Chikungunya Cases Identified in the Americas

United States

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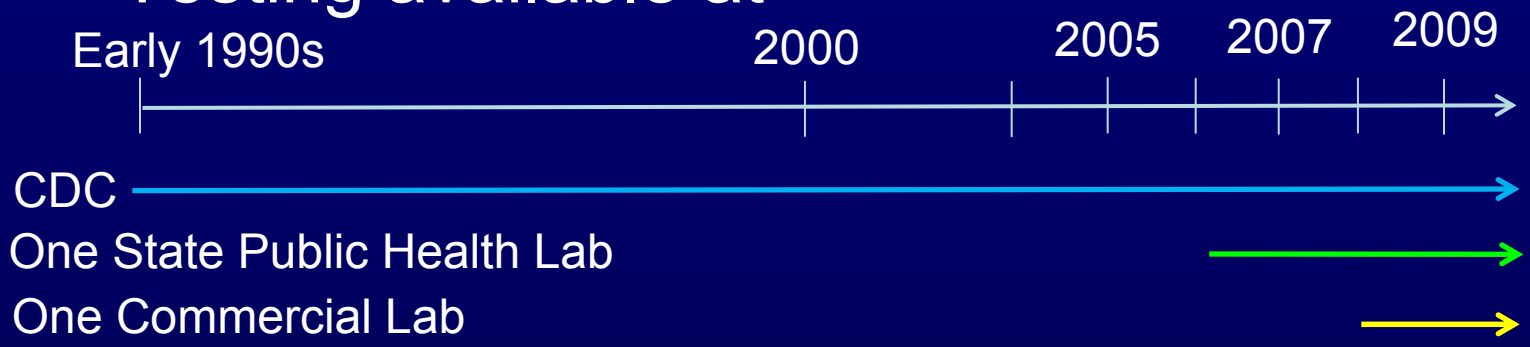
Objectives

- Describe chikungunya (CHIK) cases diagnosed in the U.S. from 1995–2009
- Determine importation risk by comparing location of CHIK cases to distribution of known chikungunya virus (CHIKV) vectors
- Explore if national surveillance adequate to detect CHIK cases or outbreak

CHIK Testing and Reporting Practices in U.S.

- Testing available at



- Since 2006, state health departments have the ability to report CHIK cases to ArboNET (CDC's national arbovirus surveillance system)
  - CHIK is not nationally notifiable

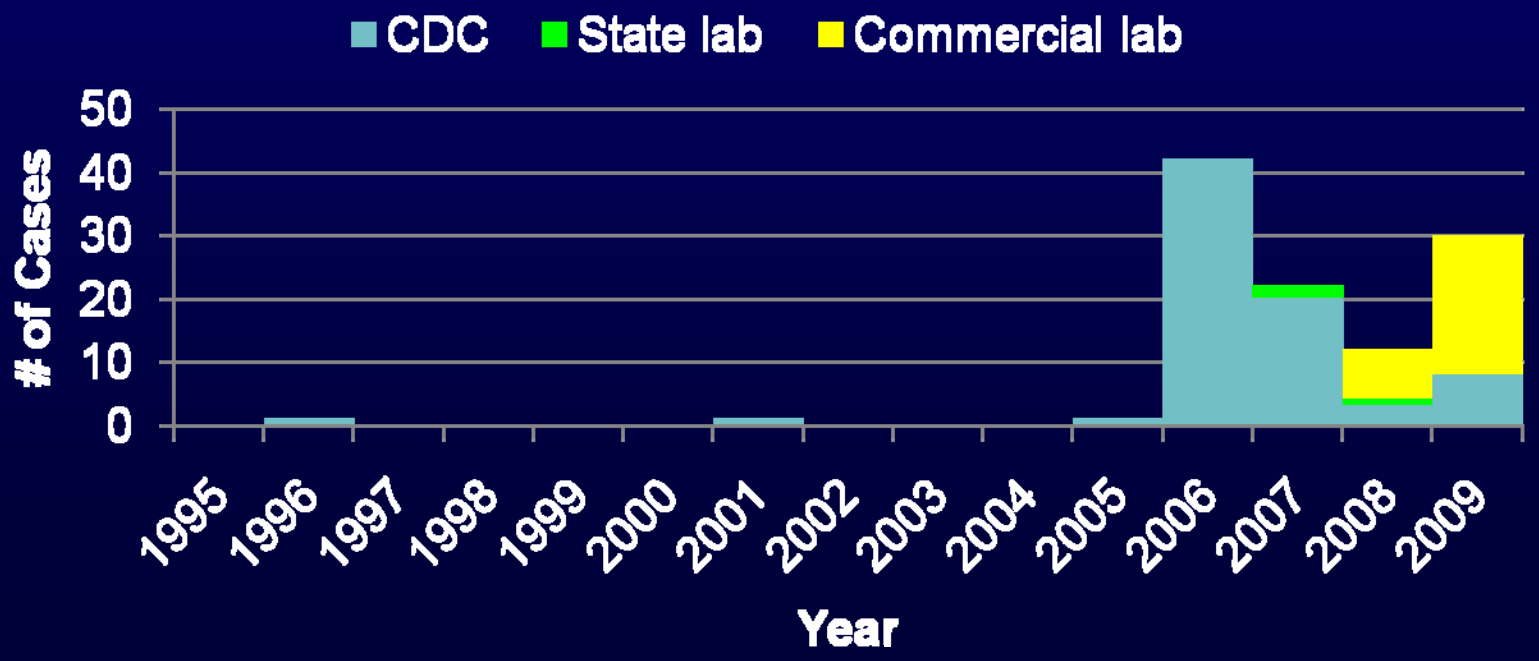
CHIK Case Definition

- Laboratory evidence of an acute CHIKV infection
  1. Detection of CHIK viral RNA or virus, or
  2. Detection of anti-CHIKV IgM antibodies (Ab)*, or
  3. Four-fold increase in neutralizing Ab titers between acute and convalescent samples

*CDC cases also require CHIKV-specific neutralizing Ab

CHIK Cases Diagnosed in U.S.

- From 1995-2009, 109 persons diagnosed with CHIKV infections in U.S. (all travel associated)
  - Three cases before 2006 (1 in 1996, 2001, and 2005)
  - 106 cases since 2006



Demographics (n=109)

- Median age 48 years (range 20-78 years)

Age group (yrs)	Number	(%)
0-19	0	(0)
20-39	31	(28)
40-59	57	(52)
≥60	16	(15)
Unknown	5	(5)

- 57% (62) female
- U.S. cases have similar age and sex distribution as CHIK cases from European Travelers

Travel History (n=78)

- 92% of cases traveled to country experiencing a CHIK outbreak
- Prior to 2006, all cases originated from Africa
- Since 2006, 92% from Asia
  - Most commonly India
- Different from European CHIK cases (travelers), who traveled most frequently to Indian Ocean
  - Vacation preference or cultural ties

Diagnosis – RT-PCR

- CHIKV RNA detected in 33% (13/39) of cases tested by RT-PCR
  - 12% (13/109) of total cases
- Of 39 cases tested by RT-PCR
  - 80% (8/10) positive ≤3 days post illness onset
  - 50% (5/10) positive 4-6 days post illness onset
  - 0% (0/19) positive ≥7 days post illness onset
- Of note, 60% of cases had illness onset within 7 days of returning to U.S.

Diagnosis – Serology

- Majority (88%) diagnosed by serologic testing

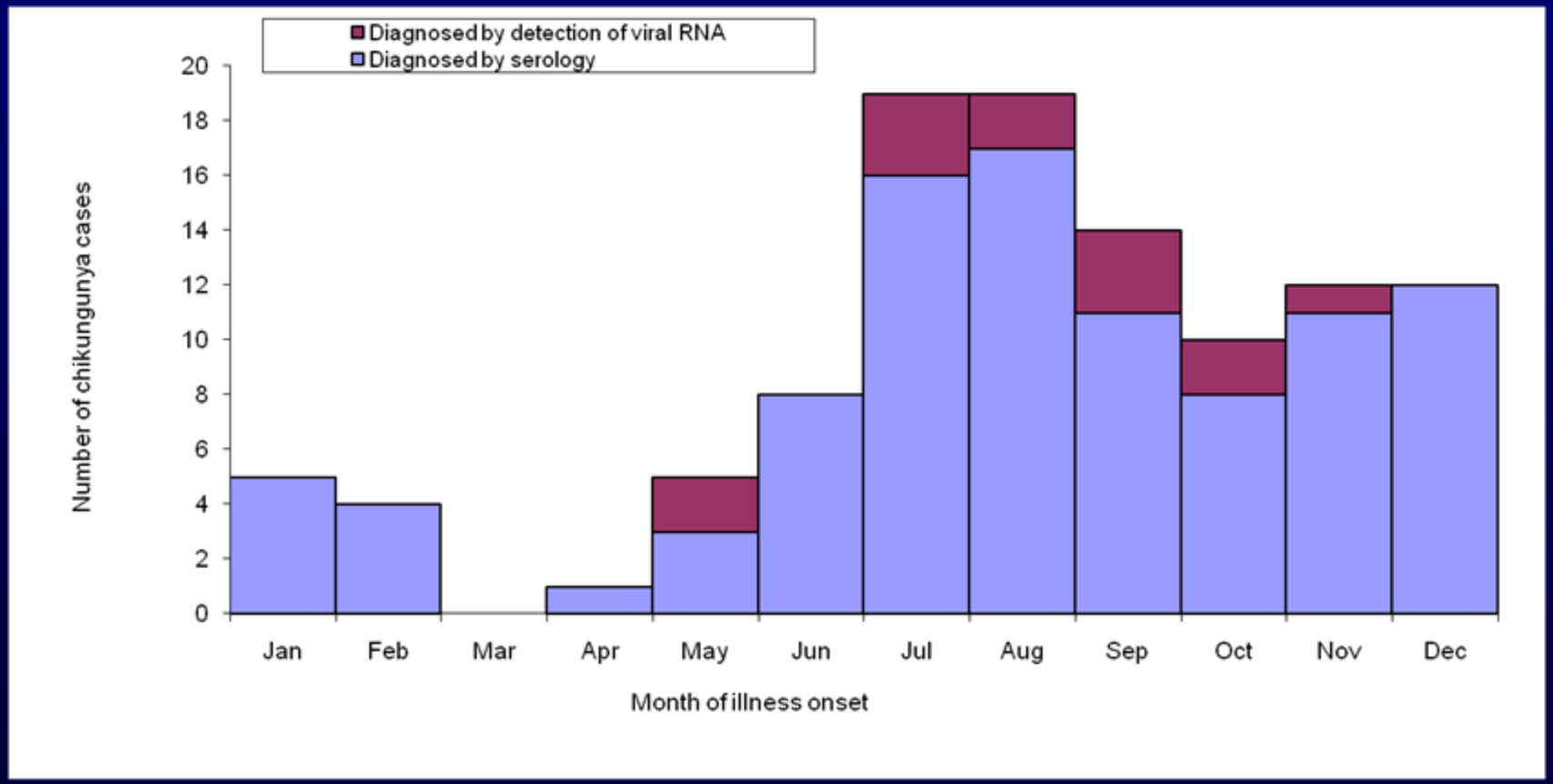
Test results	Time from illness onset to sample collection		
	≤7 days (n=24)	>7 days (n=54)	>4 weeks (n=38)
IgM positive	54%	92%[1]	NA
IgG positive	25%	82%	95%[2]
PRNT positive	59%	100%	100%

[1] Samples not IgM positive were indeterminate or equivocal (day 54 sample)
[2] Samples not IgG positive were indeterminate

CDC

Illness onset (n=109)

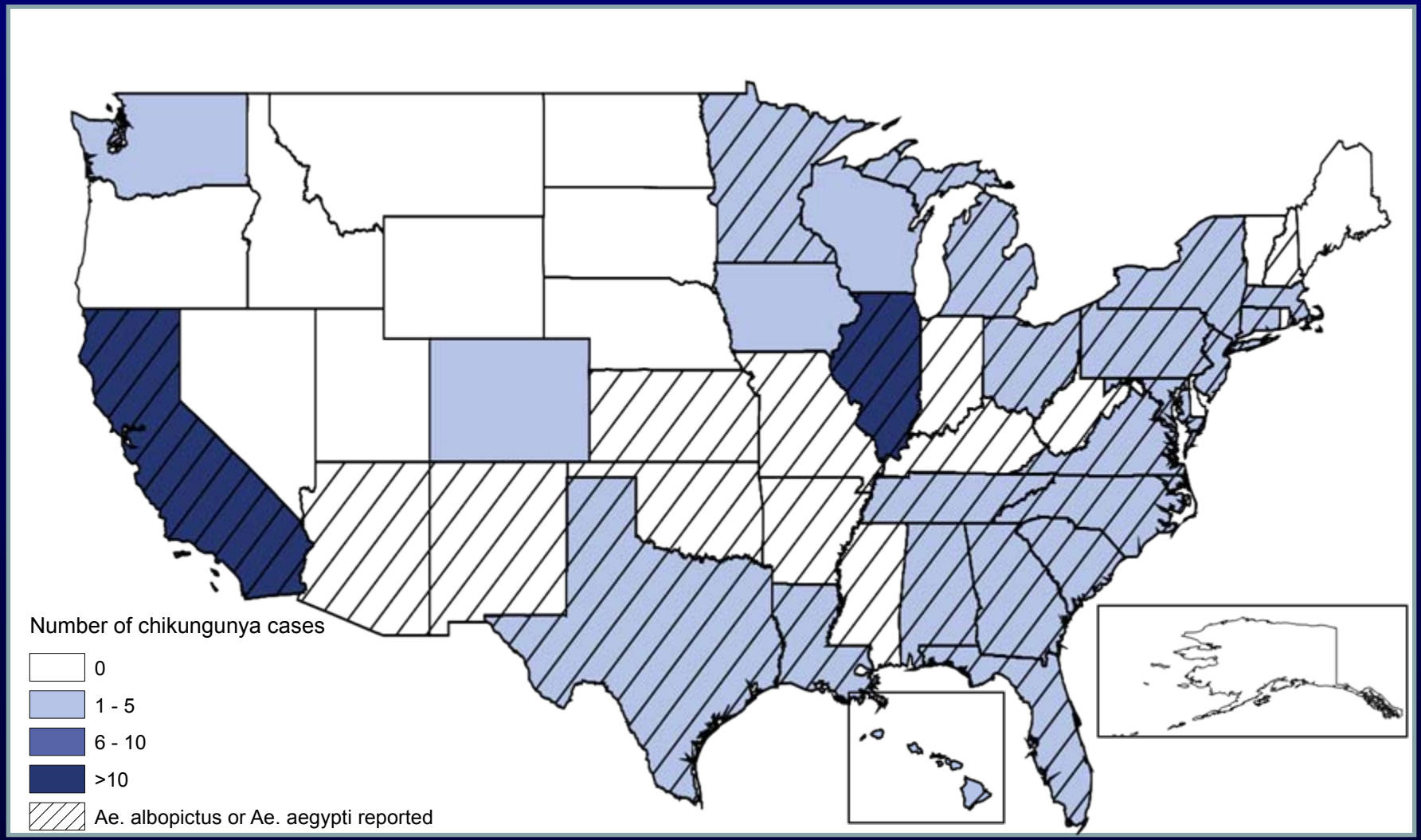
- Two-thirds (64%) of cases had their illness onset during summer and early fall when vectors likely to be active



Specimen Origin and Vectors (n=94)

- Positive specimens originated from 25 states and District of Columbia (DC)
- 81% also reported CHIKV vectors (*Ae. aegypti* or *Ae. albopictus*) in their jurisdiction
- 13 viremic cases originated from 7 states; 6 (85%) of these states also reported CHIKV vectors in at least one location

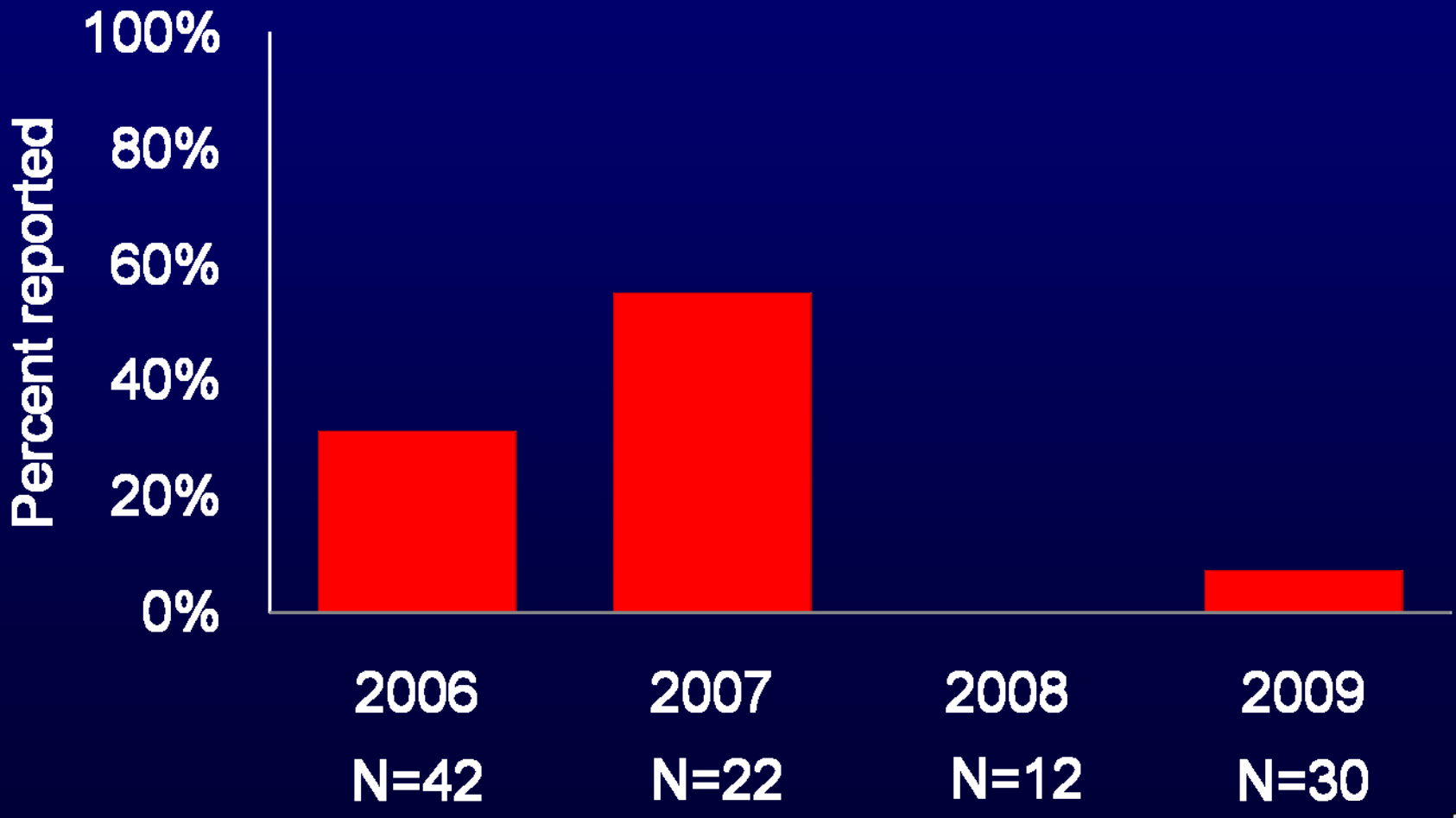
Number of CHIK Cases and Location of CHIKV Vectors, by State



Reporting of Cases

- Of 106 cases diagnosed from 2006-2009, only 25% were reported to ArboNET
- All reported cases diagnosed at CDC or state lab; none from commercial lab
  - Not nationally notifiable (no legal obligation)
  - Commercial lab calls physician with RT-PCR+ results
- Reporting time: median 122 days (range 44 to 273 days)

Proportion of Cases Reported to ArboNET, by Year



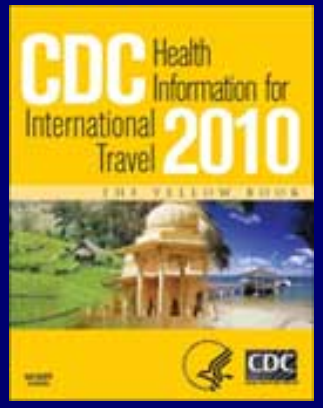
Conclusions

- Over last 4 years, 25 CHIK cases imported into the U.S. each year
  - Likely underestimate as rely on clinical suspicion and test being ordered
- Several cases viremic upon entry into U.S. and entered a state with CHIKV vectors
- Reporting to ArboNET incomplete and delayed
- U.S. at risk for CHIKV importation and spread

Recommendations

- Traveler education about disease and ways to prevent it (mosquito prevention)
- Increase awareness among clinicians of symptoms of disease, testing that can be performed, and the need to alert public health
- Inform public health community of risk of CHIKV importation to facilitate timely recognition and reporting of cases

Actions taken by CDC



- Added chapter on CHIK to 2010 Traveler's Health Information Book (yellow book)
- Published information on CHIKV cases and risk of importation
- Presented at Council of State and Territorial Epidemiologists (CSTE) meeting in 2010 to increase awareness of risk and need to report
- Worked with PAHO to draft a Preparedness Plan and train regional laboratories

Next Steps

- Finalize with PAHO and regional experts a CHIK Preparedness Plan for the Americas
  - Provide CHIK lab training courses to regional labs
- Create CHIK-specific training materials for physicians and public health officials
- Maintain current practice to alert public health officials of CHIK cases diagnosed at CDC
- Continue to share information on CHIK cases and risk with clinicians and public health officials

Questions?