The Burden of Arboviral Infection in the Military Health System, 2011-2019

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Background

- Arthropod-borne viral infections are important preventable, emerging infectious diseases closely associated with travel to endemic regions
- This group of infectious diseases has an estimated annual global economic toll of US$950 million
- Unlike malaria, these mosquito-borne diseases do not have effective chemoprophylaxis, with prevention dependent on behavioral modifications and insect precautions
- Arboviral diseases includes Dengue, Chikungunya, and Zika are of significant military significance given their potential impact on medical readiness of deployed troops to endemic regions
- We sough to evaluate the overall disease burden of arboviral in infections within the military health system (MHS) from fiscal years 2011-2019

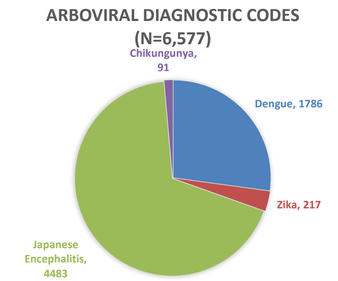
Methods

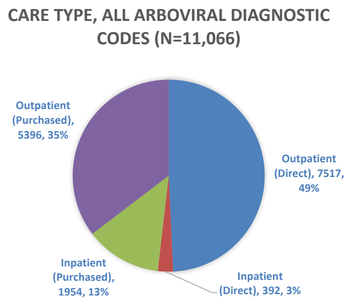
Study Data Source

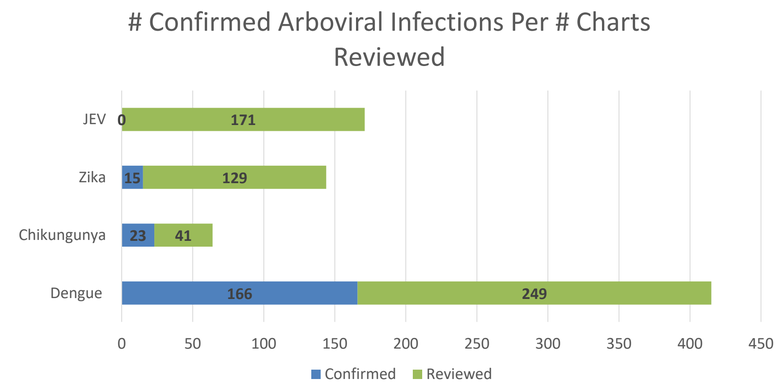
- The Infectious Diseases Clinical Research Program (IDCRP) Deployment and Travel Health: Knowledge, Attitudes, Practices, and Outcomes Study (KAPOS)
  - Multi-cohort study evaluating the burden of travel-associated diseases in the MHS
- The MHS Data Repository was searched for International Classification of Diseases (ICD)-9/10 codes for any arboviral infection in military beneficiaries receiving inpatient and outpatient care in either military treatment facilities (direct care) or civilian centers (purchased care) for fiscal years 2011-2019
- Diagnostic codes further classified as Dengue, Chikungunya, Zika, or other arbovirus infection
- Demographic data was collected and analyzed to assess the disease burden within the MHS
- A subset of outpatient charts in the direct-care system were randomly selected for chart review for validity of diagnosis, using Armed Forces Health Surveillance Center (AFHSC) case definitions, as well as the following characteristics
  - Travel history (country/region, duration of travel)
  - Lab evaluation (for validation of diagnostic code)
  - Medical co-morbidities
  - Presence of pre-travel counseling (including performance by travel specialist or non-specialist)
  - Presence/duration of inpatient hospitalization

Results

ARBOVIRAL DIAGNOSTIC CODE	# Unique Encounter Codes
JAPANESE ENCEPHALITIS	4483
DENGUE	1369
OTHER SPECIFIED MOSQUITO-BORNE VIRAL FEVERS	900
OTHER SPECIFIED ARTHROPOD-BORNE VIRAL FEVERS	854
OTHER MOSQUITO-BORNE FEVER	460
DENGUE FEVER [CLASSICAL DENGUE]	394
ARTHROPOD-BORNE VIRAL DISEASE, UNSPECIFIED	288
TICK-BORNE VIRAL ENCEPHALITIS, UNSPECIFIED	266
ZIKA VIRUS DISEASE	217
YELLOW FEVER, UNSPECIFIED	184
VIRAL ENCEPHALITIS TRANSMITTED BY OTHER AND UNSPECIFIED ARTHROPODS	138
MOSQUITO-BORNE HEMORRHAGIC FEVER	125
COLORADO TICK FEVER	120
UNSPECIFIED ARTHROPOD-BORNE VIRAL FEVER	114
ST. LOUIS ENCEPHALITIS	111
CHIKUNGUNYA VIRUS DISEASE	91
WEST NILE VIRUS INFECTION, UNSPECIFIED	87
ALL OTHER ARBOVIRAL DIAGNSOTIC CODES	865
GRAND TOTAL	11066

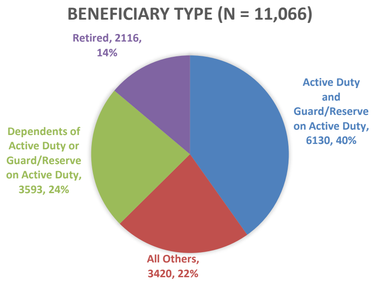


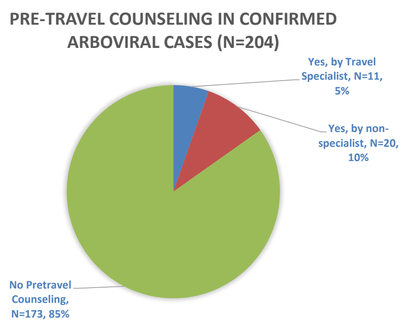




755 outpatient charts reviewed in outpatient MTF EMR (AHLTA)
Diagnostic accuracy:
Dengue: 166/249 (66.7%)
Chikungunya: 23/41 (56.1%)
Zika: 15/129 (11.6%)
No cases of JEV, Yellow Fever confirmed in 171, 10 encounters captured (respectively), all coding for each disease referred to vaccine administration

173/204 (84.8%) of confirmed arboviral cases did not undergo pre-travel counseling
31/204 (15.2%) received pre-travel counseling
11/31 (35.5%) were seen by travel specialist
20/31 (64.5%) seen by non-specialist (primary care, SRP)





Discussion

- Arboviral infections constitute a substantial burden of preventable infections within the MHS, with 11,066 unique codes identified within MHS between FY 2011-2019
- Arboviral infection have a significant active duty service members, constituting 6,130 (40%) of all unique codings
- The majority of encounters for arboviral infection is primarily in the outpatient setting, though purchased inpatient care represents a significant minority (N=1,954, 18% of all coding)
- Coding for JEV likely over-represents the true burden of this disease, as all coding referred to vaccination administration
- Low rates of pre-travel counseling among patients with confirmed arboviral infections, with limited number seen by travel specialists
- Dengue contributed the largest burden of arboviral infection when corrected for accuracy (66.7% accurate coding)
- Limitations to this study include being unable to assess diagnostic accuracy of inpatient coding (only outpatient charts reviewed), unclear benefit of pre-travel counseling for the prevention of arboviral infection

Conclusions

- Arboviral infections represent a substantial healthcare burden within the military health system, with Dengue representing largest confirmed case burden
- A significant proportion of active duty service members traveling to endemic regions seek medical care for arboviral diseases
- Diagnostic coding for Zika and Japanese encephalitis likely overestimate the burden of these diseases within the military health system

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