Aedes Aegypti control – experiences and challenges

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Municipality Characteristics

Population: 2,502,557
Population density: 7.177 inhabitants/km²

Estimated population in subnormal agglomerates: 292,157
History

- 1986 – partnership with Sucam - *Aedes albopictus*
- 1992 – the employment of health agents and the prioritization of the fight against *Aedes aegypti*
- 1994 – decentralization to the areas covered by the health centers
- 1999 – Location set for the activities of each field agent
- 2007 -2015 – Executive Group for intersectoral actions
- 2015 – Public Health Emergency – Civil Defense
Epidemiological situation

Casos confirmados de dengue, Belo Horizonte, 1996 a 2016
Vector control routines

- Coverage: 800,000 properties
- 1 field agent for every 725 properties
  - House-to-house visits: 5 visits a year
  - Monitoring strategic points: biweekly
  - Ovitrap monitoring: weekly
  - Transmission blocking
  - Clean-up campaigns – Urban cleaning
  - Forced opening of closed properties
### Tipo de imóveis com foco

<table>
<thead>
<tr>
<th>Tipo</th>
<th>% de imóveis com foco</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>86,3</td>
</tr>
<tr>
<td>C</td>
<td>7,3</td>
</tr>
<tr>
<td>TB</td>
<td>1,3</td>
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<tr>
<td>Out</td>
<td>5,1</td>
</tr>
</tbody>
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#### Criadouros predominantes

<table>
<thead>
<tr>
<th>Criadouro</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pratos de plantas</td>
<td>27,0%</td>
</tr>
<tr>
<td>Caixas d'água</td>
<td>17,1%</td>
</tr>
<tr>
<td>Inseríveis</td>
<td>11,1%</td>
</tr>
<tr>
<td>Barris e tambores</td>
<td>10,5%</td>
</tr>
<tr>
<td>Rede pluvial</td>
<td>10,2%</td>
</tr>
<tr>
<td>Rede de esgoto</td>
<td>6,0%</td>
</tr>
<tr>
<td>Bebedouros de animais</td>
<td>5,1%</td>
</tr>
<tr>
<td>Recipientes domésticos</td>
<td>4,8%</td>
</tr>
<tr>
<td>Tanques</td>
<td>3,5%</td>
</tr>
<tr>
<td>Naturals</td>
<td>2,5%</td>
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MÉDIA MÓVEL DE DUAS COLETAS, NÚMERO MÉDIO DE OVOS COLETADOS POR ARMAZÉM, QUINZENA DE INSTALAÇÃO 2008 a 2015, BELO HORIZONTE

ANO/SEMANA

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Challenges in the quality of work

• Repetitive and tiring work

• Low coverage of actions – 20% of the properties are not visited at each cycle

• High absenteeism of field agents

• Low efficiency of field supervision

• Government’s difficulties in providing adequate working conditions – PPE, ladders, vehicles, etc.
Challenges in the quality of work
Structural problems
Measures for greater effectiveness

• Variable bonus to field agents linked to process and outcome indicators: placement and removal of ovitraps, vector control at strategic points and incidence of dengue

• Definition of priority areas based on the analysis of local data

• Integration with Primary Health Care
RISK MAP* FOR OCCURRENCE OF DENGUE IN 2011
BY HEALTH CENTER COVERAGE AREA, B.H./MG,


THE RISK IS REPRESENTED BY PERCENTILE (THE HIGHER THE PERCENTILE, THE GREATER IS THE RISK)
HOT SPOTS
Local initiatives

Analysis of the occurrence of dengue infection vs building verticalization:

1) The risk of being infected by dengue was 3 times higher in horizontal property residents than in vertical property residents;

2) there was no difference in association between dengue infection in residents of apartments above the 1st floor

Analysis of 8 surveys = 7.351 positive properties

Positive APARTMENTS: 0,9% (69)

Main breeding set: flower pots (95%)
Direct operational costs

- Field agents (1,379) – US$ 728,950 /month
- Higher education professionals - US$ 171,000/month
- Vehicles – US$ 153,000/month
- Materials - US$ 65,000/month

Total Cost – US$ 1,117,950/month  \[1\text{US$} = R\$ 3,80\]
Challenges in the control of A. aegypti

- Limitations of control methods available
- Social-environmental vulnerability
- Sustainable strategies of population behavior change
- The implementation of intersectoral and integrated actions
- The issue of employment relationships in the three spheres of government
- The control in metropolitan areas: heterogeneity of the activities against the vector among municipalities
Urban Cleaning

25 trucks = US$ 52,000/month
Manager Expectations

• Less dependence on home visits by the field agents

• The possibility to extend the range of visits

• Optimization of home visits – productive breeding, better risk prediction

• Directing of government actions to specific areas
Manager Expectations

• Simpler methods to estimate the population of adult mosquitoes – risk prediction
• Simpler methods for adult mosquito control
• Continued intersectoral actions with broader and continuous spectrum – collection of waste, continuous water supply
• Implementation of operationally and financially viable technologies of wide coverage – infected mosquitoes, genetically modified mosquitoes, irradiated mosquitoes
• Additional measures for specific situations – pregnant women
Communication e Mobilization

91% of respondents know how to prevent dengue and how it is transmitted

96% of respondents recall the campaigns against dengue

55% believe they do not take the necessary precautions

Poster ? Brochure ?

Can entomology be a community mobilization tool? Knowing vs doing
Control of vector transmission of Chagas disease in Brazil

• Political priority – decisive role of the academy

• Operational viability – decisive role of Entomology

• 1943 - 1948 – Studies by Dias & Pellegrino in Bambuí - MG

➢ definition of priority criteria to combat the vectors

➢ definition of insecticides and their respective dosages

➢ operational research integrated with the service

➢ definition of epidemiological and entomological surveillance criteria for native species

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Triatomine bugs

- > 120 known species
- 48 identified in Brazil
- 30 were captured in the household environment
- 10 are observed in the Amazon region

Main genera

*Triatoma*  
*Panstrongylus*  
*Rhodnius*
Interruption of vectorial transmission of Chagas disease by *T. infestans*. Brasil, 2006
Distribution of Brazilian municipalities according to risk stratification for Chagas Disease - 2006
US$ 17,00 earned for every US$ 1,00 invested in vector control – Akvan, D. – Brasília – OPAS, 1998
The importance of integration: research and service