

Zika Virus: The Pediatric Perspective

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Objectives

1. Understand congenital Zika virus and why evaluating for congenital Zika virus is important
2. Who?, what?, when?, where? of Zika testing in babies
3. Be aware of your responsibility to communicate with health department about possible Zika virus
4. Know how to complete Zika Infant Registry forms at birth, 2, 6, 12 months of age
5. Be aware of late manifestations of congenital Zika virus
 - a. Late Microcephaly
 - b. Developmental Delays in all realms
 - c. Seizure risk including infantile spasms
 - d. Spasticity, MR, CP, feeding disorders, speech disorders, hearing and visual defects

Congenital Zika Virus Infection



Congenital Zika Virus

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EMERGING INFECTIOUS DISEASES®

SPECIAL REPORT

Zika Virus and Birth Defects — Reviewing the Evidence for Causality

Sonja A. Rasmussen, M.D., Denise J. Jamieson, M.D., M.P.H., Margaret A. Honein, Ph.D., M.P.H., and Lyle R. Petersen, M.D., M.P.H.

Volume 23, Number 7—July 2017

Dispatch

Postmortem Findings for 7 Neonates with Congenital Zika Virus Infection

Anastácio Q. Sousa¹, Diane I.M. Cavalcante, Luciano M. Franco, Fernanda M.C. Araújo, Emília T. Sousa, José Telmo Valença-Junior, Dionne B. Rolim, Maria E.L. Melo, Pedro D.T. Sindeaux, Marialva T.F. Araújo, Richard D. Pearson, Mary E. Wilson, and Margarida M.L. Pompeu

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The NEW ENGLAND JOURNAL of MEDICINE

BRIEF REPORT

Zika Virus Infection with Prolonged Maternal Viremia and Fetal Brain Abnormalities

R.W. Driggers, C.-Y. Ho, E.M. Korhonen, S. Kuivanen, A.J. Jääskeläinen, T. Smura, A. Rosenberg, D.A. Hill, R.L. DeBiasi, G. Vezina, J. Timofeev, F.J. Rodriguez, L. Levanov, J. Razak, P. Iyengar, A. Hennenfent, R. Kennedy, R. Lanciotti, A. du Plessis, and O. Vapalahti

 PLOS | NEGLECTED TROPICAL DISEASES

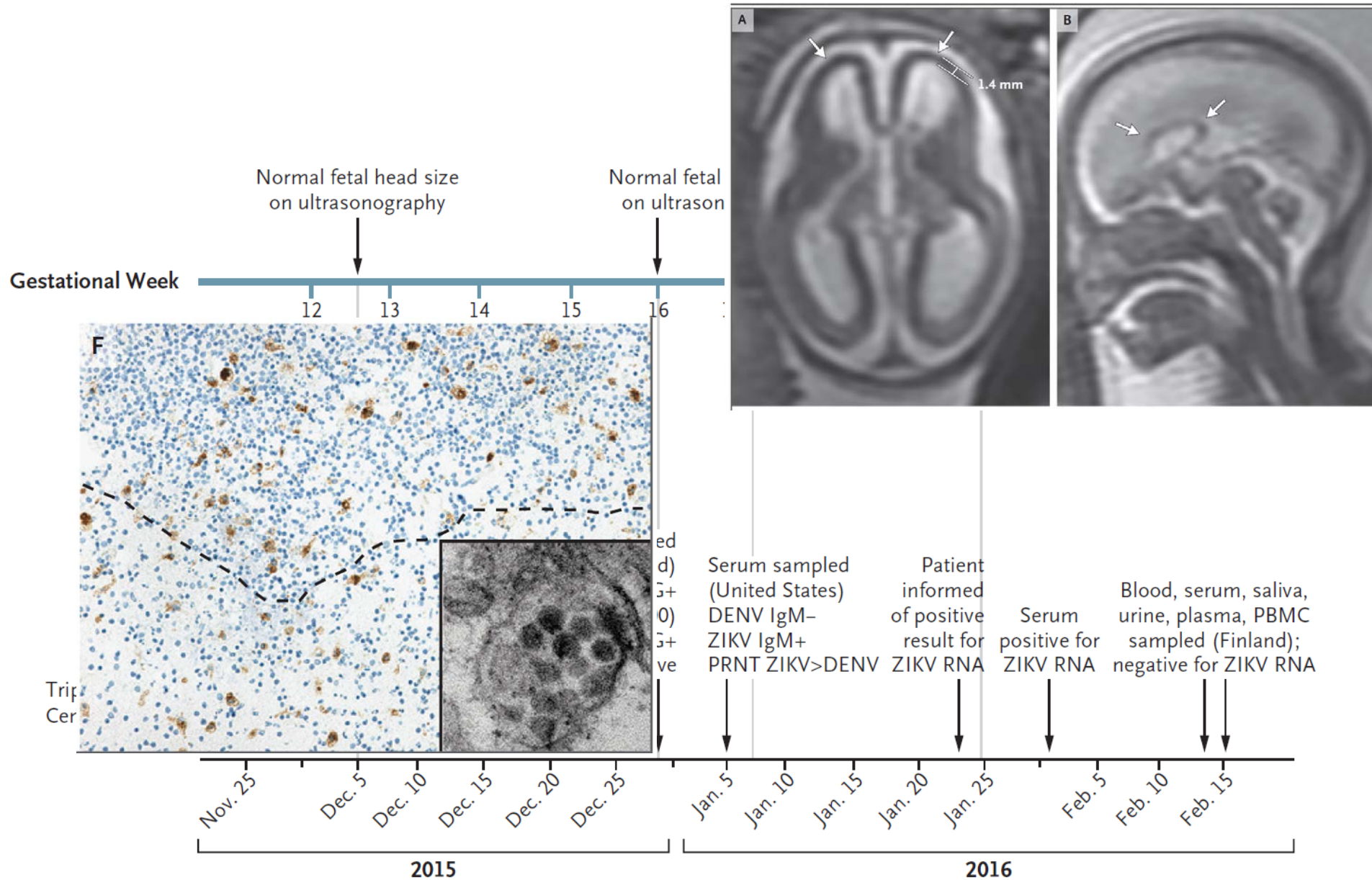
RESEARCH ARTICLE

Zika Virus Infection and Stillbirths: A Case of Hydrops Fetalis, Hydranencephaly and Fetal Demise

Manoel Sarno^{1,2}, Gielson A. Sacramento³, Ricardo Khouri³, Mateus S. do Rosário¹, Frederico Costa^{2,3,4}, Gracinda Archanjo¹, Luciane A. Santos³, Nivison Nery, Jr.³, Nikos Vasilakis⁵, Albert I. Ko^{3,4,*}, Antonio R. P. de Almeida^{1,2}

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Fetal Brain Disruption Sequence

- First described in 1984 but noted in earlier literature
- Brain destruction resulting in collapse of the fetal skull, microcephaly, scalp rugae and neurologic impairment
- Images below from 1990 series; phenotype appears to be present in some affected babies in Brazil (2015—present)



Moore et al., J Peds, 1990

Adverse outcomes in Zika infected babies to date

- Eye abnormalities
- Hearing impairment
- Seizures
- Swallowing impairment
- Hypertonicity and posturing
- Contractures including club foot and arthrogryposis
- Severe irritability
- Developmental Delay
- Growth abnormalities including IUGR and disproportionate growth

Congenital Zika Syndrome

1. Severe microcephaly with partially collapsed skull
2. Thin cerebral cortices with subcortical calcifications
3. Macular scarring and focal pigmentary retinal mottling
4. Congenital contractures
5. Marked early hypertonia and symptoms of extrapyramidal involvement

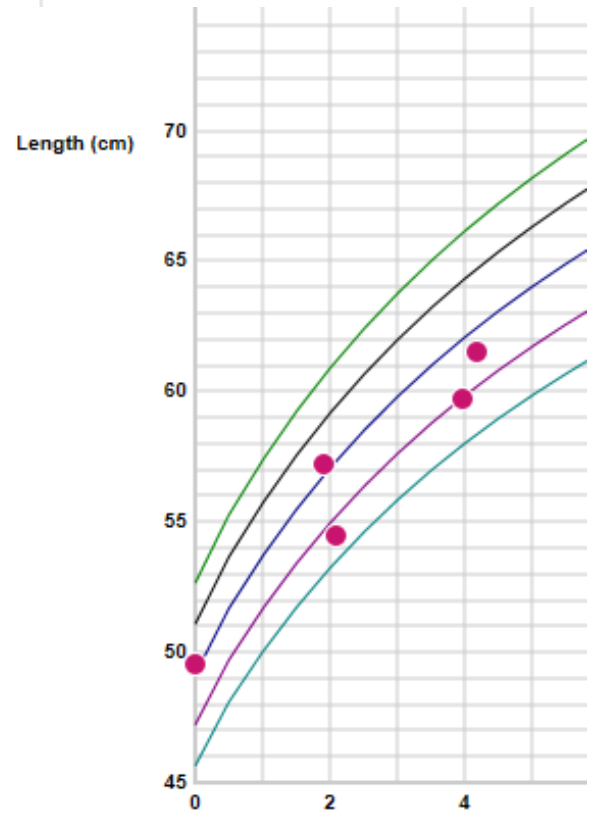
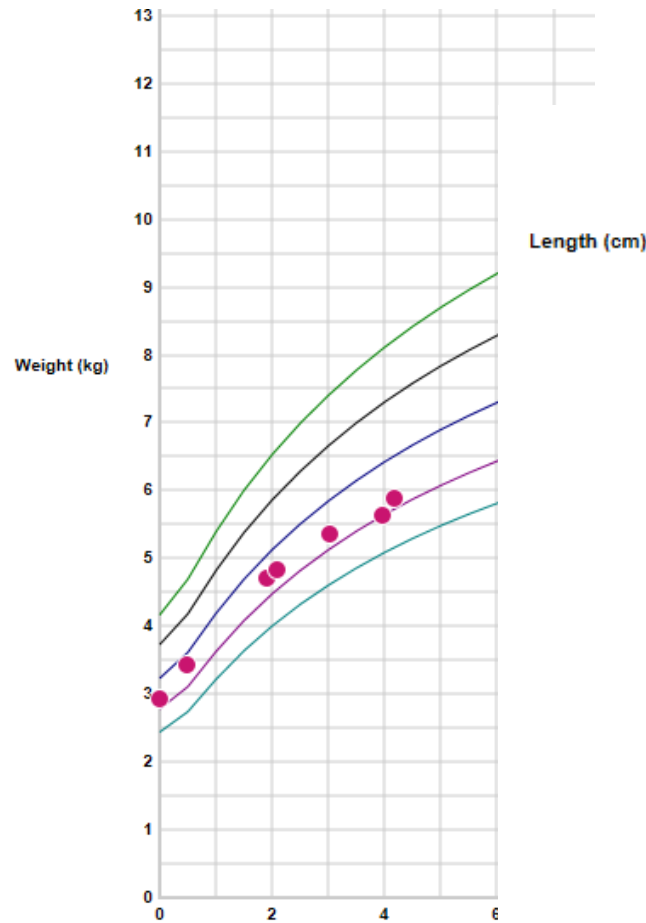
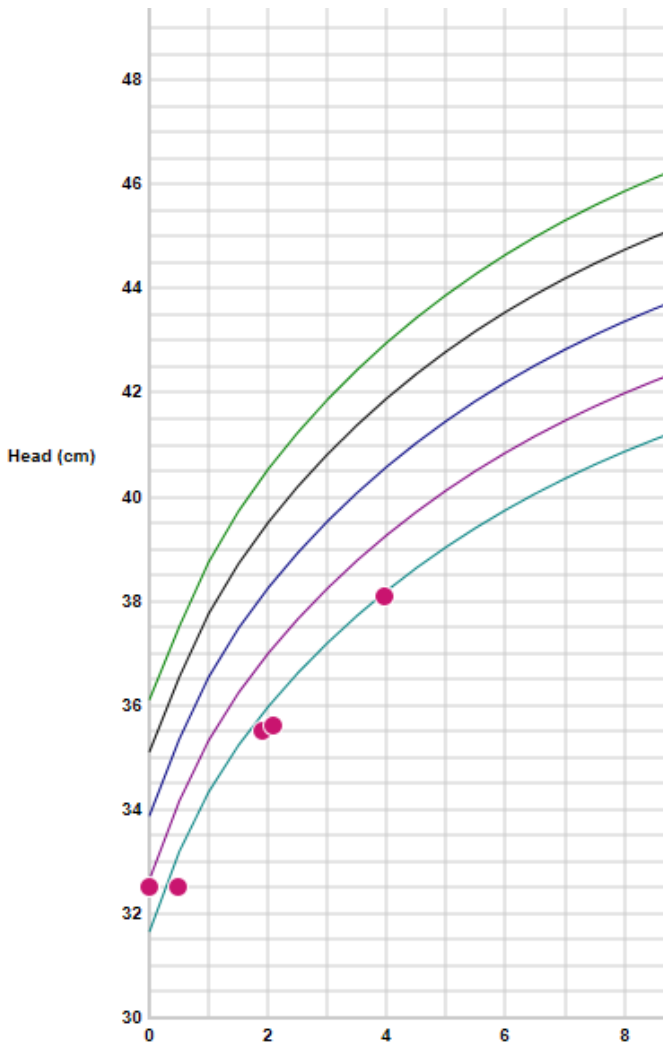
Baby A

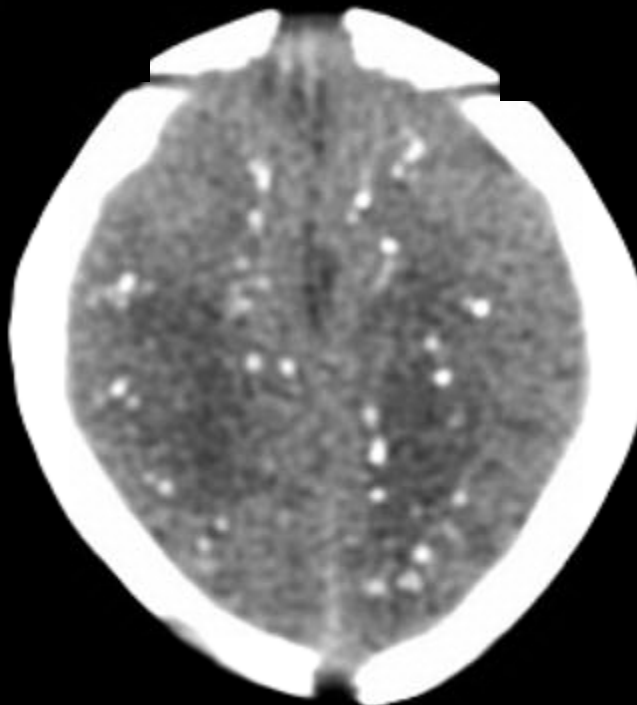
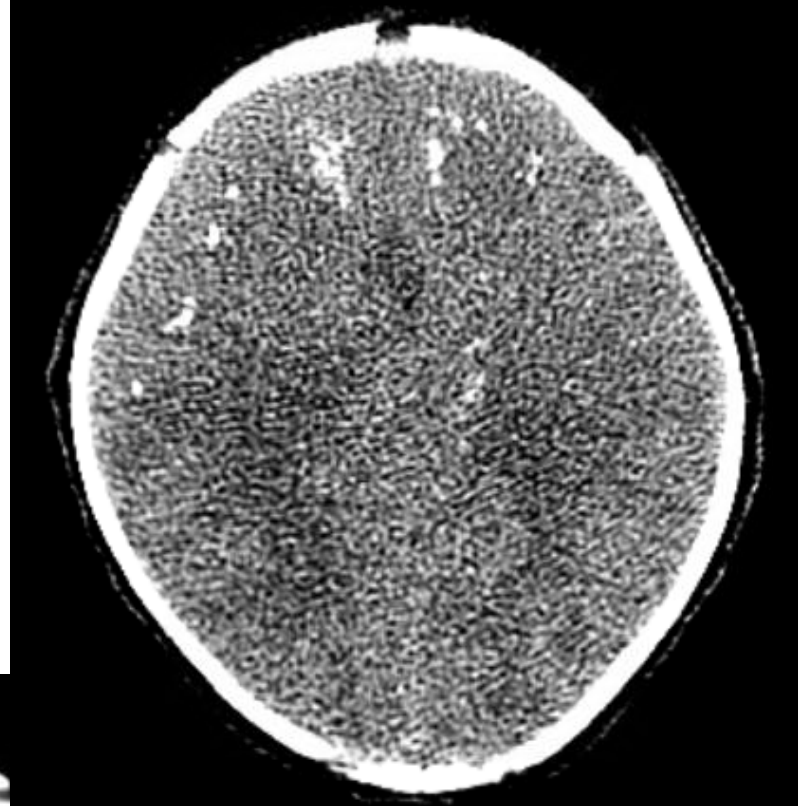
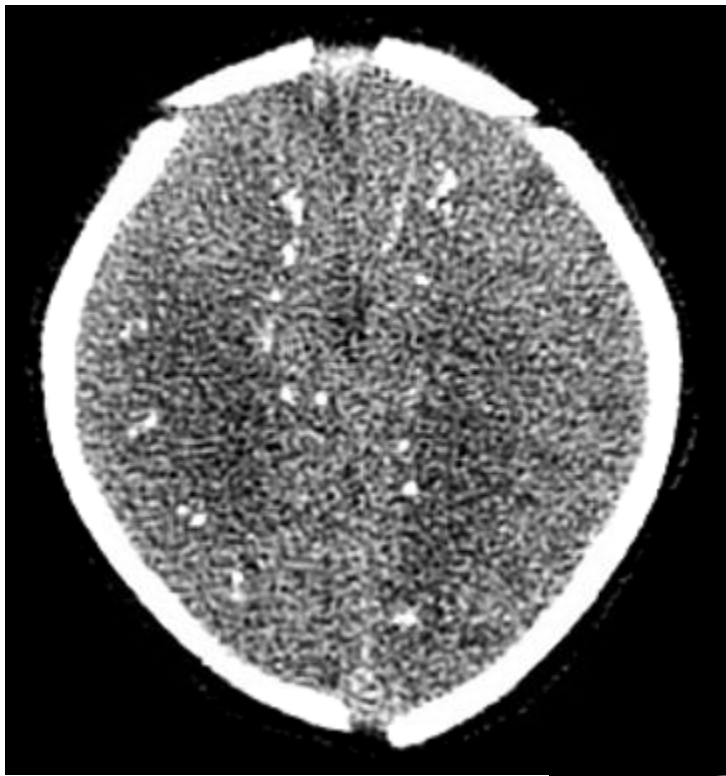
Term infant born to mother who spent first 4 months of pregnancy in Latin America

- Family did not admit travel until microcephaly diagnosed
- Mother denied Zika symptoms

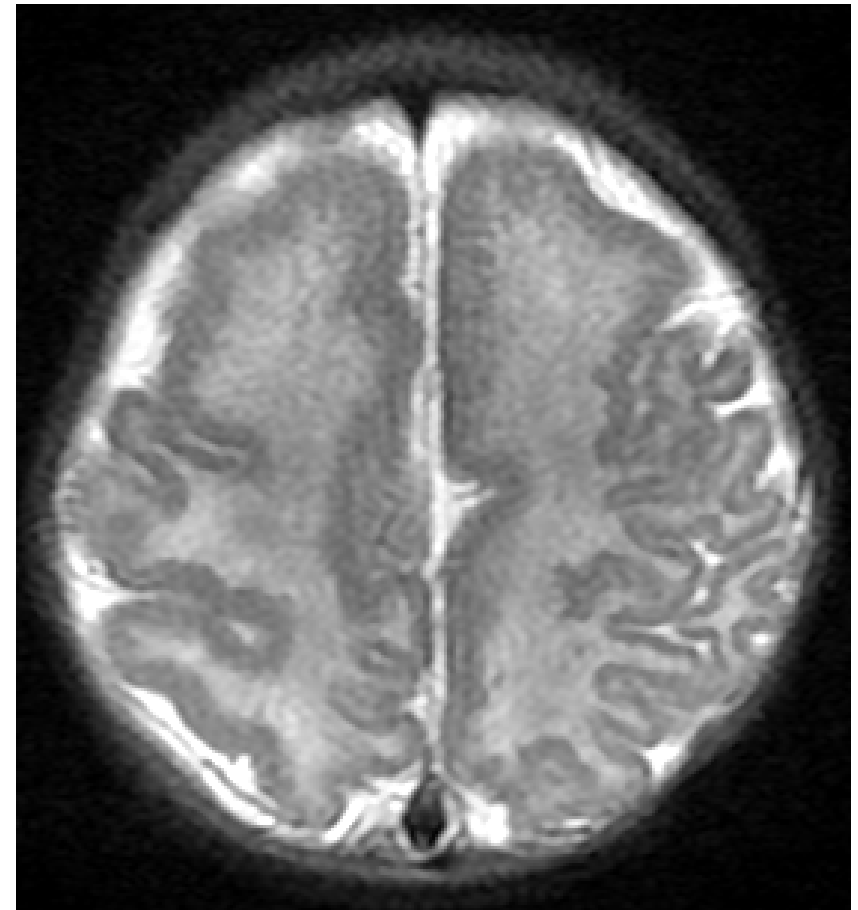
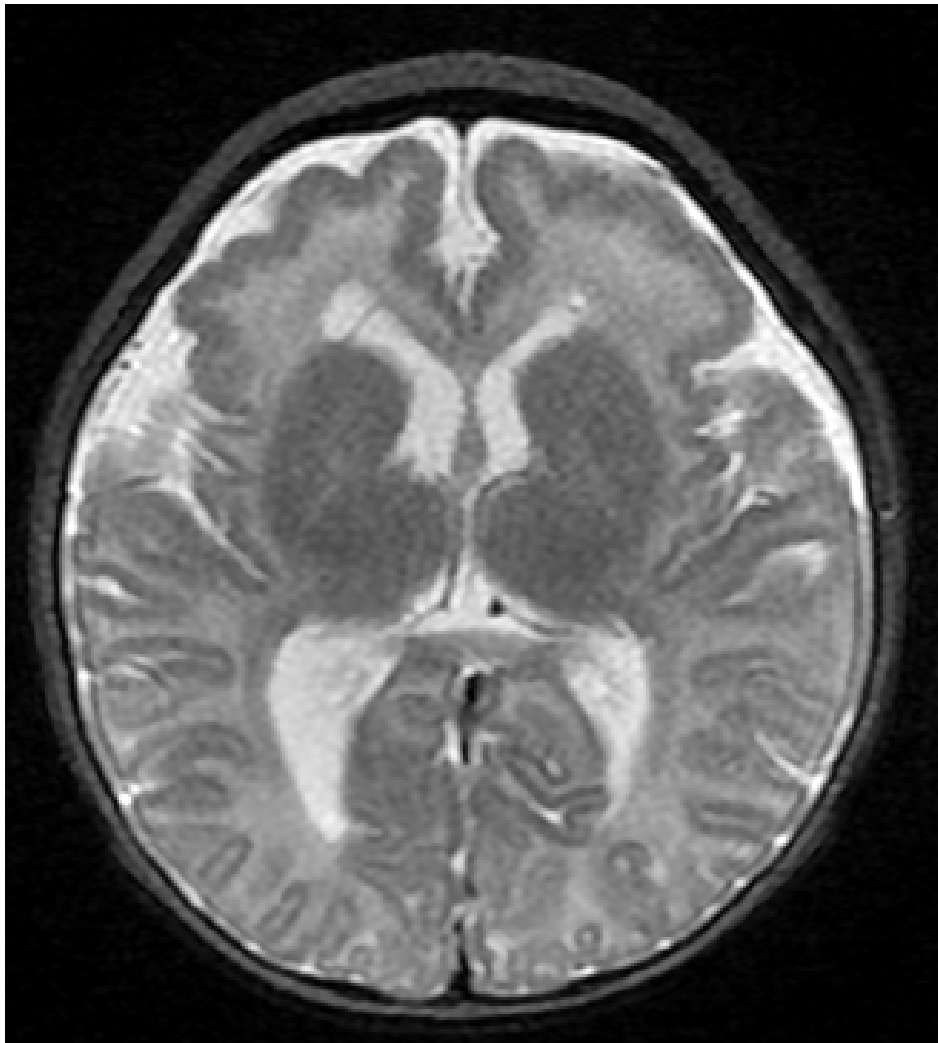
Had prenatal US near term that showed all growth parameters were “low”

Baby A

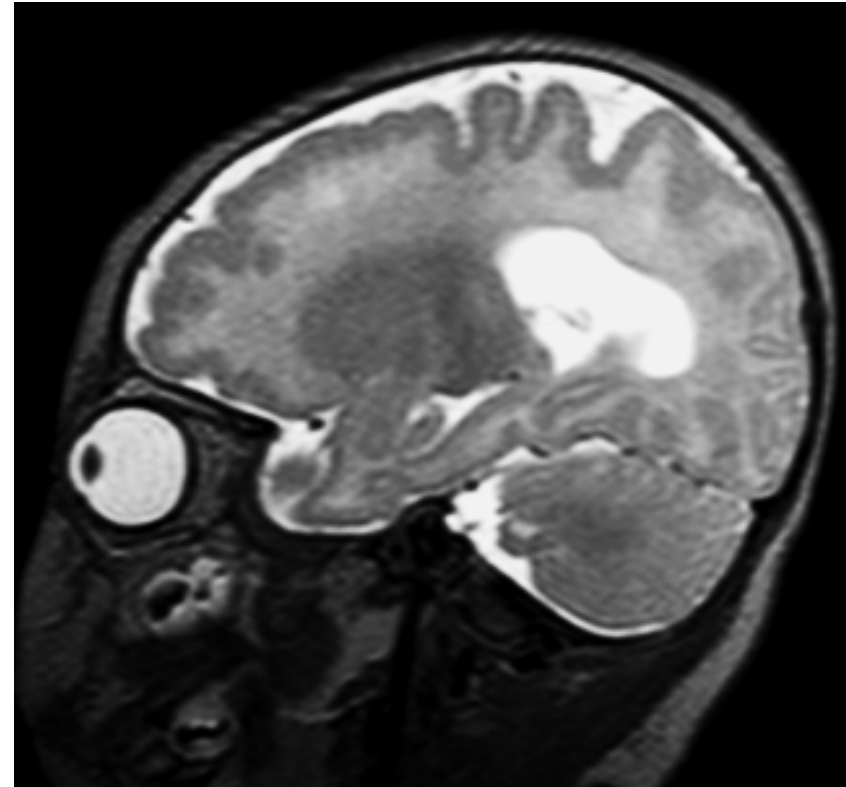
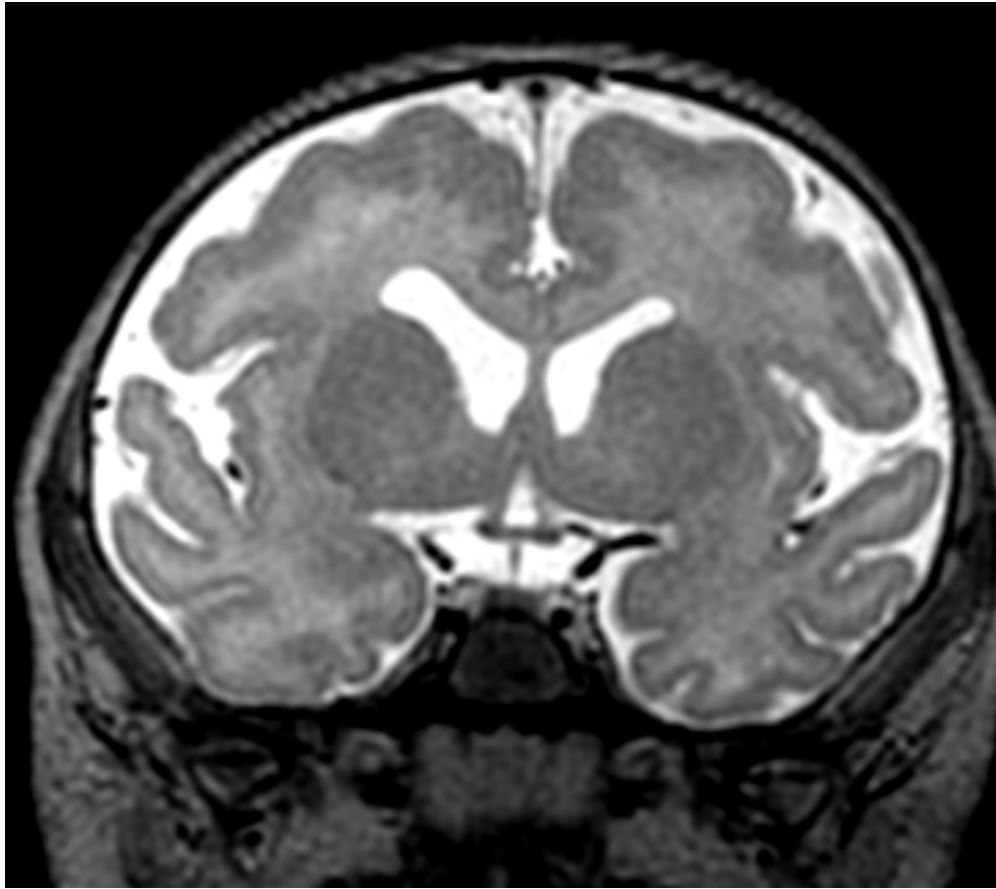


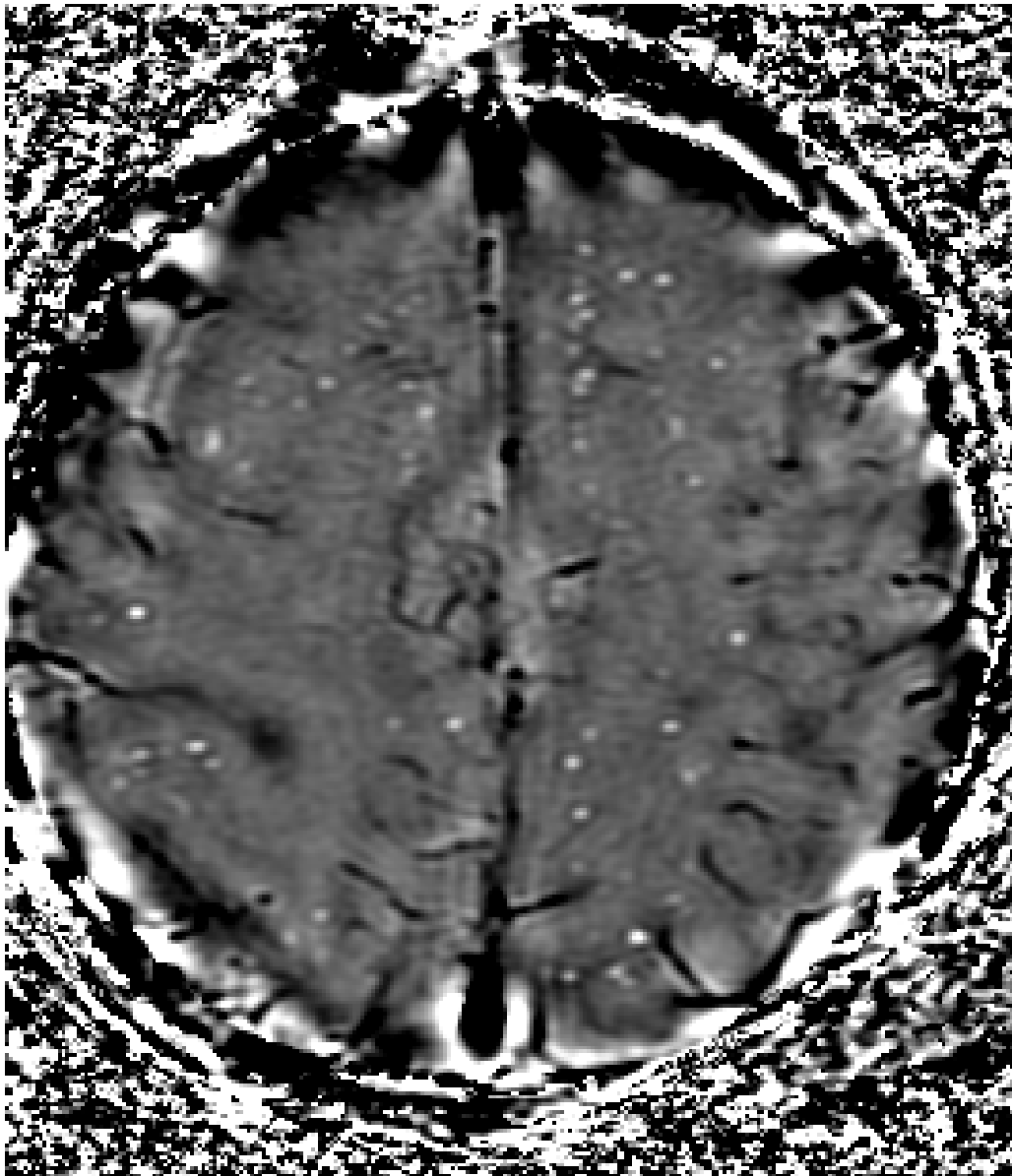


Multiple
parenchymal
calcifications on
HCT and HUS

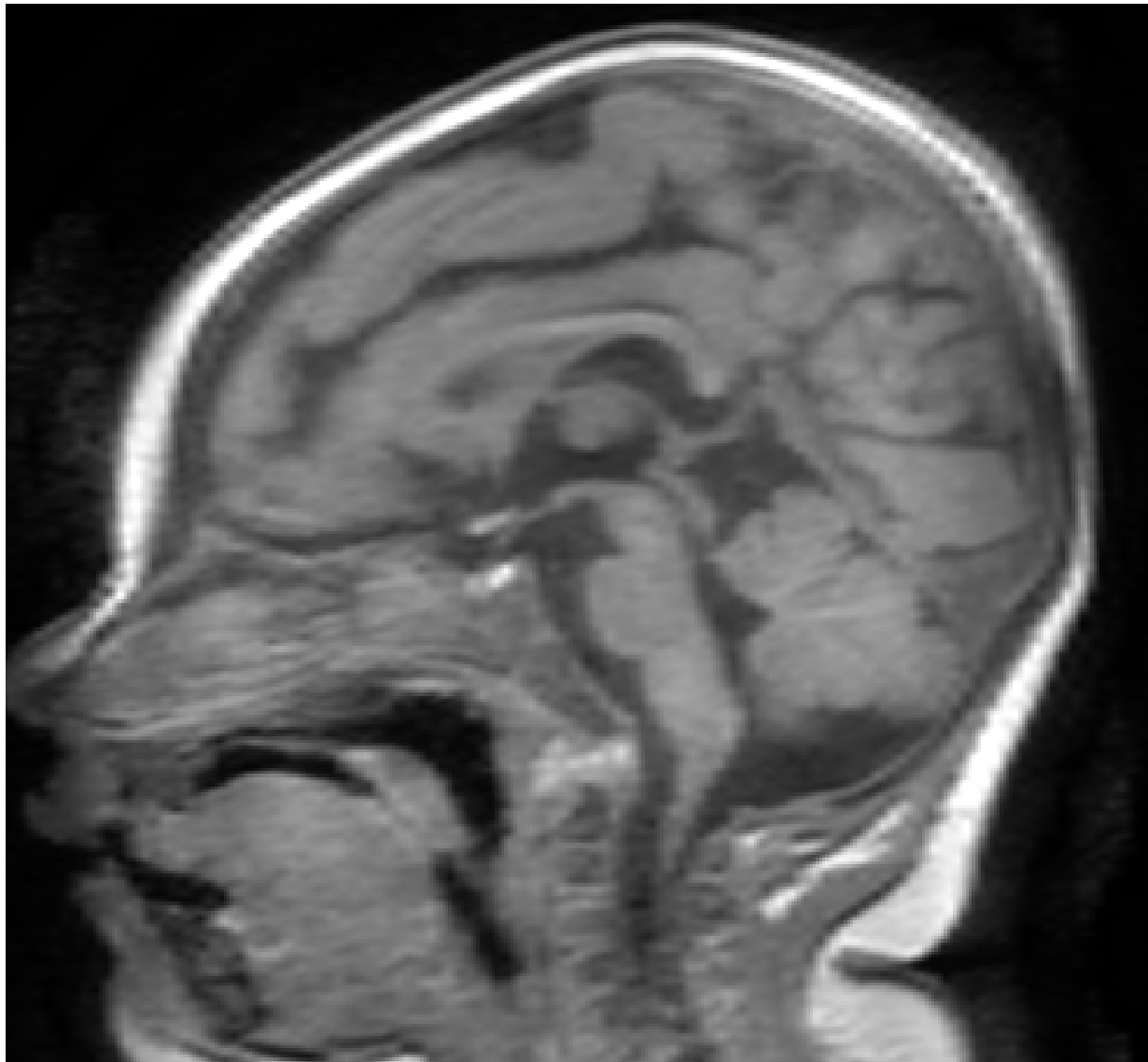


Polymicrogyria, primarily bi-frontal
Septation in frontal horn





Multiple
punctate
calcifications,
mostly at
grey/white
matter junction



Normally formed corpus callosum

At 2 weeks, 2mo, 4 months

Baby A had overt hypertonia and microcephaly by 2 weeks life

Worsening spasticity over time, fisted hands

No hearing defects, ?astigmatism in future

Lost to follow up

Which Infants to Test?

1. Test Every Baby Born to **Mother with Positive or Equivocal** Tests
2. Test Every Baby with **concerns for Congenital Zika Virus** Syndrome at birth:
 - Microcephaly (<3%ile) for age
 - Intracranial Calcifications at birth
 - Structural Brain or Eye Abnormalities
 - Other congenital CNS related abnormalities**REGARDLESS of Mom's Test Results**

Test within 2 days of life

Case definition of microcephaly

- Head circumference (HC) at birth is less than the 3rd percentile for gestational age and sex.
- If HC at birth is not available, HC less than the 3rd percentile for age and sex within the first 6 weeks of life.



Baby with microcephaly

Measuring head circumference



Baby with typical head size



Baby with Microcephaly



Baby with Severe Microcephaly

- Use a measuring tape that cannot be stretched
- Securely wrap the tape around the widest possible circumference of the head
 - Broadest part of the forehead above eyebrow
 - Above the ears
 - Most prominent part of the back of the head

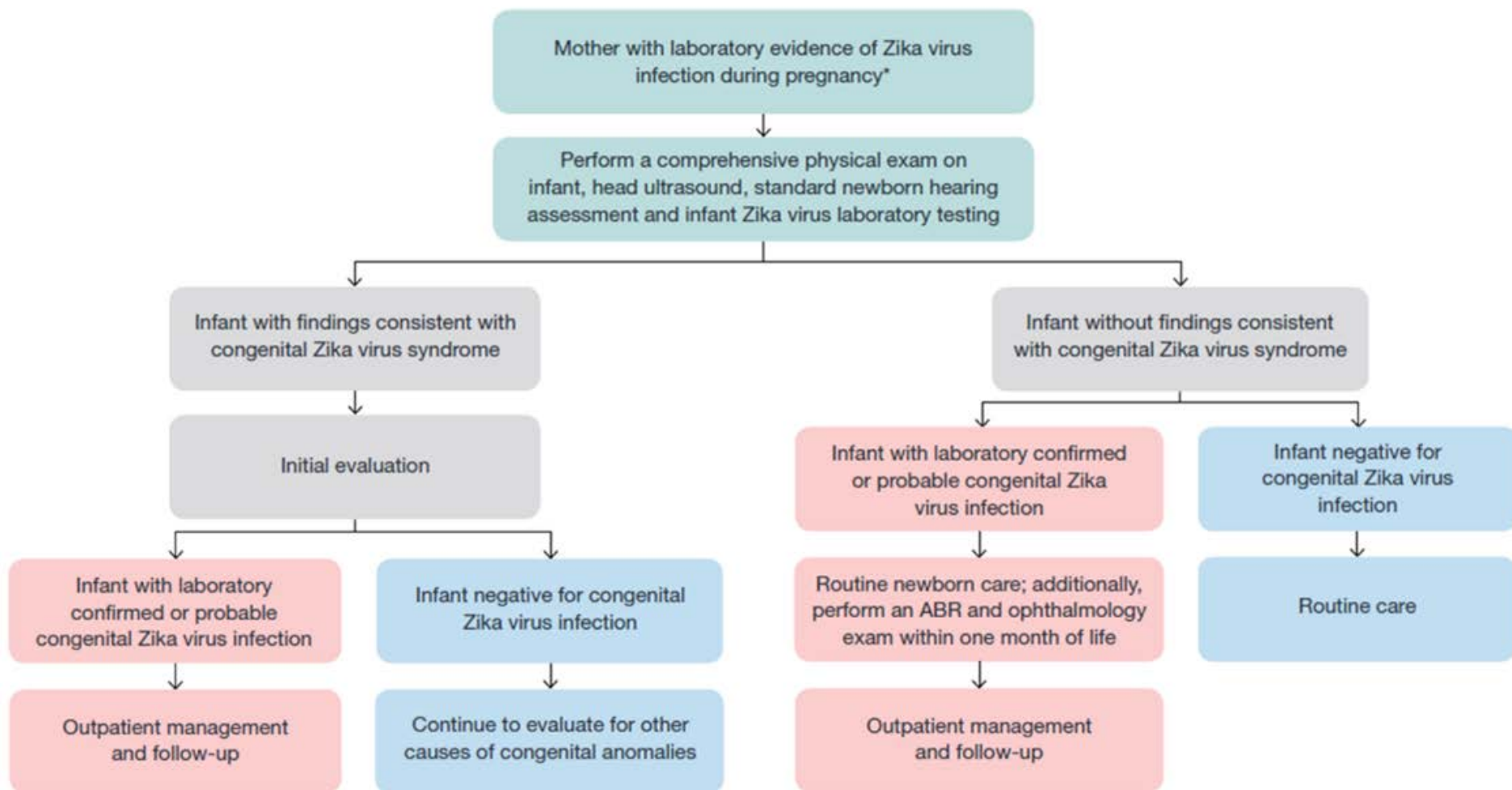
Take the measurement three times and select the largest measurement to the nearest 0.1 cm
Optimal measurement within 24 hours after birth.

- » Commonly-used birth head circumference reference charts by age and sex based on measurements taken before 24 hours of age

http://www.cdc.gov/zika/pdfs/microcephaly_measuring.pdf

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Specialist Evaluation of Congenital Zika

Peds Neurologist - determination of appropriate neuroimaging and evaluation

Peds Infectious disease specialist - diagnostic evaluation of other congenital infections

Peds Ophthalmologist - comprehensive eye exam and evaluation for possible cortical visual impairment prior to discharge from hospital or within 1 month of birth

Peds Endocrinologist - evaluation for hypothalamic or pituitary dysfunction

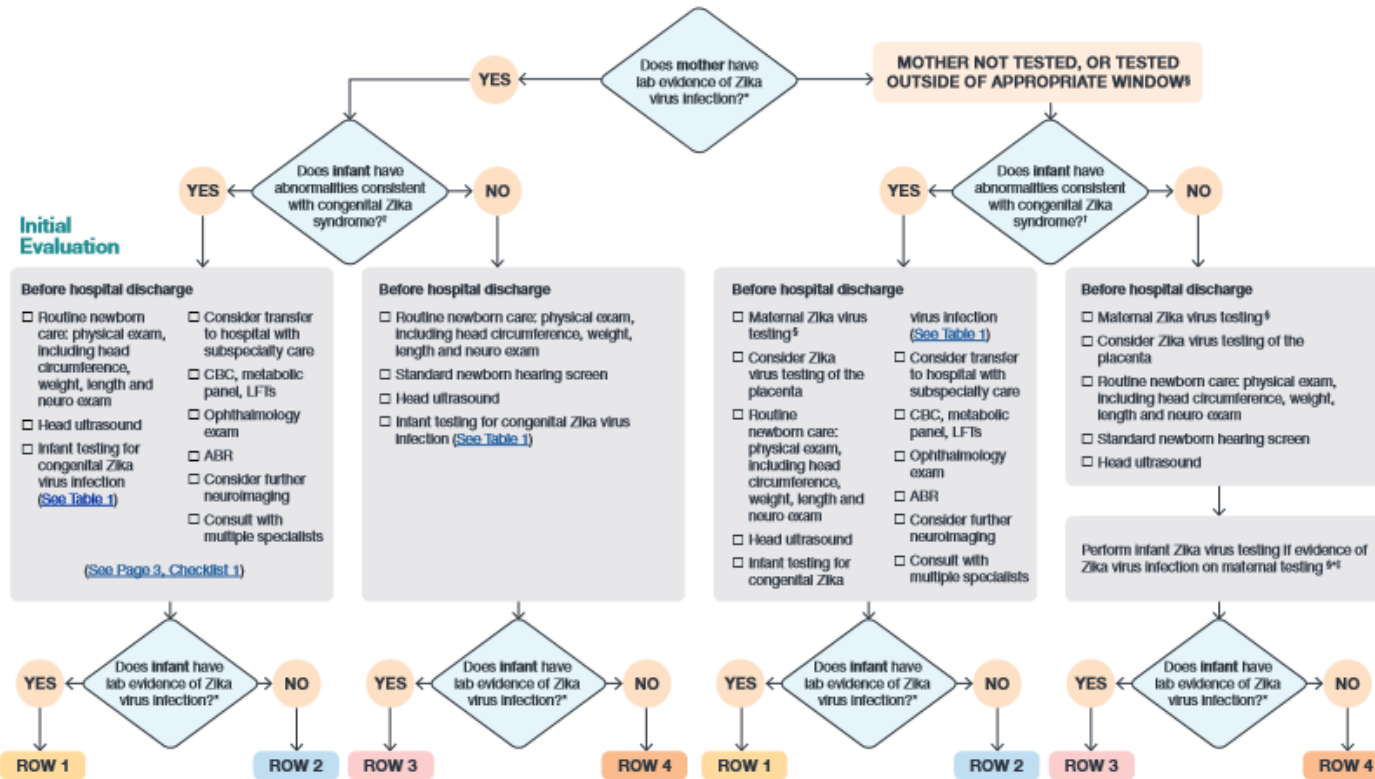
Clinical Geneticist- evaluate for other causes of microcephaly or other anomalies if present

May need: Pediatric Ortho, PM&R, PT, OT, Speech, Pulmonary, ENT, GI, nutritionist

Outpatient management checklist for babies

	2 weeks	1 mo.	2 mo.	3 mo.	4-6 mo.	9 mo.	12 mo.
Infant with abnormalities consistent with congenital Zika syndrome and laboratory evidence of Zika virus infection	☐ Thyroid screen (TSH & free T4)	☐ Neuro exam	☐ Neuro exam	☐ Thyroid screen (TSH & free T4) ☐ Ophthalmology exam	☐ Repeat audiology evaluation (ABR)	☐ Developmental screening	
	☐ Routine preventive health care including monitoring of feeding, growth, and development ☐ Routine and congenital infection-specific anticipatory guidance ☐ Referral to specialists as needed ☐ Referral to early intervention services						
Infant with abnormalities consistent with congenital Zika syndrome and negative for Zika virus infection	☐ Evaluate for other causes of congenital anomalies ☐ Further management as clinically indicated						
Infant with no abnormalities consistent with congenital Zika syndrome and laboratory evidence of Zika virus infection	☐ Ophthalmology exam ☐ ABR				☐ Consider repeat ABR	☐ Developmental screening ☐ Behavioral audiology evaluation if ABR was not done at 4-6 mo	
	☐ Monitoring of growth parameters (Head circumference, weight, and height), developmental monitoring by caregivers and health care providers, and age-appropriate developmental screening at well-child visits						
Infant with no abnormalities consistent with congenital Zika syndrome and negative for Zika virus infection	☐ Monitoring of growth parameters (Head circumference, weight, and height), developmental monitoring by caregivers and health care providers, and age-appropriate developmental screening at well-child visits						

INITIAL EVALUATION AND OUTPATIENT MANAGEMENT DURING THE FIRST 12 MONTHS OF LIFE FOR INFANTS WITH POSSIBLE CONGENITAL ZIKA VIRUS INFECTION



Follow management and follow-up recommendations indicated in Outpatient Management Checklist

TABLE 1

Interpretation of results of laboratory testing of infant's blood, urine and/or cerebrospinal fluid for evidence of congenital Zika virus infection

Infant test results*		Interpretation
rRT-PCR	IgM	
Positive	Positive or Negative	Confirmed congenital Zika virus infection
Negative	Positive	Probable congenital Zika virus infection*
Negative	Negative	Negative for congenital Zika virus infection*

Abbreviations: rRT-PCR = real-time reverse transcription-polymerase chain reaction; IgM = Immunoglobulin M

* Infant serum, urine or cerebrospinal fluid.

† Laboratory results should be interpreted in the context of timing of infection during pregnancy, maternal serology results, clinical findings consistent with congenital Zika syndrome, and any confirmatory testing with plaque reduction neutralization testing (PRNT).

CHECKLIST 1

Initial clinical evaluation & management of infants with laboratory evidence of Zika virus infection and abnormalities consistent with congenital Zika syndrome †

Consultation with:

- ☐ Neurologist for determination of appropriate neuroimaging and additional evaluation.
- ☐ Infectious disease specialist for diagnostic evaluation of other congenital infections (e.g. syphilis, toxoplasmosis, rubella, cytomegalovirus infection, lymphocytic choriomeningitis virus infection, and herpes simplex virus infection).
- ☐ Ophthalmologist for comprehensive eye exam and evaluation for possible cortical visual impairment prior to discharge from hospital or within 1 month of birth.
- ☐ Endocrinologist for evaluation for hypothalamic or pituitary dysfunction.
- ☐ Clinical geneticist to evaluate for other causes of microcephaly or other anomalies if present.

Consider consultation with:

- ☐ Orthopedist, physiatrist and physical therapist for the management of hypertonia, club foot or arthrogryposic-like conditions.
- ☐ Pulmonologist or otolaryngologist for concerns about aspiration.
- ☐ Lactation specialist, nutritionist, gastroenterologist, or speech or occupational therapist for the management of feeding issues.
- ☐ Perform ABR to assess hearing.
- ☐ Perform complete blood count and metabolic panel, including liver function tests.
- ☐ Provide family and supportive services.

CHECKLIST 2

Outpatient management of infants with laboratory evidence of Zika virus infection and abnormalities consistent with congenital Zika syndrome †

- ☐ A medical home should be established, and visits with primary care provider should occur monthly for at least the first 6 months of life.
- ☐ Follow growth parameters, monitor development, encourage parents and other caregivers to monitor child's development, provide routine immunizations and anticipatory guidance, psychosocial support, and to ensure infants receive necessary testing and consultations.
- ☐ Neurologic examination by the primary care provider at 1 and 2 months of age. Refer to neurology for any abnormalities, or for any parental or provider concerns.
- ☐ Refer to developmental specialist and early intervention services.
- ☐ Repeat a comprehensive ophthalmologic exam at 3 months of age, and refer to ophthalmology for any abnormal findings, or for any parental or provider concerns.
- ☐ Repeat ABR testing at 4-6 months of age, and follow up on any abnormal findings, or for any parental or provider concerns.
- ☐ Repeat testing for hypothyroidism (i.e. TSH, total T4 and estimated free T4) at 2 weeks and 3 months of age, even if the initial testing was normal. Refer to endocrinology for any abnormal findings.
- ☐ Provide family and supportive services.

CHECKLIST 3

Outpatient management of infants with laboratory evidence of Zika virus infection, but without abnormalities consistent with congenital Zika syndrome †

- ☐ A medical home should be established.
- ☐ Follow growth parameters, perform developmental monitoring at each well child visit and encourage parents and other caregivers to monitor child's development.
- ☐ Emphasize anticipatory guidance for families regarding developmental milestones, feeding and growth, sleep and irritability, and abnormal movements.
- ☐ Use a standardized, validated developmental screening tool at 9 months as currently recommended, or earlier for any parental or provider concerns.
- ☐ Referral to ophthalmology for comprehensive eye exam within one month of birth. Perform vision screening and assess visual regard at every well child visit, and refer to ophthalmology for any abnormal findings, or for any parental or provider concerns.
- ☐ Perform ABR within one month of birth. Perform behavioral diagnostic testing at 9 months of age, or consider repeat ABR at 4-6 months. Refer to audiology for any abnormal findings, or for any parental or provider concerns.
- ☐ Provide family and supportive services.

Infant's State/Territory ID Registry ID
 Mother's State/Territory ID

Reset Form



U.S. Zika Pregnancy Registry Infant Follow-Up Form

These data are considered confidential and will be stored in a secure database at the Centers for Disease Control and Prevention

Please return completed form via SAMS or secure FTP—request access from ZIKApregnancy@cdc.gov

The form can also be sent by encrypted email to this address or by secure fax to 404-718-1013 or 404-718-2200

Infant follow up: ☐ 2 months ☐ 6 months ☐ 12 months ☐ months			
IFU.1. State/Territory reporting Select State		IFU.2. Date of infant examination	
IFU.3. Infant's State/Territory ID	IFU.4. Mother's State/Territory ID	IFU.5. DOB:	IFU.6. Sex: ☐ Male ☐ Female ☐ Ambiguous/undetermined
IFU.7. Infant Death: ☐ No ☐ Yes IFU.8. If yes, cause of death			
IFU.9. If yes, Date or Age at death ☐ Unknown			
IFU.10. Weight: grams or lbs oz		IFU.11. Length: cm or in	IFU.12. Head circumference: cm or in
IFU.13. Infant findings for corrected age at examination: <i>(For infants born preterm, please account for corrected age: chronological age minus weeks born before 40 weeks' gestation)</i> Check all that apply			

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Estimated Rate of Birth Defects

- At least 10% of lab confirmed pregnancies resulted in birth defects in US
- Higher in first trimester but no trimester spared
- Late manifestations in babies with normal evaluations, HC at birth

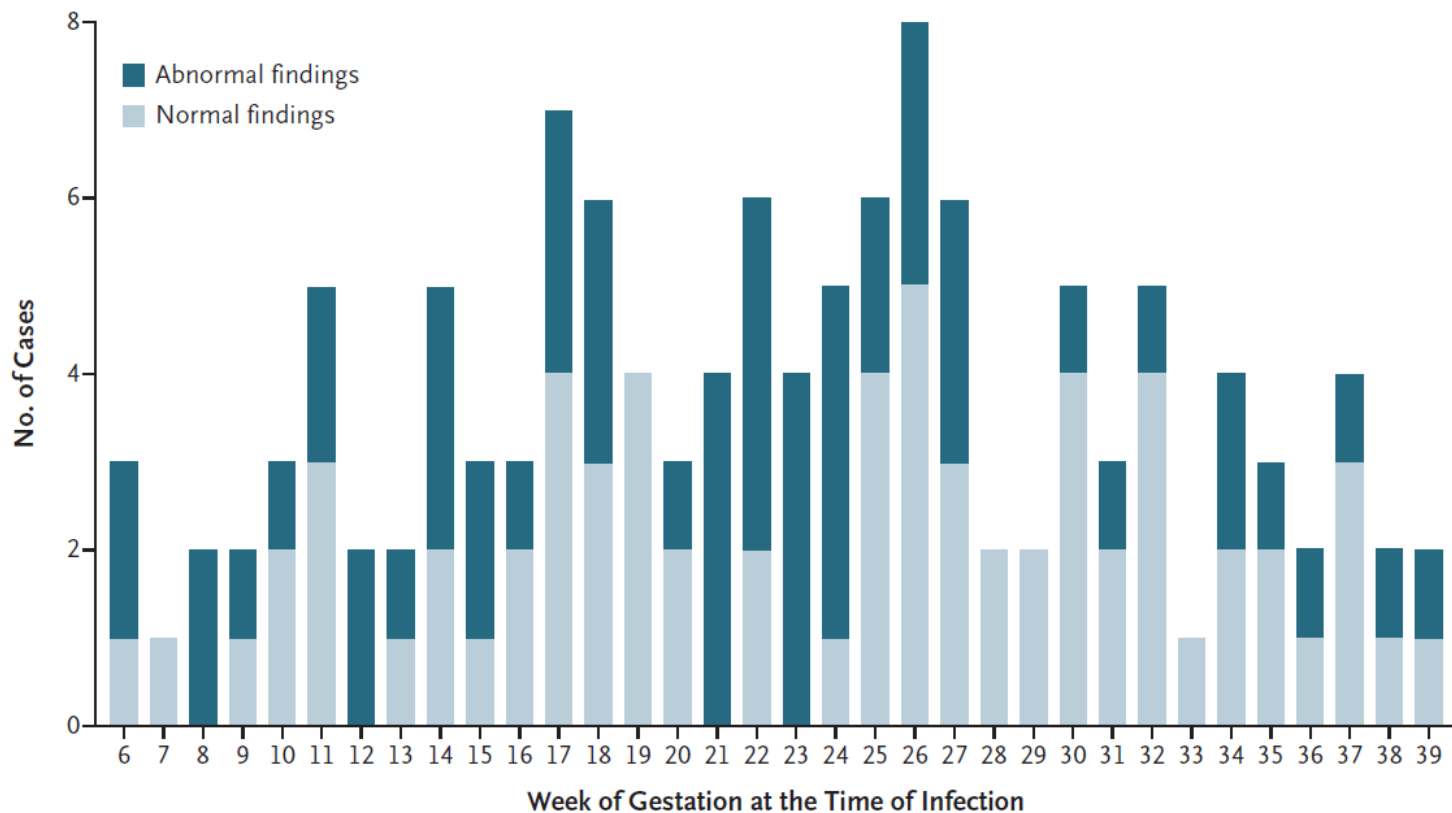
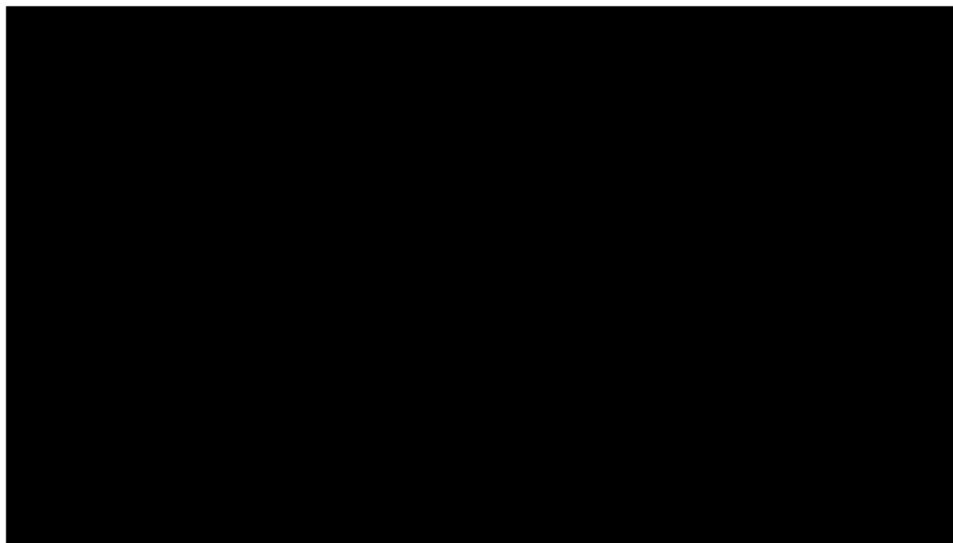


Figure 2. Pregnancy and Infant Outcomes According to the Week of Gestation at the Time of ZIKV Infection.

Adverse outcomes included 9 cases of fetal death in 125 pregnancies (7.2%) and 49 abnormal clinical findings, imaging findings, or both during the newborn period in 117 infants (42%) born from 116 pregnancies. Adverse outcomes occurred in women who were infected during the period from 6 to 39 weeks of gestation. Abnormalities are detailed in Table S2 in the Supplementary Appendix.

Putting CDC and VDH Guidance into Action



Women's healthcare needs are different than a man's. Our collaborative interdisciplinary team includes board-certified specialists in the areas most important to women: primary care, obstetrics and gynecology, breast care and cardiology. Our woman-centric care means our physicians and staff are especially attuned to these areas of key health for the adult female. We offer women 18 and older a lifetime of access to state-of-the-art, high-quality clinical care.

Learn more about the Inova Women's Comprehensive Health Center: www.inova.org/health/woman

▶ **SYSTEM OUTAGES & IT SUPPORT**

 **Unplanned** |  **Planned**

- There are no major outages at this time.

> **WHAT YOU NEED TO KNOW**



- [Zika Virus](#)
- [WellAware](#)
- [Hand Hygiene](#)
- [Huddle Review](#)

Facilities

- [Inova Alexandria Hospital](#)
- [Inova Fair Oaks Hospital](#)
- [Inova Fairfax Medical Campus](#)
- [Inova Loudoun Hospital](#)
- [Inova Mount Vernon Hospital](#)
- [Inova System Office](#)



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Zika Virus

The Centers for Disease Control has confirmed test results showing Zika virus present in the blood of a "non-traveler" in the continental United States. The CDC confirmed this is the first U.S. Zika case in someone who had not traveled abroad in the current outbreak, and was likely transmitted sexually, rather than by a mosquito. Based on this information, the CDC will provide guidance on sexual transmission of the virus. Cases of Zika virus have been reported in returning travelers in other states, including Virginia. The number of Zika cases among travelers visiting or returning to the United States will likely increase, and these cases could result in the local spread of the virus in the U.S. Even though it is not mosquito season in Virginia, it is important to be aware of Zika virus, including its potential impact to pregnant women and their babies.

[Algorithm for VDH Testing](#) (updated 11.8.16)

[WUSA-9 Interview: FDA Regulations for Screening Blood for Zika Virus](#) (8/26/16) **new!**

Inova Zika Procedures

- [Zika Virus Evaluation of Pregnant Women and Their Babies](#) (updated 8.30.16) **new!**
- [Screening Patients for Zika Virus in Physician Offices](#) (updated 8.9.16)
- [Long Term Evaluation of Babies Born to Mothers with Zika Virus](#) (updated 8.30.16) **new!**

Zika Testing Procedures: [Click here](#) for steps necessary for sample submission through Inova facilities. (updated 8.22.16)

- [Inova Patient Service Locations for Zika Specimen Collection](#)

SYSTEM OUTAGES & IT SUPPORT

Unplanned | **Planned**

- There are no major outages at this time.

Facilities

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- [Inova Fair Oaks Hospital](#)
- [Inova Fairfax Medical Campus](#)
- [Inova Loudoun Hospital](#)
- [Inova Mount Vernon Hospital](#)
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PHYSICIAN DIRECTORY

EMPLOYEE DIRECTORY

TOOLS

REFERENCES

LANGUAGE SERVICES

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Prior to Delivery (OB Nurse and OB Physician To Perform)

1. Every pregnant woman should be screened for Zika virus by asking:

Risk Factor Screening Questions	
1)	Have you traveled to a Zika-affected area within the past 12 weeks?
2)	Have you had possible sexual exposure to Zika virus within the last 12 weeks?
3)	Do you have ≥ 2 symptoms* of Zika and had mosquito bite(s) in the 2 weeks before symptom onset?
*Symptoms of Zika: • <i>Fever</i> • <i>Rash</i> • <i>Arthralgia (joint pain)</i> • <i>Conjunctivitis</i> • <i>Pregnancy complication (fetal loss, fetus or neonate with congenital microcephaly, intracranial calcifications, other structural brain or eye abnormality, or other congenital central nervous system related abnormality)</i>	

2. Any woman with any of the 3 above risk factors should have been tested by OB for Zika during pregnancy
 - a. Has the woman had testing for Zika?
 - i. **Yes:** what is the mother's result?
 1. Negative: If baby has not been diagnosed with microcephaly, intracranial calcifications, brain or eye abnormality or other CNS-related abnormality (including by fetal ultrasound), then baby warrants only routine infant care
 2. Positive, Presumptive Positive, Equivocal or "Possible Flavivirus Identified" Test Results: Baby must be tested for Zika virus
 3. I don't know the results: Call the Department of Health in county where testing sent for her results
 4. Mother's test results are pending.
 - a. *Healthy Infant:* Obtain samples for Zika testing.
 - i. High suspicion of Zika in mother – Forward specimens to DCLS for testing
 - ii. Low suspicion of Zika in mother – Forward specimens to DCLS.
(**Note:** Specimens will be held pending the results from the mother.)
 - ii. **No:** Mother was not tested for Zika but SHOULD have been tested
 1. Request/Discuss Zika testing for the mother via the health department
 2. Evaluate baby as outlined in #4 (Mother's test results are pending) above
 - iii. **No:** Mother was not tested for Zika and doesn't fit any category for risk or testing
 1. Standard care for infant and mother

3. Any infant with signs of congenital Zika infection should be tested for Zika.
 - a. Signs of congenital Zika infection include:
 1. Microcephaly ($<3^{\text{rd}}$ percentile for sex and gestational age, optimally measured 24-36 hours after birth)
 2. Intracranial calcifications
 3. Structural brain or eye abnormality
 4. Other congenital central nervous system related abnormality

For babies AT RISK FOR Zika Virus who require testing for Zika virus, 4 samples are required and should be collected at birth.

1. Blood for Zika RT-PCR and IgM ELISA
 - a. At least 1 gold top tube filled to top (2ml) whole blood from blood in serum separator tube (tiger top or gold top) spun down and separated to collect serum
2. Urine for Zika RT-PCR
 - a. 5-10mL collected in urine specimen container
 - b. Urine specimen may be bagged specimen
3. Fixed (Formalin) Placenta Tissue and Fetal Membranes (for histopath and placenta Zika PCR)
 - a. At least three (3) full thickness (0.5-1.0 cm x 3-4cm in depth) pieces from middle third of placental disk
 - b. One (1) piece from the placental disk margin
 - c. One (1) 5x12 cm strip of fetal membranes
 - d. Include samples of pathogenic lesions when possible
4. Umbilical Cord
 - a. At least four (4) 2.5cm segments of cord

Additionally, if baby requires testing of CSF for other clinical purposes then a CSF sample is requested by CDC for Zika Virus testing

1. Zika Virus RT-PCR (from CSF)
 - a. At least 1.0 mL of CSF in a sterile tube

See [DCLS/VA department of health website for laboratory specimen requirements](#)

See [CDC guidance for fetal tissue specimen requirements](#)

OB clinician must complete pathology requisition for placental testing



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Zika Virus

Public health guidance on Zika virus is updated as more information becomes known.

Zika is mainly spread through the bite of an infected *Aedes* mosquito. Zika also can be spread from a pregnant woman to her fetus, through sexual contact and possibly through blood transfusion.

Take steps to prevent mosquito bites to lower your chance of infection. If you think you may have Zika, contact your health care provider.

Outreach Materials

Fairfax businesses can request printed materials for employees and customers [PDF](#).



Zika Fact Sheet
[English](#) [PDF](#) | [Arabic](#) [PDF](#) | [Chinese](#) [PDF](#) | [Farsi](#) [PDF](#) | [Korean](#) [PDF](#) | [Spanish](#) [PDF](#) | [Urdu](#) [PDF](#) | [Vietnamese](#) [PDF](#)



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Zika-Carrying Asian Tiger Mosquito Container Breeding Card [PDF](#)



Protect Your Pregnancy Card (English/Spanish) [PDF](#)



Prevent Mosquito Bites Flyer (English/Spanish) [PDF](#)



Zika Flyers
[English](#) [PDF](#) | [Spanish \(Tip & Toss\)](#) [PDF](#)



Zika Posters [PDF](#)



Zika Postcards [PDF](#)

Clinical Testing for Zika

Health care providers, complete the Zika testing request form.



Zika Virus Disease and Prevention - Video | Presentation Slides

Zika Pregnancy Registry

- [About the Zika Pregnancy Registry](#)
- [Maternal Health History Form*](#) [PDF](#)
- [Neonate Assessment at Delivery Form*](#) [PDF](#)
- [Infant Follow-Up Form*](#) [PDF](#)

*Contact the Communicable Disease/Epidemiology Unit for the VA Zika ID.



Fairfax County Health Dept. Zika Testing Request

- Complete and submit the *Zika Testing Request*. Please fill in all required fields.
- The Communicable Disease/Epidemiology Unit will respond to your request regarding testing eligibility determination and next steps by close of the next business day.
Please know that this is a request for testing and that testing eligibility will have to be determined. Approval by the Fairfax County Health Department's Communicable Disease Epidemiology Unit must be obtained for Zika Virus testing. Any specimens submitted to the Health Department without prior approval or necessary paperwork will not be tested.
- If you experience any problems requesting Zika testing or have additional questions, please call the Communicable Disease/Epidemiology Unit at 703-246-2433.  

Provider Information

Provider Last Name		Provider First Name	
Address			
Email			
Phone		Fax	

Patient Information

Last Name		First Name	
Patient Address			
	Street	City	State Zip code
Phone		Alt Phone	
Date of Birth		☐ Male	☐ Female

EPIC communicable disease screening

Went LIVE August 2016

Updated travel notice areas:

Miami, FL and Brownsville, TX

Zika screening for all pregnant women at registration/intake (inpatient and outpatient)

OB Grease Board

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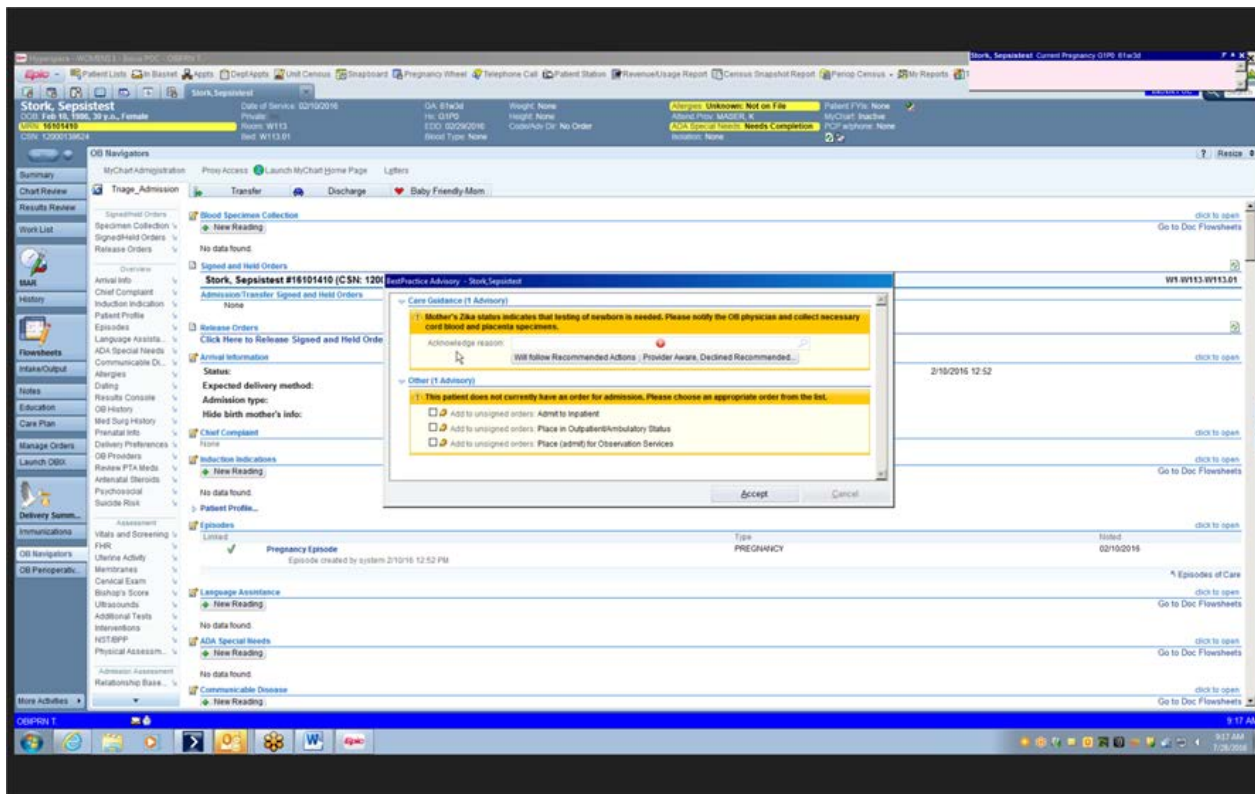
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ORDER
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L&D and for
Post-partum
Baby Care

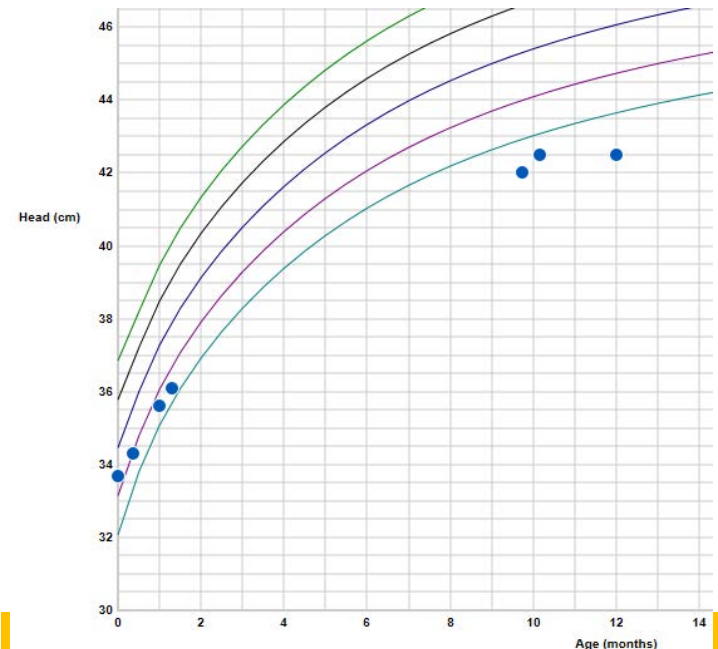
Pediatric Specialists
of Virginia

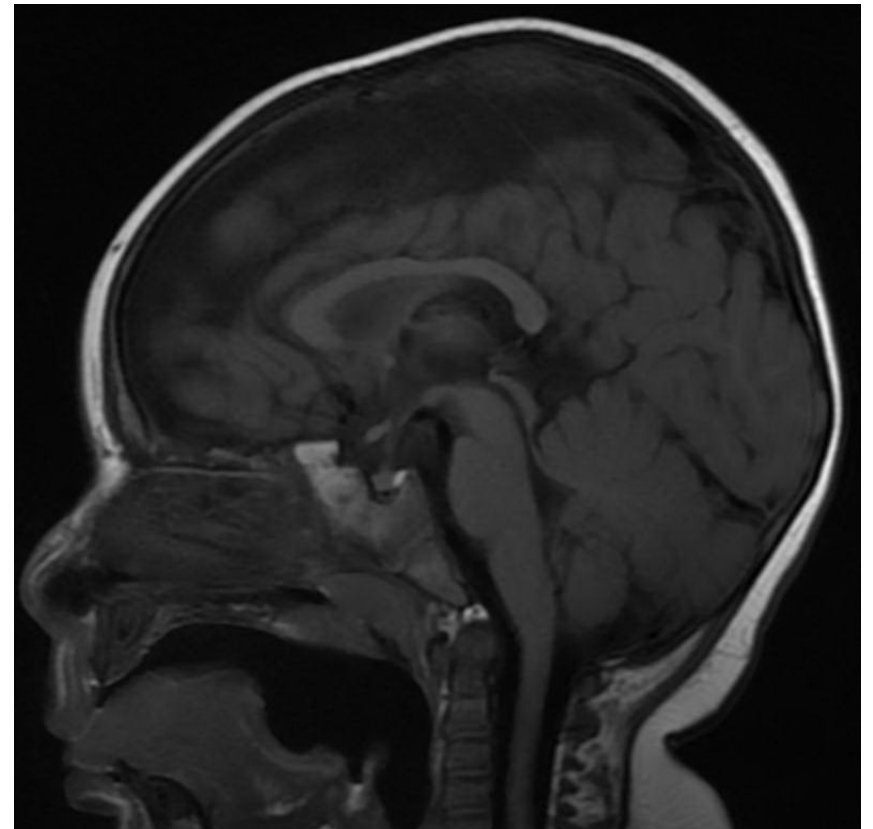
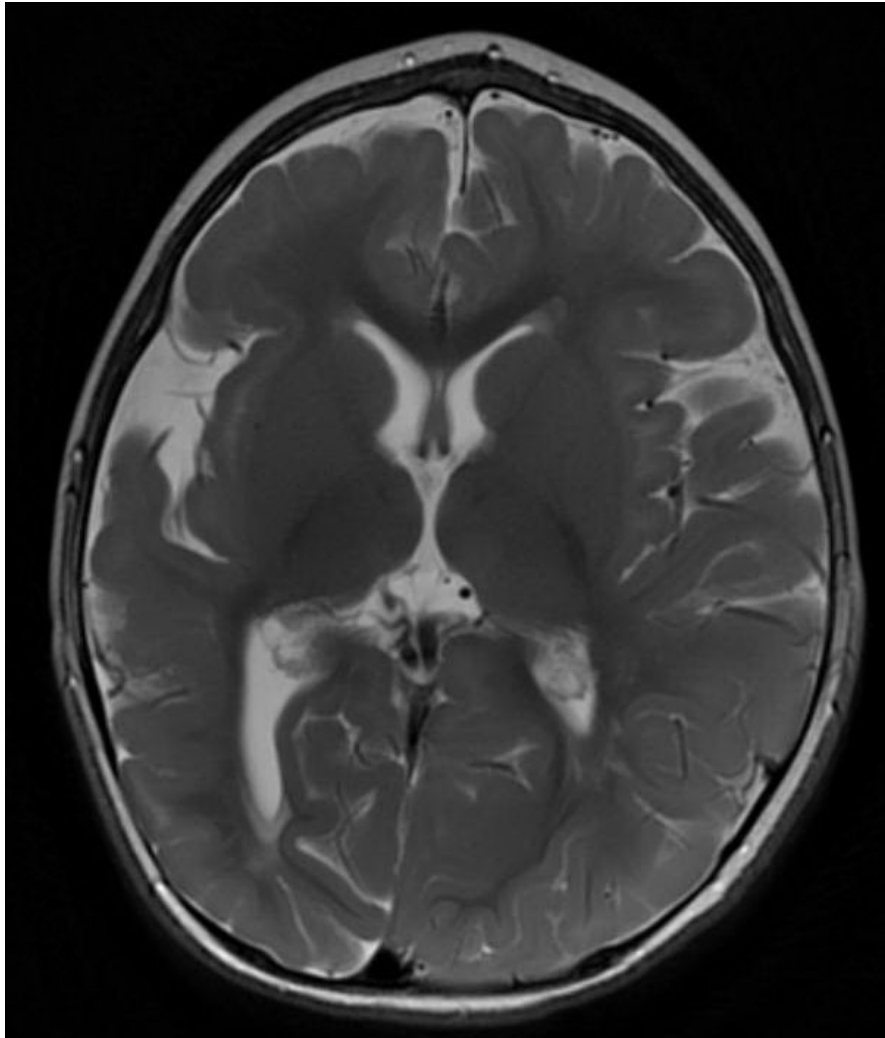


Late Manifestations

Late Microcephaly with Congenital Zika

- Reports of babies born to mothers with positive or equivocal testing for Zika who have normal exams at birth
- Months later...Baby B
 - Microcephaly
 - Developmental delays
 - Hypertonicity





Right cerebral hemisphere volume loss
 Decreased sulcation/lissencephaly in right
 frontal and parietal lobes
 Normal corpus callosum
 No abnormal calcifications

Twin Differences

Zika Twins as Insight into the Virus

New York Times: May 1, 2017

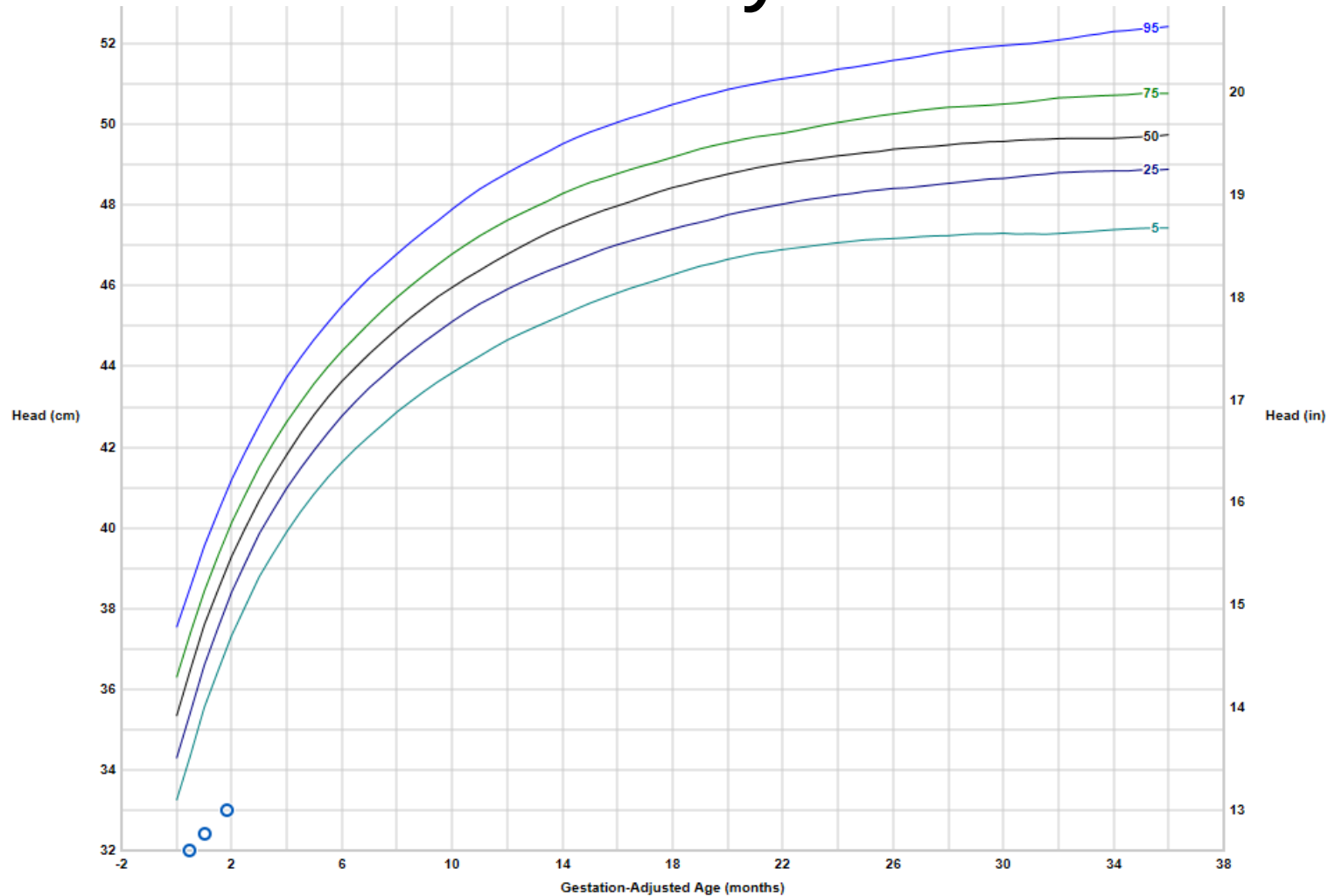


Twin studies are showing differential effects in babies born to Zika infected mothers

Pediatric Specialists
of Virginia

 Children's National.  INOVA

Baby C



Source: IHDP Growth Percentiles

Pediatric Specialists
of Virginia



Maternal Test Refusal

- Zika Virus is no longer making the headlines
- Risk of Male to Pregnant Female Transmission
- Testing issues, no lab test provides evidence of past infection
- Pregnancy Counseling vs. Birth Counseling

Zika Vaccine and Treatment

- In Phase 1/2 clinical trials now
- No therapeutics
- No treatment to reverse brain damage in these babies

Completed pregnancies with or without birth defects

1,471

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

Liveborn infants with birth defects*

64

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

Pregnancy losses with birth defects**

8

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

CDC
*Vital*signs™



Language: English ▼



Zika Virus - Protecting Pregnant Women and Babies

44 states reported cases of pregnant women with evidence of Zika in 2016. Most were travel-associated.

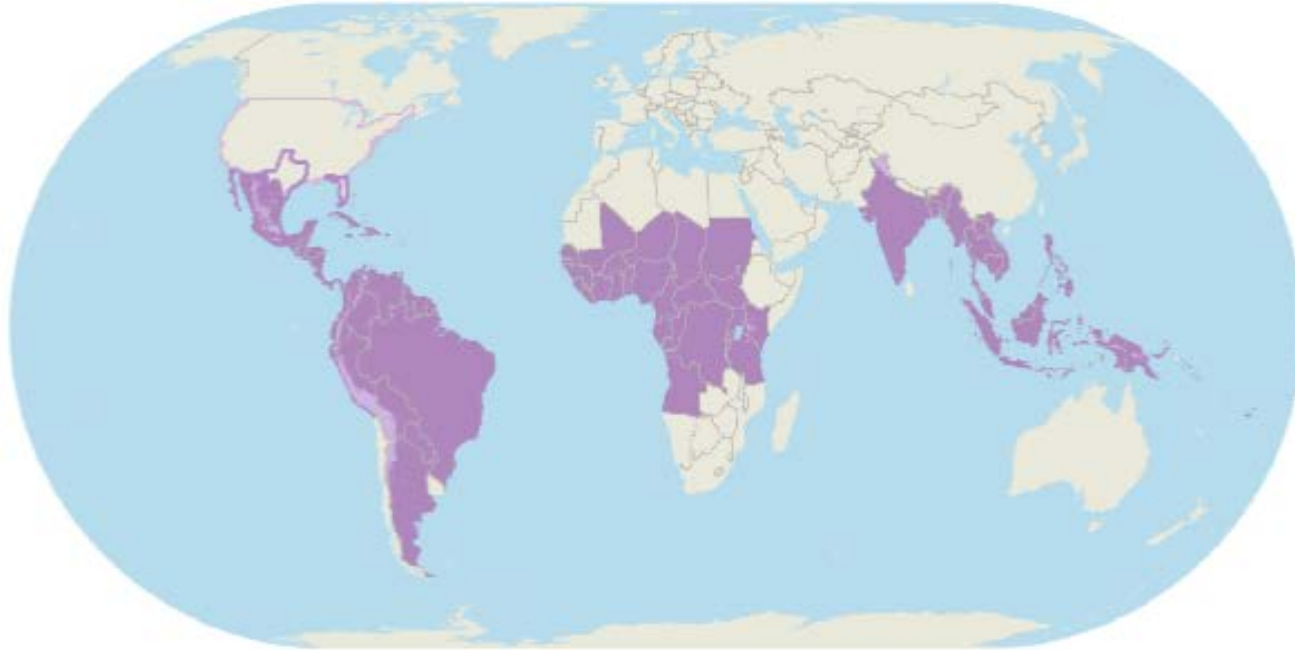
About **1 in 10** pregnant women with confirmed Zika had a fetus or baby with birth defects.

Only **1 in 4** babies with possible congenital Zika were reported to have received brain imaging after birth.

Pediatric Specialists
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 Children's National.  INOVA

World Map of Areas with Risk of Zika



Domestic areas

State Reporting Zika: 

No Known Zika: 

International areas

Zika Travel Recommendation:  Low elevation

 High elevation

No Known Zika: 

Summary

- Zika Virus Causes Birth Defects including Late Effects and Possible Twin Differences
- Testing Pregnant Women at Risk is Important
 - Provide Risk Counseling
- Evaluating and Testing Babies is Imperative
 - Families don't understand "Equivocal"
- Long-term Monitoring of Babies and Maximizing Neurodevelopmental Outcomes
- Prevention, Protection, possibly Therapeutics

Questions?

