Modeling Schistosomiasis Transmission in Togo's Ogou District

Olivia Kern
Fulbright Student — Togo, 2017

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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...

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

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

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

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

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

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

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

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

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

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

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