Nevada Dept. of Agriculture
First Annual Report on Avian Influenza Surveillance in Nevada

Introduction:

Avian Influenza is caused by Avian Influenza Viruses (AIV), a group of viruses which is both omnipresent and very diverse. A large number of wild birds carry the virus in their gastro-intestinal tract and rarely become sick. Influenza viruses infect a large number of different species, including birds, humans and a lot of domestic animals, both livestock and companion animals. In waterfowl and shore birds, the prevalence of AIVs has been shown to vary between 2 and 15%. Different species harbor different types of viruses. Influenza viruses are characterized by two dominant surface proteins, Hemaglutinin and the Neuraminidase. To date 16 different Hemaglutinin genes (H1 – 16) and nine different Neuraminidase genes (N1-9) have been identified. Viral nomenclature reflects the presence of these different subtypes, e.g. H5N1. The genome of AIV consists of 8 fragments which can recombine if two viruses infect the same host, thus making this group of viruses the most highly variable. Most AIVs cause minor morbidity and very little or no mortality in avian species.

Only AIVs containing genes for H5 and H7 have been shown to have the ability to mutate into a highly lethal virus in domestic poultry. The currently circulating strain of H5N1 most likely developed in domestic poultry in South East Asia, and then was spread into wild bird populations. Because of its geographic origin it is referred to as the “Asian H5N1” or the “Asian Bird Flu”. Wild birds infected with this virus very rarely develop severe disease. The Asian H5N1 virus is strictly an avian disease. Despite the fact that more than 200 people have been hospitalized and 100 have died from an infection with Avian H5N1 virus since 1997 it should not be considered a human disease at this point. Bearing in mind that hundreds of millions of people have been in contact with this virus the disease incidence is extremely low, albeit the mortality rate in the affected individuals very high. More than 200 million head of poultry have been culled in South East Asia and thousands of poultry workers were exposed to sick birds. There is not a single reported case of disease in a poultry worker who was involved in depopulation, clean up and disinfection.

Surveillance for Avian Influenza has been in place in the US for many years. Domestic poultry in this country is tested regularly. If a H5 or H7 virus is detected, state veterinary diagnostic laboratories send these samples for pathogenicity testing to the National Veterinary Services Laboratory (NVSL) in Ames, IA. Not every AIV which contains the H5 or H7 gene is highly pathogenic. Only a biological characterization using *in vivo* testing of the virus in embryonated eggs, chicks or adult chickens can the pathogenicity be determined. Only this type of testing determines if an AIV will be classified as a highly Pathogenic Avian Influenza Virus “HPAI” or a low pathogenic avian influenza virus “LPAI”.

Nevada Surveillance 2005 and 2006:
Since May 1st, 2005 the Animal Disease and Food Safety Laboratory (ADL) at the Nevada Department of Agriculture in cooperation with other State, County and Federal agencies has conducted Avian Influenza Surveillance in wild bird populations. The ADL is certified by USDA to conduct official testing for Avian Influenza viruses. The test consists of multiple steps. The first step determines if a specimen contains an Avian Influenza A virus based on the detection of the genetic material for the matrix protein, a structural protein highly conserved in this viral group. If this genetic material is detected, subsequent tests are performed to determine if this virus contains the genes for either H5 or H7. If neither one of these Hemaglutinin genes is present no further action is warranted.

A total of 312 birds from 15 different species were tested for Avian Influenza in Nevada since May 2005. These submissions came from 8 counties in Nevada and are a subset of the 576 birds which were submitted to the ADL for arbovirus testing. All the birds which were tested were waterfowl or shorebirds, a group of birds which has been shown to harbor avian influenza viruses. In March of 2006 five healthy American Coots from Clark County tested positive for AIV on the matrix test. The Avian Influenza virus did not contain a H5 or H7 gene. This finding was expected.

Where do we go from here…
Surveillance for AIVs in wild bird populations in Nevada is a routine procedure. Starting this summer State and Federal agencies together with their collaborators on county and municipality levels will significantly increase surveillance numbers throughout the state. The Nevada Department of Wildlife has taken the lead in developing a state wide surveillance system based on flyway patterns, species susceptibility and prevalence of migratory birds in the state during the next year. We are expecting to find more benign AIVs as we gather more data.

If we detect a H5N1 virus for the first time, the specimen will be sent to NVSL for further biological testing and genetic characterization. Contact of humans with wild bird populations is not considered to be a risk at this time. Human disease in Asia has been exclusively associated with domestic poultry. In the US domestic poultry operations abide by very strict biosafety and biosecurity guidelines and introduction into domestic poultry is highly unlikely.

The introduction of the Asian H5N1 strain into North American wild bird population should not be considered as dangerous to humans. Contact with wild birds, wild animals and even companion animals and livestock always contains a certain disease risk. More than 75% of all infectious diseases in humans are zoonotic and common sense and a basic level of hygiene should prevail when dealing with animals. If the current Asian H5N1 ever mutates into a virus, which

is easily transmissible from human to human, it will probably not be transmissible to birds or between birds.

In the event of an introduction of H5N1 into the US by wild birds, owners of backyard and free ranging poultry in Nevada will be asked to confine their birds.

Avian/Pandemic Influenza websites:
USDA: www.usda.gov/wps/portal/usdahome
USGS National Wildlife Health Center: www.nwhc.usgs.gov
US Dept. of the Interior: www.doi.gov/issues/avianflu.html
www.cdc.gov/flu/avian/index.htm
www.who.int/csr/disease/avian_influenza/en/
www.pandemicflu.gov
www.pandemicflu.nv.gov