

Burden of disease in Asthma stratified by eosinophils levels: a UK biobank study

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BACKGROUND AND OBJECTIVES

- > Evidence suggests that blood eosinophil levels (EOS) can influence response to therapy in Asthma and predict future exacerbation outcomes¹.
- > This study's objective is to characterize the Asthma burden, stratified by EOS levels (EOS \geq 300 cells/ μ l vs. EOS<300 cells/ μ l).



METHODS



Data source: UK Biobank

- Population-based prospective cohort
- 500,000 people
- Enrolled adults 40-70 years, 2006-10

> **Study design:** Patients diagnosed with Asthma (ICD-9: 493; ICD-10: J45, J46X) with an available EOS count at baseline, who did not have comorbid COPD, lung cancer, cystic fibrosis, or any other lung diseases, were included and followed from recruitment until December 31st, 2019.

> **Analysis:** The primary endpoint was the occurrence of severe exacerbations, defined as Asthma-related hospitalization. We evaluated the univariate relationships with patient baseline characteristics using logistic regression. Multivariate models were performed with stepwise variable selection.



RESULTS

Blood EOS Distribution in the Asthma Population

EOS<300 (73.3%)

EOS \geq 300 (26.7%)

EOS<150 (37.7%)

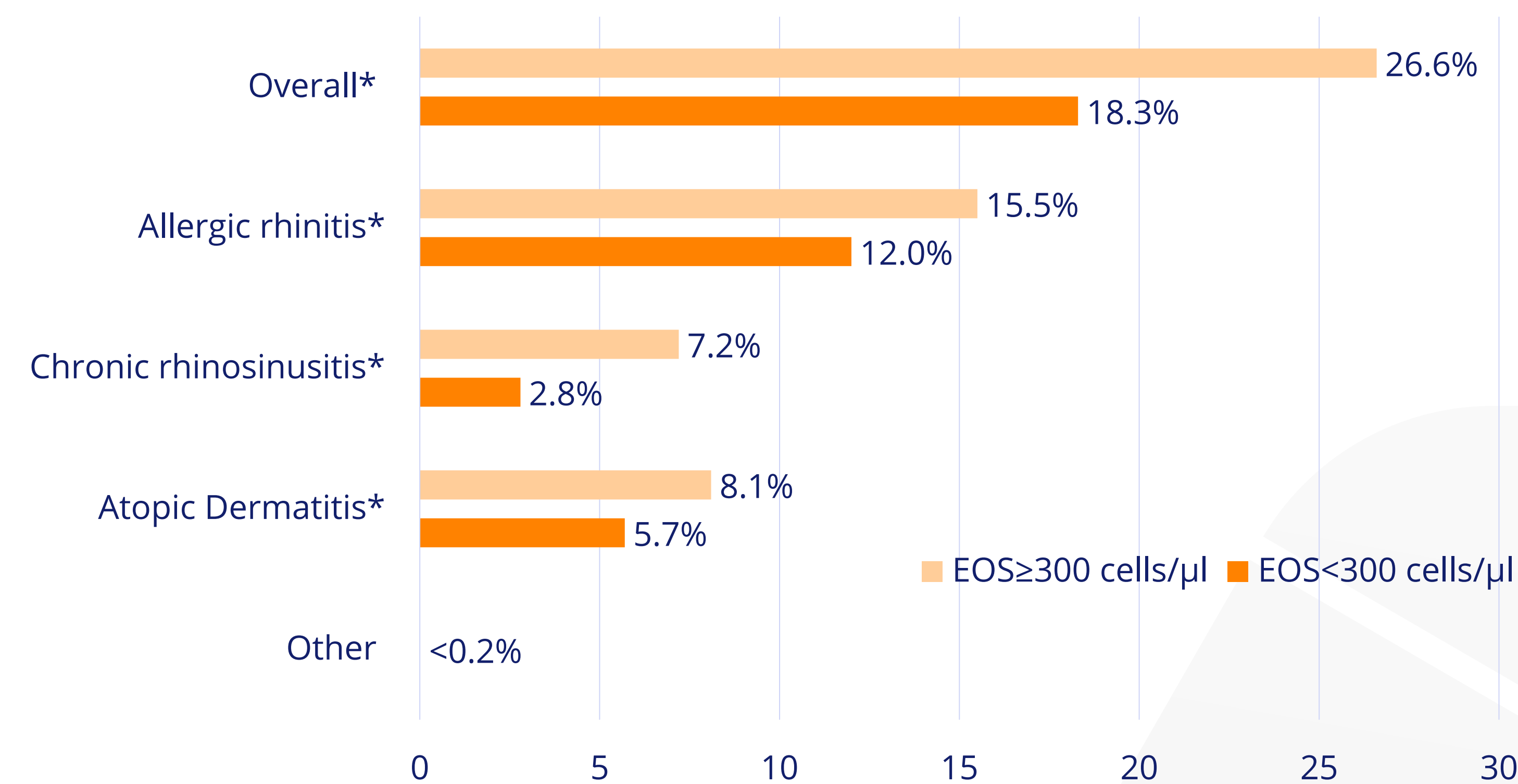
EOS \geq 150 (62.3%)

Study Population Baseline Characteristics

	Asthma Population	EOS < 300 cells/ μ l	EOS \geq 300 cells/ μ l	EOS < 150 cells/ μ l	EOS \geq 150 cells/ μ l
N (%)	52,742 (100%)	38,638 (73.3%)	14,104 (26.7%)	19,865 (37.7%)	32,877 (62.3%)
Mean age (SD), years	56.2 (8.3)	56.3 (8.2)	55.9 (8.4)	56.3 (8.2)	56.1 (8.3)
BMI	28.1 (5.3)	28.1 (5.3)	28.1 (5.2)	27.7 (5.2)	28.3 (5.3)
Age of death, mean (SD)	69.3 (7.9)	69.2 (8.0)	69.6 (7.9)	69.1 (8.0)	69.4 (7.9)
Male, n (%)	22,094 (41.9%)	15,465 (40.0%)	6,629 (47.0%)	7,344 (37.0%)	14,750 (44.9%)
Atopic Disease baseline, n (%)	10,767 (20.4%)	7,031 (18.2%)*	3,73 (26.5%)	3,356 (16.9%)*	7,411 (22.5%)
Type-2 inflammation comorbidities, n (%) ¹	10,815 (20.5%)	7,063 (18.3%)*	3,752 (26.6%)	3,374 (17.0%)*	7,441 (22.6%)

*p<0.001 ¹Atopic dermatitis, CRSwNP, CRSsNP, Allergic rhinitis, Chronic inducible urticaria, Chronic spontaneous urticaria, Chronic pruritus of unknown origin, Bullous pemphigoid, Eosinophilic esophagitis & Prurigo nodularis

Proportion of Asthma patients with a Type-2 inflammation-related comorbidity at baseline EOS \geq 300 cells/ μ l versus EOS <300 cells/ μ l



*Observed differences are significant, p<0.05

Incidence of Asthma-severe exacerbations

	Asthma Population	
	EOS < 300 cells/ μ l N= 38,638	EOS \geq 300 cells/ μ l N=14,104
Follow-up duration (years), median [Q1,Q3]	10.7 (1.4)	10.8 (1.4)
Patients with at least 1 exacerbation, n (%)	11,874 (30.7%)	4,966 (35.2%)
Mean number of exacerbations over the study period (SD)*	0.64 (1.5)	0.75 (1.5)*

*Observed differences are significant, p<0.05

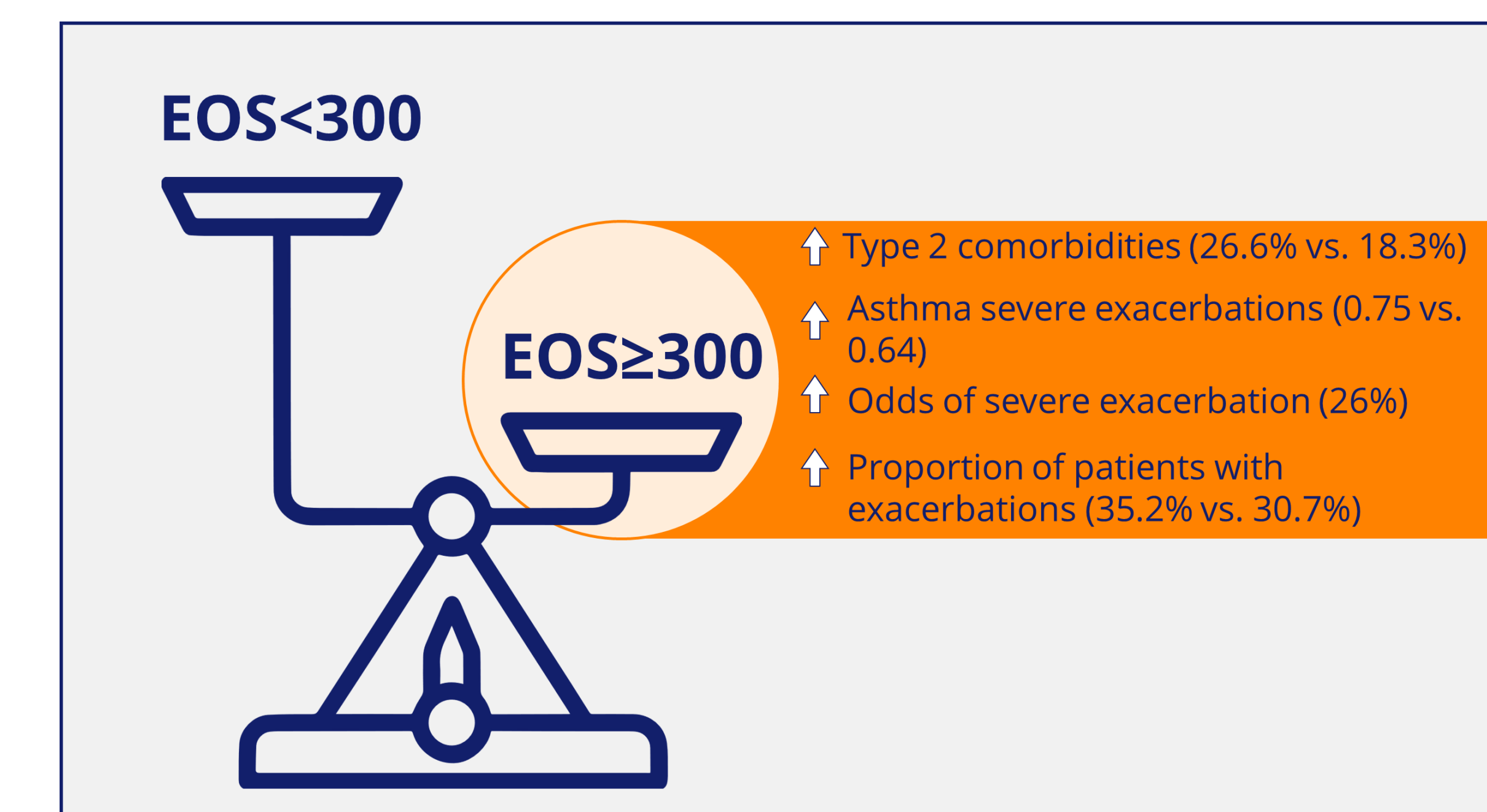
Univariate and multivariate logistic regression analysis

	Asthma Population			
	Univariate Analysis		Multivariate Analysis*	
	OR (95%CI)	p-value	OR (95%CI)	p-value
One or more exacerbation	1.22 (1.18-1.28)	<0.001	1.26 (1.21-1.32)	<0.001

*adjusted for age, gender, smoking status, type-2 inflammation comorbidities, Nitrogen Dioxide air pollution and BMI

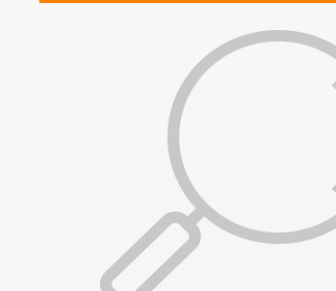


RESULTS SUMMARY



CONCLUSION

- > This study demonstrates that raised EOS are associated with increased disease burden, as measured by Asthma severe exacerbations, and the prevalence of type-2 inflammatory comorbidities.
- > The prevalence of Asthma patients with low blood eosinophils (EOS<300 cells/ μ l) is high at 73.3%



REFERENCES

- GINA. (2023). "A Global Strategy for Asthma Management and Prevention" available from : <https://ginasthma.org/wp-content/uploads/2023/05/GINA-2023-Full-Report-2023-WMS.pdf>
- UK Biobank. Enabling your vision to improve public health. 2021; Available from: <https://www.ukbiobank.ac.uk/#:~:text=UK%20Biobank%20is%20a%20large,half%20a%20million%20UK%20participants.&text=It%20is%20a%20major%20contributor,discoveries%20that%20improve%20human%20health.>