Research Priorities to Inform Public Health and Medical Practice for Domestic Zika Virus: A Workshop

February 16, 2016

National Academy of Sciences - Auditorium
2101 Constitution Ave NW
Washington, DC 20418

Background:
Zika virus, a single-stranded RNA virus of the Flaviviridae family, transmitted to humans primarily through the bite of an infected Aedes species mosquito, is endemic to parts of Africa and Asia, and has recently spread to South and Central America, and the Caribbean. In the Americas, the Zika virus first emerged in Brazil in 2015 and has since spread rapidly across the region, with local transmission in at least 26 countries in South and Central America, Mexico, and the Caribbean, including the U.S. Virgin Islands and Puerto Rico. Given the rapid spread of Zika virus throughout the Americas and the presence of its vector mosquito species within parts of the U.S., there is need to better define the risks associated with this emerging virus.

Although an estimated 80% of people infected with the Zika virus never develop signs or symptoms, and symptoms for those that do are usually mild—rarely requiring hospitalization—there is a growing concern about the association between Zika virus infection in pregnant women and babies born with microcephaly and other severe neurodevelopmental birth defects. Questions have also been raised about the potential link between Zika virus infection and Guillain Barré Syndrome (GBS), a neurologic syndrome that manifests with weakness or paralysis.

There is an urgent need for additional research to better characterize the Zika virus, especially those issues related to means of transmission and infection during pregnancy. Additional epidemiologic, entomologic, and virology research of the Zika virus under real-world conditions could provide a more robust evidence base to inform medical and public health efforts to protect those at-risk. Such research could also provide much needed answers to questions about health risks and appropriate public health and medical interventions.

This workshop will bring together key stakeholders and experts to discuss the research priorities needed to inform medical and public health practice that can be implemented under real world conditions to better understand the true risk that Zika virus poses to the public in the U.S. and adequate prevention efforts and interventions to mitigate that risk.

Workshop Objectives:
The workshop will bring together key stakeholders and experts to identify, discuss, and explore:

1. Key factors to reduce the likelihood of local transmission of Zika virus in the U.S. (e.g., epidemiological characteristics; virus vectors and reservoirs; disease pathogenesis and consequences of infection; and clinical management and public health interventions and strategies);
2. Areas of insufficient knowledge related to the key factors and prevention strategies;
3. Research questions of specific concern (e.g., establishing causality or the absence of causality between Zika virus and microcephaly); and
4. Critical communication needs of evidence-based information for public health officials, providers, and the general public regarding the level of risk and associated risk factors; transmissibility of the virus; associated health consequences; and the measures and strategies that should be taken to minimize the number of infections and prevent spread of Zika virus in the U.S.

NOTE: Breakfast and Lunch* will be on your own. Coffee will be available in the morning and at the afternoon break
*Confirmed Breakout Group participants will receive a boxed lunch (See Registration Staff for Details)
SESSION I: Opening Remarks and Workshop Introduction

8:30 a.m. Welcome to the Academies

Bruce B. Darling
Executive Officer
National Academies of Sciences, Engineering, and Medicine

8:35 a.m. Zika Virus: Once Again Unprepared

Victor J. Dzau
President
National Academy of Medicine

8:50 a.m. Workshop Objectives and Introductions

Mary E. Wilson, WORKSHOP CO-CHAIR
Adjunct Professor, Harvard T.H. Chan
School of Public Health
Visiting Professor, Epidemiology and
Biostatistics, School of Medicine
University of California, San Francisco

9:00 a.m. Charge to Participants

Nicole Lurie
Assistant Secretary for Preparedness and Response
U.S. Department of Health and Human Services

SESSION II: An Emerging Infectious Disease: Zika Virus Update

Session Objective:
- Discuss what is known about the epidemiological characteristics; reservoirs and vectors; disease pathogenesis, clinical management and public health interventions; and prevention strategies associated with the emergence of Zika Virus within the U.S.

9:15 a.m.- Panel 1: Epidemiological Characteristics
9:45 a.m. During this panel, speakers will address such topics as the epidemiology, origin and spread of the virus; the nature and incidence of complications; the role of travelers in transporting the virus; non-vector modes of transmission and disease surveillance.

Presenters: Ronald Rosenberg, Acting Director, Division of Vector-Borne Diseases, National Center for Emerging and Zoonotic Infectious Diseases, CDC

Marcos A. Espinal, Director, Department of Communicable Disease and Health Analysis, Pan American Health Organization (PAHO)

Audience Q/A
9:45 a.m.-10:30 a.m.  **Panel 2: Virus Vectors and Reservoirs**  During this panel, speakers will address vector competence, vector distribution, and vector control strategies; potential reservoir hosts; and weather and other climate effects.

Speakers:  
**Scott C. Weaver**, John Sealy Distinguished University Chair in Human Infections and Immunity, University of Texas Medical Branch  
**Thomas P. Monath**, Chief Scientific & Chief Operating Officer, BioProtection Systems/NewLink Genetics Corp. (*via WebEx*)  
**Duane J. Gubler**, Professor and Founding Director, Signature Research Program in Emerging Infectious Disease, Duke-NUS Graduate Medical School (*Due to technical difficulties, Scott Weaver presented Dr. Gubler’s slides*)

Audience Q/A

10:30 a.m.-11:15 a.m.  **Panel 3: Disease Pathogenesis and Consequences of Infection**  During this panel, speakers will address areas of: viral genetics, evolution, structure, and replication; and viral disease pathogenesis, complications, immune responses, virus clearance/persistence, and animal models.

Speakers:  
**Richard J. Kuhn**, Professor and Head, Department of Biological Sciences, Director, Purdue Institute for Inflammation, Immunology, and Infectious Diseases, Purdue University  
**Michael Diamond**, Professor, Departments of Medicine, Molecular Microbiology, Pathology & Immunology, Head, Division of Infectious Diseases and Vaccine Development Center for Human Immunology and Immunotherapy Programs Washington University School of Medicine (*Via WebEx*)  
**William J. Britt**, Charles A. Alford Professor of Pediatrics, Department of Pediatrics, University of Alabama School of Medicine (*Via WebEx*)

Audience Q/A

11:15 a.m.-11:45 a.m.  **Panel 4: Clinical Management and Public Health Interventions**  During this panel, speakers will address the spectrum of disease in adults, children and infants; evidence for microcephaly and other congenital anomalies; diagnostic strategies; and cross reactivity. Clinical management and potential prevention strategies will also be discussed.

Speakers:  
**Albert I. Ko**, Chair, Epidemiology of Microbial Diseases, Yale University School of Public Health  
**Laura Elizabeth Riley**, Director, Obstetrics and Gynecology Infectious Disease, Massachusetts General Hospital

Audience Q/A

11:45 a.m.  **Preparing for Breakout Sessions: Charge to Attendees**  
**Diane E. Griffin**, Workshop Co-Chair  
Vice President, U.S. National Academy of Sciences  
Professor, Johns Hopkins Bloomberg School of Public Health

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12:00 p.m.-12:30 p.m.  **On-Your-Own-Lunch**  
*There is a cafeteria located on the lower level of the NAS building*  
*Confirmed Breakout Group participants will receive a boxed lunch (See Registration Staff for Details)*
SESSION III: Breakout Discussions

Session Objectives:
- Identify areas of insufficient knowledge and priorities for research related to the epidemiological characteristics; virus vectors and reservoirs; disease pathogenesis and consequences of infection; and the clinical management and public health interventions associated with Zika virus

NOTE: Participants should ONLY attend the breakout session they selected during online registration as indicated on their badge. Participants not registered for a breakout session may view by simulcast the Clinical Management and Public Health Intervention Session in the NAS Auditorium.

12:30 p.m. – 3:00 p.m.

Breakout #1: Epidemiological Characteristics (Room: NAS 250)

Facilitator: Andrew T. Pavia, George and Esther Gross Presidential Professor, Chief, Division of Pediatric Infectious Diseases, University of Utah

Discussant: Sonja A. Rasmussen, Director, Division of Public Health Information and Dissemination, Editor-in-Chief, Morbidity and Mortality Weekly Report, Center for Surveillance, Epidemiology, and Laboratory Services, Office of Public Health Scientific Services, CDC

Ronald Rosenberg, Acting Director, Division of Vector-Borne Diseases, National Center for Emerging and Zoonotic Infectious Diseases, CDC

Rapporteur: Scott Wollek, Program Officer, Institute of Medicine

Breakout #2: Virus Reservoirs and Vectors (Room: NAS Board Room)

Facilitator: David Lakey, Associate Vice Chancellor for Population Health, The University of Texas System

Discussants: Scott C. Weaver, John Sealy Distinguished University Chair in Human Infections and Immunity, University of Texas Medical Branch

Stephen Higgs, Associate Vice President for Research, University Distinguished Professor, Diagnostic Medicine and Pathobiology, Kansas State University; Editor-in-Chief, Vector-Borne & Zoonotic Diseases

Thomas W. Scott, Distinguished Professor and Director, Vector-Borne Disease Laboratory, Department of Entomology and Nematology, University of California, Davis (via conference call)

Rapporteur: Lisa Brown, Program Officer, Institute of Medicine

Breakout #3: Disease Pathogenesis and Consequences of Infection (Room: NAS 125)

Facilitator: Diane E. Griffin, Vice President, U.S. National Academy of Sciences, University Distinguished Service Professor, W. Harry Feinstone Department of Molecular Microbiology and Immunology, Johns Hopkins Bloomberg School of Public Health

Discussants: Kristen Bernard, Associate Professor, Virology, University of Wisconsin School of Veterinary Medicine

Nikos Vasilakis, Associate Professor, Pathology, University of Texas Medical Branch

Rapporteur: Erin Balogh, Senior Program Officer, Institute of Medicine
Breakout #4: Clinical Management and Public Health Interventions (Room: NAS 120)

Facilitator: **Lynn R. Goldman**, Michael and Lori Milken Dean of Public Health, Milken Institute School of Public Health

Discussants: **George R. Saade**, Jennie Sealy Smith Distinguished Chair, Chief of Obstetrics & Maternal-Fetal Medicine, Director, Perinatal Research Division, The University of Texas Medical Branch

**Stephen S. Whitehead**, Senior Associate Scientist, Laboratory of Infectious Diseases, NIAID, NIH

Rapporteurs: **Justin Snair**, Program Officer, Institute of Medicine

3:00 p.m. **BREAK**

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<td><strong>Session Objective:</strong></td>
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<td>• Report back highlights and research priorities identified during the breakout groups</td>
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3:30 p.m. **Breakout Group Reports and Large Group Discussion**

**Breakout #1: Epidemiological Characteristics**  
**Andrew T. Pavia**  
George and Esther Gross Presidential Professor, Chief, Division of Pediatric Infectious Diseases, University of Utah

**Breakout #2: Virus Reservoirs and Vectors**  
**David Lakey**  
Associate Vice Chancellor for Population Health, The University of Texas System

**Breakout #3: Disease Pathogenesis and Consequences of Infection**  
**Diane E. Griffin**  
Vice President, U.S. National Academy of Sciences, University Distinguished Service Professor, W. Harry Feinstone Department of Molecular Microbiology and Immunology, Johns Hopkins Bloomberg School of Public Health

**Breakout #4: Clinical Management and Public Health Interventions**  
**Lynn R. Goldman**  
Michael and Lori Milken Dean of Public Health, Milken Institute School of Public Health

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<th>SESSION V: Other Important Zika Virus Issues– NAS Auditorium</th>
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<td><strong>Session Objective:</strong></td>
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<tr>
<td>• Identify additional research questions and issues deserving immediate research priority</td>
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4:30 p.m. **Large Group Discussion**

**Diane E. Griffin**  
Workshop Co-Chair

**Mary E. Wilson**  
Workshop Co-Chair

5:00 p.m. **Closing Remarks**

**Diane E. Griffin**  
Workshop Co-Chair

**Mary E. Wilson**  
Workshop Co-Chair

5:15 p.m. **ADJOURN**