



Health Sciences Center for Global Health

The Global Address

Veterinary Public Health “Detectives” and the Case of the Nipah Virus

by Armando Hoet, DVM, PhD

In a six-week period between February and April 2004 over 36 people in a small city in Bangladesh became severely ill with encephalitis, 27 of whom died in a matter of days. This unknown disease had a mortality rate of over 70 percent among the individuals infected, and a large portion of the affected were healthcare personnel and relatives who were taking care of the initially ill individuals.

At that time, the source of the infectious agent was unknown. The only thing the population knew was that the disease was relatively easily transmitted from person-to-person and was deadly. As soon as the general population learned about the high mortality associated with this infectious agent, it created a wave of panic.

In a matter of days complete small towns and villages in the surrounding areas were emptied as people moved out afraid of an infectious disease that was unknown to the medical community at that time. Supermarkets, schools and even police stations were completely empty, all of which created a devastating effect on the economy, locally as well as nationally.

An Interdisciplinary Team Approach

Then a group of physicians, veterinarians, epidemiologists, and other public health professionals started to investigate the possible reasons why most of the victims were pig farmers and their relatives. They soon realized that a similar outbreak of encephalitis was occurring in pigs owned by the affected farmers. Soon after that, it was discovered that a new virus, the Nipah virus, was responsible for producing the infection in the pigs as well as in the humans. After further investigation done by veterinarians and other professionals, it was shown that the real source of this



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new emerging virus was a fruit bat, which passed the infection to the pigs. Of course, when the pigs became really ill and their farmers and owners began taking care of them they got cross infected, manifesting encephalitis and dying a few days later. After the main reservoir was identified, proper measures of prevention and control were implemented to avoid the transmission of the Nipah virus from wildlife to domestic animals, and from domestic animals to humans; stopping the outbreak and its negative public health effect.

Emerging Zoonotic Threats

This is just an example of the many emerging and reemerging zoonotic diseases that have occurred in the last 70 years. A zoonotic disease is a disease that is transmitted from animals to humans, and in certain circumstances back from humans to animals. In the last 60 years over 70 percent of all emerging infectious diseases affecting humans have come from different animal populations. The study and control of these zoonotic diseases in both human and animal populations is one of the main subjects of the Veterinary Public Health field.

Veterinary Public Health (VPH) is defined by the World Health Organization as “all the contributions to the physical, mental and social wellbeing of humans through an understanding and application of veterinary science.” Today, veterinarians together with many other professionals in the health sciences and other areas have a major role in protecting the health of the general public in regards to zoonotic dis-



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Global Health Day is May 23



- Volunteer
- Join the solidarity Ride
- Attend the fair and lectures

See details on page 5

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eases as well as many other important VPH issues. Veterinarians with public health training also play an important role in food safety due to the fact that a large number of foodborne pathogens that can get transmitted through the food supply are zoonotic in nature. For example *Salmonella*, *E. coli* O157:H7, *Toxoplasma*, “Mad Cow” (BSE), and many other foodborne pathogens can be transmitted from animal populations to the human side through the food supply. Therefore, the responsibility of these professionals is to ensure that food of animal origin is safe, sound, nutritious, and fit for human consumption.

Veterinarians also play a major role in the development of biomedical research in which many of the vaccines and treatments that are currently used today in the human population have been designed and tested for efficiency and efficacy, as well as safety, in animal populations. Once these drugs, biologics, and medical procedures are proven to be successful they are translated to the human side to be used in human medicine.

Bioterrorism and Preparedness

Veterinarians also contribute to the health of our environment, especially in agricultural settings in which they have major involvement in designing agricultural production systems in the case of dairy, beef, poultry, and swine farms as well as other food animal production systems. Our major responsibility is to be sure that these production systems impact the environment the least possible wherever they are located, paying special attention to the air and water quality, carcass disposal, pest control, manure management, and many other important topics. Finally, and sadly, more recently veterinarians and related professionals working in the Veterinary Public Health field have a major role in regards to bioterrorism and preparedness. VPH professionals are right now part of the front line in national defense due to the fact that up to 80 percent of the infectious

pathogens that are classified as Class A biological agents (Anthrax, Plague, Tularemia, Botulism, Ebola), which can be used against society producing mass casualties and panic, are indeed zoonotic pathogens. Therefore, VPH professionals are currently developing, testing, and distributing different vaccines and treatment options against these biological agents, so that we can respond to such a criminal act. Similarly, many of the zoonotic diseases previously mentioned are currently present in different animal populations in the United States. However, we don't see mass numbers of casualties in the human side due to the efficient work of veterinarians and other professionals in the Veterinary Public Health field. These professionals are controlling, preventing, and even eradicating cases of diseases in the animal population, so they cannot be transmitted to the human side, as was done in the Nipah virus outbreak. And even though we still have Anthrax, Plague, Tularemia, and Rabies in different animal populations in the United States we rarely see human cases of these diseases due to the efficient control that has been done to these pathogens on the animal side.

Now You Know

As you can see, Veterinary Public Health professionals play a major role in the protection of society. However, most of the work done by many of the experts working in this field, including veterinarians and other professionals, often goes unnoticed by the general population as they typically work in the background and do not have direct interaction with the general public. Nevertheless, the effect of their work is something that is noticed on a daily basis in which, for example, we can consume dairy products and eggs on a regular basis without being too concerned about their safety and the possibility of contracting a zoonotic disease because we are consuming a product of animal origin.



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What is Veterinary Public Health?

Veterinary Public Health (VPH) looks at the intersection of animals and humans in the context of health. Food production affects every one of us and it is the role of veterinary public health to investigate, monitor, and control diseases that threaten that food supply. The transmission of zoonotic diseases is also an activity of VPH, either through direct infection or through food.

What are Zoonoses?

Zoonoses are the diseases or infections that can be transmitted from vertebrate animals to humans. Some of the more familiar are *Salmonellosis*, *E. coli*, avian influenza, Bovine Spongiform Encephalitis (mad cow disease), West Nile virus and rabies as well as lesser known zoonoses in the U.S. like Chagas disease, tuberculosis, leishmaniasis, and schistosomiasis.

Why should you care?

There are over 200 known zoonotic diseases and the World Health Organization estimates that about 75 percent of the emerging (new) diseases in the past 10 years are directly linked to animals. The animal food chain, sometimes referred to as gate-to-plate, or stable-to-table, is the source of food-borne diseases, which can lead to sickness and even death in large numbers of humans. The economy is also affected when food must be recalled or animal imports and exports are suspended.

Bridging Agriculture and Medicine



Excerpted from an article by
Lonnie J. King, DVM
Dean, College of Veterinary Medicine

Since 1892, a total of 14 diseases have been eliminated from equine, poultry, and livestock populations in the United States⁵. The elimination of these livestock diseases, along with outstanding research in animal health, is key to the remarkable gains in the efficiency of U.S. animal production. Partly as a consequence, U.S. residents spend only approximately 10 percent of their disposable income on food, whereas residents in other countries pay three or four times more⁷. Although this achievement is recognized to have added billions of dollars to other parts of the U.S. economy,

its success in allowing the U.S. public access to a nutritious, affordable, and sustainable food supply—also important for the public's health and well-being—is far less appreciated. The success of the national brucellosis and tuberculosis elimination campaigns has benefited not only the U.S. livestock industries but also human health by substantially reducing these zoonotic threats in animals. Additional public health contributions can be attributed to the Food Safety and Inspection Service of the U.S. Department of Agriculture (USDA), which has substantially reduced the burden of food-borne illnesses, improved food safety, and eliminated other zoonotic threats. Over the years, CDC has worked closely with USDA and the Food and Drug Administration to improve the safety of U.S. foods and reduce antimicrobial resistance in pathogens that infect both humans and animals.

CDC, MMWR, December 22, 2006/ 55(SUP02); 7-9

5. Dunlop RH, Williams DJ. Veterinary medicine: an illustrated history. St. Louis, MO: Mosby; 1996.

7. Committee on Assessing the Nation's Framework for Addressing Animal Diseases, National Research Council. Animal health at the crossroads: preventing, detecting, and diagnosing animal diseases. Washington, DC: National Academies Press; 2005.

Veterinary Public Health at OSU

The College of Public Health offers a Master of Public Health degree with a specialization in Veterinary Public Health (VPH). The curriculum includes courses on food safety, infectious disease, epidemiology, zoonotic diseases, and biosecurity. Students in the program are also required to complete a field practicum. The Health Sciences Center for Global Health and

the College of Public Health teamed up to provide funding for students in the Graduate Interdisciplinary Specialization in Global Health program to go abroad and conduct field research. Following are some of the projects carried out by VPH students this year.

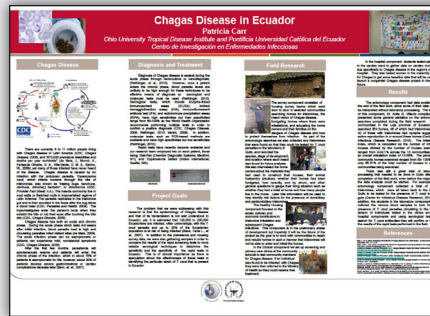
ETHIOPIA



Administering questionnaires to local dairy farmers

Sophia Dailey conducted a baseline survey of foodborne pathogen prevention and control systems in and around Gondar, Ethiopia. Her research focused on milk quality and production through the use of surveys and sample collection and laboratory processing of the samples from individual farmers and bulk tanks.

ECUADOR



Carr's poster on her Chagas disease research

Patricia Carr participated in a field study program doing research on Chagas disease in Ecuador. Chagas disease can cause serious heart and stomach illnesses and is spread by contact with an infected triatomine bug also called "kissing bug," "benchuca," "vinchuca," "chinche," or "barbeiro."¹ She had the opportunity to learn about research in the international setting, as well as research methodology.

URUGUAY



OSU students at the Carrasco slaughterhouse

VPH students Pouneh Behin, Janet Buffer and Caitlin Lacey explored the food system in Uruguay through the Farm-to-Table Study Program. Armando Hoet, DVM, PhD, coordinator, OSU VPH Program and Veterinary Medicine Professor Thomas Wittum, PhD, were leaders on the trip, which looked at aspects of animal welfare and health, food safety, food protection, and public health.

Read their full reports [online](#).

1. Chagas Disease Fact Sheet, Centers for Disease Control and Prevention



Anne Eiting Klamar, MD

My Take

OSU Alum, CEO, Global Health Activist

My name is Anne Klamar and I am a 1990 graduate of the Ohio State University College of Medicine. I am a family practitioner by training and I practiced with my husband, Rob Klamar, also a 1990 graduate of OSUCOM, and several other partners for five and a half years. For the past 10 years, I have been involved in medicine in a different way. I'm running my family's company which makes medical, dental and vet examination equipment and furniture for the office setting. I found that many of the skills that I learned in medicine like listening, empathy and problem solving serve me well in the business world.

When I left medicine, it took a while for my calling around "making a positive difference" to take shape, but happily, it did. Our company strategically was working to become a more global company when I had a conversation with a friend and colleague, Dr. Marion Bergman. Marion had been asked by the President of Tanzania to consider a project to refurbish Tanzania's only dental school at Muhimbili University where his daughter was a student. The school was reportedly in horrible shape. She asked if we would be interested in donating some of the equipment for the project. I was intrigued by the concept. We were working with a company in India at that time and on



my next trip to India, I took a detour and visited Tanzania on the way.

I met Marion there and we toured the dental school together. I was astounded by what I saw. In a country with an 8-10 percent HIV positive rate, I saw saliva and broken teeth on the countertops where patients were being treated. Blood and biohazardous waste was open and out in the areas where patients were waiting to be seen, including children. I saw a lack of sterilization and was concerned that perhaps more harm than good was being done at the school. At that point, I couldn't NOT volunteer our organiza-

tion to take on the project. The entire school and dental lab were in appalling shape, yet it was the only place for dental education in the entire country. How could we not make a positive difference?

Marion ran lead on the project and it took a year and a half from that visit to the actual installation. Things that we take for granted like clearing customs were much more complex in a third world country. One of our pieces of cabinetry had to be sent three separate times before it arrived at the school because it kept "getting lost" in the port. An amazing team of individuals from the donating companies completed the installation in March of 2009 and in November of that same year President Kikwete officially opened the school.

Our goal continues to be to make a positive difference in a country that I have come to love.

Shortly after that, we had an "Aha" moment when we realized that unless a sustainability plan was developed and put in place both from a business and an equipment service perspective, the school would be destined to fall into disrepair again. The dean was concerned primarily with academics and rightly so. No one knew how to fix the equipment if it broke and there were no dental repair organizations in the country that we could find. We had to work through the school and two government ministries to hire two technicians who were brought to the U.S. for intensive training so that they could service the equipment.



left to right: Stanley Bergman, CEO and Chairman of Henry Schein, Dr. Klamar, John Spencer, Chairman of DCI, Dr. Marion Bergman and his Excellency, President Jakayo Kikwete of Tanzania.

The business case was a little trickier. Records were poorly kept and billing was inconsistent. Many patients struggled to pay anything. The goal was financial sustainability yet even simple tracking systems were needed in a country where not everyone has a birth certificate or even knows their age. To be honest, we are continuing to work on this part of the project and when I was in Tanzania in February of this year, I was pleased to see the progress that was being made. We certainly are not finished with this part of the project yet!

One of the next steps is to link the importance of oral health to overall health and to bring basic dental care and education to the districts and villages. It's a huge task but we are patient and persistent. Marion continues to be the lead and we continue to learn about the complexities of creating a greater good in an environment that will benefit from the effort. Our goal continues to be to make a positive difference in a country that I have come to love.

I found that once I got a taste of the complexity that the project presented, once I

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Global Health Day 2011

Come celebrate Global Health Day on May 23 to raise awareness about global health issues and support Ride for World Health (R4WH). R4WH is also hosting a [Solidarity Ride](#) in Columbus on May 22 at Easton Town Center.

[R4WH](#) is a group of medical students, health care professionals, and community representatives who will participate in a 3,700 mile bicycle ride from San Diego, California, to Washington, DC to promote education and awareness of global and domestic health concerns as well as raise funds for MedWish International and AHOPE for Children.

R4WH is looking for volunteers for Global Health Day 2011 and student organizations that would be interested in having a table at the global health fair. If you or your organization would like to get involved please contact [Eliza Beal](#).

Global Health Day Itinerary

Time/Location	Event
8:00 AM Medical Center Plaza	Ride-in
10:00 AM Meiling 160	Local high school students presentations on global health topics
12:00 PM Meiling 160	Speakers, Sarah Broom (Village Health Works) and Dr. Evan Lyon (Partners in Health) at 12:00 PM and 1:30 PM (free lunch provided)
1:00 PM-4:00 PM	Global health fair with over 30 organizations

My Take: OSU Alum, CEO, Global Health Activist *Cont. from page 4*

met people that taught me about faith and laughter, once I realized that the richness in their lives had nothing to do with money, and once I saw the relative poverty in our own lives in things beyond money, the more I was committed to the concept of making a positive difference in a place where people otherwise might not get education and health care. I hope that each of us has such an opportunity in our lives and that we each live that opportunity to the fullest. We are so very lucky...

What do you think?

Jessica Evert, MD, OSU College of Medicine Class of 2005, recently blogged about reforming medical education to include global health curriculum. What do you think? What about the other health sciences disciplines? Share your thoughts at the [blog](#).

Dr. Evert is a clinical faculty member of the Department of Family and Community Medicine at San Francisco General Hospital University of California and medical director of Child Family Health International.

Global Health Spending

On March 10, 2011, the Columbus Council on World Affairs hosted a symposium on global health efficiencies and spending with speaker A.K. Nandakumar, PhD. Dr. Nandakumar has over 20 years of experience in health care financing in the U.S. and developing countries.

View Dr. Nandakumar's presentation, [Global Health Spending: Learning to do More with Less](#)

Events

"No Woman, No Cry" Film and Panel Discussion

When: 7 PM on Wednesday, April 13, 2011

Where: Mershon Auditorium at the Wexner Center

"No Woman, No Cry" is a documentary film directed by Christy Turlington Burns about at-risk pregnant women in Tanzania, Bangladesh, Guatemala, and the United States. Following the film there will be a conversation with the director and a panel of experts. Read more about the [event](#) and the organization founded by Turlington Burns, [Every Mother Counts](#).

Sponsored by Ohio State's health sciences colleges in partnership with the Wexner Center for the Arts.

Alleviating Poverty Through Entrepreneurship Summit

When: April 15, 2011

Cost: Free (must RSVP for free lunch)

Where: Mershon Auditorium at the Wexner Center

The [Alleviating Poverty Through Entrepreneurship \(APTE\) Summit 2011](#) at The Ohio State University brings together students, professionals, and community members to connect with each other and learn about market-based approaches to solving poverty. The conference will focus on how innovation in the sectors of healthcare, energy, and education are fighting poverty.

1st International Congress on Pathogens at the Human-Animal Interface

When: September 15 - 17, 2011

Where: Addis Ababa, Ethiopia

The [1st International Congress on Pathogens at the Human-Animal Interface](#) will bring together scientists, policy makers, and other stakeholders to address key issues that impact health and livelihood.

OSU, together with international partners, is sponsoring this conference.