

Direct and indirect costs of allergic and non-allergic rhinitis in the Netherlands

To the Editor,

Chronic rhinitis is a symptomatic inflammation of nasal mucosa that lasts at least 12 weeks per year. Both allergic (AR) and non-allergic (NAR) rhinitis are highly prevalent: they affect about 30% and 10% of population, respectively.¹ About 30% of patients with chronic rhinitis have a mixed form, and several endotypes of chronic rhinitis have been described.² Considering the high prevalence and the impact on general well-being,³ chronic rhinitis has a significant financial impact due to direct costs (medications, healthcare visits etc) and indirect costs (absenteeism and presenteeism). To our knowledge, no data on financial costs of non-allergic rhinitis are currently available.

In order to estimate direct and indirect costs of allergic and non-allergic rhinitis in the Netherlands, we performed a cross-sectional study in patients with allergic and non-allergic rhinitis visiting their family doctors and the patients of the Department of Otorhinolaryngology of Amsterdam UMC, location AMC, in the Netherlands (secondary/tertiary healthcare facility). Details on the materials and methods are given in the online repository (App S1).

Questionnaires were obtained from 512 participants with rhinitis and 23 healthy controls. By the nature of these questionnaires, direct costs and absenteeism were not disease-specific, whereas presenteeism was. The characteristics of the study population are presented in Table 1. The baseline characteristics of the control group were comparable to the chronic rhinitis groups.

Total costs of chronic rhinitis were €5042 patient/year (€5258 patient/year of NAR, €4827 patient/year of AR). Direct costs were €1043 patient/year vs €793 in controls. As the direct costs were not disease-specific, the most expensive component was daycare procedures (such as grommets placement, immunotherapy and gastroscopy). In the (relatively small) control group, average direct costs were dominated by specialist visits and hospital admission by some subjects. Indirect costs in the chronic rhinitis group were €3999 patient/year: €1329 for absenteeism, €2390 for (disease-specific) presenteeism and €280 for unpaid work (Table 2). On average, absenteeism costs were increased fourfold in rhinitis patients compared with controls, while presenteeism costs were increased eightfold. As such, the average total costs in rhinitis patients were increased with around €3650 patient/year, mainly due to a significant increase in presenteeism costs. Indeed, presenteeism costs were the highest component in all employed subgroups, except for those with mild rhinitis and those currently smoking.

According to the Central Bureau of Statistics, each year 5% of the Dutch population are seeking medical care due to allergic rhinitis complaints, which is about 730 000 patients of 16 years and older.

Costs of these patients alone are around €3.5-€4.0 billion a year (€750 million due to direct, €3 billion due to indirect costs). Chronic rhinosinusitis (CRS) costs per patient are even higher than chronic rhinitis costs. In the Netherlands, CRS costs were found to be €7160 patient/year (€1501 for direct and €5659 for indirect costs).⁴ But due to a lower prevalence, total annual costs of CRS are lower than those of chronic rhinitis, corresponding to €2 billion annually.

The presented data could also be used as an estimation of the true costs of chronic rhinitis in the Netherlands. The current numbers could be an overestimation: the study included patients seeking medical care, mainly suffering from moderate/severe rhinitis, while in the general population, the proportion of mild chronic rhinitis cases is higher.⁵ As such, the average costs per patient in the general population are probably lower. Indeed, compared to the TOTALL study conducted in Sweden, rhinitis costs in our study were higher: €5042 vs €961 patient/year for total costs, while the same trends could be observed with presenteeism being the most expensive component.⁶ The TOTALL study included participants with self-reported allergic rhinitis, leading to 62% of the sample having mild rhinitis (compared to 11% in our study). Indeed, in studies including patients seeking medical care, the costs were higher: in Germany, in 2003 the total costs of allergic rhinitis (excluding productivity costs) were estimated to be around €1.543 patient/year.⁷ Ten years after, the direct costs of AR patients in Germany were estimated to be €1546 patient/year.⁸

Of course, other factors contributed largely to the found differences such as inclusion of NAR, reference prices and general healthcare expenditures. Still, if we would assume the same 62% of rhinitis patients to be mild in the Dutch population, the average costs would be €3761 patient/year. Assuming a prevalence of chronic rhinitis of 30%, the total costs in the general population would be at least €19.6 billion.

On the other hand, there are several factors that could lead to underestimation of the costs. First, the last update of the used reference standard is based on prices of 2014, negating inflation of costs between 2015 and 2020. Second, for the calculation of medication costs we used a price of only one package of each reported medication at the lowest price reported by the Pharmacotherapeutic Compass of the Dutch National Healthcare Institute. Moreover, the participants only reported medication that they were currently using. We would estimate that both factors combined would give a 10% rise of the costs, meaning on average €4137 patient/year, or €21.6 billion annually in the Netherlands.

TABLE 1 Characteristics of the participants

	NAR N = 159	AR N = 350	Total rhinitis N = 512 ^a	Controls N = 23
Primary care patient	84 (53%)	288 (82%)	375 (73%)	n/a
Secondary/tertiary care patient	75 (47%)	62 (18%)	137 (27%)	n/a
Age	44.9 ± 17.7	37.3 ± 13.7	40.0 ± 15.4	43.1 ± 15.6
Gender				
Male	52 (33%)	128 (36%)	182 (35%)	5 (22%)
Female	106 (66%)	219 (63%)	326 (64%)	18 (78%)
No answer	1 (1%)	3 (1%)	4 (1%)	0
Education				
No education	1 (0.5%)	1 (0.5%)	2 (0.5%)	0
Primary education	1 (0.5%)	6 (2%)	7 (1.5%)	1 (4.5%)
Lower secondary education	27 (17%)	46 (13%)	74 (15%)	2 (9%)
Upper secondary education	61 (38.5%)	139 (39.5%)	201 (40%)	5 (22%)
Bachelor or equivalent	43 (27%)	100 (28%)	144 (28%)	7 (30%)
Master or equivalent	15 (10%)	39 (11%)	54 (10%)	7 (30%)
Other	10 (6%)	16 (5%)	26 (5%)	1 (4.5%)
Unknown	1 (0.5%)	3 (1%)	4 (1%)	0
Present employment				
Student	23 (14%)	49 (14%)	72 (14%)	1 (4%)
Paid employment	80 (50%)	222 (63%)	304 (59%)	16 (70%)
Self-employed	16 (10%)	26 (7%)	42 (8%)	2 (9%)
Housewife	8 (5%)	19 (5%)	28 (6%)	0
Unemployed	4 (3%)	10 (3%)	14 (3%)	0
Disabled	4 (3%)	9 (3%)	13 (2%)	0
Pension	22 (14%)	10 (3%)	32 (6%)	4 (17%)
Other	2 (1%)	3 (1%)	5 (1%)	0
Unknown		2 (1%)	2 (1%)	0
ARIA classification				
Mild	26 (16%)	31 (9%)	57 (11%)	n/a
Moderate/severe	123 (78%)	304 (87%)	430 (84%)	n/a
Unknown	10 (6%)	15 (4%)	25 (5%)	n/a
QoL VAS	71.0 ± 18.8	74.1 ± 19.1	73.1 ± 19.0	85 ± 12.6
CARAT nasal domain	6.5 ± 3.0	6.3 ± 3.0	6.3 ± 3.0	n/a
Controlled CARAT, nasal domain, N	56 (40%)	109 (37%)	165 (38%)	n/a
Blocked nose				
(Almost) every day	68 (43%)	115 (33%)	183 (36%)	n/a
More than 2 d a week	34 (21%)	64 (18%)	100 (19%)	n/a
1 or 2 d a week	26 (16%)	105 (30%)	131 (26%)	n/a
Never	31 (20%)	62 (18%)	94 (18%)	n/a
CARAT pulmonary domain	13.3 ± 3.5	13.3 ± 3.8	13.2 ± 3.7	n/a
Controlled CARAT, pulmonary domain, N	42 (28%)	108 (32%)	150 (30%)	n/a
CARAT total	20.0 ± 5.2	20.0 ± 5.5	20.0 ± 5.4	n/a
Presence of asthma/pulmonary complaints	37 (26%)	91 (28%)	129 (27%)	2 (10%)
Diagnosed asthma	16 (11%)	73 (22%)	89 (19%)	1 (4%)
Smoking status				
Current smoker	30 (19%)	53 (15%)	84 (17%)	3 (13%)

(Continues)

TABLE 1 (Continued)

	NAR N = 159	AR N = 350	Total rhinitis N = 512 ^a	Controls N = 23
Former smoker	39 (25%)	64 (18%)	104 (21%)	7 (30%)
Never smoked	87 (56%)	230 (66%)	318 (62%)	13 (57%)
Allergy type				
Grass/tree pollen		303 (89%)		
House dust mite		184 (54%)		
Other		133 (39%)		
Immunotherapy use				
SCIT		30 (9%)		
SLIT		15 (4%)		

Abbreviations: AR, allergic rhinitis; ARIA, Allergic Rhinitis and its Impact on Asthma; CARAT, Control of Allergic Rhinitis and Asthma Test; NAR, non-allergic rhinitis; SCIT, subcutaneous immunotherapy; SLIT, sublingual immunotherapy; VAS, visual analogue scale.

^aThe total number of rhinitis patients is higher than the sum of AR and NAR patients, because in three patients, no allergy test data were available. Their answers were used for calculation of costs in the "Total rhinitis" group.

TABLE 2 Subgroup analyses of patients with chronic rhinitis, mean costs per individual/year, €

	N	Direct costs	Indirect costs: absenteeism	Indirect costs: presenteeism	Indirect costs: unpaid work	Total costs ^a
Controls	23	793	330	285	0	1408
All rhinitis	512	1043	1329	2390	280	5042
NAR	159	1110	1374	2195	580	5258
AR	350	1001	1252	2429	145	4827
Primary patient	375	621	1408	2118	72	4218
Secondary/tertiary patient	137	2200	1113	3135	850	7298
Gender						
Male	182	1197	1866	3146	175	6384
Female	326	959	1045	1997	342	4343
Age subgroups						
16-18	4	259	853	0	0	1112
18-29	155	1066	1202	2011	309	4588
30-44	150	740	1324	2325	431	4821
44-65	159	934	1837	3079	163	6013
65+	36	2294	0	1243	112	3649
Education						
No education	2	1776	0	0	420	2196
Primary education	7	4987	2726	542	0	8256
Lower secondary education	74	892	238	1347	95	2572
Upper secondary education	201	1073	1608	2634	95	5410
Bachelor or equivalent	144	884	1797	2808	502	5991
Master or equivalent	54	919	887	2234	442	4482
Other	26	1455	534	2302	782	5043

(Continues)

TABLE 2 (Continued)

	N	Direct costs	Indirect costs: absenteeism	Indirect costs: presenteeism	Indirect costs: unpaid work	Total costs ^a
Employment status						
Student	72	1320	525	1202	306	3353
Paid employment	304	703	1884	3007	160	5754
Self-employed	42	947	1377	5045	308	7677
Housewife	28	1613	0	262	2052	3927
Unemployed	14	849	0	0	0	849
Disabled	13	3657	0	0	65	3722
Pension	32	2276	0	118	42	2436
Other	5	1165	2427	0	0	4072
ARIA classification						
Mild	57	970	1443	242	0	2655
Moderate/severe	430	1041	1389	2804	333	5566
Diagnosed with asthma	89	1506	470	1511	242	3728
Self-reported asthma/pulmonary complaints	129	1391	651	2456	255	4753
No self-reported asthma/pulmonary complaints	345	950	1586	2489	303	5328
Smoking status						
Current smoker	84	1382	2613	1702	598	6294
Former smoker	104	967	1293	3286	126	5674
Never smoked	318	990	1026	2310	252	4578

Abbreviations: AR, allergic rhinitis; ARIA, Allergic Rhinitis and its Impact on Asthma; NAR, non-allergic rhinitis.

^aTotal direct costs are different from a sum of costs presented in the table due to rounding up of the numbers.

Since the largest portion of costs is rhinitis-related presenteeism, one could argue that these costs could possibly be reduced by appropriate management of chronic rhinitis. Indeed, two thirds of participants had uncontrolled nasal complaints (CARAT score) and more than a half had nasal congestion on more than 2 days a week. Currently, a lot of patients are not being treated according to the guidelines and often self-medicate.⁹ Possibly, if the patients will receive care according to the guidelines, their complaints, and consequently presenteeism, could be reduced. Future prospective studies evaluating costs of patients receiving the treatment according to the guidelines are needed.

To our knowledge, this is the first study to report costs of NAR. Future studies are needed to understand the costs of chronic rhinitis (especially of non-allergic rhinitis) in the general population.

CONCLUSION



The costs of both allergic and non-allergic rhinitis are high, with presenteeism being the most expensive component.

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CONFLICTS OF INTEREST

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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Is time to remove parabens from standard patch test batteries? Retrospective study of 10 461 patients

To the Editor

Parabens are para-hydroxybenzoic acid esters that have been used for almost 100 years as preservatives in cosmetics, drugs, and foods.¹ Sensitization to parabens was first described in the 1940s, and these compounds were subsequently included in the standard patch test batteries. Data based on weak scientific evidence have attributed parabens with carcinogenic, infertility, and endocrine disruption effects. Genuine phobia toward these compounds, adoption of "paraben-free" labeling on cosmetic products, and European regulations were introduced.² Parabens are currently regarded as weakly sensitizing compounds, with sensitization rates of under 1%.³ However, only few studies have assessed the current situation after those changes.

We sought to describe the rate of sensitization to parabens in a large series of patients and to analyze the relationship between the European regulations and the changes in incidence. As a secondary objective, their clinical-epidemiological characteristics were evaluated.

A retrospective observational study including patients sensitized to parabens seen in the Department of Dermatology of a Spanish Hospital between January 1980 and June 2019. The study data were compiled from the skin allergy database of the Department.

Patch testing was performed according to International Contact Dermatitis Research Group guidelines, with readings taken on days 2 and 4. Positive patch test reactions to parabens (16% in petrolatum) were recorded. A descriptive statistical analysis of all variables included in the MOAHLFA index was performed. The chi-squared test was used for statistical testing. The SPSS version 26.0 statistical package (IBM, Armonk, NY, USA) was used throughout. Statistical significance was considered for $P < .05$.

Patch tests were performed in 10 461 patients. Sensitization to parabens was established in 60 patients (0.57%). In 31 cases, sensitization was of current relevance (51.7%), being more frequent methylparaben (37.5%), propylparaben (37.5%), benzylparaben (12.5%), and butylparaben (37.5%). In 7 cases, sensitization was past relevance (11.7%) and in 22 of unknown relevance (36.7%). The mean incidence of sensitization was 0.58%. It was higher in the early period between 1980 and 2002 (0.75%), and then decreased to 0.33% between 2003 and 2018 (Figure 1).

Allergic contact dermatitis affected mainly the hands (19.3%), legs (18.5%), face (13.4%), and arms (10.1%), while 11.8% of the patients presented with generalized involvement (three or more affected body regions). Sensitization was iatrogenic in 59.6% of the cases, due to cosmetics in 26.9%, occupational in 7.7%, and attributable to