APPENDICES

Appendix 1. Poisson regression model used to estimate age-specific prevalences for each province.

The final model upon which estimates of prevalence (Y/N) are based is given as:

\[
\log(E[Y]) = -4.21 + -1.51*\text{agecat} + 1.60*\text{agecat}^2 + 0.76*\text{loja} + -0.70*\text{guayas} + -1.40*\text{agecat*loja} \\
+ -0.21*\text{agecat*guayas} + 0.15*\text{agecat}^2*\text{loja} + 0.03*\text{agecat}^2*\text{guayas} + \log(N)
\]

Where

- \( Y \) = T. cruzi cases
- \( N \) = Population size
- \( \text{Agecat} = 0 \) if age 0-9
  - 1 if age 10-19
  - 2 if age 20-29
  - 3 if age 30-39
  - 4 if age 40-49
  - 5 if age 50-59
  - 6 if age 60-69
  - 7 if age \( \geq 70 \)
- \( \text{Loja} = 1 \) if province of Loja; 0 if province of Manabí or Guayas
- \( \text{Guayas} = 1 \) if province of Guayas; 0 if province of Manabí or Loja
Appendix 2. Estimation of pairwise odds ratios with the use of alternating logistic regressions

The ALR algorithm involves the simultaneous estimation of two logistic regression models: one for the within-household pairwise odds ratios, given by $\log(\psi_{ijk}) = \alpha$, and one for the probability of seropositivity, given by $\logit pr (Y = 1) = \beta_0 + \beta_1x_1 + \ldots + \beta_px_p$, where $x_1\ldots x_p$ is a set of $p$ explanatory variables associated with the risk of seropositivity and the $\beta$s are the log odds ratios for the risk of seropositivity associated with the respective covariates.\(^5\) The pairwise OR between individual $j$ and individual $k$ within household $i$ is defined as

$$\psi_{jk} = \frac{\text{pr} (Y_{ij} = 1, Y_{ik} = 1) \text{pr} (Y_{ij} = 0, Y_{ik} = 0)}{\text{pr} (Y_{ij} = 1, Y_{ik} = 0) \text{pr} (Y_{ij} = 0, Y_{ik} = 1)}$$

where $Y = 1$ if subject is seropositive; otherwise $Y = 0$ and $j \neq k$.\(^4\)

Thus, the POR is interpreted as the increased odds in favor of seropositivity for an individual from a household where another individual chosen at random from that household is seropositive relative to the odds in favor of seropositivity if that randomly chosen individual is seronegative.\(^5\)

An exchangeable structure for $\alpha$ was specified, which assumes that $j$ and $k$ are two randomly chosen individuals from the same household and the association between individuals is constant across all households.\(^5,9\)

The logistic regression models used to obtain the PORs reported in this paper are as follows:

*Coastal region, adjusted for roof type, firewood, and trash*

$$\psi_{jk} = -0.03$$

$$\logit pr (Y = 1) = -3.60 + 0.48*\text{roof} + 0.66*\text{firewood} + -1.22*\text{trash}$$
Coastal region, adjusted for wall type, firewood, trash

$$\psi_{ij} = -0.04$$

$$\text{logit pr (} Y = 1 \text{)} = -4.11 + 1.39*\text{wallwood} + 0.78*\text{wallcane} + 0.67*\text{firewood} + -1.27*\text{trash}$$

Loja province, unadjusted model

$$\psi_{ij} = 1.00$$

$$\text{logit pr (} Y = 1 \text{)} = -3.30$$

In each of the above models, Y = 1 if subject if seropositive, 0 otherwise

- Roof = 1 if house has palm roof, 0 otherwise
- Wallwood = 1 if house has wood walls, 0 otherwise
- Wallcane = 1 if house has cane walls, 0 otherwise
- Firewood = 1 if presence of firewood in peridomicile, 0 otherwise
- Trash = 1 if presence of trash in peridomicile, 0 otherwise