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
  - Zika during pregnancy can cause specific birth defects
  - There is NO vaccine or cure for Zika
  - Local mosquito-borne Zika virus transmissions has been reported in the continental United States[1]
  - Zika can be transmitted between sexual partners[3]

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 entry points and 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.

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:
Name:_____ Agency:_____

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

Last name:_____
First name:_____
Sex: ☐ M ☐ F Date of birth: ___/___/____
Address:_____
City:_____Zipcode: _____
County of residence:_____

Is patient pregnant? ☐ Yes ☐ No ☐ N/A
If YES, please provide at least one of the following:
Estimated delivery date: ___/___/____
OR date of last menstrual period: ___/___/____
OR gestational age at illness onset: _____
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-Barré Syndrome
☐ Conjunctivitis ☐ Headache
☐ Fever ☐ Myalgia
☐ Rash ☐ Nausea/vomiting
☐ Other_____

Pregnancy, Fetal, and/or Neonatal Complications:
☐ Fetal loss Date: ____/____/____
☐ Intracranial calcifications
☐ Microcephaly
☐ Other_____

Example of laboratory forms provided for the manual submission of Zika testing (cdc.gov, 2016)

Also includes Dengue and Chikungunya

Note the inclusion of pregnancy and gestational age

ZIKA Affected Countries

Area Located	*Country*	*Date of CDC Inclusion*	*CDC Current Travel Alert Level*	*Included in Alert*
North America			Alert Level 2: Enhanced Precautions	X
	Mexico	2.3.16	Alert Level 2: Enhanced Precautions	X
	United States (Florida)	8.3.16	Alert Level 2: Enhanced Precautions	
Central America		2.3.16		X
	Belize	8.3.16	Alert Level 2: Enhanced Precautions	
	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	2.3.16	Alert Level 2: Enhanced Precautions	X
Southeast Asia				
	Malaysia (Singapore)	8.30.16	Alert Level 2: Enhanced Precautions	
Pacific Islands		2.3.16		X
	American Somoa	3.11.16	Alert Level 2: Enhanced Precautions	
	Fiji	4.1.16	Alert Level 2: Enhanced Precautions	

Example spreadsheet of tracking countries with known Zika positive patient cases[2]. 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[3][4]

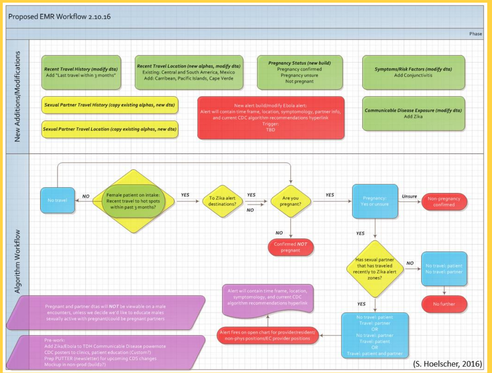
Goal 2: Rigorously test and adjust new rules and alerts as needed to fine tune process and assure that no potential patients would be missed during the implementation

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 virus/exposure

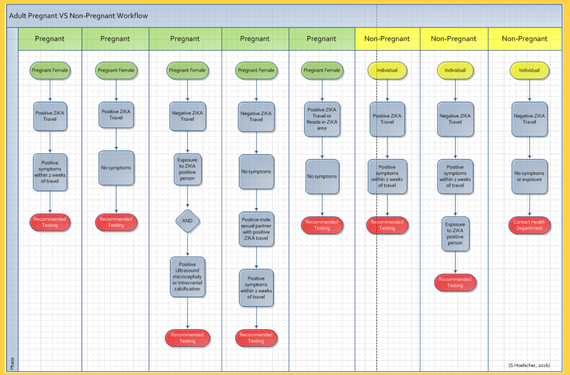
Goal 4: Maintain flexibility in the EHR system for future expansion or changes in recommended guidelines

Limitation Statement: Control group not possible for this project

Original Workflow Design for Documentation



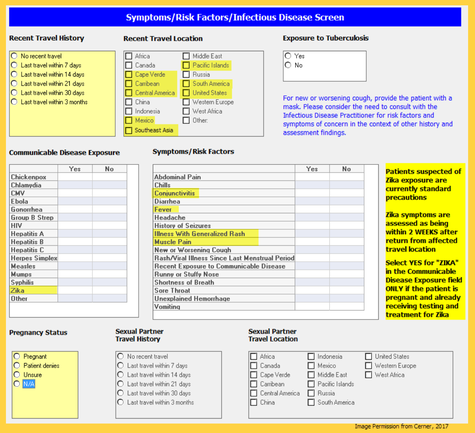
Workflow Possibilities for Female Documentation



TECHNICAL STRATEGY:

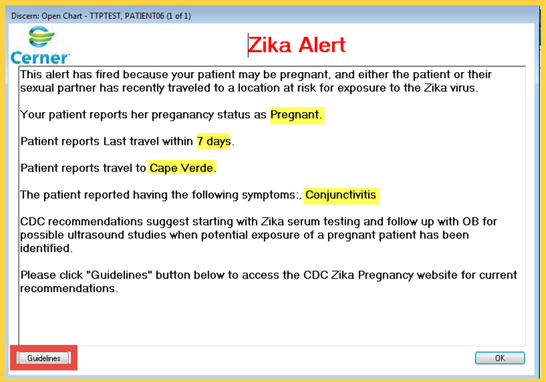
- Reviewed current literature and consulted with CDC/ONC representatives to finalize clinical needs for patient type, travel, gender, age, exposure, symptomology as related to Zika[4]
- Reviewed CDC recommendations with local subject matter experts to design a process applicable to the West Texas area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

Patient Intake Documentation



Example of the intake documentation done at all patient points of entry

Guidance Alert for Providers



Custom rule built to fire when specific criteria have been met from the intake documentation. Once fired, it alerts the provider of what triggered the alert, as well as links to current CDC guidelines, and in the future, specific orders for high risk OB consults, Infectious Disease consults, and Zika laboratory testing.

VALIDATION and RESULTS:

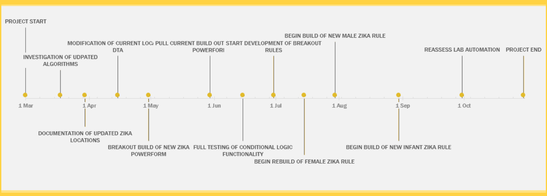
- After build of an alert and education system for providers in the EHR, the build/rules/alerts were tested and validated for accuracy within many scenarios.
- The importance of inclusion or exclusion of certain patient populations was paramount to making the system work efficiently, while also not contributing 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.**

SUCCESS!

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 virus. 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.
- Future plans of laboratory automation and reporting

Phase II Roadmap 2017



DATE	MILESTONE
1-Mar	Investigation of udpated algorithms
15-Mar	Maintenance of current Zika locations
30-Apr	Breakout build of new Zika powerform
15-Jul	Begin rebuild of female Zika rule
30-Sep	Reassess lab automation

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., Igbinosa, 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