Methods We performed a randomised, cross-over trial in 21 mild-to-moderate persistent asthmatics receiving ICS with elevated FeNO (>30ppb) that increased further (>10ppb) after ICS washout. Patients were randomised to 2 weeks of either fluticasone propionate 50µg twice-daily (FP100) or 250µg twice-daily (FP500). The primary outcome was response in diurnal domiciliary FeNO levels. Secondary outcomes included: mannitol challenge; serum eosinophilic cationic protein (ECP); blood eosinophil count; and asthma control questionnaire (ACQ).

Results We found significant dose-related reductions of diurnal FeNO compared to baseline - morning FeNO: baseline=71ppb (95%CI:61–83ppb); FP100=34ppb (95%CI:29–40ppb), p<0.001; FP500=27ppb (95%CI:22–33ppb), p<0.001; and significant dose separation for morning, p<0.05, and evening, p<0.001. Time series FeNO displayed exponential decay (Figure 1): FP100 R²=0.913, half-life=69hrs (95%CI:50–114hrs); FP500 R²=0.966, half-life=55hrs (95%CI:45–69hrs); as well as diurnal variation. ACQ showed significant improvements exceeding the minimal important difference (>0.5) with values in keeping with controlled asthma (<0.75). All other secondary inflammatory related outcomes (mannitol, ECP and eosinophils) showed significant improvements from baseline but no dose separation.

Conclusions There is a significant dose-response of diurnal FeNO to ICS in asthmatics with an elevated FeNO phenotype, which translates into well-controlled asthma. Further interventional studies are warranted using domiciliary FeNO in this specific phenotype.