Occupational exposure to cleaning products and asthma in hospital workers.

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Online supplement
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ASTHMA AND CLINICAL CHARACTERISTICS

In the Epidemiological study on the Genetics and Environments of Asthma (EGEA), at both the baseline study (EGEA1, 1991-1995) and the follow-up (EGEA2, 2003-2007), complete examination included a detailed questionnaire (administered by an interviewer) and a medical examination. Lung function tests included measure of Forced Expiratory Volume in one second (FEV_1) and methacholine bronchial challenge test (not performed in those with FEV_1<80% predicted or post-diluents FEV_1<90%). Bronchial responsiveness at 4 mg was evaluated by a decline of 20% in FEV_1 (PD20 $\leq$ 4 mg). Skin prick tests (SPT) to 12 aeroallergens (cat, *Dermatophagoides pteronyssinus*, *Blattela germanica*, olive, birch, *Parieteria judaica*, timothy grass, ragweed pollen, *Aspergillus*, *Cladosporium herbarum*, *Alternaria tenuis*, cypress) were performed. SPT to each allergen was positive for a mean wheal diameter $\geq$ 3 mm than the negative control. Total serum IgE were assessed from blood samples in a centralized laboratory.

ANALYSES OF THE ASSOCIATIONS BETWEEN OCCUPATIONAL EXPOSURE TO LATEX IN HOSPITAL WORKERS AND CURRENT ASTHMA

Three estimates of exposure to latex were available in hospital workers: self-report, expert assessment, and the asthma-specific job-exposure matrix (JEM). Self-reported exposure to latex was assessed in job-specific questionnaires for healthcare workers, with questions regarding the frequency of use of powdered and non-powdered latex gloves. In the expert assessment, and in the application of the asthma JEM (expert reevaluation step), the period of exposure (calendar year) was taken into account to assign exposure estimates, in relation to modification in use of powdered latex gloves according to hospital gloves policies. These three estimators were used alone and combined to study the relationship between exposure to latex in hospital workers and current asthma, in all subjects and in women only.

Results are presented in table E3. Using any of the assessment method independently, no association was observed between exposure to latex and current asthma (table E3). For self-reported exposure, similar results (not shown) were observed when calendar year of exposure or the number of pairs of gloves used per day was taken into account. When combining the asthma JEM (exposure to latex) and expert-assessment, more elevated OR were observed but the associations did not reach significance. Finally, in those classified as exposed to industrial cleaning products according to the asthma JEM, significant associations were observed for the use of latex estimated by the expert assessment or self-report.

Table E1. Description of various clinical characteristics according to gender and asthma status

	Men			Women		
	Never asthma	Current asthma	p	Never asthma	Current asthma	p
n	143	112		315	154	
Status in the study, %						
Case	0	55.4	-	0	48.7	-
Sibling	59.4	35.7		60.6	44.8	
Spouse	8.4	1.8		10.2	1.3	
Control	32.2	7.1		29.2	5.2	
Age at asthma-onset > 16 years old	-	24.8	-	-	41.6	-
FEV_1, n	118	99		285	144	
<80% predicted, %	5.9	28.3	<0.0001	5.6	16.7	0.0002
Methacholine challenge, n	69	51		184	84	
PD20≤ 4mg, %	13.0	66.7	<0.0001	37.0	77.4	<0.0001
SPT, n	108	95		269	98	
Positive SPT, %	40.7	83.2	<0.0001	35.7	74.8	<0.0001
Total IgE, n	120	99		287	144	
≥100 IU/ml, %	54.8	45.2	<0.0001	24.4	54.9	<0.0001

FEV1: Forced expiratory volume in one second; IgE : immunoglobulin E; PD20≤ 4mg: Provocative Dose Causing a 20% fall in FEV1 ≤ 4mg methacholine; SPT: Skin Prick Tests ;

Table E2. Associations between current asthma and frequency of exposure to cleaning task and products in female hospital workers, according to self-report alone and combined with asthma JEM

	Self-report		Self-report + asthma JEM	
	n: As-/As+	Adjusted* OR (95% CI)	n: As-/As+	Adjusted* OR (95% CI)
Non exposed (ref.)	**222 / 111**	**1**	**222 / 111**	**1**
Cleaning / disinfecting task				
1-3 days/week	14/2	-	2/2	-
4-7 days/week	54/35	1.39 (0.83 – 2.32)	19/18	1.85 (0.89 – 3.82)
Bleach				
1-3 days/week	14/4	-	3/2	-
4-7 days/week	18/14	1.73 (0.83 – 3.59)	9/10	2.28 (0.96 – 5.41)
Alcohol				
1-3 days/week	10/4	-	1/2	-
4-7 days/week	36/15	0.92 (0.47 – 1.80)	10/6	1.17 (0.40 – 3.43)
Sprays				
1-3 days/week	11/6	1.10 (0.36 – 3.35)	4/2	-
4-7 days/week	22/18	1.49 (0.74 – 3.01)	10/13	2.26 (0.90 – 5.67)

As-, never asthma; As+, current asthma; CI, Confidence Interval; OR, Odds-Ratio.

* Adjusted for age and smoking habits, and taking into account familial dependence.

Table E3. Associations between exposure to latex in hospital workers and current asthma, according to exposure assessment method

	All		Women	
	n: As-/As+	Adjusted* OR (95% CI)	n: As-/As+	Adjusted† OR (95% CI)
Non exposed (ref.)	339/206	1	222 / 111	1
Self-report, exposed ≥ 1 day/week				
All (powdered or non powdered) latex gloves	67/36	0.92 (0.59 – 1.42)	53/25	0.97 (0.56 – 1.68)
Non powdered latex gloves	43/29	1.15 (0.71 – 1.87)	33/20	1.23 (0.66 – 2.30)
Powdered latex gloves	51/26	0.84 (0.51 – 1.39)	40/17	0.86 (0.46 – 1.61)
Self-report (all latex gloves), exposed 4-7 days/week	47/25	0.90 (0.53 – 1.52)	36/18	1.05 (0.56 – 1.94)
Expert assessment	70/43	1.10 (0.73 – 1.68)	58 / 32	1.14 (0.69 - 1.89)
Expert assessment, moderate to high intensity	41/28	1.14 (0.67 – 1.88)	33/21	1.23 (0.68 – 2.22)
Asthma JEM, latex	62/37	1.09 (0.71 – 1.69)	51/29	1.16 (0.67 – 1.99)
Asthma JEM, latex + self-report‡	28/21	1.32 (0.73 – 2.40)	23/16	1.37 (0.69 – 2.71)
Asthma JEM, latex + expert assessment§	29/26	1.59 (0.92 – 2.77)	25/20	1.55 (0.83 – 2.89)
Asthma JEM, cleaning products + self-report‡	9/12	2.29 (1.00 – 5.23)	8/10	2.29 (0.89 – 5.86)
Asthma JEM, cleaning products + expert assessment§	11/15	2.22 (1.00 – 4.90)	10/13	2.28 (0.96 – 5.40)

As-, never asthma; As+, current asthma; CI, Confidence Interval; JEM, job-exposure matrix; OR, Odds-Ratio.

* Adjusted for sex, age and smoking habits, and taking into account familial dependence. † Adjusted for age and smoking habits, and taking into account familial dependence. ‡ All latex gloves, exposed 4-7 days/week. § Moderate to high intensity.