Background

- Chagas disease is one of 14 NTDs, which causes USD 1.2 billion of productivity loss, per year.

- Vectoral transmission accounts for 80% of Chagas disease transmissions. *Triatoma dimidiata* is one of major vectors in Central America.

- Without scientific justification, 5% has been used as the *T. dimidiata* infestation rate threshold, to determine whether universal insecticide spraying must be done.
Research Question

- Does a justifiable threshold of infestation rate exist?

Objectives

- Assess the existence of a threshold for *T. dimidiata* infestation rate, below which Chagas disease transmission becomes unlikely.

- If it exists, crudely estimate increase/reduction in spray-related costs, through applying the threshold.

Methods-1/2

Study areas

[Targets]
59 communities infested only with *Td* bugs in 15 highly-endemic provinces

[Survey type]
Census = all houses + all children 6mo-15yr of age

8 highly-endemic provinces

El Salvador

Honduras

100 km

50 km

7 highly-endemic provinces
Examined the presence of *T. dimidiata*, using the One-Person-Hour method.

**Td Domestic Infestation Rate (%)**

4,083 houses

Examined the presence of *T. Cruzi*, using ELISA IgG test.

**T. Cruzi/Chagas disease sero-prevalence (%)**

6,324 children 6 months-15 years of age

1. **Entomological test:**
   - Domestic infestation rate of *T. dimidiata* (%)
   - Sero-prevalence among children between 6 months and 15 years of age (%)

2. **Serological test:**
   - Domestic infestation rate ≤ 8%
   - Sero-prevalence = 0%

Results:

*T. dimidiata* domestic infestation rate (%)

8%
Results-2/3

<table>
<thead>
<tr>
<th>Relationship between <em>T. dimidiata</em> domestic infestation rate threshold 8% and sero-prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>T. dimidiata domestic infestation rate</strong></td>
</tr>
<tr>
<td>--------------------------------</td>
</tr>
<tr>
<td>0-8%</td>
</tr>
<tr>
<td>29 (49.2%)</td>
</tr>
<tr>
<td>&gt; 8%</td>
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<tr>
<td>30 (50.8%)</td>
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<tr>
<td>Total</td>
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</tbody>
</table>

*a* Number of communities  
*b* Chi-square test: $P < 0.001$

Universal spraying should be done, only when infestation rate is **found to be greater than 8%** in routine surveillance.

Results-3/3

**Crude estimates of cost saving**

By avoiding unnecessary spraying in communities with 5-8% infestation rates.

- When applying **5%** as the threshold:  
  - 100% USD 142,919
- When applying **8%** as the threshold:  
  - 79% USD 112,906

**Cost saving breakdown**

- **Transport cost**: 87.8%
- **Commodity cost**: 9.7%
- **Staff cost**: 2.5%

21% USD 30,013
Conclusion and Recommendations

- An infestation rate of **8% could serve as the threshold** below which transmission would become unlikely.

- Application of an 8% threshold could **reduce 21% of spraying-related costs**, by avoiding unnecessary spraying in communities with 5-8% infestation rate.

- Though there is need for further studies to increase precision of 8%, 8% could be **applied in resource-constraint situations**.

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Many thanks for your attention!

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