Modeling Schistosomiasis Transmission in Togo's Ogou District

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Here I apply a set of ordinary differential equations adapted from Soklow et al. 2017 to which I have added (ι, y, z) to reflect local dynamics observed during fieldwork contributing to Schistosomiasis transmission in Ogou. I also developed an equation to describe the likelihood of mass drug administration (MDA) success as a function of the variables f, a, p, unknown affecting treatment compliance.

presence and awake, history of adverse reactions, having eaten something on any given distribution day treatable population is defined as modified by incorporating (iota and ?) to fit the particular setting in Togo's Ogou district. I incorporated ... term into Eq (1) to reflect a consistent number of Ghanian immigrants belonging to the () culture who may have joined the community without having received preventative chemotherapy, increasing the susceptible human population phenomenon observed during fieldwork. Adapted a nonlinear model accounting for snail dispersal

The first equation (1) describes the rate of human population change in endemic villages. the per capita natality rate μ_H represents population growth, to which I incorporated a variable ι representing net migration given the importance of an influx of untreated persons to the transmission dynamics offset by parasite-incduced death given α parasitic pathogenicity. including the mating pair dynamics (?) and the impact of poor sanitation (variable) This N_v is the symbol for the population...

$$\dot{N}_v = \mu_H \iota (H_v - N_v) - \alpha P_v \tag{1}$$

$$\dot{P}_v = F_v N_v - (\mu_H + \mu_P + \alpha) P_v - \alpha \frac{k+1}{k} \frac{P_v^2}{N_v}$$
 (2)

$$\dot{S}_w = vS_w[1 - \gamma_w(S_w + E_w + I_w)] - \mu_S S_w - \rho M_w S_w + D_w^s$$
(3)

$$\dot{E}_w = \rho M_w S_w - (\mu_s + \eta) I_w + D_w^E \tag{4}$$

$$\dot{I}_w = \delta E_w - (\mu_s + \eta) I_w + D_w^I \tag{5}$$

$$\dot{C}_w = \zeta I_w - \mu_c C_w + L_w^I \tag{6}$$

$$\dot{M}_w = \varrho M_w + L_w^M \tag{7}$$

$$F_v = \beta \sum_{j=1}^{n_w} \Omega_v w C_w \tag{8}$$

$$F_v = \beta \sum_{j=1}^{n_w} \Omega_v w C_w \tag{9}$$

 n_v villages

 n_w water points

 N_v human population size in each village

 P_v total number of parasites in human hosts in each village

 S_w susceptible snails in freshwater source

 E_w exposed snails in freshwater source

 I_w infected snails in freshwater source

 C_w concentration of cercariae in freshwater source

 M_w concentration of miracidia in freshwater source

 P_v total number of adult parasites

 μ_H natural human host mortality

 μ_P per capita parasite mortality

v intrinsic natality rate

 γ_w site-specific effect of density dependence

 μ_s mortality rate of susceptible snails

: human contamination rate

$$\rho \cap \alpha \tag{10}$$