

Risk of respiratory allergy depends on the earliness and multiplicity of allergic sensitization, involved allergens, and allergen-specific IgE levels

To the article:

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Introduction

For clarifying the relationships between the natural history of allergic sensitization and the development of allergic diseases in childhood, we aimed to:

- Identify **allergic sensitization profiles** in children
- Identify **allergic morbidity profiles** in children
- Study **relationships between profiles** of allergic sensitization and of allergic morbidity

Methods

The study was conducted in the on-going French **population-based prospective Pollution and Asthma Risk: an Infant Study (PARIS) birth cohort**.

Allergic sensitization profiles were based on allergen-specific IgE levels measured twice:

- 4 aeroallergens and 12 food allergens at age 18 months
 - 7 aeroallergens and 12 food allergens at age 8 years
- Identified by **k-means** using "kmeans.ddR" R package

Allergic morbidity profiles were based on:

- Symptoms, symptom severity, treatments, and lifetime doctor-diagnoses of asthma, allergic rhinitis, and atopic dermatitis
 - Lower respiratory infections before age 2 years
- Identified by **latent class analysis** using "poLCA" R package

Relationships between profiles were studied by **multinomial logistic regression**:

- Adjusted** for gender, history of allergy, gestational age, season of birth, birth weight, body mass index at 8 years, exclusive breastfeeding, socio-economic status, parental smoking (prenatal, postnatal, and/or current), and furred pet ownership
- Weighted** by morbidity latent class membership probabilities

Results

714 children were included in this study.

5 allergic sensitization profiles were identified (Figure 1):

- Not or mildly sensitized $N = 548$ (76.8%)
- Mainly sensitized to egg or milk at 18 months $N = 35$ (4.9%)
- Strongly sensitized to dust mite at 8 years $N = 64$ (9.0%)
- Sensitized to timothy grass at 8 years $N = 38$ (5.3%)
- Early and persistently sensitized $N = 29$ (4.1%)

5 allergic morbidity profiles were identified (Figure 2):

- No allergic disease in childhood $N = 389$ (54.5%)
- Asthma-like symptoms at 18 months only $N = 114$ (16.0%)
- Asthma at 8 years, with or without allergic rhinitis $N = 48$ (6.7%)
- Allergic rhinitis at 8 years without asthma $N = 61$ (8.5%)
- Isolated atopic dermatitis in childhood $N = 102$ (14.3%)

Regarding **relationships between profiles** (Table 1):

- The highest risk** of asthma and allergic rhinitis was observed in children **strongly sensitized to dust mite at 8 years**
- An increased risk** of asthma and allergic rhinitis was observed in children **early and persistently sensitized** or **sensitized to timothy grass at 8 years**

Conclusion

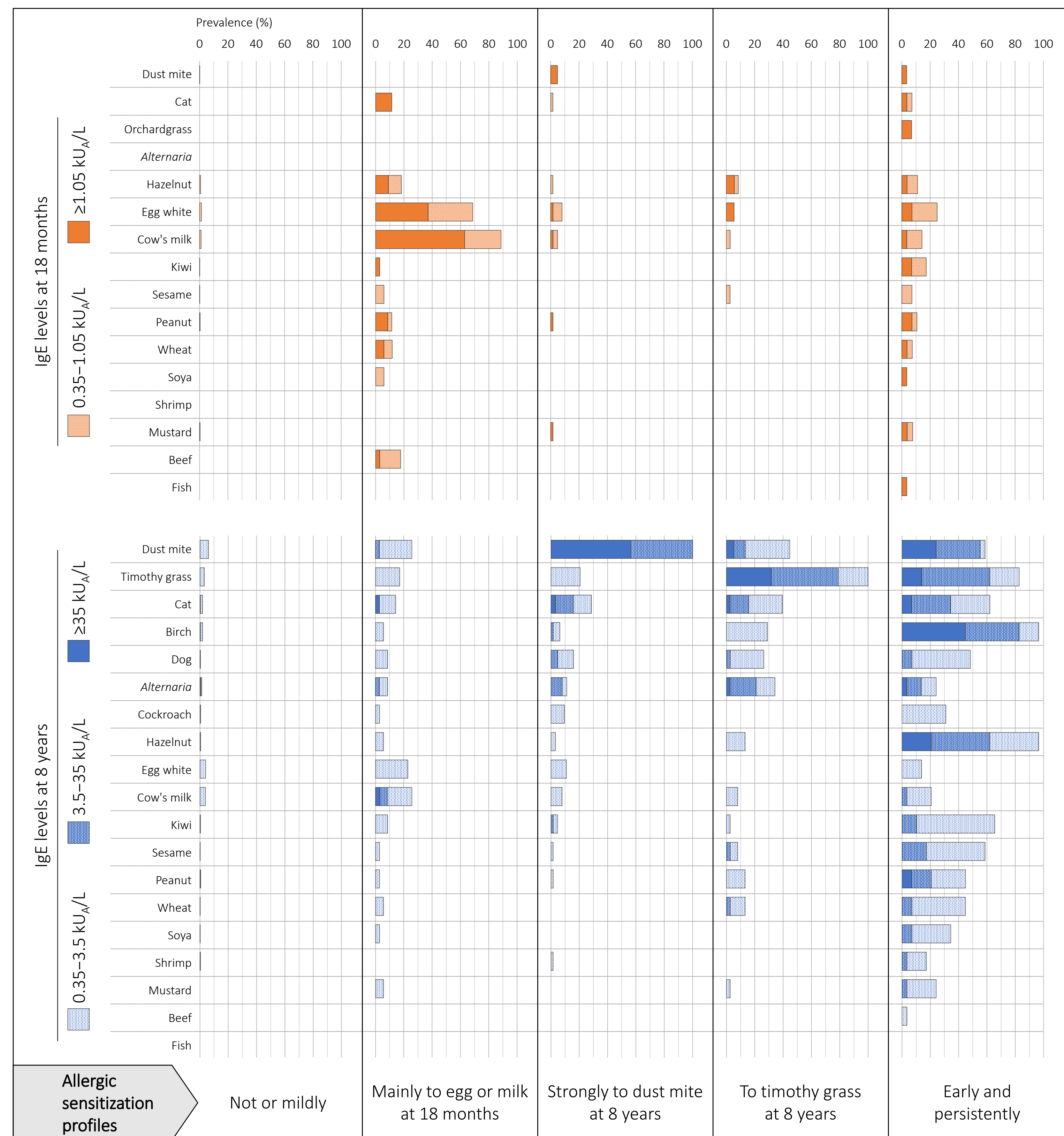
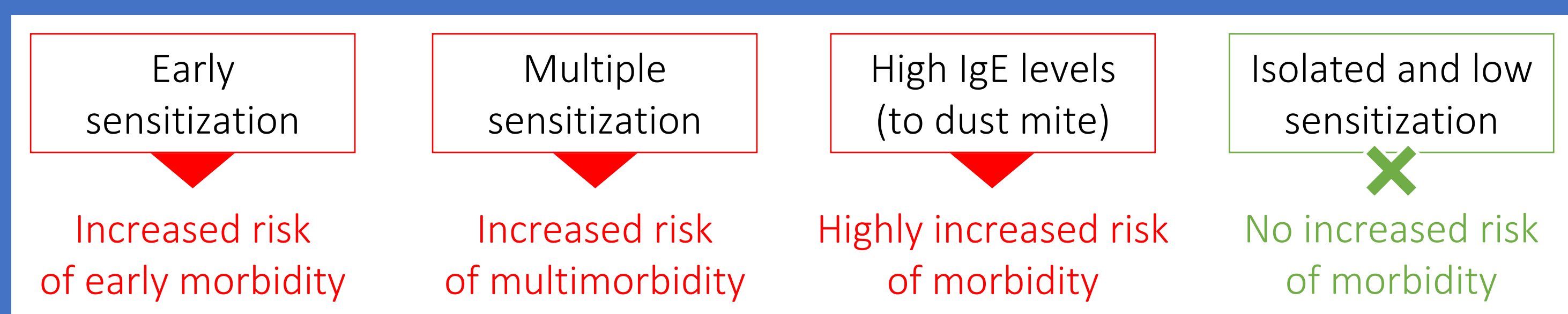


Figure 1. Unsupervised identification of allergic sensitization profiles over the first 8 years of life in PARIS birth cohort children ($N = 714$).

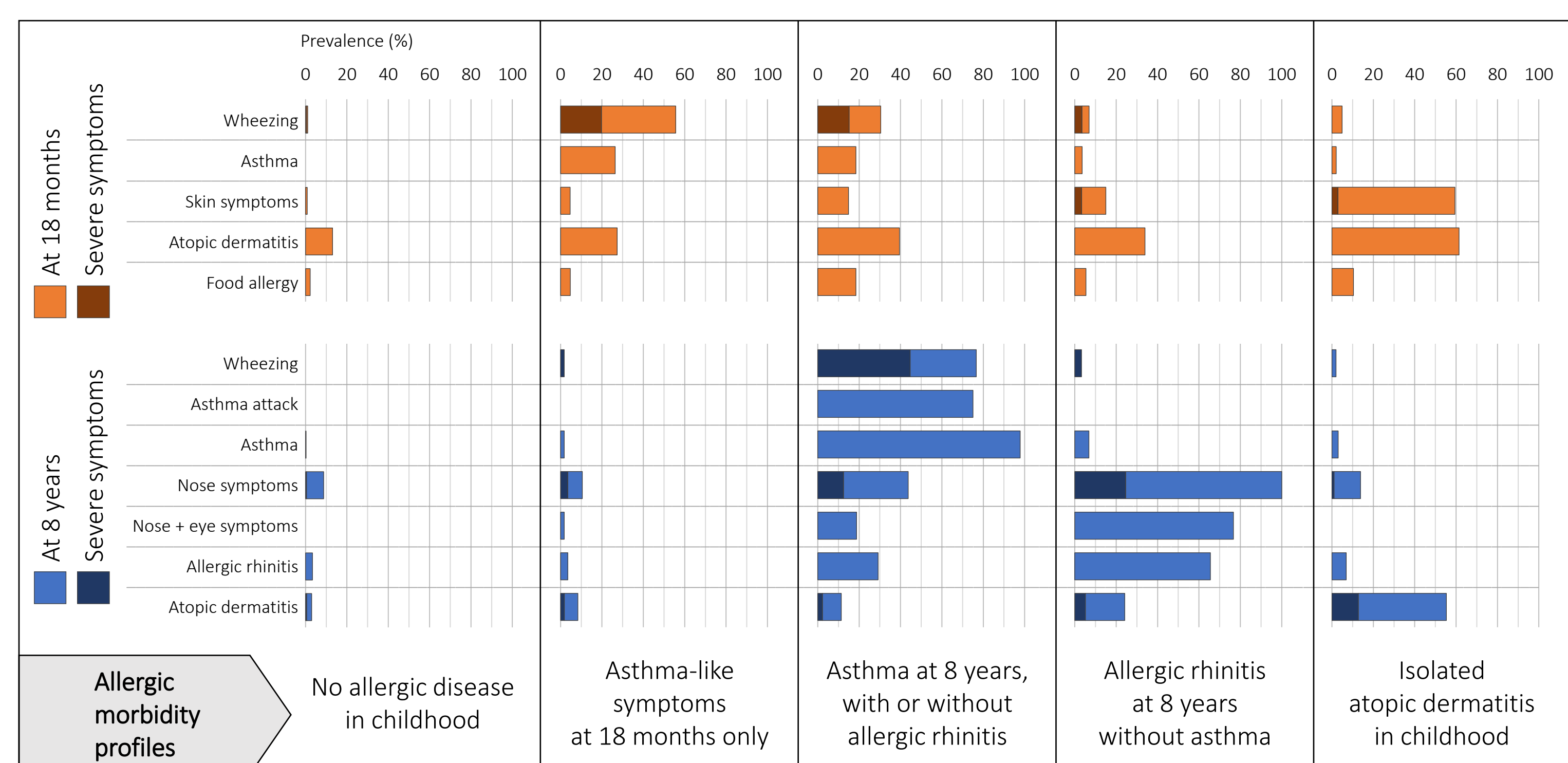


Figure 2. Unsupervised identification of allergic morbidity profiles over the first 8 years of life in PARIS birth cohort children ($N = 714$).

Table 1. Associations between profiles of allergic sensitization and of allergic morbidity over the first 8 years of life in PARIS birth cohort children ($N = 714$).

Allergic morbidity profiles	Asthma-like symptoms at 18 months only		Asthma at 8 years, with or without allergic rhinitis		Allergic rhinitis at 8 years without asthma		Isolated atopic dermatitis in childhood	
	OR (95%CI)	p-value	OR (95%CI)	p-value	OR (95%CI)	p-value	OR (95%CI)	p-value
Not and mildly	1		1		1		1	
Mainly to egg or milk at 18 months	1.47 (0.61–3.53)	0.39	4.59 (1.34–15.69)	0.015	3.23 (0.98–10.63)	0.054	2.43 (1.00–5.92)	0.051
Strongly to house dust mite at 8 years	1.64 (0.67–4.01)	0.28	10.46 (4.40–24.88)	<0.001	19.44 (9.15–41.30)	<0.001	2.42 (1.10–5.31)	0.027
To timothy grass pollen at 8 years	1.16 (0.39–3.42)	0.79	5.84 (1.96–17.41)	0.002	13.42 (5.37–33.51)	<0.001	1.62 (0.58–4.48)	0.36
Early and persistently	–	–	5.22 (1.32–20.57)	0.018	14.33 (4.84–42.46)	<0.001	5.11 (2.01–13.00)	0.001

OR between "Early and persistently sensitized" and "Asthma-like symptoms at 18 months only" profiles could not be assessed due to a lack of subjects.

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