New data set from lab (AFRICOS cohort specimens)

29 individuals represented in the data set

133 Time points

At each visit, we have a viral load

Typical time gaps -

Distribution of time gaps -

Global model of LAg ODn decline

* exp decay with a mean of 3.47 and standard deviation of 1.55 with some noise to an individual baseline
* Each individual is assigned a baseline from a distribution
* Each individual is assigned a decay rate from a distribution

Some issues around the standard deviation

* The standard deviation of ODn measurements under these conditions is usually a function of the expected value
* Start simple and refine this later
* Work in bands - ODn 0-0.2 - sigma, based on all specimens available, is about 0.05
* ODn 0.2-0.5 - sigma, based on all specimens available, is about 0.7
* ODn 0.5-1.0 - sigma, based on all specimens available, is about 0.7
* OR, ultimately, fit a model sigma = sigma\_0 + SLOPE\*<ODn>

History of each patient post-ART initiation

* Need a way to use the first 2, 3, 4 (or however many points we have) observations to assign this person their baseline and decline rate
* Then, for the NEXT observed ODn - we can express the observed value as a z score relative to the model prediction, using the patient-specific decline rate and asymptote
* Then we ask - how sensitive is a Z threshold at detecting the known uptick
* And how specific is it at clearing people who are still suppressed

pipeline/workflow:

* Point to your favourite model of ODn decline
* Assign each patient *at each time point* their current best choice of decline rate/prediction
* Load your current favourite model of measurement fluctuation
* Use this to assign each eligible observation its Z score
* Decide for each suppressed individual whether they have been ‘accidentally’ flagged (an imperfection in specificity)
* Decide for each individual at their first non-suppressed time point whether they have been correctly flagged (sensitivity estimate)