



# ZIKA: A Family Affair

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## SIGNIFICANCE:

- What we know...
  - Zika is spread mostly by the bite of an infected *Aedes* species mosquito. They are active both day and night
  - Zika can be passed from a pregnant woman to her fetus
  - Infection during pregnancy can cause certain birth defects
  - There is NO vaccine or medicine for Zika
  - Local mosquito-borne Zika virus transmissions has been reported in the continental United States<sup>[1]</sup>
  - Zika can be transmitted between sexual partners<sup>[3]</sup>

## BACKGROUND:

- Within the past ten months, the increasingly palpable impact of the Zika virus has become more and more obvious.
- Under the guidance of the Center for Disease Control and Prevention (CDC), the Office of the National Coordinator (ONC), and local pregnancy and infectious disease experts, a workflow was designed and implemented within an electronic health record (EHR) to assist providers with clinical decision support and guidance for the care of pregnant female patients and/or sexual partners that may have been exposed to Zika.
- Planning and build was followed by serious testing of all algorithms and possible patient scenarios.
- Education was provided to all intake staff (nursing) and providers of patients impacted by possible Zika exposure, prior to implementation, or “go-live”. Post go-live monitoring was maintained to assure efficacy of build.

Area Located	Country	Date of CDC Inclusion	CDC Current Travel Alert Level	Included in Alert	
North America	Mexico	2.5.16	Alert Level 2: Enhanced Precautions	X	
	United States (Florida)	8.5.16	Alert Level 2: Enhanced Precautions	X	
Central America	Belize	8.5.16	Alert Level 2: Enhanced Precautions	X	
	Costa Rica	3.11.16	Alert Level 2: Enhanced Precautions		
	Guatemala	3.11.16	Alert Level 2: Enhanced Precautions		
	El Salvador	3.11.16	Alert Level 2: Enhanced Precautions		
	Honduras	3.11.16	Alert Level 2: Enhanced Precautions		
	Panama	3.11.16	Alert Level 2: Enhanced Precautions		
	Africa	Cape Verde	2.5.16	Alert Level 2: Enhanced Precautions	X
Southeast Asia	Malaysia (Singapore)	8.30.16	Alert Level 2: Enhanced Precautions	X	
Pacific Islands	American Samoa	3.11.16	Alert Level 2: Enhanced Precautions		
	Fiji	4.1.16	Alert Level 2: Enhanced Precautions		
	Korae (Federated States of Micronesia)	4.1.16	Alert Level 2: Enhanced Precautions		
	Marshall Islands	3.11.16	Alert Level 2: Enhanced Precautions		
	New Caledonia	3.11.16	Alert Level 2: Enhanced Precautions		
	Papua New Guinea	8.5.16	Alert Level 2: Enhanced Precautions		
	Samoa	3.11.16	Alert Level 2: Enhanced Precautions		
	Tonga	3.11.16	Alert Level 2: Enhanced Precautions		
	South America	Argentina	8.5.16	Alert Level 2: Enhanced Precautions	
		Bolivia	3.11.16	Alert Level 2: Enhanced Precautions	
Brazil		3.11.16	Alert Level 2: Enhanced Precautions		
Colombia		3.11.16	Alert Level 2: Enhanced Precautions		
Ecuador		3.11.16	Alert Level 2: Enhanced Precautions		
French Guiana		3.11.16	Alert Level 2: Enhanced Precautions		

Spreadsheet documentation of tracking countries with known Zika positive patient cases<sup>[2]</sup>. Columns indicate monitoring of the country/area charted within the EHR, the date the CDC qualified it, the current travel alert level, and whether or not it is currently included in the EHR alert.

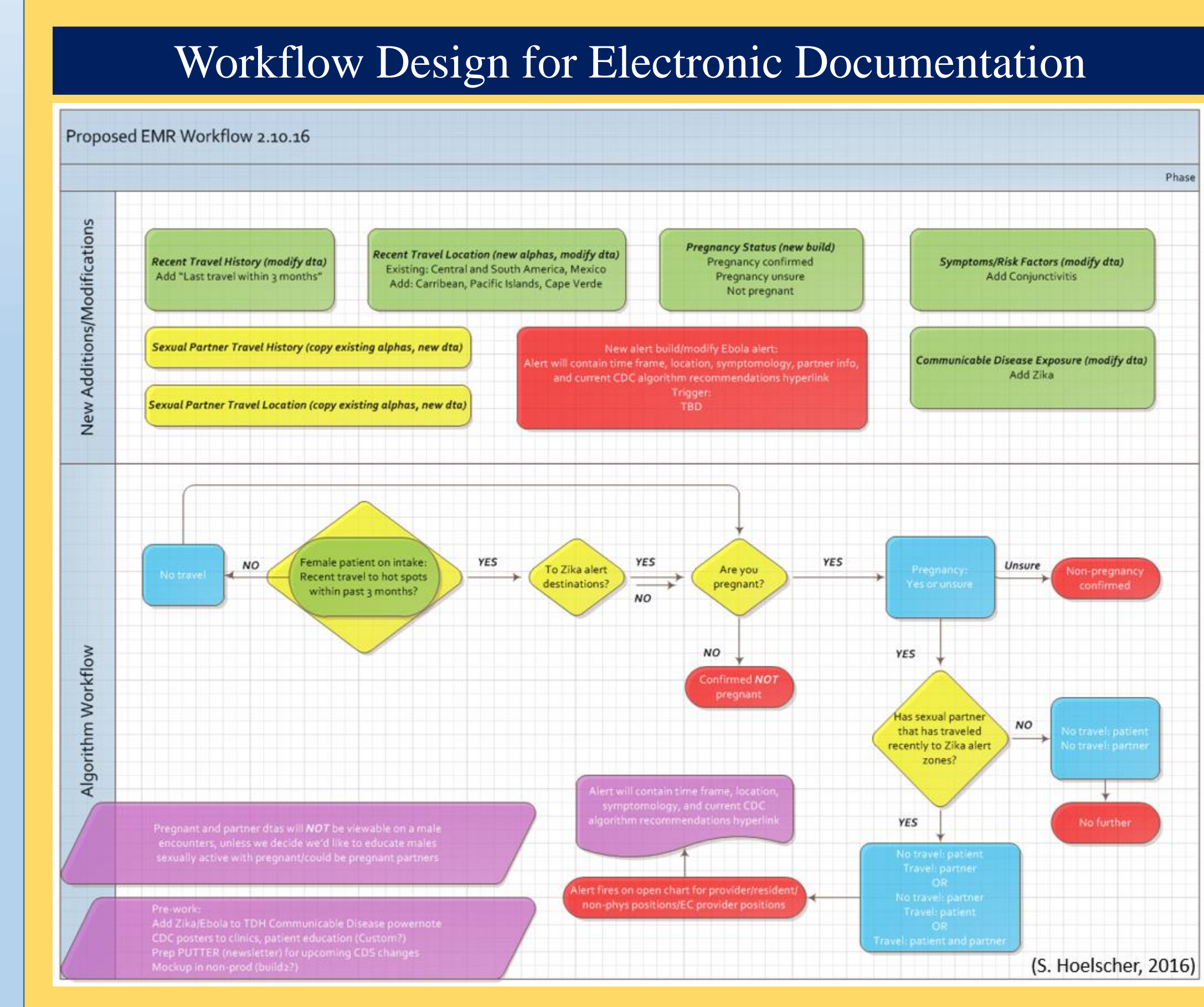
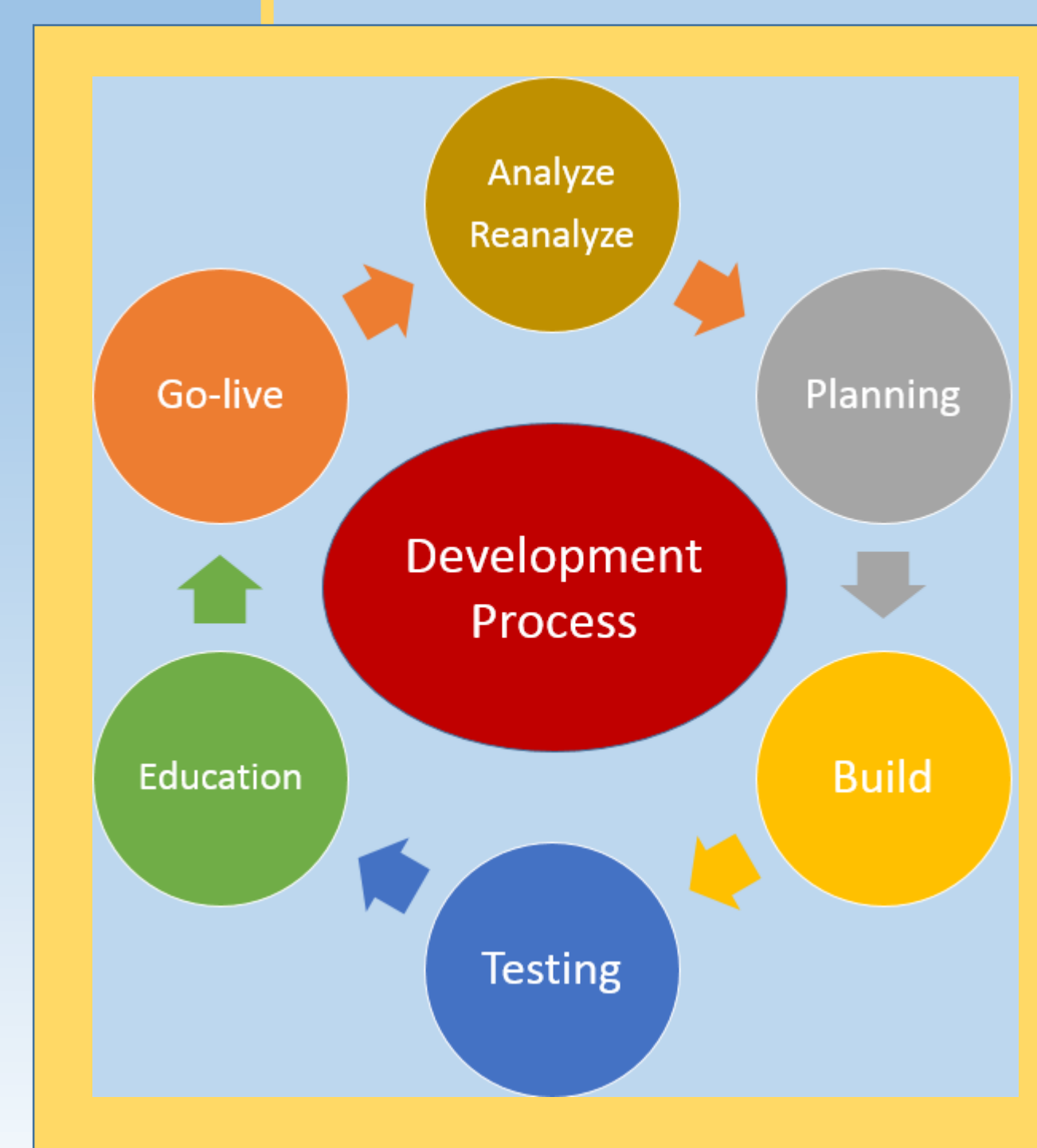
## OBJECTIVES:

- Goal 1: Analyze the technical needs to develop and implement an electronic Zika assessment process within an EHR, based on the most up to date CDC guidelines<sup>[3][4]</sup>
- Goal 2: Rigorously test and adjust new rules and alerts as needed to fine tune process and assure that no potential patients would be missed during the implementation
- Goal 3: Provide nurses and providers up-to-date clinical support and guidance in decision making regarding the care of a patient with potential Zika infection/exposure
- Goal 4: Maintain flexibility in the EHR system for future expansion or changes in recommended guidelines

Limitation Statement: Control group not possible for this project

## TECHNICAL STRATEGY:

- Review current literature and consult with CDC/ONC representatives to finalize clinical needs for patient type, travel, gender, age, exposure, symptomatology as related to Zika<sup>[4]</sup>
- Review CDC recommendations with local subject matter experts to design a process applicable to the West Texas area
- Assess current components already within EHR, including data entry, rules, alerts, education
- Design and build usable and functional clinical decision support system in EHR to aid providers in the testing and care of Zika/possible Zika patient population



### Guidance Alert for Providers

Discern: Open Chart - TPTEST, PATIENT06 (1 of 1)

**Zika Alert**

This alert has fired because your patient may be pregnant, and either the patient or their sexual partner has recently traveled to a location at risk for exposure to the Zika virus.

Your patient reports her pregnancy status as **Pregnant**.

Patient reports Last travel within **7 days**.

Patient reports travel to **Cape Verde**.

The patient reported having the following symptoms: **Conjunctivitis**

CDC recommendations suggest starting with Zika serum testing and follow up with OB for possible ultrasound studies when potential exposure of a pregnant patient has been identified.

Please click "Guidelines" button below to access the CDC Zika Pregnancy website for current recommendations.

### Patient Intake Documentation

#### Symptoms/Risk Factors/Infectious Disease Screen

**Recent Travel History**

No recent travel  
 Last travel within 7 days  
 Last travel within 14 days  
 Last travel within 21 days  
 Last travel within 30 days  
 Last travel within 3 months

**Recent Travel Location**

Africa  
 Canada  
 Cape Verde  
 Caribbean  
 Central America  
 China  
 Indonesia  
 Mexico  
 Middle East  
 Pacific Islands  
 Russia  
 South America  
 United States  
 Western Europe  
 West Africa  
 Other

**Exposure to Tuberculosis**

Yes  
 No

**Communicable Disease Exposure**

Disease	Yes	No
Chickenspox		
Chlamydia		
CMV		
Ebola		
Gonorrhea		
Group B Strep		
HIV		
Hepatitis A		
Hepatitis B		
Hepatitis C		
Hepatitis E		
Hemolytic Uremic Syndrome		
Measles		
Mumps		
Syphilis		
Zika		
Other		

**Symptoms/Risk Factors**

Symptom	Yes	No
Abdominal Pain		
Chills		
Conjunctivitis		
Diarrhea		
Fever		
Headache		
History of Seizures		
Illness With Generalized Rash		
Muscle Pain		
New or Worsening Cough		
Rash/Viral Illness Since Last Menstrual Period		
Recent Exposure to Communicable Disease		
Runny or Stuffy Nose		
Shortness of Breath		
Sore Throat		
Unexplained Hemorrhage		
Vomiting		

**Pregnancy Status**

Pregnant  
 Patient denies  
 Unsure  
 N/A

**Sexual Partner Travel History**

No recent travel  
 Last travel within 7 days  
 Last travel within 14 days  
 Last travel within 21 days  
 Last travel within 30 days  
 Last travel within 3 months

**Sexual Partner Travel Location**

Africa  
 Canada  
 Cape Verde  
 Caribbean  
 Central America  
 China  
 Indonesia  
 Mexico  
 Middle East  
 Pacific Islands  
 Russia  
 South America  
 United States  
 Western Europe  
 West Africa

**Patients suspected of Zika exposure do NOT require extra isolation**

**Zika symptoms are assessed as being with 2 WEEKS after return from affected travel location**

**Select YES for "ZIKA" in the Communicable Disease Exposure field ONLY if the patient is pregnant and already receiving testing and treatment for Zika**

### Testing Information

TEXAS Department of State Health Services Zoonosis Control Branch  
 Chikungunya, Dengue, and Zika Testing Supplemental Information

PLEASE PRINT CLEARLY AND COMPLETE ALL SECTIONS. This information is REQUIRED prior to testing. This form should be included with the specimen(s) and DSHS laboratory submission form(s).

**Submitter or Reporting Jurisdiction**

Person completing form: \_\_\_\_\_ Phone number: \_\_\_\_\_  
 City: \_\_\_\_\_ County: \_\_\_\_\_  
 Local or Regional Health Department representative contacted PRIOR to submitting specimen: \_\_\_\_\_ Agency: \_\_\_\_\_

**Patient's Demographic Information Use MM/DD/YYYY format for all dates**

Last name: \_\_\_\_\_ Is patient pregnant?  Yes  No  N/A  
 First name: \_\_\_\_\_ If YES, please provide at least one of the following:  
 Sex:  M  F Date of birth: \_\_\_\_\_ Estimated delivery date: \_\_\_\_\_  
 Address: \_\_\_\_\_ OR date of last menstrual period: \_\_\_\_\_  
 City: \_\_\_\_\_ Zipcode: \_\_\_\_\_ OR gestational age at illness onset: \_\_\_\_\_  
 County of residence: \_\_\_\_\_ OR oldest gestational age in Zika-affected area: \_\_\_\_\_

**Patient's Illness Information (Check all that apply) Use MM/DD/YYYY format for all dates**

Patient symptomatic?  Yes  No  
 If YES, illness onset date: \_\_\_\_\_  
 Arthralgia  Guillain-Barre Syndrome  Fetal loss  Date: \_\_\_\_\_  
 Conjunctivitis  Headache  Intracranial calcifications  Microcephaly  Other: \_\_\_\_\_  
 Rash  Myalgia  Nausea/vomiting  Other: \_\_\_\_\_

**Patient's (or Mother's for Neonates) Travel History Use MM/DD/YYYY format for all dates**

Did the patient travel outside of residence county in 2 weeks prior to illness onset (or during pregnancy)?  
 Yes  No  Unknown  
 If YES, dates of travel: \_\_\_\_\_ to \_\_\_\_\_  
 County(s), State(s), or Country(s)\* visited: \_\_\_\_\_

**Sexual Partner's Travel History Use MM/DD/YYYY format for all dates**

Did the patient's sexual partner travel to an area of ongoing Zika virus transmission?  
 Yes  No  Unknown  N/A  
 If YES, provide ALL of the following:  
 Date of most recent sexual contact: \_\_\_\_\_  
 Dates of travel: \_\_\_\_\_ to \_\_\_\_\_  
 County(s), State(s), or Country(s)\* visited: \_\_\_\_\_

**Other Epidemiologic Linkages (Check all that apply)**

Household member or other close contact diagnosed with Zika or a Zika-like illness  
 Association in time and place with a person with laboratory evidence of Zika infection  
 Receipt of blood, blood products, or organ/tissue transplant within 30 days of symptom onset  
 Occupational/laboratory exposure location: \_\_\_\_\_

**Additional Testing Performed or Pending at Other Laboratories (Complete all that apply)**

None  Commercial lab  Public health lab

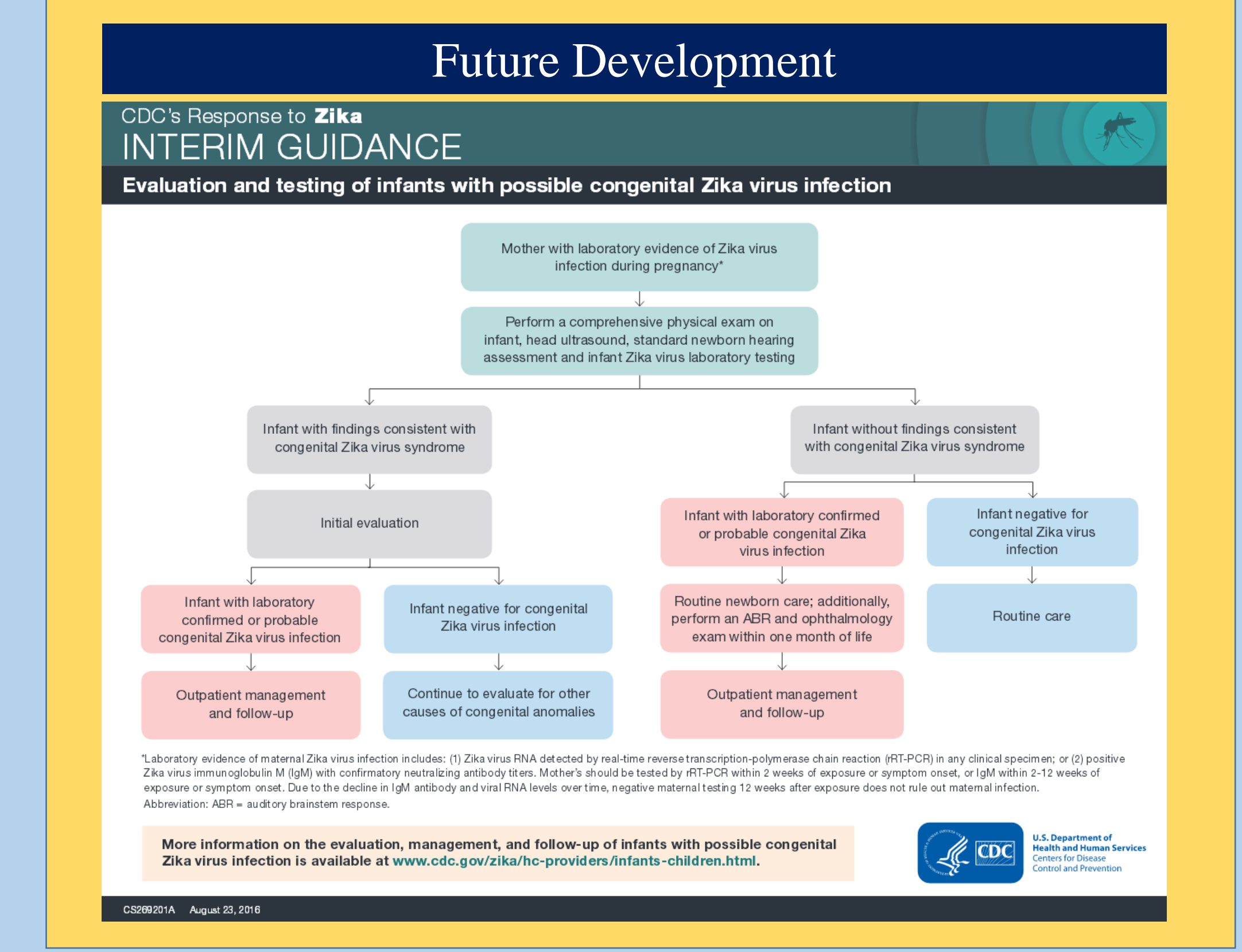
Zika Tests and Results: Chikungunya Tests and Results: Dengue Tests and Results: Other:  
 PCR: \_\_\_\_\_  PCR: \_\_\_\_\_  PCR: \_\_\_\_\_  PCR: \_\_\_\_\_  
 IgM: \_\_\_\_\_  IgM: \_\_\_\_\_  IgM: \_\_\_\_\_  IgM: \_\_\_\_\_

\*See map/list of affected areas: www.cdc.gov/zika www.cdc.gov/dengue www.cdc.gov/chikungunya  
 Rev. 09-09-16

Example of paper orders for Zika testing, as recommended by the Center for Disease Control and Prevention (CDC.gov, 2016).

## VALIDATION and RESULTS:

- After build of an alert and education system for providers in the EHR, the build/rules/alerts were tested and validated for accuracy within many scenarios.
- The importance of inclusion or exclusion of certain patient populations was paramount to making the system work efficiently, while also not contributing to “alert fatigue”, a problem with which providers already struggle significantly. The starts by assessing all patients, then starts excluding patients that are not applicable.
- After testing and implementation, the alert’s volume and accuracy was monitored continuously for four months. After which the monitoring was continued intermittently.
- The process was found to have assisted providers in identifying the first travel related Zika case in a pregnant patient in Lubbock County.



## CONCLUSION:

- There are still many unanswered questions as to how this will impact women’s health in the future.
- Ultimately, the fetus is the one most impacted by the infection. But as the mother is the fetal caretaker, currently there is significant concern for women who are or who may become pregnant.
- The inclusion of education regarding effective safe sex and birth control methods, travel information, and mosquito bite prevention becomes preponderant. This applies to both males AND females.
- Currently we are revamping the process to start including not only pregnant women, but also any female of child-bearing age, males, and infant and children, according to CDC guidelines.
- Automation of the laboratory ordering process

## REFERENCES:

1. *About Zika* (2016). CDC.gov. Retrieved 5 October, 2016, from <http://www.cdc.gov/zika/about/index.html>
2. *Areas with Zika*. (2016). CDC.gov. Retrieved 15 August 2016, from <http://www.cdc.gov/zika/geo/index.html>
3. Oduyebo, T., Igbino, I., Petersen, E. E., Polen, K. N. D., Pillai, S. K., Ailes, E. C., ... Honein, M. A. (2016, July 29). *Update: Interim guidance for health care providers caring for pregnant women with possible Zika virus exposure. Morbidity and Mortality Weekly Report, 65*(29), 739-744.
4. *Zika virus: For healthcare providers*. (2016). CDC.gov. Retrieved 15 August 2016, from <http://www.cdc.gov/zika/hc-providers/index.html>