The Frequency of Common Skin Conditions in Preschool-Age Children in Australia

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Objective: To determine the prevalence and severity of atopic dermatitis in a stratified cross-section of preschool-age children examined throughout Victoria, Australia.

Design: A cross-sectional skin survey using a selected cluster sample of the various centers throughout Victoria.

Setting: The study population included Victorian children attending child-care centers, preschools, and Maternal and Child Health Centres, with the reference population being Australian children aged 5 years and younger.

Participants: Of 1634 potential participants, 1116 children (68.3%) were examined.

Intervention: A dermatologist performed a total skin examination, including head and neck, limbs, and trunk, on all children. The diaper area was examined in children younger than 12 months.

Main Outcome Measure: All parents were administered a questionnaire to elicit demographic information, history of skin conditions, and family history of skin problems or related diseases. The examiner recorded the presence, site, and severity of atopic dermatitis for calculation of age- and sex-specific prevalence rates.

Results: The age- and sex-adjusted point prevalence was 30.8% (95% confidence interval [CI], 28.0%-33.5%). Most children (63.7%) were classified as having minimal or mild disease. Only 5.8% of children with atopic dermatitis did not have face or flexural involvement. Of the 237 children with atopic dermatitis and information available, 209 used 1 or more products to treat their condition.

Conclusions: Atopic dermatitis is common, decreasing in prevalence after the first 3 years of life. Most children have mild disease requiring little if any treatment, and much could be prevented with simple measures. Educational programs directed at those caring for preschool-age children that provide information on simple preventive measures, where practical, and sources of advice for treatment, if necessary, could substantially reduce the morbidity of this condition in predisposed children.

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dic criteria for atopic dermatitis in young people, which has been shown under field conditions to be reliable and to have a high degree of sensitivity and specificity.29,30 The criteria are based on history alone, with the exception of the physical sign of presence of dermatitis. This must be flexural in site or involve the cheeks, forehead, and outer limbs in children younger than 4 years. These criteria have now been used as the basis for reporting frequency of atopic dermatitis in a variety of different populations.21-23 Unfortunately, in a recent study involving school children in Victoria, the UK Working Party diagnostic criteria reduced by 50% the prevalence of what was considered to be atopic dermatitis on examination by the dermatologists. In other words, although these criteria may be highly specific, they may have a reduced sensitivity in detecting all cases as a result of the attempt to detect children with atopic dermatitis only and to exclude other inflammatory skin conditions.23

Not only have there been problems in the diagnostic classification of atopic dermatitis in the past, but there have also been similar problems in the classification of severity. A number of different classification systems have been recommended based generally on the level of care required, but no single system has been accepted internationally as the basis for severity reporting in population-based studies.24-28 Despite differences in method, diagnostic criteria, and severity classification, it is widely accepted that the frequency of atopic diseases, includ-

**SUBJECTS, MATERIALS, AND METHODS**

**STUDY POPULATION**

The study population was Victorian children attending child-care centers, preschools, and Maternal and Child Health Centres during the period June 26, 1998, to January 28, 1999, with the reference population being Australian children aged 5 years and younger.

The basic design was a cross-sectional skin survey using a selected cluster sample of the various centers throughout Victoria. A comprehensive list of the centers, including long day-care centers, preschools, occasional child-care centers, and Maternal and Child Health Centres, was provided by the Victorian government Department of Human Services, Melbourne, Victoria. A sample size of 1000 was selected to enable the determination of a true prevalence of atopic dermatitis in the range of 7%, with a 95% confidence interval (CI) of ±1.6%.31 From a total of 3207 child-care centers distributed throughout the state, a random selection was made of 35 centers in Melbourne and 14 in rural Victoria. Where centers had a minimum capacity of 30 children, they were used as the sole sample center for that area. For 18 centers with fewer than 30 children, an additional center was randomly selected from the remaining centers within the same postal code to give a minimum capacity of 50 children as a 1-sample cluster. The maximum capacity of the centers selected ranged from 11 to 103. A total of 37 preschool and long day-care centers and 12 occasional child-care centers were chosen.

The Maternal and Child Health Centres were divided into 2 groups on the basis of their locations. A random selection was made of 10 in the Melbourne region and 9 in rural Victoria, within the same municipalities as the previously selected child-care centers.

**SAMPLE RECRUITMENT**

A contact letter was sent initially to each selected child-care center, followed by a telephone call to arrange a face-to-face planning meeting. After obtaining consent from the center to participate, a parental notice with a brief introduction about the survey was sent to each center before a parental information kit containing a brochure explaining the survey, its aims, and the institution conducting the study was sent out to individual parents. Parents were informed that approval had been obtained to conduct the study from the Human Research Ethics Committee of St Vincent’s Hospital Melbourne, Fitzroy, and that confidentiality of personal information collected through the survey was guaranteed. A reminder notice was sent to all participants. We allowed 5 to 7 weeks from the time of the first contact letter for recruitment of the centers and organization of the children to be examined. A reminder of the time of examination, requesting parents to complete and return consent forms and completed questionnaires, was sent to each center several days before the date of skin examination. On the examination day, additional blank consent forms and questionnaires were provided for all of the centers. Parents or guardians who had not returned their forms were invited to complete them on the day of examination.

There were several minor differences in recruitment of the Maternal and Child Health Centres compared with the child-care centers. This included the initial letter being sent to the center coordinators for a given local government municipality to seek their permission and support. Contact was then made with the individual nurse at each Maternal and Child Health Centre selected and a planning meeting was organized. In contrast to child-care centers, where a fixed number of children are present and attendance is regular, at the Maternal and Child Health Centres the appointments are random and depend on the decision of the nurses and the needs of mothers and children. Therefore, the parental notice and survey reminder was not provided to the Maternal and Child Health Centres before the examination day, as this may have induced mothers who were concerned about their children’s skin to attend for that particular problem and thus created a bias in the sample population with an overrepresentation of children with skin conditions on the day of examination.

**QUESTIONNAIRES**

The parental questionnaire was self-administered and included open and closed questions. It was designed to elicit general demographic information on the child, present or past skin conditions, and family history of skin problems or related diseases. If the child had any skin condition, information was sought regarding treatment and the source of treatment recommendations. Eczema/dermatitis, diaper rash or dermatitis, and cradle cap/seborrhoeic dermatitis were identified in the specific or closed questions within the questionnaire. The questions of the UK Working Party diagnostic criteria were not used because, in a previous Victorian study23...
involving school children, the sensitivity was unacceptably low. To achieve maximal compliance with maximal information on skin conditions, the questionnaire was kept simple, the number of questions was kept to a minimum, and the questions were kept relatively general.

A questionnaire was also prepared for the child-care centers concerning diaper use. This included information on the type of diaper used and the frequency of changing diapers within the center.

DATA COLLECTION

On the day of examination, each center was visited by an examination team consisting of a consultant dermatologist (P.F.), a project manager (Y.Z.), and a research assistant.

Before the examination, the consent forms and parental questionnaires were examined to ensure that they had been completed correctly. The completed questionnaires were then given to the dermatologist before the skin examination.

The children were given a total body examination. The underpants (diaper) area was examined only in children younger than 12 months or at the request of the parent in an older child. The sites were assessed in the same sequence for all children.

The examiner recorded the presence, site, and severity of atopic dermatitis. On completion of the examination, the examiner provided a detailed parental report that notified the parent or guardian of all the examination findings. Fact sheets with information on atopic dermatitis or other conditions found and treatment available were provided if any skin condition was noted.

DIAGNOSTIC DEFINITION

Because a previous study in school-age children had found that the UK Working Party diagnostic criteria reduced by 50% the prevalence of what was considered to be atopic dermatitis on examination by dermatologists, and because a recent study on warts indicated that clinical examination by a dermatologist is more sensitive and specific than any diagnostic criterion (thus reinforcing the value of clinical experience obtained from repeated exposure to multiple variants of disease), care is required in relying on standardized criteria as the basis for clinical diagnosis. Thus, we used a clinical modification of the UK Working Party diagnostic criteria for atopic dermatitis. This included the points on history filled out on the parent’s questionnaire plus the presence or absence of clinically apparent dermatitis at the time of examination. Clinical features of atopic dermatitis included the presence of erythema, scale, papules, papulovesicles, excoriation, and lichenification at typical sites. On most occasions, parents were not present at the time of examination, and the child was too young to elaborate on the historical aspects of the UK Working Party diagnostic criteria for atopic dermatitis. The questionnaire asked parents if the diagnosis of atopic dermatitis/eczema had been made, along with questions about personal and family history of atopy.

For the purposes of this study, severity was graded in a manner similar to that previously described as minimal (disease that the parent may not have been aware of and that would require no treatment or would respond well to simple emollients available without prescription), mild (disease that might require attention from a medical practitioner with the use of minimal prescription-only treatments such as 1% hydrocortisone in addition to emollients), moderate (disease that would require attention from a medical practitioner, plus the use of more potent prescription-only topical steroids as well as emollients), and severe (disease that would require management by a specialist dermatologist).

DATA PROCESSING AND ANALYSIS

A database was established using Filemaker Pro version 4.0 software package for Windows (Claris Corporation, Santa Clara, Calif). All data gathered were entered into the database and analyzed using Statistical Package for the Social Sciences version 8.0 for Windows (SPSS Inc, Chicago, Ill). Analysis included the demographic characteristics, age, sex, region of residency, type of center attended, and birth country of parents.

Age- and sex-specific prevalence rates with 95% CIs were calculated for atopic dermatitis. Diagnosis of the presence of atopic dermatitis reported by the parent or guardian was compared with diagnosis made by the examiner, thus enabling various indices of validity to be calculated for the parental questionnaire. The prevalence estimates were based on data weighted according to the age and sex of all preschool-age children in Victoria. Because a single observer was used in clinical examinations for all children, assessment of surveyor drift was used as a measure of observer reliability. The observed prevalence based on the first 15 centers visited (390 children) was compared with that based on the last 15 centers (334 children) to detect whether there was any drift.

RESULTS

POPULATION SAMPLE

Forty-nine of the original 68 randomly selected child-care centers, kindergartens, and Maternal and Child
Health Centres participated in the study. Four of the remaining 19 centers were closed, and 3 centers did not agree to participate (2 centers were closing and 1 center had internal political problems). The remaining 12 were not surveyed because of limitations on time, plus sufficient numbers had been recruited to obtain prevalence data within the CIs required in the analysis while remaining in a satisfactorily randomized distribution within the first 49 centers.

Kits were distributed to the parents of all children attending the 49 centers. The total number of distributed kits was 1634, based on the maximal capacity of the 49 centers involved. This overestimated the true study population, as many centers were not at capacity. Of this number, 1116 children (68.3%) were examined, of whom 1091 had correctly completed parental questionnaires. There were 101 children for whom consent had been given and questionnaires had been completed but who were absent on the examination day. An additional 29 children refused to be examined on the day of the visit, although their parents had given consent and completed the questionnaire form.

A comparison of the responses in the questionnaires of children who were examined (atopic dermatitis on questionnaire, 29.4% [95% CI, 26.7%-32.1%]; mean age, 35.7 months; 50.8% boys) with responses in the 139 completed questionnaires where the child was not examined (atopic dermatitis on questionnaire, 27.3% [95% CI, 19.8%-34.8%]; mean age, 40.1 months; 57.6% boys) revealed no obvious difference between groups.

The mean age of children examined was 35.7 months, with the minimum age being 11 days and the maximum 5 years and 11 months. The mean age of children attending the Maternal and Child Health Centres was 17.8 months; that of the children attending the other centers was 41.7 months. A total of 273 children (24.5%) were seen at Maternal and Child Health Centres and 843 (75.5%) at child-care centers or kindergartens. There were 567 boys (50.8%) and 549 girls (49.2%) examined in the study, with 833 (74.6%) of the children examined coming from the Melbourne urban area and 283 (25.4%) from rural Victoria.

**OBSERVER RELIABILITY**

Assessment of surveyor drift as a measure of observer reliability showed no change in the prevalence of children detected with atopic dermatitis in the first 15 centers (33.5%) compared with the prevalence in children in the last 15 centers (28.7%; P = .17). Thus, no significant surveyor drift appeared to have occurred during the study period. The small reduction in prevalence recorded may have been due to seasonal variation, with the first 15 centers being seen in winter and the last 15 centers in spring and summer.

**PREVALENCE OF ATOPIC DERMATITIS**

Of the 1116 children examined, atopic dermatitis was diagnosed on clinical examination in 346 (point prevalence, 31.0% [95% CI, 28.3%-33.7%]). The age- and sex-adjusted prevalence was 30.8% (95% CI, 28.0%-33.5%), which is very close to the crude rate. The remainder of the results are expressed as rates adjusted by age and sex to the Victorian population.

There was no difference in overall prevalence between boys (31.3% [95% CI, 27.5%-35.1%]) and girls (30.2% [95% CI, 26.3%-34.1%]). Atopic dermatitis was uncommon in children younger than 3 months (4.5% [95% CI, 1.1%-18.0%]) and then increased in frequency to reach a maximum prevalence at 1 year of age, after which it decreased with increasing age (Table 1).

The prevalence was highest in children with mothers born in Asia (45.3% [95% CI, 35.3%-55.2%]) and lowest in children with mothers born in the Middle East or Africa (21.6% [95% CI, 5.9%-37.2%]). The prevalence among those children whose mothers were born in Australia or New Zealand (representing 74.6% of those children examined) fell between these rates (28.4% [95% CI, 25.4%-31.5%]). There was a significant difference between the frequency of atopic dermatitis in children whose mothers were born in Asia compared with those whose mothers were born in Australia or New Zealand (odds ratio [OR], 2.06 [95% CI, 1.36-3.14]).

**SEVERITY**

The severity of atopic dermatitis was classified as mild in 58.8% of children and moderate in an additional 34.5%. Those children with minimal disease made up 4.9% of the total and those with severe disease made up 1.7%. There was no outstanding trend in the proportions across the severity classifications with regard to age or sex (Table 2). However, with increasing severity, more sites were likely to be affected (Table 3). The severity of the atopic dermatitis did not correlate with a personal history of asthma or hay fever or a family history of atopy,

![Table 1. Prevalence of Atopic Dermatitis on Examination in Preschool-Age Children](image-url)
with similar proportions in each severity class for positive and negative responses to the questionnaire.

SITE

The flexures and the face were the most common sites affected in the children examined (Table 4). There was variation with age, with the dermatitis being more common on the face in the younger children and such occurrences decreasing with age ($\chi^2$ for linear trend, 35.21; $P < .001$), whereas the proportion occurring in the flexures remained constant across all ages ($\chi^2$ for linear trend, 0.11; $P = .74$). Only 20 (5.8%) of all children with atopic dermatitis did not have face or flexural involvement.

PARENTAL REPORT OF THE PRESENCE OF ATOPIC DERMATITIS (ECZEMA)

Information from the questionnaire with regard to the presence of atopic dermatitis was available for 1091 children. Two hundred thirty-seven parents of the 337 children with atopic dermatitis reported that they had eczema (sensitivity, 70.3%). Further analysis of the 100 children with atopic dermatitis on examination but not reported on the parental questionnaire showed similar age, sex, center type, time of year examination was performed, and area distributions. However, the atopic dermatitis was more likely to be minimal or mild (86.0% vs 54.9%; OR, 5.03 [95% CI, 2.72-9.37]), and the child was more likely to have a mother born in Asia (21.0% vs 11.8%; OR, 2.25 [95% CI, 1.19-4.25]). This group was less likely to have classic flexural involvement (OR, 0.41 [95% CI, 0.25-0.67]) and more likely to have a family history negative for atopy (OR, 2.76 [95% CI, 1.69-4.48]) or conversely less likely to have a family history positive for atopy (OR, 0.64 [95% CI, 0.22-0.59]). Of the 754 who did not have atopic dermatitis at the time of examination, 670 parents correctly reported that their children did not have the disease (specificity 88.9%). Clinical examination found atopic dermatitis in 237 of the 321 children whose parents said that they had atopic derma-

### Table 2. Severity of Atopic Dermatitis on Examination in Preschool-Age Children

<table>
<thead>
<tr>
<th>Children Examined</th>
<th>Clinical Atopic Dermatitis, No. (%)*</th>
<th>Severity of Atopic Dermatitis, No. (%)*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. (%)</td>
<td>Minimal</td>
</tr>
<tr>
<td>Overall</td>
<td>1116 (100.0)</td>
<td>18 (4.9)</td>
</tr>
<tr>
<td>Male</td>
<td>567 (100.0)</td>
<td>10 (5.6)</td>
</tr>
<tr>
<td>Female</td>
<td>549 (100.0)</td>
<td>8 (4.9)</td>
</tr>
<tr>
<td>Age group, y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1</td>
<td>182 (100.0)</td>
<td>1 (2.1)</td>
</tr>
<tr>
<td>1</td>
<td>176 (100.0)</td>
<td>3 (4.1)</td>
</tr>
<tr>
<td>2</td>
<td>184 (100.0)</td>
<td>6 (10.9)</td>
</tr>
<tr>
<td>3</td>
<td>224 (100.0)</td>
<td>5 (6.1)</td>
</tr>
<tr>
<td>4</td>
<td>184 (100.0)</td>
<td>3 (5.1)</td>
</tr>
<tr>
<td>5</td>
<td>166 (100.0)</td>
<td>0 (0.0)</td>
</tr>
</tbody>
</table>

*Severity classifications are described in the “Diagnostic Definition” subsection of the “Subjects, Materials, and Methods” section. Because of rounding, percentages may not all total 100. Percentages are adjusted for age and sex.

### Table 3. Severity of Atopic Dermatitis on Examination by Site of Involvement*

<table>
<thead>
<tr>
<th>Site</th>
<th>Minimal</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Total No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face</td>
<td>8 (44.4)</td>
<td>119 (58.6)</td>
<td>76 (63.9)</td>
<td>5 (83.3)</td>
<td>208</td>
</tr>
<tr>
<td>Flexures</td>
<td>9 (50.0)</td>
<td>128 (63.1)</td>
<td>108 (90.8)</td>
<td>6 (100.0)</td>
<td>251</td>
</tr>
<tr>
<td>Diaper area</td>
<td>0 (0.0)</td>
<td>13 (6.4)</td>
<td>11 (9.2)</td>
<td>1 (16.7)</td>
<td>25</td>
</tr>
<tr>
<td>Other</td>
<td>9 (41.9)</td>
<td>89 (43.8)</td>
<td>85 (71.4)</td>
<td>5 (83.3)</td>
<td>185</td>
</tr>
<tr>
<td>Total No. of children</td>
<td>18 (4.9)</td>
<td>203 (58.8)</td>
<td>119 (34.5)</td>
<td>6 (1.7)</td>
<td>346</td>
</tr>
</tbody>
</table>

*Children might have involvement at more than 1 site; therefore, total number of children is not sum of number of sites.

†Severity classifications are described in the “Diagnostic Definition” subsection of the “Subjects, Materials, and Methods” section.

### Table 4. Frequency of Various Sites Affected by Atopic Dermatitis

<table>
<thead>
<tr>
<th>Site</th>
<th>Frequency of Atopic Dermatitis, No. (%) of Sites</th>
<th>Children With Atopic Dermatitis, %*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexures</td>
<td>251 (32.9)</td>
<td>72.5</td>
</tr>
<tr>
<td>Face</td>
<td>208 (27.3)</td>
<td>60.1</td>
</tr>
<tr>
<td>Trunk</td>
<td>132 (17.3)</td>
<td>38.2</td>
</tr>
<tr>
<td>Limbs</td>
<td>130 (17.0)</td>
<td>37.6</td>
</tr>
<tr>
<td>Diaper area</td>
<td>25 (3.3)</td>
<td>7.2</td>
</tr>
<tr>
<td>All other sites</td>
<td>17 (2.2)</td>
<td>4.9</td>
</tr>
<tr>
<td>Total</td>
<td>763 (100.0)</td>
<td>...</td>
</tr>
</tbody>
</table>

*Most children had atopic dermatitis affecting more than 1 site. Ellipses indicate not applicable.
tis (positive predictive value, 73.8%). Of the 84 children whose parents reported that they had atopic dermatitis that was not confirmed by clinical examination, 38 had keratosis pilaris and 22 had xerosis (dry skin). The remainder had no skin condition or a small number of other unrelated skin conditions.

ASSOCIATED FACTORS

There was an increased personal and family history of asthma, hay fever, and/or atopic dermatitis in those children found to have atopic dermatitis on examination compared with those who did not (Table 5). Nevertheless, atopic dermatitis was diagnosed in 28.0% of children with no personal history of asthma or hay fever (compared with 39.0% who had a history of asthma or hay fever) and 27.0% of children without any recorded family history of asthma, hay fever, or atopic dermatitis (compared with 33.2% who had a family history of atopy).

The overall personal history of asthma and hay fever in this study was 26.3%, whereas family history of atopy was 62.6%.

Atopic dermatitis was more common in the urban areas (32.1% [95% CI, 28.9%-35.3%]) than in the rural areas (27.0% [95% CI, 21.8%-32.1%]; OR, 1.28 [95% CI, 0.95-1.72]). The disease was more common in the winter months of June, July, and August (33.3% [95% CI, 28.4%-38.1%]) than in the spring (September, October, and November; 30.8% [95% CI, 26.7%-34.9%]) and summer (December and January; 27.1% [95% CI, 21.7%-32.5%]). Although there was an apparent trend toward a decreasing prevalence in the warmer months, the association was not statistically significant.

TREATMENT OF ATOPIC DERMATITIS

Of the 237 children with a clinical diagnosis of atopic dermatitis who were correctly reported to have atopic dermatitis on the parental questionnaire, 209 (88.2%) had used 1 or more products to treat their condition. A total of 94 products were used, with the most common being emollients (particularly sorbolene cream) and topical steroids, including 1% hydrocortisone and a variety of other low- to intermediate-potency products.

More than half of the products being used were prescription items rather than nonprescription over-the-counter products from the pharmacy (43.4%). When coded as efficacious or not according to product type, 100% recommended by a dermatologist were coded as likely to have some effect, whereas general practitioners, Maternal and Child Health Centre nurses, and pharmacists recommended efficacious products in 98.1%, 95.0%, and 95.8% of cases, respectively. On the other hand, 32.3% of those products recommended by family, friends, or others were coded as likely to have no effect whatsoever, including some that may have exacerbated the condition.

Where information was available (99.1%), the source of advice for products used to treat atopic dermatitis was medical practitioners (80.8%), pharmacists or nurses (11.7%), and family, friends, or others (7.5%).

The results of this study suggest that atopic dermatitis is common in the community. The study also confirms previous findings of an association with other atopic disease, the highest prevalence in the first 2 years of life, the high frequency of disease in Asian infants compared with white infants, and a tendency to worsen in the colder months of the year.

The prevalence of atopic dermatitis reported herein is higher than that reported previously for any other community. A study published recently involving Victorian school students recorded an overall prevalence of 16.3% in those aged 4 to 18 years, with a prevalence in the group aged 4 to 6 years of 18.7%. We did not include 6-year-old children in the current survey, although examination of the age-specific prevalence data shows that atopic dermatitis was becoming less common with increasing age in the group aged 4 to 5 years whom we studied.

Another study from Melbourne, using the UK Working Party diagnostic criteria, revealed a cumulative incidence of atopic dermatitis in the first 12 months after birth of 27.5%, with the frequency in white infants being 21% and that in Chinese infants being 44%. These figures are remarkably similar to the overall prevalence and to the prevalence for children of mothers born in Australia or New Zealand and Asia found in the current study in children younger than 1 year.

The ideal would have been to sample the whole community within this age group. Unlike Victorian schools, where attendance is compulsory for the entire school-age population, there is no institution that all preschool-age children are required to attend. There is compulsory birth notification to Maternal and Child Health Centres, but attendance by the mother and child is entirely voluntary. Not all children attend child-care centers before starting school, although a very large proportion attend kindergartens. We predicted that merely sending an invitation to a randomized selection of households in Victoria to present for an examination looking at common skin conditions in preschool-age children would produce substantial selection bias. Even more problematical is that no records are available to allow sampling of Victorian households on the basis of having a preschool-age child living there. Hence, the current method of a random sample of the 3207 centers being

Table 5. Frequency of Atopic Dermatitis Associated With History of Atopy

<table>
<thead>
<tr>
<th>Factors Associated With Atopic Dermatitis</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Previous history of asthma/hay fever</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>112 (33.2)</td>
</tr>
<tr>
<td>No</td>
<td>225 (66.8)</td>
</tr>
<tr>
<td>Family history of asthma/hay fever/eczema</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>227 (67.4)</td>
</tr>
<tr>
<td>No</td>
<td>110 (32.6)</td>
</tr>
</tbody>
</table>

* Data are given as number (percentage) of children.

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selected with weighting of urban to rural centers to reflect the population distribution. By cluster sampling and by including all center sizes, we attempted to minimize bias and provide an even chance of a child from any sociodemographic group being enrolled. We have no evidence to suggest that there is a tendency for children attending any of these centers to be more likely to have the variety of skin conditions that we were seeking to record in the study than in the community at large. It is of interest that when we weighted the data by age and sex, there was only minimal change in the adjusted prevalence proportion of the atopic dermatitis, ie, it suggests that we examined a reasonable random sample of the community. Previous studies have reported the frequency of a family history of atopy to be 36.4%, and a history of allergic disease—eczema, asthma, hay fever—to be 23.4% to 35.2%, 34,35 The overall frequency of a history of asthma or hay fever and a family history of atopy reported herein are similar to these previously reported figures.

In any study, there is the potential for selection bias. However, in the case of the child-care centers and kindergartens, regular attendance by the children, rather than voluntary attendance on the day that we were coming, would be unlikely to induce bias because of a skin condition being present. On the other hand, it is entirely voluntary for mothers to bring their children to the Maternal and Child Health Centres, although appointments can be made 1 week or more ahead. For this reason, we carefully cautioned the nurses in charge of the centers not to request mothers of infants with skin problems to attend because we were coming to examine the children. The parental notice and reminder used for the child-care centers were not used at the Maternal and Child Health Centres to avoid overrepresentation of children with skin problems. Analysis of age-specific prevalence data comparing Maternal and Child Health Centres with the child-care centers revealed no major differences.

We have no data on the 327 nonresponders who did not undergo examination and whose parents did not complete a questionnaire. A previous study has suggested that, in voluntary surveys, the prevalence of common skin conditions on history is generally lower among nonresponders. 36 Although it is unlikely to be the case, if none of the nonresponders had atopic dermatitis (worst-case scenario), the prevalence would be reduced to 21.2%, still a substantial proportion affected.

The major criterion in the UK Working Party diagnostic criteria is a history of an itchy skin condition (or parental report of scratching or rubbing in a child). 37 One of the potential problems with atopic dermatitis is that when it is very mild, it may not itch. Hence our question concentrating more on the presence of a specific skin condition (eczema/dermatitis) than on the presence of an itch, particularly in young children. In the current study, we asked the parents if the child had eczema (dermatitis). As reported in the “Results” section, there was a high sensitivity, specificity, and positive predictive value on comparison of the parental questionnaire in response to this question with the findings on clinical examination. When our data were divided by severity gradings, 65% were in the minimal/mild category where itch may not be a major component and where minimal medical intervention is likely to be required because emollients and avoidance of irritants may be all that is needed. The low prevalences of atopic dermatitis reported previously may well have been a result of classification criteria that merely included children who had moderate to severe disease. For example, the Health and Nutrition Examination Survey in the United States reported the frequency of the disease by recording only those people whom it was considered would require medical attention. 37

Of note, 209 (88.2%) of 237 children with atopic dermatitis on examination and a report of dermatitis on the questionnaire had used 1 or more products to treat the condition—50% of products required a prescription—and 73% had seen a physician for advice.

In 100 (28.9%) of the 346 children who had atopic dermatitis on examination, the parents had reported no history of this problem. The disease on examination tended to be minimal or mild, which would make it less likely to have been noticed. A lack of a family history of atopy would compound the lack of knowledge of the disease and its signs. It appears to be relatively common knowledge in the community that atopic dermatitis in young children affects the flexures. Thus, parents were less likely to report its presence if it affected sites other than flexures. The lower reporting by parents from Asia (predominantly Chinese parents) could represent a misunderstanding of the questionnaire due to language difficulties, or possibly less education and knowledge of atopic dermatitis in their country of origin, although atopic dermatitis becomes more common in this group when they are living in Australia.

Nevertheless, because many of the cases of minimal to mild disease could be easily managed with minimal treatment and simple preventive measures such as avoidance of soap and use of emollients, this study highlights a need for community-based educational programs about this common condition. Of interest is that when parents did realize that their child had atopic dermatitis, many sought advice from people other than medical practitioners or those who might be qualified to give it. In many cases, it may be that these children only needed minimal care, as has been previously reported. 38 However, we found in many instances that the product they were using as a result of the advice they received would have no effect on atopic dermatitis at all. In these cases, the only problem would be parents paying money for something from which their children would receive no benefit. On the other hand, there were some products being used that likely irritated atopic dermatitis, and in this case, the product recommended may well have made the condition worse. These data reinforce the suggestion concerning public education about the nature of these common inflammatory skin diseases and where people affected by them should seek advice.

### CONCLUSIONS

The present study extends previous work in Australia on the frequency of atopic dermatitis in young people. The data suggest that the condition is very common and supports recent reports emphasizing the increasing fre-
quency of atopic diseases.\textsuperscript{29,30} There is room for discussion on whether all of these children had atopic dermatitis sufficient to be easily diagnosed or to require treatment. We look forward to the day when we have a test as simple as clinical examination in which we can have confidence of detecting all people in the community with atopic dermatitis, and only those people. Nevertheless, these data give an indication of the magnitude of the frequency of the disease and the potential impact on health services in the Australian community.

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