# Ecology and epidemiology of Buruli ulcer disease

**Statistical question:** What are the factors driving *M. ulcerans* ecological dynamics?

**Dynamical question:** How *M. ulcerans* environmental dynamics affect Buruli ulcer transmission to humans?

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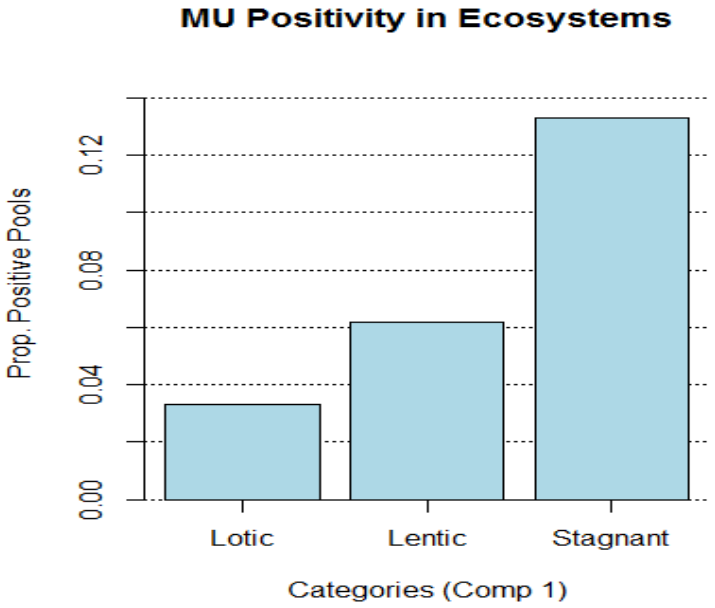
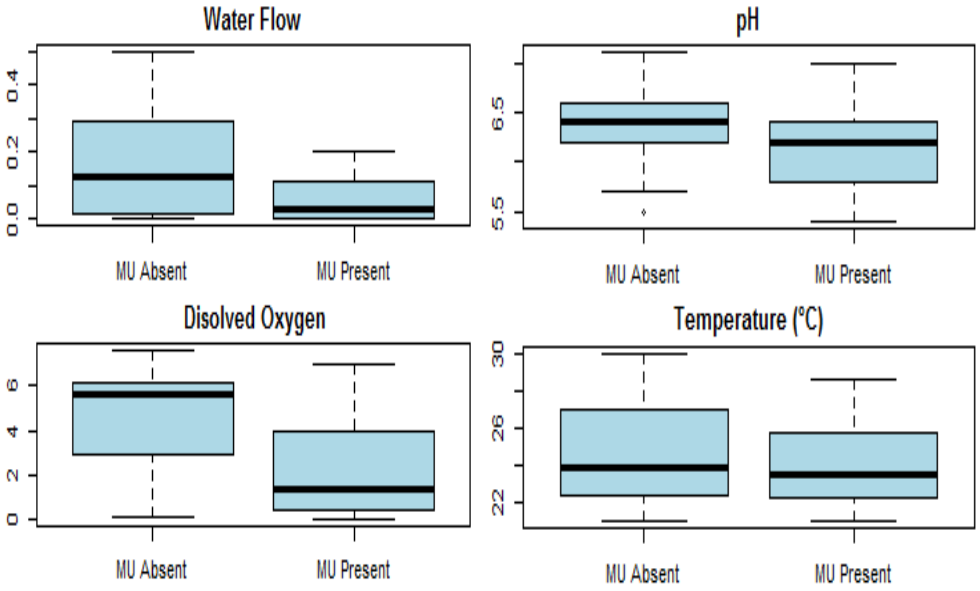
**Statistical question:** What are the factors driving *M. ulcerans* ecological dynamics?

- **Hypothesis:** *M. ulcerans* occurrence is is determined by characteristics of stagnant ecosystems
- **Response Variable:** pres/abs *M. ulcerans* in site
- **Predictor Variables:** type of environment, water flow, pH, oxygen, temperature, species abundance & diversity
- **Family:** "binomial"
- **Link:** logit
- **R code:**

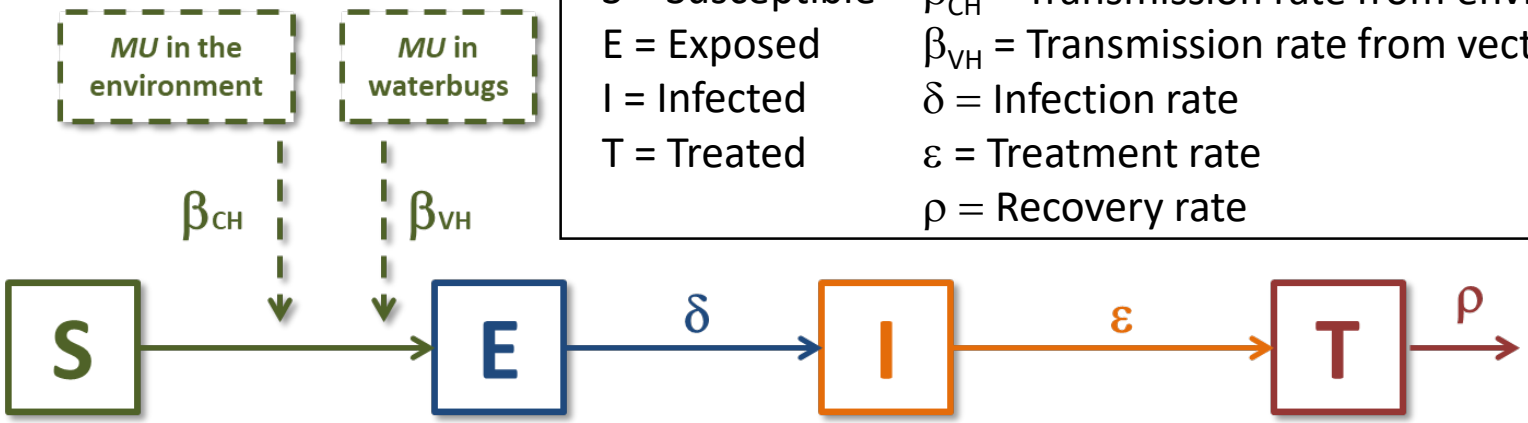
glmer(pres/abs *M. ulcerans* ~ type of environment+water flow+…+(1|site), family="binomial", data = mu.data)

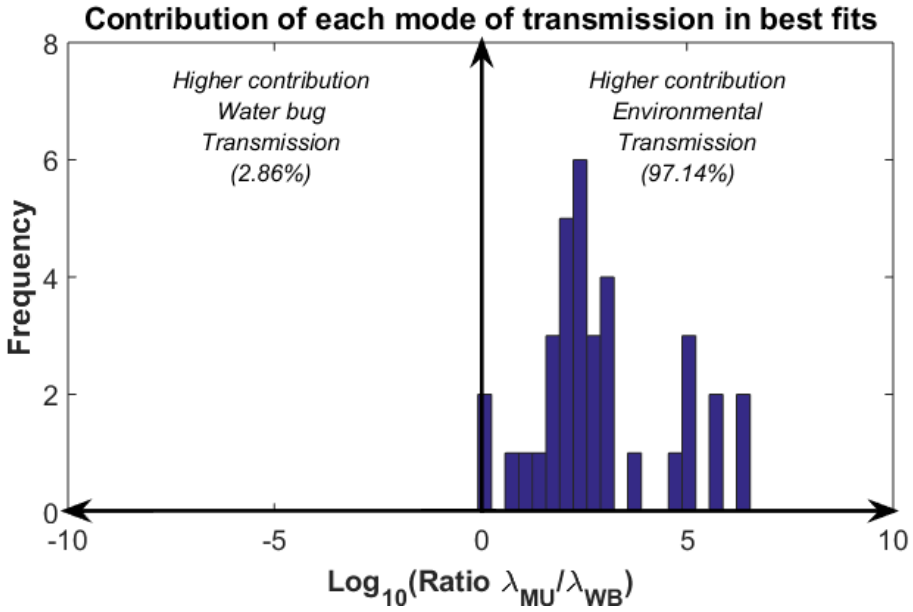


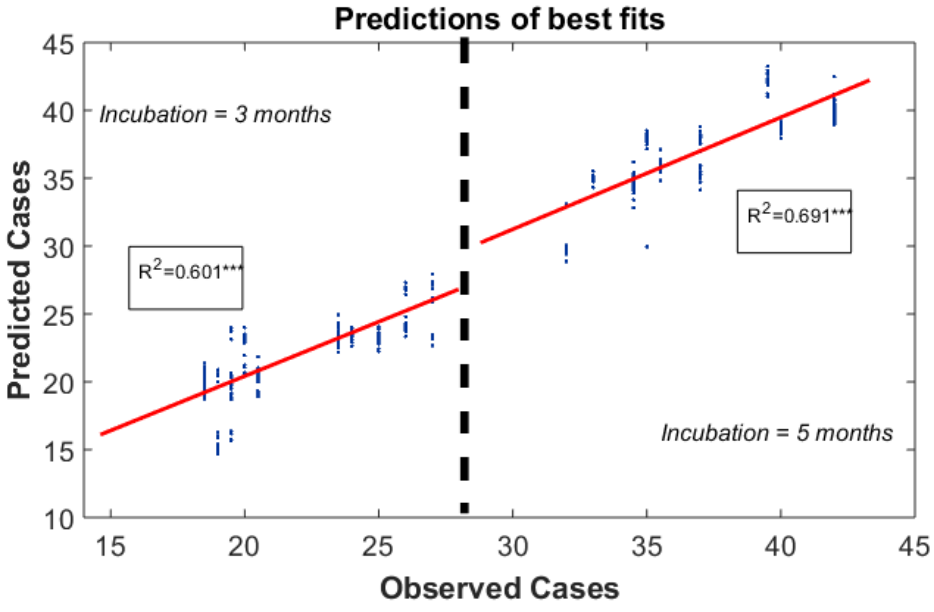



**Dynamical question:** How *M. ulcerans* environmental dynamics affect Buruli ulcer transmission to humans?

| States | Proceses |
|---|---|
| S = Susceptible | $\beta_{CH}$ = Transmission rate from environment |
| E = Exposed | $\beta_{VH}$ = Transmission rate from vectors |
| I = Infected | $\delta$ = Infection rate |
| T = Treated | $\varepsilon$ = Treatment rate |
| | $\rho$ = Recovery rate |



# FUTURE DIRECTIONS

- **Epidemiology:** Study how different exposure and vulnerabilty to Buruli ulcer infection in socio-economic groups may impact the overall transmission dynamics
- **Ecology:** Understand the impact of the aquatic food network on M. ulcerans transmission and maintenance in the environment