

Protecting Pregnant Women and Babies during Public Health Emergencies

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Outline

- **Public Health Emergencies: Impacts on Pregnant Women and Infants**
- **Experiences from Recent Public Health Emergencies**
 - H1N1 response
 - Zika response
- **Tips and Resources**

Public Health Emergencies: Impacts on Pregnant Women and Infants

Public Health Emergencies

- **Large scale natural disasters**
 - Hurricanes, earthquakes, wildfires, etc.
 - Fukushima
- **Manmade disasters – Chemical, Biologic, Radiologic, Nuclear or Explosive**
 - September 11th
 - 2001 Anthrax attacks
 - Flint water crisis
- **Significant infectious disease outbreaks**
 - H1N1, Ebola, Zika

Pregnant Women and Public Health Emergencies

- **Populations with special clinical needs***
- **Disproportionate burden for some infectious diseases**
- **Disaster exposure may be associated with:**
 - Preterm birth or low birth weight infants
 - Increases in pregnancy complications
 - Increase in psychological stress
 - Separation from family and support systems
 - Exposure to environmental contaminants
 - Lack of access to health care
- **Lack of surveillance**



Postpartum Women and Public Health Emergencies

- **Lack of access to contraception and reproductive health care for women of reproductive age**
- **Lack of access to well-child and acute care**
- **Effects on infant feeding**
 - Exposure to contaminants can affect breastfeeding
 - Lack of access to potable water may affect formula feeding
- **Loss of infant care supplies**
- **Increase in psychological stress**
- **Separation from family and support systems**



Possible Impacts of Exposures During Pregnancy

- **Infants:**
 - Birth defects
 - Small for gestational age/ low birth weight
 - Preterm birth
 - Neonatal complications
 - Prolonged hospital stay
 - Infant morbidity/mortality
- **Children:**
 - Cognitive impairment
 - Motor delay
 - Behavioral issues
 - Educational attainment



Experiences from Recent Public Health Emergencies

CDC Emergency Response

CDC Emergency Response Activation Levels

1 **Level 1**

The highest level of response reserved for critical emergencies. CDC assigns the largest number of staff possible to work 24/7 on the response. To date, there have been three Level 1 responses: Ebola outbreak (2014), H1N1 influenza outbreak (2009) and Hurricane Katrina (2005).

2 **Level 2**

The CDC experts in the particular disease lead the response with a large number of other staff from the program area. A large number of staff from CDC's Emergency Operations Center may assist with the response.

3 **Level 3**

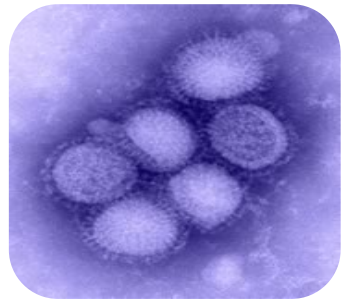
The CDC experts in the particular disease lead the response with some of their own staff. Some staff from CDC's Emergency Operations Center may assist in the response. CDC decides when a different level of response is needed.

Level 1 Activations:

- Hurricane Katrina
- H1N1 (Pandemic Flu)
- Ebola
- Zika

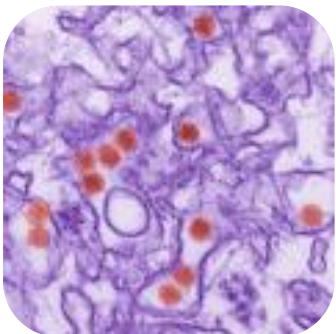


Experiences from Recent Emergencies



**2009
H1N1
Influenza**

**2014
Ebola**



**2016
Zika**

What did we learn?



Discovered pregnant women and infants can be more vulnerable



Identified need to guide frontline healthcare providers in infection control or treatment



Needed to collect data rapidly to inform response efforts

2009 H1N1

Pandemic influenza: Special considerations for pregnant women

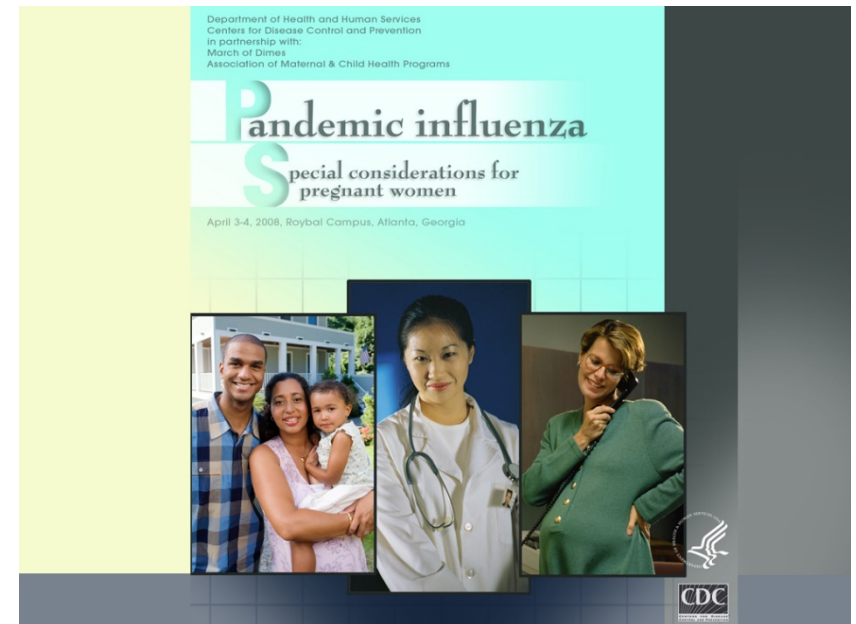
- Meeting of experts and key partners convened by CDC, April 3-4, 2008
- To develop public health recommendations specific to pregnant women in the event of an influenza pandemic

S248 | Influenza Preparedness and Response | Peer Reviewed | Rasmussen et al. American Journal of Public Health | Supplement 2, 2009, Vol 99, No. S2

Pandemic Influenza and Pregnant Women: Summary of a Meeting of Experts

Pandemic Influenza: Special Considerations for Pregnant Women was a meeting convened by the Centers for

Sonja A. Rasmussen, MD, MS, Denise J. Jamieson, MD, MPH, Kitty MacFarlane, CNM, MPH, Janet D. Cragan, MD, MPH, Jennifer Williams, MSN, MPH, and Zsakeba Henderson, MD; for the Pandemic Influenza and Pregnancy Working Group



CDC's Maternal Health Team

- **CDC Emergency Operations Center (EOC) activated April 22, 2009**
 - Maternal Health desk activated April 27, 2009 to address issues specific to pregnant and postpartum women
 - The 2nd documented death in the U.S. from H1N1 was a healthy pregnant woman
- **First time a maternal health desk established in CDC EOC during a national public health emergency response**

Admission Rates for Pregnant Women and General Population with Pandemic (H1N1) 2009 Influenza United States, April 15 to May 18, 2009

Population	Admission Rate per 100,000 (95% CI)
Pregnant women	0.32 (0.13-0.52)
General Population	0.076 (0.07-0.09)

Risk Ratio 4.3, 95% CI 2.3-7.8

Jamieson DJ et al., Lancet 374:451-8, 2009

Pandemic 2009 influenza A (H1N1) virus illness among pregnant women in the United States (JAMA 2010)

- Through December 31, 2009, 280 pregnant women in US admitted to an ICU; 56 deaths
- 5% of all reported H1N1 deaths were among pregnant women (1% of general population)
- Only 1 death occurred in pregnant patient who received treatment within 2 days of symptom onset

CDC's 2009–2011 Pregnancy Flu Line

- **First national influenza surveillance system among pregnant women**
- **Short-term, targeted program to monitor pandemic and seasonal influenza in pregnant and postpartum women**
- **Consisted of**
 - **24-hour consultation phone line for clinicians and health departments**
 - **Enhanced passive surveillance system for severe influenza in pregnant/postpartum women**
- **Operational for two years from October 2009—September 2011**
 - **No longer in existence**

Lessons Learned About Influenza & Pregnancy

- **Clear and consistent evidence documenting importance of treatment with influenza antiviral medications in pregnancy**
- **Justification for treatment of postpartum women for up to 2 weeks following delivery**
- **Increased influenza vaccination rates among pregnant women – model for other vaccines?**
- **Renewed scientific interest in wide variety of pregnancy topics – e.g. immunology, infectious diseases, critical care**

2016 Zika

PREGNANCY & BIRTH DEFECTS TASK FORCE



Collect critical information about Zika virus infection in pregnancy through surveillance



Provide technical assistance domestically and internationally



Educate audiences about Zika prevention and CDC's activities



Provide clinical consultations about Zika and pregnancy



Reduce the risk and impact of Zika virus infection in pregnant women, infants, and children

Conduct research to understand Zika virus infection in pregnancy



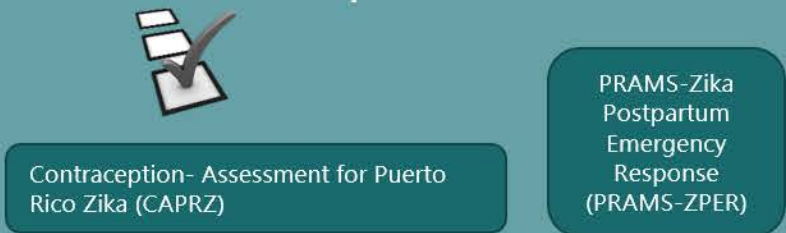
Prevent Zika-related birth defects by preventing unintended pregnancy



Engage and share information with partner organizations



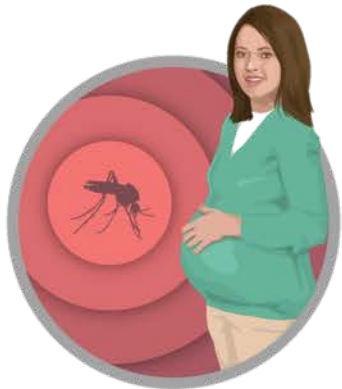
Understand knowledge and behaviors about Zika prevention



Collecting Data to Protect Mothers and Babies

Surveillance of Pregnant Women, Fetuses, & Infants

US Zika Pregnancy Registry



Zika Active Pregnancy Surveillance System (Puerto Rico)



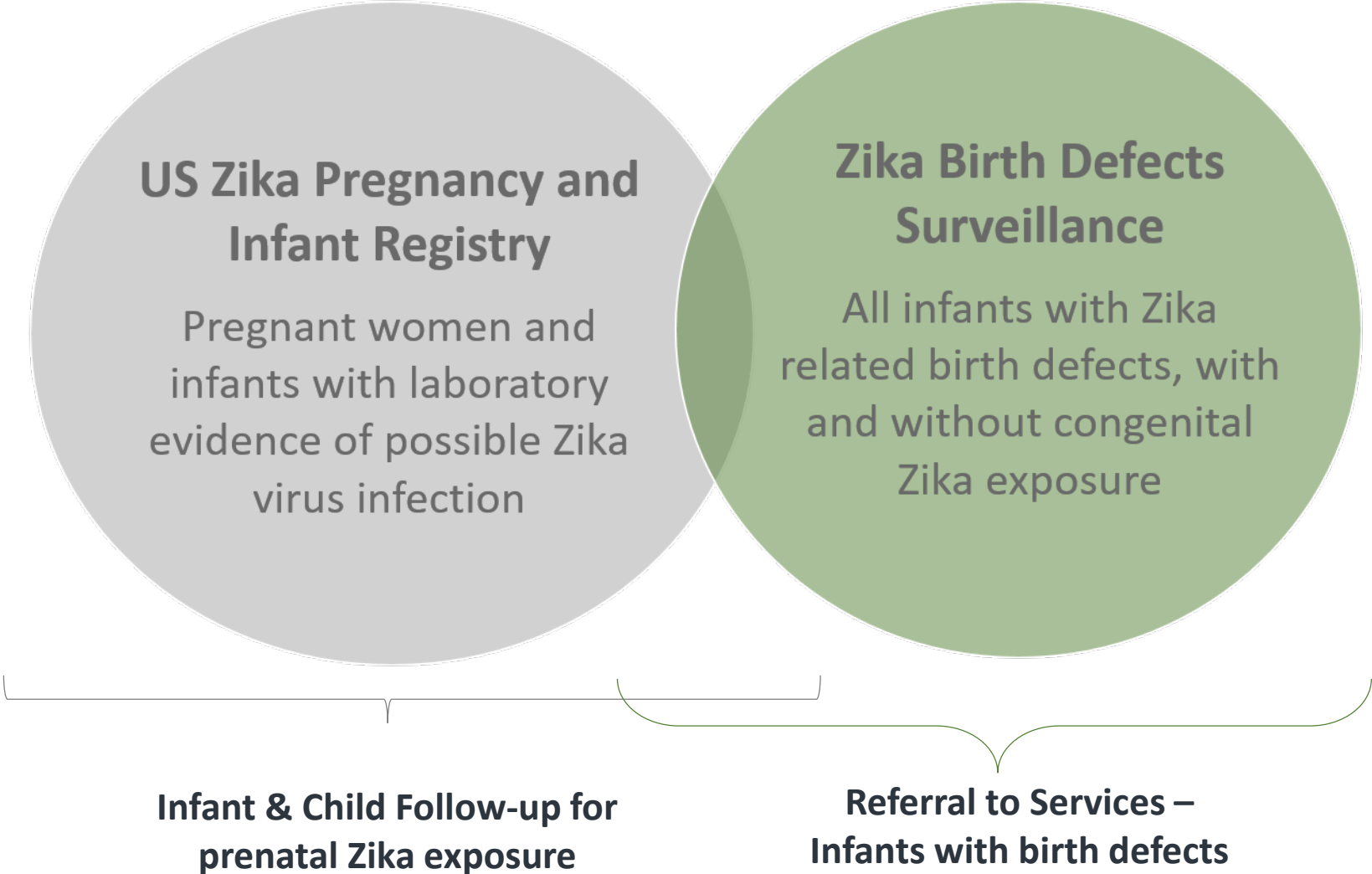
Proyecto Vigilancia de Embarazadas con Zika (Colombia)



US Zika-Related Birth Defects Surveillance



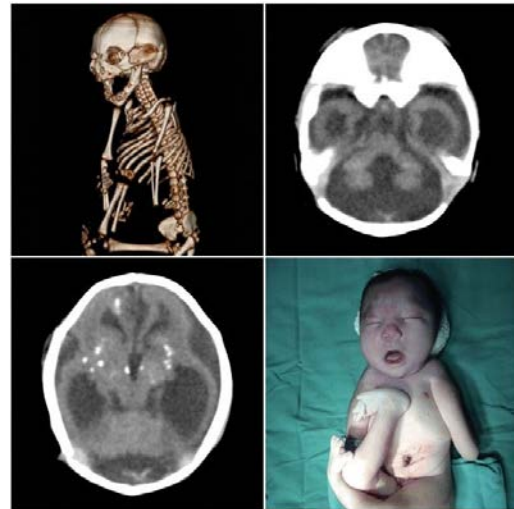
US Zika Pregnancy & Infant Registry and Zika Birth Defects Surveillance Complement Each Other



What Have We Learned about Zika During Pregnancy?



Established that **Zika is a cause** of serious brain abnormalities, microcephaly, and potentially other birth defects



Recognized pattern of birth defects associated with Zika virus infection called **congenital Zika syndrome**



Provided clues toward **the level of risk** from congenital Zika virus infection

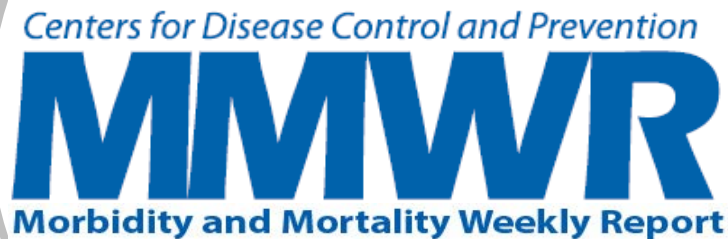


Identified that Zika infections during the **all trimesters** have been associated with birth defects

Data Informed Updates to Clinical Guidance

Expanded definition of fetal abnormalities that might be consistent with Zika virus disease beyond microcephaly

Informed recommendation to cease testing of asymptomatic pregnant women



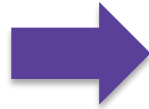
Expanded window for nucleic acid testing (NAT)

Informed updated recommendation related to prolonged IgM

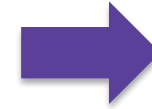
Lessons Learned: Data for Action



Rapidly identify emerging threats to mothers and babies



Consistently collect information about impact of threat on pregnancy, birth defects, and infant health



Transform data into action through development of clinical guidance

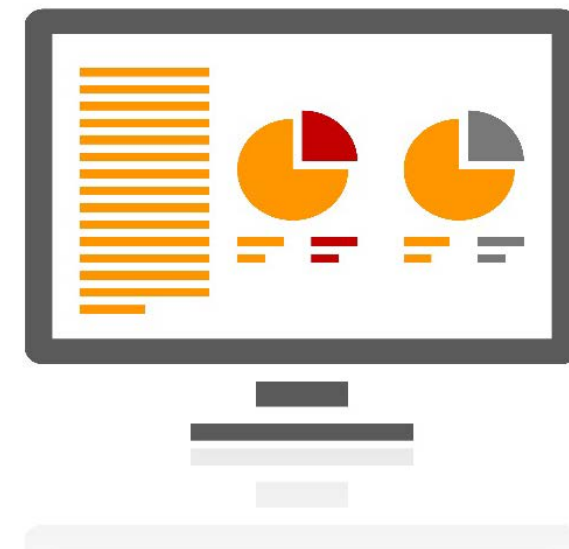
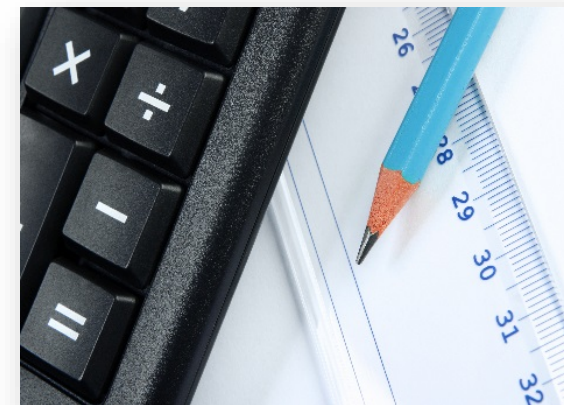


Provide support to and collaborate with state and local health departments

Tips and Resources: Pregnant Women and Infants

Tips and Resources

- **Strategies to reach target audiences**
- **Post-disaster Indicators for Pregnant Women, Postpartum Women, and Infants**
- **Pregnancy Estimation Tool**
- **Leveraging the Pregnancy Risk Assessment Monitoring System (PRAMS)**
- **Online Training**



Who Are You Talking To?

Importance of Considering Your Target Audience



Pregnant Women

Key Messages:

- Prevention

Channels:

What To Expect, Mommy Bloggers, Media



Affected Families

Key Messages:

- Affected infants need care and services

Channels:

Healthcare providers, WIC, Early intervention



Healthcare providers

Key Messages:

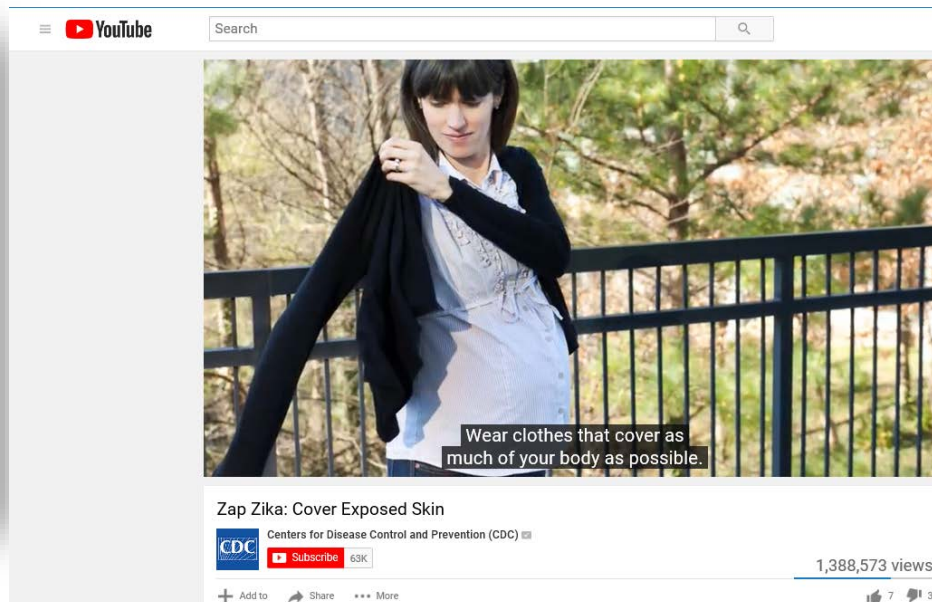
- Prevention
- Clinical care

Channels:

Professional organizations, MMWR, COCA, Medscape

Reaching Pregnant Women and Infants

- Share information at events where women and families might be present
- Supply communications materials to healthcare provider groups (e.g., managed care organizations, doctors' offices, HMOs, and clinics, especially Federally Qualified Health Clinics)



MotherToBaby
Medications & More During Pregnancy & Breastfeeding
Ask The Experts



Reaching Healthcare Providers

- Health Alerts/Advisories
- Dissemination of guidance through local chapters of professional organizations (e.g., ACOG, AAP)
- Tools to help implement guidance and educate patients



CDC's Response to Zika
UPDATED INTERIM PREGNANCY GUIDANCE:
SYMPTOMATIC PREGNANT WOMEN WITH POSSIBLE ZIKA VIRUS EXPOSURE
Accessible Version: <https://www.cdc.gov/zika/healthcare-providers/ig-guidance.html>

Testing Recommendations and Interpretation of Results for Healthcare Providers

ASK PREGNANT WOMEN ABOUT
 Travel to or residence in any areas with risk for Zika virus transmission before and during the current pregnancy? • Possible sexual exposure before and during the current pregnancy
A diagnosis of laboratory-confirmed Zika virus infection before current pregnancy? • Symptoms of Zika virus illness during current pregnancy (e.g., fever, rash, conjunctivitis, arthralgia) if symptoms reported, note to appropriate department.

WHOM to test?
 Pregnant women reporting possible exposure during current pregnancy and symptoms of Zika virus disease*

WHEN to test?
 Test as soon as possible, through 12 weeks after symptom onset

WHICH tests?
 Zika virus NAT (serum and urine) AND Zika virus IgM serology (serum)†

RESULTS and ADDITIONAL tests

- Positive Zika virus NAT†**
If Zika IgM negative, use footnote 5
ACUTE ZIKA VIRUS INFECTION
- Negative Zika virus NAT AND non-negative Zika virus IgM†**
ZIKA VIRUS INFECTION, SPECIFIC VIRUS AND TIMING OF INFECTION CANNOT BE DETERMINED
The pregnant women without Zika virus symptoms before the current pregnancy, a positive IgM result represents recent suspected Zika virus infection.
- Negative Zika virus NAT AND negative Zika virus IgM†**
FLAVIVIRUS INFECTION, SPECIFIC VIRUS AND TIMING OF INFECTION CANNOT BE DETERMINED
The pregnant women without Zika virus symptoms before the current pregnancy, a positive IgM result represents recent suspected flavivirus infection.
- Zika virus NAT <10 AND negative Zika virus IgM**
NO EVIDENCE OF ZIKA VIRUS INFECTION

INTERPRETATION

* Pregnant women with symptoms of Zika virus disease should be tested for Zika virus infection. Testing should be done as soon as possible, through 12 weeks after symptom onset. If symptoms are reported after 12 weeks, testing should be done as soon as possible. Pregnant women with symptoms of Zika virus disease who are not tested for Zika virus infection should be considered as having possible Zika virus exposure.

† The Zika virus NAT and Zika virus IgM serology tests are performed on serum and urine specimens. The Zika virus NAT test is performed on serum and urine specimens. The Zika virus IgM serology test is performed on serum specimens. The Zika virus NAT test is performed on serum and urine specimens. The Zika virus IgM serology test is performed on serum specimens. The Zika virus NAT test is performed on serum and urine specimens. The Zika virus IgM serology test is performed on serum specimens. The Zika virus NAT test is performed on serum and urine specimens. The Zika virus IgM serology test is performed on serum specimens.

<https://www.cdc.gov/zika/healthcare-providers/ig-guidance.html>

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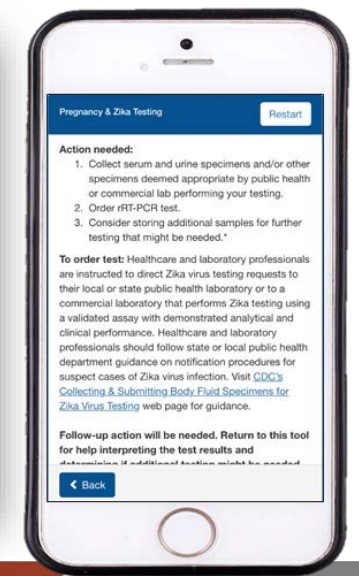
CDC's Response to Zika
MEASURING HEAD CIRCUMFERENCE

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 eyebrows
 - > 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
- Head circumference measurements should be taken on the first day of life because commonly-used birth head circumference reference charts by age and sex are based on measurements taken before 24 hours of age

For more information: www.cdc.gov/zika

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Post-disaster Indicators for Pregnant and Postpartum (P/PP) Women and Infants

- **List of common epidemiologic indicators for P/PP women and infants affected by disaster**
 - Identify salient conditions and outcomes to be monitored via surveillance or post-disaster data collection
 - Promote use of consistent measures across post-disaster studies
 - Build scientific knowledge regarding disaster effects on P/PP women and infants
- **Final Product: 25 Final Indicators with their 90 measures**

Collecting Supplemental Info on Pregnant Women When Conducting Post-Disaster Morbidity Surveillance

- Sample protocol shows how Post-Disaster Health Indicators can be used when conducting other post-disaster surveillance



- Interviewer could ask:
 - How damaged was your home by the disaster?
 - Did you experience the following? (illness, loss of power, loss of loved one)
 - Since the disaster, have you had prenatal visits?
 - Would you accept the following help? (financial, medical, etc.)

Protocol

Where 'Patient Information' box 'Pregnant'=yes, ensure that 'due date' and the entire surveillance form is completed. Then complete the "Supplemental Information on Pregnant Women" form, being sure to answer all questions on the front and back of the page.

Part I: VISIT INFORMATION	Name of Facility	City	State	Date of Visit	Time of Visit
Part II: PATIENT INFORMATION	Unique Identifier/Medical Record Number	Age <input type="checkbox"/> <1yrs <input type="checkbox"/> 1-17yrs <input type="checkbox"/> 18+	Gender <input type="checkbox"/> Male <input type="checkbox"/> Female	Pregnant <input type="checkbox"/> Yes <input type="checkbox"/> No/NA	If yes, due date
Race/Ethnicity <input type="checkbox"/> White <input type="checkbox"/> Black/African American <input type="checkbox"/> Hispanic or Latino <input type="checkbox"/> Asian <input type="checkbox"/> Unknown					
Did reason for visit occur as a result of work (paid or volunteer) involving disaster response or rebuilding efforts? <input type="checkbox"/> Yes <input type="checkbox"/> No/NA If yes, occupation/response role _____ Activity at time of injury/illness _____					
Part III: REASON FOR VISIT (Please check all categories related to patient's current reason for seeking care)					
TYPE OF INJURY	ACUTE ILLNESS/SYMPTOMS	EXACERBATION OF CHRONIC DISEASE			
<input type="checkbox"/> Abrasion, laceration, cut <input type="checkbox"/> Avulsion, amputation <input type="checkbox"/> Contusion, head injury <input type="checkbox"/> Fracture <input type="checkbox"/> Sprain/strain	<input type="checkbox"/> Conjunctivitis/eye irritation <input type="checkbox"/> Dehydration <input type="checkbox"/> Dermatitis/skin, specify: <input type="checkbox"/> Rash <input type="checkbox"/> Infection <input type="checkbox"/> Infection (e.g., lice, scabies) <input type="checkbox"/> Fever (>100°F or 37.8°C) <input type="checkbox"/> Gastrointestinal, specify: <input type="checkbox"/> Vomiting <input type="checkbox"/> Bloody <input type="checkbox"/> Watery <input type="checkbox"/> Nausea or vomiting	<input type="checkbox"/> Cardiovascular, specify: <input type="checkbox"/> Hypertension <input type="checkbox"/> Congestive heart failure <input type="checkbox"/> Diabetes <input type="checkbox"/> Immunocompromised (e.g., HIV, lupus) <input type="checkbox"/> Neurological, specify: <input type="checkbox"/> Seizure <input type="checkbox"/> Stroke <input type="checkbox"/> Respiratory, specify: <input type="checkbox"/> Asthma <input type="checkbox"/> COPD			
MECHANISM OF INJURY	<input type="checkbox"/> Jaundice <input type="checkbox"/> Meningitis/encephalitis <input type="checkbox"/> Neurological (e.g., altered mental status, confused/disoriented, syncope) <input type="checkbox"/> Obstetric/Gynecology, specify: <input type="checkbox"/> GYN condition not associated with pregnancy or post-partum <input type="checkbox"/> In labor <input type="checkbox"/> Pregnancy complication (e.g., bleeding, fluid leakage) <input type="checkbox"/> Routine pregnancy check-up	MENTAL HEALTH			
<input type="checkbox"/> Biting, specify: <input type="checkbox"/> Insect <input type="checkbox"/> Snake <input type="checkbox"/> Other specify _____	<input type="checkbox"/> Burns, specify: <input type="checkbox"/> Chemical <input type="checkbox"/> Fire, hot object or substance <input type="checkbox"/> Sun exposure <input type="checkbox"/> Cold/heat exposure, specify: <input type="checkbox"/> Cold (e.g., hypothermia) <input type="checkbox"/> Heat (e.g., stress, hyperthermia) <input type="checkbox"/> Electric shock <input type="checkbox"/> Fall, slip, trip, specify: <input type="checkbox"/> From height <input type="checkbox"/> Same level <input type="checkbox"/> Foreign body (e.g., glass shard) <input type="checkbox"/> Hit by or against an object <input type="checkbox"/> Motor vehicle crash, specify: <input type="checkbox"/> Driver/occupant <input type="checkbox"/> Pedestrian/bicyclist <input type="checkbox"/> Non-fatal drowning, submersion <input type="checkbox"/> Poisoning, specify: <input type="checkbox"/> Carbon monoxide exposure <input type="checkbox"/> Inhalation of fumes, dust, other gas <input type="checkbox"/> Ingestion specify _____ <input type="checkbox"/> Use of machinery, tools, or equipment <input type="checkbox"/> Violence/assault, specify: <input type="checkbox"/> Self-inflicted injury/suicide attempt <input type="checkbox"/> Sexual assault <input type="checkbox"/> Other assault specify _____	<input type="checkbox"/> Agitated behavior (i.e. violent behavior/threatening violence) <input type="checkbox"/> Anxiety or stress <input type="checkbox"/> Depressed mood <input type="checkbox"/> Drug/alcohol intoxication or withdrawal <input type="checkbox"/> Previous mental health diagnosis (i.e. PTSD) <input type="checkbox"/> Psychotic symptoms (i.e. paranoia) <input type="checkbox"/> Suicidal thoughts or ideation			
	<input type="checkbox"/> Pain, specify: <input type="checkbox"/> Abdominal pain or stomachache <input type="checkbox"/> Chest pain, angina, cardiac arrest <input type="checkbox"/> Ear pain or earache <input type="checkbox"/> Headache or migraine <input type="checkbox"/> Muscle or joint pain (e.g., back, hip) <input type="checkbox"/> Oral/dental pain <input type="checkbox"/> Respiratory, specify: <input type="checkbox"/> Congestion, runny nose, sinusitis <input type="checkbox"/> Cough, specify: <input type="checkbox"/> Dry <input type="checkbox"/> Productive <input type="checkbox"/> With blood <input type="checkbox"/> Pneumonia, suspected <input type="checkbox"/> Shortness of breath/difficulty breathing <input type="checkbox"/> Wheezing in chest <input type="checkbox"/> Sore throat	ROUTINE/FOLLOW-UP			
	<input type="checkbox"/> Influenza-like illness (ILI) – Fever (temperature of 100°F [37.8°C] or greater) AND a cough or a sore throat in the absence of a KNOWN cause other than influenza.	<input type="checkbox"/> Medication refill If yes, how many medications? <input type="checkbox"/> Blood sugar check <input type="checkbox"/> Vaccination <input type="checkbox"/> Blood pressure check <input type="checkbox"/> Wound care			
		OTHER			
		Part IV: DISPOSITION			
		<input type="checkbox"/> Discharge to self care <input type="checkbox"/> Refer to other care (e.g., clinic or physician) <input type="checkbox"/> Admit/refer to hospital <input type="checkbox"/> Left before being seen <input type="checkbox"/> Deceased			

Pregnancy Estimator

When There is an Emergency: Estimating the Number of Pregnant Women in a Geographic Area

- Provides estimation tool for a jurisdiction
- Calculates number of pregnant women at a point in time

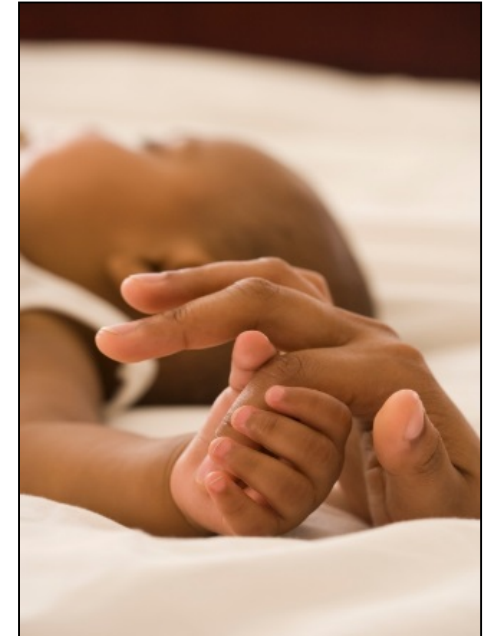


<http://www.cdc.gov/reproductivehealth/Emergency>

Pregnancy Risk Assessment Monitoring System

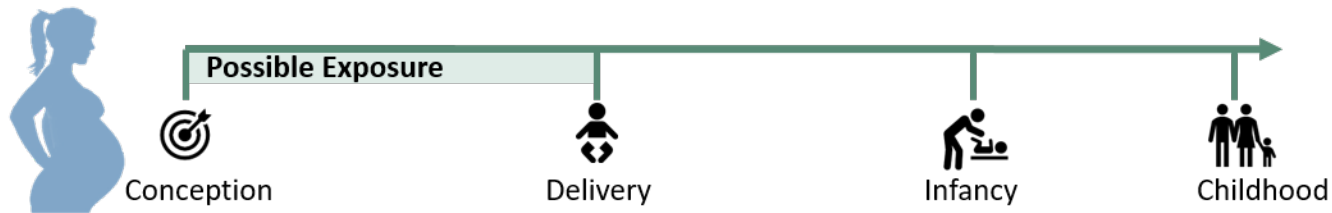


- **Population-based surveillance system of women who recently delivered a live infant**
 - 51 sites representing 83% of all U.S. live births
- **Since 2009, PRAMS has been used to collect emergency preparedness data in several states**
- **PRAMS has also been leveraged for post-disaster data collection**
 - H1N1
 - Zika
 - 2017 Hurricane Season



Pregnancy and Infant Surveillance

1 Pregnancy and Infant Registry



2 Adapted Birth Defects Surveillance



3 Local Health Department Surge Capacity

Online Training: Reproductive Health in Emergency Preparedness and Response

- **Goal:** Help learners to effectively respond to the needs of women of reproductive age during and after a disaster.
- **Target Audience:**
 - Health care professionals
 - State and local epidemiologists
 - Emergency preparedness personnel
 - Other public health staff



How to Access Online Training

- **Course Structure:** Each section of this course is designed to be completed in consecutive order. Supplemental learning materials are provided throughout the course.
- **Required Time:** 60 minutes approximately.
- **Access:** Offered through **CDC TRAIN**, a comprehensive catalog of public health learning products.
- **Available at**
<https://www.cdc.gov/reproductivehealth/emergency/course-content/course.html>
- **Continuing Education Credits:** CMEs, CNEs, and CEUs available



Future Threats are Unpredictable



The spread of disease can be fast and unpredictable.



Pregnant women and fetuses/infants have been shown to be uniquely susceptible to disease threats.

Thank you!

Questions?

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

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.

