Newsletter of the American College of Veterinary Preventive Medicine

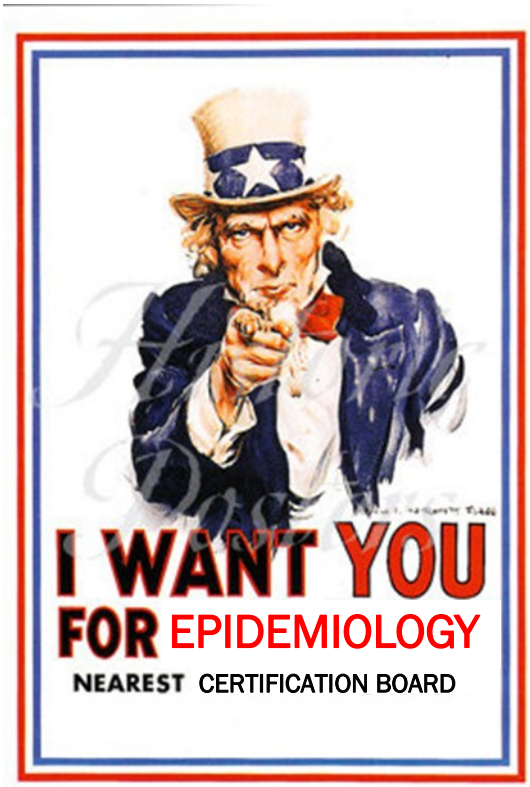
February 2013, Vol 100

News & Views

Epidemiology Specialty Wants You!

Dr. Bruce Burnham

In the last 5 years, the Epidemiology Subspecialty has not grown. The following is offered as a summary of the discussion I have received regarding this challenge. Hopefully these thoughts will spur additional thought and action.



Feedback on the question of why the Epidemiology Specialty is not growing:

- There are two other organizations that provide board certification in epidemiology: American College of Epidemiology and the Association for Veterinary Epidemiology and Preventive Medicine
- There is no pay incentive for more than one board certification particularly when this certificate is only as a sub-specialty
- There is no federal epidemiologist classification: most are General Health Scientist, Veterinary Medical Officers, or Interdisciplinary
- It is very difficult in federal position descriptions to require board certification
- There is no prerequisite for people to have "epidemiologist" in their job title including federal government jobs
- The publication requirement as part of the qualification for this subspecialty is difficult for those not in academia (this has been addressed)
- Some believe that the required exam is difficult
- Lack of knowledge by those entering the field of epidemiology of this sub-specialty
- The requirement for general board certification before subspecialty is seen as exclusion (or at least is not inviting toward) people who are truly specialists in disciplines that we represent
- Reformulate the ACVPM specialty to a set of exams for different areas within the broad umbrella

Continued on page 3

Inside this issue:

Communications Committee members:

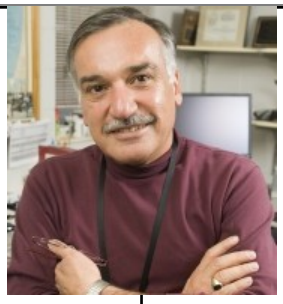
Dr. Tom Berg
thomas.Berg@pfizer.com
Dr. Ethel Taylor
EVTaylor@cdc.gov
Dr. Tom Doker
thomas.doker@gmail.com
Dr. George Moore
gemoore@purdue.edu

Please forward any news or items that you would like for us to consider publishing in the next Newsletter!

Next issue deadline: 10 May 2013

President's Commentary…Is the United States Really at Risk for Introduction of Rift Valley Fever Virus?

Dr. Mo Salman



Rift Valley fever continues to garner substantial attention as a potential agricultural and zoonotic disease threat to the United States. It has been stated that "the presence of competent vectors in countries free of RVF, the high viral titers in viremic animals and the global changes in climate, travel and trade all contribute to make this virus a threat that must not be neglected as the consequences of RVF are dramatic, both for human and animal health[1]." Rift Valley fever virus was first isolated from lambs in the Rift Valley of Kenya in the 1930s. Major outbreaks of RVFV infection have been recorded in many parts of sub-Saharan Africa since that time, and a large outbreak of the disease occurred in Egypt in the late 1970s. The virus was first detected outside the African continent in Saudi Arabia and Yemen in 2002[2], with the outbreak attributed to the legal importation of cattle and small ruminants from the Horn of Africa.[3] Six viral strains were isolated from Aedes mosquitoes during this outbreak, and all were phylogenetically related to strains isolated in Kenya in 1997. The aim of the present commentary is to qualitatively assess the threat of introduction of RVFV in nonendemic regions, particularly the United States.

Previous Assessment of the Threat

The USDA recently convened a group of infectious disease scientists employed by the federal government to assess and prioritize a list of potential animal disease threats. The scientists were requested to rank agents on the basis of a set of eight criteria: epidemic potential, economic impact, trade impact, zoonotic potential, morbidity and mortality rates, potential for cross-species infection, inability to rapidly detect an infection, and inability to vaccinate against infection. Rift Valley fever virus was ranked fourth on this list. However, the criteria for inclusion on this list were not complete because the likelihood of introduction of each agent into the country was not considered. Two qualitative risk assessments, one completed by the USDA APHIS Veterinary Services in 2007[4] and the other completed by the European Food Safety Authority[5] in 2005, concluded that introduction of RVFV into the United States and the European Union is feasible but that the likelihood of introduction is either negligible or low. Three primary pathways—importation of infected animals, arrival of infected humans by air, and arrival of infected vectors in cargo or on airplanes—were examined in each of these assessments, but intentional introduction of the virus was not considered.

Introduction of RVFV Through Live Animals or Animal Products

The likelihood that animals infected with RVFV would be imported into the United States is currently negligible, given that all livestock from locations in the world where RVF occurs are prohibited from entering the United States. Countries with confirmed cases of RVF from July 2009 to November 2010 include Saudi Arabia, Madagascar, South Africa, Namibia, Botswana, and Mauritania. The US Code of Federal Regulations states that "the importation of any ruminant or swine or any fresh (chilled or frozen) meat of any ruminant or swine that originates in any region where rinderpest or foot and mouth disease exists … or that enters a port in or otherwise transits a region in which rinderpest or foot and mouth disease exists is prohibited."[6] Although exceptions to this regulation are provided, none would apply to live ruminants from countries with confirmed cases of RVF. Wildlife imported for zoological exhibits must undergo an extensive quarantine period to prevent the introduction of foreign animal diseases into the United States. The US Code of Federal Regulations states, "Except for cattle from Central America and the West Indies and except for ruminants from Canada and Mexico, all ruminants imported into the USA shall be quarantined for not less than 30 days counting from the

Continued on page 4

Dr. Danielle Bickett-Weddle, DVM, PhD, MPH, **DACVPM** cited in 1 January 2013 JAVMA article titled *Assessment of owner willingness to treat or manage diseases of dogs and cats as a guide to shelter animal adoptability.*

Conclusions and Clinical Relevance— These results provide a baseline indication of community willingness to address medical or behavioral conditions in dogs and cats. These considerations can be used in conjunction with Asilomar Accords recommendations to assess adoptability of cats and dogs in animal shelters.

Epidemiology Specialty News *(cont.)*

Continued from page 1

Feedback on value of the Epidemiology Specialty:

- Many used the credential to obtain or maintain their current position
- Many obtained a sense of self-satisfaction and professional development
- Many benefitted from a specialized network of communication
- Some believe it is a way to show distinction or stratification for promotion
- Values those who are specialists
- The Epidemiology Specialty challenges veterinary epidemiologists toward a higher professional level
- Certification is recognized by others (including promotion and hiring groups) as a distinguishing professional achievement.

Feedback on the Epidemiology Specialty being a financial drain:

- The specialty is very close or pays its costs every year
- We should look at reducing costs for the meeting, such as coffee/food service
- Some members said that their ACVPM membership was primarily motivated by their specialty designation, and they would drop ACVPM membership if their specialty was disbanded; therefore, revenue generated for the College may actually be quite a bit higher than just the marginal difference in fees of $30/member

As per the above input and with the available background, the following paragraphs were included in the response to the American Veterinary Board Specialties (ABVS) of the ACVPM 5-year report:

The ACVPM has a steady flow of new applicants due to the financial rewards of attaining board-certification status. There is no additional financial reward for specialization, so new applicants are rare.

Therefore, the epidemiology specialty has taken a three-prong approach to improving this situation:

- An informal mentoring program that encourages members to replace themselves with new members
- A survey identifying potential barriers
- Advertisement of reasons to join the specialty in the ACVPM newsletter

Bruce Burnham

Call for Nominations!

James H. Steele VPH Award
Deadline: March 18, 2013

This distinguished award will be given to a current or former EIS officer (an alumni, who has completed EIS training within the last 5 years) — and one who has made outstanding contributions to the field of veterinary public health (i.e., for this year, members of the EIS classes of 2006-2012). Nominees may include non-veterinarians who have made substantial contributions in this field. Please contact Dr. **Casey Barton Behravesh**, DVM, **DACVPM**: dlx9@cdc.gov 404-639-0367.

Opportunity to Comment: Swine Concept Paper

Veterinary Services is considering changes to its pseudorabies virus (PRV) and swine brucellosis (SB) programs and is requesting comments on a concept paper titled *A New Approach for Managing Swine Brucellosis and Pseudorabies Virus*. The paper sets forth a draft regulatory framework that would address outdated provisions of the existing regulations, reduce regulatory burden, and combine PRV and SB into one program. The concept paper can be found by viewing the Regulations.gov Web site as described in the *Federal Register* notice or through the following link at:

http://www.aphis.usda.gov/animal_health/animal_dis_spec/swine/.

APHIS is asking stakeholders to submit comments by **April 8, 2013**. Comments may be submitted through:

http://www.regulations.gov/#!documentDetail;D=APHIS-2010-0086-0001

or submitted via first class mail as described in the *Federal Register* notice.

Is the United States Really at Risk for Introduction of Rift Valley Fever Virus? (continued)

Continued from page 2

day of arrival at the port of entry."[7] There are also requirements for blood tests or other tests as determined by the USDA APHIS administrator to determine that the animals are free from disease. The risk assessment conducted by European Food Safety Authority[5] in 2005 stated that, given the stability of RVFV and the wide variety of product types and the way they are transported, if contamination of a product were present at the point of export, then the probability of some product remaining infectious at the point of destination in Europe would be high. This would also be the case for products illegally brought to the United States from countries where an RVF outbreak was occurring. Considerable safeguards are in place to prevent illegal animal products from entering the United States. The effectiveness of these safeguards is attested to by the absence of outbreaks of other highly infectious diseases with worldwide distribution that could also enter the country through contaminated animal products (eg, foot-and-mouth disease and classical swine fever). However, the risk of RVFV entering the United States through the illegal importation of infected animal products cannot be considered negligible.

Intentional introduction of RVFV into animal populations is possible, although introduction would require administration of high doses of virus via an effective route to establish infection. This would require injection as the method of delivery, which would generally be unattractive to those meaning to do harm to the United States because of logistical complications.

Introduction of RVFV by Humans

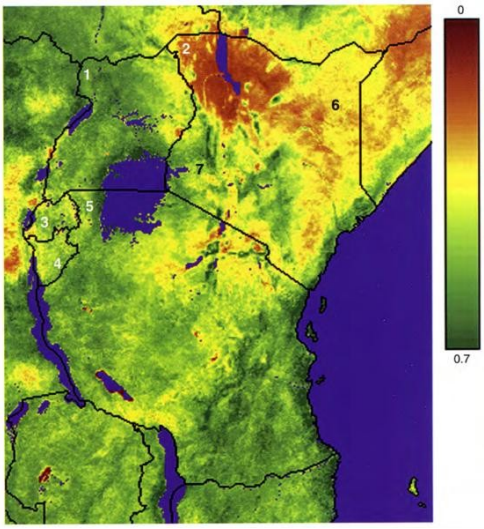
Anecdotal statements about the potential for a single US-native mosquito feeding on an RVFV-infected human arriving by air or sea and initiating an outbreak of RVF in the United States fail to consider the many low-probability events that would need to occur to establish the disease in the United States. These events depend on factors associated with both humans and vectors.

The probability that individuals from a country in which RVFV is present would be infected with the virus depends on the prevalence of the disease in susceptible species, primarily ruminants, in that country and, to a certain extent, the vector density.

Continued on page 6

More Scientists Using Weather Patterns to 'Forecast' Disease Outbreaks

Only a 10 percent chance of showers today, but a 70 percent chance of flu next month. That's the kind of forecasting health scientists are trying to move toward, as they increasingly include weather data in their attempts to predict disease outbreaks. In one recent study, two scientists reported they could predict - more than seven weeks in advance - when flu season was going to peak in New York City. Theirs was just the latest in a growing wave of computer models that factor in rainfall, temperature or other weather conditions to forecast disease.



Health officials are excited by this kind of work and the idea that it could be used to fine-tune vaccination campaigns or other disease prevention efforts. At the same time, experts note that outbreaks are influenced as much, or more, by human behavior and other factors as by the weather. Some argue weather-based outbreak predictions still have a long way to go. And when government health officials warned in early December that flu season seemed to be off to an early start, they said there was no evidence it was driven by the weather.

This disease-forecasting concept is not new: Scientists have been working on mathematical models to predict outbreaks for decades and have long factored in the weather. They have known, for example, that temperature and rainfall affect the breeding of mosquitoes that carry malaria, West Nile virus and other dangerous diseases. Recent improvements in weather-tracking have helped, including satellite technology and more sophisticated computer data processing.

As a result, "In the last five years or so, there's been quite an improvement and acceleration" in weather-focused disease modeling, said Ira Longini, a University of Florida biostatistician who's worked on outbreak prediction projects. Some models have been labeled successes.

In the United States, researchers at Johns Hopkins University and the University of New Mexico tried to predict outbreaks of hantavirus in the late 1990s. They used rain and snow data and other information to study patterns of plant growth that attract rodents. People catch the disease from the droppings of infected rodents.

"We predicted what would happen later that year," said Gregory Glass, a Johns Hopkins researcher who worked on the project. More recently, in east Africa, satellites have been used to predict rainfall by measuring sea-surface temperatures and cloud density. That's been used to generate "risk maps" for Rift Valley fever - a virus that spreads from animals to people and in severe cases can cause blindness or death. Researchers have said the system in some cases has given two to six weeks advance warning.

Last year, other researchers using satellite data in east Africa said they found that a small change in average temperature was a warning sign cholera cases would double within four months. "We are getting very close to developing a viable forecasting system against cholera that can help health officials in African countries ramp up emergency vaccinations and other efforts", said a statement by one of the authors, Rita Reyburn of the International Vaccine Institute in Seoul, South Korea.

Continued on page 11

Dr. Colleen G. Duncan, DVM, MSc, PhD, DACVP, **DACVPM** cited in 1 January 2013 JAVMA article titled *Cutaneous neoplastic lesions of equids in the central United States and Canada: 3,351 biopsy specimens from 3,272 equids (2000-2010).*

Conclusions and Clinical Relevance— Signalment, anatomic location of the mass, and geographic location of the horse can be used to help equine practitioners formulate differential diagnoses for cutaneous masses. Further research is necessary to identify the biological basis for the development of many equine cutaneous neoplasms.

Is the United States Really at Risk for Introduction of Rift Valley Fever Virus? (continued)

Continued from page 4

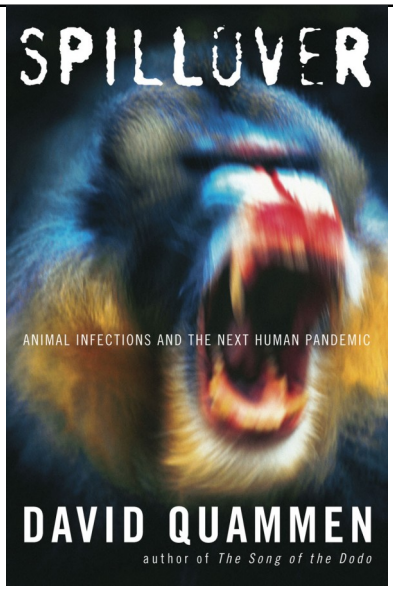
The probability of human infection is also dependent on the likelihood of viral exposure, which depends primarily on the individuals' occupations and their standard of living.[5] Generally, for infection to become established in humans, exposure to high virus titers is necessary. Thus, infection with RVFV in people has typically been considered an occupational hazard disease, primarily of slaughterhouse workers and others handling infected animals and animal products. In the large 2006–2007 east African outbreak, direct contact with infected livestock tissues or fetuses was the most important risk factor associated with infection.[8] Mosquito-borne transmission of RVFV to humans during outbreaks has been demonstrated, but human-to-human transmission has not been reported.

Most human RVFV infections are unapparent or associated with mild, flu-like symptoms (eg, fever, headache, and myalgia). In some cases, infection progresses, resulting in the development of severe complications, including hemorrhagic fever, encephalitis, and acute hepatitis.[2,9] Some infected humans do establish a high viremia during the febrile period.[10] However, the viremia is fairly short-lived (1 to 4 days).[11]

Vector competence can be defined as the combined effects of all physiologic and ecological factors related to vectors, hosts, pathogens, and the environment that influence the ability of a member of a particular vector population to transmit the virus. Laboratory studies[12] investigating the potential for North American mosquito species to transmit RVFV indicate that several species known to feed on both large mammals and humans in the United States could be capable of transmitting the virus. The vector potential ranged from very good for certain Aedes and Culex spp to poor for Anopheles spp. Those authors stated, "In nature, efficiency of transmission of viral agents by arthropod vectors is dependent upon several factors in addition to whether or not an arthropod can transmit in the laboratory. These include specific interactions between the vector, the virus, the host and the environment, such as variation in the vector and host susceptibility, host density, geographic distribution, longevity, dispersal patterns and feeding preferences."[12] The concept of sufficient and necessary causes of disease is a well-established epidemiological principle. According to Rothman,[13] a "sufficient cause may be defined as a set of minimal conditions and events that inevitably produce disease." Rothman[13] goes on to say, "In disease etiology, the completion of a sufficient cause may be considered equivalent to the onset of disease." Any sufficient

Continued on page 9

Spillover: Animal Infections and the Next Human Pandemic *by David Quammen*



What a confounding summer it was. At agricultural fairs across the country, people gathered for the simple pleasure of devouring deep-fried Mars bars were coming down with a once-placid pig virus, a variant of H3N2 influenza. Over 300 cases have been confirmed so far, with at least one death. In Texas and elsewhere, pharmacy shelves are shorn of mosquito repellent thanks to the most serious outbreak of a mosquito--borne bird virus — West Nile — the country has ever seen. In Massachusetts, high school football games are being canceled for fear of yet another animal microbe, Eastern equine encephalitis virus, currently stalking the state's residents.

That is to say, David Quammen's meaty, sprawling new book, "Spillover: Animal Infections and the Next Human Pandemic," arrives not a moment too soon. Animal microbes are on the loose. Historically, some 60 percent of the infections that plague humankind, from influenza to H.I.V. and bubonic plague, originated in the bodies of other animals. (To be fair, like any decent fight, the exchanges go the other way too.) But nowadays, Quammen writes, we are "tearing ecosystems apart," and animals and humans are rubbing shoulders in novel, unexpected ways. The steady drip of animal microbes spilling over into people quickens.

But for those ready to stock up on dehydrated meals and hide out in the basement, not to worry: most of the animal microbes portrayed here are unlikely to race across the earth felling millions, despite the book's suggestive subtitle. "Spillover" hardly touches on such pandemic--worthy animal pathogens as avian flu or multi-drug-resistant bacteria. What the book more fully describes is the unfolding convergence between veterinary science and human medicine, and how veterinary--minded medical experts discover and track diseases that spread across species. "Spillover" is less public health warning than ecological affirmation: these crossovers force us to uphold "the old Darwinian truth (the darkest of his truths, well known and persistently forgotten) that humanity is a kind of animal" — with a shared fate on the planet. "People and gorillas, horses and duikers and pigs, monkeys and chimps and bats and viruses," Quammen writes. "We're all in this together."

Much of the book details Quammen's prodigious, globe-trotting adventures with microbe hunters in the field, trapping bats in southern China and hysterical monkeys in Bangladesh. Over the course of some 500 pages, Quammen takes us to Australia, where a virus called Hendra has spilled over from bats into horses and from there into people, and to central Africa, where he learns of mass deaths of gorillas potentially connected to a spillover of Ebola virus. In Borneo, he shares a biryani lunch with Balbir Singh, an epidemiologist who investigates the spread of monkey malaria into people. In China, he feasts on the stinky durian fruit ("tastes like vanilla custard and smells like the underwear of someone you don't want to know") and helps trap local bats, which in 2003 infected civet cats and then people with the virus that causes SARS. In upstate New York, he helps capture the white-footed mice that harbor the agent that causes Lyme disease. In Cameroon, he traces the putative path of H.I.V.-1, the principal form of the virus, and its first human victims.

A vivid and erudite nature writer, Quammen is even better as a cheeky and incisive chronicler of the scientific method. He describes a scientist's archive of dried blood samples as "DNA jerky," a genetic

Continued on next page

Dr. Philip H. Kass, DVM, MPVM, PhD, **DACVPM** cited in 1 January 2013 JAVMA article titled *Computed tomographic findings in dogs and cats with temporomandibular joint disorders: 58 cases (2006-2011).* **Conclusions and Clinical Relevance**— Results indicated the TMJ disorders were frequently present in combination. Osteoarthritis was the most common TMJ disorder in dogs and the second most common TMJ disorder in cats. Computed tomography should be considered as a tool for the diagnosis of TMJ disorders in dogs and cats with suspected orofacial disorders and signs of pain.

Spillover: Animal Infections and the Next Human Pandemic (cont.)

Continued from previous page

sequence as a "choking expletive" and protective gear for fieldwork as "gleaming white footie pajamas." His leisurely, discursive style, which worked so well in his books on biogeography and top predators, can feel a bit incongruous given the urgency of his topic, though. Dramatic narrations of outbreaks and scientific investigations — replete with regularly scheduled cliffhangers — turn out to be inconclusive, debunked or tangential to the central themes of the book. Whole paragraphs are taken up with lists of minutiae, like one that enumerates the gear he takes on a trip to the Democratic Republic of Congo, including "seven stackable white plastic chairs" and "medical gloves." Quammen doesn't mind repeating himself (he admits it outright, and yes, repeatedly) and can't resist detours into side obsessions, like taxonomy. But even when his writing is not entirely germane, it's almost always fun and morbidly entertaining.

In one of the most powerful passages in the book, Quammen describes a population boom of tent caterpillars that occurred in his town in western Montana in 1993. The caterpillars had "materialized like a plague out of Exodus," he writes. "On those cool June nights, we could stand beneath a great tree and still hear the gentle crackle, like distant brush fire, of their excrement cascading down through the leaves." Then, as abruptly as they'd appeared, they vanished. He later learns that it was a pathogenic virus that led to the tent caterpillars' collapse. Are we humans, he wonders, due for the same fate? Like the tent caterpillars, we too are "grotesquely abundant" on the planet, and our numbers continue to rise. "We are an outbreak," he writes, and prime fodder for a deadly, population–crashing pandemic, the "Next Big One" (or "N.B.O." in Quammen's parlance).

Scary stuff. And yet, while it's true that every time an animal microbe finds its way into a human it gets another opportunity to mutate and adapt to the human body, it's also true that most of the spillover microbes described here remain firmly tethered to their host animals, or have only limited abilities to spread between humans. And as Quammen points out, pathogens can't just rampage unconstrained. To survive, they must balance their disease-causing activities inside the body with their need for that same body to carry them into their next victim, whether it's by coughing, having sex or contaminating the drinking water. Get that balance between transmission and virulence wrong, and even the most infectious micro-organism will die out, never to be heard from again. That's why Ebola is limited in its pandemic potential. So was SARS, which wreaked its havoc by exploiting air travel, before it too burned itself out.

There's a lot more that could be said on this topic, but Quammen seems reluctant to bog down his exuberant storytelling with too much of that pointy-headed technical stuff.

Continued on page 10

Dr. Philip H. Kass, DVM, MPVM, PhD, **DACVPM** cited in 15 February 2013 JAVMA article titled *Oleander toxicosis in equids: 30 cases (1995-2010).* **Conclusions and Clinical Relevance**—Equids with oleander toxicosis frequently had simultaneous gastrointestinal tract, cardiac, and renal problems. Oleander intoxication should be a differential diagnosis for equids with colic in geographic areas where oleander is found, especially when azotemia or cardiac arrhythmias are detected concurrently.

Is the United States Really at Risk for Introduction of Rift Valley Fever Virus? (continued)

Continued from page 6

cause incorporates certain necessary elements for the disease to occur. In the case of RVF, one necessary element is the virus itself. Thus, RVFV would have to be introduced into the United States before there would be sufficient cause to establish the disease. That is, without the introduction of the virus, even if all of the remaining factors are present, the disease still would not occur in animal or human populations in the United States.

One might consider the introduction of malaria into the United States via infected humans as having some similarities to the introduction of RVF. Approximately half the world's population lives in countries where malaria is endemic. Malaria was considered endemic in the southeastern United States prior to the 1950s, and through "improved housing and socioeconomic conditions, environmental management and vector control efforts," malaria transmission in the United States was stopped.[14] However, the mosquitos that are the vectors for malaria are still present in the United States today. The CDC reported in 2012 that 1,691 cases of malaria were reported in the United States in 2010.[14] Overall, 1,688 (99%) of those cases were classified as imported, meaning that they represented cases of malaria acquired outside the United States and its territories. In 65% of the 1,479 imported cases for which the region of acquisition was known, the infection reportedly was acquired in Africa. Importantly, even given the number of malaria cases reported each year, the likelihood that many cases go unreported, the thousands of passengers arriving each year from areas of the world where malaria is endemic, and the presence of competent vectors, there have been, to date, no reported instances of autochthonous transmission of malaria in the United States.

Intentional introduction of RVFV to the human population of the United States would require the introduction of infectious animals or vectors. This type of introduction requires careful planning, including the shipment or transfer of the virus to the United States and the ability to identify victims or vectors to be inoculated with the virus. Thus, the probability of success is not high for intentional introduction as a terrorist act.

Introduction by Vectors

Lastly, introduction of RVFV into the United States via infected mosquitos has also been proposed as a potential pathway. Similarly to the previous pathway, a series of low-probability events would be required for an infected mosquito to initiate an outbreak of RVF in the United States. Mosquitos arriving on aircraft or in cargo are likely to do so in small numbers, and it is likely that not all mosquitos arriving will be infected with the virus. Soon after arrival, infected mosquitos would need to encounter a susceptible host (animal or human) in the vicinity of its arrival location and have a high enough vector competence index to transmit the virus. The susceptible host would then need to become

Continued on next page

Spillover: Animal Infections and the Next Human Pandemic (cont.)

Continued from page 8

"Mathematics to me is like a language I don't speak though I admire its literature in translation," he writes. He often delves into an important aspect of the relevant science, but after impressing us with its technical complexity, he backs off for a side story or a biographical sketch, ending with something along the lines of "nobody really knows" or "it's complicated," as if he would rather dazzle us with the difficulty of the science than help us comprehend it. He practically apologizes for having to describe fundamental concepts like the basic reproduction rate, or "R0" (the number of new infections caused by an initial case), critical community size (the number of susceptible individuals required to sustain transmission of an infectious disease) and the high mutation rate of RNA viruses.

C'mon. Kate Winslet explained R0 in Steven Soderbergh's film "Contagion" in 20 seconds. As "Spillover" so richly details, we're talking about the potential end of the human race here. We can take it.

Sonia Shah is a science writer and the author of "The Fever: How Malaria Has Ruled Humankind for 500,000 Years."
NY Times, October 19, 2012

Is the United States Really at Risk for Introduction of Rift Valley Fever Virus? (continued)

Continued from previous page

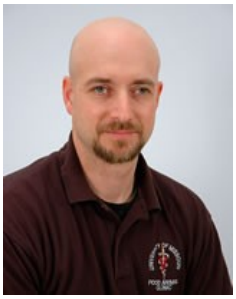
infected, amplify the virus, and transmit it to a local vector, again with a high enough vector competence index to initiate local transmission among animal or human populations.

Likelihood of Introduction of RVFV to the United States

Given the series of low-probability events that would be necessary, the likelihood of natural introduction of RVFV into the United States from countries where the virus is endemic would be negligible during interepidemic periods and low during epidemic periods (ie, during outbreaks). For transmission of RVFV to occur via a human in the United States, a person from a country with an active RVFV outbreak would need to travel from that country to the United States. However, the most important risk factor for human infection is close contact with livestock, such as work in agriculture occupations,[8] and such individuals would generally be unlikely to engage in international travel.

Even if an infected individual were scheduled to travel internationally, he or she would likely postpone the trip if clinically ill. Finally, there is a short window of time for a competent vector to feed on an infectious human (ie, a person with virema) when the person lands on US soil because the viremic period in humans is fairly short. The vectorial capacity equation described by MacDonald[15] includes two

Continued on page 12



Dr. Loren Schultz, DVM, MS, **DACVPM** cited in 1 January 2013 JAVMA article titled *Risk factors associated with cast complications in horses: 398 cases (1997-2006).* **Conclusions and Clinical Relevance**—Results indicated that 49% of horses with a cast developed cast complications.

More Scientists Using Weather Patterns to 'Forecast' Disease Outbreaks (continued)

Continued from page 5

Some diseases are hard to forecast, such as West Nile virus. Last year, the U.S. suffered one of its worst years since the virus arrived in 1999. There were more than 2,600 serious illnesses and nearly 240 deaths. Officials said the mild winter, early spring and very hot summer helped spur mosquito breeding and the spread of the virus. But the danger wasn't spread uniformly. In Texas, the Dallas area was particularly hard-hit, while other places, including some with similar weather patterns and the same type of mosquitoes, were not as affected. "Why Dallas, and not areas with similar ecological conditions? We don't really know," said Roger Nasci of the Centers for Disease Control and Prevention. He is chief of the CDC branch that tracks insect-borne viruses.

Some think flu lends itself to outbreak forecasting - there's already a predictability to the annual winter flu season. But that's been tricky, too. Seasonal flu reports come from doctors' offices, but those show the disease when it's already spreading. Some researchers have studied tweets on Twitter and searches on Google, but their work has offered a jump of only a week or two on traditional methods.

In the study of New York City flu cases published last month in the Proceedings of the National Academy of Sciences, the authors said they could forecast, by up to seven weeks, the peak of flu season.

They designed a model based on weather and flu data from past years, 2003-09. In part, their design was based on earlier studies that found flu virus spreads better when the air is dry and turns colder. They made calculations based on humidity readings and on Google Flu Trends, which tracks how many people are searching each day for information on flu-related topics (often because they're beginning to feel ill).

Using that model, they hope to try real-time predictions as early as next year, said Jeffrey Shaman of Columbia University, who led the work. "It's certainly exciting," said Lyn Finelli, the CDC's flu surveillance chief. She said the CDC supports Shaman's work, but agency officials are eager to see follow-up studies showing the model can predict flu trends in places different from New York, like Miami.

Despite the optimism by some, Dr. Edward Ryan, a Harvard University professor of immunology and infectious diseases, is cautious about weather-based prediction models. "I'm not sure any of them are ready for prime time," he said.

Published January 03, 2013, Associated Press

Drs. Barbara Knust, DVM, MPH, DACVPM and Scott J. Wells, DVM, PhD, DACVPM cited in 1 March 2013 JAVMA article titled *Evaluation of the effects of a killed whole-cell vaccine against Mycobacterium avium susp paratuberculosis (MAP) in 3 herds of dairy cattle with natural exposure to the organism.* Conclusions and Clinical Relevance—Vaccination with a killed whole-cell MAP vaccine appeared to be an effective tool as a part of a program to control the spread of Johne's disease in dairy cattle.

"**Even if you fall on your face, you're still moving forward.**" **-- Victor Kiam,** American businessman

"**The highest reward for a person's toil is not what they get for it, but what they become by it.**" **-- John Ruskin,** British art critic

Position Opening

Department Head/Director, Veterinary & Biomedical Sciences/Animal Disease Research & Diagnostic Laboratory, South Dakota State University

The Veterinary and Biomedical Sciences Department (VBSD) at South Dakota State University invites applications for the position of Department Head and Director of the Animal Disease Research and Diagnostic Laboratory. The University seeks a dynamic individual to provide strong and effective vision and leadership for the department and laboratory. The VBSD is an academic unit of the College of Agriculture and Biological Sciences; the Department Head reports to the Dean of this College. This is a 12-month, administrative appointment that carries an academic rank of Professor in the VBSD.

For a detailed listing of the position responsibilities and requirements, please visit: http://www.sdstate.edu/vs

For questions on the position, please contact Daniel Scholl, Search Chair, at (605) 688-4149 or daniel.scholl@sdstate.edu

To apply, please visit: https://yourfuture.sdbor.edu

Search by the position title, view the job announcement, and click on "apply for this posting." Applications will be accepted until filled, with initial review on March 22, 2013. For questions on the electronic employment process, contact SDSU Human Resources at (605) 688-4128. SDSU is an AA/EEO employer.

President's Commentary…Is the United States Really at Risk for Introduction of Rift Valley Fever Virus?

Continued from page 10

variables of importance to this argument: the human-biting tendency of the vector and its daily mortality rate. Feeding preference is strongly swayed by specific host availability and certain "innate and species-specific properties of the vector" that affect its choice of host.[16]

Vector behavior is on a continuum from total zoophily to complete anthropophily. Therefore, the mere chance encounter of an infected human and a competent vector does not ensure feeding, and feeding does not ensure transmission of the virus to the vector. Even if we assume that transmission of the virus from infectious person to the vector is successful, the vector must survive long enough and again have the appropriate feeding predilection and host availability to transmit the virus to a new susceptible host. We know that to find the probabilities of successive events, we multiply conditional probabilities given the previous event. Given the small conditional probabilities of the individual events required for RVFV transmission from an infected human, the probability of the successive events is smaller yet. Therefore, although transmission is feasible, it is unlikely. The absence of autochthonous malaria transmission in the United States is most likely due to the very same low probability of the necessary series of events for transmission.

Conclusion

Recent research activities on RVFV in the United States and elsewhere have improved our understanding of the epidemiological and virologic characteristics of the disease and virus, respectively. This research has led to implementation of risk-reduction strategies in countries known to have outbreaks and to improvements in monitoring for disease events outside of these countries. Many

Continued on next page

President's Commentary…Is the United States Really at Risk for Introduction of Rift Valley Fever Virus?

Continued from previous page

experts predicted that RVFV would move out of Africa into the Near East, Middle East, and European Union following the outbreak in Egypt in the late 1970s, and the outbreak of RVF in Yemen and Saudi Arabia in 2000 supported that contention. Yet, RVFV has not moved to Europe and would seem even less likely to move to the United States.

Rift Valley fever virus most certainly does not warrant a ranking of fourth on a list of animal disease threats to the United States. If research work in the United States continues on this virus and disease, it should be with the overt objective of assisting areas of the world where the disease occurs and not for the purpose of preventing the highly unlikely introduction of the virus into the United States.

References

1. Pepin M, Bouloy M, Bird B, et al. Rift Valley fever virus (Bunyaviridae: Phlebovirus): an update on pathogenesis, molecular epidemiology, vectors, diagnostics and prevention. Vet Res 2010; 201: 41–61.
2. Chevalier V, Pepin M, Plee L, et al. Rift Valley fever—a threat for Europe? Euro Surveill 2010; 15: 19506.
3. Abdo-Salem S, Waret-Szkuta A, Roger F, et al. Risk assessment of the introduction of Rift Valley fever from the Horn of Africa to Yemen via legal trade of small ruminants. Trop Anim Health Prod 2011; 43: 471–480.
4. Kasari TR, Carr DA, Lynn TV, et al. Evaluation of pathways for release of Rift Valley fever virus into domestic ruminant livestock, ruminant wildlife, and human populations in the continental United States. J Am Vet Med Assoc 2008; 232: 514–529.
5. European Food Safety Authority. The risk of Rift Valley fever incursion and its persistence within the community. EFSA J 2005; 238: 1–128.
6. Regions where rinderpest or foot-and-mouth disease exists; importations prohibited. 9 CFR 94.1.
7. Quarantine requirements. 9 CFR 93.411.
8. Anyangu AS, Gould LH, Sharif SK, et al. Risk factors for severe Rift Valley fever infection in Kenya, 2007. Am J Trop Med Hyg 2010; 83: 14–21.
9. Flick R, Bouloy M. Rift Valley fever virus. Curr Mol Med 2005; 5: 827–834.
10. Meegan JM. The Rift Valley fever epidemic in Egypt 1977–78. 2. Ecological and entomological studies. Trans R Soc Trop Med Hyg 1979; 73: 618–623.
11. Ikegami T, Makino S. The pathogenesis of Rift Valley fever. Viruses 2011; 3: 493–519.
12. Gargan TP II, Clark GG, Dohm DJ, et al. Vector potential of selected North American mosquito species for Rift Valley fever virus. Am J Trop Med Hyg 1988; 38: 440–446.
13. Rothman KJ. Causal inference in epidemiology. In: Rothman KJ, ed. Modern epidemiology. Boston: Little, Brown and Co, 1986; 11.
14. Mali S, Kachur SP, Arguin PM, et al. Malaria surveillance—United States, 2010. MMWR Surveill Summ 2012; 61: 1–17.
15. MacDonald G. The analysis of equilibrium in malaria. Trop Dis Bull 1952; 49: 813–829.
16. Kiszewski A, Mellinger A, Spielman A, et al. A global index representing the stability of malaria transmission. Am J Trop Med Hyg 2004; 70: 486–498.

JAVMA, March 1, 2013