



# Health experts call for unified efforts to face climate issues

One Medicine Symposium focused on potential impact

Human encroachment into uninhabited parts of Southeast Asia exposed people to unusual animals and previously unknown pathogens, and global travel carried a tropical zoonotic disease to Toronto in 2003, Dr. Barrett Slenning told a gathering of public health professionals.

That transmission chain for severe acute respiratory syndrome would have been nearly impossible only a few decades ago, said Dr. Slenning of the Population Health and Pathobiology Department at the North Carolina State University College of Veterinary Medicine.

"Economic globalization and climate change combine to allow people, plants, animals, products, markets, vectors, and contaminants to move very rapidly across the globe, creating a changing mix of biological systems with which we have never had to deal before," Dr. Slenning said, adding that the dynamism of that mix augments the complexity of challenges in animal and human health.

Dr. Slenning made the comments during a presentation Dec. 11 for about 250 public health professionals gathered at the sixth annual One Medicine Symposium in Durham, N.C. The two-day meeting starting Dec. 10 was titled "Earth, Wind, and Fire: a One Medicine Approach to Climate Change."

The symposium's speakers largely agreed that climate change—particularly warming—is occurring, and there was no debate or rebuttal on those points during presentations or Q-and-A sessions.

The AVMA policy on Global Climate Change and Animal Health, which was approved in November 2008, states "climate change has serious far-reaching negative implications for animal and ecosystem health" and it encourages a one-health approach, enhanced governmental response capacity, research, surveillance, and development of educational initiatives related to climate change, animal disease, and animal health.

Steve Cline, DDS, deputy state health director for North Carolina, said in opening remarks for the symposium he thinks it has become clear climate change is occurring, and the debate has shifted from what is causing the change to what can be done to solve its challenges.

New species of fire ants are populating North Carolina, and the state may see more severe weather events, increased risk of food- and waterborne illness, and threats from wildfire, Dr. Cline said. Not all of those can be blamed on climate change, he said, but public health professionals can improve work across disciplines and agencies to find solutions.

Dr. Roger K. Mahr, past president of the AVMA, also called for collaboration to face an environment increasingly affected by climate change. That environment is populated by interconnected humans and animals, and the integrated challenges created by their contact require integrated solutions, he said.

"Animal and public health are truly at a crossroads," Dr. Mahr said. "The convergence of animal, human, and environmental health dictates that the one-health concept must be embraced."

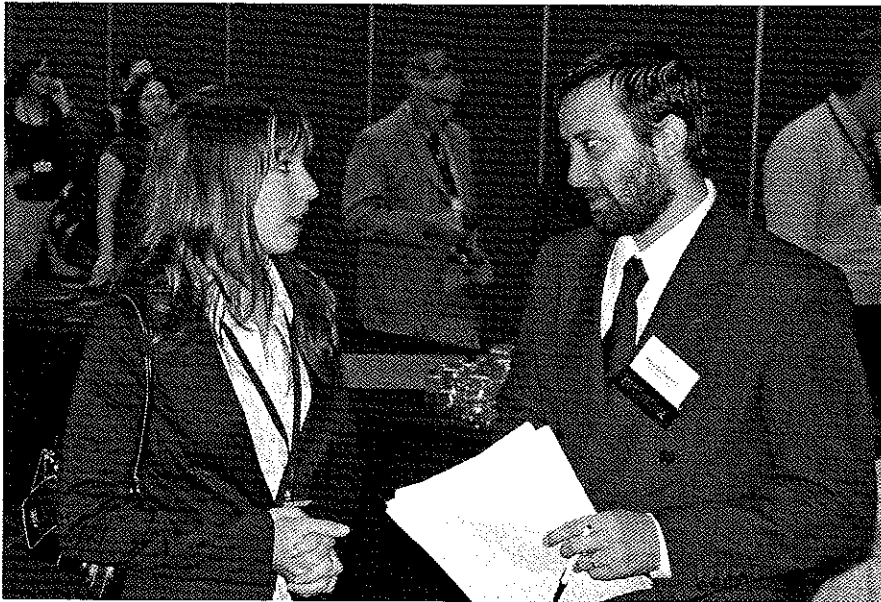
While climate change was the focus of the symposium, some speakers' presentations or portions of their presentations related more to the general need for collaboration across disciplines.

Dr. Slenning said public health has to be recognized as a part of food supply veterinary medicine. Food supply veterinary medicine and animal agriculture, however, are not seen as the public goods they are because food animals, their processing and marketing, and their health delivery systems are privately held.

As a result, federal and state funding of animal health is incorrectly viewed as separate from public health, Dr. Slenning said.

Inadequate funding for animal health work could also put the public health at risk, Dr. Slenning said. He cited an AVMA map that showed U.S. counties with large livestock populations and no identified food animal veterinarians. The AVMA maps of livestock populations and food animal veterinarians are available at [www.avma.org/fsvm/maps/](http://www.avma.org/fsvm/maps/).

"The last time the federal government put any significant money into veterinary medicine was in the '70s," Dr. Slenning said. "Since then, we've had mad cow, we've had SARS, we've had food safety issues, we've had environmental and ecologic issues, on down the line."



Dr. Pablo Beldomenico, a wildlife epidemiologist for the Wildlife Conservation Society, talks with Dr. Maria Baron Palamar, a postdoctoral student in North Carolina State University's Fisheries and Wildlife Sciences PhD program.

Dr. Slenning said internationally sourced food contaminations, West Nile virus' incursion into the United States, and the rapid spread of SARS are examples of such complex issues.

George Luber, PhD, associate director for Global Climate Change in the National Center for Environmental Health in the Centers for Disease Control and Prevention, said the planet will continue warming even if emissions responsible for global temperature rise were to stop instantly.

The change in climate will result in shifts in plant hardiness zones, receding Arctic ice caps, more intense heat waves and cyclones, and increases in harmful algal blooms or "red tides," Dr. Luber said. Increased temperatures and the resulting increase in capacity for the atmosphere to hold water will lead to heavier precipitation.

About two-thirds of waterborne disease outbreaks between 1948 and 1994 were preceded by above-average precipitation events, Dr. Luber said.

Shifts in temperatures can also expand the range of vectorborne diseases, with Lyme disease soon becoming the United States' latest export to Canada, Dr. Luber predicted.

Because of climate change's

impact, public health officials need to help form energy policies, he said.

Dr. Pablo Beldomenico, a wildlife epidemiologist for the Wildlife Conservation Society, said climate change's impact on wildlife is complex, and it is difficult to prove it affects disease spread and severity. There is, however, a great probability some pathogens, their vectors, or both may be favored by climate change.

Vectors such as ticks may move to higher latitudes with increased temperatures, and increased rainfall can help parasites such as nematodes proliferate.

Dr. Beldomenico said climate change can also increase susceptibility of hosts, leading to increased exposure to pathogens through changes in behavior and concentration of animals in some areas. Increased susceptibility to disease may also be caused by impairment of host resistance to infection.

Wild animals live in pathogen-rich environments, and their immunologic systems are constantly challenged, Dr. Beldomenico said. Increased stress in animals leads to a drop in immunocompetence in a cycle that diminishes health.

Most emerging infectious diseases are zoonotic, and Dr. Beldomenico

said 72 percent of those zoonoses have wildlife origins. Humans impact disease spread and prevalence through introduction of domestic animals, invasive species, or environmental stress.

Patricia Tester, PhD, branch chief for the National Oceanic and Atmospheric Administration's Center Coastal Fisheries and Habitat Research Laboratory in Beaufort, N.C., said potential effects of climate change on North Carolina can be seen by examining conditions on the Florida coast and in the Gulf of Mexico. Harmful algal blooms have periodically shut down shellfish harvests because of the risk of neurotoxic shellfish poisoning for humans, and they have caused mass deaths among finfish, marine mammals, and birds.

The most prevalent harmful algal blooms in Florida also cause respiratory tract problems in humans, dogs, cats, and marine mammals, Dr. Tester said.

Kenneth Gage, PhD, supervisory research biologist and chief of flea-borne diseases activity for the CDC, said increased temperatures can also increase the number of generations of vectors—such as mosquitoes—in a year or the number of pathogens carried by those vectors. He said regional changes in temperature, precipitation, and humidity can affect the survival and development of vectors, pathogen development, and transmission dynamics.

"For some of these diseases—like plague, for example—if you get the host level above a certain threshold of density, you're liable to kick off epizootics," Dr. Gage said.

David R. Easterling, PhD, chief of the Scientific Services Division for the National Climatic Data Center of the National Oceanic and Atmospheric Administration, said China and India are rapidly developing their economies, and he does not expect large declines in carbon dioxide production in the next several decades.

Dr. Easterling said global temperatures have increased 0.7 C since the late 1800s, and tropo-

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conjunction with overexpression of Hras, an oncogene commonly over-expressed in a number of cancers in humans, augments tumorigenesis.

Dr. David Caudell focused his work at the NCI on leukemia research in rabbits and mice. Studying the role of chromosomal translocations, Dr. Caudell generated transgenic mice that expressed a CALM-AF10 fusion gene. Almost half the mice developed acute leukemia—providing experimental confirmation that this fusion, isolated from patients with some forms of leukemia, is leukemogenic.

Dr. Caudell said he enjoyed the chance to pioneer the veterinary training program at the NIH. "It's been really great watching the program evolve, watching it grow exponentially."

Dr. R. Mark Simpson, director of the Molecular Pathology Unit within the NCI Laboratory of Cancer Biology and Genetics, was the founder of the training partnerships with the veterinary colleges. He said the NIH institutes benefit from veterinarians' comparative perspectives in problem solving, hypothesis testing, and critical thinking.

Dr. Simpson also received the 2008 Leading Diversity Award from the NCI for recruiting and mentoring African-American veterinarians and veterinary students.

"We have been successful in our ability to include underrepresented minority veterinarians, in large part, due to combined efforts in building a network of supportive programs and people at both the NIH and our veterinary college partners," he said.

Dr. Simpson said the joint training program's ultimate goal is to prepare interdisciplinary, comparative biomedical scientists who will help lead the research teams of the future—opening new synergies to address public health challenges impacting humans, animals, and the environment.

Information is available at [http://ccr.ncifcrf.gov/resources/molecular\\_pathology](http://ccr.ncifcrf.gov/resources/molecular_pathology).

—KATIE BURNS

## AVMA calls for applications to WVA Council



The AVMA is accepting applications and nominations to replace Dr. James E. Nave as the United States representative to the World Veterinary Association Council. The deadline is March 2, 2009.

Dr. Nave has stepped down as the North American councilor after serving nearly six years in that position.

The World Veterinary Association is an international organization that develops policies affecting the veterinary profession and animal health on a global scale. Its constituency consists of national veterinary associations and international specialist veterinary associations.

The council is one of the WVAs governing bodies. It comprises regional veterinary representatives, including two from North America—one from the United States and the other, Canada. The AVMA is responsible for appointing the U.S. councilor.

The WVA Council traditionally meets once a year, but the new president, Dr. Tjeerd Jorna of The Netherlands, is proposing more frequent meetings and more activity of the councilors. For example, the U.S. councilor may be asked to represent the WVA at the United Nations and other organizations in the United States.

Councilors represent collectively and individually their geographic region. Councilors convey the policies of the WVA to their constituency and speak on behalf of the WVA to the region. Councilors partake in the policymaking process of the WVA.

Councilors may also be responsible for developing a relationship with one or more governmental or nongovernmental organizations of interest or with a veterinary professional or scientific specialization.

Councilors can serve a maximum of three three-year terms.

In November 2008, the AVMA Executive Board approved adopting an application form for the councilor position to help the board make informed decisions about who to appoint. The board will make its appointment at its April 2009 meeting.

The WVA councilor application form is available on the AVMA Web site. Inquiries on this position can be answered at (800) 248-2862, Ext. 6605, or by e-mail at [OfficeEVP@avma.org](mailto:OfficeEVP@avma.org).

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spheric temperatures recorded in the past three decades show warming consistent with surface warming. Slightly less warming has occurred in water than on land, but it has occurred at a similar rate, he said.

"The warming is unequivocal," Dr. Easterling said. "We're certain."

Edward Maibach, PhD, director of the Center for Climate Change Communication and a professor at George Mason University in Fairfax, Va., said health professionals have opportunities to help others understand the issues facing them because of climate change. He encouraged attendees to carry to people a message that climate change is real, it impacts them, it can be stopped, and it is caused by humans.

"This is our fight to convince our fellow Americans that global warming is bad for people," Dr. Maibach said.

—GREG CIMA