Global burden of *Aedes* borne diseases in urban environments

Dr Mathieu Bangert
World Health Organization, Geneva

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Major Aedes borne diseases

- Dengue
- Zika
- Chikungunya
- Yellow Fever
Predicted distribution of Ae. aegypti.
Global spread of *Aedes* mosquitos

*Source:* Slide courtesy of WHO/PAHO Arbovirus unit
Global spread of Zika, 1947-2017

80 countries affected globally

Source: PAHO/WHO, BBC, University of Lancaster
Surveillance gap: phylogenetic tracing

From Pacific islands outbreak → Brazil → Honduras → Colombia → Puerto Rico → Caribbean → Florida

Initial detection
Multiple introductions

Source: Worobey et al., Nature 2017
Chikungunya spread and endemicity

Number of cases (confirmed & suspected) in the Americas

<table>
<thead>
<tr>
<th>Year</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>1,094,492</td>
</tr>
<tr>
<td>2015</td>
<td>670,311</td>
</tr>
<tr>
<td>2016</td>
<td>504,103</td>
</tr>
<tr>
<td>2017</td>
<td>184,700</td>
</tr>
</tbody>
</table>

Source: Weaver, NEJM 2015; PAHO/WHO
Brazil yellow fever: WHO warns travellers to Sao Paulo

Source: Peter Salama
Yellow Fever in the Americas, 2015-18

- Suriname: confirmed cases (n=1)
- Ecuador: confirmed cases (n=3)
- Bolivia: confirmed case (n=5)
- Colombia: confirmed and probable cases (n=18)
- Perú: confirmed and probable cases (n=82)
- Brazil: confirmed cases (n=1600)

Since 2017
1098 cases
340 deaths

At risk 2013 (WHO)
At risk 2017 (WHO)

Source: PAHO/WHO
2016 Angola: 3,137 suspected cases, including 345 deaths
2016 DRC: 700 suspected cases, including 63 deaths
2017 Nigeria: 341 suspected cases

Source: WHO Health Emergencies
Delhi faces Dengue fever outbreak

The Indian capital Delhi is in the grip of the most severe outbreak of Dengue fever for five years.

Suspected cases and deaths reported to WHO regions, 2000-2016

Source: who.int/denguecontrol/
Europe: emerging burden

Aedes albopictus - current known distribution – July 2017

Chikungunya - Europe - 2017
Opening date: 15 September 2017
Latest update: 20 October 2017
Since August 2017, both France and Italy have reported autochthonous transmission of chikungunya virus. In France, the Var department is affected; in Italy, the Lazio and Calabria regions reported autochthonous transmission. The two events involve strains of different origin and are therefore not related.

Source: ECDC Stockholm, Eurosurveillance
Africa: endemicity and outbreaks

2015 Kraemer et al

2012 Brady et al
Control of *aedes* borne disease
Previous vector control success


*Source:* Gubler, EID 1998
Arbovirus in the Americas, 2008-2017

Source: PAHO/WHO
Vector control response in the Americas

Zika Warning Spotlights Latin America’s Fight Against Mosquito-Borne Diseases
January 2016, New York Times

Brazil deploys 220,000 troops to battle Zika mosquitoes
February 2016, Associated Press

Source: Getty Images
Sustained vector control is highly cost-effective even in the presence of a targeted and low cost vaccine.
Urban vector control challenges

- Water storage & solid waste
- Surveillance of disease & vector
- Access to community
- Sustainability

Source: Donatas Dabravolskas
Urban vector control approach

• Intersectoral collaborations

• Integrated surveillance
  • Disease
  • Vector
  • Environment
  → Burden estimation

• Locally adapted control and prevention
  • Community/household level
  • Integrate all available tools as applicable
Future concerns

- **Continued unplanned urbanization**
  
  Including deforestation

- **Climate change**
  
  Outbreak intensity and spread

- **Global travel**
  
  Import/export of cases

- **Vector control in health system**
  
  Surveillance and control mechanisms
WHO high level support

Global Vector Control Response

Sustainable Development Goals

who.int/vector-control/publications/global-control-response/

Bangert et al, J Inf Dis Pov 2017
Thank you for your attention

bangertm@who.int
@BangertMat

Dr Raman Velayudhan, Coordinator Global Dengue Control, Vector Ecology and Management

Dr Christopher Fitzpatrick
NTD Health Economics

WHO Department of Control of Neglected Tropical Diseases