

Domestic exposure to irritant cleaning agents and asthma in women

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Supplementary materials

Methods

Evaluation of ICS refunds

ICS refunds were evaluated with the following ATC codes (R03BA, R03AK06-13, R03AL08-9), which corresponds to the drugs selected by Sanchez et al, in another article (1). Subsequently, we defined asthma with ICS refunds (3-level): never asthma (reference group), ICS treated (at least ICS recorded in the last 12 months in the database) and non-ICS treated (no ICS treatment recorded in the database) current asthma.

Used questionnaire definitions of allergic rhinitis

Allergic Rhinitis (AR) ever was defined by a positive answer to nasal symptoms: ‘Have you had a problem with sneezing or runny or blocked nose when you did not have a cold or the flu?’ and a positive answer to ‘Have you ever had allergic rhinitis?’ or ‘Have you ever had hay fever?’. **Current AR** was further defined among participants with AR ever by a positive answer to nasal symptoms in the last 12 months.

Table S1

ATC codes used for screening the MGEN drug refund database, specifically indicated of pathologies of interest

ATC Class	Level 2 ATC code	Level 5 ATC code
Dermatological agents for topic use – agents for dermatitis excluding corticosteroids	D11	D11AH01, D11AH04, D11AH05
Nasal preparations for topic use – antiallergic and corticosteroids	R01	R01AC01, R01AC03, R01AC05, R01AD01, R01AD04, R01AD05, R01AD07-11, R01AD12, R01AD52,
Antihistamines for systemic use	R06	R06AB01, R06AB02, R06AB52, R06AB54, R06AD07, R06AE07, R06AE09, R06AX13, R06AX17, R06AX22, R06AX25-29
Opthalmological agents for topic use – Corticosteroids not associated	S01	S01BA01, S01BA07, S01BA13
Opthalmological agents for topic – Decongestants and antiallergics, not sympathomimetics	S01	S01GX01, S01GX02, S01GX03, S01GX04, S01GX05, S01GX07, S01GX08, S01GX09, S01GX10

Table S2

ATC codes of drugs with unspecific indication of interest

Classe ATC	Code ATC niveau 2	Codes ATC niveau 5
Dermatological agents for topic use – antipsoriatics	D05	D05AD02
Dermatological agents for topic use – corticosteroids	D07	D07AA01, D07AA02, D07AB02, D07AB08, D07AC01, D07AC05, D07AC06, D07AC11, D07AC14, D07AC16, D07AC17, D07AC19, D07AD01, D07BC01
Nasal preparations for topic use – sympathomimetics and others	R01	R01AA05, R01AB05, R01AB08, R01AX03, R01BA52
Antihistamines for systemic use – promethazine and oxatomide	R06	R06AD02, R06AE06

Table S3

Population characteristics comparing excluded data in two groups versus the included group.

	Included	Excluded – missing data	Excluded – asthma data
N	12758	3814	2832
Age (years), mean ± s.d	69.7 ± 6.1	72.0 ± 6.7^a	69.4 ± 6.0
BMI (Body Mass Index), n (%)	12758	3814^a	2832
<20	12.5	11.3	11.6
[20-25[55.4	54.1	54.3
[25-30[24.8	26.1	26.0
≥30	7.3	8.5	8.1
Smoking status, n (%)	12704	3744^a	2816^a
<i>Never smoker</i>	53.8	56.5	50.3
<i>Ex-smoker</i>	41.9	38.5	45.4
<i>Current smoker</i>	4.3	5.0	4.4
Education level, n (%)	12267	3623^a	2719^a
< <i>high school diploma</i>	10.7	18.2	10.5
<i>High school to 2-level university diploma</i>	52.0	48.6	48.0
<i>3-level or 4-level university diploma</i>	19.2	15.8	20.3
> <i>5-level university diploma</i>	18.1	17.3	21.3
At least 1 irritant^b /week, n (%)	5757 (46.7)	1597 (53.2)^a	1311 (47.9)
At least 1 spray/week, n (%)	2866 (23.1)	804 (27.1)^a	648 (23.6)
Allergic Rhinitis, current (questionnaire), n (%)	2701 (25.5)	683 (26.3)	851 (39.3)^a
Allergic comorbidities (refund database), 12 months, n (%)	4615 (36.2)	1344 (35.2)	1221 (43.1)^a
ICS^c (refund database), 12 months, n (%)	1825 (14.3)	593 (15.6)	486 (17.2)^a

^a p-value of the chisq test for difference between included and excluded group of interest^b domestic irritant cleaning products used, grouping 4 categories : ammonia, bleach, solvents and acids^c at least one ICS refunded in the last 12 months (ATC codes : R03BA, R03AK06-13, R03AL08-9)

Table S4

Associations between domestic irritants use, in frequency or number per week, and current asthma stratified on household help

	Household help			
	No n=7366		Yes n=4908	
	n	Adjusted OR ^a [95%CI]	n	Adjusted OR ^a [95%CI]
At least 1 irritant^b/week				
<i>No (reference)</i>	3818	1	2733	1
<i>Yes</i>	3548	1.20 [1.07-1.35]	2175	1.18 [1.03-1.34]
Number of irritants used/week^b				
<i>1</i>	2629	1.15 [1.01-1.30]	1594	1.13 [0.98-1.34]
<i>2</i>	786	1.22 [1.01-1.47]	346	1.24 [1.00-1.54]
<i>≥3</i>	133	2.41 [1.67-3.48]	93	1.72 [1.11-2.66]
p for trend		<0.0001		0.0025
Frequency of irritants used/week^b				
<i>1-3d/week</i>	2898	1.14 [1.01-1.29]	1781	1.13 [0.98-1.29]
<i>4-7d/week</i>	650	1.47 [1.21-1.80]	394	1.41 [1.12-1.78]
p for trend		<0.0001		0.0027

^a adjusted for age, smoking status and BMI

^b domestic irritant cleaning products used, grouping 4 categories: ammonia, bleach, solvents and acids

Table S5

Associations between domestic irritants use, in frequency or number per week, and current asthma stratified on spray use

	At least 1 spray used per week			
	No n=9267		Yes n=2785	
	n	Adjusted OR ^a [95%CI]	n	Adjusted OR ^a [95%CI]
At least 1 irritant^b/week				
<i>No (reference)</i>	5491	1	971	1
<i>Yes</i>	3776	1.12 [1.01-1.24]	1814	1.19 [0.99-1.44]
Number of irritants used/week^b				
<i>1</i>	2965	1.10 [0.98-1.22]	1156	1.09 [0.89-1.34]
<i>2</i>	730	1.20 [0.99-1.44]	519	1.18 [0.92-1.52]
<i>≥3</i>	81	1.43 [0.87-2.35]	139	2.34 [1.61-3.39]
p for trend		0.0101		0.0004
Frequency of irritants used/week^b				
<i>1-3d/week</i>	3207	1.09 [0.98-1.21]	1362	1.12 [0.92-1.36]
<i>4-7d/week</i>	569	1.31 [1.07-1.60]	452	1.44 [1.12-1.85]
p for trend		0.0065		0.0071

^a adjusted for age, smoking status and BMI

^b domestic irritant cleaning products used, grouping 4 categories : ammonia, bleach, solvents and acids

Table S6

Associations between domestic irritants use, in frequency or number per week, and current asthma with or without ICS refunds

	n, total	Current asthma, No ICS ^a		Current Asthma, ICS ^a	
		n	Adjusted OR ^b [95%CI]	n	Adjusted OR ^b [95%CI]
At least 1 irritant^c/week					
<i>No (reference)</i>	6551	705	1	673	1
<i>Yes</i>	5723	736	1.22 [1.09-1.37]	644	1.12 [0.99-1.25]
Number of irritants used/week^c					
<i>1</i>	4223	520	1.16 [1.03-1.31]	461	1.07 [0.94-1.22]
<i>2</i>	1274	165	1.22 [1.02-1.47]	152	1.19 [0.99-1.44]
<i>≥3</i>	226	51	2.52 [1.81-3.52]	31	1.61 [1.08-2.40]
p for trend			<0.0001		0.0092
Frequency of irritants used/week^c					
<i>1-3d/week</i>	4679	582	1.17 [1.04-1.32]	506	1.07 [0.94-1.21]
<i>4-7d/week</i>	1044	154	1.47 [1.21-1.78]	138	1.35 [1.11-1.65]
p for trend			<0.0001		0.0084

^a at least one ICS refunded in the last 12 months

^b adjusted for age, smoking status and BMI

^c domestic irritant cleaning products used, grouping 4 categories : ammonia, bleach, solvents and acids

Table S7

Associations between weekly use of domestic irritants use and allergic or non-allergic asthma, according to various outcome definition based on drug reimbursements

	n, total	Non-allergic asthma		Allergic asthma	
		n	Adjusted OR ^a [95%CI]	n	Adjusted OR ^a [95%CI]
At least 1 irritant^b/week					
Main analysis					
<i>No (reference)</i>	6551	590	1	788	1
<i>Yes</i>	5723	581	1.15 [1.02-1.30]	799	1.19 [1.07-1.32]
2 reimbursements in the last 12 months					
<i>No (reference)</i>	6551	789	1	589	1
<i>Yes</i>	5723	764	1.13 [1.01-1.26]	616	1.23 [1.09-1.38]
Unspecific ATC codes					
<i>No (reference)</i>	6551	530	1	848	1
<i>Yes</i>	5723	494	1.09 [0.96-1.24]	886	1.22 [1.10-1.35]
Reference group without allergic comorbidities					
<i>No (reference)</i>	5060	590	1	788	1
<i>Yes</i>	4356	581	1.19 [1.05-1.35]	799	1.23 [1.10-1.38]

^a adjusted for age, smoking status and BMI

^b domestic irritant cleaning products used, grouping 4 categories: ammonia, bleach, solvents and acids

^c at least one ICS refunded in the last 12 months (ATC codes: R03BA, R03AK06-13, R03AL08-9)

ATC: Anatomical Therapeutic Chemical

Figure S1

Associations between domestic irritants use, in frequency or number per week, and current asthma with or without allergic rhinitis evaluated by questionnaire

