



Center for Birth Defects Research and Prevention, and collaborative Zika virus surveillance with the Bureau of Infectious Disease and Laboratory Sciences

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Background on the Center for Birth Defects Research and Prevention

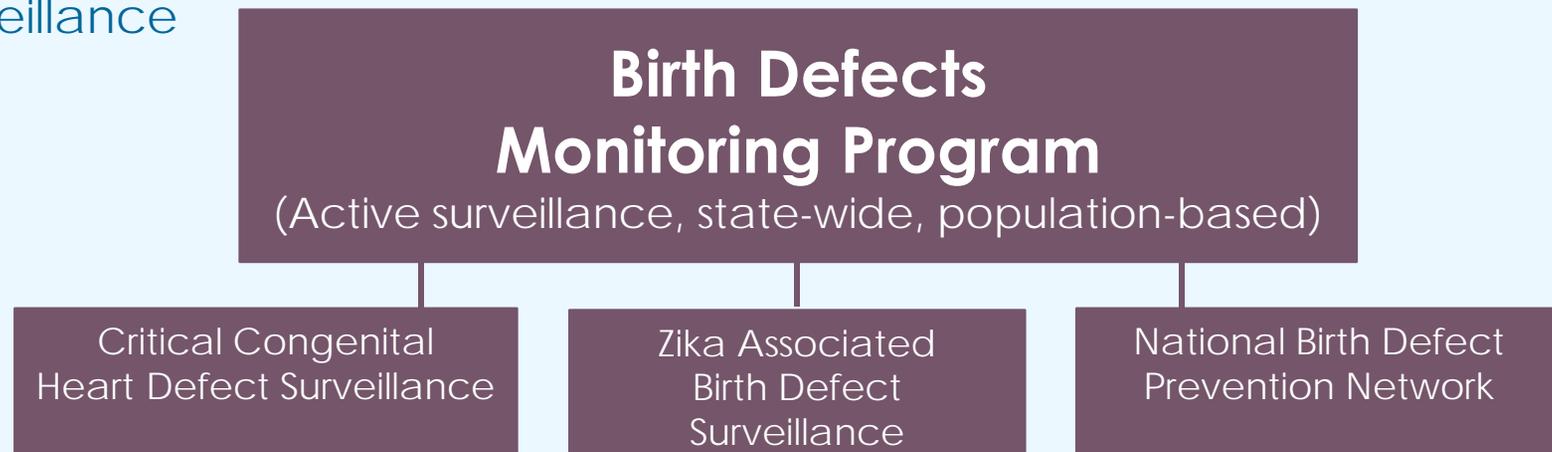
MA Center for Birth Defects Research and Prevention



- Why monitor for birth defects?
 - Understand causes of birth defects
 - 70% of birth defects are of unknown cause
 - Exposed to new untested chemicals and medications
 - Investigate environmental hazards
 - Prevention, early detection, and care throughout the lifespan of affected persons
 - MCBDRP
 - Established in 1996
 - In the Bureau of Family Health and Nutrition
 - CDC designated *Center for Excellence in Birth Defects Research and Prevention*
 - >250 peer-reviewed publications
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Mission: To support surveillance, research and dissemination of information aimed at preventing birth defects.

Surveillance



Research



Prevention & Education



Birth Defects Monitoring Program

Receive reports
of cases

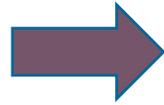


- Data sources
 - 50 MA reporting hospitals
 - Tertiary care hospitals
 - Prenatal reporters
 - Selected outpatient records
 - Vital records, birth/ death/ fetal death certificates

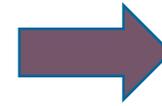


Birth Defects Monitoring Program

Receive reports
of cases



Abstractor reviews
hospital records



Abstract info on
cases



Clinical review
and classification
of cases

- Case criteria
 - Structural defect, present at birth or before
 - Livebirths, stillbirths, other pregnancy losses
 - Confirmed by testing <1 year
 - Severity more than mild
 - Massachusetts residence



Zika Surveillance

Zika Overview

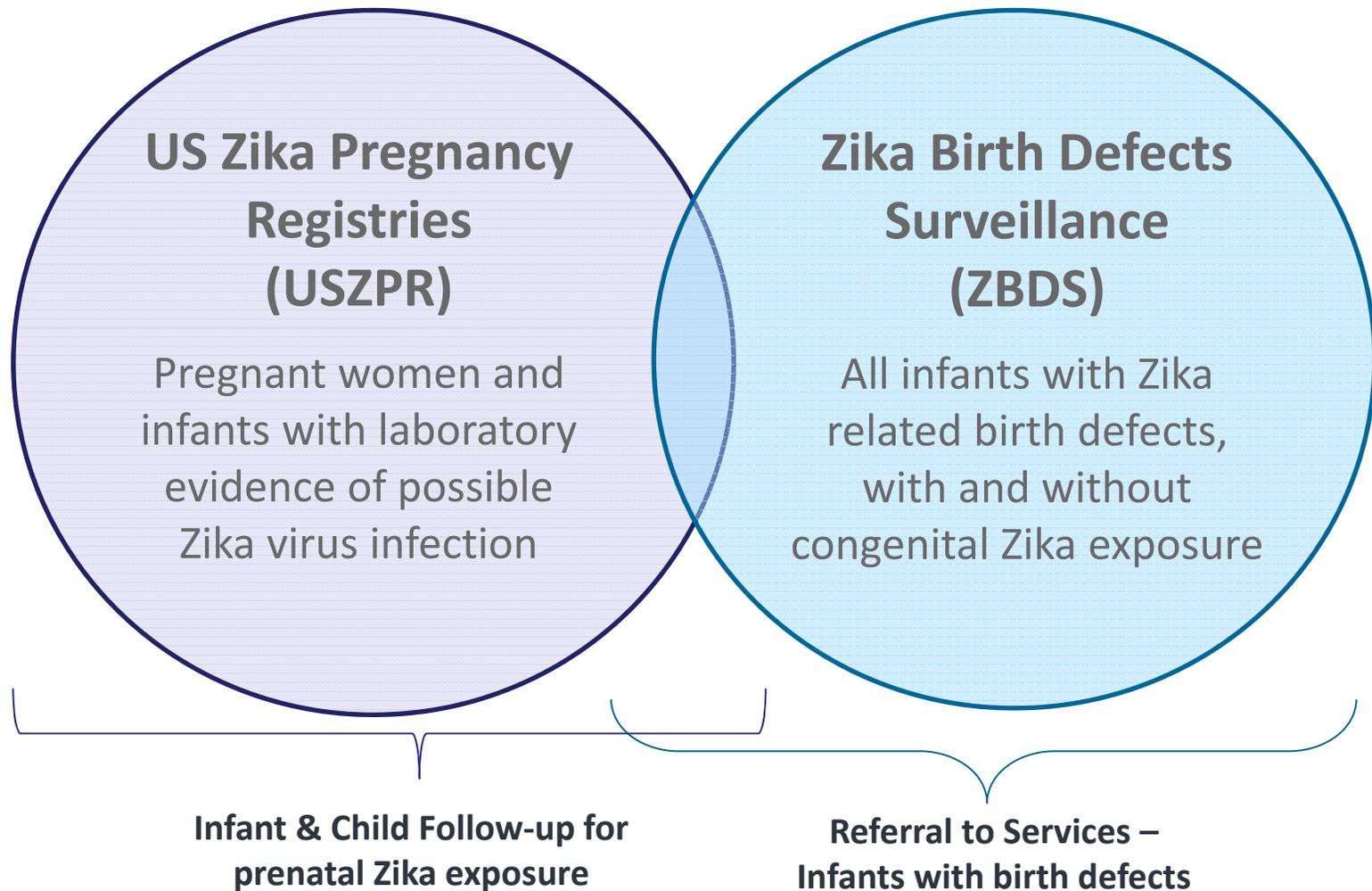
- Mosquito-borne flavivirus (related to dengue and WNV)
 - Endemic to southeast Asia and parts of Africa
 - Infection induces lifelong immunity
 - Spread to the Americas and the Caribbean
 - Arrived 2014-2015
 - Largest Zika virus outbreak ever recorded
 - Extremely limited transmission in continental US
 - Parts of Florida and Texas
 - Affected individuals traveling to or from outbreak areas
 - And their sexual partners
 - No local mosquito-borne transmission in MA
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Public Health Impact

- 80% asymptomatic, severe disease limited
- Can be associated with birth defects when women are infected during pregnancy
- Defects include severe neurologic damage, notably microcephaly
 - Consequences are lifelong

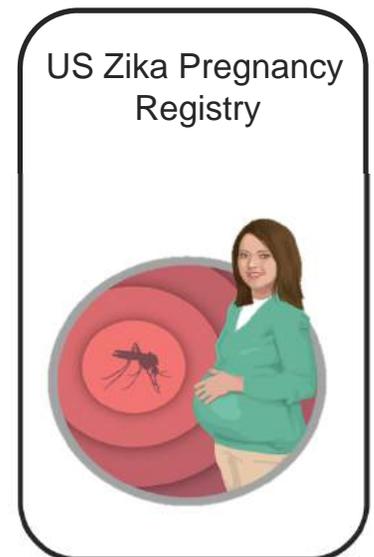


US Zika Pregnancy Registry and Zika Birth Defects Surveillance



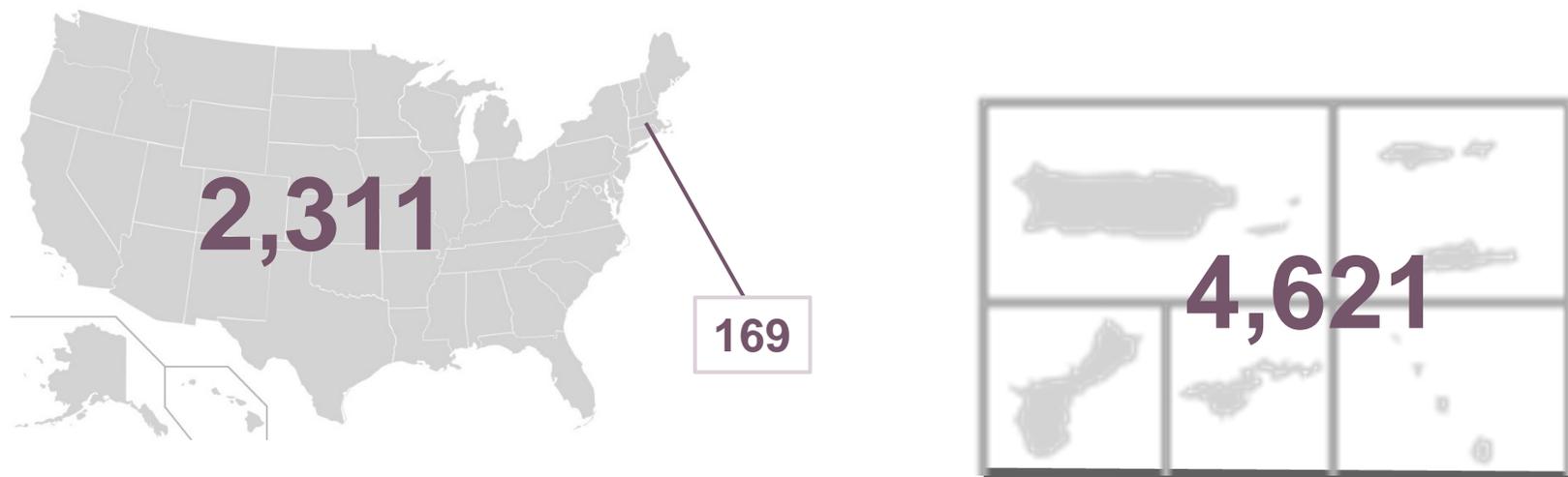
US Zika Pregnancy Registry (USZPR)

- In MA, Bureau of Infectious Disease and Laboratory Sciences (BIDLS)
- Pregnant women and infants with laboratory evidence of Zika infection
- Information collected on maternal health history, pregnancy exposures, neonatal outcomes, and infants followed through age 1
- In Massachusetts:
 - 169 pregnant women reported, 155 infants being followed (as of 12/11/2017)
 - All travel-related infections



US Zika Pregnancy Registry (USZPR)

Currently more than 5,000 pregnant women with laboratory evidence of possible Zika virus infection in the United States and US territories



* Data from USZPR and Puerto Rico Surveillance system, as of November 14, 2017

Pregnancy outcomes among women with Zika

Number of completed pregnancies with or without birth defects in the United States: **2,507**

- **98** live born infants born with a birth defect consistent with congenital Zika infection
- **9** pregnancy losses affected by a birth defect consistent with congenital Zika infection



Zika Birth Defects Surveillance (ZBDS)

- In MA, Center for Birth Defects Research and Prevention
- Rapid surveillance to identify all infants with Zika associated birth defect, **regardless of Zika exposure**
- Zika associated defects:
 - Brain and eye abnormalities
 - Central nervous system defects
 - Congenital contractures
 - Congenital deafness
- In Massachusetts:
 - 492 cases reported (1/1/16 – 9/21/17)



Zika Birth Defects Surveillance (ZBDS)

- Work with the Newborn Hearing Screening Program to get data on hearing loss
- Assess early intervention utilization for infants in USZPR
- Assess early intervention utilization for ZBDS cases
- Connect affected families



Other activities in MA

Outreach campaign (lead: BIDLS)

- Initial “Zika 101” webinar for website
- Develop & disseminate educational materials to target populations

CBDRP: birth defects expertise

Webinar for providers (lead: CBDRP)

- Webinar w/ CME credits on Zika and practice guidelines

BIDLS: assisted with connecting to providers and doing session on testing

Zika advisory committee

- BIDLS & CBDRP identified representatives of key organizations



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PROMOTING THE HEALTH OF
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ACOG

MNATM Massachusetts
Nurses
Association

MHA

Massachusetts Hospital
Association

AMERICAN COLLEGE
of NURSE-MIDWIVES

Successes and What's Next

Collaboration successes

- Massachusetts was the 1st state to transfer data to USZPR, and among the first group to provide ZBDS data
- Early collaboration has resulted in a more robust response to Zika
- Connecting to other programs
 - WIC, Sexual and Reproductive Health Programs
 - Working on linking to Early Intervention
- Increased completeness of USZPR data collection for reporting
- Contributed to the literature on what's known on Zika in pregnancy



Contributed to the research

Research

JAMA | **Original Investigation**

Birth Defects Among Fetuses and Infants of US Women With Evidence of Possible Zika Virus Infection During Pregnancy

Margaret A. Honein, PhD; April L. Dawson, MPH; Emily E. Petersen, MD; Abbey M. Jones, MPH; Ellen H. Lee, MD; Mahsa M. Yazdy, PhD; Nina Ahmad, MD; Jennifer Macdonald, MPH; Nicole Evert, MS; Andrea Bingham, PhD; Sascha R. Ellington, MSPH; Carrie K. Shapiro-Mendoza, PhD; Titilope Oduyebo, MD; Anne D. Fine, MD; Catherine M. Brown, DVM; Jamie N. Sommer, MS; Jyoti Gupta, MPH; Philip Cavicchia, PhD; Sally Slavinski, DVM; Jennifer L. White, MPH; S. Michele Owen, PhD; Lyle R. Petersen, MD; Coleen Boyle, PhD; Dana Meaney-Delman, MD; Denise J. Jamieson, MD; for the US Zika Pregnancy Registry Collaboration

- Among completed pregnancies (n=442) in the US with lab evidence of possible Zika infection
 - **6%** of fetuses or infants had birth defects
 - Similar proportion with birth defects (**≈6%**) in symptomatic and asymptomatic women
 - Among women with infection in the 1st trimester of pregnancy, birth defects reported in **11%**
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Contributed to the research, con't

Morbidity and Mortality Weekly Report

Baseline Prevalence of Birth Defects Associated with Congenital Zika Virus Infection — Massachusetts, North Carolina, and Atlanta, Georgia, 2013–2014

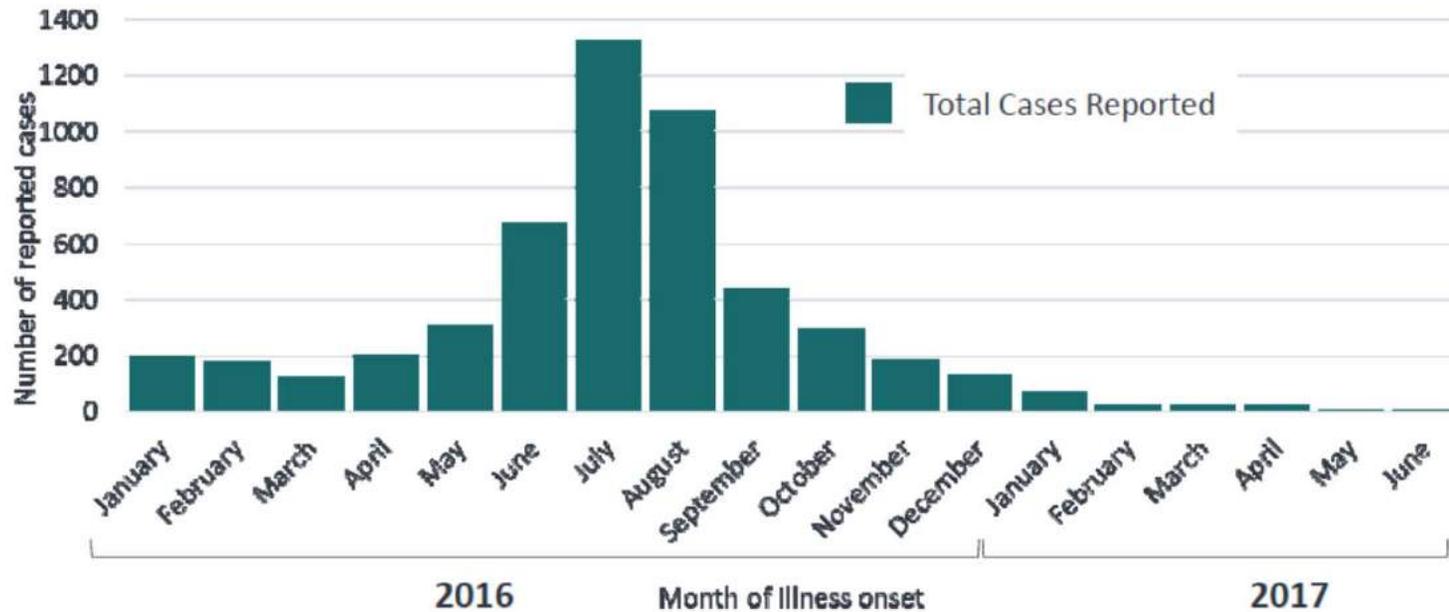
Janet D. Cragan, MD¹; Cara T. Mai, DrPH¹; Emily E. Petersen, MD²; Rebecca F. Liberman, MPH³; Nina E. Forestieri, MPH⁴; Alissa C. Stevens, MPH⁵; Augustina Delaney PhD¹; April L. Dawson, MPH¹; Sascha R. Ellington, MSPH²; Carrie K. Shapiro-Mendoza, PhD²; Julie E. Dunn, PhD³; Cathleen A. Higgins³; Robert E. Meyer, PhD⁴; Tonya Williams, PhD⁵; Kara N.D. Polen, MPH¹; Kim Newsome, MPH¹; Megan Reynolds, MPH¹; Jennifer Isenburg, MSPH¹; Suzanne M. Gilboa, PhD¹; Dana M. Meaney-Delman, MD⁶; Cynthia A. Moore, MD, PhD¹; Coleen A. Boyle, PhD⁷; Margaret A. Honein, PhD¹

- Prevalence 2013-2014: 2.86 per 1,000 live births
 - Prevalence for pregnancies with Zika exposure: 58.8 per 1,000 live births
 - **20-fold increase** in Zika-related birth defects in USZPR
 - **33-fold increase** for brain abnormalities or microcephaly in USZPR
 - Demonstrate the importance of birth defects surveillance
-

Decline in US cases

Declining Trends in Reported Zika Virus Disease Cases in the US

Laboratory-confirmed Zika virus disease cases in US states and Washington, DC, 2016–2017 (as of July 5, 2017)



Source: COCA Call https://emergency.cdc.gov/coca/calls/2017/callinfo_072717.asp

Decline in MA cases



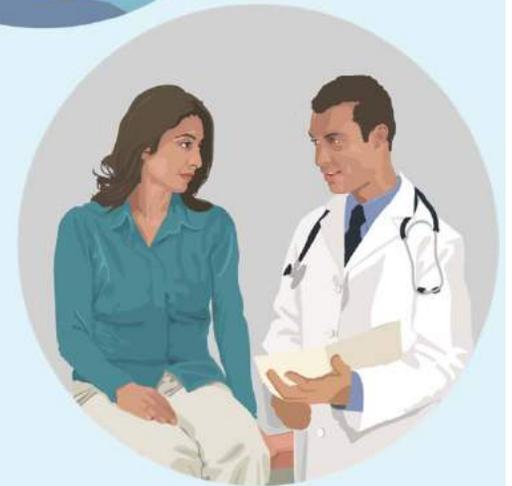
Current Status

Epidemic >>endemic:

- change in testing priorities
- change in infant evaluation recommendations
- no change in prevention recommendations

Families relocating from hurricane impacted areas

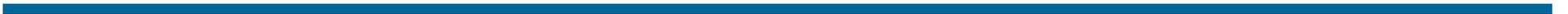
Vaccines in development



Acknowledgments

...it takes a village

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 - Gillian Haney
 - Melissa Cumming
 - Matthew Osborne
 - State Lab Team
 - Epidemiology Team



What are birth defects?

- Structural malformation that may affect appearance, organ function, and physical and mental development

Birth defects are common



Every 4½ minutes, a baby is born with a birth defect in the United States.

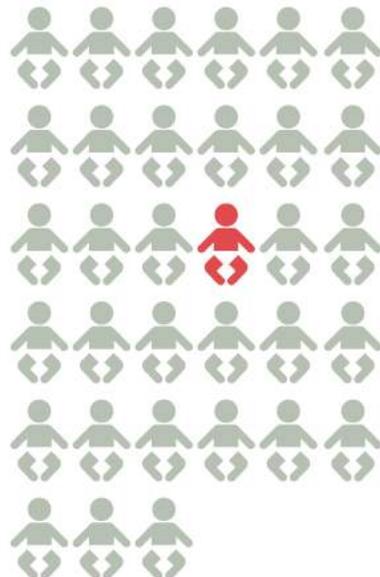
Birth defects affect

1 in every **33**

babies born in the United States *each* year.

That translates into about

120,000 babies.



Birth defects are costly



Each year, total hospital **costs** for U.S. children and adults with birth defects **exceed**

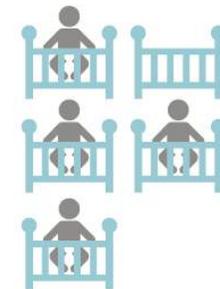
\$22.9 billion

Birth defects are critical

Birth defects cause

1 in every **5**

deaths during the *first* year of life.



Birth defects are **critical** conditions that can cause **lifelong** challenges.



The Zika outbreak is unprecedented



1st time a mosquito-borne virus known to cause serious birth defects



1st time a mosquito-borne virus was found to be sexually transmitted



1st time contraception is primary mitigation measure in an emergency response

An update from the USZPR

MMWR, April 7, 2017 / 66(13);366-373

44

States reported pregnant women with evidence of Zika in 2016

1 in 10

Pregnant women with confirmed Zika had a fetus or baby with birth defects

1 in 4

Babies with possible congenital Zika infection were reported to have received brain imaging after birth

1 in 10

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

#VitalSigns

Vital^{CDC}signs™

www.cdc.gov/vitalsigns/zika-babies



An update from the USZPR

MMWR, April 7, 2017 / 66(13);366-373

- **5%** with possible Zika exposure had birth defects
- **10%** with confirmed Zika exposure had birth defects
- **15%** with confirmed Zika exposure in the 1st trimester had birth defects

