



ASPR
ASSISTANT SECRETARY FOR
PREPAREDNESS AND RESPONSE

USG ZIKA RESPONSE UPDATE

Resilient People. Healthy Communities. A Nation Prepared.

Photo credit: CDC/James Gathany

Zika Virus

- Zika virus (ZIKV) belongs to the family Flaviviridae (Dengue, West Nile, Yellow Fever, Japanese encephalitis)
- Brief history
 - First isolated in Zika forest in 1947 with limited human infections in Africa and SE Asia through 2006
 - Emerged in Micronesia in 2007, and French Polynesia in 2008
 - Current outbreak began in Brazil in 2015
 - Currently found in over 60 countries and territories worldwide
 - WHO declared a PHEIC on February 1, 2016
 - HHS Secretary declared a public health emergency in Puerto Rico (8/12)



How Zika Spreads

Most people get Zika from a mosquito bite



More members in the community become infected



A mosquito bites a person infected with Zika virus



The mosquito becomes infected



A mosquito will often live in a single house during its lifetime



More mosquitoes get infected and spread the virus



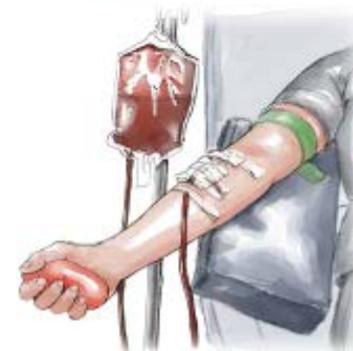
The infected mosquito bites a family member or neighbor and infects them



During pregnancy
A pregnant woman can pass Zika virus to her fetus during pregnancy. Zika causes microcephaly, a severe birth defect that is a sign of incomplete brain development



Through sex
Zika virus can be passed through sex from a person who has Zika to his or her sex partners



Through blood transfusion
There is a strong possibility that Zika virus can be spread through blood transfusions

Congenital Syndrome



- Multi-faceted syndrome with broad-ranging neurological sequelae, unknown long-term health consequences
- Reported in 15 countries throughout North and South America
- As of 8/26, over 1,928 cases reported (1,845 in Brazil)

ASPR/BARDA Priorities

BARDA will work with PHEMCE partners to address medical countermeasure needs for the Zika response both domestically and globally.



Prevent Zika virus infection through new vaccines



Detect acute and previous Zika virus infections through new rapid diagnostics



Ensure a blood supply safe from Zika virus through use of screening tests for donated blood and virus inactivation in blood products



Activate our National Medical Countermeasure Response Infrastructure to help medical countermeasure developers

Priority 1: Prevent ZIKV Infection

There is currently no licensed ZIKV vaccine available, however...



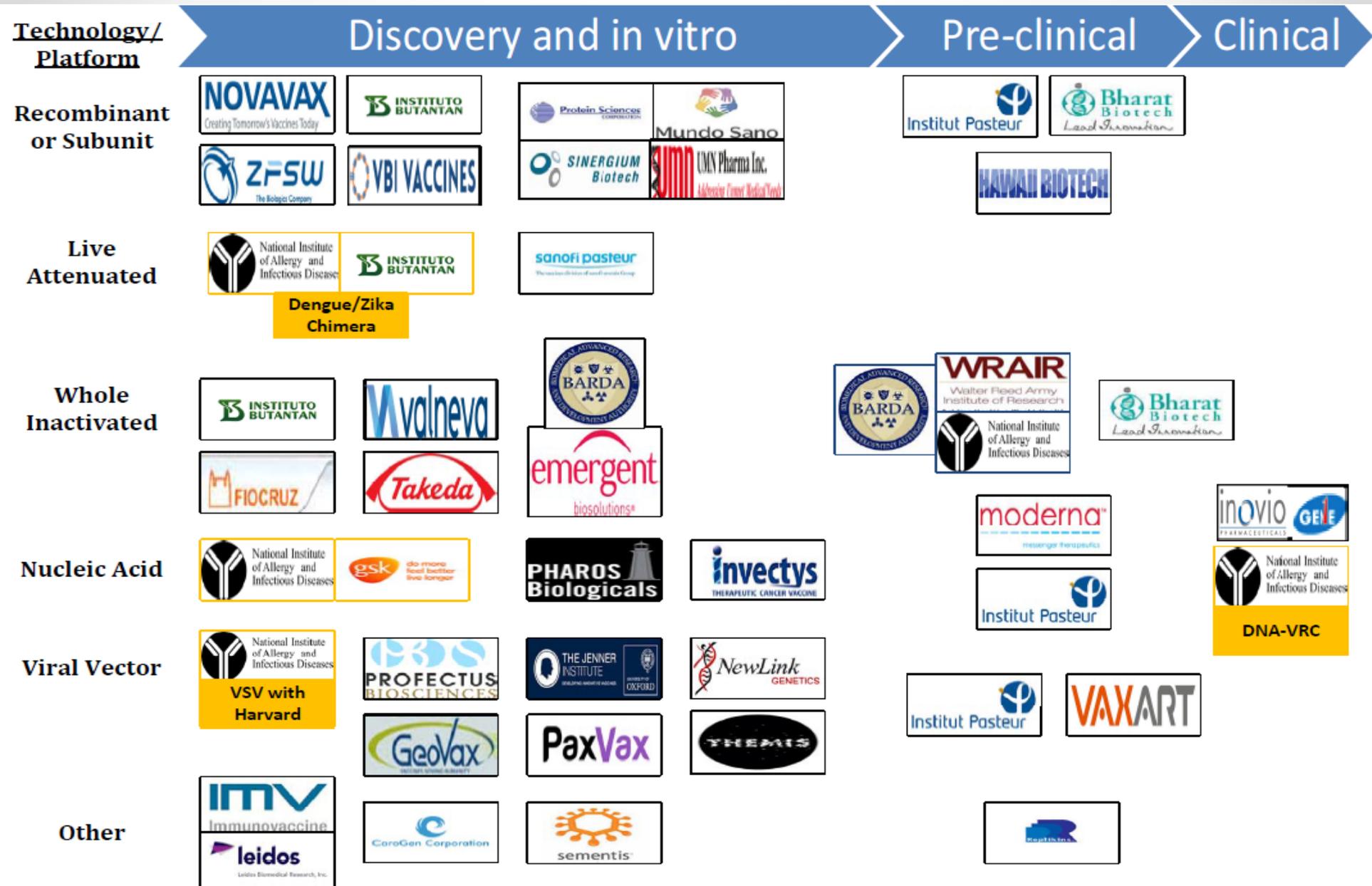
- Vaccine for other flaviviruses have been developed and used for over 70 years
- Active development programs for Dengue and West Nile vaccines have been ongoing for over 30 years, exploring a variety of vaccine platforms to develop vaccines for these flaviviruses
- Experiences gained and vaccine platforms developed for other flaviviruses could be leveraged for ZIKV vaccine development

USG ZIKV Vaccine Goals

- Vaccine Candidate(s) available to address immediate U.S. response needs by 2018
 - Protection of key at-risk populations
 - Potential suppression of transmission in active disease sites
 - Reduction of disease
- Vaccine candidate(s) approved for general use and commercial distribution by 2020
 - Marketed for personal protection and general public health use to control transmission and endemic / epidemic disease
 - Potential for global distribution
 - Broad coverage across age groups
 - Limited contraindications



Zika Vaccines Landscape September 7, 2016



HHS Vaccines in Development

- **DNA vaccine** – based on West Nile vaccine (NIAID/VRC), currently enrolling Phase I, Phase II in Nov/Dec 2016
- **Whole-particle inactivated vaccines**
 - WRAIR/NIAID/BARDA - Phase I in Oct 2016
 - BARDA/Emergent CIADM – Phase I in April 2017
 - BARDA/Takeda – Phase I in Sept. 2017
 - BARDA/Sanofi – Phase I/II in Q12018
- **mRNA vaccines**
 - NIAID/GSK – self replicating replicon RNA
 - BARDA/Moderna – mRNA, Phase I in Dec. 2016
- **Live-attenuated dengue/ZIKV chimeric** – vaccine (for non-obstetric population) – based on NIAID dengue vaccine candidate, collaboration with Butantan
- **Vesicular stomatitis virus (VSV)** – vectored vaccine (Harvard)



Priority 2: Detect Zika Infection

There is currently no FDA-cleared *in vitro* diagnostic for the detection of ZIKV infection, however...



- On February 26, 2016, HHS Secretary declared a potential public health emergency due to ZIKV that allowed FDA to issue an emergency use authorization (EUA) for CDC's Zika IgM Antibody Capture ELISA (Zika MAC-ELISA)
- Declaration allows FDA to issue additional EUAs for commercial tests that meet specific criteria for performance validation

HHS Zika Diagnostics Strategic Goals

- Expand testing capacity in public health/LRN and commercial laboratories
- Advance the development of more specific and sensitive tests for use in the U.S. and elsewhere
- Provide reagents (viruses, antigens, clinical samples) and reference panels for test development and validation
- Develop high throughput assays to detect Zika virus in the blood supply
- Define and communicate to developers the FDA regulatory pathways for Zika assays



Zika Diagnostic Assays

Indication	Diagnostic Technology	Useful Period (Post Disease Onset)	# EUA's/INDs Today	BARDA Role
Identify persons with active Zika infection (active symptoms)	Molecular (PCR-like) tests	Up to 7 days (Blood) Up to 14 days (urine)	CDC and 6+ commercial	Validation Panels
Identify persons previously infected with Zika virus, particularly women infected during pregnancy.	Serologic/Antibody (IgM & IgG) tests	~3 days to >> 3months	2 CDC and InBios	ARD funding, validation panels
Ensure safety of the blood supply.	Molecular assays, high-throughput platforms	Active infection in asymptomatic individuals	2 Roche Hologic	ARD funding, validation panels

FDA Zika EUA's & IND's

Molecular Test EUA	
Organization	Test name
CDC	CDC Triplex Real-time RT-PCR Assay
Quest Laboratories/ Focus Diagnostics,	Zika Virus RNA Qualitative Real-Time RT-PCR
Altona Diagnostics GmbH	RealStar Zika Virus RT-PCR Kit U.S.
Hologic, Inc.	Aptima Zika Virus assay
Viracor-IBT Laboratories, Inc.	Zika Virus Real-time RT-PCR Test
Siemens Healthcare Diagnostics Inc.	VERSANT® Zika RNA 1.0 Assay (kPCR) Kit
Luminex Corporation	xMAP® MultiFLEX™ Zika RNA Assay
Roche Molecular Systems, Inc	xMAP® MultiFLEX™ Zika RNA Assay
Vela Diagnostics USA, Inc	Sentosa® SA ZIKV RT-PCR Test

Serologic Test EUA	
Organization	Test Name
CDC	CDC Zika Immunoglobulin M (IgM) MAC-ELISA
InBios International	Zika Detect™ IgM Capture ELISA
Blood Screening IND's	
Organization	Test Name
Roche Molecular Systems, Inc.	cobas® Zika test
Hologic, Inc.	Procleix Zika virus blood screening assay



BARDA Zika Diagnostic Portfolio

	Company	Serology Test name	Award date	Test Type	Platform	EUA
Laboratory	InBios International Inc.	Zika Detect™ IgM Capture ELISA	July 2016	IgM ELISA	Manual	✓
	Diasorin, Inc.	LIAISON Zika Virus IgM and IgG assays	Aug. 2016	IgM/IgG*	Liason XL HT automated	
POC	ChemBio Diagnostics Inc.	DPP® Zika IgM/IgG Assay	Aug. 2016	IgM/IgG*	Lateral flow + Micro Reader	
	OraSure Technologies Inc.	OraQuick® Zika Test	Aug. 2016	IgM/IgG*	Lateral flow	



BARDA Zika Blood Screening Portfolio

Company	Test name	Award Date	Platform	Regulatory Status
Roche Molecular Systems, Inc.	cobas® Zika test	April 2016	cobas® 6800/8800 Systems	IND March 31
Hologic, Inc.	Procleix Zika virus blood screening assay.	Aug. 2016	Panther	IND June 17



Priority 3: Secure and Protect Blood Supply

- Unexpected involvement in movement of blood products to Puerto Rico (PR)
- Assist in development of pathogen reduction technologies (PRT) for processing of blood products

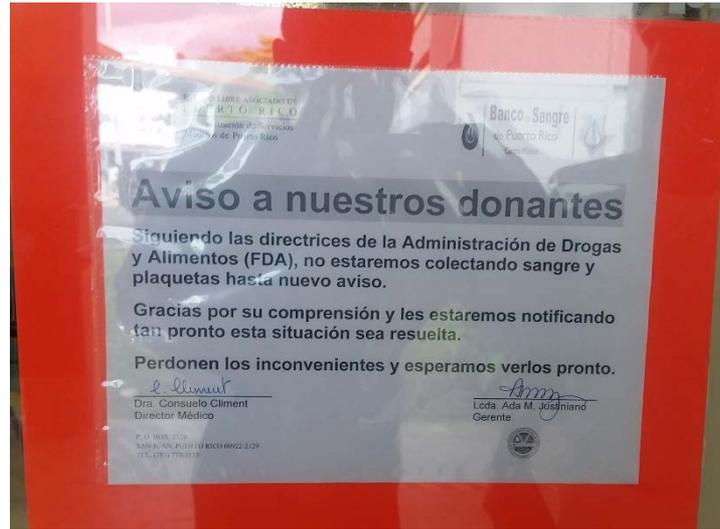
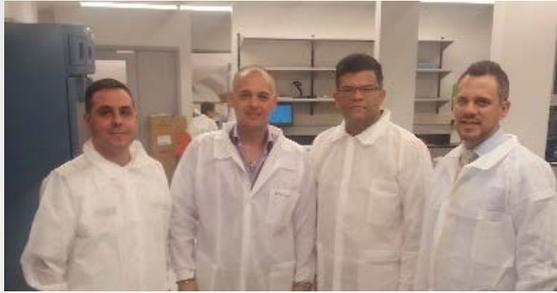


Puerto Rico Blood Supply



- FDA halted collection of blood on March 5
- ASPR worked closely with OASH, FDA, and CDC to deliver blood products from continental US to PR
- Awards were made on March 2 to ARC and BCA
- Deliveries began on March 5 with BARDA & OEM personnel on the ground to ensure delivery & distribution to 11 blood centers in PR
- March 30, FDA approved Roche IDE for blood screening assay
- Allowed blood collections to resume in PR
- ASPR/BARDA supported screening under Roche IDE to validate assay with samples from PR
- Deliveries halted in April

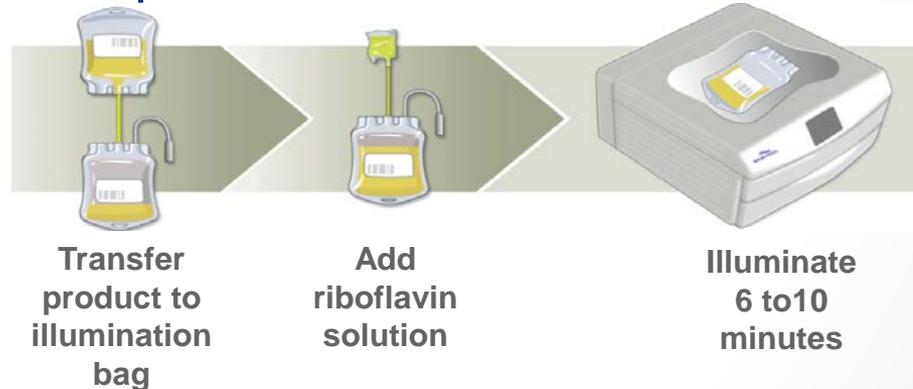
Puerto Rico Blood Supply



Pathogen Reduction Systems

■ Terumo

- Mirasol pathogen reduction system for whole blood
- Already in use in Europe – has CE mark in 16 countries
- Portable/deployable
- Rapid processing time
- BARDA funding use for platelets



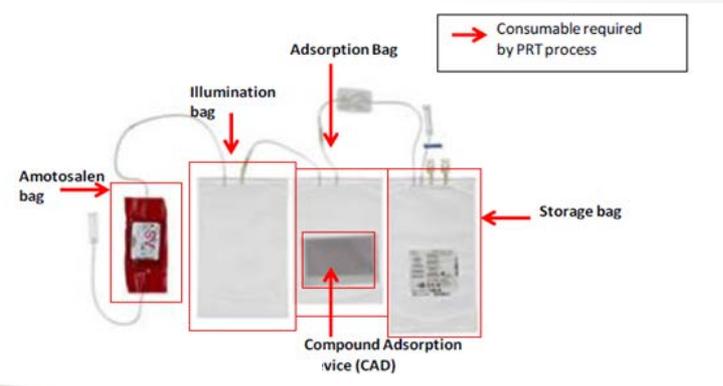
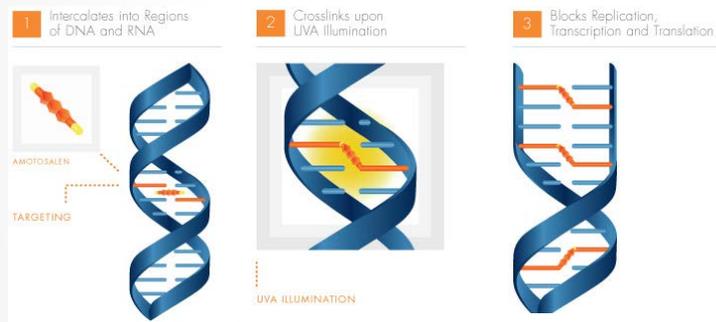
Split as needed[‡]

Transfuse or store for up to 5 days

Pathogen Reduction Systems

- Cerus Corp

- Intercept System approved in US for pathogen reduction of plasma and platelets
- BARDA working with FDA and Cerus to support expansion of use for RBCs



INTERCEPT
BLOOD SYSTEM
PATHOGEN REDUCTION SYSTEM





Boston Globe
Silvia Izquierdo/AP