Margaret (Peggy) Honein, PhD, MPH
Epidemiologist
Co-Lead, Pregnancy and Birth Defects Task Force
Chief, Birth Defects Branch
Centers for Disease Control and Prevention
FACULTY

Mark Hudak, MD, FAAP
Professor, Department of Pediatrics
Chief, Division of Neonatology
University of Florida, Jacksonville

Chair-Elect, AAP Section on Neonatal-Perinatal Medicine.
FACULTY

Shana Godfred-Cato, DO, FAAP
General Pediatrician
Austin Regional Clinic

Liaison from the AAP Section on Early Career Physicians to the AAP Disaster Preparedness Advisory Council
**Disclosures**

• The presenters have no relevant financial relationships with the manufacturers(s) of any commercial products(s) and/or provider of commercial services discussed in this activity.

• The presenters do not intend to discuss an unapproved/investigative use of a commercial product/device in this presentation.
TECHNICAL SUPPORT

• Type issue into the chat feature
• Call 1-800-843-9166
• Email support@readytalk.com
Welcoming Remarks

V. Fan Tait, MD, FAAP
American Academy of Pediatrics
Chief Medical Officer
Zika Virus: Protecting Pregnant Women and Babies

Margaret (Peggy) Honein, PhD, MPH
Co-Lead, Pregnancy and Birth Defects Task Force
Chief, Birth Defects Branch
Centers for Disease Control and Prevention
“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

“...the last time an infectious pathogen (rubella virus) caused an epidemic of congenital defects was more than 50 years ago...”
CDC Guidance: Prevent Mosquito Bites

If a pregnant woman lives in or travels to an area with risk of Zika, she should

• Wear long-sleeved shirts and long pants
• Stay and sleep in places with air conditioning or that use window and door screens
• Use EPA-registered insect repellents
• Once a week, empty and scrub, turn over, cover, or throw out items that hold water, such as tires, buckets, planters, toys, pools, birdbaths, flowerpots, or trash containers
A pregnant woman whose partner lives in or has traveled to an area with risk of Zika should

- Use condoms correctly every time they have sex, or
- Not have sex

During pregnancy, even if the pregnant woman’s partner does not have symptoms or feel sick.
Zika, Pregnancy, and Congenital Zika Syndrome

Zika infection during pregnancy can

• Cause brain abnormalities and microcephaly, and has been linked to other birth defects

• Lead to congenital Zika syndrome, a pattern of birth defects that includes
  » Brain abnormalities
  » Vision problems
  » Hearing loss
  » Joint contractures
Many Questions Remain

• What is the level of risk from a Zika virus infection during pregnancy?

• When during pregnancy does Zika virus infection poses the highest risk to the fetus?

• What is the full range of potential health problems that Zika virus infection may cause?

• What other factors (e.g., co-occurring infection, nutrition, presence of symptoms) might affect the risk for birth defects?
Surveillance of Pregnant Women, Fetuses, and Infants

- US Zika Pregnancy Registry
- Zika Active Pregnancy Surveillance System (Puerto Rico)
- US Zika-Related Birth Defects Surveillance
- Proyecto Vigilancia de Embarazadas con Zika (Colombia)
US Zika Pregnancy Registry

**Purpose:** To monitor pregnancy and infant outcomes in pregnancies with laboratory evidence of possible Zika virus infection and to inform clinical guidance and public health response

- Estimate the proportion of pregnancies with lab evidence of possible Zika virus infection who have Zika-associated birth defects
- Provide information to inform the full range of outcomes associated with congenital Zika virus infection
- Help to ensure infants are linked to care
- Update clinical guidance

**Possible Zika infection** — Any lab evidence of recent Zika infection.
**Confirmed Zika infection** — A subgroup of possible Zika infection defined as presence of Zika virus or antibodies specific to Zika. Testing for Zika can only positively confirm Zika within a few weeks of infection – a special challenge when there are no symptoms.
US Zika Pregnancy Registry: How It Works

• Identification
  » Health departments identify pregnant woman with Zika virus infection through notification from healthcare provider and/or notification of positive Zika test result

• Data Collection
  » Health departments work with healthcare providers to collect data for the US Zika Pregnancy Registry

• Data Analysis & Reporting
  » CDC receives data from health departments, aggregates and analyzes. Reporting occurs twice monthly on CDC’s website.

• Publication
  » Data Use Working Group (consisting of CDC and health department partners) routinely publish results
Key Partnerships

CDC collaborates with several key partners to advance the success of registries

- Local chapters of clinical partner organizations to increase outreach to healthcare providers
- State, tribal, local, and territorial health departments
Vital Signs Key Findings

44 States that reported pregnant women with evidence of Zika in 2016

About 1 in 10 Pregnant women with confirmed Zika that had a fetus or baby with birth defects
Vital Signs Key Findings

- About 1 in 3: Babies with possible congenital Zika infection had no report of Zika testing at birth.
- Only 1 in 4: Babies with possible congenital Zika infection were reported to have received brain imaging after birth.
Vital Signs Key Findings

Nearly 1,000 pregnant women with laboratory evidence of Zika completed their pregnancies in 2016, and some had babies with Zika-related birth defects:

- **5%** with *possible* Zika had birth defects
- **10%** with *confirmed* Zika had birth defects
- **15%** with *confirmed* Zika in the *first trimester* had birth defects
# Updated Data from the US Zika Pregnancy Registry

Pregnant Women with Any Laboratory Evidence of Possible Zika Virus Infection

<table>
<thead>
<tr>
<th>US States and the District of Columbia*</th>
<th>1,716</th>
</tr>
</thead>
</table>

*Includes aggregated data reported to the US Zika Pregnancy Registry as of March 28, 2017

## Completed Pregnancies

<table>
<thead>
<tr>
<th>Completed pregnancies with or without birth defects</th>
<th>1,311</th>
</tr>
</thead>
</table>

*Includes aggregated data reported to the US Zika Pregnancy Registry*

## Pregnancy Outcomes in the United States and the District of Columbia

<table>
<thead>
<tr>
<th>Liveborn infants with birth defects*</th>
<th>56</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnancy losses with birth defects**</td>
<td>7</td>
</tr>
</tbody>
</table>

*Includes aggregated data reported to the [US Zika Pregnancy Registry]*

**Includes aggregated data reported to the [US Zika Pregnancy Registry]**
New Vital Signs Report
Zika Virus: Protecting Pregnant Women and Babies

• Healthcare providers can
  » Educate families about how to prevent Zika
  » Ask about possible exposure to Zika and provide all needed testing and follow-up care
  » Support babies and families
Healthcare Providers Caring for Pregnant Women and Infants Should Ask about Zika Exposure during Pregnancy

Have you traveled to an area with risk of Zika during pregnancy or just before you became pregnant?

Have you had sex without a condom with a partner who lives in or traveled to an area with risk of Zika?

Do you live in or do you frequently travel (daily or weekly) to an area with risk of Zika?
Who Should Be Tested for Zika?

• All pregnant women (regardless of symptoms) who
  » Live in or recently traveled to an area with risk of Zika that has a CDC Zika travel notice, or
  » Had unprotected sex with a partner who lives in or traveled to an area with risk of Zika that has a CDC Zika travel notice

• Pregnant women who live in or recently traveled to an area with risk of Zika but without a CDC Zika travel notice
  » If they develop symptoms of Zika, or
  » If their fetus has abnormalities on an ultrasound that may be related to Zika infection

Testing Babies for Zika

CDC recommends laboratory testing for

- All infants born to mothers with laboratory evidence of Zika virus infection during pregnancy
- Infants who have abnormal clinical or neuroimaging findings suggestive of congenital Zika syndrome and a mother with a possible exposure to Zika virus, regardless of maternal Zika virus testing results
Pediatric Evaluation and Follow-Up: The First 12 Months

Update Posted April 2017: New Considerations

Additional Considerations for Evaluation and Management of Infants with Zika


- New considerations and clarifying information to update the August 2016 MMWR on evaluation and management of infants with possible Zika
Testing Babies for Zika: New Considerations

• Testing of cerebrospinal fluid
  » Consider obtaining CSF for Zika virus RNA and IgM antibody testing in infants with clinical findings of possible congenital Zika syndrome but whose initial laboratory tests are negative on serum and urine

• Testing beyond 2 days of life
  » Test specimens collected from infants within 2 days after birth
    » Testing specimens collected within the first few weeks to months after birth may still be useful in the evaluation for possible congenital Zika virus infection, especially among infants born in areas without risk of Zika
Pediatric Evaluation and Follow Up: New Considerations

Imaging

- Perform a head ultrasound before hospital discharge or within 1 month of birth for infants with possible Zika virus infection
- For infants with a small or absent anterior fontanelle and poor visualization of the intracranial anatomy on ultrasound, other imaging (i.e., magnetic resonance imaging or computed tomography) should be considered
Pediatric Evaluation and Follow Up: New Considerations

Maintain a level of suspicion

- For infants without laboratory evidence of Zika virus infection but for whom suspicion for congenital Zika virus infection remains, healthcare providers should
  - Evaluate for other causes of congenital infection
  - Consider an ophthalmology exam and auditory brainstem response hearing test before hospital discharge or within 1 month of birth
  - Consider performing other evaluation and follow up in accordance with CDC guidance
Testing Babies for Zika: New Considerations

Testing of infants whose mothers had possible Zika virus exposure during pregnancy but were not tested or were tested more than 12 weeks after maternal exposure or symptoms

• Conduct a comprehensive physical examination of infant, including standardized measurement of head circumference
  » Perform maternal testing if exposure is within the last 12 weeks
  » Consider testing of the placenta for Zika virus PCR

• Perform infant testing if maternal testing is consistent with laboratory evidence of Zika virus infection
  » If infant appears clinically well, further evaluation can be deferred until maternal test results are available

• Consider further infant evaluation before hospital discharge if there is concern about follow up or maternal testing not performed/negative more than 12 weeks earlier
Local Health Department Initiative

Map showing various health departments across the United States, including:
- Salt Lake County Health Dept
- City of El Paso Dept of Health
- FL Dept of Health – Miami-Dade County
- Miami-Dade County
- Alameda County Public Health Dept
- County of San Diego Health and Human Services
- City of El Paso Dept of Health
- City of Laredo Dept of Health
- Hidalgo County Health and Human Services Dept
- Brownsville Public Health Dept
- Kosrae/Micronesia Dept of Health Services
- FL Dept of Health – Palm Beach County
- FL Dept of Health – Orange County
- USVI Dept of Health

Key areas of focus:
- Referral to Service
- Surveillance & Reporting
- Partnership Engagement
- Provider Outreach
Zika Care Connect: Improving Access to Clinical Services

1. **Provider Network for Families Affected by Zika**
   Identify specialty healthcare providers (1,200 providers in network initially)
   - Maternal-fetal medicine, pediatric neurology, pediatric ophthalmology, pediatric radiology, audiology, mental health services, early intervention services, developmental pediatrics, physical therapy, and occupational therapy
   - Planned expansion in mid-2017

2. **Laboratory Testing Web Portal for Healthcare Providers**
   Identify laboratories that can test for Zika

HelpLine: 1-844-677-0447 (toll-free)
Website: www.zikacareconnect.org
Healthcare Providers Have a Critical Role

- Educate families on Zika prevention
- Ask about Zika and provide all needed tests and follow-up care
- Support babies and families
Thank you!

For more information, please visit:

www.cdc.gov/vitalsigns/index.html
www.cdc.gov/zika

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.
A Neonatologist’s Perspective

Mark Hudak, MD, FAAP
Professor, Department of Pediatrics
Chief, Division of Neonatology
University of Florida, Jacksonville
Chair-Elect, AAP Section on Neonatal-Perinatal Medicine.
COMMUNICATION: OBSTETRICIANS TO PEDIATRICIANS

American College of Obstetricians and Gynecologists Zika Virus Practice Advisory...

“It is important that maternal Zika virus exposure and testing information be available and communicated to the pediatric provider so that appropriate infant testing and management can be implemented in accordance with existing guidance. It is particularly important that this information be conveyed while neonates are hospitalized after birth to allow for collection of infant specimens within 2 days of birth.”

Source: http://www.acog.org/About-ACOG/News-Room/Practice-Advisories/Practice-Advisory-Interim-Guidance-for-Care-of-Obstetric-Patients-During-a-Zika-Virus-Outbreak
ZIKA: NEWBORN PROVIDER ROLE

Ascertain Relevant Aspects of Maternal History

Did the mother travel during the pregnancy to high risk areas?

Did any sexual partner travel to high risk areas, either during the pregnancy or up to 6 months prior to conception?

Did the mother or any sexual partner have an illness during pregnancy consistent with Zika?

Did the mother:

Undergo testing for Zika virus infection during pregnancy;
If so, when;
What test(s) were performed;
What were the results?
**Zika: Newborn Provider Role**

If Mother Was Tested: Why, When, and What Were the Results?

Why? Travel/exposure history; abnormal prenatal findings; maternal concern

When? Which trimester(s)? What was the temporal relationship of testing to travel/exposure or to clinical illness consistent with Zika?

What tests were performed and what were the results?

- RNA NAT (nucleic acid testing)
- rRT-PCR (real time reverse transcriptase polymerase chain reaction)
- Zika virus-specific IgM
- Plaque reduction neutralization test (PRNT)
OB – Peds Communication: Potential Problems

All communication is local!

• Obtaining results of tests is often delayed – e.g.,
  – Hepatitis B, group B streptococcus (GBS)
  – Prenatal ultrasound findings

• Root cause = failure of data systems to communicate
  – Outside laboratory results are not accessible/importable into EMR’s
  – Records in obstetrician offices are not available to newborn providers after hours/weekends

• Historical details and laboratory testing for Zika are more complex than for hepatitis B or GBS
OB – Peds Communication: Potential Solutions for Zika

- Develop maternal Zika passport (e.g., Virginia, New York)

- Obstetrician office can allow mother to take a photograph of an in-house “Zika passport” on her cell phone to share with hospital staff on admission and with pediatric providers after delivery

- Develop a custom Zika module within the hospital EMR
  - Data on travel history of mother and partners
  - Maternal self-report on Zika testing and ultrasounds during pregnancy
  - Completed by obstetrician nurse admitting mother during any possible delivery hospital stay
  - Hard stop option: note cannot be finalized without full responses to Zika module
  - Incorporate Best Practice Alerts

Redundancy is helpful!
ZIKA: NEWBORN PROVIDER ROLE

High risk newborns:

- Newborn infants born to mothers with definite or possible Zika infection during pregnancy
- AND/OR
- Newborns with abnormalities consistent with congenital Zika virus syndrome

Should have the following evaluations performed before hospital discharge:

- Appropriate testing for Zika virus infection before hospital discharge (role for placental and CSF tests)
- Detailed neurologic examination
- Brain ultrasound (in rare cases, MRI)
- Standard newborn hearing screening (auditory brainstem response, if abnormalities)
- Retinal examination
- Thyroid function testing

Develop an electronic order set module in the hospital EMR
Congenital Zika Virus Syndrome

A Unique Constellation of Findings:

- Microcephaly (severe) with partially collapsed skull
- Thin cerebral cortices with subcortical calcifications
- Macular scarring and focal pigmentary retinal mottling
- Congenital contractures
- Marked early hypertonia and symptoms of extrapyramidal involvement


Source: http://jamanetwork.com/journals/jamapediatrics/fullarticle/2579543
CONGENITAL ZIKA PHENOTYPE

For more information: www.cdc.gov/zika

A Right eye
B Left eye

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN®
# Neuroimaging

<table>
<thead>
<tr>
<th>Testing</th>
<th>No (%) liveborn infants</th>
<th>With birth defects</th>
<th>Without birth defects</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td>45</td>
<td>850</td>
<td>895</td>
</tr>
<tr>
<td>Neuroimaging</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any neuroimaging reported to USZPR</td>
<td></td>
<td>29 (64)</td>
<td>192 (23)</td>
<td>221 (25)</td>
</tr>
<tr>
<td>Infant Zika virus testing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive test result on an infant specimen†,§</td>
<td></td>
<td>25 (56)</td>
<td>69 (8)</td>
<td>94 (11)</td>
</tr>
<tr>
<td>Negative infant test results among infants with ≥1 infant specimen reported as tested</td>
<td></td>
<td>17 (38)</td>
<td>474 (56)</td>
<td>491 (55)</td>
</tr>
<tr>
<td>No infant specimen test results reported to USZPR</td>
<td></td>
<td>3 (7)</td>
<td>307 (36)</td>
<td>310 (35)</td>
</tr>
</tbody>
</table>

- Any neuroimaging reported
- No neuroimaging reported

No. of infants

Month of birth

December 2015–August 2016

September–December 2016
What Else Can Newborn Provider Do?

Initiate Enrollment or Provide Further Information for the U.S. Zika Pregnancy Registry (USZPR)

• Report infants who are eligible for USZPR to state, local, tribal, or territorial health department. If report is made to CDC, CDC will notify appropriate health department.
• Infant may be reported without preceding maternal report.
• Newborn findings are critical!
Provide a Good Hand-off to Ensure Appropriate Postnatal Follow-up and Treatment

Infants with Abnormalities Consistent with Congenital Zika Virus Syndrome Need:
A coordinated evaluation by multiple specialists by 1 month of age (audiologist, clinical geneticist, endocrinologist, neurologist, family and supportive services, infectious disease specialist, lactation specialist, ophthalmologist, orthopedist, physiatrist or physical therapist, and pulmonologist [for concerns about aspiration]).

Asymptomatic Infants with positive or probable positive test results:
Follow American Academy of Pediatrics Bright Futures Periodicity Schedule for developmental, behavioral and motor screening recommendations and timing.

Repeat hearing testing (ABR) between 4 to 6 months and 9 to 12 months of age.
Pediatric Provider Advice: Care for Infants with Congenital Zika Virus Syndrome

Shana Godfred-Cato, DO, FAAP
General Pediatrician
Austin Regional Clinic
Liaison from the AAP Section on Early Career Physicians to the AAP Disaster Preparedness Advisory Council
ZIKA TOPICS

• Transition from Hospital to Primary Care Provider
• Care for Congenital Zika Infant
• Care for Infants Without Symptoms
• Resources for the Primary Care Provider
• Resources for the Family
Transition from Hospital to Primary Care Provider

• Once a child with CZVS is ready to be discharged:
  • Ensure that primary care provider is notified of possible or confirmed Congenital Zika Syndrome
  • Hospital records should be available to the primary care provider
• Screen all mothers at infant’s first visit after hospital discharge for Zika exposure
Clinic Care for the Congenital Zika Syndrome Infant

- Infant should follow-up a few days after hospital discharge, again at 1 month, then for scheduled well checks
- Brain imaging per CDC guidance (if not prior to discharge)
- Well infant examinations (length, weight, and head circumference)
- Monitor developmental progress
- Ensure that therapy is being provided as needed
Clinic Care for the Congenital Zika Syndrome Infant (Cont)

• Provide immunizations and other well infant care
• Repeat ABR at 4-6 months of age
• Thyroid screening 2 weeks and 3 months of age
• Comprehensive eye exam at 3 months of age
• Family support services provided
SPECIALTY CARE

• Ensure that infant has been referred to specialists
  • Neurology- neuroimaging, such as MRI or ultrasound
  • Ophthalmology- evaluate for possible cortical visual impairment
  • Infectious Disease- confirm Zika or other congenital infection
  • Endocrinology- monitor hypothalamic, thyroid and pituitary function
  • Genetics- Evaluate for possible genetic causes of microcephaly and other malformations
SPECIALTY CARE (CONT)

• Therapists- speech, occupational and physical therapy- monitor for age appropriate development
• Orthopedics- hypertonia, club foot or arthrogryposis
• Pulmonology or otolaryngology- evaluation for aspiration
• Gastroenterology/nutrition/lactation specialist- monitor appropriate feeding and weight gain
CARE FOR ZIKA POSITIVE INFANTS WITHOUT SYMPTOMS

- Provide well child care
- Monitor growth parameters, sleep, feeding, fussiness
- Ensure developmental screening/testing
- Use a standardized, validated developmental screening tool at 9 months or sooner if developmental abnormalities identified
- Repeat ABR at 4-6 months of age- even if passed at birth
- Family support services
- Early referral for services if abnormalities identified
Pediatric healthcare providers can:

- Identify and report suspected congenital Zika virus exposure to their state, tribal, local, or territorial health department for possible testing.
- Collect pertinent clinical information about infants born to women with laboratory evidence of Zika virus infection or infants with congenital Zika virus infection.
- Provide the information to state, tribal, local or territorial health departments or directly to CDC registry staff if asked to do so by local health officials.
- Notify state, tribal, local, or territorial health department staff or CDC registry staff of adverse events (e.g., perinatal or infant deaths).
RESOURCES FOR THE PRIMARY CARE PROVIDER

- AAP Zika Web pages: [www.aap.org/zika](http://www.aap.org/zika) and [www.healthychildren.org/zikavirus](http://www.healthychildren.org/zikavirus)
**Resources: AAP Psychosocial Support Videos for Parents and Providers**

**Pediatrician Advice for Families: Responding to your Concerns about Zika**

An expecting parent's number one wish is for a happy, healthy baby. The spread of Zika virus to the United States and the national news coverage has sparked concerns among pregnant women and their partners—as well as their extended family and friends.

In this video, David Schonfeld, MD, FAAP, a developmental-behavioral pediatrician at Children's Hospital Los Angeles and director of the National Center for School Crisis and Bereavement (NCSCB) at the University of Southern California and Carolina Peña, MD, FAAP, a developmental-behavioral pediatrician at Kaiser Permanente, West Los Angeles, provide expectant parents and their families with some basic information about the risks of Zika infection during pregnancy and recommends strategies to deal with stress if they are worried. Dr. Schonfeld and Dr. Peña also address what expectant parents can do or expect if Zika virus infection is suspected or known during pregnancy.

**Zika: Ten Tips for Pediatricians Supporting Families**

Pediatricians are learning more about Zika virus at the same time as their patients may be coming to them with questions. In this video, David Schonfeld, MD, FAAP, a developmental-behavioral pediatrician at Children's Hospital Los Angeles and director of the National Center for School Crisis and Bereavement (NCSCB) at the University of Southern California, provides 10 tips for pediatricians to consider when speaking with their patients who may have a child with Zika virus syndrome, or are worried about possible infection in their unborn child.
**IN SUMMARY**

- Communication and record sharing from hospital staff to primary care providers
- Provide consistent and thorough monitoring of infant development
- Provide needed referrals and ensure follow-ups
- Support family through this journey and provide resources
QUESTIONS?

• Dial *1 on your phone to ask a live question.
• Phone: 888-299-7210
• Participant Passcode: 847729

• You may also ask a question through the chat box in the lower left hand corner. The AAP staff or presenters will address unanswered questions via e-mail after the call.

• Please e-mail DisasterReady@aap.org to follow-up as needed.