

Zika virus: an emerging public health threat in maternal-child health

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Abstract

Climate change, conflict and poor urbanization are reported to be responsible for *Aedes*-linked arboviral diseases mainly increasing Zika and dengue public health threats. Yet, lack data or information on *Aedes*-or transfusion/sexual-linked ZV infections and outcomes remains to be established. A cross-sectional and analytical study was conducted from Feb. 2021 to Sept 2023 to assessed Zika virus (ZV) prevalence and maternal-child health and birth defects in 3 urban zones in Cameroon. Interestingly, in a total of 734 asymptomatic blood samples collected and consented pregnant women clinical data reported varied percent of Zika viral load, and day 1 new born-baby ZV defects. This study revealed that 41.1% of people tested positive to ZV in Douala, 34.7% ZV in Ngaoundere and 19.3% ZV in Yaoundé either through direct or indirect transmission dynamics. Results are discussed in establishing an integrated One health *Aedes*-linked arboviral surveillance and early warning systems to curb the growing threat.

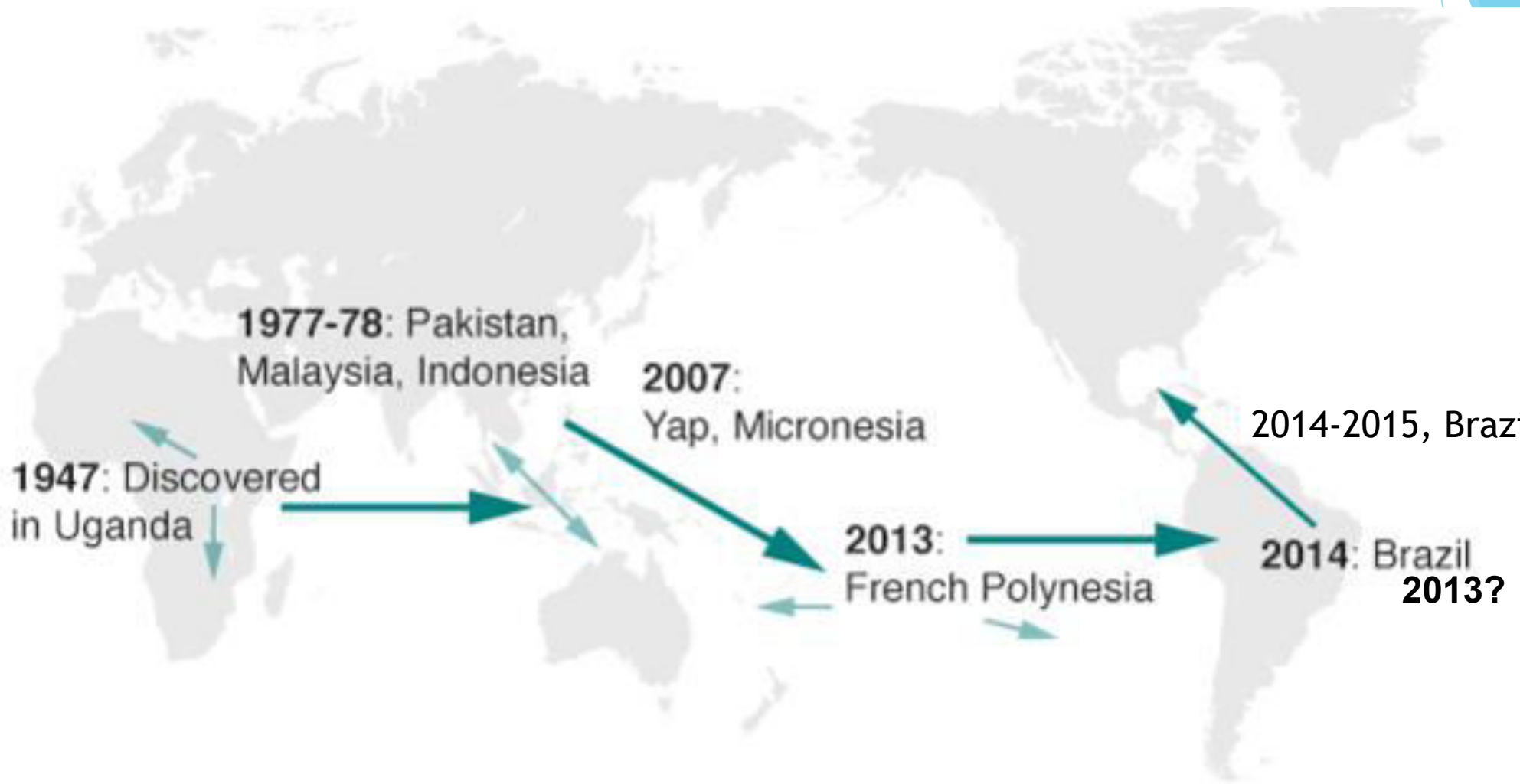
INTRODUCTION

- ▶ **The global emergence and threat of Zika virus (ZIKV) revealed the unprecedented ability for Aedes mosquito-borne virus to cause ZIKV congenital birth defects,** and other arboviruses such as Dengue or chikungunya virus
- ▶ In pregnant women, **Zika infection is linked to microcephaly** – a birth defect in fetus which a baby's head is smaller than expected, **still birth and Guillaume syndrome.**
- ▶ Little is documented across Africa on ZIKV burden, despite a growing body of laboratory **evidence pointing towards higher transmissibility and pathogenicity of the African ZIKV lineage.**
- ▶ There is **no vaccine or treatment** for the Zika virus, and limited research and innovation





Epidemiological distribution of Zika Virus outbreaks

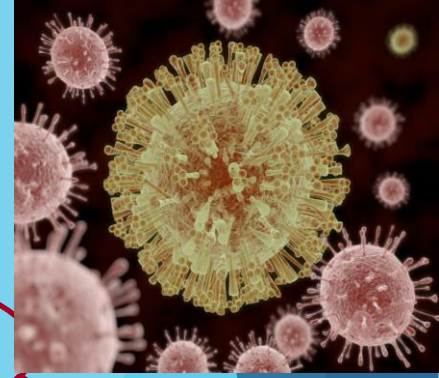


What is already known on at risk populations?



« is Zika virus a threat to woman at reproductive age in Africa...?!»

- Gake et al 2015, reported in 1084 blood donors collected a seroprevalence of 10% and 7.7% in Douala and Bertoua from August to October 2015 in six sites of Cameroon, pointing to the existence of a local (peri-)sylvatic cycle of transmission
- Crooks et al 2021 highlighted both the threat that African-lineage ZIKV poses to pregnant individuals and their infants and the need for epidemiological and translational *in vivo* studies with African-lineage ZIKV



What is already known on at populations?

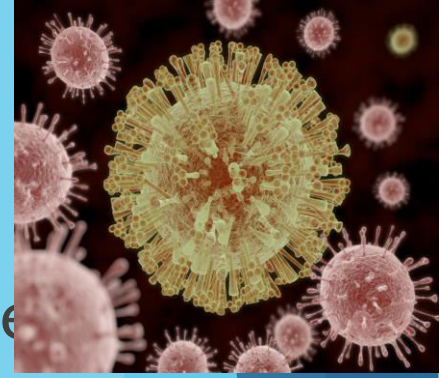
- ▶ In Africa, where both ZIKV and *Ae. aegypti* mosquitoes are present, only one human outbreak was reported in the archipelago of Cape Verde between 2015 and 2017.
- ▶ Major drivers for unprecedented and unplanned urban growth, high motility, climate change and environmental issue, conflict and providing the ideal ecological conditions to increase the *Aedes* mosquito population
- ▶ **Aubry et al 2021** reported that recent African ZIKV strains display higher transmissibility in mosquitoes and higher lethality in both adult and fetal mice than their Asian counterparts Asian strains due to their propensity to cause fetal loss rather than birth defects.
- ▶ Phylogenetic analyses revealed that the ZIKV strains detected in Cape Verde and Angola belonged to the Asian lineage and were probably independently imported from Brazil.
- ▶ So far, the African ZIKV lineage has never been detected outside the African continent and never been associated with epidemic transmission, birth defects or neurological disorders



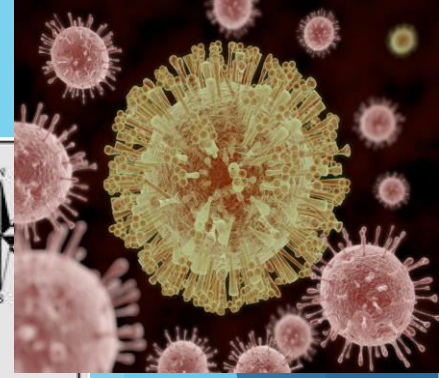
- ▶ Climate change, conflict and poor urbanization as well as ineffective mosquito control and increased travel exchanges of humans and goods are reported to be responsible for *Aedes*-linked arboviral diseases mainly increasing Zika and dengue public health threats.
- ▶ Yet, lack data and information on *Aedes*-or transfusion/sexual-linked ZIKV infections and outcomes maternal-child health remains to be established.

Findings

- ▶ Our entomological findings revealed that of 4289 mosquito larvae collected, had different pattern of *Aedes* species abundance
 - ▶ ***Ae. albopictus* 94.39%** in the urban and **91.69%** peri-urban sites
 - ▶ ***Ae. aegypti* 68.56%**, was the most abundant species in rural settings
 - ▶ ***Ae. Albopictus* 42.51%**, preferred breeding habitats were discarded tires
 - ▶ whereas ***Ae. aegypti* 65.87%**. more prevalent in plastic containers used for storing water



Prevalence of Zika virus in Cameroon

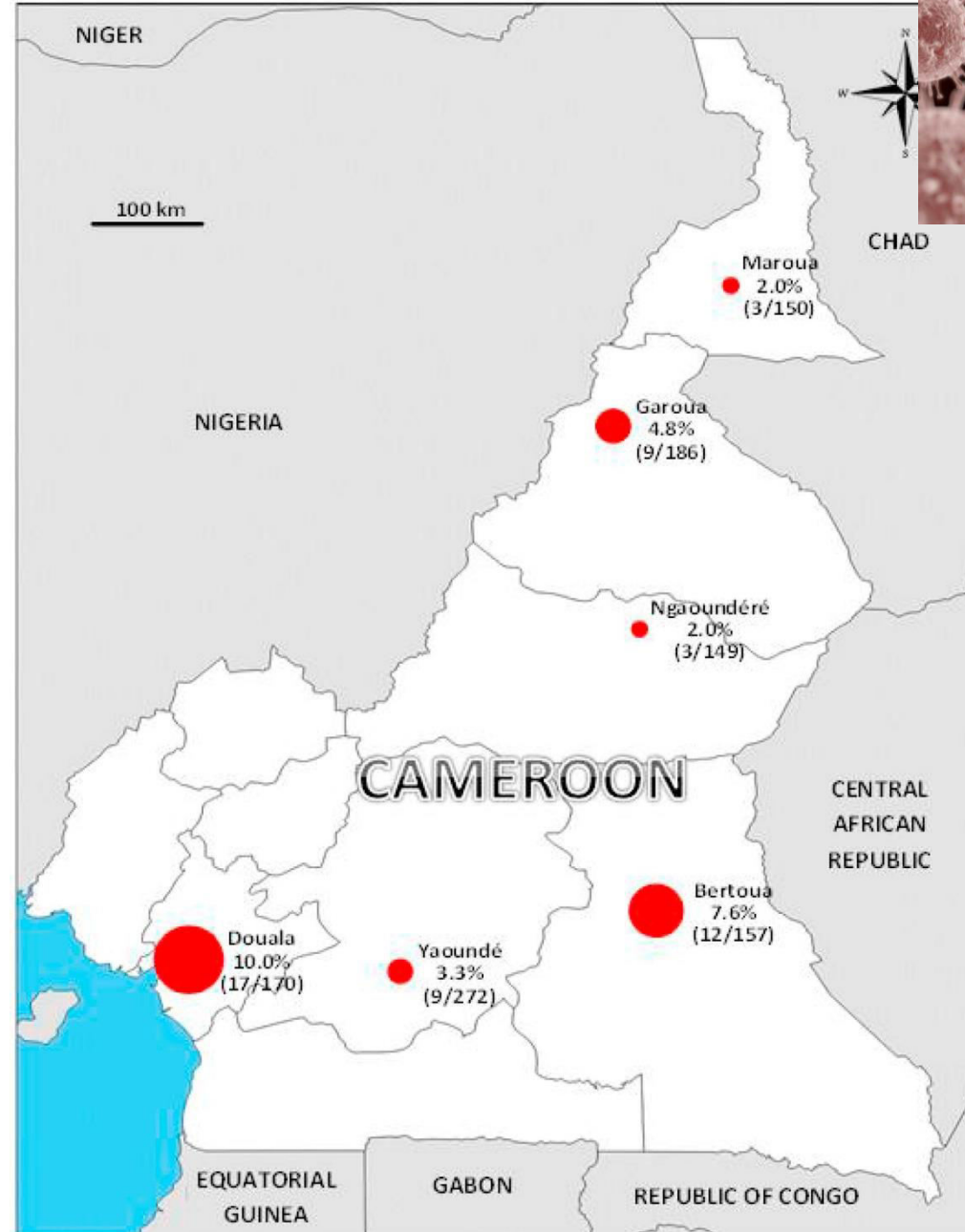


▶ A total of 734 asymptomatic blood samples collected and consented pregnant women clinical data reported varied from 5-17% across region.

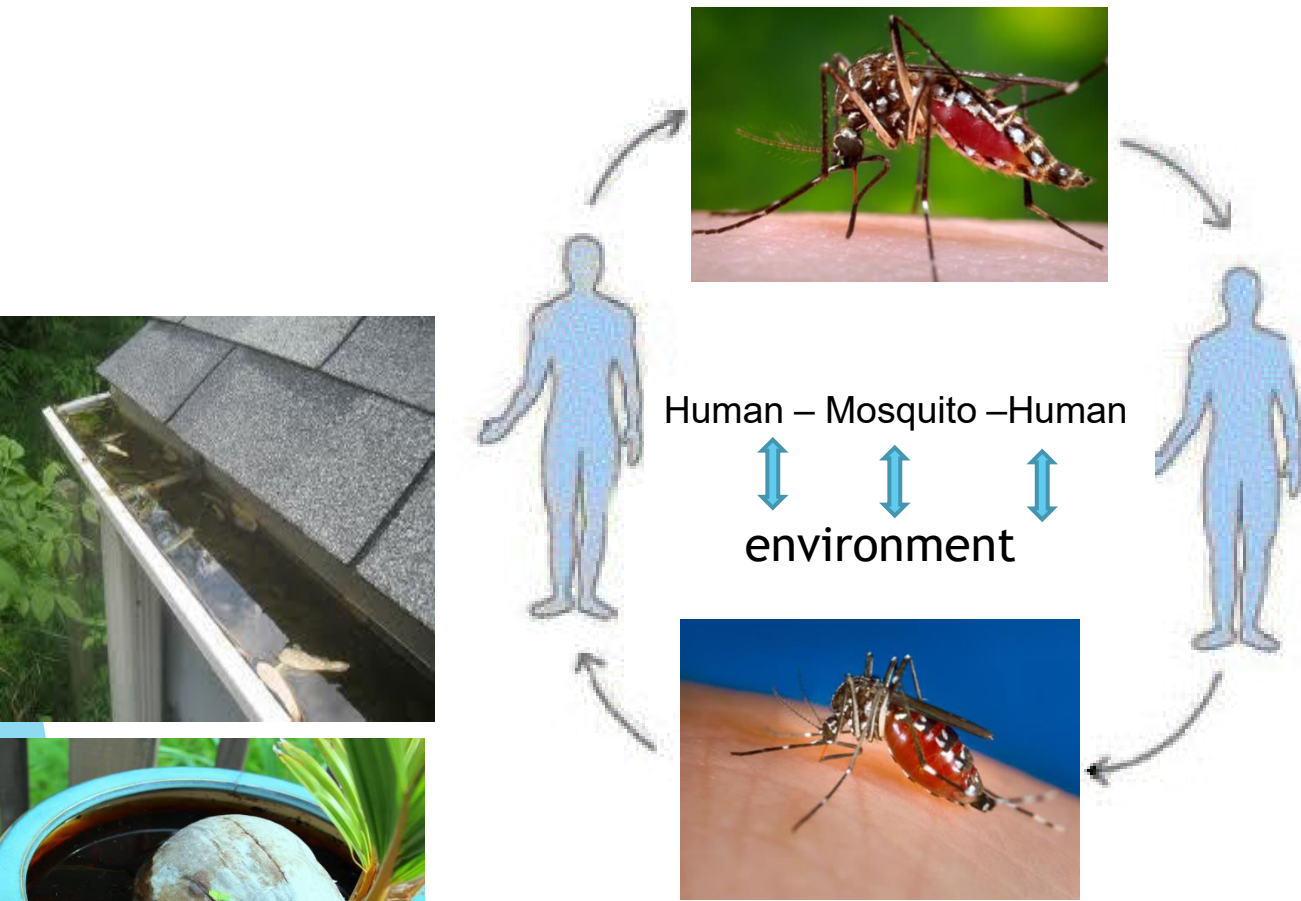
▶ This study revealed that

- ▶ 41.1% of people tested positive to ZV in Douala,
- ▶ 34.7% ZV in Ngaoundere and
- ▶ 19.3% ZV in Yaoundé either through direct or indirect transmission dynamics.

▶ Little is documented on climate change and environment effects, adaptation of the Aedes and virus to urban and rural dwellings



Aedes linked Zika Transmission Cycle and breeding sites



Natural plant containers



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Artificial containers

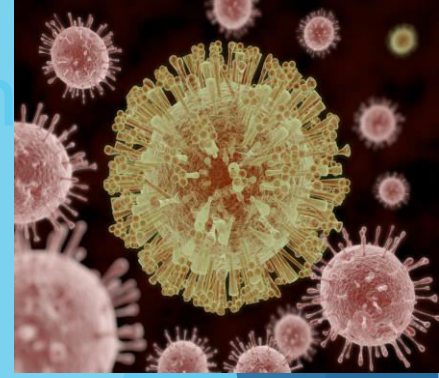
Containers that are filled with rain water



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Documented signs and symptoms in pregnant women



▶ Documented Zika infections signs and symptoms in the studied population

- ▶ fever, 97%
- ▶ rash, 88%
- ▶ joint pain, 96%
- ▶ red eyes, 77%

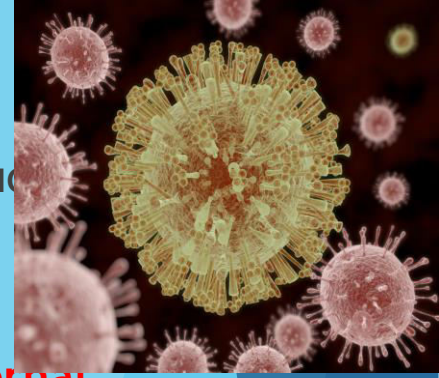
▶ Asymptomatic cases with Zika virus confirmation on blood samples

- ▶ fever, 47%
- ▶ rash, 68%
- ▶ joint pain, 66%
- ▶ red eyes, 57%

Exposure and Symptoms	Timeframe (use condoms or abstain from sex)
traveler to area with Zika, no symptoms	8 weeks
woman has Zika or Zika symptoms	6 months
woman lives in area with Zika, no symptoms	As long as Zika is in the area

Conclusion and Moving forward

- ▶ **Aedes linked Zika virus still a major public health issue** with implications for women of reproductive age due to uncertainty, Zika Virus and fatal pregnancy outcomes
- ▶ **Lessons drawn from the recent COVID-19 and Ebola outbreaks in strengthening Zika and maternal health inclusiveness, health systems resilience approach and effectiveness**
- ▶ **Investing on evidence-based access and uptake of life-saving interventions and strategies** to prevent Zika virus infection in pregnancy in Africa.
- ▶ **Improved counseling about risks to their pregnancies** and their children quality services delivery to affected children and families.
- ▶ **Strengthening health surveillance and preparedness**, and proactive handling of the Zika virus through adequate testing, tracing and case management
- ▶ **Adequate prevention and Vaccine development of a vaccine is essential:** the proactive prevention guidelines set up
- ▶ **Community engagement and participation by all stakeholders:** productive dialogue and reliable information channels



Questions & Answers



Thanks