# Prevalence of oral mucosal lesions in children and youths in the USA

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**Summary.** *Introduction.* There is a dearth of studies of oral lesions in children and youths using probability samples of a general population. The present paper describes the results of the Third National Health and Nutrition Examination Survey, 1988–1994 (NHANES III), and compares them to those of the National Survey of Oral Health in US Schoolchildren, 1986–1987.
*Methods.* The NHANES III was a large US study based on a multistage probability sample. Dentist examiners were trained to recognize, classify and record, in a standard manner, the clinical characteristics of each of the 48 conditions of interest using procedures based on the World Health Organization's *Guide to Epidemiology and Diagnosis of Oral Mucosal Diseases.*
*Results.* Examinations were performed on 10 030 individuals (10·26%) aged between 2 and 17 years, 914 of whom had a total of 976 lesions. The lip was the most frequent site of lesions (30·7%), followed by the dorsum of the tongue (14·7%) and the buccal mucosa (13·6%). Lesions were more prevalent in males (11·76%) than females (8·67%). The most prevalent lesions were lip/cheek bite (1·89%), followed by aphthous stomatitis (1·64%), recurrent herpes labialis (1·42%) and geographic tongue (1·05%). The prevalence of recurrent aphthous stomatitis in the NHANES III child and youth survey was substantially higher than that for adults, while the NHANES III adult estimates for geographic tongue (1·85%; 95% CI 1·42, 2·28) and cheek/lip bite (3·05%; 95% CI 2·36, 3·74) were substantially greater than those for children and youths (0·97% and 2·05%, respectively).
*Conclusion.* Reported prevalences for rare conditions in other studies employing more selected samples (especially if standard errors or confidence intervals are not provided) should be interpreted with caution. Studies of adult populations, however valid, may have limited applicability to children.

## Introduction

While diagnosis of the wide variety of mucosal lesions which occur in the oral cavity is an essential part of dental practice, there are relatively few systematic studies of the prevalence of such lesions in children and youths. This is a critical deficiency since appropriate diagnosis and treatment requires knowledge of the relative frequency or probability of possible lesions [1].

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Crivelli *et al.* [2] compared the prevalence of oral mucosal lesions in 846 children between 4 and 13 years of age attending a suburban private school to estimates for children of the same age attending a public school in an indigent area. They found that, while there was no difference in overall lesion prevalence, affluent children had significantly higher prevalences of recurrent aphthous stomatitis (RAS) and geographic tongue, and lower prevalences of angular cheilitis and recurrent herpes labialis (RHL) than did poor children. Sawyer *et al.* [3] studied the prevalence of specific oral lesions in 2203 children who attended three Nigerian secondary schools. They found the prevalence of geographic and fissured tongue to be 0·3% and 0·8%, respectively.

In a study of 1112 Brazilian paediatric outpatients aged from birth to 12 years of age, Bessa *et al.* [1] found oral mucosal alterations (lesions) present in 24·9% of children under the age of 4 years, and 30·3% of children between 5 and 12. The most prevalent lesions were geographic tongue (9·1%), cheek bite (6·1%) and melanotic macules (2·6%). García-Pola *et al.* [4] found that the most prevalent lesion among Spanish 6-year-olds was saburral (coated) tongue (16·0%), followed by traumatic lesions (12·2%), geographic tongue (4·5%) and haemangioma (3·8%).

Sousa *et al.* [5] reviewed data from 2356 biopsies on children from birth to 14 years of age and found that inflammatory/reactive lesions were the most prevalent (21·6%), followed by cystic lesions (18·0%) and salivary gland pathologies (13·5%). In a study of 472 oral biopsies from children below 15 years of age, Gultelkin *et al.* [6] found that inflammatory and reactive lesions formed the largest group of diagnoses (49%), followed by neoplasms (36%) and cystic lesions (12%).

With the exception of Kleinman *et al.* [7], the literature is devoid of epidemiological studies of oral mucosal lesions of children and youths based on a probability sample of a national population. Kleinman *et al.* [7] reported oral mucosal lesion prevalence data from the National Survey of Oral Health in US School Children, 1986–1987 (OHSC), a survey which was based on a multistage national probability sample. Clinical examinations for oral mucosal lesions were performed on 39 206 children in kindergarten through twelfth grade (age range = 5–17 years) using standardized examiners. Clinically apparent lesions were found in 4·08% (SE = 0·37) of those examined. The most prevalent lesions were: RAS (1·23%), followed by RHL, smokeless-tobacco-related lesions (0·71%) and geographic tongue (0·60%).

Most of the reports of prevalence of oral mucosal lesions in children have been based on atypical samples which have been derived either from biopsies [5,6], clinic attenders [1] or a handful of schools in a city [2]. Shulman *et al.* [8] pointed out that such sampling frames pose serious challenges to validity because they are not representative of the general population, and may add little except knowledge about the participants studied. Moreover, not all studies used the same diagnostic criteria, adding to the problem.

The present paper describes previously unreported results regarding the prevalence of oral mucosal lesions in children and youths derived from the Third National Health and Nutrition Examination Survey, 1988–1994 (NHANES III). In addition, the author includes reanalysed data from the OHSC [9] in order to facilitate comparison of prevalence estimates for RHL, RAS and geographic tongue between the studies. The investigation also aimed to explore the extent to which prevalence data for adults are relevant to paediatric populations by comparing results with previously reported adult data from the NHANES III [8].

## Subjects and methods

### Third National Health and Nutrition Examination Survey

Oral mucosal examinations were performed by standardized dentists using procedures based on the World Health Organization's (WHO's) *Guide to Epidemiology and Diagnosis of Oral Mucosal Diseases* [10]. The examinations formed part of the NHANES III, a periodic survey conducted by the National Center for Health Statistics from 1988 through 1994, with sampling based on a complex, national, multistage plan [11]. Detailed discussions of the survey methods and the oral mucosal examination have been presented by Drury *et al.* [12] and Shulman *et al.* [8], respectively.

Prevalence, the proportion of subjects presenting with a lesion, was analysed in the aggregate, and by gender, age and race–ethnicity (i.e. non-Hispanic white, non-Hispanic black and Mexican–American). Subjects not falling into the three race–ethnicity categories were excluded from analyses using the race–ethnicity variable. This resulted in the removal of 487 subjects, who were categorized as 'other', from some analyses.

### National Survey of Oral Health in US School Children

The OHSC was a national, three-stage, school-based probability sample representing US schoolchildren from kindergarten through the twelfth grade. The study was conducted by the National Institute of Dental Research between 1986 and 1987 [13]. The methodology has been described fully by Kleinman *et al.* [7]. For training purposes, dentist examiners were shown colour transparencies of lesions of interest which included geographic tongue, RHL and RAS. The diagnostic criteria for RAS were based on those

described in the WHO's *Guide to Epidemiology and Diagnosis of Oral Mucosal Diseases* [10].

Since both surveys used complex, multistage sampling, the SAS-callable SUDAAN 8.0.2 computer program was used to calculate standard errors for all variables, adjusting for the effects of the survey design (design effect). The findings from the 10 032 subjects between 2 and 17 years of age (NHANES III) who received an oral mucosal examination could be projected to represent values for 58 580 750 individuals of an equivalent age in the US noninstitutionalized population. The results are presented in tables showing the number of lesions found, the prevalence, the standard error adjusted for the design effect and a chi-square test for homogeneity among the levels of the categorical co-variates. The prevalences of RHL, RAS and geographical tongue, lesions common to the NHANES III and OHSC data sets, are also shown analysed by age group (i.e. 4–7, 8–12 and 13–17 years).

## Results

Clinically apparent lesions were found in 914 individuals, i.e. 10·26%, when adjusted for the sampling effect. Figure 1 shows the locations of the lesions. The lip was the most common site for lesions (30·7%), followed by the dorsum of the tongue (14·7%) and the buccal mucosa (13·6%). Table 1 shows the point prevalence of each lesion, the overall prevalence ranking, standard error and 95% confidence interval (CI). For some lesions with low prevalences and large standard errors, the lower limits of the CIs were negative and were truncated to zero. Lesion prevalence increased significantly with age and was significantly greater in males (11·76%) than females (8·67%). On the other hand, prevalence was not associated with race–ethnicity.

Table 2 shows the prevalence of the specific lesions (NHANES III). Overall, the most prevalent lesion was cheek/lip bite (1·89%). As a group, acute conditions comprised the largest class of lesions (32·3%), with RAS (1·64%) being most common, followed by RHL, which was only slightly less so (1·42%). Of nonacute lesions, nevi (1·54%) were the most prevalent, followed by geographic tongue (1·05%).

Since the OHSC and NHANES III used similar methodologies for classifying lesions, the studies may be compared. Since the youngest child examined in the OHSC was only 4 years of age, a subset the NHANES III data was used so that the age ranges were comparable. Table 3 compares the prevalences of all lesions and the three most prevalent lesions (RAS, RHL and geographic tongue) between 6711 children from the NHANES III and 43 282 children in the OHSC in the aggregate and by gender. The prevalence of all lesions was almost three times higher in the NHANES III (11·30% *vs* 4·08%). Similarly, the prevalence of RAS (1·94% *vs* 1·23%), RHL (1·55% *vs* 0·78%) and geographic tongue (0·97% *vs* 0·60%) were all higher in the NHANES III, although to a lesser extent than in the aggregate. All differences were statistically significant at the *P* < 0·05 level, as illustrated by the fact that mean values for one study each fall outside the 95% CI for the other. In both studies, males had a significantly higher overall lesion prevalence, although there was no significant
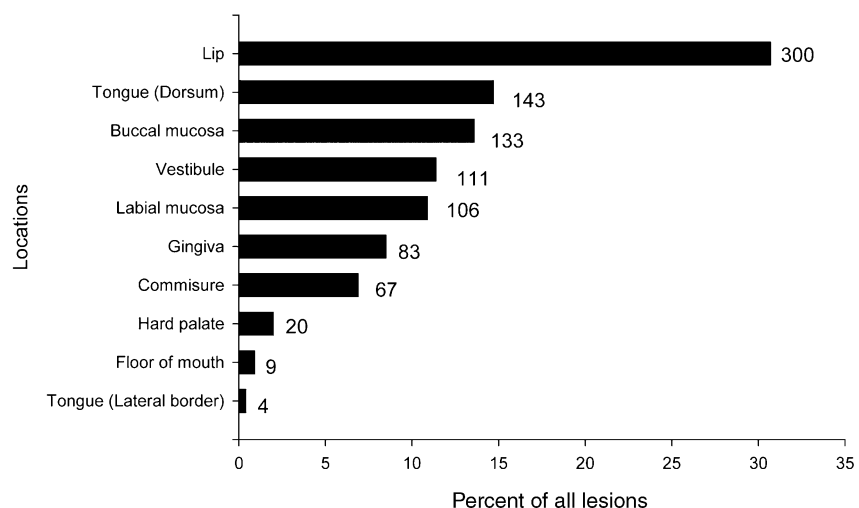


**Fig. 1.** Distribution of lesions by location.

**Table 1.** Prevalence of mucosal lesions by age group, gender and race–ethnicity (Third National Health and Nutrition Examination Survey, 1988–1994).

| Variable | Sample size | Number of lesions | Prevalence (%) | Ninety-five per cent confidence interval |
|---|---|---|---|---|
| Age (years) | | | | |
| 2 | 1176 | 41 | 3·62 | 2·14, 5·10 |
| 3 | 1071 | 61 | 7·38 | 4·24, 10·52 |
| 4 | 1074 | 76 | 6·59 | 4·43, 8·75 |
| 5 | 1031 | 85 | 7·87 | 5·22, 10·52 |
| 6 | 535 | 39 | 6·89 | 3·61, 10·17 |
| 7 | 537 | 51 | 8·20 | 4·73, 11·67 |
| 8 | 508 | 48 | 8·91 | 5·31, 12·51 |
| 9 | 560 | 52 | 10·27 | 5·89, 14·65 |
| 10 | 544 | 55 | 12·12 | 6·98, 17·26 |
| 11 | 556 | 57 | 10·75 | 3·95, 17·55 |
| 12 | 425 | 41 | 9·59 | 4·50, 14·68 |
| 13 | 417 | 49 | 11·34 | 6·81, 15·87 |
| 14 | 408 | 52 | 9·96 | 5·46, 14·46 |
| 15 | 369 | 59 | 13·95 | 9·61, 18·29 |
| 16 | 419 | 72 | 16·47 | 11·34, 21·60 |
| 17 | 402 | 74 | 21·10 | 15·29, 26·91 |
| Total*** | 10 032 | 912 | 10·26 | 8·79, 11·73 |
| Gender | | | | |
| Male | 4934 | 487 | 11·76 | 9·76, 13·77 |
| Female | 5098 | 425 | 8·67 | 6·99, 10·35 |
| Total** | 10 032 | 912 | 10·26 | 8·79, 11·73 |
| Race-ethnicity | | | | |
| non-Hispanic white | 2703 | 244 | 10·45 | 8·74, 12·16 |
| non-Hispanic black | 3344 | 283 | 10·31 | 8·06, 12·55 |
| Mexican–American | 3498 | 334 | 10·15 | 7·82, 12·49 |
| Total | 9545 | 861 | 10·40 | 8·95, 11·84 |

**Chi-square test; $P < 0.01$.
***Chi-square test; $P < 0.001$.

gender difference for geographic tongue, RHL or RAS. As might be anticipated, the OHSC had consistently smaller standard errors because its sample size was several times larger.

## Discussion

It is clear from the present study that cheek/lip bites (1·89%) were the most prevalent lesions in the aggregate, followed by RAS (1·64%), nevus (1·54%), RHL (1·42%) and geographic tongue (1·05%). Lesion prevalence generally increased with age, although some of the increase was a result of the accumulation of noninflammatory lesions, such as nevi, warts, scars and tumours. However, the prevalence of RAS and RHL did increase with age.

The NHANES III prevalences for children and youths were consistently higher than those from the OHSC for all lesions common to both studies (Table 3), although only the difference in RAS prevalence proved to be statistically significant, with the value for prevalence of RAS from the OHSC (1·21%) lying outside the 95% CI for RAS prevalence from the NHANES III (1·51, 2·37). This difference in results from the contemporaneous studies may be because of more-conservative classification on the part of the OHSC examiners, despite the fact that both studies used diagnostic criteria based on those described in the WHO's *Guide to Epidemiology and Diagnosis of Oral Mucosal Diseases* [10].

Since the prevalence of specific lesions was generally low, with substantial variation, CIs were wide. For example, the prevalence of periodontal abscess (NHANES III) was 0·26%, with a 95% CI ranging from 0·05 to 0·22 (Table 2). This range of 17 percentage points is 65% of the prevalence, demonstrating a wide variation and/or skew distribution. Consequently, reported prevalences for rare conditions in other studies (especially if standard errors or CIs are not provided) should be interpreted with caution [8].

**Table 2.** Prevalence of mucosal lesions in 10 032 US children and youths aged between 2 and 17 years.

| Lesion | Number | Point prevalence (%) | Standard error | Ninety-five per cent confidence interval |
|---|---|---|---|---|
| *Acute conditions* | | | | |
| Recurrent aphthous ulcerations | 128 | 1·64 | 0·189 | 1·27, 2·01 |
| Herpes labialis | 102 | 1·42 | 0·371 | 0·69, 2·15 |
| Trauma | 36 | 0·36 | 0·097 | 0·17, 0·55 |
| Periodontal abscess | 20 | 0·26 | 0·109 | 0·05, 0·47 |
| Burn | 7 | 0·11 | 0·056 | 0·00*, 0·22 |
| Abscess | 11 | 0·09 | 0·064 | 0·00*, 0·22 |
| Bite | 7 | 0·05 | 0·029 | 0·01, 0·11 |
| Ulcer (nonspecific) | 4 | 0·05 | 0·029 | 0·01, 0·11 |
| Herpetic givgivostomatitis | 5 | 0·03 | 0·027 | 0·00*, 0·08 |
| Haematoma | 1 | 0·01 | 0·064 | 0·00*, 0·14 |
| Total | 321 | | | |
| *Other conditions* | | | | |
| Cheek/lip bite | 188 | 1·89 | 0·275 | 1·35, 2·43 |
| Scar | 42 | 0·61 | 0·170 | 0·28, 0·94 |
| Other | 45 | 0·48 | 0·133 | 0·22, 0·74 |
| Unknown | 11 | 0·06 | 0·028 | 0·01, 0·11 |
| Fistula | 10 | 0·04 | 0·021 | 0·00*, 0·08 |
| Cleft lip/palate | 6 | 0·06 | 0·032 | 0·00*, 0·12 |
| Total | 302 | | | |
| *Red/white conditions* | | | | |
| Nevus | 155 | 1·54 | 0·349 | 0·86, 2·22 |
| Frictional white lesion | 17 | 0·26 | 0·089 | 0·09, 0·43 |
| Amalgam tattoo | 3 | 0·03 | 0·029 | 0·00*, 0·09 |
| Total | 175 | | | |
| *Benign tongue conditions* | | | | |
| Geographical tongue | 123 | 1·05 | 0·207 | 0·64, 1·46 |
| Fissured tongue | 5 | 0·08 | 0·066 | 0·00*, 0·21 |
| Hairy tongue | 1 | 0·00 | 0·004 | |
| Total | 129 | | | |
| *Raised conditions* | | | | |
| Tumour (nonspecific) | 6 | 0·08 | 0·041 | 0·00*, 0·16 |
| Gingival hyperplasia | 4 | 0·08 | 0·068 | 0·00*, 0·21 |
| Mucocele | 5 | 0·04 | 0·022 | 0·00*, 0·08 |
| Papillomas/warts | 5 | 0·02 | 0·012 | 0·00*, 0·04 |
| Fibroma | 3 | 0·01 | 0·008 | 0·00*, 0·17 |
| Total | 23 | | | |
| *Candida-related* | | | | |
| Angular cheilitis | 10 | 0·21 | 0·096 | 0·00*, 2·09 |
| Denture stomatitis, types 1 and 2 | 2 | 0·08 | 0·079 | 0·00*, 0·23 |
| Median rhomboid glossitis | 1 | 0·00 | 0·009 | |
| Total | 13 | | | |
| *Tobacco-related* | | | | |
| Smokeless-tobacco-associated | | | | |
|   Wrinkling with colour change | 6 | 0·19 | 0·099 | 0·00*, 0·34 |
|   Wrinkling with colour change | 4 | 0·09 | 0·051 | 0·00*, 0·19 |
|   Wrinkling with colour change, furrows, thickening | 1 | 0·04 | 0·044 | 0·00*, 0·13 |
| Leukoplakia (homogeneous) | 1 | 0·01 | 0·007 | |
| Nicotinic stomatitis | 1 | 0·00† | 0·004 | |
| Total | 13 | | | |
| Grand total | 976 | | | |

*Negative lower bound rounded to zero.

**Table 3.** Comparison of prevalences of selected lesions and standard errors by age from the Third National Health and Nutrition Examination Survey, 1988–1994 (NHANES III), and the National Survey of Oral Health in US Schoolchildren, 1986–1987 (OHSC): (95% CI) 95% confidence interval.

| | Children and youths (4 to 17 years of age) | | | | Adults (NHANES III; $n$ = 17 235) | |
| | NHANES III ($n$ = 6711) | | OHSC ($n$ = 39 236) | | | |
| Lesion | Prevalence (%) | 95% CI | Prevalence (%) | 95% CI | Prevalence (%) | 95% CI |
|---|---|---|---|---|---|---|
| Recurrent aphthous stomatitis | 1·94* | 1·51, 2·37 | 1·21*** | 0·99, 1·43 | 0·89 | 0·60, 1·18 |
| 4–7 years | 0·91 | 0·20, 1·62 | 0·54 | 0·34, 0·74 | | |
| 8–12 years | 1·68 | 1·01, 2·35 | 1·26 | 0·99, 1·53 | | |
| 13–17 years | 2·53 | 1·61, 3·45 | 1·55 | 1·30, 1·80 | | |
| Recurrent herpes labialis | 1·55* | 0·67, 2·43 | 0·77** | 0·55, 0·99 | 1·61 | 1·32, 1·90 |
| 4–7 years | 0·45 | 0·21, 0·69 | 0·41 | 0·19, 0·63 | | |
| 8–12 years | 2·29 | 0·41, 4·17 | 0·85 | 0·60, 1·10 | | |
| 13–17 years | 1·30 | 0·36, 2·24 | 0·91 | 0·54, 1·28 | | |
| Geographic tongue | 0·97** | 0·52, 1·42 | 0·58 | 0·42, 0·74 | 1·85 | 1·42, 2·28 |
| 4–7 years | 1·38 | 0·60, 2·16 | 0·41 | 0·27, 0·55 | | |
| 8–12 years | 0·33 | 0·09, 0·57 | 0·60 | 0·42, 0·78 | | |
| 13–17 years | 1·39 | 0·51, 2·27 | 0·67 | 0·43, 0·91 | | |
| Nevus | 1·75** | 0·97, 2·53 | 2·00 | 1·16, 2·84 | | |
| 4–7 years | 0·72 | 0·07, 1·37 | | | | |
| 8–12 years | 1·37 | 0·39, 2·35 | | | | |
| 13–17 years | 2·62 | 1·42, 3·82 | | | | |
| Cheek/lip bite | 2·05* | 1·46, 2·64 | 3·05 | 2·36, 3·74 | | |
| 4–7 years | 1·19 | 0·72, 1·66 | | | | |
| 8–12 years | 2·13 | 1·13, 3·13 | | | | |
| 13–17 years | 2·43 | 1·37, 3·49 | | | | |

*Chi-square test; $P$ < 0·05.
**Chi-square test; $P$ < 0·01.
***Chi-square test; $P$ < 0·00.

Similarly, RAS prevalences derived from the NHANES III child and youth survey are significantly higher than those for adults, while the NHANES III adult estimates for geographic tongue (1·85%; 95% CI 1·42, 2·28) and cheek/lip bite (3·05%; 95% CI 2·36, 3·74) are significantly greater than those for children and youths (0·97% and 2·05%, respectively). These differences may simply be a consequence of the fact that these lesions are related to age. For example, RHL prevalence is related to herpesvirus infection (which is cumulative) so that adults have a greater likelihood of being infected than children. Thus, studies of adult populations, however valid, may have limited applicability to children.

Since Bessa *et al.* [1] used the WHO diagnostic criteria, as did the NHANES III and OHSC, subsets of the NHANES III data for children aged between 5 and 12 years were reanalysed. The results are shown in Fig. 2. While the prevalences of RAS are not substantially different, the OHSC RHL prevalence (0·68%) was less than half that of the NHANES III (1·69%) and Bessa *et al.* (1·72%). The prevalence of geographic tongue was much higher in Bessa *et al.*
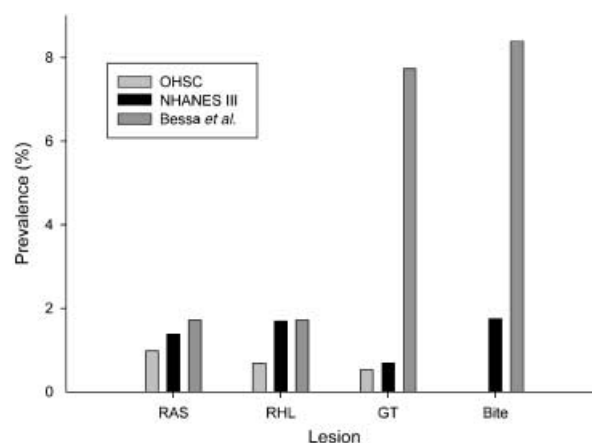


**Fig. 2.** Prevalence of recurrent aphthous stomatitis, recurrent herpes labialis, geographic tongue and cheek/lip bite in children between 5 and 12 years of age according to the Third National Health and Nutrition Examination Survey, 1988–1994, the National Survey of Oral Health in US Schoolchildren, 1986–1987, and Bessa *et al.* [1].

(7·74%) than in the NHANES III (0·69%) or OHSC (0·53%). The prevalence of cheek/lip bites was also more than four times greater in Bessa *et al.* (8·39%) than the NHANES III (1·75%). Since Bessa *et al.*

did not provide standard errors for estimates of these lesions, significance tests for the differences could not be performed, although because only 465 children between 5 and 12 years of age were examined (compared to 4696 in the NHANES III and 24 807 in the OHSC), these are likely to have been relatively large. Perhaps some of the difference between the NHANES III/OHSC results and those of Bessa *et al.* were related to different cultural or environmental factors in the USA and Brazil.

While the NHANES III and OHSC were based on national probability samples, they nonetheless have limitations. Since the relative rarity and variable clinical appearance of the lesions precluded the use of replicate examinations for calibration, examiner standardization was limited to viewing photographs of characteristic lesions. Moreover, lesions were identified without laboratory or histological tests. While trained examiners can be expected to identify many entities (e.g. RAS and RHL) without additional diagnostic aids, others such as nevus or haemangioma may have other differential diagnoses, and may be diagnosed clinically with less certainty. Some lesions described as tumour, nonspecific and unknown could not be identified at all.

Ideally, a study of oral mucosal lesion prevalence should: (1) be based on a large probability sample; (2) have standard definitions of the conditions of interest; (3) have calibrated examiners; and (4) present standard errors or 95% CIs. Moreover, the data should be stratified by co-variates, i.e. factors suspected to be associated with the prevalence of the lesion of interest; typically, at a minimum, age, race–ethnicity and gender. Since many of these lesions have low prevalences, many examinations must be performed in order to yield a sufficient number of lesions to perform stratified or multivariate analyses. Given the high cost of such studies, they will be repeated infrequently, if at all. In fact, there are no oral mucosal examinations in the ongoing NHANES. Consequently, the OHSC and NHANES III data sets, notwithstanding their flaws, are likely to be the gold standard for many years.

The results reported in the present paper were based on the oral mucosal tissue examination and demographic information collected as part of a health interview. However, the NHANES III data set contains laboratory values of blood drawn at the time of the examination, as well as a record of prescribed and nonprescribed drugs and a 24-h diet diary. Future analyses should explore these potential risk factors for lesions of clinical interest such as RHL and RAS.

## Conclusions

Clinicians should be aware that prevalences for mucosal lesions in adults are different from those for children and youths, and for some conditions, prevalence increases with age. Studies of adult populations, however valid, may have limited applicability to children. Moreover, caution should be used in applying reported prevalences unless the ages and other demographic characteristics of the subjects are similar to those of the patients in question.

**Résumé.** *Introduction*. Il y a une pénurie d'études concernant les lésions buccales chez l'enfant et se basant sur des échantillons de probabilité au sein de la population générale. Cet article décrit les résultats de la troisième enquête nationale d'examen de la santé et de la nutrition, 1988–1994 (NHANES III) et les compare à ceux de l'enquête nationale de santé buccale des enfants scolarisés américains, 1986–1987 (OHSC).

*Méthodes*. Le NHANES III a été une vaste étude US basée sur un échantillon de probabilité à plusieurs étages. Les dentistes examinateurs ont été entraînés à reconnaître, classifier et enregistrer de façon standard les caractéristiques de chacune des 48 pathologies d'intérêt à l'aide de procédures inspirées du *guide d'épidémiologie et de diagnostic des maladies muqueuses buccales de l'OMS*.

*Résultats*. Les examens ont été réalisés chez 10 300 individus (10,26%) ages de 2 à 17 ans dont 914 avaient un total de 976 lésions. La lèvre était le site le plus fréquent de lésions (30,7%) suivi par le dos de la langue (14,7%), et la muqueuse buccale (13,6%). Les lésions étaient plus fréquentes chez les garçons (11,76%) que chez les filles (8,67%). Les lésions les plus retrouvées étaient les morsures de lèvre/joue (1,89%), suivies par les stomatites aphteuses (1,64%), l'herpès labial récurrent (1,42%) et la langue géographique (1,05%). La prévalence de la stomatite aphteuse récurrente dans le NHANES III pour enfants et jeunes était significativement élevé que pour les adultes, tandis que l'estimation du NHANES III adultes était significativement plus élevé pour la langue géographique (1,85%: 1,42; 2,28) et la morsure de joue/lèvre (3,05%: 2,36; 3,74) comparée à celle du NHANES III enfants et jeunes (0,97% et 2,05%, respectivement).

*Conclusion.* Les prévalences rapportées pour ces pathologies rares dans d'autres études utilisant des échantillons plus sélectionnés (surtout si les intervalles de confiance ou les erreurs standards ne sont pas fournis) devraient être interprétées avec précaution. Les études des populations adultes, valables cependant, peuvent avoir une applicabilité limitée à l'enfant.

**Zusammenfassung.** *Einleitung.* Es fehlen Studien zu Schleimhautläsionen bei Kindern und Jugendlichen, bei welchen Zufallsstichproben aus der Bevölkerung herangezogen wurden.

Ergebnisse der Third National Health and Nutrition Examination Survey, 1988–1994 (NHANES III) werden in dieser Arbeit verglichen mit der Studie National Survey of Oral Health in US Schoolchildren, 1986–1987 (OHSC).
*Methoden.* NHANES III war eine US-Studie basiert auf einer Zufallsstichprobe.

Die zahnärztlichen Untersucher waren geschult die 48 klinischen Bedingungen, welche im *World Health Organization's Guide to Epidemiology and Diagnosis of Oral Mucosal Disease*s aufgeführt sind, zu erkennen, klassifizieren und zu dokumentieren.
*Ergebnisse.* Untersuchungen wurden bei 10,030 Individuen (10.26) im Alter von 2 bis 17 Jahren, davon hatten 914 insgesamt 976 Läsionen. Am häufigsten betroffen war die Lippe (30.7%) gefolgt vom Zungenrücken (14.7%) und der Wangenschleimhaut (13.6%). Die Läsionen wurden häufiger bei männlichen (11.76%) als bei weiblichen Individuen (8.67%) entdeckt.

Am häufigsten waren Lippen/Wangenbiss (1.89%) gefolgt von Aphthen (1.64%) Herpes labialis (1.42) und Lingua geographica (1.05%). Die Prävalenz von rekurrenten Aphthen in der NHANES III Kinder- und Jugendstudie war signifikant höher als bei der NHANES III-Studie für Erwachsene. Dagegen waren die Zahlen für die Erwachsenen höher bei Lingua geographica (1.85%: 1.42, 2.28) und Bissverletzungen (3.05%: 2.36, 3.74).
*Schlussfolgerung.* Die Prävalenzzahlen aus Studien mit selektierteren Populationen (insbesondere bei Fehlen von Konfidenzintervall oder Standardfehler) sollten vorsichtig interpretiert werden.

Die Ergebnisse bei Erwachsenen haben jedenfalls nur eingeschränkte Aussagekraft für Kinder und Jugendliche.

**Resumen.** *Introducción.* Hay una escasez de estudios de lesiones orales en niños y jóvenes usando muestras de probabilidad de la población general. Este trabajo describe los resultados del Tercer Examen Nacional de Salud y Nutrición, 1988–1994 (TENSN III) y los compara con los del Examen Nacional de Salud Oral en Niños escolares de USA, 1986–1987 (SON).
*Métodos.* El TENSN III fue un estudio amplio de USA basado en muestras de probabilidad multi-etápicas. Los odontólogos examinadores se entrenaron para reconocer, clasificar y registrar de una manera estándar, las características clínicas de cada una de las 48 patologías de interés usando procedimientos basados en la *Guía de Epidemiología y Diagnóstico de Enfermedades de la Mucosa Oral de la Organización Mundial de la Salud.*
*Resultados.* Los exámenes se realizaron en 10·030 individuos (10,26%) entre 2 y 17 años de los que 914 tenía un total de 976 lesiones. El labio fue el lugar más frecuente de lesiones (30,7%), seguido por el dorso de la lengua (14,7%) y la mucosa bucal (13,6%). Las lesiones fueron más prevalentes en varones (11,76%) que en las mujeres (8,67%). Las lesiones más prevalentes fueron mordedura de labio/mejilla (1,89%), seguido de estomatitis aftosa (1,64%), herpes labial recurrente (1,42%) y lengua geográfica (1,05%). La prevalencia de la estomatitis aftosa recurrente en el examen de niños y jóvenes del TENSN III fue significativamente más alta que la de los adultos, mientras que en los adultos del TENSN III las estimaciones de lengua geográfica (1,85%: 1,42, 2,28) y mordedura de labio/mejilla (3,05%: 2,36, 3,74) son significativamente mayores que las de los niños y jóvenes (0,97% y 2,05%, respectivamente).
*Conclusión.* Las prevalencias sobre alteraciones raras señaladas en otros estudios que emplean muestras más seleccionadas (especialmente si no están provistos de errores estándar, ni intervalos de confianza) deberían interpretarse con precaución. Estudios en poblaciones de adultos, sin embargo válidas, pueden tener aplicación limitada en niños.

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