

**STATEMENT OF
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OF THE
INTERNATIONAL SPECIES INFORMATION SYSTEM**

before the

**SUBCOMMITTEE ON OVERSIGHT OF GOVERNMENT MANAGEMENT,
THE FEDERAL WORKFORCE, AND THE DISTRICT OF COLUMBIA
COMMITTEE ON HOMELAND SECURITY AND GOVERNMENT AFFAIRS
UNITED STATES SENATE**

On

Forestalling the Coming Pandemic: Infectious Disease Surveillance Overseas

October 4, 2007

Mr. Chairman and Members of the Subcommittee:

Thank you for the opportunity to testify on the role that the Zoological Information Management System (ZIMS) can play in providing early warning and surveillance of emerging zoonotic infectious diseases for both the U.S. and other countries. I also am pleased to discuss opportunities for collaboration and cooperation between ISIS and the federal agencies charged with infectious disease surveillance and the critical connection between animal diseases and public health in general.

The International Species Information System (ISIS) is a U.S.-based non-profit that facilitates information exchange between 700 zoo and aquarium member institutions in 73 countries on six continents, including 263 in 47 states in the United States. Honolulu Zoo director Ken Redman sends his regards to you, Chairman Akaka. He would welcome the opportunity to show you what he plans to do with our new program ZIMS at his zoo.

Headquartered near Minneapolis with branch offices in Australia and Amsterdam, ISIS is by far the world's largest zoo and aquarium membership organization. U.S. and international ISIS membership lists and member maps are attached.

ISIS serves as the animal and veterinary global database for zoos and aquariums around the world and collects data on a total population of two million animals representing 10,000 species. ISIS was founded in 1974, and has expanded membership every year since then. ISIS has created a unique international cooperating network of trust with a

long history of sharing animal information across international boundaries. In 2007, ISIS added 40 new members, mostly in Europe. ISIS now covers most accredited zoos in North America, Europe and Australasia, plus a growing number in Asia, Africa, and Latin America. ISIS' expansion continues with the government of India announcing this year that they will be sponsoring 59 Indian zoos to join ISIS.

For thirty-four years, ISIS has designed and delivered four successively sophisticated generations of information technology that support zoos and aquariums in their missions to conserve their collections of living – and increasingly, endangered – animals. ISIS is now completing the next generation: ZIMS, a state-of-the-art, web-based software for zoos and aquariums worldwide that will operate in real-time. ZIMS, a \$25 million effort, has been designed through a massive global collaboration of more than 500 zoo and aquarium professionals through numerous meetings, webinars and e-forums, and is nearly complete. This broad constituency is now helping ISIS test ZIMS and is eagerly awaiting the chance to begin using it when it rolls out worldwide next summer.

Veterinary staff in this global network will use ZIMS daily to record signs, diagnoses, treatments and necropsy findings on more than two million individually tracked animals of 10,000 species. A key feature of ZIMS is that it is designed to meet the day-to-day needs of those entering the information. ISIS participation is voluntary – more than 15,000 veterinary and other staff at zoos and aquariums around the world enter information into ISIS systems every day because it helps them perform their jobs – caring for animals. This is a huge advantage over systems to which people are asked to “report.” Additionally, the new ZIMS data record also will be *the* individual institutional record – there will not be separate record keeping systems. Put another way, a zoo's record-keeping system will be ZIMS. And for the first time in the zoological community, there will be one, global, lifetime, permanent ID number assigned to each animal.

Deleted: everyday

Zoos Standing Watch for Animal – and for Human Health

The zoo community's surveillance for disease outbreaks in our own animal collections is arguably more intense than any other. Zoos must take all appropriate steps to protect their irreplaceable living collections from threatening diseases. Building and adopting ZIMS is an essential step for them to protect their own business and ZIMS supports their missions to help stand watch for disease. It makes sense for us to pool our monitoring efforts a step further and help guard the public against infectious diseases. The Association of Zoos and Aquariums strongly supports ISIS-ZIMS.

Emerging Zoonotic Disease Surveillance

The zoo world is inherently international because animals move constantly from zoo to zoo around the world. Sharing data worldwide with other institutions with the same animals is a critically important best practice for high-quality care of exotic animals. Nowhere on earth is animal health monitored as closely as in zoos and aquariums, and nowhere is international data on those animals shared more than through ISIS. And while Avian Influenza is a current major concern, zoos monitor for all diseases, including

new and emerging ones. What they find will be recorded in ZIMS. Because of this intense monitoring of animal health, zoos and aquariums around the nation constitute an early warning system for infectious diseases.

Diseases in the news like Avian Flu, SARS, Monkey Pox and West Nile Virus are not new – they have existed in animals for sometime. What is new is the way diseases are crossing the species barrier and migrating to humans. As environmental changes occur, the traditional boundaries separating humans from existing diseases also change, opening the door to new human epidemics. Historically, most new epidemics first show up in animals and then migrate to humans.

Zoos and aquariums depend on the health of their animals for their very livelihood. Animals are observed, inspected, and closely monitored many times each day. Veterinary records (animal observations and treatments) are entered daily. In addition, all animals that die on zoo grounds (e.g., birds, squirrels, mice), whether part of a zoo's collection or not, are necropsied by zoo staff.

A renowned example is Dr. Tracey McNamara, formerly of the Bronx Zoo. In the summer of 1999, New York City was plagued by an uncommon sight: dozens of dead crows, found at the Bronx Zoo and throughout metropolitan New York. At the same time, apparently unrelated, elderly patients checked into area hospitals suffering from muscular weakness, fever and confusion. At least seven people eventually died. Dr. McNamara, the zoo's staff pathologist, established a connection between these events and helped to pinpoint the cause: West Nile Virus. The Centers for Disease Control and Prevention credit her with potentially saving many lives. Incidentally, Dr. McNamara currently is an advisor to ISIS on ZIMS.

The zoological community's strength in disease surveillance is that it is looking for the unknown – zoos test everything that dies. It was because of this that the Denver Zoo discovered last May that an eight-year-old hooded capuchin monkey was a victim of the bubonic plague outbreak that was moving through the City Park neighborhood near the zoo. While risk to the public was extremely low, public health officials warned the local population that they should not handle rodents and should keep their pets away from dead squirrels or rabbits.

Year's ago, the Defense Advanced Research Projects Agency (DARPA), the central research and development organization for the Department of Defense, recognized that zoos could be an integral part of any biodefense surveillance network. However, there has not been the opportunity to enlist the zoological community in a proactive and integrated way until now with ZIMS.

Unfortunately, the overwhelming majority of disease surveillance focuses solely on human patients, despite the fact that in all significant outbreaks of new diseases over the past decade or more in North America, animals were the first victims. The largest and most economically significant disease outbreaks among humans had animal sources. All of the CDC's Class A and Class B bioterrorism diseases (with the sole exception of

smallpox) are animal diseases. Thus, it is highly likely that if there ever is a large-scale bioterrorism event, animals will almost certainly become ill in large numbers and probably display classic syndromes recognized easily by the veterinary community. It is certainly not enough to watch for outbreaks only in the human population and we applaud the Subcommittee for recognizing the critical relationship between animal and human health.

The Power of ZIMS for International Biosurveillance

Until ZIMS, the mechanisms by which the wild animal veterinary community tracks emerging zoonotic diseases internationally were extremely limited, scattered, and anecdotal in nature. ZIMS will transform this loose network into a unified global database. The state-of-the-art, web-based architecture of ZIMS means that hard data entered into the system on its secure web server is immediately accessible to authorized users.

Clearly, there is enormous potential for rapid epidemiological monitoring and analysis. ZIMS has the capacity to alert us the same day of unusual signs or outbreaks in cities across the world. ZIMS allows a new, unprecedented level of real-time, international data sharing among 700 ISIS institutions with more than 15,000 zoological professionals who are daily monitoring the health of their animals. To our knowledge, there are no other multi-national, real-time veterinary or human medical information or surveillance systems of this scope today. ZIMS is unique.

ISIS Relationships with U.S. and International Agencies

ISIS has long-standing relationships with several federal agencies, including the U.S. Fish and Wildlife Service (USFWS), National Institutes of Health, NOAA's National Marine Fisheries Service and the National Science Foundation. For example, the USFWS uses our animal records as the "gold standard" in applications for Convention on International Trade of Endangered Species (CITES) import and export permits and captive-bred wildlife permits.

Early on, ISIS recognized the importance of ZIMS' biosurveillance potential and took the initiative to include U.S. government agencies such as the Department of Homeland Security - National Biosurveillance Integration Center (NBIC), Centers for Disease Control and Prevention, Department of Agriculture (Animal and Plant Health Inspection Service), Department of Defense, Department of State, and others in design meetings and discussions about ZIMS.

Currently we are working with NBIC officials to design a framework for sharing ZIMS data. This will assist the Agency in meeting its wildlife disease surveillance and monitoring requirements under Homeland Security Presidential Directives 9 and 10, and its obligation under its authorizing legislation to seek private sources of surveillance, both foreign and domestic, when such sources would enhance coverage of critical surveillance gaps. ISIS will provide NBIC with appropriate access to ZIMS, including outputs from

ZIMS for incidence report resolution, and/or broad epidemiological analysis in identifying disease and biological threats to the animal and human populations whether as a result of bioterrorism or naturally occurring. To date, ISIS has shared ZIMS data standards and its data model – an enormous ISIS investment in time and development funds – to jumpstart technical coordination with NBIC. NBIC officials also participated in a recent ISIS-sponsored workshop hosted by the Smithsonian’s National Zoological Park to develop ZIMS data access and data privacy policies and protocols.

ISIS is looking forward to DHS’ support to expedite training and implementation of ZIMS in 25-plus key U.S. metropolitan centers and several key institutions abroad. The current working list of these metropolitan areas is attached. We are also hoping for DHS support to hire staff to watch for and interpret data patterns appearing in ZIMS and act as a liaison between NBIC and ISIS members, and to adapt extant computer algorithms to automatically scan the volume of data pouring into ZIMS and look for potential outbreak patterns in space and time.

ISIS looks forward to deepening its relationship with NBIC, and to establishing closer ties with the other federal agencies represented here today. ISIS would welcome anything the Subcommittee can do to support and encourage our efforts with U.S. government agencies.

Internationally, we have met and engaged with the World Organization for Animal Health (OIE), which sent a representative to our recent workshop, several European Union agencies, including the newly established European Centre of Disease Prevention and Control in Stockholm, Department for Environment, Food and Rural Affairs in the United Kingdom, and others. We are exploring useful links with the wild bird Avian Influenza monitoring project run by the Wildlife Conservation Society (WCS), called GAINS. WCS is an ISIS member and has contributed \$100,000 to the ZIMS project, and has expended an equivalent amount in-house in preparation for data conversion to ZIMS. ISIS is committed to building even stronger connections with relevant U.S. and international agencies. All of these agencies and organizations have realized how unique the ISIS global network is, and how powerful ZIMS biosurveillance will be.

Current ZIMS Funding

To date, ZIMS represents a \$25 million effort, not counting several million dollars in professional time and travel donated by scores of veterinarians and other users during the design process. \$8 million in ZIMS design and development costs have been invested to reach our current “testing prior to release” phase. ISIS member zoos and aquariums are mostly non-profit organizations and as such are far more likely to ask for pledges, than to make them. Nonetheless, 143 members made significant pledges totaling over \$4 million to start ZIMS software development – testimony of the community’s strong commitment and confidence in the promise of ZIMS. ZIMS also has received:

- \$1.5 million from the David and Lucile Packard Foundation;
- \$1.2 million from re-allocating ISIS operating budgets;

- \$500,000 through CDC;
- \$500,000 from the Institute for Museum and Library Services; and
- \$300,000 from the National Science Foundation.

Furthermore, our software development vendor, CGI Inc., is donating an additional \$17 million in technical assistance to ZIMS.

Realizing the Full Potential of ZIMS

The direct obstacle to full deployment of ZIMS worldwide is funding. There is strong interest in ZIMS in developing regions of the world, and we have done considerable outreach. For example, ISIS currently has Board members from Latin America, Africa, and Asia, as well as North America, Europe, and Australasia, and we are working closely with regional zoo associations on all the continents.

To be successful in expediting and expanding the ISIS-ZIMS early warning network around the globe, ISIS needs funding to provide in-region training and translate ZIMS into additional languages (currently ZIMS is already in English, Spanish, and Japanese, and we have plans for German, French, Italian, Russian, Hebrew, Thai, Indonesian, and Chinese-Mandarin). Funding also is needed to cover annual ISIS membership dues (averaging \$2,000 per year) for the several hundred zoological institutions in these regions, which are not yet ISIS members and lack the resources to join. ISIS could accomplish complete global membership for approximately \$2 million per year.

ZIMS has come a long way in realizing its potential as an early warning and surveillance system for zoonotic diseases, but we have more to accomplish.

I thank you again for this opportunity to testify about the great domestic and international biosurveillance potential of ZIMS to identify emerging health threats. I look forward to answering any questions that you may have.