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# Vector Borne Disease Bulletin



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## A Note from the Editor:

Welcome to the first 2008 issue of the Vector-borne Disease Bulletin. The intent of this quarterly bulletin is to keep you better informed about the vector-borne disease investigations and surveillance conducted by the California Department of Public Health and collaborating State and local agencies in California. This issue provides a summary of surveillance activity in 2007. Look for the next bulletin at the beginning of May. In the meantime, please email me with any suggestions to make this bulletin more useful for your work and research. Thanks to everyone who contributed to this bulletin.

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## Mosquito-borne Virus Surveillance



In 2007, West Nile virus (WNV) activity was reported from 51 counties. A total of 378\* human WNV cases were reported from 30 counties for a statewide incidence of 1.0 case per 100,000 people. Of the 378 cases reported, 155 (41%) were classified as West Nile neuroinvasive disease and 219 (58%) were West Nile fever. The clinical presentation of four cases was unknown. The median age of all cases was 55 years (range: 2-96 years) and 210 cases (56%) were male. Seventeen WNV-related fatalities were reported from Colusa (1), Fresno (1), Kern (4), Kings (1), Los Angeles (3), Riverside (3), Sacramento (1), San Bernardino (1), San Joaquin (1), and Tulare (1) counties.





Non-human WNV activity reported in 2007 including the following: 14 counties reported 28 equine WNV cases; 50 counties reported 1,396 WNV-positive dead birds; 30 counties reported 1,008 WNV-positive mosquito pools; 27 counties reported 510 WNV-positive sentinel chickens; and 10 counties reported 26 WNV-positive tree squirrels.

Western equine encephalomyelitis virus (WEE) was also detected in California in 2007 in 16 mosquito pools from Fresno (1 pool) and Kern (15 pools) counties, and 13 sentinel chickens from Kern (10) and Los Angeles (3) counties.

*\*As of January 4, 2008*

<b>2007 &amp; 2006 West Nile Virus Comparisons*</b>		
	<b>2007</b>	<b>2006</b>
Positive Counties	51	54
Human Cases/ Tested	378 / 1,326	278 / 1,583
Horse Cases/ Tested	28 / 332	58 / 622
Total Dead Bird Reports	31,950	46,345
Positive Dead Birds/ Tested	1,396 / 5,986	1,446 / 6,535
Positive Mosquito Pools/ Tested	1,008 / 27,595	832 / 25,613
Positive Chicken Sera/ Tested	510 / 28,874	640 / 33,001
Positive Squirrels/ Tested	26 / 224	32 / 138

**A summary of West Nile virus activity from 2003-2008 can be found at:**

[www.westnile.ca.gov](http://www.westnile.ca.gov)



## Hantavirus Surveillance

Two cases of hantavirus pulmonary syndrome were identified in California residents in 2007. Case-patients were residents of El Dorado and Mono counties; both individuals survived.

Rodent surveillance for Sin Nombre virus (SNV) was conducted in 18 California counties in 2007. Of 944 deer mice (*Peromyscus maniculatus*) collected and tested, antibodies to SNV were detected in 163 (17.3%). Seroprevalence estimates were highest in Butte (38.5%) and Mono (29.1%) counties.

### Results of testing for serum antibody to Sin Nombre virus in *Peromyscus maniculatus* reported in June-August, 2007

County	No. Positive	No. Tested
Alameda	0	28
Butte	5	13
Contra Costa	0	2
El Dorado	36	174
Lassen	8	76
Los Angeles	0	2
Madera	10	42
Mariposa	1	5
Mono	65	223
Napa	0	1
Orange	16	174
Riverside	2	60
San Bernardino	0	10
San Diego	0	33
Santa Barbara	11	54
Siskiyou	6	22
Tuolumne	3	25



Rodent processing during a hantavirus case investigation

## Plague Surveillance

A total of 1494 specimens have been tested for plague antibody from 34 counties. Of these, 74 samples from eight counties were seroreactive.

**Mammals testing positive for plague (*Yersinia pestis*), 2007**

County	Location	Date	Host	No. pos	Results
Inyo	Taboose Creek CG	8-May	California Ground Squirrel	7	1:128,1:256, 1:256,1:256, 1:512,1:512, 1:2048
Inyo	Baker Creek CG	15-May	California Ground Squirrel	2	1:128, 1:256
Inyo	Diaz Lake CG	22-May	California Ground Squirrel	1	1:512
Inyo	Schulman Grove	12-Jun	Chipmunk	1	1:64
Inyo	Tinemaha Creek CG	13-Sept	California Ground Squirrel	1	1:32
Inyo	Millpond CG	26-Sept	California Ground Squirrel	7	1:256,1:256, 1:512,1:1024, 1:2048,1:2048, 1:2048
Kern	Bakersfield, 5E	19-Jan	Coyote	1	1:512
Kern	Kernville, 5SE	19-Jan	Coyote	1	1:256
Kern	Hart Flat	30- Apr	Domestic Cat	1	POS
Mariposa	Yosemite NP	6-Aug	Black Bear	1	1:64
Mariposa	Yosemite NP	27-Sept	Black Bear	1	1:128
Modoc	Hackamore Reservoir	5-Jul	Coyote	1	1:32
Modoc	Camby, 4NE	6-Jul	Coyote	1	1:64
Modoc	Cedarville, 2E	20-Jul	Coyote	1	1:64
Modoc	Eagleville 3.5E	23-Aug	Coyote	1	1:512
Modoc	Fort Bidwell, 2E	20-Sept	Coyote	1	1:256
Modoc	Fort Bidwell, 5S	20-Sept	Coyote	1	1:32
Modoc	Lake City, 5N	20-Sept	Coyote	1	1:32
Modoc	Lake City, 5NE	20-Sept	Coyote	1	1:512
Modoc	Cedarville, 9S	21-Sept	Coyote	1	1:64
Modoc	Fort Bidwell, 3E	1-Nov	Coyote	1	1:32
Modoc	Eagleville, 3E	8-Nov	Coyote	1	1:256
Modoc	Lake City, 4NE	16-Nov	Coyote	1	1:128
Modoc	Lake City, 5NE	10-Dec	Coyote	2	1:1024, 1:1024
Modoc	Eagleville, 9E	13-Dec	Coyote	2	1:32, 1:64
Plumas	Beckwourth, 7N	29-May	Coyote	2	1:256, 1:256
Plumas	Johnsville	31-May	Black Bear	1	1:32
Plumas	Graeagle	7-Jun	Black Bear	1	1:32
Plumas	Portola, 3W	26-Jun	Coyote	1	1:128.
Plumas	Portola, 5W	26-Jun	Coyote	1	1:128
Plumas	Portola	11-Jul	Black Bear	1	1:64
Plumas	Portola	13-Jul	Black Bear	1	1:128



Plumas	Quincy	27-Jul	Black Bear	1	1:128
Plumas	Quincy	30-Aug	Black Bear	1	1:32
Plumas	Cromberg	12-Sept	Coyote	1	1:64
Plumas	Quincy, 2W	13-Sept	Coyote	2	1:64, 1:64
Plumas	Beckwourth, 3S	14-Sept	Coyote	1	1:64
Plumas	Vinton, 3E	20-Sept	Coyote	2	1:64, 1:64
Plumas	Vinton, 1N	21-Sept	Coyote	1	1:32
Plumas	Cromberg	29-Oct	Black Bear	1	1:64
Plumas	Quincy, 12E	29-Oct	Gray Fox	1	1:64
Plumas	Graeagle	31-Oct	Black Bear	1	1:64
Plumas	Vinton, 4W	9-Nov	Coyote	2	1:128
San Bernardino	San Bernardino NF, Hana Flats	18-July	California Ground Squirrel	3	1:32,1:256, 1:512
San Diego	Palomar Mt SP, Cedar Grove	14-Aug	California Ground Squirrel	2	1:64, 1:256
Sierra	Calpine, 5N	1-Jun	Coyote	2	1:32, 1:64
Sierra	Tahoe NF, Webber Lake	8-Aug	Black Bear	1	1:64
Sierra	Calpine	23-Aug	Black Bear	1	1:512
Sierra	Sierraville, 2W	12-Sept	Coyote	1	1:128
Sierra	Sierraville, 5N	17-Sept	Coyote	1	1:64
Sierra	Sierraville, 7N	19-Sept	Coyote	1	1:64
Sierra	Loyalton, 3N	8-Nov	Coyote	1	1:128
<b>Total No. Mammals Positive for Plague</b>				<b>75</b>	

## Tick-borne Disease Surveillance

The California Department of Public Health reported 58 cases of Lyme disease between January and December, 2007. There were two tick-borne relapsing fever cases; case patients were residents of San Diego and Orange counties. Local health departments will finalize 2007 case reports by May, 2008.



As part of an on-going collaborative surveillance effort of local, state, and federal agencies, 4,060 field-collected western-black legged ticks (*Ixodes pacificus*) from 19 counties were tested by indirect fluorescent antibody assay (IFA), direct fluorescent antibody assay (DFA), and polymerase chain reaction (PCR) to determine *Borrelia* infection prevalence.

Of 3,594 adult *I. pacificus* tested, 44 (1.2%) from 11 counties were positive for *Borrelia* species; of these 26 were identified as *Borrelia burgdorferi* (0.7%) by either specific antibodies (IFA) or by species-specific primers (PCR). Eight of 579 (1.4%) adult ticks were positive in a DFA assay with generic *Borrelia* antibodies. Twenty pools tested by PCR were positive using *Borrelia burgdorferi*-specific primers; 10 were positive only at the *Borrelia* genus level: Butte (1), Lake (3), Santa Clara (2), Santa Cruz (2), Sonoma (1), and Trinity (1). Comparative sequence analysis with other *Borrelia* will be performed on the latter samples to determine species.

Fourteen of 466 *I. pacificus* nymphs (3.0%) tested from 5 counties were *Borrelia* species positive; 7 (1.5%) were *B. burgdorferi* positive by IFA and PCR and 7 were negative when tested with *B. burgdorferi*-specific primers: Santa Clara (2), Santa Cruz (1), and Sonoma (4). Comparative sequence analysis with other *Borrelia* will be performed on the latter samples to determine species.



VBDS staff during routine tick surveillance.

***Ixodes pacificus* ticks tested for evidence of *Borrelia* species, California, 2007**

County	Location	No. ticks tested	No. pools tested	No. pools positive				Laboratory
				IFA	DFA	PCR		
				<i>Borrelia</i> Spp.	<i>Borrelia</i> spp.	<i>Borrelia</i> spp. <sup>a</sup>	<i>B. burgdorferi</i>	
Alameda	Tilden Park-Carousel PA	35*	4			0		US Army
	Tilden Park – Jewel Lake Trail	117	117		1			CDPH-VBDS
	Tilden Park – Laurel Canyon Road	76	76		0			CDPH-VBDS
	Tilden Park – Laurel Canyon Road	2*	1			1	1	US Army
	Tilden Park-Pine Tree Trail	21*	3			0		US Army
	Tilden Park-Upper Packrat Trail	2	2		0			CDPH-VBDS
	Kilkare Road, Sunol	9*	9	1				Sonoma Co PHL
	Pineneedle Rd, Oakland	17*	17	0				Sonoma Co PHL
	Sobrante Rd, Oakland	8*	8	1				Sonoma Co PHL
Butte	Loafer Creek SRA	113	13			2	1	US Army
Calaveras	California Caverns	43	6			0		US Army
	Parrots Ferry Road	19	3			0		US Army
Contra Costa	Tilden Park-Big Springs	19*	2			0		US Army
	Tilden Park-Curran Trail	24	24			0		US Army
	Tilden Park-Meadow Trail	17	17		4			CDPH-VBDS
	Tilden Park – Nimitz Trail	105	105		2			CDPH-VBDS
	Tilden Park-Padre PA	11*	1			0		US Army
	Tilden Park-Vollmer Peak Trail	29*	3			0		US Army
El Dorado	Bridal Veil Falls PA	7	2			0		US Army
	Icehouse Road	17	2			0		US Army

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County	Location	No. ticks tested	No. pools tested	No. pools positive				Laboratory
				IFA	DFA	PCR		
				<i>Borrelia Spp.</i>	<i>Borrelia spp.</i>	<i>Borrelia spp.</i> <sup>a</sup>	<i>B. burgdorferi</i>	
Lake	Bruner Dr	22	2			0		US Army
	CCC Camp	16	2			0		US Army
	Dorn Trail	15	2			0		US Army
	Glen Eden Trail	61	6			1	1	US Army
	Judge Davis Trail	137	13			4	2	US Army
	Lake Pillsbury	32	4			0		US Army
	Bogg's Mountain	3	2			1	0	US Army
	Parkside Trail	18	2			0		US Army
	Red Bod Trail	15	2			1	1	US Army
Los Angeles	Avalon Canyon	65	7			0		US Army
	Griffith Park-Zoo and Fern Trails	183	19			0		US Army
	Hogsback Road	63	7			0		US Army
	Monrovia Canyon Park	81	9			0		US Army
	One Hour Horse Trail	142	16			0		US Army
	Trask BSA	186	19			0		US Army
Mariposa	Indian Flat Campground	2	1			1	1	US Army
	Mariposa Reservoir	19	3			2	2	US Army
	McCabe Campground	29	4			0		US Army
	Midpines	3	1			0		US Army
Napa	Main CG, Bothe-Napa SP	84	84	2				Napa MAD
	Bale Grist Mill SHP	44	44	0				Napa MAD
	Skyline Wilderness Park	90	90	0				Napa MAD
	Table Rock Trail	88	88	4				Napa MAD
Placer	Driver's Flat	145	15			0		US Army
Riverside	Kenworthy Fire Station	4	2			0		US Army
	Santa Rosa Plateau	110	24			0		US Army
	Thomas Mountain	8	3			0		US Army
San Bernardino	Butterfield Ranch	2	1	0				Sonoma Co PHL
	Chino Hills SP	96	25	0				Sonoma Co PHL
Santa Clara	Henry Coe SP - Corral Trail	75	8			4	2	US Army
	Henry Coe SP - Corral Trail	1*	1			0		US Army
	Henry Coe SP - Forest Trail	280	29			9	9	US Army
	Henry Coe SP - Forest Trail	56*	7			3	1	US Army



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[www.calsurv.org](http://www.calsurv.org)

County	Location	No. ticks tested	No. pools tested	No. pools positive				Laboratory
				IFA	DFA	PCR		
				<i>Borrelia</i> Spp.	<i>Borrelia</i> spp.	<i>Borrelia</i> spp. <sup>a</sup>	<i>B. burgdorferi</i>	
Santa Cruz	Armory-Delaveaga Park	43	6			1	1	US Army
	Fuel Break Road	77	10			2	1	US Army
	Fuel Break Road	18*	2			1	0	US Army
	George's PA	67	7			0		US Army
	Nisene Marks	32	4			0		US Army
	Pogonip Creek	5	2			0		US Army
	Pogonip Creek	10*	1			0		US Army
	U-Con Trail	73	9			0		US Army
Shasta	Hirz Bay CG	127	127		0			CDPH-VBDS
	McCloud Bridge CG	27	27		0			CDPH-VBDS
	Pollard Gulch RA	82	82		1			CDPH-VBDS
Sonoma	Diamond A	207	21			1	0	US Army
	Camp Via	167*	18			6	3	US Army
	Tilton Road – Sebastopol	71	9			0		US Army
Trinity	Stoney Creek PA	48	7			1	0	US Army
Tuolumne	Columbia SP	4	2			0		US Army
Ventura	Arroyo Conejo	22	2			0		US Army
Total ticks tested		4060	1347					
Total pools positive				<b>8</b>	<b>8</b>	<b>42</b>	<b>25</b>	

\* Nymphs

CG, Campground  
PA, Picnic Area  
SHP, State Historic Park  
SP, State Park  
SRA, State Recreation Area

Laboratory: US Army, United States Army Center for Health Promotion and Preventive Medicine - West  
CDPH-VBDS, California Department of Public Health, Vector-Borne Disease Section  
Napa MAD, Napa County Mosquito Abatement District  
Sonoma Co PHL, Sonoma County Public Health Laboratory

<sup>a</sup>PCR primer sets were specific for *B. burgdorferi*

**If you have questions about the information contained in this report, please contact your CDPH VBDS Regional Biologist, or VBDS Headquarters at 916-552-9730.**