

# Blood Eosinophil Levels in Chinese Patients with Chronic Obstructive Pulmonary Disease: Pooled Analysis of 7 Phase III/IV Randomized Controlled Trials

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## Background

- Chronic obstructive pulmonary disease (COPD) is a heterogeneous disease. The distribution of eosinophil levels may differ between populations and is influenced by allergic or infections responses<sup>1</sup>; atopy is found to be more prevalent among Caucasian than Asian populations<sup>2</sup>.
- A patient's blood eosinophil count (BEC) is an important biomarker to predict the response to inhaled corticosteroids (ICS) for the pharmacological management of patients with COPD<sup>3</sup>.
- The existing literature on BEC for Chinese patients with stable COPD remains limited.
- In this pooled analysis, we aim to present the profile of blood eosinophil levels in Chinese patients with stable COPD and compare the distribution with that of non-Chinese patients.

## Methods

- Baseline blood eosinophil data from 7 phase III/IV randomized controlled COPD trials in tiotropium, olodaterol and tiotropium/olodaterol programs\* that included an overall of 1532 Chinese and 11357 non-Chinese patients with COPD were pooled and retrospectively analyzed.

\*NCT00239434, NCT00387088, NCT00782210, NCT00782509, NCT01431274, NCT01431287, NCT00975195.

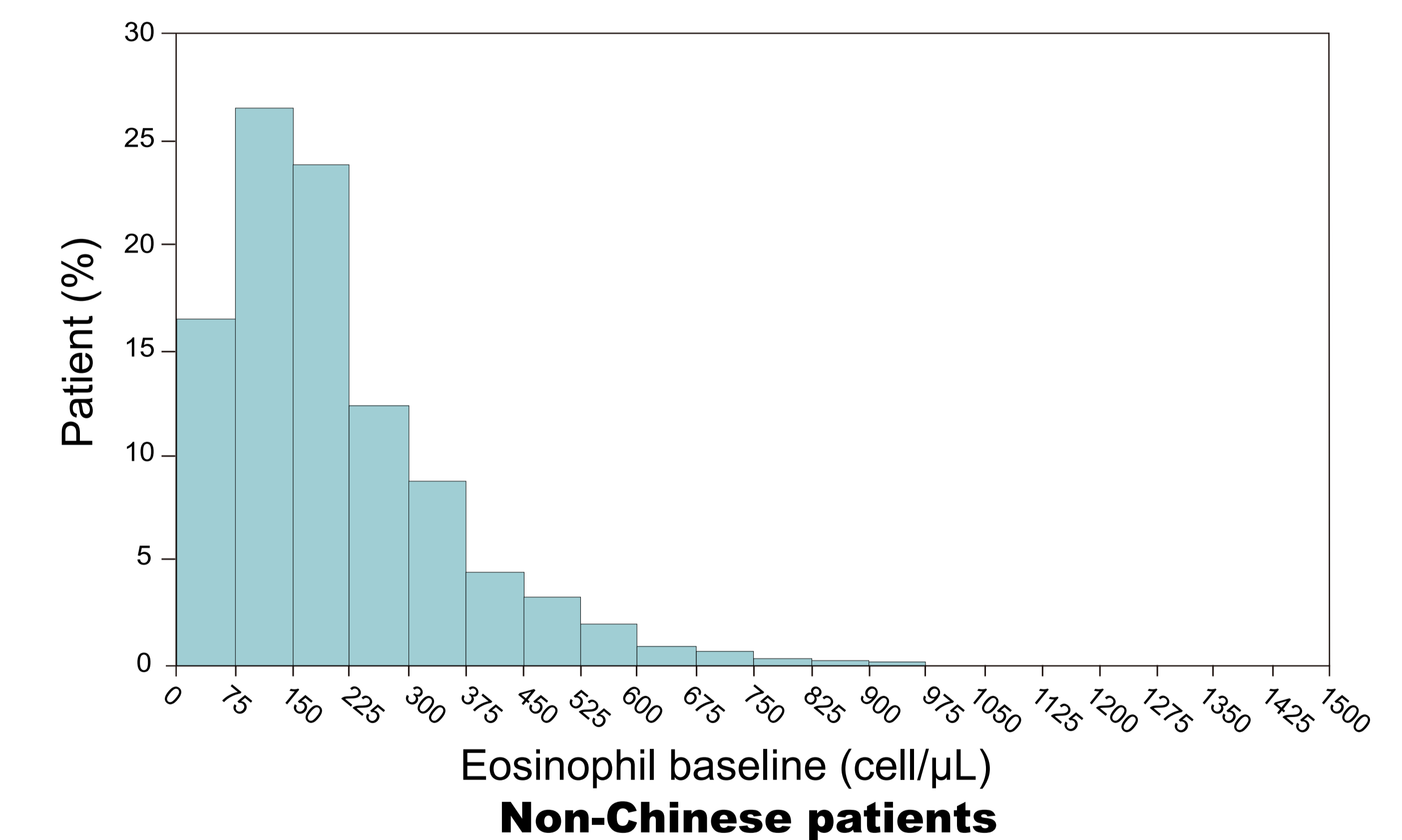
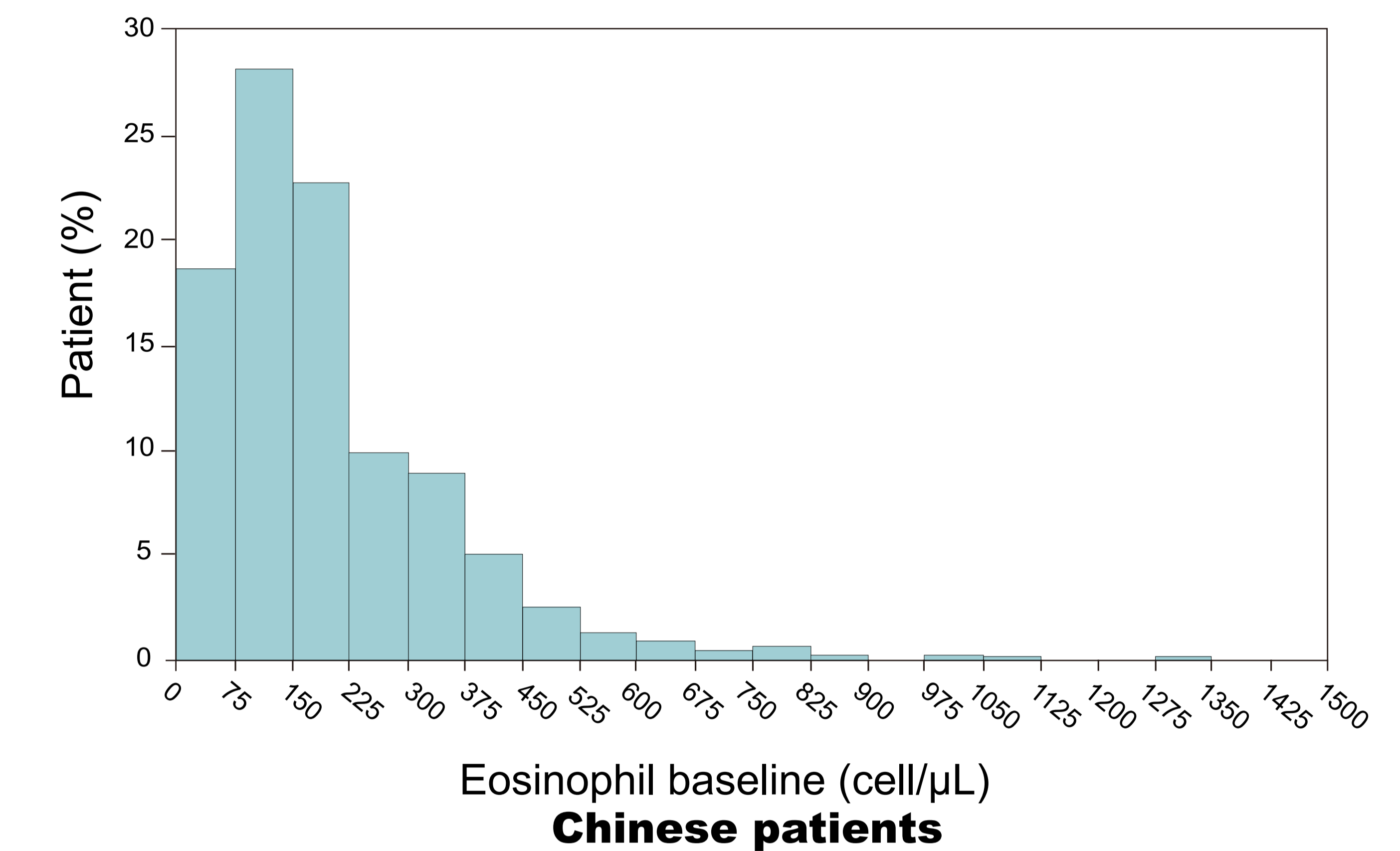
## Results

- In Chinese patients, the mean age was 64.9 years old. Most patients were males (93.1%) and ex-smokers (74.3%), with a mean post-bronchodilator FEV<sub>1</sub> of 40.8% predicted. A total of 25.3%, 48.4% and 26.3% out of 1322 patients presented with GOLD II, III and IV, respectively. More than 1/3 out of 1324 patients (43.8%) had  $\geq 2$  moderate to severe exacerbations in the previous year.
- Baseline demographics and clinical characteristics between Chinese patients with absolute BEC <300 and  $\geq 300$  cells/ $\mu$ L were comparable (Table 1).
- At baseline, the median (interquartile range [IQR]) absolute BEC in 1532 Chinese patients was 150 cells/ $\mu$ L (90–250 cells/ $\mu$ L). Overall, 1221 (79.7%) had an absolute BEC <300 cells/ $\mu$ L and 408 (26.6%) had <100 cells/ $\mu$ L; only 20.3% had an absolute BEC  $\geq 300$  cells/ $\mu$ L (Figure 1).
- In 11357 non-Chinese patients, the median (IQR) absolute BEC was 170 cells/ $\mu$ L (100–260 cells/ $\mu$ L) at baseline. The absolute BEC distribution of non-Chinese patients was similar to that of Chinese patients, i.e. 9007 (79.3%) non-Chinese patients had an absolute BEC <300 cells/ $\mu$ L and 2720 (23.9%) had <100 cells/ $\mu$ L; only 20.7% had an absolute BEC  $\geq 300$  cells/ $\mu$ L (Figure 1 and 2).

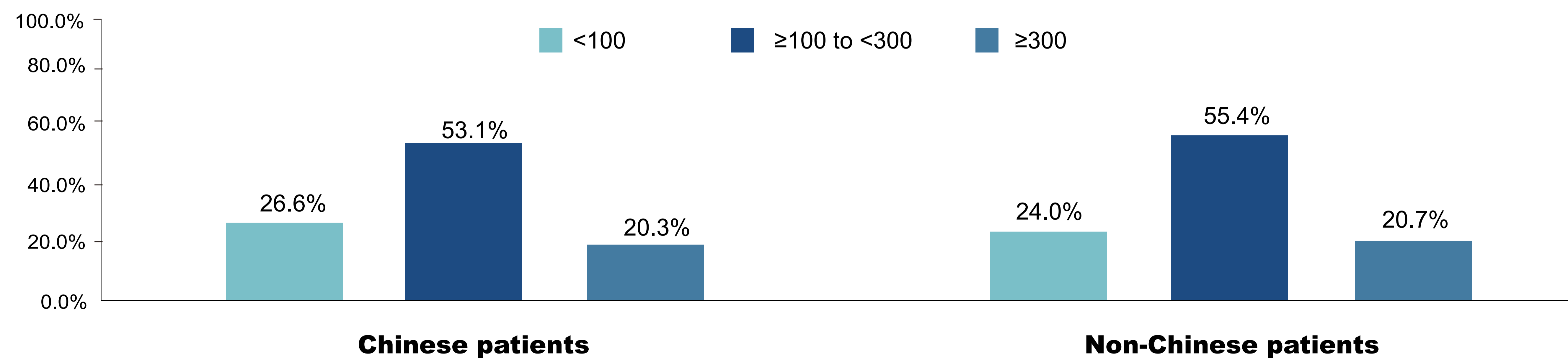
**Table 1: Baseline demographic and clinical characteristics of Chinese patients**

	Eosinophil count, cells/ $\mu$ L	
	<300 (n=1221)	$\geq 300$ (n=311)
Age, mean years (SD)	64.6 (8.0)	65.8 (7.9)
Male, n (%)	1128 (92.4)	298 (95.8)
Patients with smoking status, n (%)	1221 (100.0)	311 (100.0)
Ex-smoker	905 (74.1)	233 (74.9)
Currently smokes	316 (25.9)	78 (25.1)
Patients with GOLD assessment, n (%)	1043 (100.0)	279 (100.0)
Stage II	273 (26.2)	61 (21.9)
Stage III	500 (47.9)	140 (50.2)
Stage IV	270 (25.9)	78 (28.0)
Patients with post-bronchodilator data, n	1043	279
FEV <sub>1</sub> /FVC, %, mean (SD)	39.73 (10.30)	40.11 (10.48)
FEV <sub>1</sub> , % predicted, mean (SD)	41.10 (14.53)	39.72 (14.01)
Patients with exacerbation data in the previous year, n (%)	1045 (100.0)	279 (100.0)
Moderate to severe exacerbation		
0	348 (33.3)	88 (31.5)
1	253 (24.2)	55 (19.7)
$\geq 2$	444 (42.5)	136 (48.8)
Severe exacerbation		
0	871 (83.4)	230 (82.4)
$\geq 1$	174 (16.7)	49 (17.6)

FEV<sub>1</sub>, forced expiratory volume; FVC, forced vital capacity; GOLD, Global Initiative for Chronic Obstructive Pulmonary Disorder; SD, standard deviation.



**Figure 2:** Distribution of blood eosinophil counts in Chinese vs non-Chinese patients at baseline



**Figure 1:** Proportion of patients according to eosinophil count (cells/ $\mu$ L) in Chinese vs non-Chinese patients at baseline

## Conclusion and Implications

- The results show that the majority of Chinese patients with stable COPD had absolute BEC <300 cells/ $\mu$ L; the observed proportion and overall distribution of eosinophils in Chinese patients is similar to that of the non-Chinese patient population.
- According to GOLD recommendations<sup>3</sup>, these Chinese patients with absolute BEC <300 cells/ $\mu$ L might not require ICS containing therapy as initial pharmacological treatment.
- Limitations: These findings are based on blood eosinophil data of a relatively small sample captured at a single point in time; larger samples and longitudinal studies are needed to further investigate the distribution and stability of blood eosinophil status in this population.

### Disclosures

J. Z. has received consulting and speaking fees from AstraZeneca and Boehringer Ingelheim GmbH, and is a funding recipient of the National Key R&D program (2018YFC1911300). W. J. has nothing to declare. L. S. and W. S. are employees of Boehringer Ingelheim.

### Data disclosure

The percentage values for the baseline demographic and clinical data for patients included this study has been updated to exclude missing data. The updated percentages provide more accurate data and were assessed as only minimally different than that of reported in the accepted abstract

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1) Klion AD. Hematology Am Soc Hematol Educ Program 2015;2015:92–7. 2) Gerez IF et al. Expert Rev Clin Immunol 2010;6:279–89. 3) Global Initiative for Chronic Obstructive Lung Disease. Global strategy for the prevention, diagnosis, and management of chronic obstructive pulmonary disease (2020 report).