Longitudinal Homework 6

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1. Model planning

a. Software

i. Medication use

Correlated count data like this probably requires a generalized linear mixed model (GzLMM) where the outcome is modeled as Poisson-distributed, a random intercept for subject, and with an AR(1) or spatial power correlation for repeated measures. I think the best way to do this in SAS is to use PROC GLIMMIX, and in R glmmPQL() should work.

If there are a lot of zero counts then it might be necessary to use a zero-inflated Poisson model, which would require some complicated coding in PROC NLMIXED.

ii. FEV1

I think you might be able to get away with a normal theory model for FEV1 data, unless it's really skewed. If so, I would use either PROC MIXED in SAS or lme() in R. If normal theory models won't work, then I would use PROC GLIMMIX or glmmPQL() to model the outcome with a non-normal distribution.

b. Data

i. Medication use

Because we need a GzLMM for this outcome, I would set up the data so that each subject has a row for every day during the relevant timeframe. On days without an albuterol count the outcome would be filled in as missing (NA in R).

There isn't a REPEATED statement in PROC GLIMMIX, so you need to another random effect with the "*residual*" and the correlation structure

```
proc glimmix data=y5dat_red method=mspl;
model exacerb(event='1')
= pm25cen02 day weekend holiday
/ solution distribution=binary;
random intercept / subject=id;
random _residual_ / subject=id type=ar(1); run;
```