

Zoonotic Disease

A Zoonotic Disease Summary for Public Health Personnel in the United States Army

INSIDE

2 Executive Summary

3 Human Disease Summary

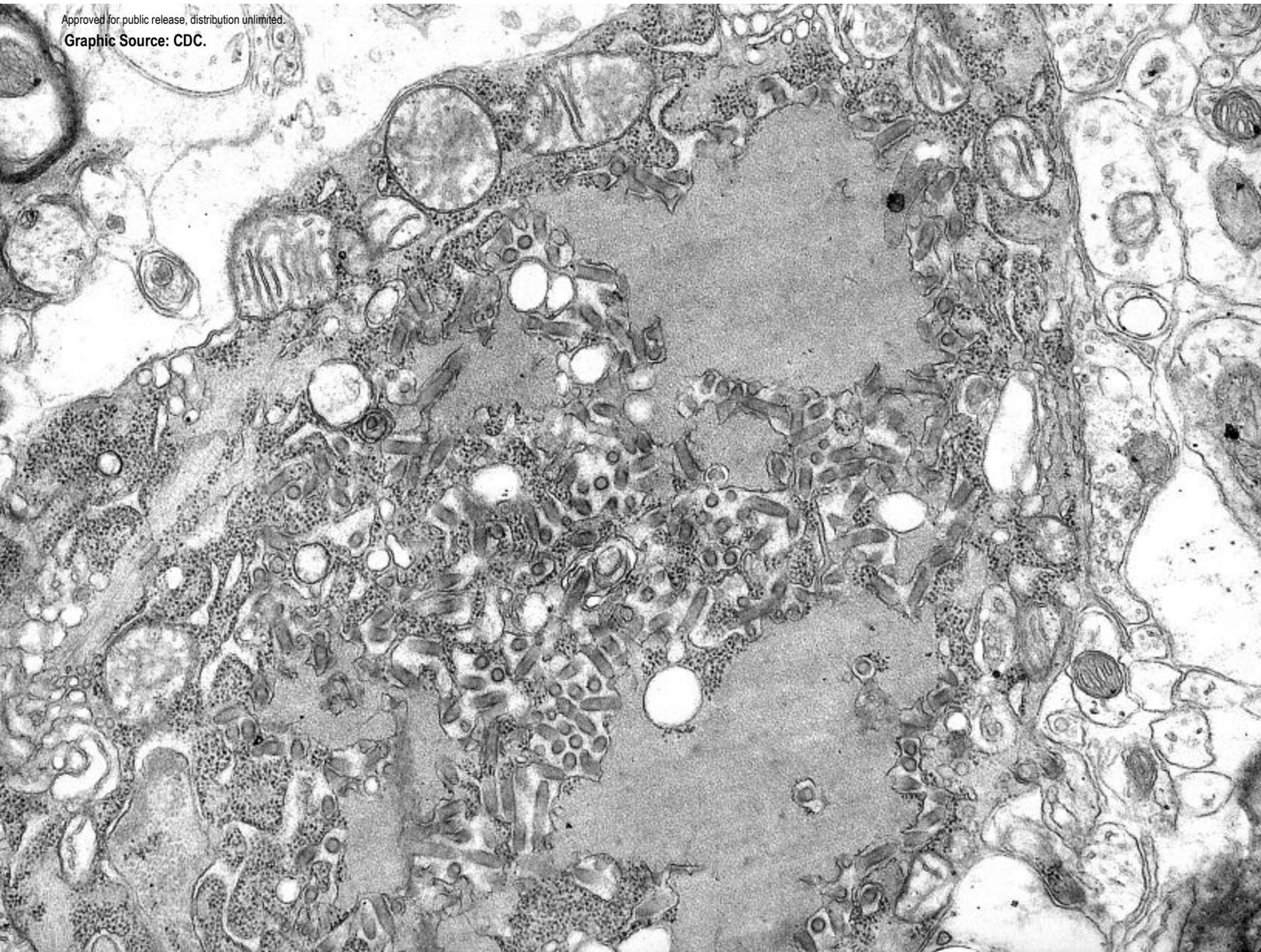
6 Animal Disease Summary

9 Vector Surveillance Summary

12 Focus On: Rabies

13 References

Approved for public release, distribution unlimited.
Graphic Source: CDC.



Executive Summary

Human Disease

- In the first quarter of 2013, zoonotic diseases accounted for 4% (16 of 450) of all reported medical events, excluding sexually transmitted infections, (STIs). This was true for the US Army Active Duty (AD) Service Members (SMs) population, the non-AD beneficiary population (family members and retirees), and the overall population.
- During the same period, 15 cases of borreliosis, including Lyme disease, were reported in Disease Reporting System-internet (DRSi): 7 in AD SMs and 8 in non-AD beneficiaries. Five cases were from MTFs (Medical Treatment Facility) in the PHC Region-Europe (PHCR-Europe) area, 8 from MTFs in PHC Region-North (PHCR-North) area, and 1 from Tripler in PHC Region-Pacific (PHCR-Pacific). Review of medical records and health insurance claims identified an additional 97 patients (19 AD SMs and 78 non-AD beneficiaries) with visits coded for borreliosis.
- No hantavirus cases were reported from Army installations or among Soldiers at non-Army installations during this period of time. Among non-Department of Defense (DoD) populations, multiple cases of hantavirus have been reported in North and South America, as well as the United Kingdom. The North American cases were all suspected to be Sin Nombre virus. The Canadian case was the farthest North that hantavirus had ever been reported. Seoul virus was detected in domesticated and wild rats as well as in humans in the United Kingdom.

Animal Disease Summary

- In the first quarter, six rabies samples were collected in animal populations that impact DoD personnel overseas. Five of the six animal specimens submitted for testing to the PHCR-Europe Laboratory Sciences from Central Command, Turkey, and Italy tested negative for rabies. One of those samples was indeterminate for rabies. These six animals were associated with five human exposures. None of the 13 animal specimens submitted for testing to the PHC Region-South (PHCR-South) Laboratory Sciences were positive for rabies. All results were communicated back to the veterinarians who submitted the samples for testing.
- Stray cats being cared for by non-DoD individuals in New Jersey were determined to be rabid; post-exposure prophylaxis was provided to the family, and rabies boosters to two pet dogs.
- There is an ongoing outbreak of rabies in Greece. Greece had been free from rabies for 25 years prior to this outbreak. Peru had a rabies outbreak in their cattle, which were likely infected by vampire bats.
- Influenza A(H5N1) activity continues in domestic bird flocks in six countries in southeast Asia. Of these six countries, Vietnam experienced the largest number of events; they had 18 outbreaks among their domesticated flocks dur-

Vector Surveillance Summary

- During the first quarter of 2013, both *Ixodes scapularis* and *Amblyomma americanum* ticks were removed from human and animal hosts in the Middle Atlantic and southern regions of the United States and submitted for testing to the DoD Tick Test Kit Program (human patient ticks) and PHCR-North Laboratory Services (animal patient ticks). 17% (3 of 18) of the *Ixodes scapularis* ticks taken from human patients were tested positive for *Borrelia burgdorferi*, the causative agent of Lyme disease.
- PHCR-North Laboratory Sciences conducted a tick collection at Joint Base Langley-Eustis in the spring of 2012. Of the 96 ticks collected, 93 were *Amblyomma americanum* ticks and one of these ticks tested positive for *Ehrlichia ewingii*. In addition, a single *Amblyomma maculatum* tick was collected and tested positive for *Rickettsia parkeri*.
- West Nile Virus surveillance in the National Capitol Area will commence at the end of May. PHCR-North Laboratory Services will oversee this surveillance program.

Human Disease Summary: US Army Soldiers and Non-AD Beneficiaries

Zoonotic Diseases Reported in DRSi from Army Installations and in Soldiers at Navy Installations, 1 January to 31 March 2013				
Installation	Borreliosis		Q Fever	
	Active Duty	Non-AD Beneficiary	Active Duty	Non-AD Beneficiary
PHCR-Europe				
Baumholder, Germany		1		
Grafenwoehr, Germany	1		1	
Katterbach, Germany	1			
Landstuhl, Germany		1		
Vilseck, Germany	1			
TOTAL	3	2	1	0
PHCR-North				
Aberdeen Proving Ground, MD		1		
Ft Belvoir, VA	1			
Ft Lee, VA		1		
JB Myer-Henderson Hall, VA		1		
Susquehanna, PA		1		
Walter Reed National Military Medical Center, MD	1	1		
West Point, NY	1			
TOTAL	3	5	0	0
PHCR-Pacific				
Tripler, HI	1	1		
TOTAL	1	1	0	0

- Excluding STIs, 450 reportable medical events (RMEs) were submitted in DRSi from 1 January to 31 March 2013 from MTFs in the PHCR areas. Of these, 16 (4%) were for zoonotic diseases, 8 in Active Duty Service Members (AD SMs) and 8 in non-AD beneficiaries. During this same time period in 2012, 25 RMEs had been reported in DRSi for a zoonotic disease; 12 in AD SMs and 13 in non-AD beneficiaries.
- Borreliosis (including Lyme disease) was reported in 5 individuals at MTFs in PHCR-Europe area and 8 individuals at MTFs in PHCR-North area between 1 January 2013 to 31 March 2013. During this same time period in 2012, borreliosis was reported in 15 individuals at MTFs in PHCR-Europe area and 6 individuals at MTFs in PHCR-North area.
- An SM from Europe presented with acute fever in February. Serologic testing revealed an incidental diagnosis of a previous infection with *Coxiella burnetii*, the causative agent of Q fever, but the acute fever with which the patient presented in February was not due to this pathogen.

Human Disease Summary: US Army Soldiers and Non-AD Beneficiaries

Zoonotic Diseases Cases Identified from Soldier and Beneficiary Medical Visit Data in M2, 1 January to 31 March 2013

Installation	Borreliosis		Q Fever		Rocky Mountain Spotted Fever		Babesiosis		Leptospirosis		Cutaneous Leishmaniasis		West Nile fever virus		Brucellosis		Crimean Congo Hemorrhagic Fever	
	AD	BEN	AD	BEN	AD	BEN	AD	BEN	AD	BEN	AD	BEN	AD	BEN	AD	BEN	AD	BEN
PHCR-Europe																		
Landstuhl Vicenza	3 1	6 1																
PHCR-North																		
Ft Belvoir	10	54				2												
Ft Knox	3	2					1				1							
Ft Bragg	5	11				1					2							
West Point	1	11										1						
PHCR-South																		
Ft Campbell	2	5		1		1												
Ft Hood		5	1	1		1		1		1				1				1
Ft Gordon	1	2																
Ft Benning	4	1			1											1		
Ft Sill	1																	
Joint Base San Antonio	2	4																
Ft Stewart	1	2	1															
Ft Polk																		1
Ft Jackson		2								1								
PHCR-West																		
Ft Wainwright		1								1	1							
Ft Carson	1	6	1															
Ft Riley	2	3	1	1														
Joint Base Lewis McChord	3	4	1								1							
Ft Irwin	1																	
Ft Bliss	2	3																
Ft Leonard Wood		4																
PHCR-Pacific																		
Seoul	2	1																
Ft Shafter		2							2									
Total	45	130	5	3	1	5	1	1	2	3	5	1	0	1	0	1	0	2

- In- and outpatient records were reviewed for zoonotic disease diagnoses at MTFs in the PHC regions. Verification of cases was not possible due to lack of access to full medical records. Cases listed in this section may not meet RME guidelines or may represent follow-up encounters of incident cases from previous time periods.
- Borreliosis (including Lyme disease) was the most common diagnostic code used; 45 Active Duty Service Members (AD SMs) and 130 non-AD beneficiaries had visits associated with this code.
- Visits coded for Q fever and cutaneous leishmaniasis were primarily from installations where major combatant commands are located, likely because Army cases are often related to deployment. Three cutaneous leishmaniasis cases found in M2 had also been reported in DRSi. These cases as found in M2 are assumed to be follow-up appointments during the first quarter.
- Non-AD beneficiary visits coded for brucellosis (n=1) and Crimean Congo hemorrhagic fever (CCHF) (n=2) were identified in insurance claim records but could not be corroborated. In the US civilian population, the CDC reported 8 cases of brucellosis in the first quarter of 2013, with 122 cases reported in 2012 overall. CCHF is endemic to parts of Africa, Europe, and Asia and diagnosis in the US is usually associated with travel to these areas. Follow-up on a preliminary DRSi entry for one of the leptospirosis cases at Ft Shafter revealed that the laboratory culture was negative.

Human Disease Summary: Notable Medical Events

Civilian Cases of Hantavirus Reported in ProMED, 1 January to 31 March 2013

Location	Hantavirus type	# Cases: confirmed (suspected)	Animal Infected	Illness Type
Americas				
Canada		1		
<i>British Columbia</i>	Sin Nombre*	1	Human	HPS
United States		2		
<i>Oklahoma</i>	Sin Nombre*	1	Human	HPS
<i>Montana</i>	Sin Nombre*	1	Human	HPS
Panama		8		
<i>Los Santos</i>	Choclo*	4	Human	HPS
<i>Veraguas</i>	Choclo*	4	Human	HPS
Bolivia		1 (2)		
<i>La Paz</i>	Laguna Negra*	1 (2)	Human	HPS
Uruguay		1		
<i>Colonia</i>	Central Plata*	1	Human	HPS
Argentina		2 (2)		
<i>Jujuy</i>	Unspecified	(1)	Human	HPS
<i>Neuquen</i>	Andes*	(1)	Human	HPS
<i>Buenos Aires</i>	Unspecified	1	Human	HPS
<i>Salta</i>	Unspecified	1	Human	HPS
Europe				
United Kingdom		9+		
<i>England</i>	Seoul	8	Pet Rats	
<i>England</i>	Seoul	many	Rats	
<i>Wales</i>	Seoul	1	Human	HFRS

- Hantaviruses are a group of viruses found in rodents worldwide. About 20 of these viruses cause human disease. European and Asian viruses can cause Hemorrhagic Fever with Renal Syndrome (HFRS). HFRS caused by European viruses have been reported to have a case fatality rate (CFR) <1% and the HFRS due to Asian viruses have been reported to have a CFR of 15%. Viruses in the Americas can result in Hantavirus Pulmonary Syndrome (HPS); this syndrome may have a case fatality as high as 60%.
- No hantavirus cases were reported from Army installations or from Soldiers at non-Army locations during this period.
- In South America there were 13 confirmed hantavirus cases and 4 suspect cases. 7 deaths were reported.
- Of the three cases reported in North America, the Oklahoma & British Columbia cases died. The Canadian case was the northernmost case of hantavirus recorded in that province.
- The fatal case in Wales was associated with domesticated rats. Sero-surveillance of wild rats revealed the presence of Seoul virus in those populations.
- The presence of hantavirus associated with rats in the UK highlights how easily rodent-borne diseases can spread due to international commerce.

* Denotes the most likely virus based on the known geographic distribution.

Civilian Avian-Associated Human Flu Cases Reported in FAO's EMPRES-I Database, 1 January to 31 March 2013

Africa		
Country	Serotype	# of cases*
Egypt	H5N1	2
Asia		
Cambodia	H5N1	8
China	H5N1	2
	H7N9	1

* Events reported in EMPRES-i are assumed to be individual cases and not disease clusters.

- Since 2003, [WHO](#) reported 468 cases of human influenza A(H5N1) with 262 deaths (56%).
- From 1 January to 31 March 2013, EMPRES-I, the Emergency Prevention System's Global Animal Disease Information System, captured 8 cases of influenza A(H5N1) in Cambodia. In 2012, Cambodia had 21 cases and 19 deaths (90%); China had 43 cases and 19 (44%) deaths; Egypt had 169 cases and 60 (36%) deaths.
- The first human infection with influenza A(H7N9) was also detected during this time period.

Animal Disease Summary: Rabies

Laboratory Services Rabies Specimen Testing, 1 January to 31 March 2013

LABORATORY SERVICES ANIMAL SPECIMEN RABIES TESTING

	Species	Other Species	# Samples Tested	# Human Exposures	# DFA* Indeterminate	% DFA Indeterminate	# DFA Positive	% DFA Positive	# MNA* Positive	% MNA Positive
Central Command										
Afghanistan	Canine		2	1	1	50	0	0	0	0
	Feline		1	1	0	0	0	0	0	0
	TOTAL		3	2	1	33	0	0	0	0
Bahrain	Feline		1	1	0	0	0	0	0	0
	TOTAL		1	1	0	0	0	0	0	0
PHCR-Europe										
Incirlik, Turkey	Feline		1	1	0	0	0	0	0	0
	TOTAL		1	1	0	0	0	0	0	0
Aviano, Italy	Feline		1	1	0	0	0	0	0	0
	TOTAL		1	1	0	0	0	0	0	0
PHCR-South										
Ft Hood, TX	Canine		1	3	0	0	0	0	0	0
	Feline		1	1	0	0	0	0	0	0
	Skunk		1	0	0	0	0	0	0	0
	TOTAL		3	4	0	0	0	0	0	0
Ft Leonard Wood, MO	Bat		1	1	0	0	0	0	0	0
	TOTAL		1	1	0	0	0	0	0	0
Ft Sam Houston, TX	Bat		7	2	0	0	0	0	0	0
	TOTAL		7	2	0	0	0	0	0	0
Ft Stewart, GA	Feline		1	1	0	0	0	0	0	0
	Other	squirrel	1	1	0	0	0	0	0	0
	TOTAL		2	2	0	0	0	0	0	0

*DFA: Direct Fluorescent Antibody; MNA: Mouse Neuroblastoma Cells

- In the first quarter, six rabies samples were collected in animal populations that impact DoD personnel overseas. Five of the six animal specimens submitted for testing to the PHCR-Europe Laboratory Sciences were negative for rabies. One of those samples was indeterminate for rabies. Five human exposures were associated with these specimens, the majority of which were feline (4; 67%). Results were communicated to the individual who submitted the specimen, often a veterinarian.
- Continental United States (CONUS) Army Installations submitted 13 specimens to the PHCR-South Laboratory Sciences. Of these, 8 (62%) were bats, 2 (15%) were cats, and there was 1 (8%) skunk, squirrel, and dog each. These specimens had 9 associated human exposures, but none of the specimens tested positive for rabies. Across the US, the [CDC](#) reported 48 rabid animals identified in the first quarter of 2013.

Animal Disease Summary: Rabies

International Rabies Reporting through FAO's EMPRES-I, 1 January to 31 March 2013

Country	Animal Infected	Animal Type	# Events
Peru	Cattle	Domestic	27
	Horse	Domestic	1
Greece	Cats	Domestic	1
	Red fox	Wild	8
Slovakia	Red fox	Wild	3

- Livestock populations are at risk of rabies outbreaks due to wildlife exposure. In South America, including Peru, rabies outbreaks in livestock have been attributed to vampire bats. Peru reported 28 rabies outbreaks in the first quarter of 2013, which highlights the severity of the problem and the threat of the vampire bat.

- The affected regions in Greece border rabies-endemic areas of Macedonia and Albania. Prior to this outbreak, rabies was absent from Greece for 25 years.

Rabies Cases in the United States Reported in ProMED, 1 January to 31 March 2013

State	# of Animal Cases	Animal Infected	Animal Type
Maryland	1	Human	
Georgia	1	Llama	Domestic
Massachusetts	1	Bobcat	Wild
New Jersey	1	Cat	Stray

- Overall, four animal cases and one human case were reported between 1 January and 31 March 2013. The human case was associated with organ transplantation and was due to the raccoon variant of rabies. The organ donor had been bitten by two raccoons in the preceding few years; the last bite was seventeen months prior to donating his organs. National guidelines for organ donor screening currently include questions about animal bites in the six months prior to death. Donor organs are not routinely tested for rabies due to the rarity of infection in the United States and the lack of a rabid rabies test. The donor's organs were screened and cleared by a civilian organ procurement office.
- A feral cat in New Jersey resulted in potential rabies exposures for four people and two pet dogs. All of the people received post-exposure prophylaxis and two dogs were given rabies boosters as a precaution.
- The rabid llama exposed four individuals and the rabid bobcat exposed two individuals. According to the information captured by ProMED, all of the exposed individuals received post-exposure prophylaxis as a precaution.
- During this time period, there were no rabies cases reported in Active Duty Soldiers or their dependents, nor were there any cases reported from US Army installations.

Animal Disease Summary: Tick-borne Disease

Laboratory Services Animal Serum Testing, 1 January to 31 March 2013

- PHCR-North Laboratory Sciences tests clinical samples and, when available, ticks submitted by US Army veterinarians for tick-borne disease detection.
- Diseases tested for include: *Babesia canis*, *Babesia microti*, *Borrelia burgdorferi*, *Ehrlichia chaffeensis*, *Ehrlichia ewingii*, *Ehrlichia canis*, *Anaplasma phagocytophilum*, *Rickettsia* spp., *Leishmania* spp., *Bartonella* spp.
- In this quarter four Military Working Dogs (MWDs) and three pet dogs had serum samples submitted for testing. None of these samples were positive for a tick-borne disease.
 - Three MWD samples were submitted by the Ft Belvoir VTF and one by the Ft Knox VTF.
 - The three pet samples were from the Ft Belvoir VTF.
- One *Ixodes scapularis* tick found on a MWD was submitted for analysis by Ft. Belvoir, VA. No pathogenic organisms were detected in the sample.

International Avian Influenza Reported in FAO's EMPRES-I, 1 January to 31 March 2013

Country	Influenza Serotype	Animal(s) Infected	Animal Type	# of Events
Hong Kong				
	H5N1	Black-headed gull	Wild	1
Bhutan				
	H5N1	Chicken	Domestic	1
	H5N1	Unspecified bird	Domestic	1
Cambodia				
	H5N1	Chicken, Quail, Pigeon	Domestic	1
	H5N1	Duck	Domestic	2
India				
	H5N1	Unspecified bird	Domestic	4
Nepal				
	H5N1	Chicken	Domestic	1
	H5N1	Northern pintail duck	Wild	1
Vietnam				
	H5N1	Chicken	Domestic	8
	H5N1	Water fowl	Domestic	5
	H5N1	Unspecified bird	Domestic	1
	H5N1	Chicken	Domestic	2
	H5N1	Chicken & Duck	Domestic	1
	H5N1	Chicken, Duck, Geese	Domestic	1
	H5N1	Duck	Domestic	1

- H5N1 infections occurred in domestic poultry flocks and water fowl throughout Southeast Asia.
- Water fowl spread the disease and act as a reservoir. They rarely show clinical signs, but shed the virus in their feces.
- Water fowl have been falsely implicated with the western spread of H5N1. These birds migrate in a north-south direction and often within a given region. Human beings were responsible for the majority of the spread of H5N1 from southeast Asia because of the practices of home slaughter of water fowl and handling of diseased or dead fowl prior to proper cooking.
- Due to the limited human-to-human transmission associated with influenza A(H5N1), the monitoring of bird flocks is necessary in order to understand the geographic risk to humans.
- Human cases in this quarter arose from Egypt, Cambodia, and China, yet only Cambodia reported cases in their bird population.

Vector Surveillance: Tick Summary

Department of Defense Human Tick Test Kit Program, 1 January to 31 March 2013												
Installation	Tick Species	Total #	<i>Babesia microti</i>	<i>Anaplasma phagocytophilum</i>	<i>Ehrlichia chaffeensis</i>	<i>Ehrlichia ewingii</i>	<i>Borrelia burgdorferi</i>					
PHCR-North												
Aberdeen Proving Ground, MD		#	#	%	#	%	#	%	#	%	#	%
	<i>Ixodes scapularis</i>	7	0	0	0	0					2	29
	Total:	7	0	0	0	0					2	29
Ft Belvoir, VA		#	#	%	#	%	#	%	#	%	#	%
	<i>Ixodes scapularis</i>	5	0	0	0	0					0	0
	Total:	5	0	0	0	0					0	0
Ft Eustis, VA		#	#	%	#	%	#	%	#	%	#	%
	<i>Ambylomma americanum</i>	1					0	0	0	0		
	Total:	1					0	0	0	0		
Ft Indiantown Gap, PA, USARNG		#	#	%	#	%	#	%	#	%	#	%
	<i>Ixodes scapularis</i>	1	0	0	0	0					1	100
	Total:	1	0	0	0	0					1	100
Ft Myer, VA		#	#	%	#	%	#	%	#	%	#	%
	<i>Ixodes scapularis</i>	3	0	0	0	0					0	0
	Total:	3	0	0	0	0					0	0
JB Dix-Lakehurst-McGuire, NJ		#	#	%	#	%	#	%	#	%	#	%
	<i>Ixodes scapularis</i>	2	0	0	0	0					0	0
	Total:	2	0	0	0	0					0	0
PHCR-South												
Ft Campbell, KY		#	#	%	#	%	#	%	#	%	#	%
	<i>Ambylomma americanum</i>	1					0	0	0	0		
	Total:	1					0	0	0	0		
Ft Rucker, AL		#	#	%	#	%	#	%	#	%	#	%
	<i>Ixodes scapularis</i>	1	0	0	0	0					0	0
	Total:	1	0	0	0	0					0	0
Jordan Dam Corps of Engineers, NC		#	#	%	#	%	#	%	#	%	#	%
	<i>Ambylomma americanum</i>	1					0	0	0	0		
	Total:	1					0	0	0	0		

Vector Surveillance: Tick Summary

DOD Human Tick Test Kit Program, 1 January to 31 March 2013

- The DOD Human Tick Test Kit Program at AIPH conducted testing on ticks collected from human patients. 22 ticks were submitted from 1 January to 31 March 2013. All testing was done on individual ticks; none were pooled.
- The majority of ticks submitted to AIPH from humans in PHCR-North were *Ixodes* spp. (18). Of these ticks, three (17%) were positive for *Borrelia burgdorferi*, the causative agent of Lyme disease. Three ticks were submitted by PHC Region South, two were *Amblyomma* spp. (67%) but none tested positive for disease.
- To submit tick specimens collected from human patients, contact the DOD Human Tick Test Kit Program at the AIPH Entomological Sciences Program. The contact information can be found at this website: <http://phc.amedd.army.mil/organization/institute/dehe/Pages/EntomologicalSciencesProgram.aspx>.

Environmental Tick Collection Program, 1 January to 31 March 2013

Installation	Date Collected	Tick Type	# tested	<i>Babesia microti</i>	<i>Babesia canis</i>	<i>Anaplasma phagocytophilum</i>	<i>Ehrlichia chaffeensis</i>	<i>Ehrlichia ewingii</i>	<i>Borrelia burgdorferi</i>	<i>Rickettsia parkeri</i>	<i>Rickettsia rickettsii</i>
PHCR-North											
Joint Base Langley Eustis, VA			#	#	%	#	%	#	%	#	%
<i>Ticks Collected from the Environment</i>											
	1 March to 31 July 2012	<i>Dermacentor variabilis</i>	3								0 0
		<i>Amblyomma americanum</i>	58					0 0			
		Total:	61					0 0			
<i>Ticks Collected from Animals</i>											
	1 March to 31 July 2012	<i>Dermacentor variabilis</i>	1								0 0
		<i>Ixodes affinis</i>	1	0 0	0 0				0 0		
		<i>Amblyomma</i>	93					1 1			
		<i>Amblyomma maculatum</i>	1							1 100	
		Total:	96					1 1		1 1	

- Tick collection from Joint Base Langley-Eustis was conducted from 1 March to 31 July 2012 by PHCR-North Laboratory Sciences and testing was completed in the first quarter of 2013.
- Only *Amblyomma* spp. ticks collected from animal hosts tested positive for infectious diseases.
 - One *A. americanum* tick was positive for *E. ewingii*, one of the causes of ehrlichiosis. However, the CDC reports that in the US, the majority of ehrlichiosis cases are caused by *E. chaffeensis*.
 - One *A. maculatum* tick collected tested positive for *Rickettsia parkeri*.

Vector Surveillance: Mosquito Summary

- AFRICOM's Combined Joint Task Force's Surgeon Cell submitted 5,184 mosquitoes from the Horn of Africa to PHCR-Europe for speciation and testing.
 - 5,129 (99%) were *Culex* spp. *Culex* mosquitoes in Africa currently pose little disease risk. Should West Nile fever virus become a greater threat in the area, then PHCR-Europe Laboratory Services will be able to conduct testing to evaluate that risk.
 - 55 (1%) were *Aedes* spp. The greatest threats from *Aedes* mosquitoes in the Horn of Africa is from dengue fever virus, Rift Valley fever virus, and chikungunya fever virus.
- PHCR-North will initiate its annual mosquito surveillance in the National Capitol Region (NCR) on 28 May 2013. PHCR-South and PHCR-Europe also conduct annual mosquito surveillance to monitor mosquito-borne diseases.
 - Last year, West Nile Virus (WNV) had a significant human health impact. According to PHCR-North, more than 75 confirmed human cases, including 9 fatalities, occurred in the NCR. No Army Soldiers or non-AD beneficiaries were reported to have contracted WNV, although cases in Soldiers and non-AD beneficiaries were reported from other parts of the country, particularly in Texas.

Additional Information

Tick Identification

Source: Public Health Command Visual Information Division



Ixodes scapularis (Deer tick; Blacklegged tick)
Ventral and dorsal view

Amblyomma americanum (Lone star tick)
Ventral and dorsal view

External Resources

- Free webinar CME course: [Recognizing and Treating Tick-Borne Diseases](#).
 - Missouri State Department of Health and Senior Services and DEET Education Program
- [Tick Removal Procedures](#)
 - CDC/NCEZID/DVBD

Focus On: Rabies

An Overview

- Rabies virus belongs to the genus *Lyssavirus* of the family Rhabdoviridae (image seen on the cover of this summary). It is a neurotropic virus that produces a flaccid paralysis in the infected mammal. There are many variants of the rabies virus. Each variant is generally maintained in a host species, but any mammal is susceptible to any variant and one variant can become established within a new species. The canine variant in the United States developed into the various wildlife variants currently endemic throughout the country.
- There are more than 55,000 human rabies deaths worldwide every year, and the majority of these deaths are due to the canine variant. The most affected populations are in southeast Asia and sub-Saharan Africa and children have the greatest risk of infection within these populations. Many developed countries have human and animal cases of this disease every year as well. There are only a handful of locations that are considered rabies-free, including the United Kingdom, Japan, Australia, and Hawaii. Pet importation laws regarding proof of rabies vaccination and serologic testing to prove the vaccination efficacy are used to help maintain this rabies-free status. In recent years, the most common cause of human rabies in the continental United States is from rabid bats.
- Rabies exposures are a result of any saliva contact with an open wound or mucous membranes and can be bites and scratches from any potentially rabid animal, as well as saliva contact from these animals. Only vaccinated animals and small mammals such as rodents are considered a low-risk rabies exposure. All other unvaccinated animals that expose a human to saliva must be considered a potential rabies suspect. This includes livestock species.
- There are effective pre-exposure prophylaxis for at-risk humans and pets as well as effective post-exposure prophylaxis for potentially exposed individuals. For all individuals exposed to a rabid animal, post-exposure prophylactic vaccinations need to be given prior to the development of clinical signs in order to prevent death. This requires four vaccinations for previously unvaccinated individuals and three vaccinations for previously vaccinated individuals. For those without a pre-exposure prophylaxis, human rabies immunoglobulin must also be administered after exposure. The [Milwaukee Protocol](#), the medical protocol developed to treat individuals with symptoms for rabies, has been successful in saving 4 of 31 individuals who were treated.

Pathogenesis

- Animals will typically develop disease within six months and humans in one to three months, although the incubation period is highly variable. It varies based on the distance of the site of exposure from the central nervous system (CNS), the amount of virus inoculated into the tissue, and possibly the variant as well.
- After the virus enters the tissue, the virus multiplies at the site and eventually enters the peripheral nerve. It then travels retrograde to the central nervous system. No humoral immune response is generated during this period, thus no antibodies are created. Therefore, early blood tests do not show evidence of the infection.
- Upon reaching the CNS, the virus multiplies in the brain and invades the salivary glands. Virus is then shed through the saliva, which can occur 3-5 days prior to exhibiting clinical signs. The associated encephalitis results in neurologic signs, which determine if the hyper-excitable (furious form) or the generalized paralysis (dumb form) of rabies is present. At this point the virus is spread throughout the body through the peripheral nervous system and a humoral immune response is mounted. Antibodies are now detectable in the blood.
- The final result is a rapidly progressing flaccid paralysis. Individuals and animals exhibit lethargy or overly aggressive behavior (dumb versus furious rabies in animals), vocalizations, and hydrophobia associated with an inability to swallow. The infected human or animal eventually succumbs to respiratory paralysis.
- For more information and to view references click [here](#) or visit the [CDC website](#).

Reference: Data Resource Summary

Case Definitions and Incidence Rules Used for Human Zoonotic Disease Surveillance:

For this report, zoonotic diseases were defined as diseases with an animal host or reservoir that can be transmitted to a human. RME definitions or ICD-9 codes were used to select medical encounters as suggested in the 2012 Armed Forces RME Guidelines and Case Definitions. Armed Forces Health Surveillance Center (AFHSC) case definitions and incident rules were then applied: one RME or one inpatient encounter with any of the defining diagnoses in any diagnostic position is considered a case. Borreliosis, Crimean-Congo hemorrhagic fever, eastern/western equine arboviruses and West Nile fever virus all must have two outpatient encounters occurring within 60 days of each other, with any of the defining ICD-9 codes in any diagnostic position to be considered an outpatient case.

More information on these rules can be found at: http://afhsc.mil/viewDocument?file=CaseDefs/Web_11_INFECTIOUS_DISEASE_NOV11.pdf.

The Military Health System Management Analysis and Reporting Tool (M2)

M2 is a web-based medical and personnel data repository that contains information on military medical treatment facility medical records, demographic data, laboratory records, as well as Tricare insurance claims (inpatient and outpatient). M2 was queried based on zoonotic disease ICD-9 codes as referenced in the 2012 Armed Forces RME Guidelines and Case Definitions. ICD-9 codes were used to select medical encounters from the first quarter of 2013 based on the date of service variable in M2. Data were pulled to identify inpatient and outpatient encounters for those patients who had received military medical facility care and services purchased through the Tricare Management Agency medical insurance program.

Disease Reporting System-internet (DRSi)

DRSi is a web-based application developed by the Navy that the Army uses to monitor RMEs. Cases that meet RME case definitions are entered manually by personnel at each MTF into the DRSi platform. These medical event reports are reviewed at the US Army Public Health Command Disease Epidemiology Program for completeness and accuracy. For this report, the system was queried based on date of diagnosis for all medical event reports entered between 1 January and 31 March 2013.

US Army Public Health Command Laboratory Sciences Portfolio

US Army Public Health Command Laboratory Sciences at the Army Institute of Public Health (AIPH) and PHCR-Europe, -North, and -South completed all of the vector-borne surveillance testing and US Army installation-related rabies specimen testing. Each PHCR collated the results from their area of responsibility and sent the data to the USAPHC Disease Epidemiology program at the end of the quarter for the purposes of this Zoonotic Disease Summary.

Global Animal Disease Information System (EMPRES-i)

EMPRES is the Emergency Prevention System group within the Food and Agricultural Organization of the United Nations (FAO). EMPRES has developed the database EMPRES-i, which stands for the Emergency Prevention System's Global Animal Disease Information System. The EMPRES-i system uses official and unofficial sources to confirm or deny reports of animal disease. For the purposes of this report, all confirmed H5N1, H7N9, and rabies events with distinct identification numbers were considered separate events. Events were queried based on the date of report into the system.

Program for Monitoring Emerging Diseases (ProMED)

The Program for Monitoring Emerging Diseases (ProMED) is an internet-based system for rapid global dissemination on issues of public health concern, and is managed by the International Society for Infectious Diseases. It is populated by a variety of sources, including official notifications and media alerts; reports can be contributed by individual subscribers as well. Submissions are reviewed by qualified moderators before being posted to the system for global dissemination. For the purposes of this report, each alert was individually assessed to determine the number and location of events. When case counts could be ascertained, they were summarized; otherwise the number of different events were reported. Follow-up reports were not included. ProMED mail was searched using the search function on the website for key events identified over the course of the quarter by the authors, who monitor the ProMED emails as part of their daily routines.

US Army Public Health Command Zoonotic Disease Summary

Other Disease Epidemiology Program Resources:

Epidemiology Training: <http://phc.amedd.army.mil/topics/healthsurv/de/Pages/Epi-TechTraining.aspx>

DRSi Resources: <http://phc.amedd.army.mil/topics/healthsurv/de/Pages/DRSiResources.aspx>

Resource Materials: <http://phc.amedd.army.mil/topics/healthsurv/de/Pages/ResourceMaterials.aspx>

Approved for public release, distribution unlimited