AMERICAN ACADEMY OF PEDIATRICS
ZIKA ECHO
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Zika Outcomes and Development in Infants and Children (ZODIAC) Project

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“Never before in history has there been a situation where a bite from a mosquito could result in a devastating malformation.”

– Dr. Tom Frieden, Former CDC Director

*Fortune*, April 13, 2016
Background

What we know:

- Most research and publications to date have focused on infants with microcephaly and other neurologic manifestations present at birth
- Zika virus impairs neural progenitor cells and neural migration, and neurologic sequelae may develop over time

What we don’t know:

- The long-term effects of congenital Zika virus infection or more subtle clinical findings associated with congenital Zika virus infection
What is known about delayed effects of other congenital infections

- CMV: Delayed sensorineural hearing loss, cognitive deficit, chorioretinitis, seizures\(^1\)
- Rubella: Delayed neurologic and ophthalmologic sequelae, hearing loss, endocrinopathies\(^2\)
- Toxoplasmosis: Delayed neurologic sequelae\(^3\)
- HIV: Delayed neurologic sequelae\(^4\)

2. Sever et al. 1985. Delayed manifestations of congenital rubella
Zika Outcomes and Development in Infants and Children (ZODIAC)

- Follow up assessment of babies aged 12-24 months with congenital ZIKV infection in two Brazilian states: Paraíba and Ceará
- Collaboration between CDC’s National Center on Birth Defects and Developmental Disabilities and Center for Global Health, and Brazil’s Ministry of Health
Creating a Comprehensive Picture

▪ **Expertise—CDC Staff**
  – Developmental Pediatrics, General Pediatrics, Pediatric Neurology
  – Neuroscience, Audiology, Ophthalmology, Behavioral Health
  – Epidemiology, Statistics

▪ **Data Sources**
  – Medical record abstraction
  – Neurologic and developmental assessments
  – Caregiver interview
  – Physical exam, including laboratory tests
  – Ophthalmologic exam
  – Other exams as clinically indicated (e.g., auditory, neuroimaging)
Comprehensive description of the health and development of 19 children, ages 19-24 months, with microcephaly and laboratory evidence of congenital Zika virus infection

- Based on direct clinical assessments, caregiver interviews, and medical record review
Investigators found that, of the 19 children:

<table>
<thead>
<tr>
<th>Count</th>
<th>Description</th>
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<tbody>
<tr>
<td>11</td>
<td>had indications of <strong>possible seizure disorder</strong></td>
</tr>
<tr>
<td>10</td>
<td>had <strong>sleep difficulties</strong></td>
</tr>
<tr>
<td>9</td>
<td>had <strong>feeding difficulties</strong> (e.g. trouble swallowing)</td>
</tr>
<tr>
<td>13</td>
<td>had <strong>hearing problems</strong> (e.g. not responding to sound of a rattle)</td>
</tr>
<tr>
<td>11</td>
<td>had <strong>vision problems</strong> (e.g. not being able to follow a moving object with their eyes)</td>
</tr>
<tr>
<td>15</td>
<td>had <strong>severe motor impairments</strong>, including inability to sit independently</td>
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<tr>
<td>14</td>
<td>had <strong>at least three of these challenges</strong>, complicating their care</td>
</tr>
<tr>
<td>8</td>
<td>had been <strong>previously hospitalized</strong>, with bronchitis/pneumonia being the most commonly reported reason for hospitalization (<strong>6 of the 8</strong>)</td>
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</table>
How ZODIAC May Help in the Future

Tools and training from ZODIAC may be useful to:

▪ Build sustainable screening protocols in clinical practices
▪ Raise awareness of less salient or delayed onset consequences of congenital Zika that may otherwise be missed
▪ Track at-risk children’s health and development over time

ZODIAC data may help inform:

▪ Preparedness efforts, public health policies and programs related to congenital Zika virus infection
▪ Response to emerging threats to children’s health and development
Moving forward...

- Children affected by Zika virus will continue to require specialized care from various healthcare providers and caregivers as they age
  - Important that health care providers work closely with parents to provide this care and support
- Must remain vigilant in our Zika prevention efforts both in the United States and around the world, especially for pregnant women
- This work will provide critical scientific information to help countries prepare for the unprecedented challenges posed by Zika virus infection
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.