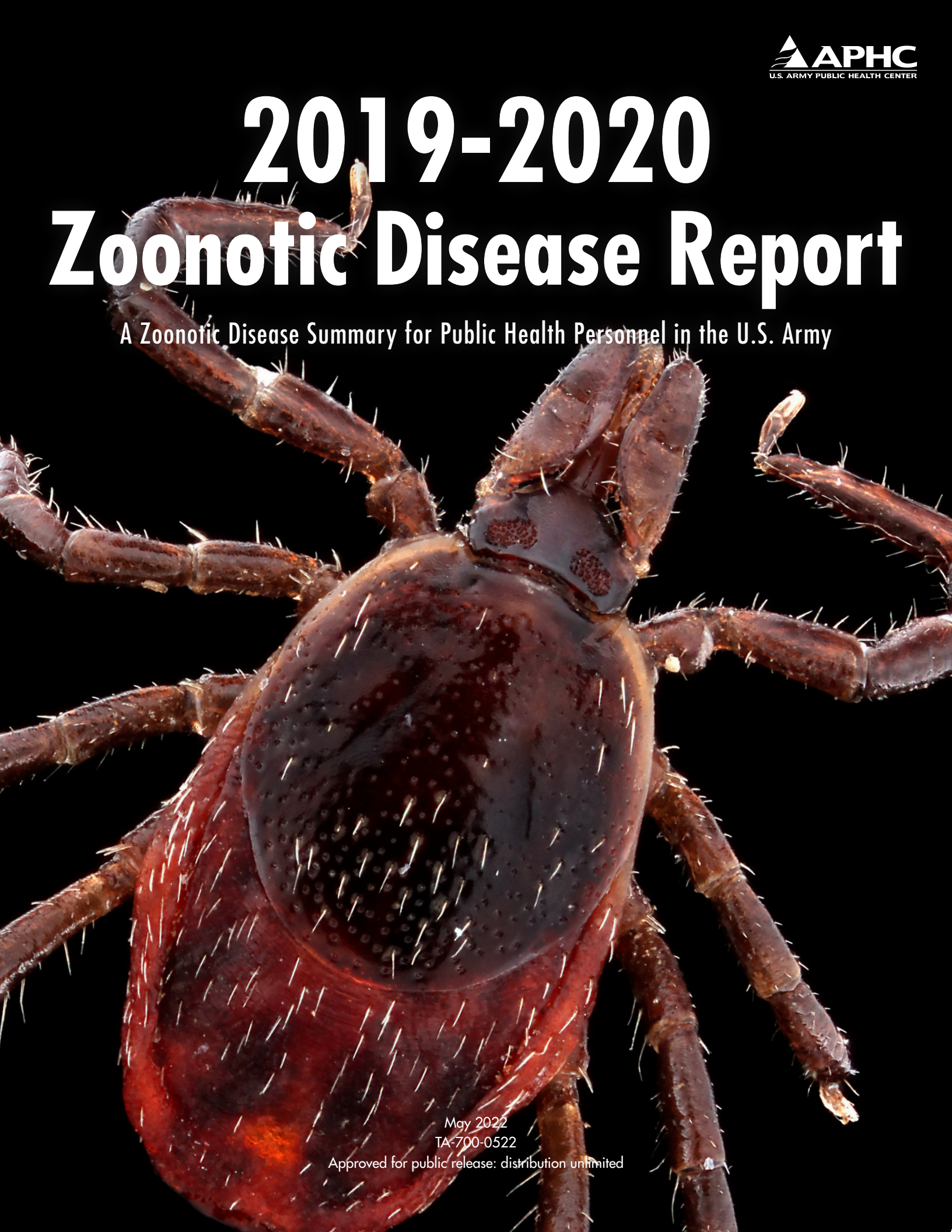
APHC
U.S. ARMY PUBLIC HEALTH CENTER

2019-2020 Zoonotic Disease Report

A Zoonotic Disease Summary for Public Health Personnel in the U.S. Army



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Cover photo: U.S. Army, APHC photo by Graham Snodgrass

Data Sources

U.S. Army Public Health Center (APHC) and Public Health Command (PHC) Laboratories, and the Department of Defense Food Analysis and Diagnostics Laboratory (DoD FADL)

The Military Tick Identification/Infection Confirmation Kit (MilTICK) is a service provided by the Tick-Borne Disease Laboratory at the APHC. It is a free tick testing and identification service available for ticks removed from Department of Defense (DoD) personnel and their dependents. For more information about MilTICK, visit https://phc.amedd.army.mil/topics/envirohealth/epm/Pages/HumanTickTestKitProgram.aspx

The Tick-Borne Disease Laboratory at the APHC and laboratories within each Public Health Command (PHC) completed all of the vector-surveillance testing included in the report.

The DoD FADL completed rabies specimen testing and furnished data to the APHC. Calendar year 2020 rabies-testing data were unavailable at the time of publishing.

Collection and testing efforts were affected by logistical issues and the response to the COVID-19 pandemic during 2019 and 2020, respectively.

Defense Manpower Data Center (DMDC)

Army active-duty (AD) population estimates were calculated using monthly DMDC personnel rosters. The average of the monthly values were used to calculate annual population estimates.

Disease Reporting System internet (DRSi)

The DRSi is a passive surveillance system that the Army uses to monitor reportable medical events (RMEs); it was developed by the Navy and Marine Corps Public Health Center. Cases that meet RME case definitions, as defined in the Armed Forces Reportable Medical Events Guidelines and Case Definitions, are entered into the DRSi by staff members at military medical treatment facilities. Epidemiologists at the APHC review these medical event reports for completeness and accuracy.

For the human disease summary in this zoonotic disease report, DRSi medical event reports (MERs) must meet all of the following criteria:

1. MERs should be final, i.e. all available information about the case has been entered into the system;
2. MERs should have a case classification of confirmed, probable, or suspected (case classifications are disease-specific);
3. The individual described in the MER may be anyone that visited an Army medical treatment facility (regardless of beneficiary status) or an Army beneficiary that visited a non-Army medical treatment facility (this does not include civilian medical treatment facilities).

Cases are categorized by beneficiary status: Army AD Soldiers are designated as 'Army AD Soldiers' and all other individuals that meet the analysis criteria are designated as 'Other individuals'. Rates are only calculated for Army AD Soldiers due to the availability of population estimates, and all results should be interpreted with caution due to under-reporting of zoonotic diseases in the DRSi.

Government and Privately-owned Animal Worldwide Surveillance System (GPAWSS)

GPAWSS is a companion animal (canine and felines) disease surveillance system for Government Owned Animals and Privately Owned Animals seen in DoD Veterinary Treatment Facilities (VTFs). GPAWSS-Zoonoses,

the first component of GPAWSS launched in 2019, captures 12 zoonotic diseases that are entered onto a patients' Master Problem List (MPL) by VTF personnel. A case is captured if it meets the following criteria: 1) the disease is on a companion animal patient's MPL and 2) the disease is on the list of GPAWSS-Zoonoses monitored diseases. All case classifications (suspected, probable, and/or confirmed) are included in case counts. The zoonotic disease incidence is the number of new cases of disease per 10,000 outpatient visits (OPVs) per month. The numerator for this calculation is the monthly companion animal zoonotic disease case count. The denominator is the total number of monthly OPVs. This fraction is then multiplied by 10,000 to yield the monthly disease incidence. This calculation allows for comparison between facilities or geographic areas regardless of caseload.

Companion animal zoonotic disease case count data and OPV data for this report includes data from 1 January 2019 to 31 December 2020. The training population of military working dogs (MWDs) located at the DoD MWD Veterinary Service is excluded from these data.

Human Disease Summary: Zoonotic Disease-Related Reportable Medical Events

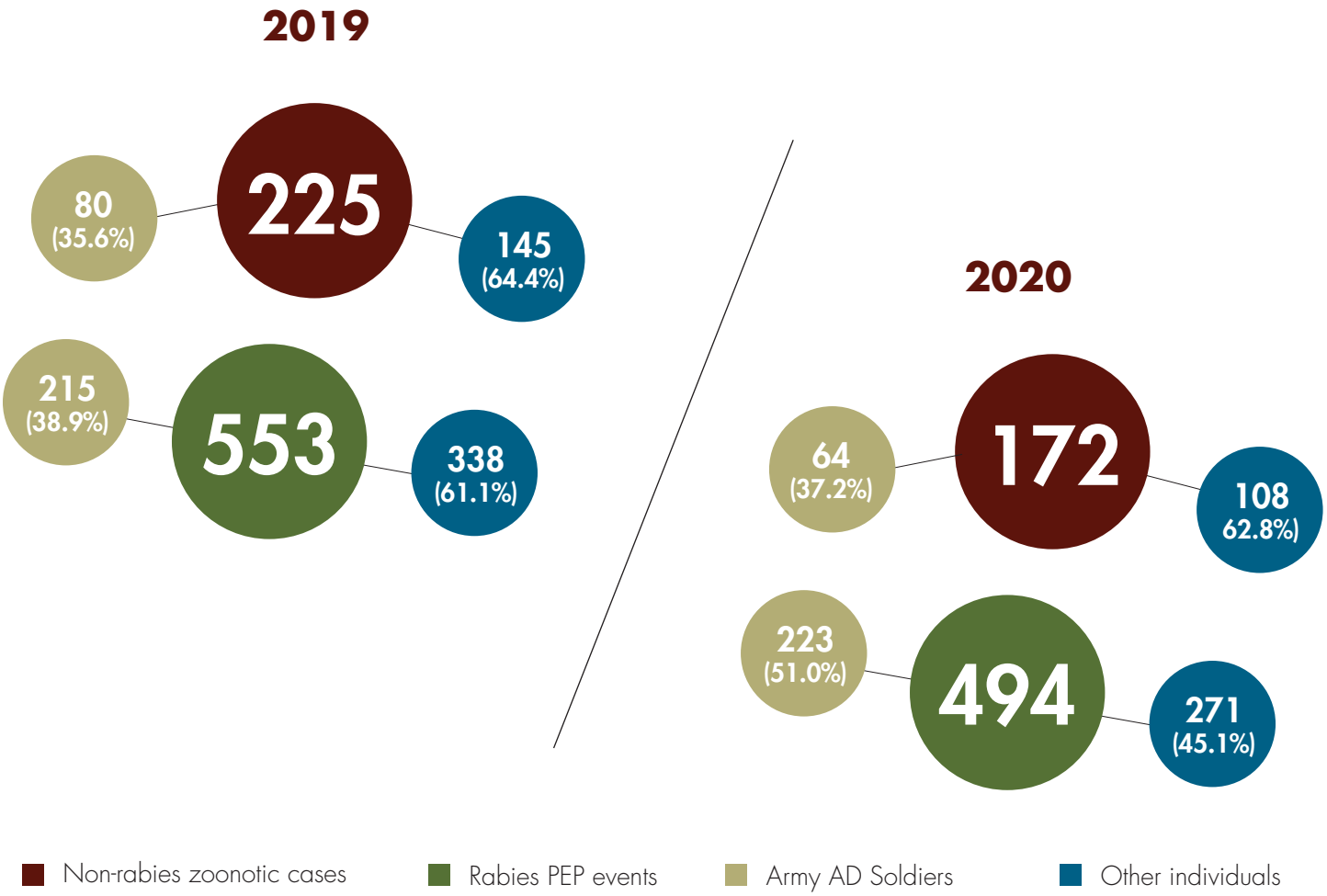
Zoonotic diseases (zoonoses) occur when harmful pathogens (bacteria, fungi, viruses, etc.) are spread from animals to humans. Illnesses in the affected individuals may range from mild to severe, and the animals suspected of causing infections may not even show symptoms of disease. To help prevent zoonotic diseases, individuals should wash hands after coming in contact with or being near animals, vaccinate their pets, limit contact with wild animals, and prevent bites from mosquitoes, fleas, and ticks (CDC 2022).

In 2019, 225 zoonotic disease cases were reported in the Disease Reporting System internet (DRSi); 553 rabies post-exposure prophylaxis (PEP) reports were also reported during the same time period.

Of the 225 zoonotic disease cases, 80 (35.6%, 1.7 cases per 10,000 Soldiers) were among Army Soldiers and 145 (64.4%) occurred among all other individuals. Of the rabies PEP cases, 215 (38.9%, 4.6 cases per 10,000 Soldiers) were among Army AD Soldiers and 338 (61.1%) were among all others.

In 2020, 172 zoonotic disease cases were reported in the Disease Reporting System internet (DRSi); 494 rabies post-exposure prophylaxis (PEP) reports were also reported during the same time period.

Of the 172 zoonotic disease cases, 64 (37.2%, 1.3 cases per 10,000 Soldiers) were among Army AD Soldiers and 108 (62.8%) were among all other individuals. Of the rabies PEP cases, 223 (45.1%, 4.7 cases per 10,000 Soldiers) were among Army AD Soldiers and 271 (54.9%) were among all others.



Overall, the rate of zoonotic disease cases among Army AD Soldiers—
(excluding rabies PEP)

DECREASED
30.4%
from 2018 to 2019

DECREASED
20.9%
from 2019 to 2020

In contrast to 2018, **Lyme disease** was the most frequently reported zoonotic disease in the DRSi in 2019 and 2020.

The average yearly increase in Lyme disease rates, among Army AD Soldiers, between 2018 and 2020 was **12%.**

Ft. Hood reported the highest number of rabies PEP cases in both 2019 and 2020, with a combined total of **197 cases** (18.8%).

Ft. Leonard Wood reported **60** (15.1%) zoonotic cases (excluding rabies PEP) from 2019-2020, of which **50** (83.3%) were spotted fever rickettsiosis cases.

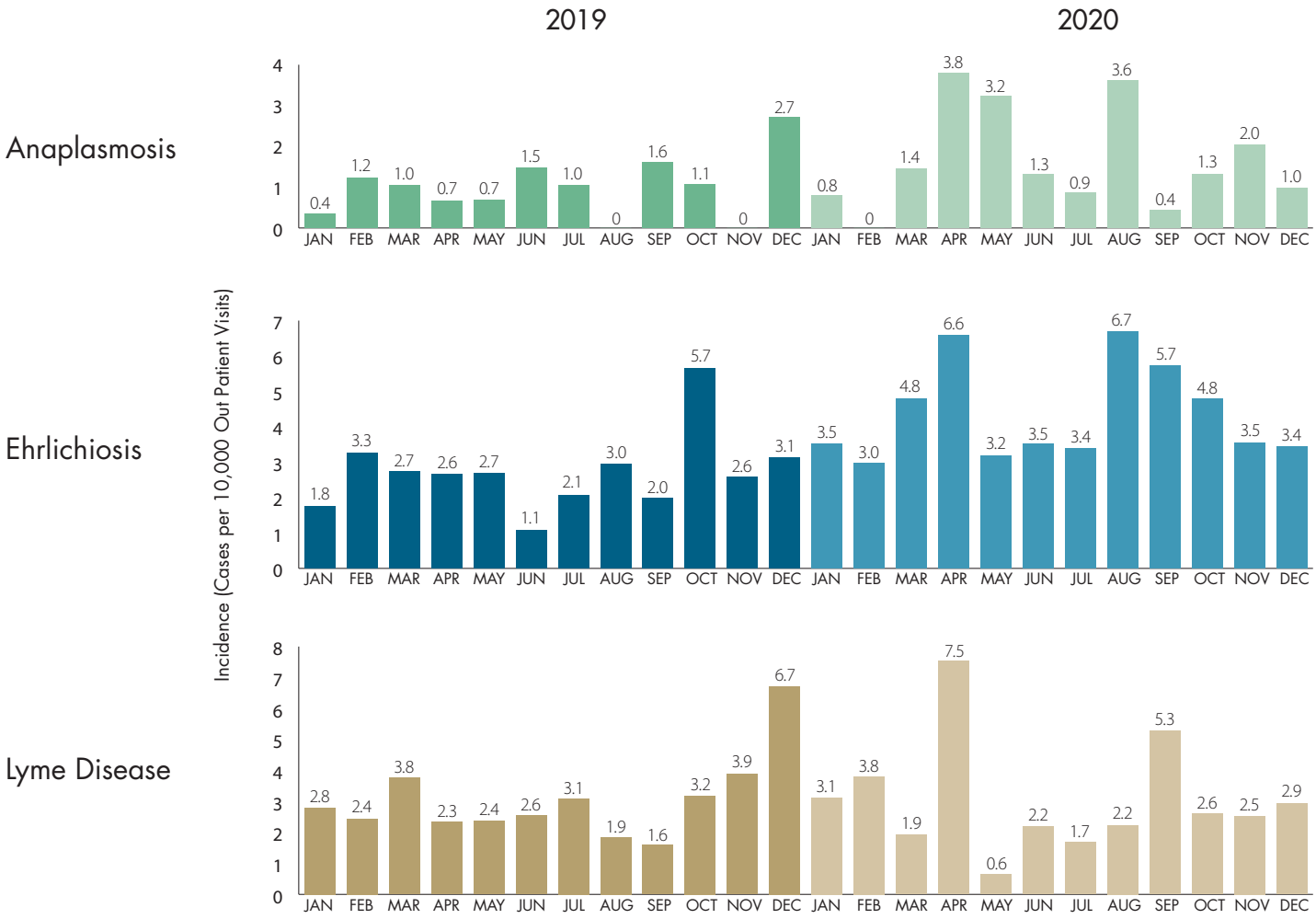
Animal Disease Summary: Government and Privately-owned Animal Worldwide Surveillance System (GPAWSS)

Companion Animal Tick-borne Disease Incidence

Tick-borne disease (anaplasmosis, ehrlichiosis, and Lyme disease) incidence captured in GPAWSS-Zoonoses in 2019 and 2020 did not follow an expected seasonal pattern. Vectors for these diseases are most active May through August, with disease onset expected to lag exposure by 1-3 months. An increase in disease incidence was observed in October 2019 (ehrlichiosis) and December 2019 (anaplasmosis and Lyme disease), and again in August 2020 (anaplasmosis and ehrlichiosis) and September 2020 (Lyme disease). These patterns are most likely attributed to the seasonality of exposure in the summer months and development of disease in the months following. Additionally, an increase in incidence of anaplasmosis, ehrlichiosis, and Lyme disease in April 2020 may be explained by changes to veterinary-care-seeking behavior as a result of the Covid-19 pandemic. Vector-borne disease screening is a routine part of canine wellness exams; disease exposure can be identified in animals that appear clinically healthy. An exact explanation for the observed incidence patterns is unknown based on the available data.

It is important to remember that anaplasmosis, ehrlichiosis, and Lyme disease prevention in animals is accomplished through tick control. Owners should check their animals frequently for the presence of ticks, especially after outdoor trips, and remove promptly if found. Owners should contact their veterinarian for effective tick control products to use on their animals.

Companion Animal Tick-borne Disease Incidence, 2019-2020



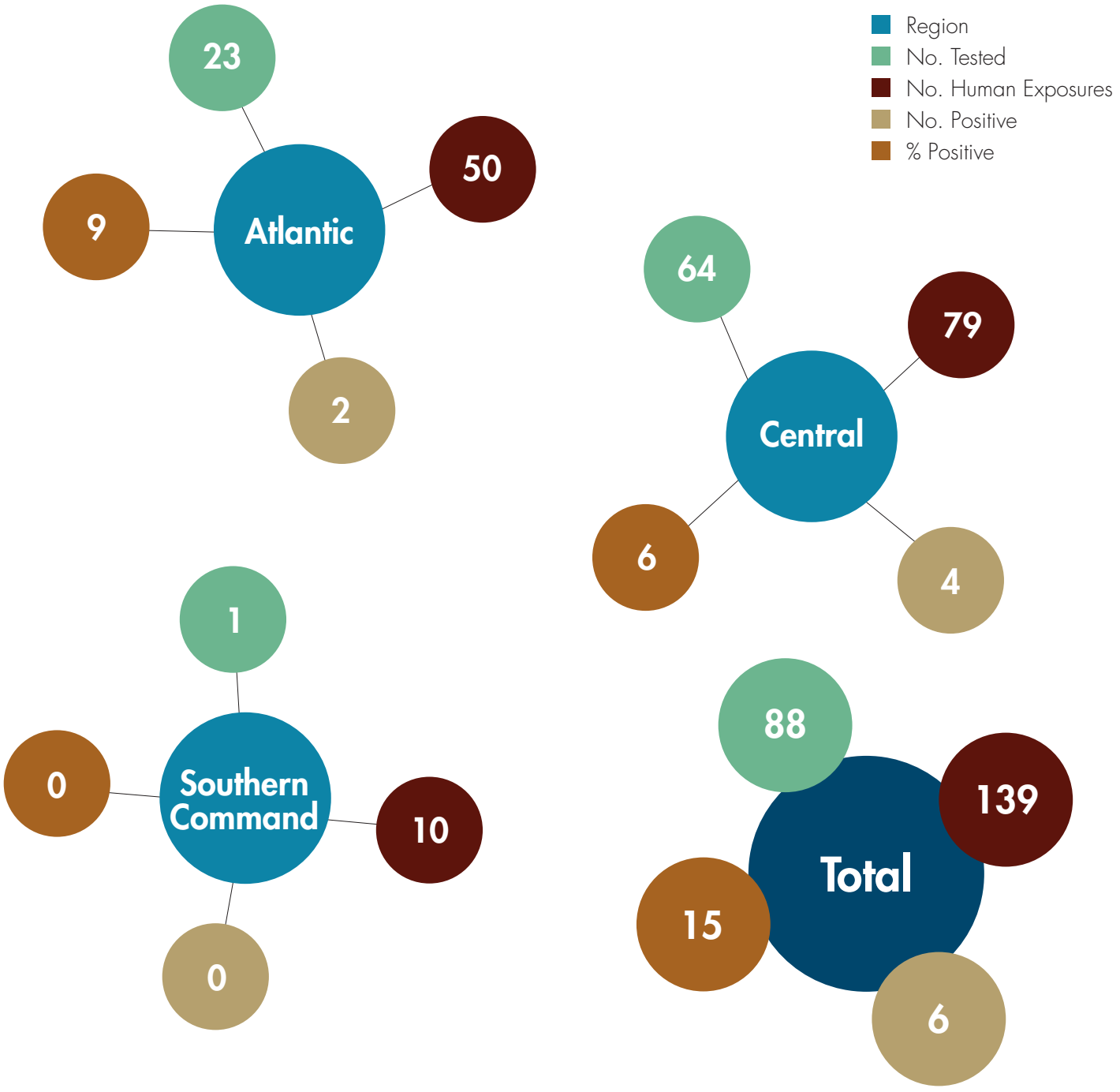
Animal Disease Summary: Army Rabies Testing

Rabies Testing by the DoD Food Analysis and Diagnostics Laboratory (FADL), 2019

Samples collected from locations in RHCs-Atlantic and Central, and Southern Command (SOUTHCOM) were submitted to the DoD FADL for rabies testing during 2019. The samples were associated with 139 human exposures.

Six samples were indeterminate; the samples were unable to be tested due to sample condition issues.

Six samples were dFA (direct fluorescent antibody)-positive: four bats from Kansas and Texas, and one feline and one fox from Florida. Overall, 7% of samples tested by the DoD FADL were positive for rabies, and 36 humans were exposed to the animals whose samples tested positive.



Vector Surveillance: Mosquito Summary – West Nile Virus Testing

Military Mosquito Testing for West Nile Virus, 2019-2020

A total of 39,386 mosquitoes were collected and tested in 4,511 pools* for West Nile virus (WNV) by military assets during 2019 (n=25,197) and 2020 (n=14,189). Twenty-two (0.5%) of the pools were WNV-positive and twenty-one (95%) of these positive pools were collected in 2019.

PHC-Central (48%, n=2,153) collected and tested most of the pools, followed by PHC-Atlantic (28%, n=1,258), PHC-Europe (21%, n=938), and PHC-Pacific (4%, n=162).

Three mosquito genera (Aedes, Culex, and Culiseta) were tested for WNV; the majority of mosquitoes were Culex spp. (95%, n=37,549).

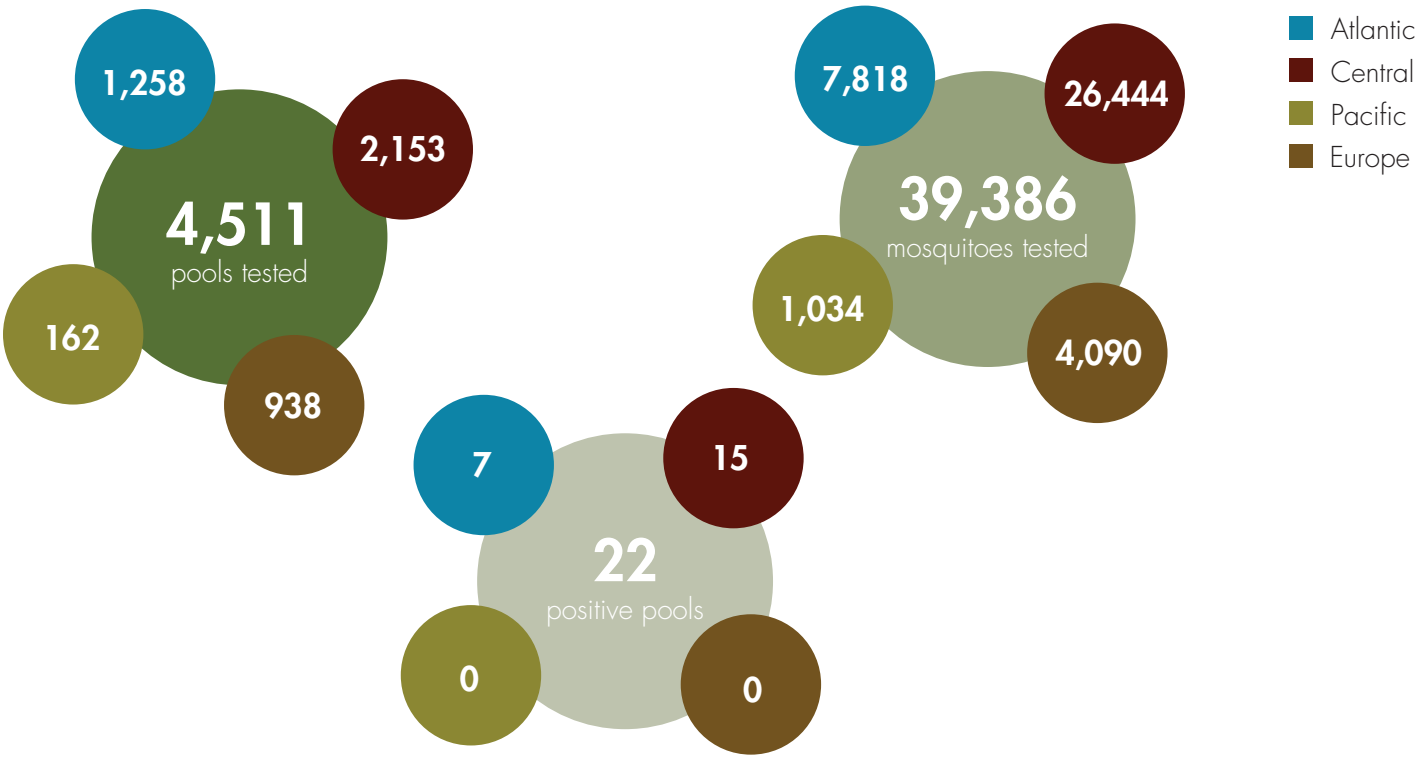
Fewer mosquito pools were tested for WNV in 2020 compared to 2019 (1,898 pools v. 2,613 pools). However, a greater number of pools were tested by labs in regions Europe and Pacific in 2020 when compared to 2019 (Europe: 910 v. 28; Pacific: 152 v. 10).

The majority of military WNV collection and testing efforts in 2019 and 2020 were centered in Texas; 20,852 (53%) of the 39,386 mosquitoes tested for WNV were collected at Camp Bullis, Ft. Bliss, Ft. Hood, Joint Base San Antonio, and Red River Army Depot. Fifteen (68%) of the twenty-two positive pools were collected from locations in Texas.

Military WNV collection efforts were also heavily concentrated in the CENTCOM region, where 3,694 mosquitoes were tested in 781 pools; none of the pools were WNV-positive. PHC-Europe was responsible for collecting and testing samples from CENTCOM locations.

The highest, nonzero minimum infection rate (MIR), 9.5, was observed at the Armed Forces Retirement Home in Washington, DC (Atlantic region). The next highest MIRs were observed at Ft. Hamilton, NY (MIR=5.9), Ft. Benning, GA (MIR=1.9) (both in the Atlantic region), and Ft. Bliss, TX (MIR=1.3) (Central region).

*Pooling refers to the collecting and combining of mosquitoes or ticks for pathogen testing.



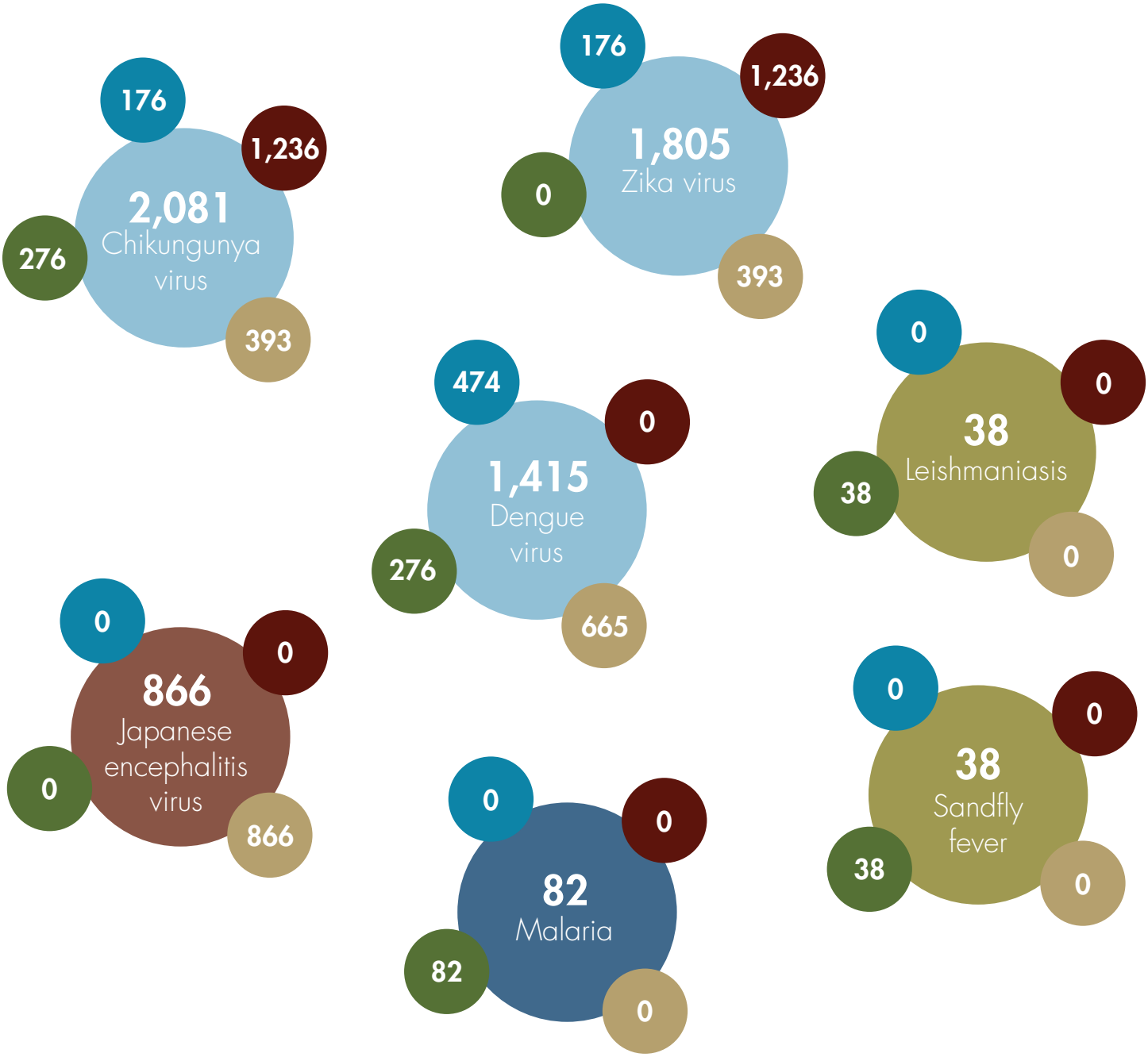
Military Mosquito Testing for Other Pathogens, 2019-2020

PHC-Atlantic tested 176 mosquitoes for chikungunya and Zika viruses, and 474 mosquitoes for dengue virus; all were negative.

PHC-Central tested 1,236 mosquitoes for chikungunya and Zika viruses; all were negative.

PHC-Europe tested 276 mosquitoes for chikungunya and dengue viruses, 82 mosquitoes for malaria, and 38 sandflies for leishmaniasis and sandfly fever; all were negative.

PHC-Pacific tested 393 mosquitoes for chikungunya and Zika viruses, 866 mosquitoes for Japanese encephalitis virus, and 665 mosquitoes for dengue virus; all mosquitoes tested negative for these pathogens.



** Mosquitoes may be tested for more than one pathogen; e.g., Aedes spp. mosquitoes tested for chikungunya virus may also be tested for dengue virus.*

Vector Surveillance: Tick Summary

Anaplasmosis

A total of 1,425 *Ixodes spp.* ticks were collected and tested in 1,416 pools by military laboratories in and outside the Continental U.S. (CONUS and OCONUS, respectively) for the bacteria *Anaplasma phagocytophilum*, which is the pathogen that causes human granulocytic anaplasmosis. A total of 33 pools infected with *A. phagocytophilum* were identified. The infection prevalence of *A. phagocytophilum* ranged from 1% at a location within U.S. Army Garrison (USAG) Rheinland-Pfalz, Germany to 33% at a location within USAG Ansbach, Germany.

Babesiosis

A CONUS military laboratory tested 469 *Ixodes spp.* ticks in 460 pools for *Babesia microti*, the pathogen that causes babesiosis. Ten pools tested positive and the infection prevalence of babesiosis ranged from 1% at Aberdeen Proving Ground to 5% at Ft. Indiantown Gap, Pennsylvania.

Ehrlichiosis

A total of 2,956 *Amblyomma spp.* ticks were collected and tested in 2,486 pools for *Ehrlichia chaffeensis, E. ewingii,* and Panola Mountain *Ehrlichia*, and 1,233 *Ixodes spp.* and *Rhipicephalus spp.* ticks were collected and tested in 1,233 pools for *Ehrlichia chaffensis, Ehrlichia ewingii,* and *Ehrlichia spp.* pathogenic organisms by CONUS and OCONUS military laboratories; these pathogens cause ehrlichiosis. One hundred and twenty-nine pools were infected with at least one of the aforementioned pathogens. The infection prevalence of ehrlichiosis ranged from 1% at a location in the country of Georgia to 9% at Letterkenny Army Depot, Pennsylvania.

Lyme disease

A total of 1,669 *Ixodes spp.* ticks were collected and tested in 1,660 pools by CONUS and OCONUS military laboratories for the bacteria *Borrelia burgdorferi*, which is the pathogen that causes Lyme disease. One hundred and eighty-one pools were infected with *Borrelia burgdorferi* were identified. The infection prevalence of Lyme disease ranged from 3% at a location within USAG Rheinland-Pfalz, Germany to 42% at Ft. Drum, New York.

Spotted Fever Rickettsiosis

CONUS military laboratories tested 720 *Amblyomma spp., Dermacentor variabilis,* and *Rhipicephalus spp.* ticks from 691 pools for spotted fever rickettsioses (*Rickettsia rickettsia* and *R. parkeri*). Two pools tested positive for *R. parkeri* and were collected from Ft. Campbell and Ft. Knox.

Tick-borne encephalitis

An OCONUS military laboratory tested 1,199 *Ixodes spp.* ticks for tick-borne encephalitis. One tick, collected from a human, tested positive.

Reference

Centers for Disease Control and Prevention (CDC). "One Health: Zoonotic Diseases." www.cdc.gov/onehealth/basics/zoonotic-diseases.html. Accessed 19 January 2022.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