

## **WEST NILE VIRUS SUMMARY REPORT 2008 SEASON UTAH DEPARTMENT OF HEALTH**

### **Report Purpose**

The purpose of this document is to provide Utah West Nile virus (WNV) partners a concise summary of this season's major results. Information displayed in this report has been compiled by the Utah Department of Health (UDOH), but reflects information obtained from concerted joint efforts. All activities related to WNV during the 2008 season involved major contributions from many different agencies. These include as follows: blood banks of Utah, local health departments (LHDs), Utah Department of Agriculture and Food (UDAF), Utah Division of Wildlife Resources (UDWR), Utah Mosquito Abatement Association (UMAA), the Utah Public Health Laboratory (UPHL), and the Utah Veterinary Diagnostic Laboratory (UVDL). In addition to the direct contribution of surveillance data, these agencies were also involved in systematic planning and preparation for the 2008 season. The intent of this report is to document the results of the efforts put forth by these entities during the 2008 WNV season.

*Please note, the purpose of this report is to describe general trends that occurred during the 2008 season. Specific surveillance counts may be subject to change as data continues to be reconciled for the season.*

### **Introduction to WNV**

During the summer of 2008, WNV reemerged in Utah. This was the sixth year WNV activity was detected in Utah. WNV is a disease transmitted by mosquitoes. Birds are the natural hosts of the disease with humans and horses serving as accidental hosts. The majority of people infected with WNV never develop symptoms. A small percentage of infected individuals will display West Nile fever symptoms (i.e. fever, headache, and body aches). A more serious form of the disease, West Nile neuroinvasive illness, may also occur when the virus infects the central nervous system. People with this form of the disease will have high fevers, severe headaches, neck stiffness, and mental confusion. Hospitalization may be required and death is possible.

### **Introduction to WNV Surveillance in Utah**

Surveillance for WNV activity involves several different components. Since the disease is zoonotic in nature, both human and animal surveillance occurs. In past years, WNV surveillance in Utah involved human, mosquito, wild bird, horse, and sentinel chicken populations. Due to the involvement of these different populations, surveillance efforts this season enlisted the expertise and abilities of many different agencies. Budget constraints limited surveillance for the 2008 season, and in order to keep more critical surveillance running, wild bird testing was eliminated from routine surveillance. Local mosquito abatement districts (MADs), in conjunction with the UMAA, performed necessary trapping and identification for mosquito surveillance. Testing of these mosquitoes occurred at the UPHL as well as in-house at some MAD facilities using the RAMP testing platform. Sentinel chicken flocks were also maintained and bled by mosquito abatement personnel. Chicken blood samples were processed at the UVDL -Nephi. Oral swabs from wild birds were only collected by the Salt Lake Valley Health Department (SLVHD) as part of a special study with initial testing done in-house and confirmatory testing at UPHL and UVDL. Horse blood samples were collected and submitted by local veterinarians with the UDAF coordinating testing efforts at the UVDL-Logan. Major health care providers submitted human samples across the state with testing occurring at both the UPHL and private laboratories such as ARUP (Associated Regional and University Pathologists). The three major blood banks servicing Utah (American Red

Cross, ARUP, and Mountain Star) coordinated screening of donated blood for identification of viremic donors. All LHDs in Utah were involved with disseminating, investigating, and responding to surveillance data indicative of local WNV activity.

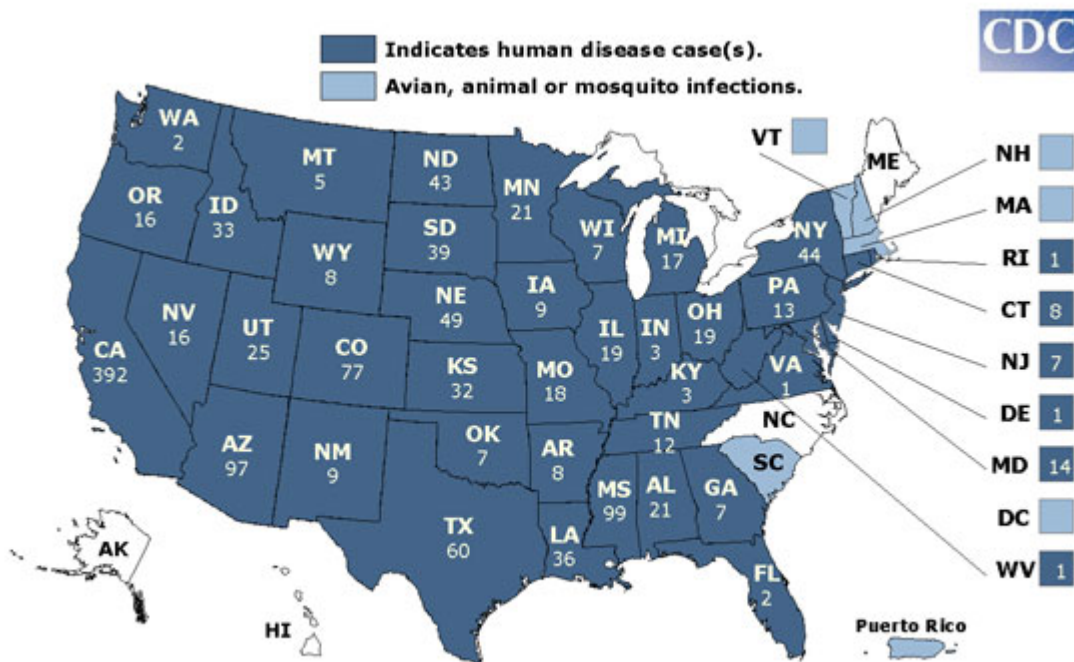
**2008 Season National Highlights**

As of November 18, 2008 avian, animal, or mosquito WNV infections were reported to CDC ArboNet from the following states in 2008: Alabama, Arkansas, Arizona, California, Colorado, Connecticut, District of Columbia, Delaware, Florida, Georgia, Iowa, Idaho, Illinois, Indiana, Kentucky, Louisiana, Massachusetts, Maryland, Michigan, Minnesota, Missouri, Mississippi, Montana, North Dakota, Nebraska, New Hampshire, New Jersey, New Mexico, Nevada, New York, Ohio, Oklahoma, Oregon, Pennsylvania, Puerto Rico, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Vermont, Washington, Wisconsin, West Virginia, and Wyoming.

Human cases were reported in Alabama, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Jersey, New Mexico, New York, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, West Virginia, Wisconsin, and Wyoming.

As of November 18, 2008, of the 1,301 human cases reported to CDC, 602 (46%) were reported as West Nile meningitis or encephalitis (neuroinvasive disease), 650 (50%) were reported as West Nile fever (milder disease), and 49 (4%) were clinically unspecified at the time of this report. A total of 34 cases were fatal in 2008.

**Figure 1 : 2008 U.S. WNV Human Case Counts (reported to the CDC as of 11/18/2008)**



### 2008 Season Utah Highlights

Activity during the 2008 WNV season decreased compared to activity detected during the 2007 season. The geographic spread of both human and animal activity was fairly evenly distributed throughout the state with the most concentration focused in the most populous region of the state (Salt Lake County). A total of 14 counties had activity detected during the 2008 season.

**Table 1: 2008 WNV Activity in Utah (Positive Counts Only)**

<b>Total West Nile Virus Positive Samples: Utah 2008</b>					
<b>County of Residence</b>	<b>Human</b>	<b>Horse†</b>	<b>Bird†</b>	<b>Chicken</b>	<b>Mosquito</b>
Beaver	–	–	–	–	–
Box Elder	–	2	–	2	2
Cache	2	1	–	1	34
Carbon	–	–	–	–	–
Daggett	–	–	–	–	–
Davis	2	1	–	–	6
Duchesne	1	–	–	2	–
Emery	–	–	–	1	1
Garfield	–	–	–	–	–
Grand	–	–	–	–	–
Iron	–	–	–	–	–
Juab	–	–	–	–	1
Kane	–	–	1	–	–
Millard	–	–	–	–	5
Morgan	–	–	–	–	–
Piute	–	–	–	–	–
Rich	–	–	–	–	–
Salt Lake	9	–	2	4	70
San Juan	–	–	–	–	–
Sanpete	–	–	–	–	–
Sevier	–	–	–	–	–
Summit	–	–	–	–	–
Tooele	2	–	–	1	2
Uintah	6	–	–	–	13
Utah	1	1	–	1	4
Wasatch	–	–	–	–	–
Washington	1	–	–	4	1
Wayne	–	–	–	–	–
Weber	3	3	–	–	1
<b>State Total</b>	<b>27</b>	<b>8</b>	<b>3</b>	<b>16</b>	<b>140</b>

† In 2008, the state of Utah did not routinely test horses or wild/dead birds for West Nile virus. However, the Salt Lake Valley Health Department conducted a study on dead birds. The numbers listed above represent West Nile virus testing of horses or wild/dead birds performed by a private laboratory and reported to the Utah Department of Health.

### **Past Season Comparison**

2003 was the first year WNV activity was established in Utah. Similar to many initial seasons in other states, activity was muted. One human case was reported for the 2003 season in Utah in addition to one viremic donor who did not develop symptoms. Horse activity was the main indication of WNV presence in 2003. 2004 was the first year WNV activity was established in northern Utah along the Wasatch Front. The majority of activity for 2004 occurred in extreme southern and eastern areas of Utah such as Washington and Grand counties. During 2005, activity expanded into more northern regions of the state and Utah and Uintah counties served as focal points for detected activity. The 2006 season was the most active season. Activity was focused along the Wasatch Front in the more populated areas, Salt Lake County and Utah County. With an increase in activity, there was also an increase in fatalities, with Utah experiencing five. 2007 started the decline in the number of cases, as well as a decrease in the number of fatalities. 2007 also showed that the virus was moving into the more northern parts of the state, with the bulk of the cases being in the Cache and Box Elder counties.

**Table 2: Utah WNV Season Comparison, 2003-2008**

	<b>2008</b>	<b>2007</b>	<b>2006</b>	<b>2005</b>	<b>2004</b>	<b>2003</b>
<b>Human</b>	27	70	158	52	11	1
<b>Horse</b>	8	18	59	68	5	35
<b>Bird</b>	3	19	76	22	8	2
<b>Chicken</b>	16	74	107	79	32	9
<b>Mosquito Pools</b>	140	225	466	80	181	3
<b>Counties with Detection</b>	14	19	19	17	11	9

### **2008 Utah Activity Timeline**

The majority of surveillance measures began in May 2008. West Nile activity was detected the week of June 8, 2008 in a mosquito pool in Washington County using the RAMP. Activity was detected throughout August and September with WNV activity being detected in all surveillance measures (human, horse, wild bird, chicken, and mosquito) by August. Human and equine cases continued to be reported into October. All active surveillance for the 2008 season had ceased by the end of October. However, testing of suspect human and horse cases continues year-round.

### **Human Surveillance**

Human surveillance occurs primarily through reporting of results indicative of acute infection from major laboratories. LHDs were immediately notified in these instances for the initiation of case investigations. The majority of testing occurred in private laboratories, with some specimens for positive humans being forwarded to the UPHL for verification of results. The UPHL tested samples for both WNV and SLE antibodies. This year, one of the major private laboratories experienced a high false positivity rate with one of their testing kits, prompting a major investigation by the Centers of Disease Control and Prevention (CDC). This laboratory tested several of Utah's positive cases. Some of the cases opted to not be re-tested, and most of the serum samples had been destroyed by the time this problem was detected. Utah decided to keep the original number of positive cases, due to most being symptomatic. Additionally, major blood banks servicing Utah screened donations for the presence of WNV.

The total Utah human case count for the 2008 season currently stands at 28 identified cases.

Five individuals were identified as being infected with WNV through blood donation screening. Three of these individuals were identified as having symptoms and were classified as WNV cases. The remaining two individuals remained under the asymptomatic viremic donor classification.

**Table 3: 2008 WNV Season, Clinical Comparison of Human Cases. United States versus Utah**

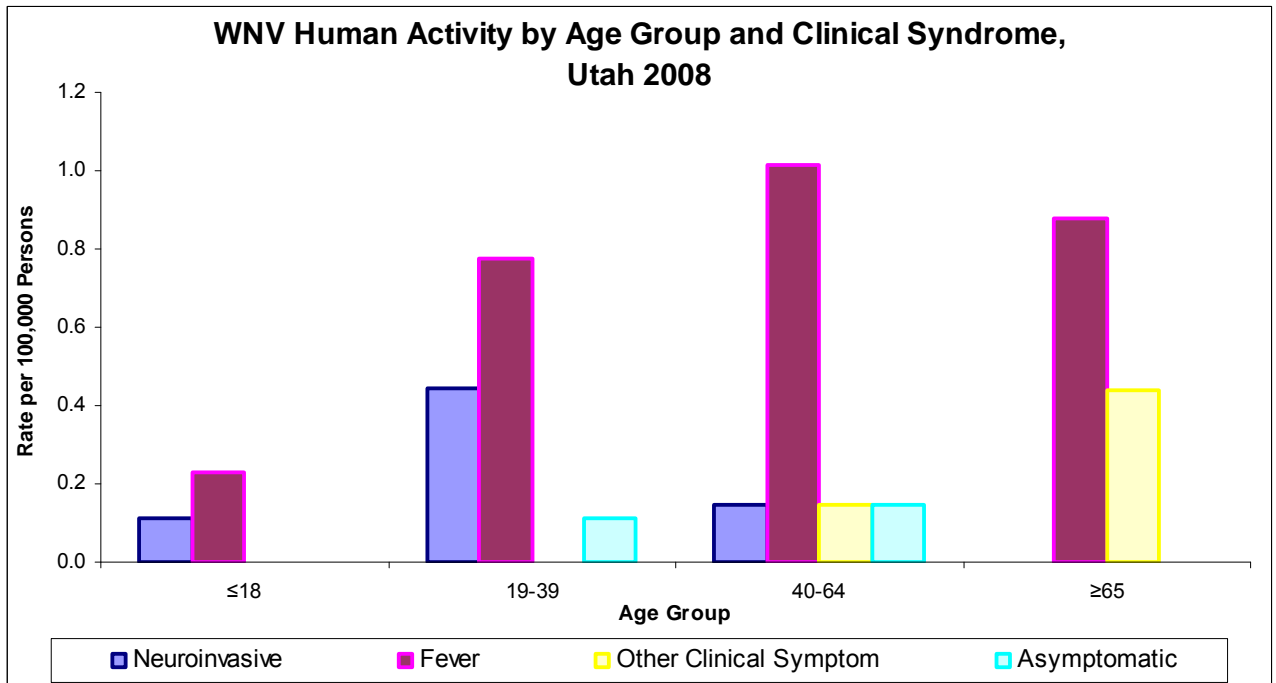
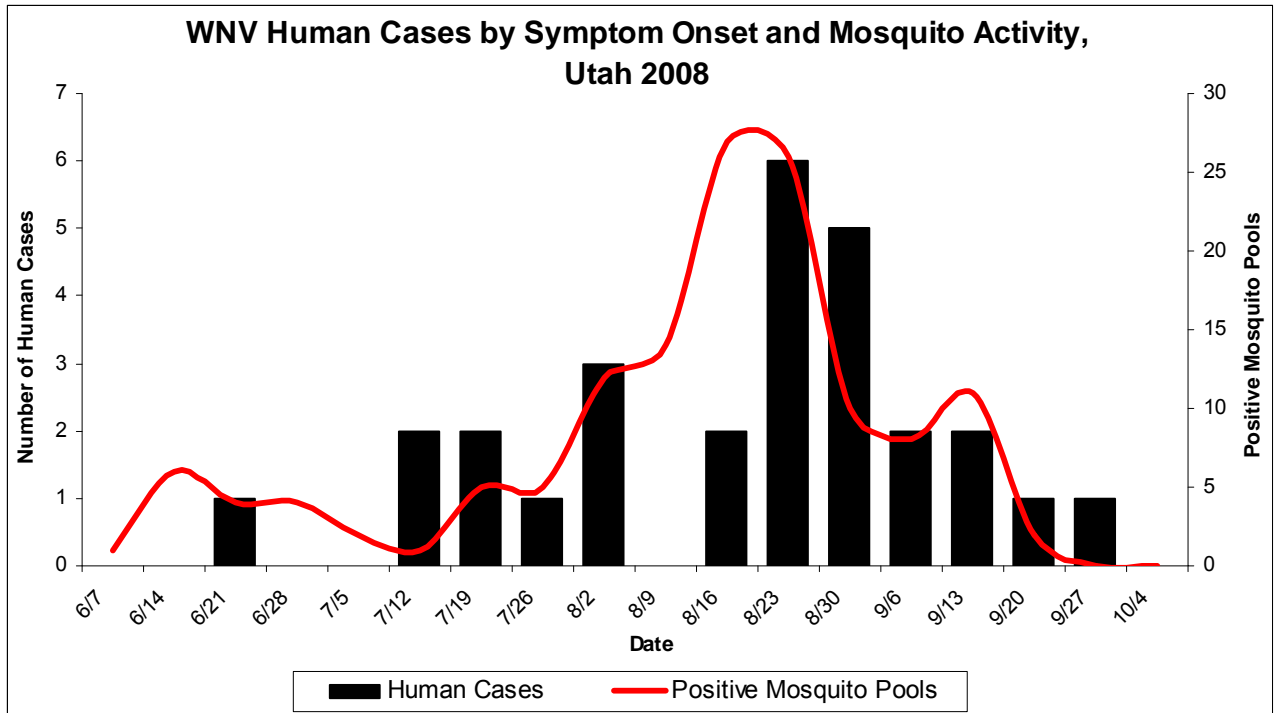
	<b>Utah</b>	<b>United States</b>
<b>Case Number</b>	28	1,370
<b>Fatalities</b>	0	37
<b>Fatalities (%)</b>	0	1
<b>Neuroinvasive (%)</b>	33	47

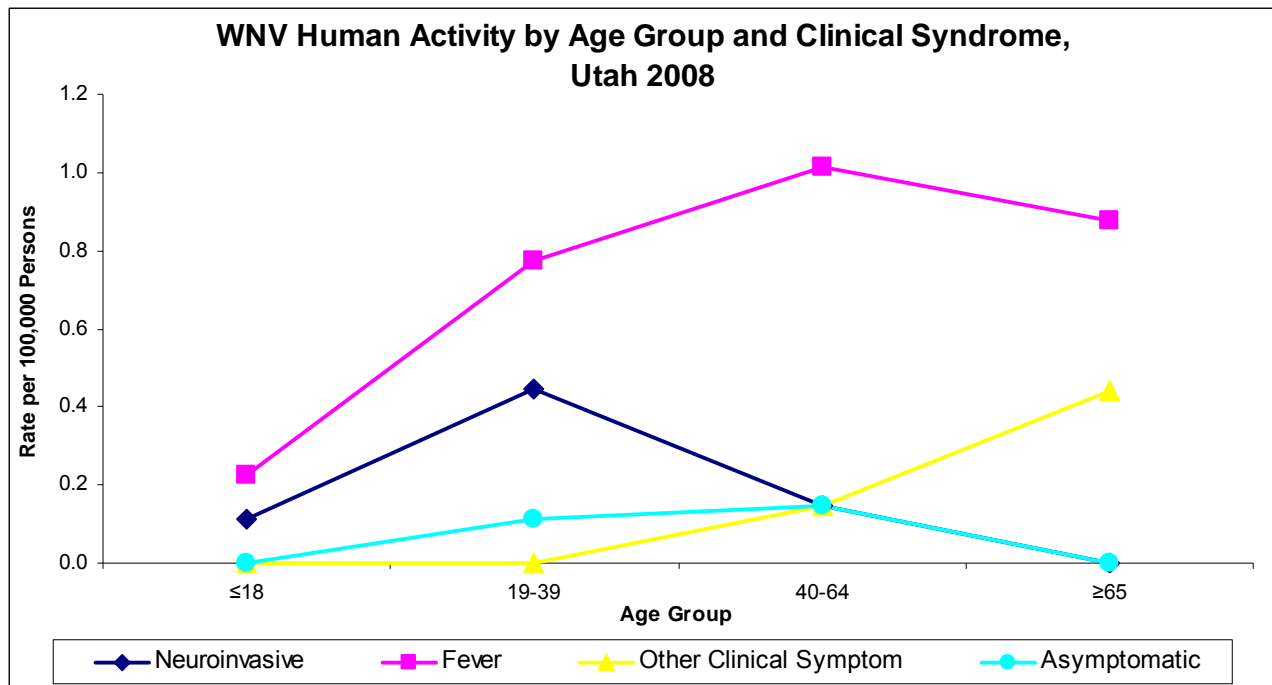
**Table 4: Clinical and Demographic Comparison of Human Cases, Utah 2003-2008**

	<b>2008</b>	<b>2007</b>	<b>2006</b>	<b>2005</b>	<b>2004</b>	<b>2003</b>
<b>Case Number</b>	28	70	158	52	11	1
<b>Fatalities</b>	0	2	5	1	0	0
<b>Male (%)</b>	79	51	51	54	45	100
<b>Median Age</b>	41 years	50 years	47 years	43 years	53 years	47 years
<b>Age Range</b>	4-79 years	3-89 years	1-88 years	6-86 years	5-80 years	-----

**Table 5: Clinical and Demographic Characteristics, by Age Group, Utah 2008**

	<b>&lt; 18 years</b>	<b>18-39 years</b>	<b>40-64 years</b>	<b>≥ 65 years</b>
<b>Case Number</b>	3	12	9	4
<b>Fatalities</b>	0	0	0	0
<b>Neuroinvasive # (%)</b>	1 (33%)	4 (33%)	3 (33%)	1 (25%)
<b>Hospitalized # (%)</b>	1 (33%)	4 (33%)	1 (11%)	2 (50%)
<b>Male # (%)</b>	1 (33%)	10 (83%)	7 (78%)	4 (100%)





**Mosquito Surveillance**

Personnel from mosquito abatement districts across the state performed the primary functions of trapping mosquitoes at various locations in their district. Trapped mosquitoes were identified and sorted into “pools” based on species. Each mosquito pool contained 50-100 individual mosquitoes. These pools were shipped to the UPHL for testing by PCR or tested in-house by the MADs using the RAMP.

**Horse surveillance**

Surveillance of equine disease related to WNV infection was again coordinated by the UDAF. Veterinarians across the state were encouraged to submit samples from suspect equine cases to the UVDL-Logan for testing. Results of these serum tests were reported by the UDAF to the UDOH with appropriate notification occurring for positive cases. The majority of samples submitted for testing were from domestic, privately owned horses with symptoms indicative of infection and no history of vaccination. Disease awareness among veterinarians and horse owners was accomplished through distribution of pamphlets and periodic updates using the Utah Veterinary Alert Listserv.

**Wild bird surveillance**

Due to budget constraints, wild bird surveillance was discontinued for the 2008 season. However, SLVHD conducted a special study involving only birds in their jurisdiction. These birds were tested using the RAMP. Testing criteria focused on collecting samples from Corvid family members, birds of prey, and other avian species considered at greater risk of WNV-related fatalities.

**Sentinel chicken surveillance**

This season, approximately 38 flocks (10 chickens per flock) were distributed across the state. Mosquito abatement personnel maintained flocks and flocks of 10 were sometimes split into two flocks of five for greater geographical coverage. Chicken blood samples were tested at the UVDL-Nephi.

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