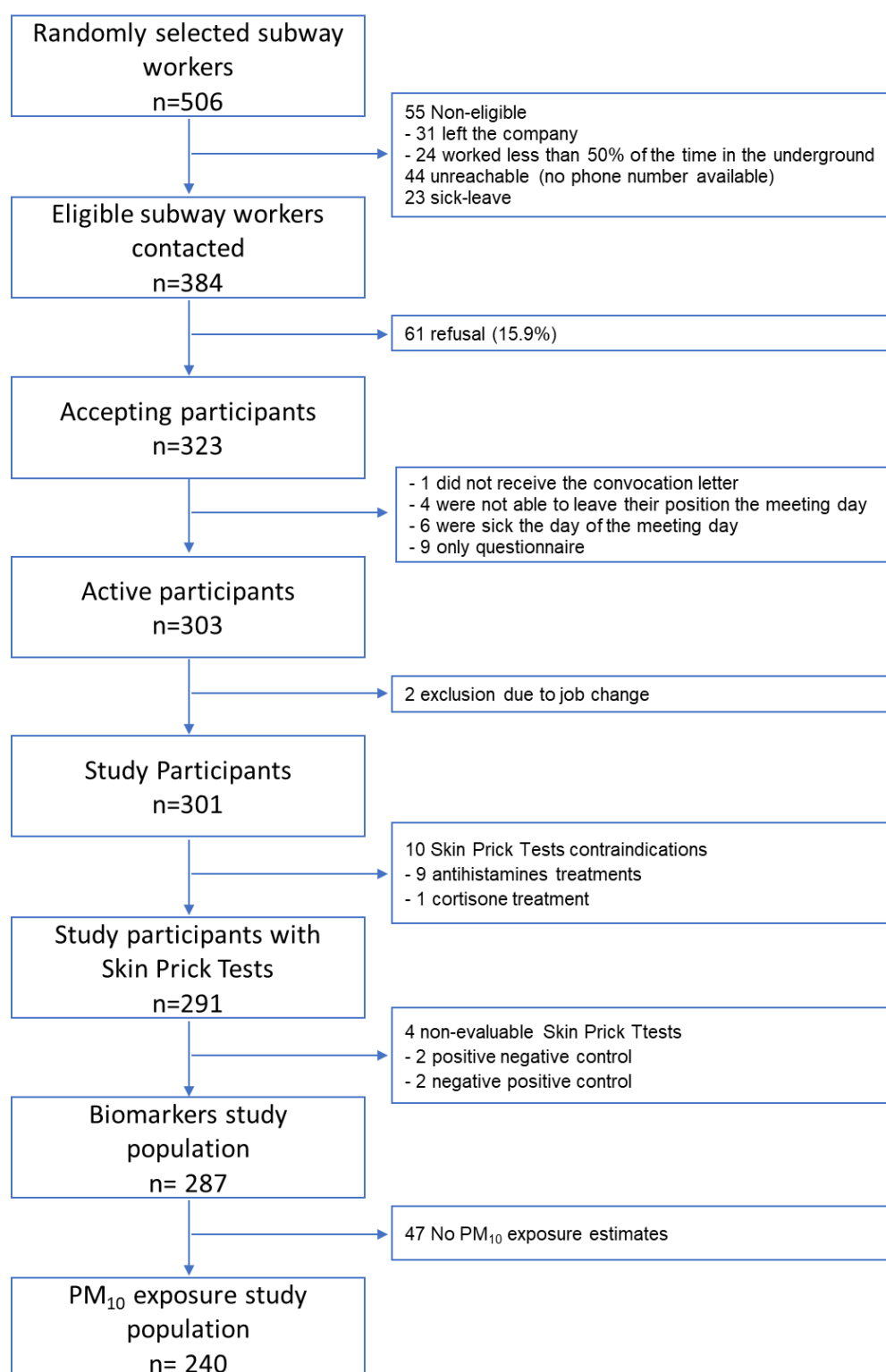


Supplementary materials for Online Open Access Repository

- **Supp figure 1:** Flow Chart of participant selection
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Supplementary figure 1: Flow Chart of participant selection



Abbreviations: PM₁₀ Particulate matter less than 10 microns

Supplementary Table 1: Sample description

Variable	PM ₁₀ exposure study population n=240	Biomarkers study population n=287
Gender, male, n (%)	102 (42.5%)	144 (50.2%)
Mean age, years, m (SD)	52.6 (5.3)	52.3 (5.3)
Age category		
40-45	31 (12.9%)	38 (13.2%)
45-50	30 (12.5%)	41 (14.3%)
50-55	80 (33.3%)	96 (33.4%)
55-60	89 (37.1%)	102 (35.5%)
60+	10 (4.2%)	10 (3.5%)
BMI (kg/m ²), m (SD)	26.0 (4.6) 4*	26.0 (4.3) 4*
Subway occupations, n (%)		
Station agents	121 (50.4%)	121 (42.2%)
Locomotive operators	119 (49.6%)	120 (41.8%)
Security guards	0 (0%)	46 (16.0%)
Smoking category, n (%)		
Non smoker	116 (48.3%)	144 (50.2%)
Current smoker	90 (37.5%)	105 (36.6%)
Ex-smoker	34 (14.2%)	38 (13.2%)
Tobacco exposure, pack-years, m (SD)	16.6 (15.4)	15.5 (14.9)
Employment duration in years, m (SD)	24.6 (6.5)	24.2 (6.3)
Exposure duration in years, m (SD)	23.3 (7.4)	23.1 (7.0)
Mean PM ₁₀ concentration at workplace in µg/m ³ , m (SD)	76.7 (34.5)	
Mean inhaled PM ₁₀ mass (iPM ₁₀) in µg/shift, m (SD)	0.6 (0.2)	-
Atopic sensitization	84 (35.0%)	111 (38.7%)
Mono-sensitization (1 allergen in SPT)	30 (12.5%)	39 (13.6%)
Poly-sensitization (>1 allergen in SPT)	54 (22.5%)	72 (25.1%)
Mugwort (<i>Artemisia vulgaris</i>)	10 (4.2%) 6*	12 (4.2%) 8*
Ragweed (<i>Ambrosia artemisiifolia</i>)	4 (1.7%) 6*	4 (1.4%) 8*
Timothygrass (<i>Phleum pratense</i>)	37 (15.4%) 6*	50 (17.4%) 8*
Birchtree (<i>Betula verrucosa</i>)	26 (10.8%)	29 (10.1%)
Cypress (<i>Cupressus Arizonica</i>)	7 (2.9%)	8 (2.8%)
Platane (<i>Platanus acerifolia</i>)	12 (5.0%)	14 (4.9%)
<i>Aspergillus fumigatus</i>	7 (2.9%)	9 (3.1%)
<i>Alternaria</i>	11 (4.6%)	12 (4.2%)
European Dust Mites (<i>Dermatophagoide pteronyssius</i>)	42 (17.5%)	57 (19.9%)
American Dust Mite (<i>Dermatophagoides farinae</i>)	37 (15.4%)	47 (16.4%)
Cat Air	17 (7.1%)	25 (8.7%)
Dog air	13 (5.4%)	17 (5.9%)
Asthma		
Ever asthma	21 (8.8%)	25 (8.7%)
Current asthma	12 (5.0%)	14 (4.9%)
Rhinitis		
Ever rhinitis	94 (39.2%)	113 (39.4%)
Current rhinitis	82 (34.2%)	100 (34.8%)
Eczema		
Ever Eczema	45 (18.8%)	55 (19.2%)
Current Eczema	27 (11.3%)	33 (11.5%)

Note: values shown are mean (SD) or number (%) of subjects where appropriate. * number of missing data (missing allergen extracts for SPT). Abbreviations: BMI body mass index, m mean, PM₁₀ Particulate matter less than 10 microns, SD standard deviation, SPT Skin Prick Tests. Lifetime smoking exposure was calculated by multiplying the estimation of cigarette packs smoked per day by the number of years smoking.

Supplementary Table 2: Relationship between EBC nitrite or nitrate levels and atopic sensitization

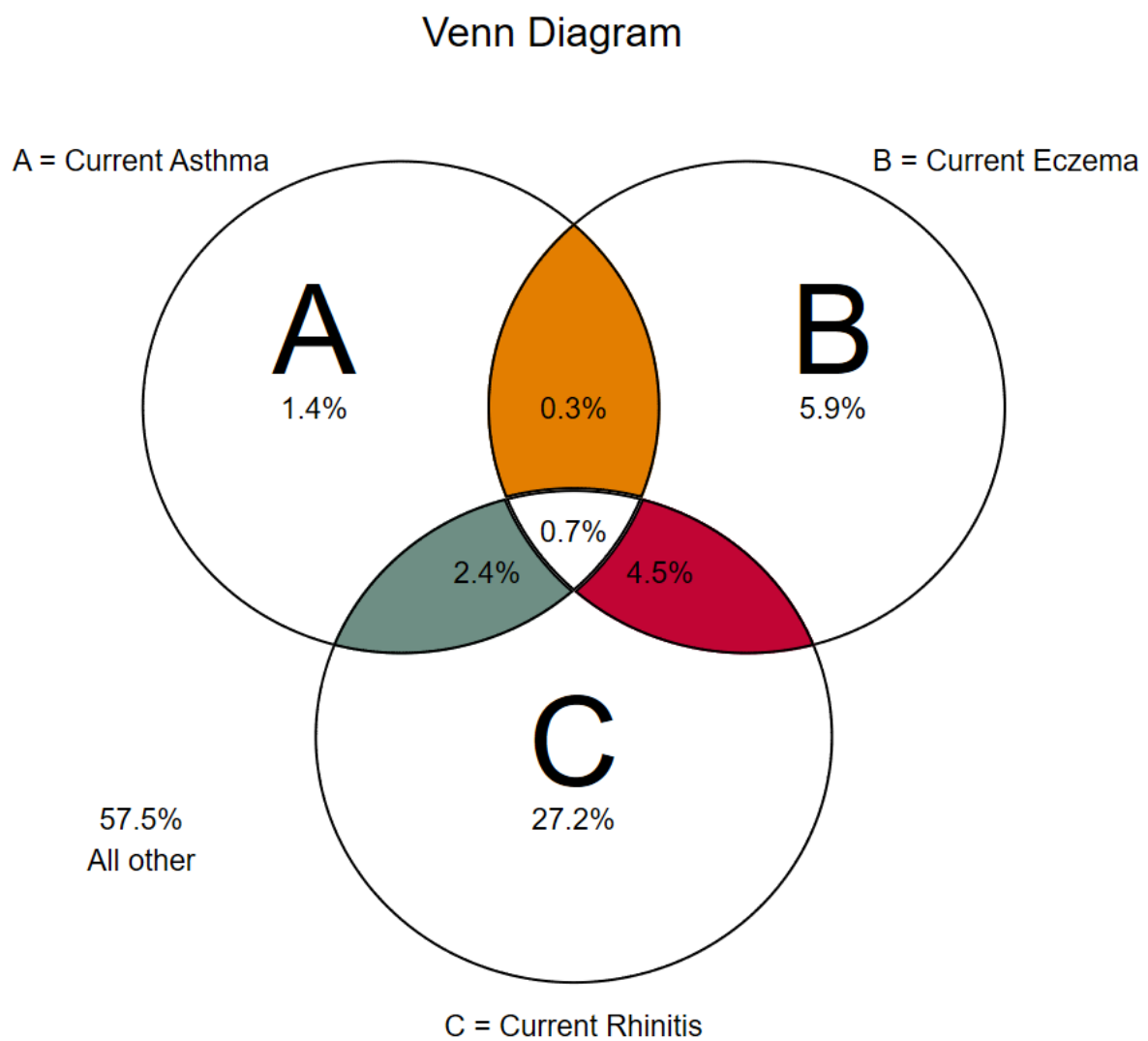
Logistic regression adjusted model	n	Nitrite (μmol/L)					Nitrate (μmol/L)				
		aOR	95%-CI			<i>p</i> ^a	aOR	95%-CI			<i>p</i> ^a
Atopic sensitization	280	2.95	1.21	-	7.19	0.02	2.81	0.94	-	8.45	0.07
Poly-Atopic sensitization (vs no atopic sensitization)	243	3.94	1.35	-	11.54	0.01	2.51	0.70	-	9.01	0.16

Logistic regression adjusted models are adjusted on age, sex, and smoking status.

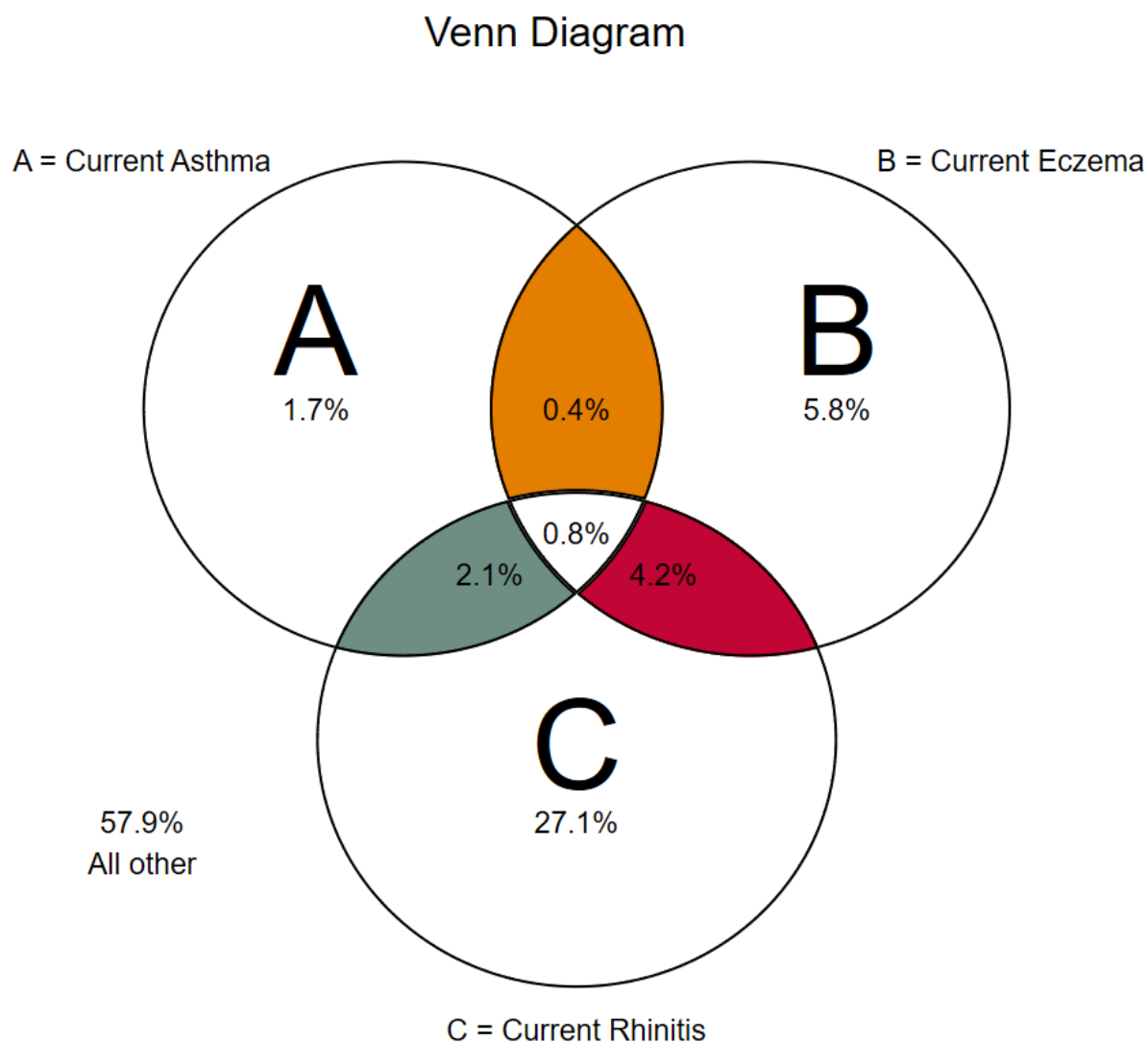
^a Associations with a p-value of <0.05 are bolded.

Abbreviations: aOR adjusted Odds Ratio, CI confidence interval, OR Odds Ratios, *p* p-value.

Supplementary Figure 2: Circular Venn diagram illustrating the prevalence of current rhinitis, current asthma and current eczema; and the overlap between the conditions (Biomarkers study population n=287)



Supp figure 3: Circular Venn diagram illustrating the prevalence of current rhinitis, current asthma and current eczema; and the overlap between the conditions (PM₁₀ exposure study population n=240)



Supplementary Material Table 3: Eight measured biomarkers concentration

Biomarker Median [IQR], missing data	No Atopic sensitization n = 176	Atopic sensitization n = 111	Total n=287	[0;LOD] n (%)	[LOD;LOQ] n (%)	LOD Value	LOQ value
Nitrite (μmol/L)	1.0 [0.7-1.7], 5	1.2 [0.7-1.7], 2	1.1 [0.7-1.7], 7	1 (0.4%)	8 (2.8%)	0,1	0,3
Nitrate (μmol/L)	12.5 [8.3-15.9], 5	13.3 [9.4-16.3], 2	12.6 [8.8-16.0], 7	1 (0.4%)	3 (1.1%)	0,25	0,75
Lactate (μmol/L)	2.5 [1.0-4.5], 5	1.8 [0.4-4.1], 2	2.2 [0.6-4.4], 7	14 (4.9%)	30 (10.5%)	0,1	0,3
Butyrate (μmol/L)	1.0 [0.5-1.7], 5	0.7 [0.4-1.6], 2	0.9 [0.4-1.7], 7	3 (1.1%)	41 (14.3%)	0,1	0,3
Formate (μmol/L)	1.5 [1.0-2.1], 5	1.4 [1.1-2.1], 2	1.5 [1.1-2.1], 7	2 (0.7%)	1 (0.4%)	0,1	0,3
Propionate (μmol/L)	9.6 [4.6-18.3], 5	9.2 [5.0-16.0], 2	9.3 [4.7-17.2], 7	1 (0.4%)	0 (0.0%)	0,1	0,3
Acetate (μmol/L)	35.9 [22.8-58.2], 5	34.8 [21.8-49.1], 2	35.1 [22.5-55.5], 7	0 (0.0%)	0 (0.0%)	0,25	0,75
MDA (pg/mL)	268.9 [164.7-434.1], 1	239.8 [124.8-396.6], 2	261.3 [147.9-411.3], 3	6 (2.1%)	17 (5.9%)	25	75

Abbreviations: IQR Interquartile range, LOD Limit of detection, LOQ Limit of quantification, MDA Malondialdehyde

Supp material 1: List of the 12 allergen extracts

We used the following allergen extracts:

- Mugwort (*Artemisia vulgaris*)
- Ragweed (*Ambrosia artemisiifolia*)
- Timothygrass (*Phleum pratense*)
- Birchtree (*Betula verrucosa*)
- Cypress (*Cupressus Arizonica*)
- Platane (*Platanus acerifolia*)
- *Aspergillus fumigatus*
- *Alternaria*
- European Dust Mites (*Dermatophagoïde pteronyssius*)
- American Dust Mite (*Dermatophagoides farinae*)
- Cat Air
- Dog air