hassan, C. Ahlm, M. Evander. *Infection Ecology & Epidemiology*. February 2014. 4. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3915885/

Veterinary Journal To Publish One Health Series in 2014

[Originally printed on the One Health Initiative Website (onehealthinitiative.com) on Friday, January 24, 2014]

The highly respected and widely read *Veterinary Record* journal, the journal of the British Veterinary Association, has announced that "Throughout 2014, we'll be publishing feature articles written by experts in a range of fields that explore current issues in One Health, the history of One Health and challenges for the future. We hope to draw attention to this important field and stimulate debate."

The first two articles have been published and are free to access at the links below:

The evolution of One Health: a decade of progress and challenges for the future.
E.P. Gibbs. *Veterinary Record*. January 2014. 174(4):85-91. http://veterinaryrecord.bmj.com/content/174/4/85.full

One Health and the food chain: maintaining safety in a globalised industry.
P. Wall. *Veterinary Record*. February 2014. 174(8):189-92. http://veterinaryrecord.bmj.com/content/174/8/189.full

Reverse zoonotic disease transmission (zooanthroponosis): a systematic review of seldom-documented human biological threats to animals. A.M. Messenger, A.N. Barnes, G.C. Gray. *PLoS ONE*. February 2014. 9(2): e89055. http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0089055

Research regarding zoonotic diseases often focuses on infectious diseases animals have given to humans. However, an increasing number of reports indicate that humans are transmitting pathogens to animals. Recent examples include *methicillin-resistant Staphylococcus aureus*, influenza A virus, *Cryptosporidium parvum*, and *Ascaris lumbricoides*. The aim of this review was to provide an overview of published literature regarding reverse zoonoses and highlight the need for future work in this area.

[Originally posted on the One Health Initiative Website (onehealthinitiative.com)]

Recent Publications (continued)

Taking the bite out of rabies, putting teeth into "One Health". D.N. Fisman. *Annals of Internal Medicine*. January 2014. 160(2):132-133. http://annals.org/article.aspx?articleid=1814429

Humans and cattle: a review of bovine zoonoses. C.J. McDaniel, D.M. Cardwell, R.B. Moeller Jr., G.C. Gray. *Vector-Borne and Zoonotic Diseases*. January 2014. 14(1):1-19. http://online.liebertpub.com/doi/abs/10.1089/vbz.2012.1164

Surveillance, response systems, and evidence updates on emerging zoonoses: the role of One Health. G.V. Asokan, R.K. Kasimanickam, V. Asokan. *Infection Ecology & Epidemiology*. December 2013. 3. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3864162/

Toward proof of concept of a One Health approach to disease prediction and control. P.M. Rabinowitz, R. Kock, M. Kachani, R. Kunkel, et al. *Emerging Infectious Diseases*. December 2013. 19(12). http://wwwnc.cdc.gov/eid/article/19/12/13-0265_article.htm

The politics of trypanosomiasis control in Africa, STEPS Working Paper 57. I. Scoones. *STEPS Centre*. January 2014. http://steps-centre.org/wp-content/uploads/Trypanosomiasis.pdf

The Politics of Trypanosomiasis Control in Africa, a new working paper by Professor Ian Scoones of the Institute of Development Studies, UK, explores the scientific and policy debates surrounding trypanosomiasis control. The paper focuses in particular on Zambia and Zimbabwe where Professor Scoones is undertaking research with the Dynamic Drivers of Disease in Africa Consortium (www.driversofdisease.org), a multidisciplinary research programme exploring the links between ecosystems, poverty and disease.

[Originally posted on the One Health Initiative Website (onehealthinitiative.com)]

One Health at Kansas State University. K.S. KuKanich. *American Journal of Nursing*. December 2013. 113(12):61-3. http://www.ncbi.nlm.nih.gov.lp.hscl.ufl.edu/pubmed/24284588

Transdisciplinary research for complex One Health issues: a scoping review of key concepts. B. Min, L.K. Allen-Scott, B. Buntain. *Preventive Veterinary Medicine*. November 2013. 1;112(3-4):222-9. http://www.sciencedirect.com/science/article/pii/S0167587713002882

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