University of Brasilia

Multisectoral approach for controlling Zika, dengue and chikungunya

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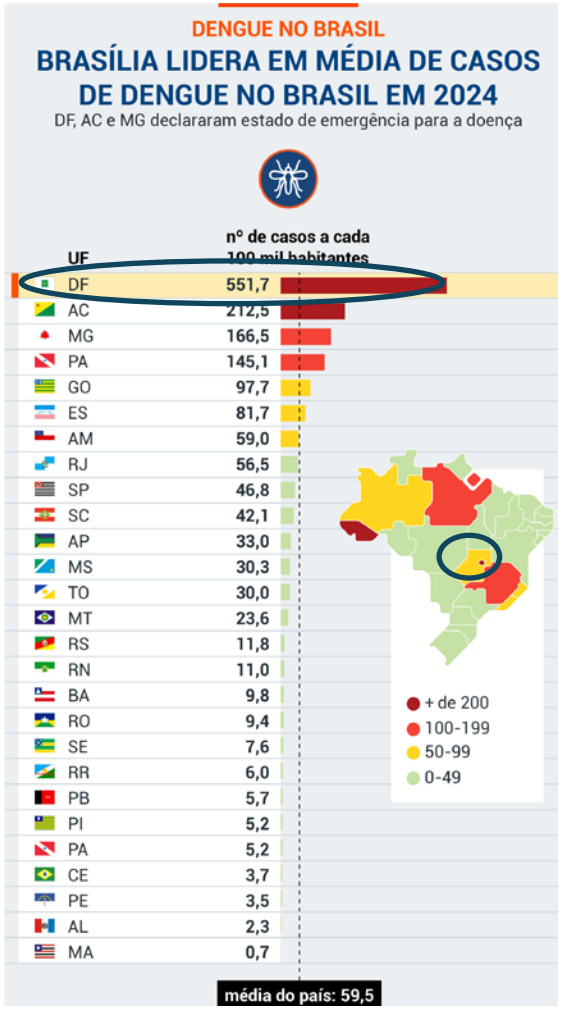
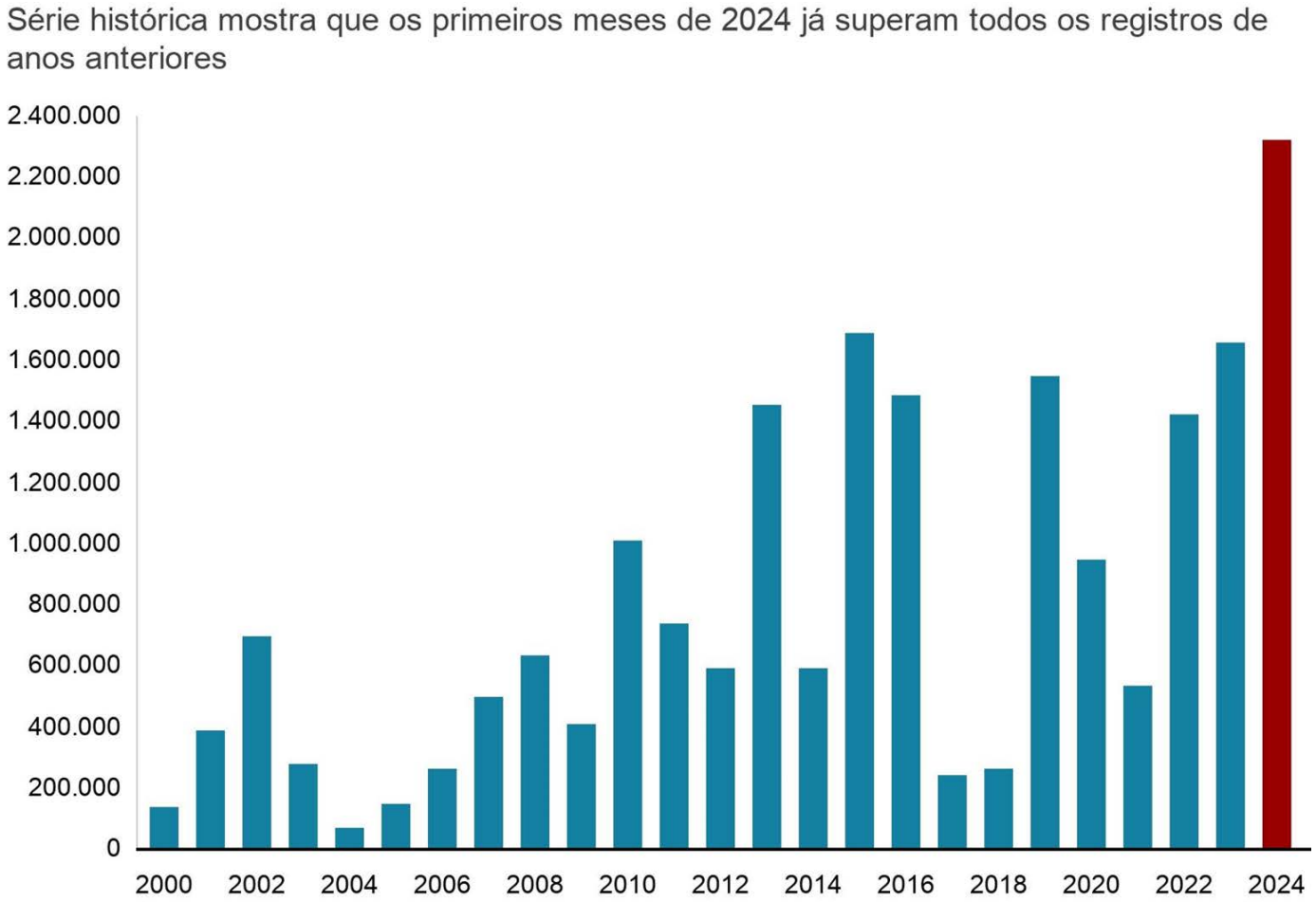
How it all began in Brasilia, Brazil

Dr Vanessa Cruvinel

- **Epidemiologist**; Associate Professor at the University of Brasília.
- Works in areas of **environmental** and **occupational health** with vulnerable people.
- Coordinator of the **Stop, Think and Discard** research programme at the University of Brasilia.
- Coordinator of the international committee **Waste Workers Occupational Health and Safety**-WWOSH from **Workplace Health Without Borders**. http://www.whwb.org/wwosh/

Context: Number of probable cases of dengue in Brazil (2000-March 2024)





https://www.bbc.com/portuguese/articles/ce7x6yn0r90o

Multisectoral approach

The emergence of arboviruses in Brazil has been affected by:

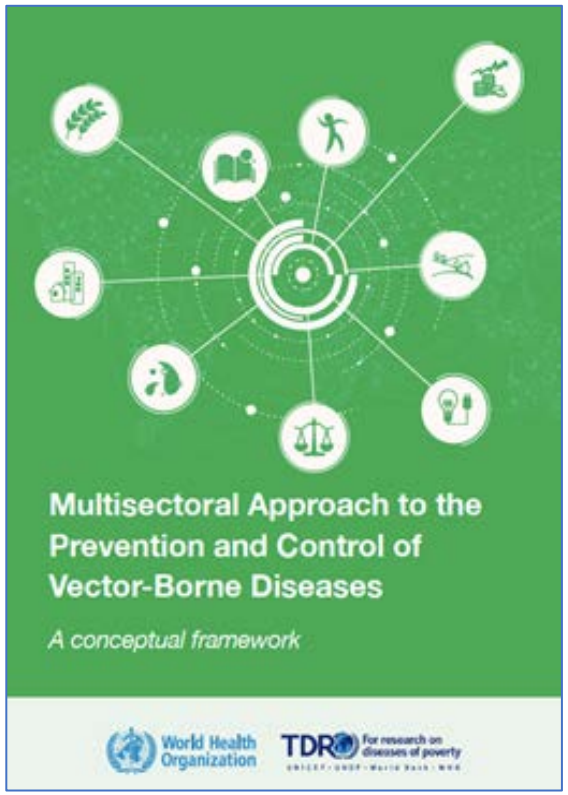
- water and sanitation (discarded tyres and waste)
- poverty (economic situation)
- education
- environment

The project is a collaboration between the following sectors:

- **sanitation**
- **urban services**
- **education**

https://www.slu.df.gov.br/projeto-de-cara-nova-une-consciencia-ambiental-e-combate-a-dengue/
https://www.gov.br/saude/pt-br/campanhas-dasaude/2023/combate-ao-mosquito/dengue-nas-escolas
https://g1.globo.com/saude/noticia/2024/04/16/brasil-passa-por-surto-de-dengue-enquanto-atrasa-metas-de-saneamento-basico-entenda.ghtml

TDR's framework on multisectoral approach



- Guidance on detailed strategies and **programmes involving different sectors** in the prevention and control of vector-borne diseases.
- Case studies supported in collaboration with WHO Teams* showed that **some populations are more vulnerable than others**.
- For the elimination of the diseases, **interventions must adapt and target the most vulnerable**.
- Our plan for 2024-2025 is to investigate **links between extreme poverty and vector-borne disease transmission** in the community of Estrutural City in Brasilia.

* *In collaboration with WHO Teams: WASH, the Department for the Control of Neglected Tropical Diseases and the Global Malaria Programme.*

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TDR-supported projects on multisectoral approach

The highlighted countries conducted projects financially supported by TDR on multisectoral approaches against VBDs.

The University of Brasilia will host a workshop later this month, at which all participating countries will be represented to discuss the results, outcomes, share experiences and plan for next steps.

Estrutural City, Brasília, Brazil

- High prevalence of dengue among waste pickers who live near the open dump and were more exposed.
- Serological and molecular results: 72.8% of dengue

Implementing the multisectoral approach in Brasilia

- Arboviruses are greatly affecting Brazil's population
- Poor people are more vulnerable to being exposed to Aedes Aegypti
- Estrutural City is the poorest region in Brasilia

CRUVINEL, VRN et al. Vector-borne diseases in waste pickers in Brasilia, Brazil. **Waste Management**, v. 105, p. 223-232, 2020;

CASSEMIRO ÉM, et al. Dengue and Chikungunya seroprevalence in waste pickers from the largest Latin American open-air dump. **J Infect.** v. 83(6), p.709-737, 2021

Study objectives

The overall aim of this work is to develop public health-applicable solutions to reduce incidence of arboviral infection in vulnerable areas in Brasilia through the participation of the different sectors.

1. Assessing **sanitation** conditions in two different areas of Estrutural City.
2. Improving entomological surveillance, working with **urban services**.
3. Conducting qualitative research and health **education.**

Methods

- Observation of waste disposal and water storage
- Collection of water samples
- Improving entomological surveillance
- Conducting qualitative research and health education

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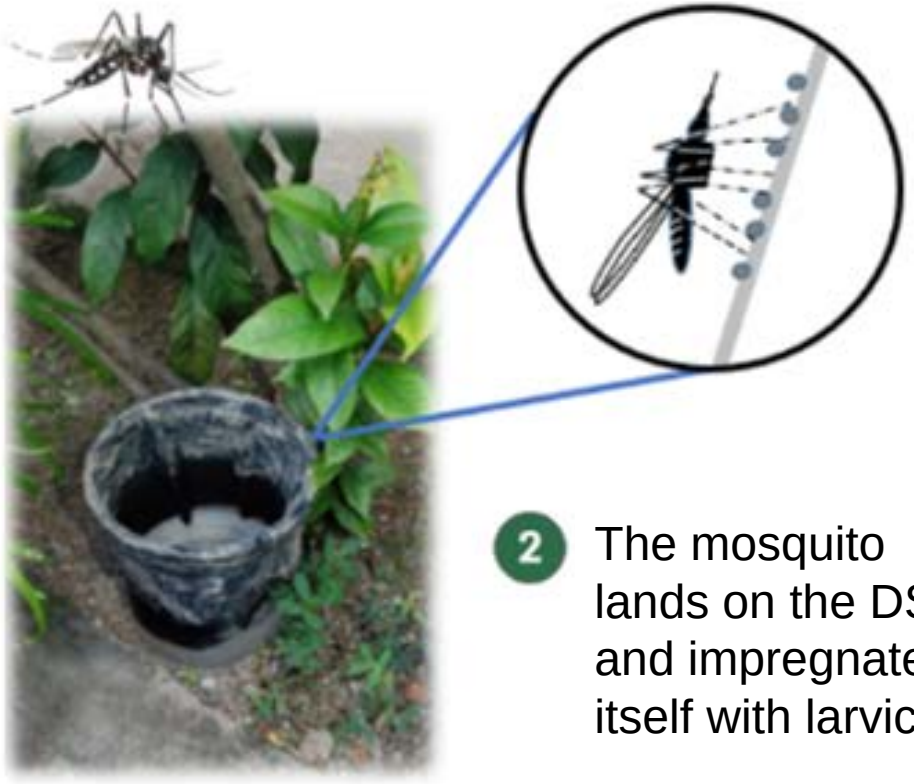
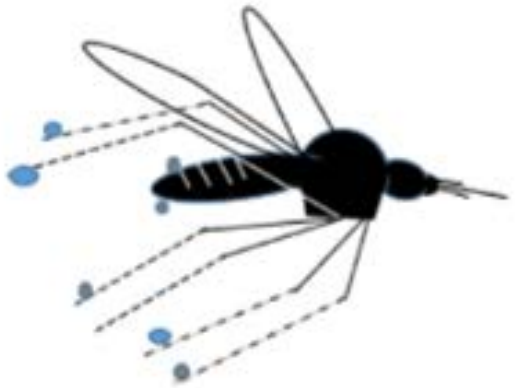
Mosquito disseminated larvicide: Pyriproxyfen

1. *Aedes aegypti* looks for a place to lay its eggs



Dissemination station (DS)

2. The mosquito lands on the DS and impregnates itself with larvicide



3. The mosquito looks for other breeding sites to lay more eggs

4. The mosquito lands in other breeding sites and contaminates them with larvicide, killing the immature forms

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Results

Analysis of drinking water

- Analysis of water samples from Estrutural City showed that untreated water is not only offering numerous breeding sites to vectors transmitting vector-borne diseases but is also posing a high risk of water-borne diseases to the population.

Qualitative survey

- This research confirmed the knowledge of this population regarding exposure to vectors, specifically dengue.
- Participants mentioned contributing factors to the disease, while identifying mosquitos that carry dengue.

Zolnikov TR, Clark T, Furio F, Yasobant S, Martins ACS, Cruvinel VRN, Obara MT. "Look, it's a dengue mosquito": A qualitative study on living near open-air dumpsites and vector-borne diseases. Adv Environ Eng Res ***2023****; 4(3): 045; doi:10.21926/aeer.2303045.*

Improving entomological surveillance and mosquito control

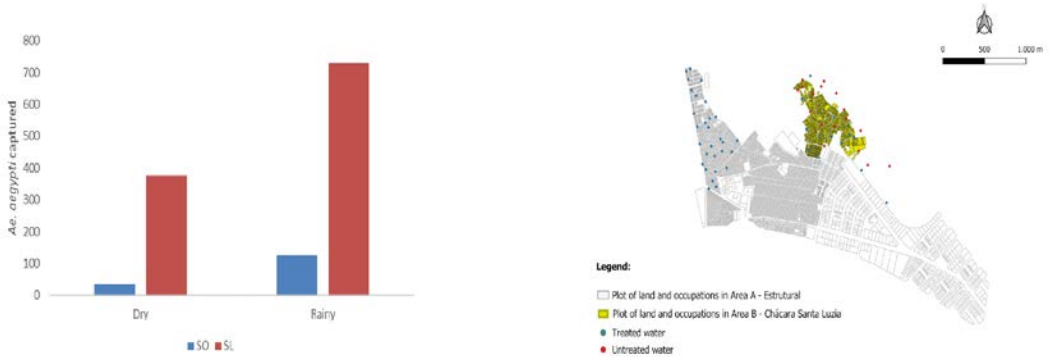


Fig1. Number of *Ae. aegypti* captured in two areas in two climatic seasons

- We developed CULICIDEX, an app for identification of mosquitoes: available on the Apple store and Google Play:
  https://apps.apple.com/br/app/vetordex/id1602553121
  https://play.google.com/store/apps/details?id=vetordex.com
  .
- A total of 150 larvicide MD-PPFs (mosquito-disseminated pyriproxyfen) were installed.

Further development of the project to help the community of Estrutural

At the local level:

- **The Government of Brasilia from the Urban Cleaning Service has encouraged and implemented some educational efforts to focus on correct waste disposal**. One of these actions has been published: https://www.agenciabrasilia.df.gov.br/2023/01/20/slu-promove-mutirao-de-conscientizacao-sobre-descarte-de-lixo-na-estrutural/

- A report with the results on quality of drinking water was sent to Surveillance of Health **with a request to undertake measures to protect these people, in particular the children**.

At the Regional level:

- The Secretariat of Health in Brasilia **intends to implement the strategy of mosquito dissemination of Pyriproxyfen** in the areas of high incidence of dengue.

Challenges and lessons learned from implementing a multisectoral approach

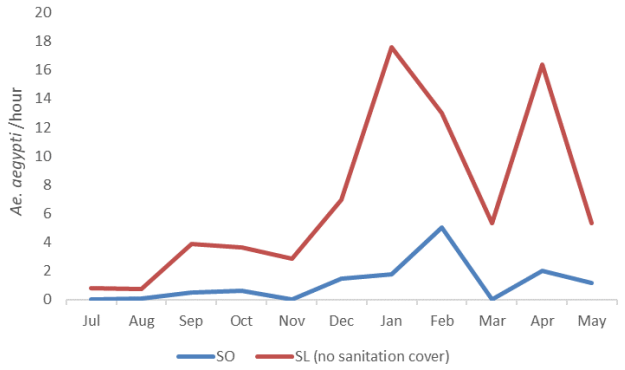
- During the qualitative survey, we realized that **people have knowledge of the risk factors for vector-borne diseases**, but unfortunately they cannot act adequately due to limited resources and the low infrastructure of the territory.
- The context of informal and **irregular area** is **limiting the actions** of the government to improve the **sanitation supply**.
- The **economic situation** and **low income** of families prevent improvement and increase the use of **incorrect containers to store water and discard trash.**
- The partnership with the **sanitation department** and **urban services** was essential to give more strength to the programme.
- The partnership with the **education sector** for adults and children empowered the population to know about measures of protection.

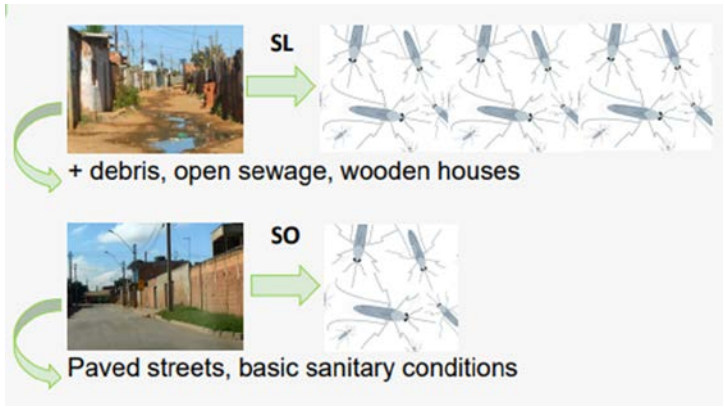
Outcomes

Decrease in dengue cases in Estrutural City:

- 2021, 1070 confirmed cases
- 2022, 5078 confirmed cases (more or less five times higher than the previous year)
- 2023 (to June), 186 confirmed cases with a reduction of 63.8% compared to the same period in 2022, within the context of the worst dengue epidemic Brazil has ever experienced.

Reduction in the density of mosquitos/per hour:





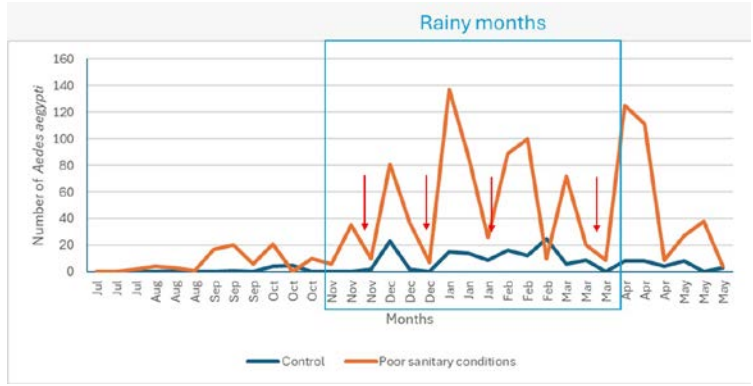


Figure 1. *Aedes aegypti* density (mosquitoes/hour) in two areas of Estrutural city (Area A: SO, area B: SL)

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Alone we can do so little; together we can do so much.

Helen Keller

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THANK YOU

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