SCWDS BRIEFS

A Quarterly Newsletter from the
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HPAI and Wild Birds

A highly pathogenic avian influenza (HPAI) virus (H5N1) recently has been reported among domestic poultry in Cambodia, China, Indonesia, Japan, Laos, South Korea, Thailand, and Vietnam. This virus also has been responsible for 23 confirmed human cases, including 18 deaths. A report on this outbreak is available through the Morbidity and Mortality Weekly Report (MMWR 53:97-100) from the Centers for Disease Control and Prevention (CDC), which can be accessed through their website (www.cdc.gov).

Associated with this outbreak are increasing but unconfirmed reports of HPAI mortality in wild birds, which has raised questions relating to both direct wild bird mortality and the possibility that wild birds could be involved in the maintenance or transmission of this virus. Although there is no direct evidence to support either possibility at this time, two events during the last 2 years suggest that we might want to keep an open mind. The first and most recent event is the isolation of an H5N1 virus from a peregrine falcon found dead in Hong Kong during January 2004. The second event occurred during the winter of 2002-2003, with confirmed outbreaks of an H5N1 HPAI in two waterfowl parks in Hong Kong. During these outbreaks, mortality was documented in captive wild ducks and flamingos and in free-flying gray herons and a black-headed gull.

It is well established that wild birds represent the reservoir for avian influenza viruses (AIV) worldwide. This is especially true for numerous species in the orders Anseriformes (ducks, geese, and swans) and Charadriiformes (shorebirds, gulls, and terns), from which a diversity of influenza viruses has been isolated. These viruses have included all of the currently known AIV hemagglutinin (H) and neuraminidase (N) subtypes that are used to classify these viruses. AIV is transmitted within these avian populations through a fecal/oral transmission route via cloacal shedding of virus and by contaminated water. Infection rates in wild birds are dependent on season, location, age, and species. In North American ducks, for example, high infection rates (which can exceed 30%) are primarily associated with juvenile mallards during pre-migration staging in late summer, when birds are migrating from northern breeding areas. With shorebirds, consistent isolations of AIV have been reported only from ruddy turnstones during spring migration stopovers at Delaware Bay. In short, the epidemiology of these viruses in wild birds is complex and dependent on behavior as well as species susceptibility to infection.

AIV diversity within these populations also presents a complex picture with regard to both subtype and virulence. Subtype diversity in wild bird populations does not occur randomly. In duck populations in North America, for example, H3, H4, and H6 subtypes represent the majority of isolates, and this has been a consistent finding for more than 30 years. The H5 and H7 AIV subtypes have been isolated from wild birds, but they are uncommon and, with a single exception, have been nonpathogenic viruses. HPAI H5 and H7 viruses from wild birds are extremely rare, *if they exist at all*. Of the thousands of viruses isolated from wild birds worldwide, only one has been previously associated with either domestic or wild bird mortality. This virus, an H5N3, represented the first AIV reported from a wild bird species and was responsible for mortality in common terns in South Africa in 1961. It is relevant to point out that there is no evidence that this particular virus persisted in any wild bird population following this single outbreak, and its origin remains unknown. There are no reports of direct transmission of any AIV from wild birds to humans.

There are some unique observations associated with the Hong Kong waterfowl park outbreaks that deserve attention. At these waterfowl parks, mortality attributable to a HPAI virus (H5N1) was reported from numerous species of ducks and geese. Although captive, these species represent a group of wild birds (ducks and geese) that have not been previously associated with clinical disease or mortality attributable to AIV infection. In addition, HPAI mortality was documented in captive flamingos and from several free-living birds, including gray herons and a black-headed gull. This is not the first time that an AIV has been isolated from gray herons or black-headed gulls, but, as with ducks, it is the first time that mortality was associated with infection.

With influenza the basic rule is "never say never." The current H5N1 HPAI outbreaks in domestic poultry in Southeast Asia, the zoonotic potential of this virus, unconfirmed reports of wild and zoo bird mortality associated with this virus, and previous reports of wild bird mortality associated with a closely related H5N1 virus in Hong Kong certainly deserve attention. Mortality associated with the HPAI outbreaks in the Hong Kong waterfowl parks indicates that some H5N1 HPAI viruses may be pathogenic to some species of wild birds. However, these results provide little insight into either transmission or maintenance of HPAI in wild bird populations or transmission between wild and domestic avian populations. These unfolding events dramatically underscore the need to further understand the epidemiology of AIV in our wild bird populations and to identify mechanisms for both interspecies transmission and the emergence of HPAI viruses. (Prepared by David Stallknecht)

BSE Investigation Completed

On December 23, 2003, U.S. Secretary of Agriculture Ann Veneman announced a "presumptive positive" case of bovine spongiform encephalopathy (BSE) in a dairy cow from the state of Washington. This diagnosis was confirmed by the BSE World Reference Laboratory in Weybridge, England, on December 25. Since this first diagnosis of BSE in the United States, numerous efforts have been undertaken to determine the source

of BSE in this animal, to identify any other animals that may have BSE, and to assure citizens and trade partners that cattle and their products from the United States are safe.

The USDA's Animal and Plant Health Inspection Service (APHIS) investigation of BSE in the United States has been transparent, with regular updates of the investigation available at the APHIS website (www.aphis.usda.gov). Additional information at this website includes background data on BSE, measures taken in the United States to safeguard human and domestic animal health, and the findings and recommendations of the U.S. Secretary of Agriculture's Foreign Animal and Poultry Disease Advisory Committee's Subcommittee on the U.S. Response to the Detection of a Case of Bovine Spongiform Encephalopathy. This international subcommittee evaluated the epidemiological and associated investigations surrounding BSE in the United States, as well as the scope of policy options and measures undertaken or being considered to address the newly recognized BSE situation that exists in North America.

On February 9, 2004, APHIS issued a "Final BSE Update," announcing that the field investigation of the case of BSE in the Washington cow had been completed. The following details were gleaned from this report:

- The epidemiological tracing and DNA evidence proves that the BSE-positive cow slaughtered in the State of Washington on December 9, 2003, was born on a dairy farm in Alberta, Canada, on April 9, 1997. The cow was moved to the United States in September 2001, along with 80 other cattle from that dairy.
- The epidemiological investigation to find additional animals from the source herd resulted in 189 investigations, leading to complete herd inventories on 51 premises in Idaho, Oregon, and Washington. The inventories involved identification of more than 75,000 animals. All herd inventories have been completed and appropriate analysis of those inventories have been performed. There are no premises remaining under hold order.
- A total of 255 "Animals of Interest" were identified on 10 premises in Idaho, Oregon, and Washington. "Animals of Interest" are defined as animals that were - or could have been - from the source herd in Alberta, Canada. All 255 animals were killed, and BSE testing was negative on all of them.
- Included in the 255 animals of interest were 28 identified back to the group of 80 cattle that entered the United States with the index cow. Guidelines on BSE issued by the World Organization for Animal Health state that animals born on a premises within 1 year (before or after) of a BSE-affected animal should be considered of greater risk to the country reporting the BSE detection. As such, USDA has focused on 25 of the 81 animals also born into the birth herd of the index animal and has located 14 of these animals, including the index cow.
- The USDA feels confident that the remaining animals represent very little risk. Even in countries like the United Kingdom, where the prevalence of BSE has been very

high, it is uncommon to find more than one or two positive animals in a herd. Any of these animals showing nervous system disorder - or any that are nonambulatory at the time of slaughter - will be condemned and not allowed into the human food chain. Any animals slaughtered after January 12, 2004, will have the specified risk materials (SRMs) removed and not allowed into the human food chain. The SRMs are those tissues or portions of the carcass likely to contain the infectious agent in an infected animal. And, finally, the United States has had an effective feed ban in place for over 6 years, thus preventing the transmission of the disease to other animals.

CWD Proposed Rule Published

On December 24, 2003, the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) published a Proposed Rule in the Federal Register regarding a chronic wasting disease (CWD) herd certification program and interstate shipping requirements for captive deer and elk. Publication of the Proposed Rule is the result of cooperative efforts that began in 1998 and have involved APHIS, the United States Animal Health Association, the North American Elk Breeders Association, the North American Deer Farmers Association, state animal health agencies, state wildlife management agencies, and others.

The goals of the proposed herd certification and interstate shipping programs are to eliminate CWD from captive deer and elk and to prevent interstate movement of deer and elk that pose a risk of spreading CWD. The proposed certification program is voluntary for captive cervid owners, but only those participating in the program would be allowed to ship captive deer or elk interstate. Captive cervid owners can enroll in the federal program or in a state program with requirements determined by APHIS to be equivalent to those of the federal program. Participating herd owners would have to follow requirements for individual animal identification, CWD testing, herd management, and movement of animals into and out of herds. States are free to implement regulations that are more stringent than those of the proposed federal program and many already have done so. Captive cervid herds that have been enrolled in state programs may be "grandfathered" into the proposed program if the state requirements meet or exceed those of the federal program.

Some of the key elements of the proposed CWD certification program and interstate shipping regulations for captive deer and elk include:

- Perimeter fencing that prevents ingress or egress of cervids
- Immediate reporting and CWD testing of all animals 16 months of age or older that die or are killed
- Maintenance of accurate herd inventory, acquisition, and disposition records
- Two forms of approved individual animal identification
- On the anniversary of enrollment, herd status would be upgraded by 1 year, i.e., after 12 months, a herd would attain "second year status," and so on

- Reversion to the source herd status when a herd acquires animals from a herd of lower status
- Herd certification after 5 years of enrollment in the program with no evidence of CWD infection or exposure
- CWD testing of only those animals over 16 months of age that die (and are not slaughtered or shot on hunting premises) after certification status has been attained
- Loss or suspension of herd status if a herd is designated as CWD-positive or CWD-exposed

- Development of a herd plan acceptable to APHIS, the state agency, and the captive cervid owner in response to CWD infection or exposure of a herd
- Interstate shipping after 12 months of participation for herds that are enrolled when the rule is adopted
- Extension by 12 months of the participation period required prior to shipping each year after the rule's adoption, for the first 5 years
- Inclusion of free-ranging deer and elk under the authority of state wildlife management agencies in the definition of "captive cervid" when they are captured for interstate translocation
- Free-ranging cervids captured for translocation across state lines must come from a population certified to be CWD-free, based on a surveillance program approved by the receiving state and by APHIS

The comment period for the Proposed Rule is open through February 23, 2004. The entire rule and information regarding the comment process can be found through the APHIS CWD website at www.aphis.usda.gov (Prepared by John Fischer)

Another BIG Year for West Nile Virus

Since West Nile virus (WNV) was first recognized in the United States in 1999 the geographic distribution of the virus has spread progressively, and the resulting morbidity and mortality associated with human, equine, and wildlife infection has increased. For a comprehensive and concise review of the virus and disease see SCWDS BRIEFS Vol. 15, No. 3 (www.scwds.org) or visit the website of the Centers for Disease Control and Prevention (www.cdc.gov).

The 2002 and 2003 WNV epidemics will go on record as being the largest recognized arboviral meningoencephalitis epidemics in the Western Hemisphere and the largest West Nile meningoencephalitis epidemics ever recorded. In 2002, significant human disease activity was recorded in Canada for the first time, and WNV transmission also was documented in the Caribbean basin and Mexico. Additionally, in 2002 four novel routes of WNV transmission to humans were documented: (1) blood transfusion, (2) organ transplants, (3) transplacental transfer, and (4) breast-feeding. Although it still is not known when or how WNV was introduced into North America, international travel of infected persons to the New York vicinity, importation of infected birds or mosquitoes, and migration of infected birds are considered possibilities.

Nationwide surveillance data reported to CDC between January 1 and November 25, 2003, showed that during 2003, a total of 9,136 human cases of WNV infection were reported from 45 states and the District of Columbia. There have been 228 human deaths attributable to WNV infection. Four states (CO, NE, SD, and TX) have accounted for 66% of the total number of confirmed human cases and more than half of the fatalities during 2003. There have been 737 presumptive West Nile viremic blood donors reported to CDC.

Many states continue to use dead birds, mosquito testing, or sentinel animals, either in combination or singly, to detect WNV. Through November 2003, 11,350 dead wild birds with WNV infection were reported from 43 states and the District of Columbia. A total of 7,725 WNV-positive mosquito pools have been reported from 38 states and the District of Columbia. Additionally, WNV seroconversions have been reported in 1,377 sentinel chicken flocks from 15 states and in 61 sentinel horses in 4 states.

WNV infections in non-sentinel animals also have been reported to the CDC. WNV has been detected in horses (4,146), dogs (30), squirrels (17), and a cat from 41 states. In the United States, only four states (AK, HI, NE, and OR) have remained entirely free of WNV infection since the appearance of the virus in North America. The complete CDC report on nationwide surveillance can be accessed on the CDC website. These data are preliminary; a final report with confirmed results will become available in spring 2004.

Recently, Dr. L.E. Austgen and associates at Colorado State University, collaborating with the CDC, investigated the response of domestic cats and dogs to experimental WNV infection. The results of their study ("Experimental Infection of Cats and Dogs with West Nile Virus") was published in the January 2004 issue of *Emerging Infectious Diseases*, 10(1):82-86. In summary, domestic dogs and cats were exposed to WNV via infected mosquito bite. A second group of cats was exposed to WNV by ingestion of infected mice. The results of this study demonstrated that domestic dogs and cats are readily susceptible to WNV infection. Infected dogs did not exhibit clinical signs of disease; however, three of the four cats infected by mosquito bite showed mild, nonspecific signs of disease (lethargy and decreased appetite). All animals recovered. This study suggests that WNV does not pose a significant morbidity or mortality factor for dogs and cats. However, it must be remembered that animals that have an underlying health condition and/or a compromised immune system have a higher risk of developing clinical disease following WNV exposure.

SCWDS continues to conduct WNV surveillance among wild birds and mosquitoes in Georgia in collaboration with the Georgia Department of Human Resources' Division of Public Health (GDHR-DPH) and among wild birds in West Virginia in collaboration with the West Virginia Department of Health and Human Resources (WVDHHR). Data from these collaborative studies, as they pertain to WNV, are included in the CDC reports.

During 2003, 6,228 mosquito pools and tissue samples from 2,138 dead birds

submitted by Georgia county health departments were evaluated at SCWDS for WNV infection. West Nile virus was detected in 477 dead birds submitted by the GDHR-DPH. Other viruses detected in birds submitted through GDHR-DPH include eastern equine encephalitis virus (EEEV) in 14 birds and Highlands J virus (HJV) in 3 birds. West Nile virus was isolated from 106 mosquito pools submitted by the GDHR-DPH. Other viruses detected in mosquito pools include EEEV (1), Cache Valley virus (4), Flanders virus (15), Keystone virus (1), and Potosi virus (1). West Nile virus was isolated from 45 of 706 wild birds submitted by WVDHHR in 2003. Additional viruses detected were EEEV (2) and Flanders virus (1).

In addition, tissue was analyzed for WNV from 107 individual animals submitted to the SCWDS Diagnostic Laboratory from our cooperative states as clinical cases during 2003. States from which samples were analyzed were FL (6), GA (48), KS (10), KY (1), LA (1), MD (1), NC (1), SC (19), TN (5), VA (4), and WV (11). West Nile virus was isolated from two American crows and a pied-billed grebe submitted by the Georgia Department of Natural Resources (GDNR), from a fox squirrel submitted by the Kansas Department of Parks and Wildlife, and from a red-shouldered hawk and a bald eagle submitted by the South Carolina Department of Natural Resources, Division of Wildlife and Freshwater Fisheries (SCDNR). In addition, EEEV was isolated from a wild turkey submitted by the GDNR and from a red-shouldered hawk submitted by SCDNR.

As in previous years, CDC suggests that the risk for human and domestic animal infection with WNV may be minimized by surveillance, the use of personal protective behaviors, along with sustained and integrated mosquito control. (Prepared by Danny Mead)

Brucellosis in Wyoming Cattle

Two cattle herds in Wyoming recently were confirmed to be infected with brucellosis, which will result in loss of the state's Brucellosis Free Status, according to the Brucellosis Uniform Methods and Rules (UM&R) of the USDA's Animal and Plant Health Inspection Service (APHIS). The first infected herd was found in Sublette County in late 2003. Although the source of infection for the Sublette County herd has not been confirmed, transmission from free-ranging elk is suspected because the cattle herd had not received any purchased additions in more than 30 years and the premises was adjacent to a state elk feeding ground used by wild elk known to be infected with *Brucella abortus*.

Brucellosis initially was detected in November 2003 in four cattle from the herd that had been shipped to Nebraska for slaughter. Subsequent testing of the entire source herd confirmed infection in 31 of 391 cattle. The 31 infected animals were euthanatized and necropsied, 105 heifer calves were spayed, and the remaining herdmates were shipped to slaughter. Epidemiological investigations traced cattle from the Sublette County herd to a herd at a feedlot in Washakie County where infection subsequently was confirmed in 6 of 12 cattle tested, all of which originated from the Sublette County index herd.

Brucellosis is a bacterial disease of ungulates that results in persistent

infections and causes abortion. There is no effective treatment for infected animals. Among livestock, *Brucella* bacteria are transmitted by direct contact with infected animals or with an environment that has been contaminated with discharges from infected animals, particularly during abortion or calving. Brucellosis in livestock has almost been eradicated from the United States due to control efforts that began in the 1930s by APHIS and state animal health agencies. However, brucellosis in bison and elk in the Greater Yellowstone Area has been a well-recognized problem for many years.

Humans also are susceptible to infection with several species of *Brucella* bacteria. Currently, most human infections in the United States are acquired via consumption of unpasteurized milk from infected goats. Human infection, or "undulant fever," is characterized by fever, headache, weakness, profuse sweating, arthritis, and other symptoms. Long-term (6 weeks) antibiotic therapy is the treatment of choice and relapses may occur due to the intracellular sequestration of the bacteria.

The finding of two positive herds within a state within a 2-year period results in reversion from Free Status to Class A Status, according to the UM&R. The loss of Free Status for Wyoming will not occur until APHIS has published official notification in the Federal Register; however, some states already have placed some import restrictions on Wyoming cattle. The states of California, Colorado, Nebraska, and South Dakota now require testing for cattle coming from Wyoming that are not destined for slaughter. Wyoming can regain its Brucellosis Free Status by complying with Class A Status provisions for 1 year, providing no new infections are found. Class A Status provisions include testing of all test eligible cattle within 30 days prior to change of ownership. Only two other states, Missouri and Texas, currently have Class A Status; all other states have Brucellosis Free Status. (Prepared by John Fischer)

Contributions for CWD Work

The Southeastern Wildlife Health Development Fund, which provides financial support to SCWDS, is supported by donations from individuals and organizations that believe wildlife health is a measure of environmental quality. The Fund recently received donations from three new benefactors, as well as from some old friends. During the autumn and winter of 2003, SCWDS received generous contributions from the Rocky Mountain Elk Foundation, the Alabama Wildlife Federation, and the Louisiana Wildlife Federation in support of work on chronic wasting disease (CWD) being conducted at SCWDS. These donations provide financial assistance for CWD tests performed on free-ranging deer and elk in SCWDS member states. During the 2002-2003 hunting and testing season, SCWDS tested approximately 9,000 wild deer and elk, and projections for the current season exceed 12,000 animals. We are happy to report that all results available to date have been negative. Although actively involved in surveillance, SCWDS does not conduct CWD research.

The Rocky Mountain Elk Foundation (RMEF) is an international, mission based, nonprofit wildlife habitat conservation organization with more than 132,000 members. Missions of RMEF,

which is celebrating its 20th anniversary in 2004, are to: (1) conserve, restore, and enhance natural habitats; (2) promote sound management of free-ranging elk, which may be hunted or otherwise enjoyed; (3) foster cooperation among federal, state, and private organizations and individuals in wildlife management and habitat conservation; and (4) educate members and the public about habitat conservation, the value of hunting, hunting ethics, and wildlife management. More information about RMEF can be found at www.rmef.org.

The Alabama Wildlife Federation (AWF) is the oldest and largest nonprofit conservation organization in Alabama. It was founded by sportsmen in 1935 to promote the conservation and wise use of Alabama's wildlife and natural resources as a basis for the social and economic prosperity of present and future generations through responsible stewardship of wildlife, forests, fish, soils, water, and air. Current membership in the AWF is more than 21,000. More information about AWF can be found at http://alabamawildlife.org. The generous donation received from the AWF would not have been possible without the assistance and encouragement of the Alabama Department of Conservation and Natural Resources (DCNR). The Alabama DCNR is one of the original members of SCWDS and has always been a strong supporter.

The Louisiana Wildlife Federation (LWF) is that state's leading organization of sportsmen and conservationists with more than 30 state and local-affiliated clubs and over 13,000 members. It represents a broad constituency of hunters, fishers, campers, birders, boaters, and other outdoor-oriented citizens. The goals of the LWF are to conserve the natural resources of Louisiana, with particular emphasis on fish and wildlife and their habitats, to protect the rights of Louisiana citizens to enjoy these resources in accordance with scientifically based resource management policies, and to accomplish these goals primarily through education and advocacy. More information about the LWF can be found at www.lawildlifefed.org. The Louisiana Department of Wildlife and Fisheries (DWF) was instrumental in facilitating the generous donation that the LWF made to the Development Fund. Like the Alabama DCNR, the Louisiana DWF is a founding member of SCWDS and has been a strong SCWDS supporter since 1957.

We are very grateful for the contributions that these organizations and others, such as the Camp-Younts Foundation and the Arcadia Wildlife Preserve, Inc., have provided to assist SCWDS with wildlife health issues, including CWD, avian vacuolar myelinopathy, mortality causes among endangered Key deer, and others. Please consider supporting SCWDS by making a gift or by providing information about SCWDS and our commitment to wildlife health to individuals and organizations that support wildlife conservation projects. To learn more about the Southeastern Wildlife Health Development Fund, visit the SCWDS website at www.scwds.org or contact our Director, John Fischer, at 706-542-1741. (Prepared by John Fischer)

SCWDS BRIEFS Electronically

A considerable number of our subscribers responded to our offer last

quarter to change their names from our snail mail list to a list of those who wish to receive the BRIEFS electronically. The BRIEFS can be accessed on the SCWDS website (www.scwds.org) at least a week before copies are received in the mail. If you wish to be included, just send an email to gdoster@vet.uga.edu and we will inform you each quarter when the latest issue is posted on our website.

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Information on SCWDS and recent back issues of SCWDS BRIEFS can be accessed on the internet at www.scwds.org