

## Data driven longitudinal model with application to HIV differentiated care

Collins Odhiambo and Stephen Weunda  
Institute of Mathematical Sciences, Strathmore University, Nairobi, Kenya.  
School of Mathematics, University of Nairobi, Nairobi, Kenya.

Differentiated care is a new innovative approach for managing HIV/AIDS where ART treatment services are customized by staggering patient's visits for stable status while reducing unnecessary burdens on the health system. Through provision of differentiated care, the health system can reallocate resources to patients most in need who are failing treatment. The main objective of this study is to develop a data-driven longitudinal model which is applicable to HIV differentiated care. Method: We used routine data of HIV positive patients initiated to ART at the point of care from 4 medical facilities in Nairobi in the year 2018. Since both the GLMM and GEE are extensions of the GLM, we start with a brief overview of GEE then relooked at extensions of GLMM. We specify  $f(u)$  and  $g(p)$  to be dependent on the type of response  $Y_i$ . For a binary  $Y_i$ , we consider  $f(u)$  as Bernoulli distribution and  $g(p)$  as the logit function,  $g(u) = \log$  resulting to GLM is the logistic regression. Results show the binary response which was differentiated care category fits well with GLMM. We also found TB-HIV co-infection to be the only significant predictor of differentiated care under both GEE and GLMM.

**Keywords:** GLMM; GEE; HIV/AIDS; ART; Differentiated care.