Determinants of the therapeutic issues of tuberculosis patients in Madagascar

- Background : Madagascar has adhered to the “End-Tuberculosis 2030” strategy since 2015.The existence of failure, abandonment and coinfection tuberculosis-HIV despite the effectiveness of tuberculosis treatment constitute obstacles to achieving this objective.
- Statistical question : what are the relationship between patient tuberculosis demographic and the death of patient?
- Mechanistic question : how does coinfection tuberculosis-HIV affect mortality in tuberculosis- infected people?

STATISTICAL QUESTION

- What are the relationship between patient tuberculosis demographic and the death of patient?
- Response variable : death of patients (yes or no=successful+failure+abandomnent)
- Predictor variable : age of patient (numeric), gender (factor).
- Family : « binomial »
- Link : « logit »
- Hypothesis : the death of patient tuberculosis demonstrate significant correlation with age.
- R code : glm (death~age + gender, family=binomial (link=« logit »), data=datatb)

1	id	gender	age_group	category	clinical_form	success	abandonmer	failure	death	vih
2	1	male	<15	new	tpbplus	1	0	0	0	0
3	2	male	<15	new	tpbplus	1	0	0	0	0
4	3	male	<15	new	tpbplus	1	0	0	0	0
5	4	male	<15	new	tpbplus	1	0	0	0	0
6	5	male	<15	new	tpbplus	1	0	0	0	0
7	6	male	<15	new	tpbplus	1	0	0	0	0
8	7	male	<15	new	tpbplus	1	0	0	0	0
9	8	male	<15	new	tpbplus	1	0	0	0	1
10	9	male	<15	new	tpbplus	1	0	0	0	0
11	10	male	<15	new	tpbplus	1	0	0	0	0
12	11	male	<15	new	tpbplus	1	0	0	0	0

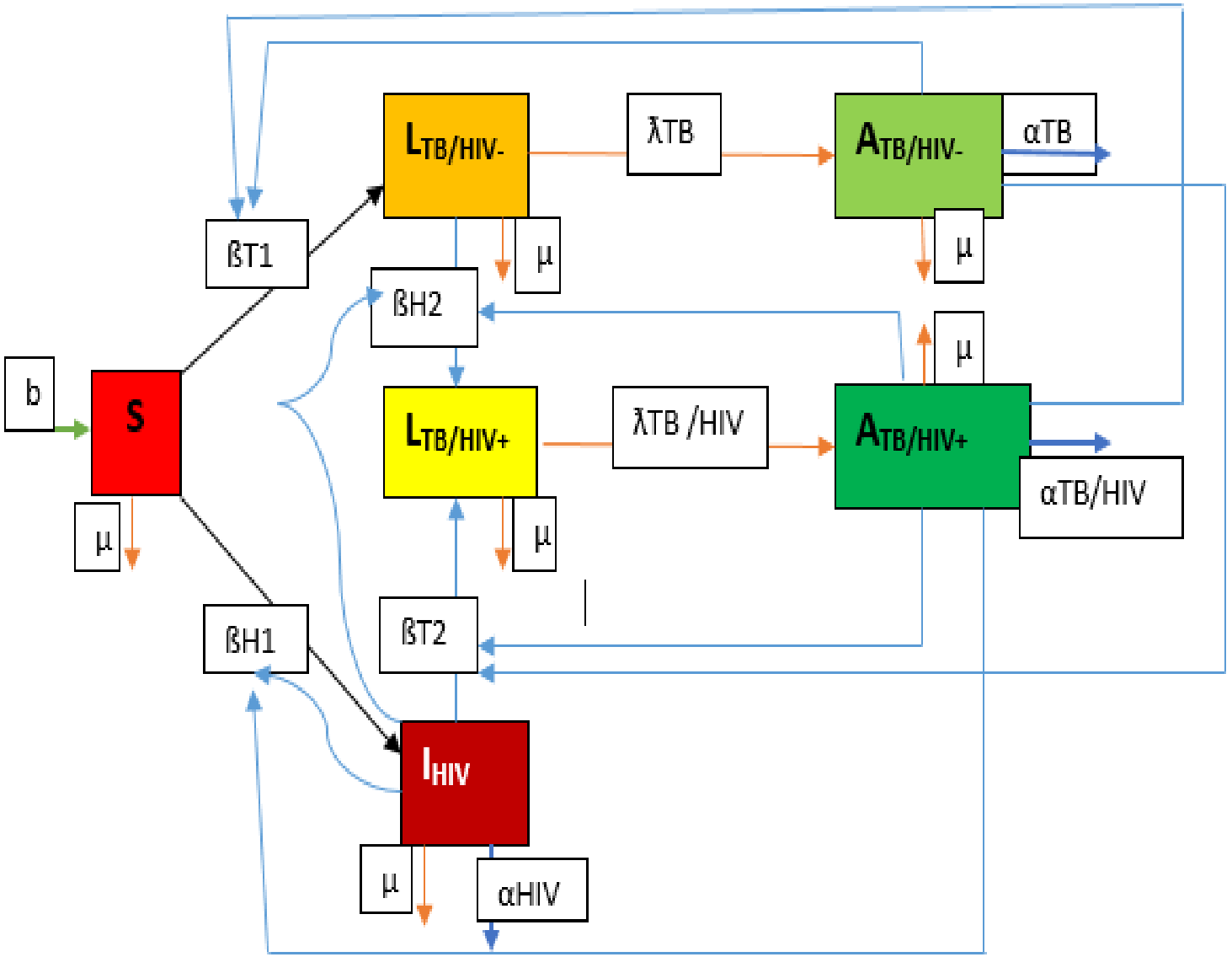
MECHANISTIC QUESTION : How does coinfection tuberculosis –HIV affect mortality in tuberculosis infected people ?

- **States**

- **S** : susceptible
- $L_{TB/HIV-}$: latent tuberculosis seronegative
- $A_{TB/HIV-}$: active tuberculosis seronegative
- $L_{TB/HIV+}$: latent tuberculosis seropositive
- $A_{TB/HIV+}$: active tuberculosis seropositive
- I_{HIV} : Infected by HIV

- **Processes**

- **b** : birth rate
- **ßT1** : transmission coefficient TB/HIV-
- **ßT2** : transmission coefficient TB/HIV+
- **λTB** : active rate TB/HIV -
- **λTB/HIV** : active rate TB/HIV +
- **α TB** : TB/HIV- induced mortality rate
- **α TB/HIV** : TB/HIV+ induced mortality rate
- **μ** : mortality rate



NEXT STEPS

- Research bibliographic about: the parameters, the same study already done
- Build the equations, and make it on R
- Fit the mechanistic model to field data