CDC Zika IMS Sustaining the Zika Response in 2017
Laboratory Task Force
Wednesday, 15 March 2017

Dr. Ed Ades, Senior Science Advisor
Dr. Wendi Kuhnert and Dr. Rob Lanciotti, Zika Laboratory Team Leads
Opening Remarks
OVERVIEW

- Opening Remarks
- 2016 Zika Lessons Learned
- Updates to Zika Guidance
- Task force recommendations for jurisdictional and CDC actions for 2017
- Q&As
- Closing Remarks
Laboratory Task Force
Why Important – Continental US

- Continental US will continue to have travelers who go to areas with Zika virus
- Further local transmission of Zika virus is still a potential; however, the extent is unknown
- Zika diagnostic test performance continues to be limited by cross-reactivity to other flaviviruses
Successes

- CDC-developed MAC-ELISA (February 26, 2016) and Trioplex rRT-PCR (March 17, 2016) tests receive first FDA EUA to diagnose Zika virus infection
- CDC continues to manufacture and distribute reagents for these assays domestically and internationally
- CDC laboratories provide confirmatory testing and surge capacity for Zika virus

<table>
<thead>
<tr>
<th>Laboratory</th>
<th>Number of Specimens Received</th>
<th>Number of Specimens Tested by rRT PCR</th>
<th>Number of Specimens Tested by Zika IgM MAC ELISA</th>
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<tbody>
<tr>
<td>CDC-Atlanta</td>
<td>5,023</td>
<td>3,464</td>
<td>2,827</td>
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<td>CDC-Fort Collins</td>
<td>18,262</td>
<td>3,926</td>
<td>15,571</td>
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<td>CDC-San Juan</td>
<td>81,667</td>
<td>45,136</td>
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<td>Laboratory Response Network</td>
<td>60,788</td>
<td>25,439</td>
<td>35,349</td>
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<tr>
<td>Total</td>
<td>165,296</td>
<td>77,965</td>
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Updated 1/2017
Concerns

- Limited data on viral persistence and effect on testing algorithms
- Specificity of diagnostic assays
  - In-house evaluation of 3 commercial assays with MAC-ELISA as gold standard

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Sensitivity</th>
<th>Specificity</th>
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<tbody>
<tr>
<td>InBios (EUA approved)</td>
<td>82%</td>
<td>85%</td>
</tr>
<tr>
<td>NovaTec NovaLisa</td>
<td>70%</td>
<td>98%</td>
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<tr>
<td>Euroimmun</td>
<td>72%</td>
<td>95%</td>
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- Usefulness of PRNT
  - Cross reactivity due to past flavivirus infections
- Turnaround time from sample receipt to when results reach physicians
  - Discussions ongoing to pursue Health Level-7 (HL7)messaging to decrease time from test completion to results being available to a physician
Zika Virus Laboratory Priorities, 2017

- Continue to provide Zika virus subject matter expert and reference laboratory support in Fort Collins; surge planning for upcoming season in progress
- Maintain surge laboratories for Zika diagnostic testing in Atlanta
- Assist state and territorial laboratories, as needed
- Refine performance of diagnostic assays inclusive of assessing the value of whole blood and urine in molecular diagnostics
- Consider updates to the testing algorithm to allow increased flexibility and to simplify as appropriate
- Assist as needed in moving testing to commercial laboratories
- Continue to conduct new research
Plans - Move testing to commercial laboratories

- Early in response CDC entered into agreements with the 4 nation-wide commercial laboratories
  - Provided MAC-ELISA reagents free of charge to encourage testing until additional serologic assays achieved EUA approval
  - Challenges with reporting and commercial lab performance
- Movement of testing will decrease surge needs for CDC laboratories
  - 12 PCR assays currently FDA EUA approved (including Trioplex)
  - 2 IgM assay currently FDA EUA approved (including MAC-ELISA)
Plans - New Research: Improvement of Molecular and Serologic Diagnostic Tools for Zika Virus (all CDC laboratories)

- Improve sensitivity of high-throughput rRT-PCR by specimen volume or type
  - Studies ongoing to evaluate serum, whole blood, and urine to evaluate sensitivity of each
- Develop a Zika virus multiplex bead assay (IgM/IgG)
  - Investigation of more specific antibodies
- Develop rapid and specific IgM diagnostic test that uses mass spectrometry
- Refine recombinant antigens in testing platforms to eliminate the need for inactivation of live virus
Why Important – Puerto Rico

- **Epidemic transmission**
  - Almost 38,000 confirmed cases (102,000 tested)
  - Peak of epidemic during September 2016
- **Rate Zika-associated of birth defects will not be known until summer 2017**
Upcoming Transmission Season – Puerto Rico

- Likely will start in May
- Likely will be less intense for Zika, but could be high for dengue or chikungunya due to varying seasonality
Concerns – Puerto Rico

- Existing PR requirement to test pregnant women in each trimester of pregnancy (30,000 pregnancies/year)
- Co-circulation of dengue and chikungunya viruses requires complex testing algorithm for symptomatic cases
- PRNTs are impractical and uninformative because of the high volumes of samples and the previous exposure of the population to dengue
  - Confirmatory testing of PCR neg/IgM pos is not feasible
2017 Anticipated Plans – Puerto Rico

- CDC Dengue laboratory (Capacity = 1500 samples/month) to support PRDH arbovirus surveillance needs
- Surge Plan for 2017

- PRDH/BCEL * (1500 samples/week)
- CDC-DB (Excedent up to 1500 samples/week)
- CDC ATL (Excedent up to 500 samples/week)

- Validate and evaluate CDC’s commercial diagnostic tests for Zika and provide recommendations to Puerto Rico Department of Health (PRDH)

*BCEL - Biological and Chemical Emergencies Laboratory
2017 Anticipated Plans – Puerto Rico

- **Supports testing for Zika-related epidemiologic and clinical assessments as needed. For example**
  - Guillain-Barre Syndrome surveillance
  - Screening of pregnant women
  - Cross reactivity in serologic tests
  - Virus persistence in body fluids
  - Testing of placenta or newborns

- **Improve automation and throughput for Zika, dengue and chikungunya testing**
Closing Remarks
<table>
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<tr>
<th>Task Force</th>
<th>Date/Time/Location</th>
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<tr>
<td>Laboratory Task Force</td>
<td>Wed 3/15/2017 / 2pm–3pm EDT - Domestic</td>
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<tr>
<td>Eddie Ades, Robert Lanciotti, Christy Ottendorfer</td>
<td>Wed 3/15/2017 / 5 pm–6 pm EDT - Islands</td>
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<td>Bridge Line: 1(888)972-6716/ Passcode: 6721430</td>
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<td>Joint Information Center/Communications</td>
<td>Wed 3/22/2017 / 2pm–3pm / Rm 5116</td>
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<td>Erin Connelly</td>
<td>Bridge Line: 1(888)972-6716/ Passcode: 6721430</td>
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<td>Epidemiology Task Force</td>
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<td>Stacey Martin, Carolyn Gould</td>
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<td>Vector Issues Team</td>
<td>Tues 3/28/2017 / 2pm–3pm / Rm 5116</td>
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<td>Janet McAllister, Audrey Lenhart</td>
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<td>Policy and Partnerships</td>
<td>Wed 3/29/2017 / 1:30pm–2:30pm / Rm 5116</td>
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<td>Sue Visser, Melody Stevens</td>
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<td>Pregnancy and Birth Defects Task Force (including surveillance)</td>
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<td>Koo Chung, Matt Kuhnert, Craig Hooper</td>
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<td>Maleeka Glover</td>
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Thank You!

For more information, contact CDC
1-800-CDC-INFO (232-4636)

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.