1. Toxicity:

Under the setting of EWOUC-NETS, we have

Re-parameterization:

For each dose level, we have one .

Marginal density function for toxicity:

1. Efficacy

Where and

Comment: here the has been normalized and range from 0 to 1.

1. Joint distribution of ():

Given S, we assumed that the distribution of is normal.

Where is the parameter for the regression of on S. Large absolute values of indicate a strong correlation between the two outcomes. When = 0, the two outcomes are independent given the dose level of agent A in the model. The correlation based on this model is

1. Selling point: continuous toxicity endpoint as NETS ranging from 0 to 1, instead of 0 and 1 (binary).
2. We used EWOUC (over- and underdose control)
3. Efficacy is truncated normal distributed in simulation (more meaning).
4. Reduced the parameters and we standardized the efficacy within 0 and 1.