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Title: Blood eosinophil count is a useful biomarker to identify patients with severe eosinophilic asthma

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Body: Background: Measurement of peripheral blood eosinophils (eos) may be informative in the identification of severe eosinophilic asthma. Objective: We investigated whether a single measurement of blood eos is predictive of future blood eos levels or whether multiple measurements over time are significantly more predictive. Methods: DREAM (NCT01000506) included patients (pts) with frequent serious exacerbations and measured eos at screening, start of treatment (week 0) and every four weeks up to week 56. Based on data from placebo pts (N=155) we determined whether pts with a eos count of ≥150/µL at screening remained on average above this level during the following year. A repeated measures model examined the relationship between screening blood eosinophil level and subsequent measurements. Results: Of 115 pts with eos ≥150/µL at screening, 17 (15%) fall below this level in their post-screening average. Using the average of 2, 3 or 4 measures ≥150/µL, selects 120, 116 and 118 pts respectively; of these, 18 (15%), 12 (10%) and 10 (8%) have post-screening averages below 150/µL. The data shows that extreme values at screening tend not to be replicated. The model suggests that pts with 150/µL at screening would have a mean post-screening average in the following year of 168/µL 95%CI (149, 189). Conclusion: A single measurement ≥150/µL appears highly sensitive (85%) to predict the average of subsequent measurements being ≥150/µL in this population. A higher cut-off may be less predictive. Using an average of multiple measurements only marginally increases the sensitivity. Therefore, a single eos measurement in severe asthma pts may be a reliable biomarker for the eosinophilic asthma phenotype.