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Epidemiology of common cold

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SUMMARY

The epidemiology of common cold and the role of some predisposing factors were studied by examining 2065 healthy children, aged 2.5–6 years. The examination included a questionnaire, completed by the parents, a general physical examination, a clinical E.N.T.-examination and various technical investigations.

The mean annual incidence of common cold was 2.43 (as was reported by the parents) and 5 when taking into consideration the time span between the last episode of common cold and the date of examination. Mucoid and purulent rhinitis were less frequently found in older children.

A positive history of upper respiratory tract infections in the parents showed to be the most important risk factor for the occurrence of infectious rhinitis in the children. The higher the weight of the child, the lower the incidence of common cold and the fewer pathological rhinoscopical findings. Children with a head circumference below the 2.5 percentile had the highest incidence of infectious rhinitis.

Humid housing conditions showed to be connected with a higher incidence of infectious rhinitis. Children of parents with a higher profession had more rhinitis than children of labourers. Smoking habits of the parents had only little effect on the rhinological status of children.

From a literature review we know that the annual incidence of common cold varies from two to eight, according to the different authors and the different age groups that were studied. Common cold is more frequently occurring in autumn, winter and spring than in summer and young children have more episodes than older children and than adults (Kaye et al., 1971; Loda et al., 1972; Monto and Ullman, 1974; Gwaltney, 1975; Shurin, 1983).

It is more interesting to study which groups of human beings are more likely to present a higher incidence of common cold than the average citizen.

METHODS AND MATERIAL

In a large population study focused on upper respiratory tract infections in 2065 young children (age 2.5 to 6 years), we looked upon the possible relationship between different parameters obtained from personal and family history, from a

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general physical examination, from a clinical E.N.T.-examination and from technical investigations such as rhinomanometry, tympanometry and audiometry on the one hand and the rhinoscopical findings and the incidence of common cold on the other hand. This allowed us not only to exclude the possibility that certain factors are predisposing to infectious rhinitis, but it also showed us statistically significant and at the same time sometimes surprising correlations between the occurrence of common cold and other parameters.

RESULTS

From the questionnaire, completed by the parents of the children, we learned that the majority of the children had 2 to 3 episodes of common cold per year(with a mean value of 2.43); this figure is lower than what was reported by most other authors, who have studied this item (Shurin, 1983). The number of children without common cold is very low (Figure 1).

From the answers to our question concerning the time span between the last episode of common cold and the date of our examination, we learned that nearly 50% of the children had their last episode of common cold within the last month, and another 17% between one and two months before examination. Mathematical manipulation of these results suggests that the mean annual incidence of common cold in our population of children is about 5 instead of 2.43 (Figure 2). With regard to the objective findings, obtained by rhinoscopy, we found that 52% of the children between 33 and 39 months of age had some kind of rhinitis: 9% had serous rhinitis, 21% purulent rhinitis and 22% mucoid rhinitis. When we plot our different rhinoscopical findings at an age scale, we note that there is a tendency for the percentage of children with rhinitis to decrease; at the age between 69 and 75 months of age, the total number of children having rhinitis was only 25.7%. With regard to serous rhinitis, we did not see any relationship between age, contrary to

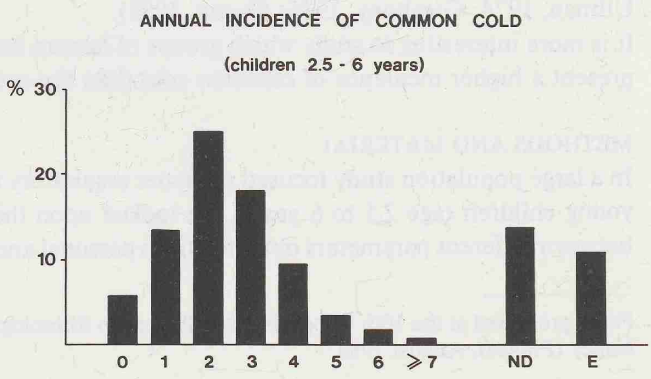

Figure 1.
Annual incidence of common cold in 2065 healthy children, aged 2.5–6 years.
X-axe: number of common colds per year (ND = number not determined;
E = no common cold during last year, but present in earlier period of life).
Y-axe: % of children with the given annual incidence.

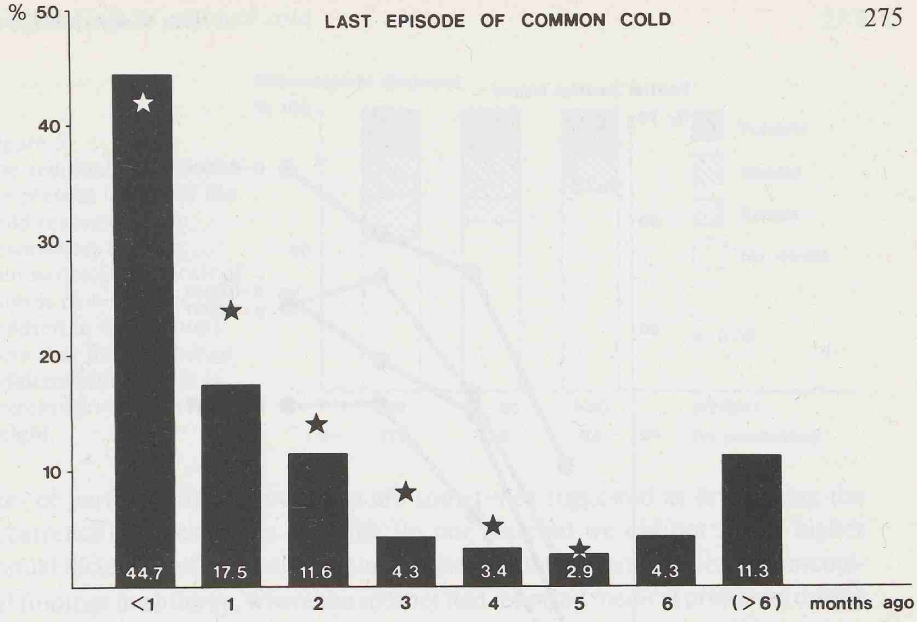

Figure 2. Time span (in months) between the last episode of common cold and the date of examination.
*: expected % of children in case of 5 episodes of common cold per year.

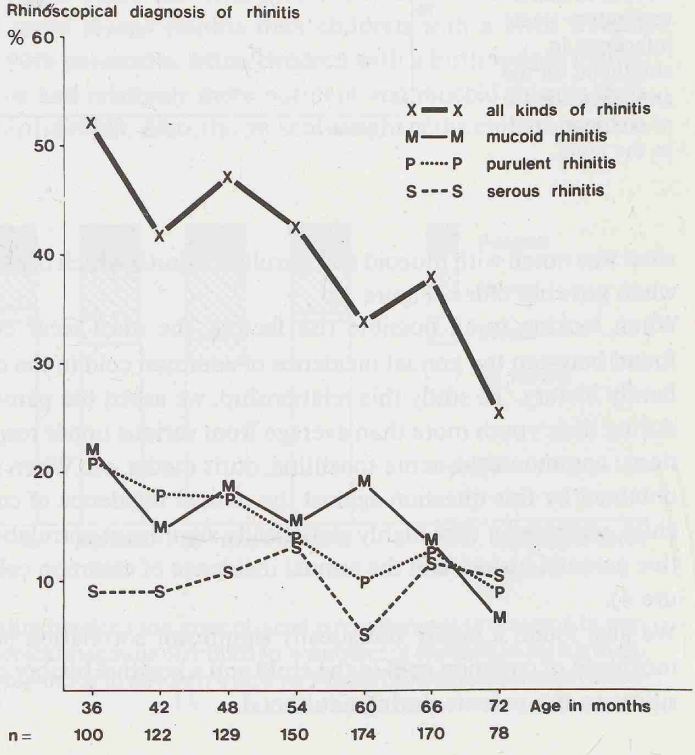

Figure 3. % of children with a rhinoscopical diagnosis of rhinitis, according to the age. Note the decrease of rhinitis cases with increasing age.

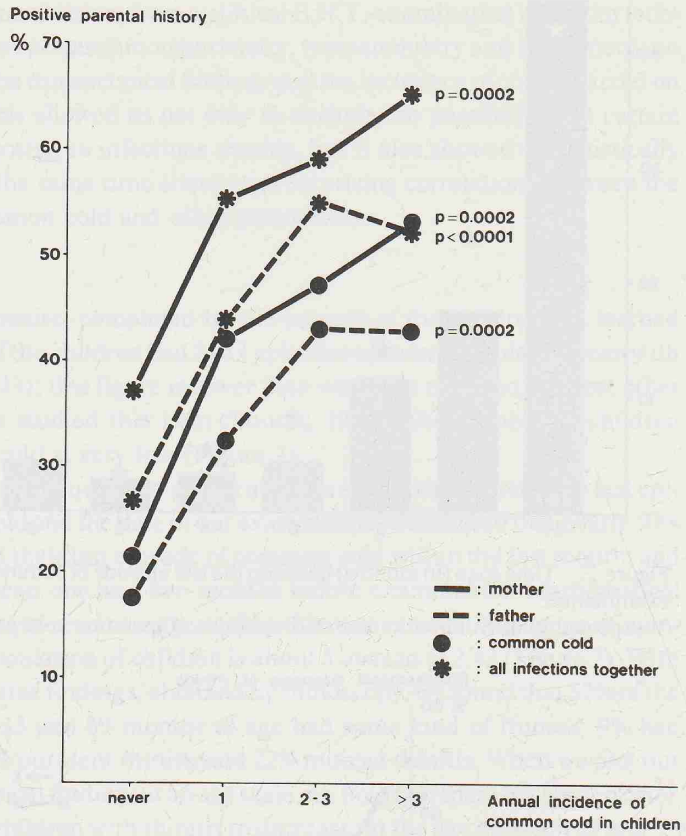

Figure 4.
The influence of a positive parental history of upper respiratory tract infections in childhood on the annual incidence of common cold in the child.

what was noted with mucoid and purulent rhinitis which both showed a decrease when growing older (Figure 3).

When looking to all possible risk factors, the most clear cut correlation was found between the annual incidence of common cold in the child and a positive family history. To study this relationship, we asked the parents if they suffered during their youth more than average from various upper respiratory tract infections: common cold, acute tonsillitis, otitis media, etc.When plotting the results obtained by this question against the annual incidence of common cold in the child, we noted a very highly statistically significant correlation between a positive parental history and the annual incidence of common cold in the child (Figure 4).

We also found a highly statistically significant correlation between the annual incidence of common cold in the child and a positive history of sinusitis and tonsillitis in the parents during adulthood.

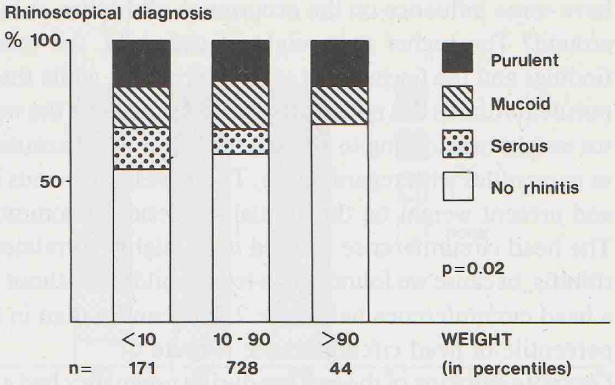

Figure 5. The relationship between the present weight of the child (expressed in percentiles) and the rhinoscopical diagnosis of rhinitis (n = number of children in each group). Note that the number of children with rhinitis is decreasing with increasing weight.

Pre- or perinatal health problems are sometimes suggested as favourising the occurrence of infection in later life. In our material we did not find a higher annual incidence of common cold or a higher number of pathological rhinoscopical findings in children, where the mother had reported medical problems during pregnancy, or who had a lower apgar score at birth, or who had to stay longer than usual in the hospital. A border-line statistically significant correlation was, however, found between birth weight and pathological rhinoscopical findings. Children with a birth weight below the tenth percentile had fewer normal rhinoscopical findings and more serous rhinitis than children with a birth weight between the 10th and 90th percentile, while children with a birth weight higher than the 90th percentile had relatively more purulent and mucoid rhinitis than children with a lower birth weight. Also, the present weight of the child showed to

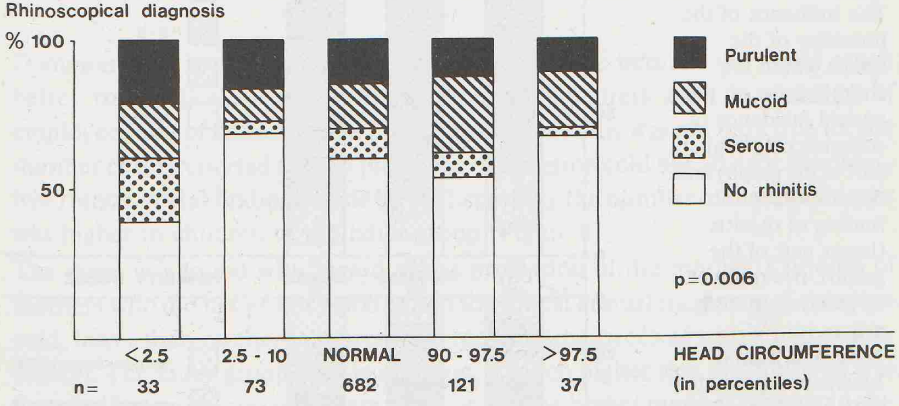

Figure 6. The relationship between the present head circumference (expressed in percentiles) and the rhinoscopical diagnosis of rhinitis (n = number of children in each group). Note the higher number of rhinitis in children with a very small head circumference (below the 2.5 percentile).

have some influence on the occurrence of rhinitis, or is it perhaps the other way around? The higher the weight of the child, the more normal rhinoscopical findings and the fewer cases of serous rhinitis, while the presence of mucoid and purulent rhinitis did not seem to be influenced by the weight (Figure 5). This factor weight has nothing to do with the factor age, because all values are expressed in percentiles with regard to age. There was no obvious influence of birth weight and present weight on the annual incidence of common cold.

The head circumference showed to be highly correlated with the occurrence of rhinitis, because we found much fewer children without rhinitis in the group with a head circumference below the 2.5 percentile than in the groups with a higher percentile of head circumference (Figure 6).

Cigarette smoking of the mother during pregnancy had a definite influence on the occurrence of prematurity, and is also predisposing to low birth-weight but did not really influence the annual incidence of common cold and the mucosal status of the children, in our study.

Environmental factors certainly play a role in the incidence of common cold. We found a statistically significant correlation between the humidity of the house where the child lived in on the one hand, and the annual incidence of common cold and rhinoscopical finding of rhinitis on the other hand. Humid houses were accompanied by a higher annual incidence of common cold and by a higher percentage of rhinitis, serous as well as purulent rhinitis. There was no difference between the group who lived in dry houses and those who lived in houses with normal humidity conditions (Figure 7).

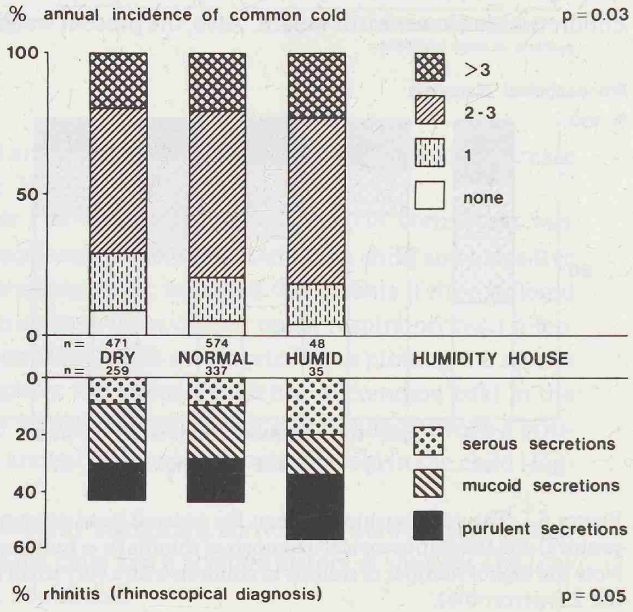

Figure 7.
The influence of the humidity of the house where the child lives in on the annual incidence of common cold (upper part of the graph) and the rhinoscopical finding of rhinitis (lower part of the graph). n = number of children in each group.
Note that humid houses are associated with a higher annual incidence of common cold and a higher % of pathological rhinoscopical findings.

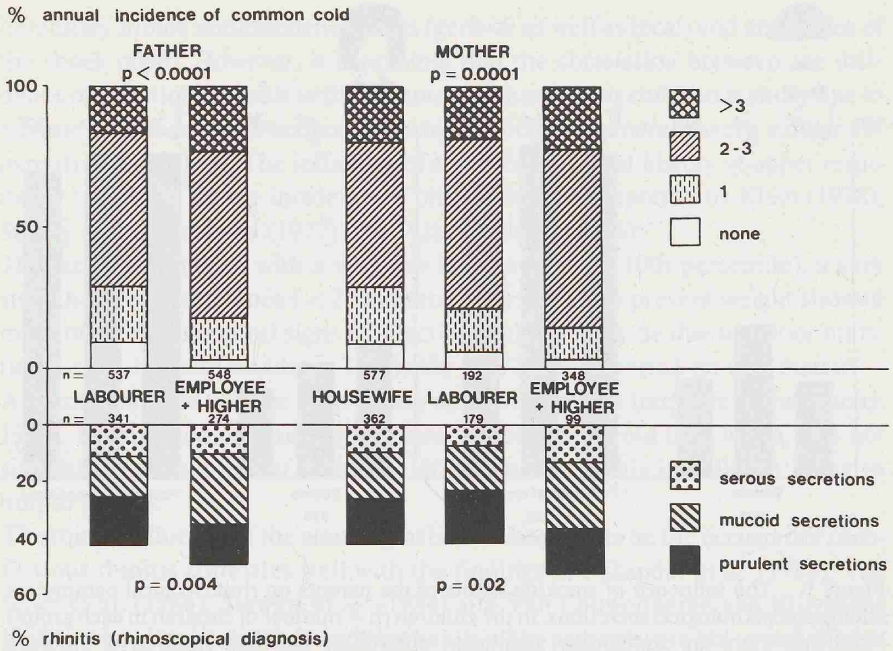

Figure 8. The relationship between the profession of father and mother on the one hand and the annual incidence of common cold and rhinoscopical diagnosis of rhinitis in their children on the other hand (n = number of children in each group).
Note the higher annual incidence of common cold and the higher % of pathological rhinoscopical findings in children of employees and parents with a higher profession! All differences between the children of labourers and these of employees (+ higher profession) are statistically significant.

Common cold is certainly not a poor men's disease because we found much better rhinological situations in children of labourers than in children of employees and of fathers with a higher profession. This was not only true for the number of the reported annual incidence of common cold but also for the objective rhinoscopical findings made by us. Especially the number of mucoid rhinitis was higher in children of the latter group (Figure 8).

The same was found with regard to the profession of the mother. Children of mothers who did not go out working had the lowest annual incidence of common cold, lower than mother-labourers and mother-employees or with a higher profession. The latter group had, in addition, a much higher rate of rhinitis as was revealed by our rhinoscopy. Here again, it was the higher number of mucoid rhinitis that determined the higher figures in children of mothers with a higher profession. All these differences were statistically significant, most of them even highly statistically significant.

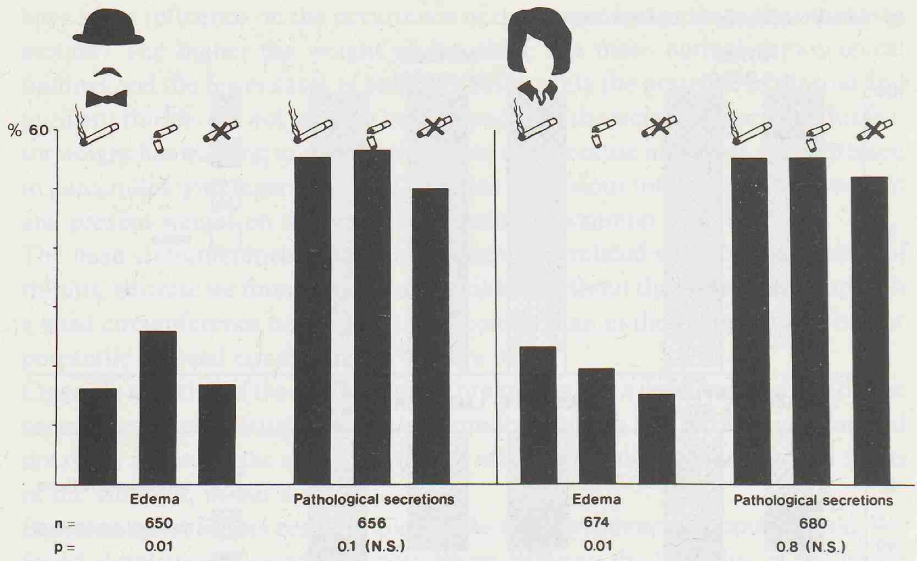

Figure 9. The influence of smoking habits of the parents on rhinoscopical parameters, edema and pathological secretions, in the children (n = number of children in each group). Note that there are statistically significant differences between children of smokers, parents who stopped smoking and non-smokers with regard to the presence of an edematous nasal mucosa ($p = 0.01$). There were no statistically significant differences with regard to the presence of pathological secretions.

The last aspect that we want to discuss here is the influence of smoking habits of the parents on the occurrence of rhinitis in their children. With regard to the smoking habits of the father we noted that the highest number of nasal edema was seen in children of fathers who stopped smoking; pathological nasal secretions were more seldom found in children of non-smoking fathers; this difference was, however, not statistically significant. The edema was also less in children of non-smoking mothers (this was statistically significant), while there was no real difference with regard to the pathological nasal secretions (Figure 9). Smoking habits of the parents have, consequently, only little effect on the occurrence of infectious rhinitis in the child.

DISCUSSION

Although nearly everybody suffers from a common cold from time to time, some individuals have a higher risk to experience a higher incidence of common cold than others.

A positive family history of upper respiratory tract infections showed to be the most important predisposing factor in our material of 2.5 to 6 years old children. Hereditary predisposition to infection may be due to different factors, such as

hereditary minor immunodeficiencies (general as well as local) and anomalies of the shock organ. However, it is possible that the correlation between the incidence of infectious rhinitis in the parents and that in their children is partly due to environmental or socio-economic factors which are generally very similar for parents and children! The influence of a positive parental history of upper respiratory infections on the incidence of otitis media was reported by Klein (1978), Spivey and Hirschhorn (1977) and Visscher et al. (1984).

The fact that children with a very low birth-weight (< 10th percentile), a very small head circumference (< 2.5th percentile) and a low present weight showed more often rhinoscopical signs of infectious rhinitis, may be due to a poor nutritional state in these children. Takahashi (1977) has reported on this matter.

A humid and cold climate is favouring upper respiratory tract infections (Suehs, 1952). Because temperature in Belgium is more often cold than warm, it is not surprising to see a higher incidence of infectious rhinitis in children living in humid houses.

The minor influence of the smoking habits of the parents on the occurrence of infectious rhinitis correlates well with the findings of Pukander et al. (1984), Visscher et al. (1984), Stewart et al. (1984) and Van Cauwenberge and Kluyskens (1984), who all reported that smoking habits of the parents were not or only slightly correlated with the tympanometrical findings.

Trying to explain the higher incidence of rhinitis in children of employees or parents with a higher profession than in children of labourers, would only be very speculative.

RÉSUMÉ

L'épidémiologie de coryza et le rôle de certains facteurs prédisposants ont été etudiés lors d'une étude epidémiologique chez 2065 enfants agés de 2,5 à 6 ans. L'examen consistait en une questionnaire - remplie par les parents - un examen clinique général, un examen oto-rhino-laryngologique et divers examens techniques.

L'incidence annuaire de coryza était 2,43, en se basant sur les réponses des parents et 5 en se basant sur l'intervalle entre la dernière episode de coryza et la date de l'examen clinique. L'incidence des rhinites muqueuses et purulentes était plus basse chez les enfants les plus agés.

Une histoire d'infections des voies respiratoires supérieures chez les parents était le facteur de risque le plus important.

L'incidence de coryza diminuait avec l'augmentation du poids (exprimé en percentiles) et la circumférence de la tête (les enfants avec une circumférence de la tête en-dessous le 2,5ième percentile présentaient beaucoup plus de coryza que les autres).

Des enfants vivant dans des maisons humides avaient une incidence plus élevée

de coryza, de même que des enfants de parents ayant une profession située plus haut sur l'échelle sociale.
Le fait que les parents étaient des fumeurs n'avait q'une très légère influence sur l'état rhinologique de l'enfant.

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