WEST NILE VIRUS SUMMARY REPORT 2007 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 2007 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), 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 the systematic planning and preparation for the 2007 season. The intent of this report is to document the results of the efforts put forth by these entities during the 2007 WNV season.

Please note, the purpose of this report is to describe general trends that occurred during the 2007 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 2007, WNV reemerged in Utah. This was the fifth year WNV activity has been 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 Utah, WNV surveillance involves 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. Local mosquito abatement districts in conjunction with the UMAA performed the necessary trapping and identification for mosquito surveillance. Testing of these mosquitoes occurred at the UPHL. 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, both live and dead, collected by UDWR officials and other designated staff were sent to the UPHL for testing. 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 as well as 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.

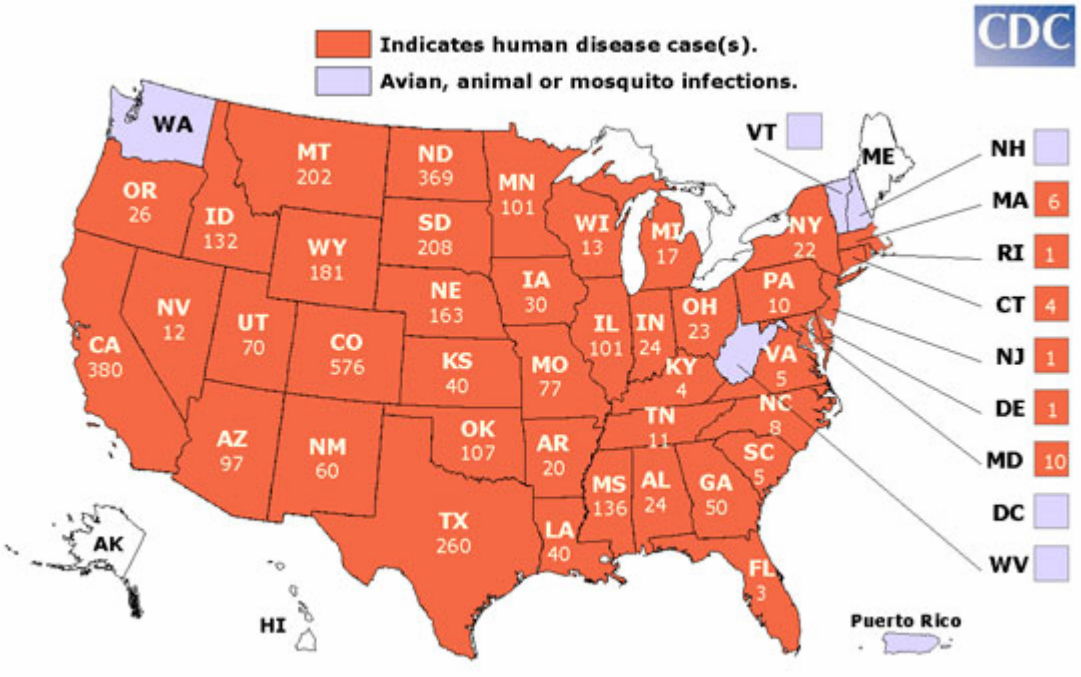
2007 Season National Highlights

As of December 3, 2007 avian, animal or mosquito WNV infections have been reported to CDC ArboNET from the following states in 2007: Alabama, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, District of Columbia, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Puerto Rico, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming.

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

As of November 27, 2007, of the 3359 cases, 1105 (33%) were reported as West Nile meningitis or encephalitis (neuroinvasive disease), 2191 (65%) were reported as West Nile fever (milder disease), and 63 (2%) were clinically unspecified at this time. A total of 98 cases were fatal.

Figure 1 : 2007 U.S. WNV Human Case Counts (reported to the CDC as of 12/3/2007)



2007 Season Utah Highlights

The magnitude of activity during the 2007 WNV season was a dramatic decrease compared to activity detected during the 2006 season. The geographic spread of both human and animal activity moved northward into areas that did not have much activity in 2006. A total of 19 counties had activity detected during the 2007 season. Major areas of activity included more populous regions of the state (Salt Lake County), and more rural areas in the Northern part of the Wasatch Front (Cache and Box Elder Counties).

Table 1: 2007 WNV Activity in Utah (Positive Counts Only)

County of Residence	Human	Horse	Bird	Chicken	Mosquito
Beaver	0	0	0	0	0
Box Elder	8	3	0	2	24
Cache	11	6	0	23	44
Carbon	0	1	1	1	0
Daggett	0	0	0	0	2
Davis	6	1	1	14	32
Duchesne	1	1	0	11	2
Emery	0	0	0	12	0
Garfield	0	0	0	0	0
Grand	1	0	1	0	2
Iron	1	0	0	0	0
Juab	0	0	0	0	0
Kane	0	0	0	0	0
Millard	0	0	0	0	1
Morgan	0	0	0	0	0
Piute	0	0	0	0	0
Rich	0	0	0	0	0
Salt Lake	30	2	13	4	88
San Juan	2	0	0	0	0
Sanpete	0	1	0	0	0
Sevier	0	0	0	0	0
Summit	0	0	0	0	1
Tooele	2	0	0	4	0
Uintah	4	0	2	0	12
Utah	2	1	0	1	3
Wasatch	0	0	0	0	0
Washington	2	0	0	2	14
Wayne	0	0	0	0	0
Weber	0	2	1	0	0
State Total	***70***	***18***	***19***	***74***	***225***

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 of fatalities, with Utah experiencing five.

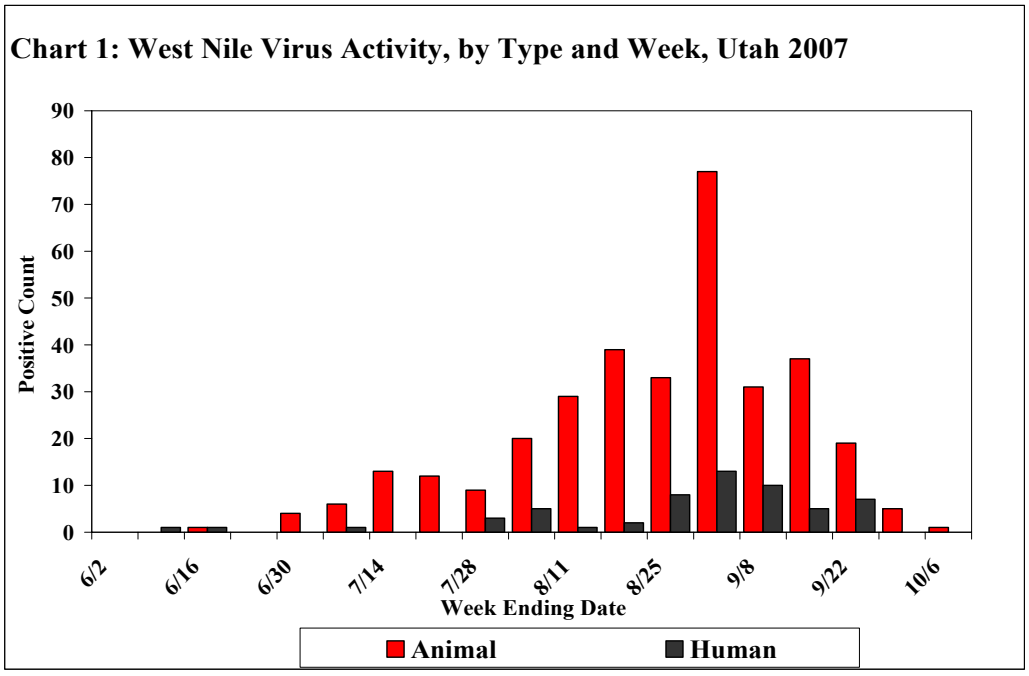
Table 2: Utah WNV Season Comparison, 2003-2007

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

2007 Utah Activity Timeline

The majority of surveillance measures began in May 2007. West Nile activity was detected the week of June 9, 2007 in a mosquito pool in Salt Lake County. Activity was detected throughout August and September with WNV activity being detected in all surveillance measures (human, horse, wild bird, chicken, mosquito) by July. Human and equine cases continued to be reported into October. All active surveillance for the 2007 season had ceased by the end of October. However, testing of suspect human and horse cases continues year-round.

Chart 1: West Nile Virus Activity, by Type and Week, Utah 2007



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 private lab specimens for positive humans were forwarded to the UPHL for verification of results. The UPHL tested samples for both WNV and SLE antibodies. Additionally, major blood banks servicing Utah screened donations for the presence of WNV. The total Utah human case count for the 2007 season currently stands at 70 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 (from Salt Lake County) remained under the asymptomatic viremic donor classification.

Table 3: 2007 WNV Season, Clinical and Demographic Comparison of Human Cases. United States versus Utah

	Utah	United States
Case Number	70	3359
Fatalities	2	98
Fatalities (%)	3	3
Neuroinvasive (%)	41	33
Male (%)	51	55
Median Age	50 years	51 years
Age Range	3 years-89 years	3 months - 99 years

Table 4: Clinical and Demographic Comparison of Human Cases, Utah 2003-2007

	2007	2006	2005	2004	2003
Case Number	70	158	52	11	1
Fatalities	2	5	1	0	0
Male (%)	51	51	54	45	100
Median Age	50 years	47 years	43 years	53 years	47 years
Age Range	3 years-89 years	1 year-88 years	6 years - 86 years	5 years - 80 years	------

Table 5: Clinical and Demographic Characteristics, by Age Group, Utah 2007

	≤ 18 years	19-39 years	40-64 years	≥ 65 years
Case Number	7	16	34	12
Fatalities	0	0	0	2
Neuroinvasive (%)	14	31	38	75
Hospitalized (%)	20	47	43	90
Male (%)	43	44	59	58

Chart 2: WNV Human Cases, by Symptom Onset and Mosquito Activity, Utah 2007

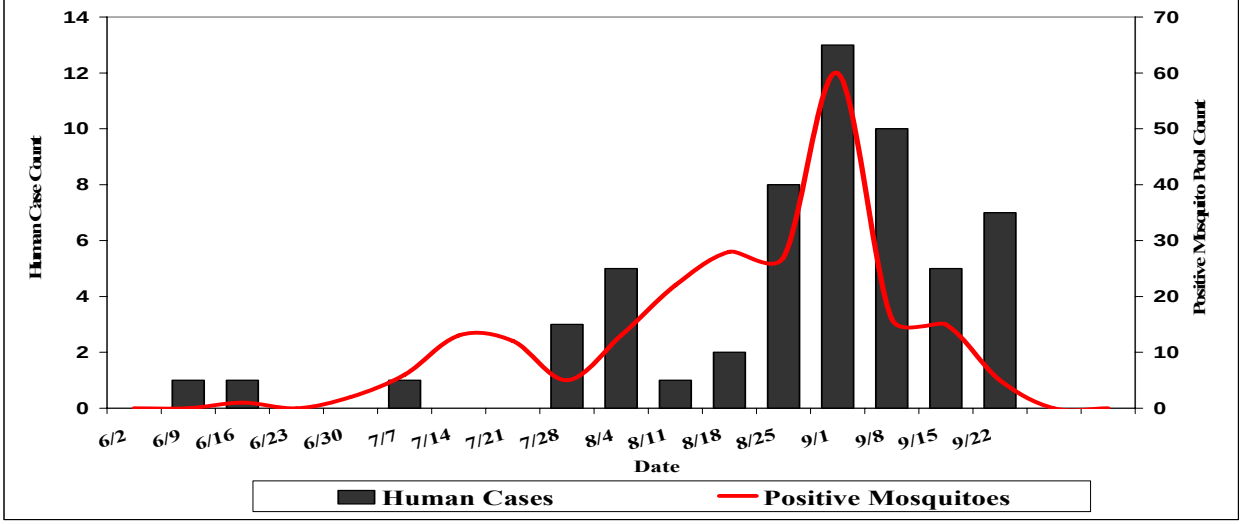
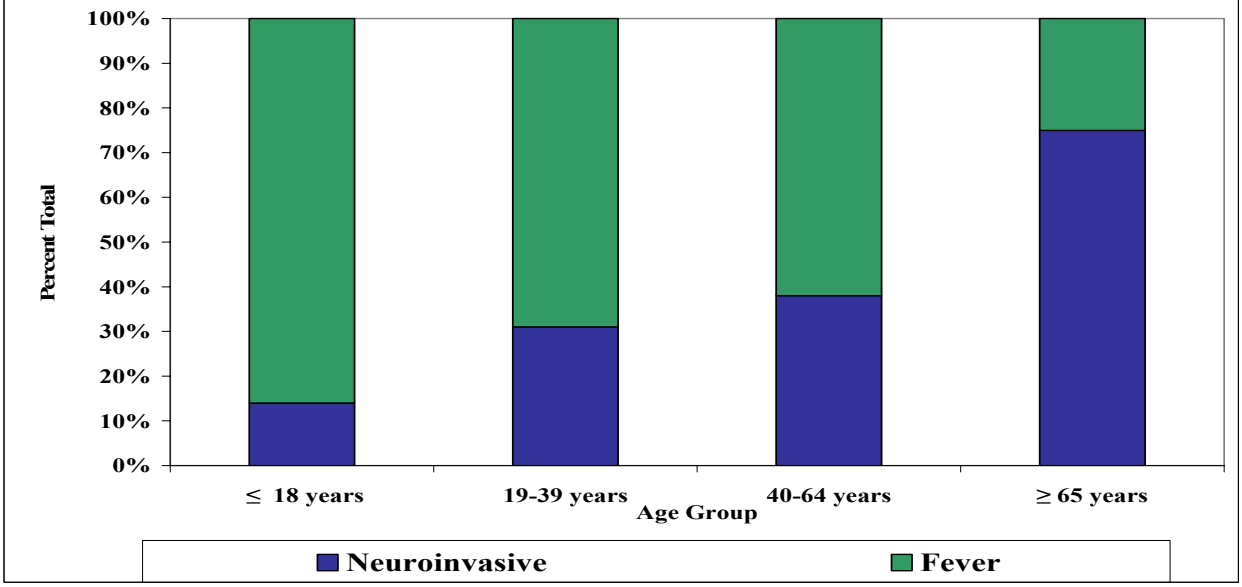
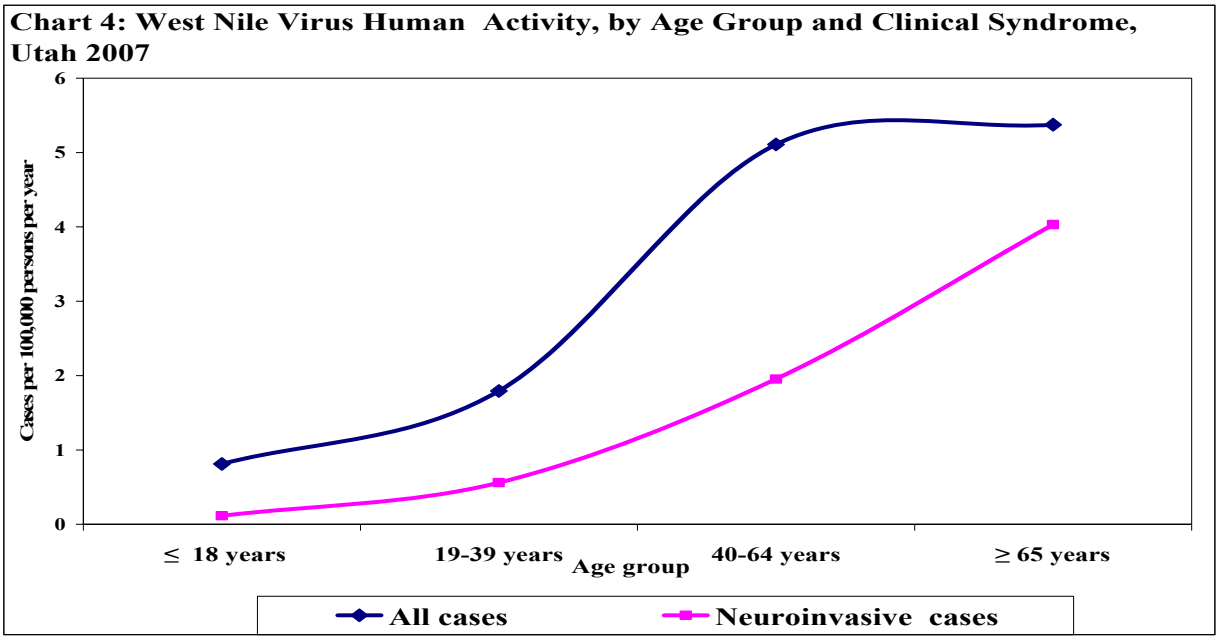


Chart 3: West Nile Virus Human Activity, by Age Group and Clinical Syndrome, Utah 2007





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 10-50 individual mosquitoes. These pools were shipped to the UPHL for testing. The pools were individually tested for WNV, SLE, and WEE using PCR techniques.

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 histories of unvaccination. Disease awareness among veterinarians and horse owners was accomplished through distribution of pamphlets and periodic updates using the Utah Veterinary Alert Listserver.

Wild bird surveillance

Surveillance of WNV infection in wild bird populations was again coordinated by the UDWR. The UDWR officers and other certified personnel collected oral swabs from reported dead birds meeting testing criteria. 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. Collected swabs were sent to the UPHL for PCR testing (WNV, SLE, and WEE). Results of these tests were reported by the UPHL and UVDL to the UDWR and the UDOH with appropriate notification occurring for positive results.

Due to budget cuts, riparian (live wild bird) surveillance did not occur for the 2007 WNV season.

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.