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# ***ANNOUNCEMENT***



- **To Register for the Monthly Disease Surveillance Trainings:**
  1. **Contact your Service Surveillance HUB to receive monthly updates and reminders**
  2. **Log-on or Request log-on ID/password:**  
<https://tiny.army.mil/r/zB8A/CME>
  3. **Register at: <https://tiny.army.mil/r/4TgNE/EpiTechFY17>**
  
- **Confirm attendance:**
  - **Please enter your full name/email into the DCS chat box to the right or email your Service HUB**
  - **You will receive a confirmation email within 48 hours with your attendance record; if you do not receive this email, please contact your Service HUB**



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# **Ex NEW HORIZONS Zika Field Investigation**



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**Distribution D: DoD and DoD Contractors Only**

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# *Learning Objectives*



- **Recognize Zika Virus Disease background information and how it is a model of emerging vector borne infectious disease**
- **Describe the field epidemiology investigation of Zika Virus Disease among Exercise NEW HORIZON personnel**
- **Understand when and how to consult USAFSAM/PH (or your service specific surveillance hub) for field epidemiology support**

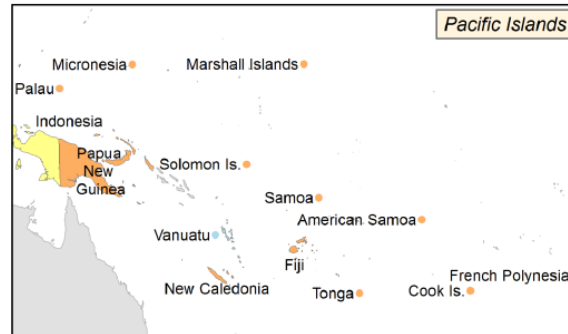
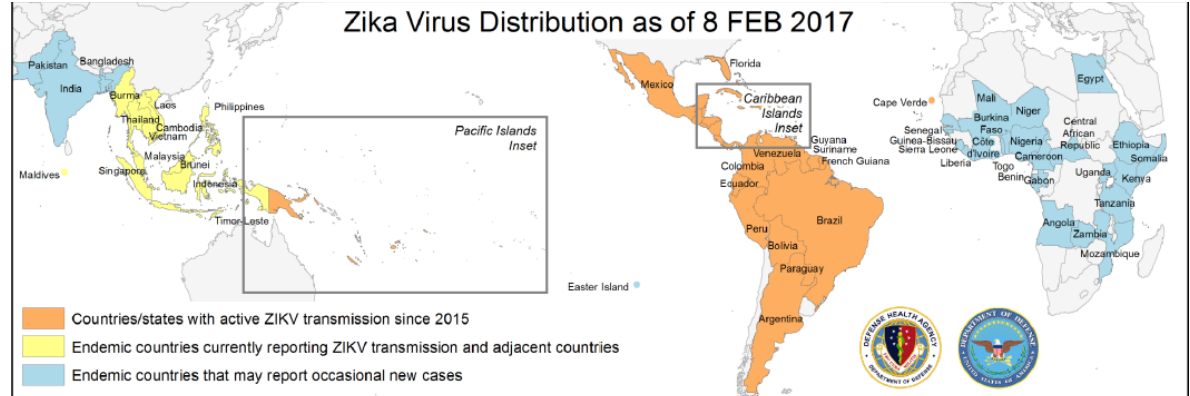


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# Zika Virus Surveillance



Demographics for all confirmed Zika cases in Military Health System Beneficiaries as of 1300, 8 FEB 2017 (N = 168 confirmed cases)			
Demographic		N	%
<b>Service</b> <small>*includes MHS beneficiaries from USPHS, NOAA, etc.</small>	Army	71	42.3%
	Air Force	28 (+1)	16.7%
	Navy	23	13.7%
	Marine Corps	13	7.7%
	Coast Guard	31	18.5%
	Other*	2	1.2%
<b>Status</b> <small>**includes Reserve Component</small>	Service Member**	118 (+1)	70.2%
	Dependent	39	23.2%
	Retiree	11	6.5%
<b>Age</b>	0-20	11	6.5%
	21-35	82 (+1)	48.8%
	36-50	50	29.8%
	51+	20	11.9%
	Not Reported	5	3.0%
<b>Gender</b>	Female	66	39.3%
	Male	102 (+1)	60.7%
<b>(FOUO) Location of Possible Exposure<sup>†</sup></b>	(FOUO) Locations of possible exposure include: Antigua (1), Antilles (1), Barbados (3), Bonaire (1), Brazil (1), British Virgin Islands (1), Cambodia (2), Caribbean region (1), Colombia (4), Costa Rica (1), Curacao (2), Dominica (1), Dominican Republic (12), El Salvador (1), Grenada (2), Guatemala (2), Guyana (1), Haiti (2), Honduras (4), Jamaica (11), Malaysia (1), Martinique (2), Mexico (5), Nicaragua (3), Panama (1), Philippines (2), Puerto Rico (96), Singapore (2), St. Lucia (5), St. Martin (2), Thailand (1), Trinidad & Tobago (3), U.S. (Florida) (1), U.S. Virgin Islands (6), Vietnam (1), and Unknown (3).		
	<sup>†</sup> Some cases had possible exposure in more than one country		



Source: CDC; AFHSB



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# *Zika in Exercise NEW HORIZONS Personnel*



- **Four** USAF personnel presented with signs and symptoms characterized by rash, fever, and arthritis
  - **Three** USAF military personnel subsequently tested positive for Zika virus disease by RT-PCR and PRNT
- AFSOUTH/SG requested a public health investigation
- Initial investigation determined by IRB to be exempt as a public health investigation



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# Field Epidemiology Team



## Outbreak Investigative Support

- Specimen Collection
- Epidemiological Survey Questionnaire



## Force Health Protection

- Site Surveys
- Chemoprophylaxis/Treatment



## Risk Communication

- Individual and Group



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# ***Field Investigation Design***



- **Surveillance Participants and Site**
  
- **Laboratory Sample Collection and Analysis**
  - **Weekly urine and serum collection**
  - **Pre- and Post- serum collection**
  
- **Epidemiological Survey Questionnaire**
  - **Assigned De-identified Participant Number**
  - **Administered coded questionnaires**
  - **Merged questionnaire and lab data using ID code**





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# Laboratory Testing Algorithm



	Post-deployment	Week 2	Week 1	Pre-deployment
IgM assay (serum)	Test all.	Test, if post deployment IgM and PRNT are positive and Week 1 is negative.	Test, if post-deployment IgM and PRNT are positive.	Test, if post-deployment and week 1 IgM and PRNT are positive.
PRNT (serum)	Test if post-deployment IgM is positive.		Test, if post-deployment IgM and PRNT are positive.	Test, if post-deployment and week 1 IgM and PRNT are positive.
RT-PCR (urine and serum)	If the IgM and PRNT results agree that there was a seroconversion, test the specimens collected for every week.			



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# Epidemiological Survey Questionnaire



**EPIDEMIOLOGY CONSULT SERVICE DIVISION (PHR)**  
**DEPARTMENT OF PUBLIC HEALTH AND PREVENTIVE MEDICINE (PH)**  
**U.S. AIR FORCE SCHOOL OF AEROSPACE MEDICINE (USAFSAM)**  
**WRIGHT-PATTERSON AIR FORCE BASE, OH**  
**New Horizons - 2016 Surveillance Questionnaire**

**PATIENT DEMOGRAPHIC INFORMATION (FIRST VISIT ONLY)**  
 Form completion date: \_\_\_\_\_ Date of arrival in country: \_\_\_\_\_  
 Unique ID: \_\_\_\_\_ Rank: \_\_\_\_\_ Age: \_\_\_\_\_  
 Home Station: \_\_\_\_\_  
 If Reserve or Guard, Home State/City: \_\_\_\_\_  
 Beneficiary Status:  Active Duty  AFRICAN  Other: \_\_\_\_\_  
 Sex:  Male  Female  
 Service Branch:  Air Force  Other U.S. Armed Force Service: \_\_\_\_\_

**TRAVEL HISTORY PRIOR TO ARRIVAL IN THE DOMINICAN REPUBLIC (FIRST VISIT ONLY)**  
 Did you travel 6 months prior to arriving in the Dominican Republic?  Yes  No  
 Location of travel: \_\_\_\_\_ From (date: \_\_\_\_\_) To (date: \_\_\_\_\_)  
 Location of travel: \_\_\_\_\_ From (date: \_\_\_\_\_) To (date: \_\_\_\_\_)

**PREVIOUS HEALTH HISTORY (FIRST VISIT ONLY)**  
 Have you ever been diagnosed by a health care provider as having any of the following conditions?  
 Dengue  Yes (date: \_\_\_\_\_)  No  Unknown  
 Chikungunya  Yes (date: \_\_\_\_\_)  No  Unknown  
 West Nile  Yes (date: \_\_\_\_\_)  No  Unknown  
 Zika  Yes (date: \_\_\_\_\_)  No  Unknown  
 Previously vaccinated against:  
 Yellow Fever  Yes (date: \_\_\_\_\_)  No  Unknown  
 Japanese encephalitis  Yes (date: \_\_\_\_\_)  No  Unknown

**CURRENT HEALTH HISTORY**  
 Are you currently ill?  Yes  No  
 Date of symptom onset: (date: \_\_\_\_\_)  
 Were you seen in EMEDS?  Yes  No  
 Date of EMEDS visit: (date: \_\_\_\_\_)

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Time of day of mosquito bites (check all that apply):  
 Dawn  Day time  Dusk  Night

Frequency of mosquito bites:  
 None  1-5 a day  5-10 a day  10+ a day  
 < 1 a week  1-5 a week  5-10 a week  10+ a week

Did you use insect repellent on exposed skin while in country?  Yes  No  
 If yes, please indicate what type:  
 DEET  Other insect repellent (Brand name): \_\_\_\_\_  
 If yes, when do you use insect repellent?  
 Daytime  Nighttime  Both  
 If yes, how often did you apply insect repellent per day?  
 Every 2 hrs  Every 4 hrs  Every 6 hrs  Every 8 hrs  Every 12 hrs  Only once

Did you re-apply repellent after changing clothes?  Yes  No

Were you issued permethrin prior to deployment?  Yes  No

Was your uniform or work attire permethrin treated?  Yes  No

Were your non-work clothes permethrin treated?  Yes  No

Were you given medications to prevent malaria?  Yes  No  
 Which medication did you take while in country?  
 Chloroquine  Doxycycline  Mefloquine (Lariam)  Proguanil/atovaquone (Malarone)

How often did you take your medication?  
 Once a day  Every other day  Twice a week  Weekly  Did not take any



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# Description of Zika Cases



	Cases <i>n</i> (%)	Non-Cases <i>n</i> (%)
<b>Total</b>	6	183
<b>Active Duty</b>	6 (100.0)	165 (90.2)
Missing	0 (0.0)	18 (9.8)
<b>Sex</b>		
Female	3 (50.0)	54 (29.5)
Male	3 (50.0)	127 (69.4)
Missing	0 (0.0)	2 (1.1)
<b>Rank</b>		
Enlisted	3 (50.0)	119 (65.0)
Officer	3 (50.0)	56 (30.6)
Missing	0 (0.0)	8 (4.4)
<b>Age</b>		
20-29	4 (66.7)	67 (36.6)
30-39	2 (33.3)	80 (43.7)
40-49	0 (0.0)	21 (11.5)
50+	0 (0.0)	2 (1.1)
Missing	0 (0.0)	13 (7.1)



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# Description of Zika Symptoms



Symptoms	Cases* n (%)	Non-Cases* n (%)
Currently ill (at time of questionnaire completion)	0 (0.0)	11 (6.1)
Symptomatic (any symptoms)	6 (100)	57 (31.1)
Zika specific symptoms:	6 (100.0)	37 (20.2)
Fever	5 (83.3)	7 (3.8)
Arthralgia	5 (83.3)	20 (10.9)
Rash	4 (66.7)	19 (10.4)
Conjunctivitis	1(16.7)	2 (1.1)
Other Symptoms:		
Myalgia	1(16.7)	25 (13.7)
Headache	1(16.7)	32 (17.5)
Vomiting	0 (0.0)	5 (2.7)
Numbness	0 (0.0)	2 (1.1)
Retroorbital pain	0 (0.0)	2 (1.1)
Diarrhea	0 (0.0)	21 (11.5)
Weakness	0 (0.0)	2 (1.1)
*Symptoms among non-cases were extracted from the first questionnaire. Zika specific symptoms among cases were extracted from the questionnaire obtained closest to the time of the positive lab result and supplemented with medical record review.		



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# Description of Zika Exposures



	Cases <i>n</i> (%)	Non-Cases <i>n</i> (%)
<b>Bitten by a mosquito</b>	5 (83.3)	166 (93.3)
<b>Frequency of mosquito bites:</b>		
1-5/day	1 (16.7)	61 (33.5)
5-10/day	0 (0.0)	12 (6.6)
10+/day	0 (0.0)	11 (6.0)
<1/week	3 (50.0)	21 (11.5)
1-5/week	1 (16.7)	39 (21.4)
5-10/week	1 (16.7)	17 (9.3)
10+/week	0 (0.0)	12 (6.6)
<b>Time of day of mosquito bites<sup>a</sup>:</b>		
Dawn	2 (33.3)	68 (37.4)
Day time	3 (50.0)	107 (58.8)
Dusk	3 (50.0)	134 (73.6)
Night	3 (50.0)	117 (64.5)
<b>Location of mosquito bite exposure<sup>a</sup>:</b>		
In lodging	3 (50.0)	145 (79.7)
At primary worksite	5 (83.3)	118 (64.8)
Off-duty activities	5 (83.3)	133 (73.1)
<b>Hours spent outside:</b>		
< 1 hr	0 (0.0)	6 (3.3)
1-3hrs	1 (16.7)	49 (27.1)
4-6hrs	1 (16.7)	43 (23.8)
7-10hrs	1 (16.7)	28 (15.5)
10+hrs	3 (50.0)	55 (30.4)
<b>Frequency of insect repellent usage:</b>		
Once/day	1 (16.7)	23 (13.2)
Every 2 hrs	0 (0.0)	10 (5.6)
Every 4hrs	2 (33.3)	40 (23.0)
Every 6 hrs	0 (0.0)	42 (24.1)
Every 8hrs	2 (33.3)	34 (19.5)
Every 12hrs	1 (16.7)	25 (14.4)



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# Exposures between Zika Cases and Non-cases



	Cases n (%)	Non-cases n (%)	OR	p-value*
Mosquito bites daily vs. weekly	4 (66.7)	97 (58.8)	1.4	1.00
Bitten at dawn vs. not bitten at dawn	2 (33.3)	68 (37.4)	0.8	1.00
Bitten at daytime vs. not bitten at daytime	3 (50.0)	107 (58.8)	0.7	0.69
Bitten at dusk vs. not bitten at dusk	3 (50.0)	134 (73.6)	0.4	0.35
Bitten at night vs. not bitten at night	3 (50.0)	117 (64.3)	0.6	0.67
Insect repellent re-applied on skin after changing clothes vs. not re-applied (DEET)	3 (50.0)	149 (84.7)	0.2	0.06
Concerned about getting any vector-borne illness vs. not concerned	6 (100.0)	152 (88.4)	n/a	1.00
Outside for 7 or more hours vs. less than 7 hours	4 (66.7)	83 (45.9)	2.4	0.42
Issued permethrin vs. not issued permethrin	5 (83.3)	134 (77.5)	1.5	1.00
Uniform treated vs. untreated	3 (50.0)	105 (58.0)	0.7	0.70
Non-work clothes treated vs. untreated	0 (0.0)	27 (14.9)	0.0	0.60
<b>Description of lodging:</b>				
Air conditioned vs. not air conditioned	2 (33.3)	143 (78.6)	0.1	0.03
Screened windows vs. none	0 (0.0)	32 (17.6)	0.0	0.59
Field conditions vs. hotel	0 (0.0)	45(2.8)	0.0	1.00
<b>Description of work site:</b>				
Office building workplace vs. non-office workplace	0 (0.0)	41 (22.5)	0.0	0.34
Air conditioned workplace vs. not air conditioned workplace	0 (0.0)	33 (18.1)	0.0	0.59
Screened windows workplace vs. unscreened windows	0 (0.0)	11 (6.6)	0.0	1.00
Indoor workplace vs. outdoor workplace	1 (16.7)	95 (52.2)	0.2	0.11
*Fisher's exact chi-squared test				



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# ***Discussion***



- **Geographic variations of virulence**
  - **Distribution of Vector**
  - **Uncertainty over the ratio of symptomatic to asymptomatic cases**
- **Force health protection of the military population**
  - **Routine screening for ZVD not recommended**
  - **Identified correlates of protection (A/C; DEET issuance)**
- **Opportunity for improvement**
  - **Adherence to uniform/clothing treatment**
  - **Allocation of DEET/permethrin for at-risk missions**
- **Zika Virus Disease is reportable in DRSi under “Any other unusual condition or event”**





# Contact Information



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- **Army:** APHC – Disease Epidemiology Division  
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- **Navy:** NMCPHC Preventive Medicine Programs and Policy Support Department  
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# Questions



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