The Kiss of Death: Chagas Disease
Mary-Lee Barboza (Bio/Biotech), Rachel Feyler (BME), Victoria Grimes (ChemE), Kirsten Reed (BME), Libbi Richardson (Bio/Biotech)
Advisors: Professor Jill Rulfs (Biology), Helen Vassallo (Management)

Past Model Systems
Using posters, mothers in Belize were educated about malaria symptoms in children
- Uneducated: 22.6% seek correct treatment
- Educated: 75.7% seek correct treatment

Surveys showed the effectiveness of insecticide spraying and education in preventing Chagas disease.
- 1981 Mumbai, Brazil
  - Site of health post & research study
  - 84% understood type of disease transmitted
  - 56% realized importance of bug control
  - No bugs

- 1995 Guatemala
  - 0% knew Chagas disease existed
  - 39% had bugs before
  - Site of health post & research study

- 1997 Posse, Brazil
  - Insecticide spraying & home building programs since 1981
  - Are triatomine bugs present in the household?
    - 95% no bugs
    - 39% had bugs before spraying

Life Cycle

Chagas disease is a dangerous epidemic affecting the uneducated in poverty-stricken countries and is therefore often neglected. Besides the lack of knowledge, there is a deficiency of medication used to treat the disease. The spread of Chagas can be avoided through a combination of well-researched methods.

Need:
To prove that Chagas disease is a problem and to stop the spread in Bolivia.

Approach:
Prevent infection through:
1. Education
2. Use of insecticides/ bed nets
3. Housing Improvements
4. Screening of blood/organ donors

Why Prevention?
- Lack of medicine to cure disease

Why Bolivia?

Abstract

Background
- Neglected tropical disease
- Flu-like symptoms
- Spread by triatomine bugs
  - Parasite infects the skin
- Disease can be transmitted human to human (transfusions/ transplants) or animal to human
- No vaccine
- Medication is very limited
- If not treated, leads to death

Methods of Prevention

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insecticides</td>
<td>• Most Effective</td>
<td>• Expensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Needs maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Possibly dangerous</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Possible resistance</td>
</tr>
<tr>
<td>Native Plants/Predators</td>
<td>• Easily accessible</td>
<td>• Not as effective as insecticides</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Could harm ecosystem</td>
</tr>
<tr>
<td>Insecticidal Paint</td>
<td>• Easy to apply</td>
<td>• Not always accepted by community</td>
</tr>
<tr>
<td></td>
<td>• Long lasting</td>
<td>• Only applicable to certain houses</td>
</tr>
<tr>
<td>Insecticide Treated Bed Nets</td>
<td>• New LLINs</td>
<td>• Limited usage</td>
</tr>
<tr>
<td></td>
<td>• Very effective</td>
<td>• Not always used</td>
</tr>
<tr>
<td>Insecticide Treated Clothes</td>
<td>• Effective when outside</td>
<td>• Needs maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Expensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not tested with triatomines</td>
</tr>
</tbody>
</table>

Methods of Prevention

Conclusions
Chagas disease is a neglected disease in need of prevention. The only medicine, Benznidazole, is no longer being produced and the current supply is diminishing. Combining preventative measures such as insecticides, housing improvements, caution of transmission, and knowledge of symptoms can lead to a healthier life and lower risk of infection. These measures have been proven effective through past studies in regions similar to Bolivia.

References
- Atlantic, Joseph. The Kiss of Death. 2015