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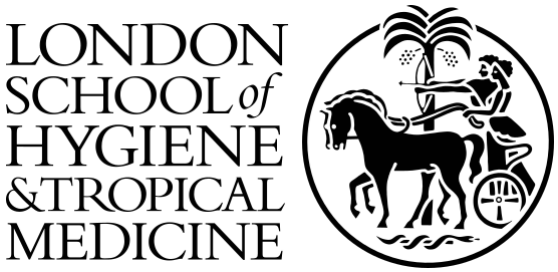

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Time trends, ethnicity and risk factors for eczema in New Zealand children: ISAAC Phase Three

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Background: Eczema is a common chronic disease which has significant morbidity and costs for children and their families. Phase One (1993) of the International Study of Asthma and Allergies in Childhood (ISAAC) found a high prevalence of symptoms of eczema in New Zealand.

Objective: In Phase Three (2001-3) we aimed to answer these three questions: Is the prevalence of eczema changing over time?; Are there ethnic differences in prevalence?; and What are the risk factors for eczema?

Methods: Five New Zealand centres participated in ISAAC Phases One and Three using the same methodology. Questionnaires about ethnicity, symptoms of eczema and environmental factors were completed by parents of 6-7 year olds (children) and self-completed by 13-14 year olds (adolescents). Prevalence and change per year were calculated by centre, ethnicity and gender. Prevalence differences between centres and associations with environmental factors were examined using logistic regression.

Results: There was little change in prevalence over time for the children, and a decrease in prevalence for the adolescents. Prevalence was higher among Māori and even higher among Pacific participants than among European children. Positive associations with current eczema symptoms were found for both age groups for truck traffic in the street of residence, and current paracetamol consumption, and for children only, antibiotics or paracetamol in the 1st year of life. Inverse associations were found with residence in New Zealand less than 5 years, consumption of milk, seafood, and eggs, and presence of a dog in the home.

Conclusion: Eczema remains a significant problem, particularly for young Māori and Pacific New Zealanders in whom less recognition of eczema and poorer access to effective, sustained eczema management may be contributing factors. Reverse causation may explain all the environmental findings apart from truck traffic which is increasing in New Zealand.

Key words: Eczema; Children; Adolescents; Ethnicity; New Zealand; Environment

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INTRODUCTION

Eczema is a common chronic disease which has significant morbidity and costs for children and their families. It is a common skin disease characterised by an itchy rash, often located in the flexural areas (e.g. folds of the elbows and knees), which frequently first occurs at a young age (less than 2 years) and follows a chronic relapsing course [1-3]. While many children with eczema experience remission as they grow up, approximately 20-40% of those affected will continue to experience eczema as adults [4, 5]. The high direct and indirect costs of chronic eczema to families and health care systems [6], and significant morbidity and impairment to quality of life in individuals [7] have been documented.

Concern that the prevalence of childhood eczema (as well as the prevalence of asthma and rhinitis) was increasing in affluent countries led to the establishment of the International Study of Asthma and Allergies in Childhood (ISAAC) in 1991 [8]. ISAAC used standardised methods to measure the prevalence of symptoms of asthma, rhinitis and eczema among children and adolescents in order to allow valid comparisons between centres, both within and between countries [9]. Six New Zealand centres (Auckland, Bay of Plenty, Hawke's Bay, Wellington, Nelson and Christchurch, all in 1993) participated in ISAAC Phase One [10] with prevalence of current symptoms of eczema ranging from 12.0% to 16.6% and 12.1% to 13.8% for the 6-7 year and 13-14 year age groups respectively [11]. In ISAAC Phase Two, of the New Zealand centres, only Hawke's Bay participated and the prevalence of current symptoms of flexural eczema was 14% detected by questionnaire and 8.2% detected by skin examination [12].

In 2002-3 ISAAC Phase Three took place, including five centres in New Zealand, repeating the methodology of Phase One [13] so that time trends in prevalence of symptoms could be assessed [14]. Prevalence of symptoms of asthma in New Zealand has been shown in phases One and Three to vary by ethnicity with high prevalence among Māori children and adolescents [15, 16]. However little is known about variation in prevalence by ethnicity and time trends for symptoms of eczema in New Zealand. An environmental questionnaire was added with questions about a variety of potential protective and risk factors.

Our hypotheses were that the prevalence of eczema in New Zealand is increasing, that it is more common among Māori and Pacific than European children and adolescents, and that there are some avoidable risk factors. The research objective was to answer these three questions: is eczema prevalence changing over time?; are there ethnic differences in prevalence?; and what are the risk factors for eczema?

MATERIALS AND METHODS

ISAAC Phase One (1993) and Phase Three (2001-3) in New Zealand surveyed parents of 6-7 year old children and 13-14 year old adolescents concerning symptoms of asthma, rhinoconjunctivitis and eczema (core questionnaire), and, in Phase Three, added questions about environmental factors which may be associated with these diseases. Detailed information concerning the Phase One and Phase Three study design and questionnaires has been reported previously [9, 13]. Ethics Committee approval was obtained for each centre and centres obtained their own funding.

The questionnaire included demographic information concerning the age, date of birth, gender and ethnicity of participants. The ethnicity question included options for 'European/Pakeha', 'Māori', 'Pacific Island' and 'Other' ethnicities and multiple selections were accepted. In cases where multiple options were selected a single ethnicity was allocated using a prioritisation of 'Māori', 'Pacific Island', 'Other' and 'European/Pakeha' as for Phase One [15].

Schools were selected randomly from a defined sampling frame (except for Nelson where all schools in the study area participated). An information letter about the study was provided to parent/guardians of all eligible children. The questionnaires were completed at home by the parent/guardian of children, and self-completed by the adolescents at school. Passive consent was implied by return of the completed questionnaire to school by the children or failure to object to participation of the adolescents. Passive consent is associated with increased response rates and is acceptable for non-invasive questionnaire-based research in community settings [17].

The questions used in the ISAAC core questionnaire concerning symptoms of eczema were:

1. Has your child/Have you ever had an itchy rash which was coming and going for at least six months? (Yes/No)
2. Has your child/Have you had this itchy rash at any time in the past 12 months? (Yes/No)
3. Has this itchy rash at any time affected any of the following places: the folds of the elbows, behind the knees, in front of

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the ankles, under the buttocks, or around the neck, ears or eyes? (Yes/No)

4. At what age did this itchy rash first occur? (Under 2 years/Age 2-4 years/Age 5 or more) [for the parents of the children only]
5. Has this itchy rash cleared completely at any time during the past 12 months? (Yes/No)
6. In the past 12 months, how often on average, has your child/have you been kept awake at night by this itchy rash? (Never/Less than one night per week/One or more nights per week)
7. Has your child/Have you ever had eczema? (Yes/No)

The main outcome measures of interest reported here are current symptoms of eczema (those participants who answered 'Yes' to questions 2 and 3), and current symptoms of severe eczema (those participants with current symptoms of eczema who also answered 'One or more nights per week' to question 6). Results are also presented for question 7 ('eczema ever') to provide information about use of the label 'eczema'. Early onset eczema was defined as participants with current symptoms of eczema who also replied "Under 2 years" for question 4 above, used only for the 6-7 year age group.

The environmental questions concerned weight, height, a range of dietary factors, physical exercise, cooking and heating fuels in the home, paracetamol use, antibiotic use, number of siblings, birth in New Zealand, years lived in New Zealand, maternal education, truck traffic in street of residence, birth weight, breastfeeding, exposure to pets and farm animals, and exposure to environmental tobacco smoke in the home. Several questions concerning early life exposures were omitted from the 13-14 year age group questionnaire as adolescents could not be expected to provide valid responses.

Confidence intervals for the prevalence estimates were adjusted for the cluster sampling methodology. Logistic regression was used to examine whether there was more variation in prevalence of current symptoms of eczema, current symptoms of severe eczema and 'eczema ever' between centres than would be expected by chance, adjusted for gender, age, ethnicity, school decile (a surrogate measure of socio-economic status), and the cluster sampling methodology. Odds ratios for associations between the main outcome measures and environmental factors were also estimated using logistic regression, adjusted for gender, ethnicity, school decile, and the cluster sampling methodology. All analyses were carried out using SAS version 9.2 (SAS Institute Inc., Cary, NC, USA).

RESULTS

ISAAC Phase Three data was collected in Auckland and Wellington in 2001, Bay of Plenty in 2002, and Nelson and Christchurch in 2003. Four centres had response rates for both age groups greater than 80%: 6-7 year age group total 10,873 children, mean response rate of 85.2%, 13-14 year age group total 13,317 adolescents, mean response rate 89.2%. The response rate for the children in Wellington was low (47.2%) and data from this age group in Wellington was excluded from the analysis and the time trends analysis.

The Phase One and Phase Three results by centre, ethnicity and gender (including change per year) are presented in Table 1. The combined (all centres) prevalence of symptoms in children and adolescents respectively for current eczema was 15.0% and 8.8%; severe eczema 1.8% and 1.3%; 'eczema ever' 31.5% and 26.1%.

There was greater variation between centres than would be expected by chance for all outcomes for both age groups ($p < 0.001$) with the exception of current symptoms of severe eczema for the adolescents ($p = 0.092$). Auckland had the highest prevalence of severe eczema but lowest prevalence of 'eczema ever' in both age groups. Christchurch had the highest prevalence of current symptoms of eczema and 'eczema ever' in children. Wellington had the highest prevalence of current symptoms of eczema and 'eczema ever' in adolescents and Christchurch the lowest. Nelson had the lowest prevalence in children of current symptoms of eczema and severe eczema and in adolescents of severe eczema.

For the children, there was generally little change in prevalence by centre between Phase One and Phase Three for current symptoms of eczema and current symptoms of severe eczema but increases in prevalence for 'eczema ever' were observed across all centres for this age group. There was a different pattern for the adolescents, with decreases for current symptoms of eczema and, to a lesser extent, current symptoms of severe eczema, and little change in 'eczema ever'.

European/Pakeha and other participants had consistently lower prevalence than Māori who were lower than Pacific participants in both phases for current symptoms of eczema and current symptoms of severe eczema than, for Phase Three illustrated in Fig. 1. In contrast, for 'eczema ever', the pattern was reversed, with highest prevalence values found in European/Pakeha and Māori participants and lower values found for Pacific and other participants. There was no difference from the whole group in the

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Table 1. Phase One and Three prevalence, and change per year from Phase One (95% confidence intervals) by centre, ethnicity and gender for current symptoms of eczema, current symptoms of severe eczema and eczema ever

	N	N	Current symptoms of eczema			Current symptoms of severe eczema			Eczema ever		
	Phase One	Phase Three	Phase One(%)	Phase Three(%)	Change Per Year* (%)	Phase One(%)	Phase Three(%)	Change Per Year* (%)	Phase One(%)	Phase Three(%)	Change Per Year* (%)
6-7 year age group											
Auckland	3,526	3,541	14.4	14.3	-0.00 (-0.24,0.23)	2.6	2.5	-0.01 (-0.13,0.10)	22.3	26.4	**0.45 (0.18,0.72)**
Bay of Plenty	2,681	2,150	13.8	13.8	0.01 (-0.23,0.24)	2.2	1.5	-0.07 (-0.16,0.02)	24.5	29.2	**0.52 (0.23,0.82)**
Nelson	1,868	1,867	12.0	11.6	-0.05 (-0.28,0.19)	0.7	0.7	0.00 (-0.06,0.06)	24.4	32.5	**0.82 (0.47,1.16)**
Christchurch	3,318	3,315	15.8	18.5	**0.27 (0.07,0.47)**	1.6	1.9	0.02 (-0.04,0.09)	28.8	37.9	**0.91 (0.66,1.16)**
Total for all centres	11,393	10,873	14.3	15.0	0.07 (-0.04,0.18)	1.9	1.8	-0.01 (-0.06,0.04)	25.0	31.5	**0.71 (0.54,0.88)**
European/Pakeha	7,552	6,118	12.6	13.8	**0.12 (0.01,0.24)**	0.9	0.8	-0.01 (-0.04,0.02)	26.5	34.3	**0.78 (0.62,0.93)**
Māori	2,245	2,578	17.9	17.2	-0.08 (-0.32,0.16)	3.9	3.0	-0.10 (-0.21,0.02)	25.6	32.1	**0.72 (0.44,1.01)**
Pacific Island	891	818	20.4	20.8	0.04 (-0.39,0.47)	4.9	5.4	0.05 (-0.19,0.29)	17.1	23.3	**0.70 (0.27,1.12)**
Other	624	1,307	12.8	13.1	0.03 (-0.33,0.39)	2.7	2.1	-0.06 (-0.24,0.11)	17.0	22.0	**0.55 (0.14,0.97)**
Female	5,754	5,392	15.8	16.5	0.07 (-0.08,0.23)	2.1	2.0	-0.01 (-0.07,0.05)	25.7	32.5	**0.75 (0.57,0.94)**
Male	5,639	5,481	12.6	13.6	0.11 (-0.03,0.24)	1.7	1.6	-0.01 (-0.06,0.04)	24.3	30.5	**0.68 (0.50,0.87)**
13-14 year age group											
Auckland	3,206	2,870	12.4	8.9	**-0.43 (-0.84,-0.03)**	1.9	1.9	-0.00 (-0.13,0.12)	23.5	20.6	-0.37 (-0.80,0.06)
Bay of Plenty	2,813	1,976	13.8	8.1	**-0.62 (-1.01,-0.23)**	2.4	1.0	**-0.16 (-0.26,-0.07)**	25.3	21.1	-0.48 (-1.11,0.16)
Wellington	4,417	3,050	13.2	12.1	-0.13 (-0.41,0.14)	2.1	1.5	-0.06 (-0.14,0.01)	27.9	32.2	**0.54 (0.03,1.06)**
Nelson	1,838	2,305	12.8	7.5	**-0.53 (-0.83,-0.23)**	1.5	0.7	-0.08 (-0.19,0.02)	26.2	26.8	0.05 (-0.49,0.60)
Christchurch	3,186	3,116	12.3	7.0	**-0.52 (-0.74,-0.31)**	1.7	1.3	-0.04 (-0.11,0.02)	24.9	27.8	0.30 (-0.16,0.75)
Total for all centres	15,460	13,317	12.9	8.8	**-0.49 (-0.64,-0.34)**	2.0	1.3	**-0.08 (-0.12,-0.03)**	25.7	26.1	0.03 (-0.23,0.29)
European/Pakeha	10,033	7,450	11.7	7.3	**-0.43 (-0.52,-0.35)**	1.3	0.8	**-0.05 (-0.08,-0.02)**	27.4	28.8	**0.14 (0.00,0.27)**
Māori	2,937	2,501	16.9	10.4	**-0.73 (-0.93,-0.52)**	3.7	2.1	**-0.18 (-0.28,-0.08)**	26.1	26.4	0.03 (-0.23,0.30)
Pacific Island	1,332	1,633	15.1	14.0	-0.13 (-0.45,0.19)	3.5	2.8	-0.08 (-0.24,0.08)	18.2	22.5	**0.54 (0.17,0.90)**
Other	1,076	1,634	10.4	8.3	-0.27 (-0.55,0.02)	1.4	1.0	-0.04 (-0.16,0.07)	17.8	17.4	-0.06 (-0.43,0.31)
Female	8,289	6,940	16.3	11.1	**-0.52 (-0.63,-0.41)**	2.6	1.7	**-0.09 (-0.14,-0.04)**	31.5	31.6	0.02 (-0.13,0.16)
Male	7,171	6,372	9.0	6.4	**-0.26 (-0.35,-0.17)**	1.3	1.0	-0.03 (-0.07,0.00)	19.0	20.1	0.10 (-0.03,0.24)

*Change per year values where the 95% confidence interval does not include 0% change per year are in bold type.

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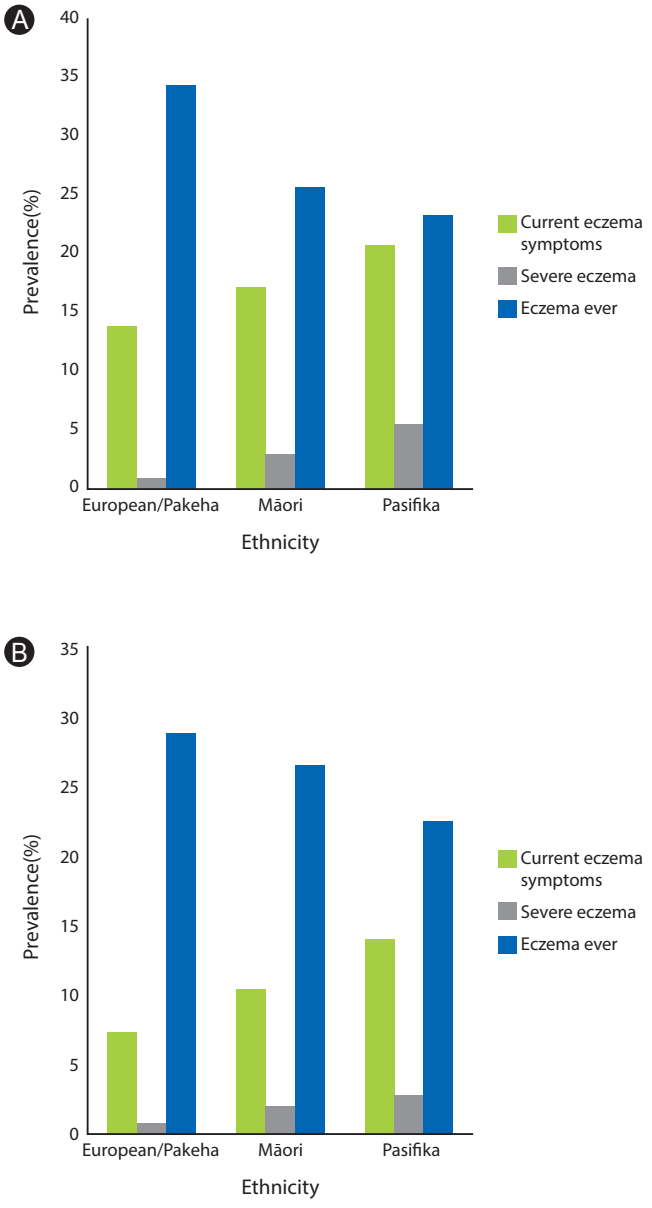

Fig. 1. (A) Eczema Prevalence in 6-7 yr age group in ISAAC Phase Three. (B) Eczema Prevalence in 13-14 yr age group in ISAAC Phase Three.

pattern of change over time by ethnicity except for adolescents where decreases in prevalence for current symptoms of eczema and current symptoms of severe eczema were statistically significant only for European/Pakeha and Māori participants, and there were significant increases in prevalence of 'eczema ever' for European/Pakeha and Pacific participants.

All eczema symptoms were more common in girls than boys for both phases and both age groups. For the children, both genders showed a similar pattern of change between Phase Ones and Three as for the overall data. For the adolescents, the changes were similar for both genders for current symptoms of eczema (decrease) and current symptoms of severe eczema and 'eczema ever' showed little change.

Many environmental factors showed no association with eczema symptoms (Supplementary Tables 1 and 2). Positive associations (risk factors) with current symptoms of eczema, onset under 2 years, symptoms of severe eczema or 'eczema ever' were found for truck traffic in street of residence, current paracetamol use, paracetamol or antibiotic use in the first year of life. Inverse associations (potentially protective) were found for being resident in New Zealand fewer than 5 years, consumption of milk, and in the children only, current dog in the home, consumption of seafood, and eggs.

DISCUSSION

This study confirmed that eczema is common among children and adolescents in New Zealand. The prevalence of current eczema symptoms remains high, with New Zealand ranking 9th out of 60 countries among children and 39th among 96 countries among adolescents [18]. Current eczema symptoms are about twice as common in children (about 1 in 6) than in adolescents (about 1 in 12), although the difference in study methodology (parental report for the children vs. self-report for the adolescents) may be part of the explanation for this contrasting prevalence.

There was variation in prevalence between centres with inconsistent patterns except for Auckland which had the highest prevalence of current symptoms of severe eczema for both age groups but had the lowest prevalence of 'eczema ever' for both age groups. Nelson had the lowest prevalence of current symptoms of severe eczema for both age groups and also had a comparatively low prevalence of current symptoms of eczema in both age groups. Nelson had a lower prevalence of eczema in Phase One [11] and although various ideas for this lower prevalence have been put forward, there is no clear explanation.

Over the 9 year (average) time period somewhat different time trends were identified for the children (little change for current symptoms of eczema and severe eczema, and an increase for 'eczema ever') and adolescents (decreases for current symptoms of eczema and severe eczema, and little change for 'eczema ever').

Prevalence of symptoms of eczema was highest among Māori

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and Pacific participants for both phases. This contrasts with the Phase One asthma symptom results where European/Pakeha participants were intermediate between Māori and Pacific participants [15]. There was little evidence of changes in the burden of eczema symptoms between ethnic groups.

New Zealand children and adolescents have high rates of hospital admission for serious skin infection, which have been increasing over the last decade, have a clear social gradient and show marked ethnic gradients with Pacific 4.5 and Māori 2.8 times the European rate [19]. Infected eczema makes a modest contribution to these figures, and points to under-treatment of eczema being a factor, as well managed eczema and early treatment of infected eczema would not normally be followed by hospital admission. Moreover Māori and Pacific children and adolescents are disproportionately affected by socioeconomic disadvantage (poverty) and thus the direct and indirect costs of doctors visits and treatments for eczema may be unsustainable for some families [20].

Prevalence of all symptoms was higher among female participants which is consistent with many other studies [21]. Time trends in prevalence for both genders were generally similar, reflecting the overall patterns although there was an indication that the prevalence of severe symptoms decreased among females but not males in the adolescents.

Many potential aetiologic factors have been examined within New Zealand including antibiotics [22, 23], breastfeeding [23-25], family history [23, 24, 26], maternal smoking [23], migration [27], immunisation [23, 28], paracetamol [22] and pets [23]. We found few consistent associations between eczema symptoms and reported environmental factors. Potential risk factors of particular interest were truck traffic in street of residence, current paracetamol use, paracetamol or antibiotic use in the first year of life. Those which showed potentially protective associations with current symptoms of eczema, onset under 2 years, symptoms of severe eczema or 'eczema ever', were being resident in New Zealand fewer than 5 years, consumption of milk, and in the children only, current dog in the home, consumption of seafood, and eggs. Reverse causation could be the explanations for many of these findings: paracetamol or antibiotics could be given for eczema, and consumption of milk, eggs, seafood, and exposure to dogs avoided because of eczema.

The associations with birth in New Zealand and years lived in New Zealand are consistent with data presented by Waite et al. [27] regarding eczema among Tokelauan children living in New Zealand and Tokelau, and a study of immigrant children in Italy which reported lower prevalence and incidence of eczema [29], and are consistent with the ISAAC findings for asthma [30].

The association with truck traffic is also consistent with the global level ISAAC Phase Three results [31]. Positive associations have also been reported among children in Germany [32] and Taiwan [33], and among adults in Sweden [34]. The findings are concerning because of the increase in truck traffic in New Zealand roads.

We examined early onset of eczema (less than 2 years of age) in the children because mutations in the filaggrin gene (an important structural protein in the epidermis) are strongly associated with the early eczema phenotype [35, 36]. The pattern of eczema prevalence and its association with environmental factors was similar for all current eczema symptoms and early onset of eczema symptoms, showing no distinguishing features for early onset of eczema symptoms.

The strengths of this study include participation from centres from a number of regions within New Zealand and the standardised methodology, allowing valid comparisons between centres and ISAAC phases. The study was carried out to a high standard and achieved a high response rate. Rigorous data and methodology checks were used to reduce the risk of bias.

There are some limitations which should be acknowledged. Estimates of change per year in prevalence between Phase One and Phase Three have been presented in order to adjust for slightly different periods between phases among the participating centres. However, these values should not be interpreted as a consistent linear change. Recall bias may have affected the estimates of prevalence of 'eczema ever', and this may be worse for adolescents who may have difficulty accurately recalling early life events. For this study, eczema was defined by questionnaire, not examination by trained research staff. However an ISAAC Phase Two analysis comparing questionnaire and skin examination assessment of eczema has shown that the questionnaire is a valid measure in community-based studies [12]. The environmental questionnaire included a large number of questions (50 for the children and 38 for the adolescents) and the questions were intentionally simple in order to be useable and translatable throughout the world. However some environmental factors which would have been of interest could not be included and it was not possible to examine any factor in depth.

Finally, this study has shown that young New Zealanders continue to experience a significant burden of eczema and this

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burden is disproportionally higher among Māori and Pacific children and adolescents. It is vital that all New Zealand children and adolescents have timely, affordable access to optimal management of eczema.

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Supplementary Table 1. Associations between EQ variables and current symptoms of eczema, current symptoms of severe eczema, eczema ever and early onset eczema, 6-7 year age group

Question	Response category	Current symptoms of eczema			Current symptoms of severe eczema			Eczema ever			Current symptoms of eczema and rash onset < 2 years		
		%	Odds ratio* (95% CI)	*p* value*	%	Odds ratio* (95% CI)	*p* value*	%	Odds ratio* (95% CI)	*p* value*	%	Odds ratio* (95% CI)	*p* value*
Body mass index	Normal	14.9		0.394	1.1		0.491	34.3		0.391	8.6		0.714
	Overweight	15.7	1.05 (0.86,1.27)		1.7	1.39 (0.81,2.37)		32.5	0.93 (0.80,1.08)		8.3	0.96 (0.73,1.25)	
	Obese	13.1	0.86 (0.67,1.10)		1.6	1.04 (0.52,2.08)		30.2	0.90 (0.75,1.08)		7.3	0.88 (0.64,1.20)	
Consumption of meat	Never or occasionally	18.7		0.189	1.4		0.174	34.9		0.236	6.3		0.543
	Once or twice per week	16.1	0.82 (0.60,1.13)		2.4	1.72 (0.64,4.61)		30.4	0.80 (0.62,1.03)		7.9	1.25 (0.79,1.97)	
	Three or more times a week	14.7	0.77 (0.56,1.05)		1.7	1.40 (0.49,4.03)		32.1	0.82 (0.65,1.05)		7.7	1.18 (0.75,1.85)	
Consumption of seafood	Never or occasionally	15.9		0.094	1.8		0.157	34.7		**<0.001**	7.9		0.639
	Once or twice per week	14.6	**0.89 (0.80,0.99)**		1.7	0.92 (0.67,1.26)		30.0	**0.82 (0.75,0.90)**		7.7	0.98 (0.85,1.12)	
	Three or more times a week	15.2	0.89 (0.64,1.22)		4.9	1.69 (0.91,3.16)		23.9	**0.71 (0.53,0.95)**		5.5	0.78 (0.45,1.33)	
Consumption of fruit	Never or occasionally	15.6		0.738	1.2		0.556	35.8		0.114	6.2		0.676
	Once or twice per week	15.7	0.97 (0.67,1.42)		2.6	1.79 (0.53,6.08)		28.8	**0.75 (0.57,0.98)**		7.2	1.22 (0.70,2.13)	
	Three or more times a week	15.0	0.92 (0.64,1.33)		1.8	1.52 (0.48,4.85)		32.0	0.80 (0.62,1.03)		7.8	1.25 (0.75,2.07)	
Consumption of vegetables	Never or occasionally	13.5		0.485	2.8		0.222	29.7		0.878	6.1		0.468
	Once or twice per week	16.3	1.20 (0.89,1.63)		2.9	0.97 (0.55,1.71)		29.4	0.97 (0.77,1.23)		7.0	1.15 (0.73,1.80)	
	Three or more times a week	15.0	1.16 (0.89,1.52)		1.5	0.76 (0.45,1.30)		32.4	1.01 (0.83,1.22)		8.0	1.24 (0.82,1.87)	
Consumption of pulses	Never or occasionally	15.6		0.579	2.0		0.818	33.4		0.068	7.9		0.423
	Once or twice per week	14.7	0.95 (0.85,1.06)		1.7	1.00 (0.72,1.38)		31.3	**0.91 (0.82,1.00)**		7.9	1.00 (0.87,1.15)	
	Three or more times a week	15.3	1.01 (0.88,1.16)		1.6	0.89 (0.62,1.28)		30.9	**0.89 (0.79,1.00)**		7.0	0.89 (0.73,1.07)	
Consumption of cereal	Never or occasionally	16.9		0.173	3.1		0.053	20.8		**0.028**	4.6		0.672
	Once or twice per week	17.4	1.02 (0.60,1.73)		3.9	1.32 (0.45,3.88)		24.8	1.17 (0.67,2.04)		6.7	1.39 (0.49,3.97)	
	Three or more times a week	14.9	0.86 (0.54,1.37)		1.7	0.75 (0.29,1.94)		32.4	1.43 (0.87,2.37)		7.8	1.46 (0.56,3.82)	
Consumption of pasta	Never or occasionally	16.0		0.653	2.9		0.442	25.9		**<0.001**	7.1		0.822
	Once or twice per week	14.8	0.96 (0.85,1.10)		1.5	0.80 (0.57,1.13)		33.5	**1.27 (1.13,1.42)**		7.8	1.00 (0.83,1.20)	
	Three or more times a week	16.4	1.05 (0.87,1.26)		1.9	0.86 (0.53,1.41)		31.9	**1.19 (1.01,1.40)**		8.5	1.08 (0.81,1.45)	
Consumption of rice	Never or occasionally	14.2		0.438	1.8		0.479	32.7		**0.017**	7.7		0.895
	Once or twice per week	15.2	1.06 (0.93,1.21)		1.5	0.87 (0.61,1.23)		33.6	1.03 (0.92,1.15)		8.0	1.02 (0.85,1.22)	
	Three or more times a week	16.0	1.13 (0.94,1.36)		2.9	1.03 (0.71,1.49)		24.5	**0.84 (0.72,0.99)**		6.9	1.07 (0.81,1.40)	

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Supplementary Table 1. (Cont'd)

Question	Response category	Current symptoms of eczema			Current symptoms of severe eczema			Eczema ever			Current symptoms of eczema and rash onset < 2 years		
		%	Odds ratio* (95% CI)	*p* value*	%	Odds ratio* (95% CI)	*p* value*	%	Odds ratio* (95% CI)	*p* value*	%	Odds ratio* (95% CI)	*p* value*
Consumption of butter	Never or occasionally	15.2		0.289	1.6		0.925	34.6		**<0.001**	8.6		**0.023**
	Once or twice per week	15.9	1.04 (0.91,1.19)		1.8	0.93 (0.62,1.41)		30.2	**0.86 (0.76,0.97)**		7.7	0.92 (0.77,1.11)	
	Three or more times a week	14.8	0.93 (0.82,1.06)		2.1	1.01 (0.73,1.39)		29.8	**0.83 (0.75,0.92)**		6.8	**0.80 (0.68,0.94)**	
Consumption of margarine	Never or occasionally	14.8		0.136	1.6		0.872	31.8		0.254	8.1		0.738
	Once or twice per week	17.0	1.14 (0.96,1.35)		2.3	1.12 (0.69,1.81)		29.0	0.94 (0.80,1.10)		7.6	0.98 (0.77,1.24)	
	Three or more times a week	14.9	0.98 (0.86,1.10)		1.8	1.01 (0.73,1.39)		32.8	1.04 (0.94,1.15)		7.7	0.94 (0.80,1.10)	
Consumption of nuts	Never or occasionally	15.7		0.185	1.9		0.458	33.8		**<0.001**	8.4		**0.011**
	Once or twice per week	14.1	0.88 (0.76,1.01)		1.7	0.81 (0.56,1.16)		28.9	**0.82 (0.75,0.91)**		6.8	**0.82 (0.69,0.98)**	
	Three or more times a week	14.7	0.90 (0.67,1.21)		1.8	0.73 (0.33,1.60)		25.0	**0.69 (0.55,0.88)**		4.7	**0.56 (0.35,0.89)**	
Consumption of potato	Never or occasionally	15.8		0.593	2.0		0.483	32.9		0.291	8.3		0.690
	Once or twice per week	15.4	0.98 (0.76,1.25)		1.6	0.87 (0.46,1.66)		31.6	0.88 (0.73,1.06)		7.6	0.87 (0.62,1.22)	
	Three or more times a week	14.8	0.93 (0.73,1.19)		2.0	1.05 (0.54,2.02)		31.7	0.86 (0.70,1.04)		7.6	0.86 (0.61,1.21)	
Consumption of milk	Never or occasionally	22.3		**<0.001**	3.5		**0.009**	43.3		**<0.001**	13.6		**<0.001**
	Once or twice per week	16.5	**0.66 (0.50,0.88)**		2.2	0.53 (0.28,1.00)		30.5	**0.58 (0.46,0.74)**		7.5	**0.51 (0.36,0.70)**	
	Three or more times a week	14.5	**0.57 (0.45,0.72)**		1.7	**0.43 (0.25,0.75)**		31.2	**0.58 (0.47,0.72)**		7.4	**0.49 (0.37,0.64)**	
Consumption of eggs	Never or occasionally	18.1		**<0.001**	2.0		0.238	38.3		**<0.001**	10.5		**<0.001**
	Once or twice per week	14.5	**0.75 (0.67,0.84)**		1.6	0.72 (0.49,1.06)		31.7	**0.76 (0.69,0.84)**		7.5	**0.69 (0.59,0.81)**	
	Three or more times a week	13.2	**0.64 (0.53,0.78)**		2.4	0.74 (0.44,1.25)		22.3	**0.53 (0.45,0.63)**		4.4	**0.42 (0.31,0.58)**	
Consumption of fast food	Never or occasionally	14.2		0.136	1.5		0.680	32.6		0.237	7.5		0.143
	Once or twice per week	16.0	1.12 (1.00,1.25)		1.9	1.02 (0.76,1.37)		31.4	0.98 (0.90,1.07)		8.0	1.09 (0.94,1.25)	
	Three or more times a week	16.5	1.04 (0.75,1.43)		4.7	1.38 (0.67,2.87)		22.7	0.76 (0.55,1.05)		4.7	0.71 (0.44,1.12)	
Frequency of exercise	Never or occasionally	17.1		0.172	3.9		**0.007**	25.4		**0.012**	6.8		0.841
	Once or twice per week	15.5	0.92 (0.77,1.09)		1.5	**0.56 (0.38,0.82)**		31.7	**1.17 (1.01,1.36)**		7.9	1.04 (0.80,1.36)	
	Three or more times a week	14.3	0.85 (0.72,1.01)		1.5	**0.63 (0.45,0.89)**		33.2	**1.20 (1.06,1.35)**		7.8	0.99 (0.77,1.28)	
Frequency of television viewing	Less than 1 hour	15.1		0.948	1.3		0.140	32.6		0.457	8.6		0.430
	1 hour but less than 3 hours	14.7	0.99 (0.86,1.14)		1.6	1.12 (0.72,1.75)		32.1	1.01 (0.91,1.13)		7.5	0.89 (0.75,1.05)	
	3 hours but less than 5 hours	15.5	1.01 (0.83,1.24)		2.1	1.18 (0.71,1.98)		29.9	0.94 (0.82,1.07)		7.4	0.88 (0.71,1.09)	
	5 hours or more	15.7	1.03 (0.83,1.28)		3.5	**1.89 (1.03,3.46)**		30.4	0.98 (0.83,1.15)		6.7	0.80 (0.57,1.11)	

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Supplementary Table 1. (Cont'd)

Question	Response category	Current symptoms of eczema			Current symptoms of severe eczema			Eczema ever			Current symptoms of eczema and rash onset < 2 years		
		%	Odds ratio* (95% CI)	*p* value*	%	Odds ratio* (95% CI)	*p* value*	%	Odds ratio* (95% CI)	*p* value*	%	Odds ratio* (95% CI)	*p* value*
Cooking fuel	Electricity only	14.9		0.583	1.8		0.313	31.1		0.350	7.6		0.817
	Gas only	16.7	1.13 (0.96,1.34)		2.4	1.38 (0.89,2.12)		31.6	1.04 (0.91,1.19)		7.8	1.02 (0.79,1.32)	
	Fire/Wood only	9.5	0.60 (0.23,1.58)					33.3	1.07 (0.58,1.97)		7.1	0.91 (0.30,2.77)	
	Other fuel only	18.2	1.17 (0.23,5.94)		9.1	4.11 (0.50,34.08)		36.4	1.42 (0.37,5.38)		18.2	2.86 (0.53,15.51)	
	Multiple fuels	15.3	1.03 (0.84,1.27)		1.6	1.16 (0.64,2.10)		36.1	**1.18 (1.01,1.38)**		8.0	1.00 (0.76,1.31)	
Heating fuel	Electricity only	15.6		0.058	2.2		0.233	30.0		**0.004**	7.4		**0.021**
	Gas only	13.2	**0.83 (0.68,1.00)**		1.4	0.68 (0.43,1.07)		29.7	0.90 (0.78,1.04)		6.0	**0.74 (0.57,0.98)**	
	Fire/Wood only	14.0	0.92 (0.78,1.08)		1.4	0.76 (0.51,1.15)		31.4	0.96 (0.86,1.08)		7.4	0.93 (0.75,1.16)	
	Other fuel only	16.9	1.06 (0.59,1.92)		2.8	1.29 (0.29,5.62)		32.4	1.06 (0.67,1.67)		8.5	1.09 (0.45,2.61)	
	Multiple fuels	16.6	1.09 (0.94,1.26)		1.8	1.04 (0.70,1.54)		35.7	**1.15 (1.02,1.30)**		9.4	1.17 (0.97,1.41)	
Paracetamol use in the 1st year of life	No	10.1			0.8			21.2			4.4		**<0.001**
	Yes	15.8	**1.64 (1.35,2.00)**		2.0	**2.56 (1.41,4.64)**		33.3	**1.77 (1.56,2.01)**		8.2	**1.88 (1.49,2.37)**	
Current paracetamol use	Never	10.1		**<0.001**	0.9		**<0.001**	23.6		**<0.001**	5.6		**<0.001**
	At least once a year	14.0	**1.43 (1.14,1.78)**		1.2	1.47 (0.67,3.26)		31.8	**1.45 (1.24,1.70)**		7.4	1.31 (0.97,1.76)	
	At least once a month	20.3	**2.19 (1.72,2.79)**		4.0	**3.91 (1.82,8.42)**		33.5	**1.73 (1.45,2.05)**		9.4	**1.83 (1.30,2.57)**	
Antibiotic use in the 1st year of life	No	11.2			1.2			25.5			5.0		**<0.001**
	Yes	17.5	**1.69 (1.49,1.92)**		2.2	**1.86 (1.31,2.66)**		35.5	**1.59 (1.45,1.75)**		9.4	**1.99 (1.70,2.32)**	
Number of older siblings	0 siblings	15.1		0.859	1.4		0.209	34.1		**<0.001**	8.1		0.449
	1 sibling	15.1	0.99 (0.88,1.12)		1.6	1.18 (0.84,1.66)		32.1	0.92 (0.84,1.01)		7.9	0.97 (0.83,1.14)	
	2 siblings	14.8	0.95 (0.81,1.10)		2.0	1.28 (0.80,2.04)		28.2	**0.76 (0.67,0.87)**		7.3	0.91 (0.75,1.10)	
	3 or more siblings	15.5	0.95 (0.79,1.14)		3.3	**1.61 (1.03,2.50)**		27.6	**0.77 (0.67,0.88)**		6.6	0.84 (0.66,1.06)	
Number of younger siblings	0 siblings	15.4		0.418	1.7		0.732	31.0		0.345	7.5		0.882
	1 sibling	14.4	0.91 (0.82,1.02)		1.6	0.89 (0.65,1.21)		32.6	1.07 (0.99,1.17)		7.8	1.04 (0.90,1.21)	
	2 siblings	15.8	0.98 (0.83,1.16)		2.4	1.12 (0.77,1.63)		32.3	1.08 (0.94,1.25)		8.0	1.08 (0.86,1.36)	
	3 or more siblings	16.1	0.91 (0.64,1.29)		3.0	0.98 (0.48,2.03)		29.4	1.02 (0.79,1.32)		7.6	1.09 (0.73,1.63)	
Parity (version 1)	Not eldest	15.1		0.576	2.1		0.192	30.2		**<0.001**	7.5		**0.034**
	Eldest	15.4	1.05 (0.95,1.17)		1.3	0.71 (0.48,1.03)		35.1	**1.22 (1.12,1.33)**		8.6	**1.15 (1.00,1.31)**	
	Only child	14.4	0.97 (0.80,1.18)		1.7	0.92 (0.56,1.49)		31.4	1.07 (0.92,1.26)		6.5	0.87 (0.66,1.14)	
Parity (version 2)	Not eldest	15.1			2.1			30.2			7.5		0.322
	Eldest	15.1	1.03 (0.93,1.14)		1.4	0.77 (0.56,1.05)		34.1	**1.18 (1.09,1.28)**		8.0	1.07 (0.94,1.22)	
Birth in New Zealand	No	10.7			1.6			19.3			3.4		**<0.001**
	Yes	15.7	**1.59 (1.29,1.96)**		1.9	1.43 (0.83,2.47)		33.3	**1.83 (1.52,2.19)**		8.2	**2.44 (1.63,3.64)**	
Years lived in New Zealand	6 years or more	15.7		**0.002**	1.9		0.638	33.2		**<0.001**	8.2		**0.008**
	0-1 years	8.7	**0.49 (0.33,0.73)**		1.8	0.78 (0.29,2.14)		12.4	**0.32 (0.23,0.43)**		2.5	**0.30 (0.14,0.64)**	
	2-3 years	11.4	**0.67 (0.47,0.96)**		1.6	0.65 (0.25,1.69)		22.9	**0.68 (0.51,0.91)**		4.6	0.58 (0.33,1.01)	
	4-5 years	14.7	0.88 (0.72,1.07)		1.7	0.72 (0.41,1.27)		27.7	**0.83 (0.69,1.00)**		6.3	0.78 (0.56,1.07)	

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Supplementary Table 1. (Cont'd)

Question	Response category	Current symptoms of eczema			Current symptoms of severe eczema			Eczema ever			Current symptoms of eczema and rash onset < 2 years		
		%	Odds ratio* (95% CI)	*p* value*	%	Odds ratio* (95% CI)	*p* value*	%	Odds ratio* (95% CI)	*p* value*	%	Odds ratio* (95% CI)	*p* value*
Maternal education	Tertiary Institution	16.0		**0.010**	1.4		0.077	34.5		**<0.001**	8.9		**0.001**
	No education	13.7	0.75 (0.52,1.10)		1.8	0.82 (0.36,1.84)		23.2	**0.61 (0.45,0.82)**		4.4	**0.52 (0.29,0.93)**	
	Primary school	16.9	0.99 (0.79,1.25)		3.8	**1.75 (1.11,2.77)**		28.3	0.83 (0.68,1.00)		7.4	0.88 (0.66,1.18)	
	Secondary school	14.1	**0.85 (0.76,0.94)**		2.0	1.21 (0.85,1.71)		29.7	**0.82 (0.74,0.90)**		6.7	**0.76 (0.65,0.89)**	
Frequency of truck traffic in street of residence	Never	14.5		0.089	1.8		0.062	31.4		0.280	8.3		0.698
	Seldom	15.1	1.04 (0.90,1.20)		1.6	0.80 (0.53,1.22)		32.7	1.10 (0.98,1.22)		7.5	0.90 (0.73,1.12)	
	Frequently through the day	14.5	0.98 (0.84,1.15)		1.8	0.82 (0.53,1.26)		30.7	1.04 (0.92,1.17)		7.8	0.98 (0.78,1.23)	
	Almost the whole day	18.7	**1.29 (1.02,1.62)**		4.1	1.49 (0.86,2.58)		28.0	0.99 (0.83,1.18)		6.9	0.89 (0.64,1.25)	
Birth weight	More than 4 kg	14.6		**0.023**	1.8		0.582	33.3		**0.008**	7.9		**0.004**
	Less than 2.5 kg	14.1	0.95 (0.71,1.27)		1.9	0.94 (0.44,2.02)		28.0	**0.80 (0.65,0.99)**		6.0	0.74 (0.49,1.11)	
	2.5 - 3 kg	13.5	0.91 (0.73,1.13)		2.1	1.06 (0.59,1.93)		29.9	0.90 (0.77,1.05)		6.5	0.80 (0.61,1.05)	
	3 - 3.5 kg	14.7	0.99 (0.81,1.22)		1.4	0.72 (0.40,1.29)		31.9	0.95 (0.83,1.08)		7.4	0.91 (0.72,1.16)	
	3.5 - 4 kg	16.5	1.16 (0.96,1.41)		1.6	0.93 (0.58,1.48)		35.1	1.09 (0.96,1.24)		9.3	1.17 (0.91,1.51)	
Breast fed	No	14.0			2.6			28.0			6.3		**0.047**
	Yes	15.3	1.12 (0.96,1.31)		1.6	**0.71 (0.51,0.97)**		32.4	**1.17 (1.03,1.33)**		8.0	**1.24 (1.00,1.53)**	
Cat in the home in the 1st year of life	No	15.4			2.0			30.3			7.4		0.844
	Yes	14.6	0.99 (0.88,1.11)		1.6	1.22 (0.89,1.67)		33.4	1.04 (0.95,1.13)		8.0	1.02 (0.87,1.18)	
Current cat in the home	No	16.1			2.2			30.6			7.8		0.100
	Yes	14.1	**0.87 (0.78,0.98)**		1.5	0.96 (0.70,1.31)		32.5	0.95 (0.87,1.04)		7.5	0.88 (0.75,1.03)	
Dog in the home in the 1st year of life	No	15.4			2.0			31.9			7.9		0.073
	Yes	14.1	0.92 (0.81,1.05)		1.5	0.86 (0.59,1.23)		31.0	0.92 (0.84,1.02)		7.0	0.85 (0.72,1.01)	
Current dog in the home	No	15.8			1.9			31.8			8.0		**0.024**
	Yes	13.3	**0.83 (0.73,0.94)**		1.7	0.97 (0.72,1.32)		31.0	0.91 (0.83,1.00)		6.9	**0.83 (0.70,0.98)**	
Exposure to animals in the 1st year of life	No	15.3			1.8			32.2			7.8		0.072
	Yes	13.4	0.88 (0.74,1.04)		2.0	1.14 (0.75,1.73)		26.5	**0.75 (0.64,0.87)**		6.3	0.80 (0.63,1.02)	
Maternal exposure to animals during pregnancy	No	15.2			1.8			32.0			7.7		0.468
	Yes	14.0	0.94 (0.78,1.12)		1.8	1.07 (0.66,1.75)		28.6	0.84 (0.68,1.02)		7.0	0.91 (0.69,1.18)	
Current maternal smoking	No	14.8			1.6			32.2			7.9		0.115
	Yes	15.6	1.00 (0.88,1.13)		2.5	1.24 (0.90,1.72)		29.8	**0.88 (0.80,0.98)**		6.9	0.86 (0.71,1.04)	
Number of cigarettes smoked by mother	No cigarettes	14.8		0.488	1.6		0.124	32.2		**0.004**	7.9		0.282
	Less than 10	15.2	0.94 (0.76,1.16)		2.8	1.26 (0.80,1.99)		31.5	0.97 (0.84,1.13)		7.2	0.90 (0.70,1.17)	
	10 - 19	16.5	1.09 (0.93,1.27)		2.1	1.11 (0.73,1.70)		30.7	0.91 (0.80,1.04)		7.6	0.93 (0.73,1.17)	
	20 or more	13.6	0.89 (0.67,1.20)		3.6	**1.95 (1.11,3.41)**		24.2	**0.66 (0.52,0.84)**		5.1	0.64 (0.40,1.01)	

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Supplementary Table 1. (Cont'd)

Question	Response category	Current symptoms of eczema			Current symptoms of severe eczema			Eczema ever			Current symptoms of eczema and rash onset < 2 years		
		%	Odds ratio* (95% CI)	*p* value*	%	Odds ratio* (95% CI)	*p* value*	%	Odds ratio* (95% CI)	*p* value*	%	Odds ratio* (95% CI)	*p* value*
Current paternal smoking	No	14.6			1.6			32.1			7.6		0.376
	Yes	16.2	1.10 (0.97,1.25)		2.2	1.00 (0.69,1.47)		30.5	0.98 (0.89,1.08)		7.9	1.09 (0.90,1.31)	
Number of cigarettes smoked by father	No cigarettes	14.6		0.472	1.6		0.939	32.2		0.545	7.6		0.665
	Less than 10	16.2	1.09 (0.89,1.35)		2.3	0.93 (0.52,1.67)		28.8	0.96 (0.81,1.14)		7.2	1.02 (0.74,1.42)	
	10 - 19	16.7	1.14 (0.96,1.35)		2.4	1.13 (0.67,1.91)		30.5	0.96 (0.83,1.11)		8.3	1.15 (0.90,1.47)	
	20 or more	14.7	1.00 (0.80,1.25)		2.1	1.06 (0.62,1.82)		28.9	0.89 (0.75,1.05)		7.0	0.95 (0.69,1.31)	
Maternal smoking during 1st year of life	No	14.9			1.6			32.2			7.9		0.153
	Yes	15.5	1.00 (0.88,1.14)		2.5	1.24 (0.88,1.74)		29.8	**0.87 (0.78,0.97)**		7.1	0.86 (0.71,1.06)	
Number of smokers in the home	No smokers	14.5		0.325	1.3		0.234	33.5		**0.005**	8.0		0.232
	1 smoker	15.9	1.08 (0.95,1.22)		2.3	1.26 (0.88,1.82)		29.6	**0.87 (0.79,0.97)**		8.1	1.04 (0.86,1.26)	
	2 smokers	16.1	1.05 (0.88,1.26)		2.5	1.22 (0.79,1.86)		30.8	0.90 (0.78,1.04)		7.1	0.88 (0.67,1.15)	
	3 or more smokers	13.6	0.82 (0.57,1.17)		4.4	1.74 (0.98,3.09)		23.8	**0.66 (0.51,0.86)**		4.4	0.54 (0.29,1.03)	
Parental smoking	Neither smokes	14.5		0.349	1.4		0.129	32.6		0.104	7.6		0.053
	Father smokes	16.5	1.16 (0.99,1.37)		2.1	1.19 (0.74,1.90)		31.1	1.02 (0.89,1.16)		9.0	**1.29 (1.03,1.61)**	
	Mother smokes	15.1	1.02 (0.85,1.23)		2.8	**1.63 (1.08,2.46)**		29.7	0.87 (0.75,1.01)		7.1	0.94 (0.73,1.21)	
	Both smoke	15.8	1.04 (0.89,1.23)		2.2	1.12 (0.71,1.77)		29.9	0.89 (0.78,1.02)		6.7	0.88 (0.68,1.13)	

* Statistically significant (at the 95% level) associations are identified by bold type.

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Supplementary Table 2. Associations between EQ variables and current symptoms of eczema, current symptoms of severe eczema and eczema ever, 13-14 year age group

Question	Response category	Current symptoms of eczema				Current symptoms of severe eczema				Eczema ever			
		%	Odds ratio* (95% CI)	*p* value*	*p* value* (overall)	%	Odds ratio* (95% CI)	*p* value*	*p* value* (overall)	%	Odds ratio* (95% CI)	*p* value*	*p* value* (overall)
Body mass index	Normal	7.1			**0.008**	1.0			0.252	26.2			0.127
	Overweight	10.2	**1.44 (1.14,1.82)**	**0.002**		1.8	1.42 (0.93,2.15)	0.104		23.3	0.95 (0.82,1.10)	0.484	
	Obese	10.9	**1.47 (1.04,2.09)**	**0.029**		1.5	1.01 (0.47,2.16)	0.981		25.7	1.19 (0.92,1.53)	0.183	
Consumption of meat	Never or occasionally	10.1			**0.016**	1.2			0.852	27.8			0.011
	Once or twice per week	8.5	0.85 (0.69,1.06)	0.146		1.4	1.14 (0.50,2.57)	0.760		24.5	0.95 (0.80,1.12)	0.549	
	Three or more times a week	9.1	0.98 (0.77,1.25)	0.858		1.3	1.19 (0.55,2.59)	0.656		27.1	1.07 (0.91,1.25)	0.398	
Consumption of seafood	Never or occasionally	8.5			0.078	1.3			0.085	28.2			0.010
	Once or twice per week	9.3	**1.16 (1.01,1.33)**	**0.035**		1.1	0.87 (0.65,1.15)	0.327		24.5	0.94 (0.86,1.02)	0.132	
	Three or more times a week	9.4	1.10 (0.84,1.43)	0.497		2.6	1.78 (0.95,3.33)	0.073		17.6	**0.69 (0.52,0.91)**	**0.008**	
Consumption of fruit	Never or occasionally	10.0			0.315	2.0			0.182	25.5			**0.003**
	Once or twice per week	8.4	0.76 (0.53,1.08)	0.130		1.4	0.61 (0.32,1.16)	0.133		23.5	0.88 (0.71,1.09)	0.243	
	Three or more times a week	9.0	0.81 (0.59,1.12)	0.209		1.3	0.57 (0.31,1.04)	0.066		27.3	1.01 (0.81,1.26)	0.934	
Consumption of vegetables	Never or occasionally	11.2			0.244	2.8			**0.017**	19.9			**0.001**
	Once or twice per week	8.6	0.78 (0.58,1.05)	0.096		1.3	**0.52 (0.32,0.84)**	**0.008**		23.6	1.21 (0.94,1.57)	0.135	
	Three or more times a week	8.8	0.88 (0.69,1.11)	0.277		1.2	**0.58 (0.39,0.88)**	**0.010**		27.5	**1.34 (1.08,1.68)**	**0.009**	
Consumption of pulses	Never or occasionally	8.9			**0.003**	1.6			0.004	25.1			0.081
	Once or twice per week	8.1	1.00 (0.85,1.17)	0.998		1.0	0.70 (0.47,1.04)	0.080		26.0	1.05 (0.95,1.17)	0.346	
	Three or more times a week	9.8	**1.26 (1.07,1.49)**	**0.005**		1.5	1.17 (0.79,1.72)	0.432		27.3	**1.13 (1.01,1.26)**	**0.027**	
Consumption of cereal	Never or occasionally	9.3			0.595	1.5			0.798	23.7			0.159
	Once or twice per week	9.6	1.08 (0.88,1.32)	0.484		1.5	1.04 (0.53,2.04)	0.916		25.2	1.12 (0.97,1.31)	0.126	
	Three or more times a week	8.6	1.02 (0.82,1.27)	0.863		1.2	0.94 (0.50,1.76)	0.842		26.8	1.18 (1.00,1.39)	0.055	
Consumption of pasta	Never or occasionally	8.8			0.298	1.4			0.756	23.0			**0.003**
	Once or twice per week	8.8	1.10 (0.96,1.26)	0.158		1.3	1.13 (0.81,1.59)	0.464		27.6	**1.17 (1.07,1.28)**	**<0.001**	
	Three or more times a week	9.0	1.11 (0.92,1.33)	0.263		1.3	1.13 (0.70,1.82)	0.629		27.0	1.15 (1.00,1.32)	0.054	
Consumption of rice	Never or occasionally	8.1			0.111	1.4			0.506	25.5			**<0.001**
	Once or twice per week	8.5	1.03 (0.90,1.19)	0.661		1.2	0.80 (0.54,1.19)	0.271		28.0	**1.15 (1.08,1.24)**	**<0.001**	
	Three or more times a week	10.4	1.17 (0.99,1.39)	0.058		1.6	0.89 (0.55,1.42)	0.618		23.0	1.10 (0.96,1.25)	0.171	

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Supplementary Table 2. (Cont'd)

Question	Response category	Current symptoms of eczema				Current symptoms of severe eczema				Eczema ever			
		%	Odds ratio* (95% CI)	*p* value*	*p* value* (overall)	%	Odds ratio* (95% CI)	*p* value*	*p* value* (overall)	%	Odds ratio* (95% CI)	*p* value*	*p* value* (overall)
Consumption of butter	Never or occasionally	8.3			0.075	1.1			0.133	28.3			**0.040**
	Once or twice per week	8.3	0.96 (0.82,1.14)	0.659		1.2	0.91 (0.61,1.36)	0.641		24.7	**0.90 (0.82,0.98)**	**0.012**	
	Three or more times a week	9.9	1.18 (0.99,1.41)	0.063		1.7	1.30 (0.84,2.02)	0.239		25.6	0.96 (0.87,1.06)	0.440	
Consumption of margarine	Never or occasionally	8.5			0.645	1.4			0.376	26.4			**0.044**
	Once or twice per week	8.8	1.00 (0.87,1.16)	0.960		1.4	0.87 (0.54,1.41)	0.574		24.4	**0.90 (0.82,0.99)**	**0.035**	
	Three or more times a week	9.2	1.07 (0.92,1.24)	0.382		1.2	0.75 (0.50,1.14)	0.176		27.6	1.01 (0.93,1.10)	0.817	
Consumption of nuts	Never or occasionally	9.1			0.169	1.3			0.074	26.7			0.964
	Once or twice per week	8.3	0.97 (0.85,1.10)	0.616		1.2	0.98 (0.64,1.49)	0.920		25.8	1.01 (0.93,1.09)	0.827	
	Three or more times a week	10.8	1.25 (0.97,1.60)	0.082		2.5	**1.80 (1.03,3.12)**	**0.038**		24.2	0.98 (0.81,1.19)	0.863	
Consumption of potato	Never or occasionally	9.6			0.683	2.3			0.061	22.6			0.651
	Once or twice per week	8.6	0.90 (0.67,1.22)	0.504		1.1	**0.49 (0.27,0.89)**	**0.018**		25.5	1.09 (0.90,1.32)	0.396	
	Three or more times a week	9.0	0.95 (0.70,1.29)	0.733		1.4	0.61 (0.37,1.01)	0.057		27.0	1.09 (0.90,1.33)	0.358	
Consumption of milk	Never or occasionally	10.9			0.327	2.3			**0.023**	28.6			0.209
	Once or twice per week	9.0	0.80 (0.58,1.10)	0.172		1.1	**0.43 (0.24,0.79)**	**0.006**		25.4	0.86 (0.73,1.03)	0.097	
	Three or more times a week	8.7	0.80 (0.60,1.07)	0.137		1.3	**0.56 (0.31,0.99)**	**0.046**		26.3	0.95 (0.82,1.09)	0.460	
Consumption of eggs	Never or occasionally	8.4			0.617	1.2			0.885	27.6			0.244
	Once or twice per week	8.9	1.08 (0.90,1.29)	0.430		1.3	1.08 (0.78,1.50)	0.628		26.6	1.01 (0.93,1.10)	0.731	
	Three or more times a week	9.5	1.11 (0.89,1.38)	0.358		1.5	1.09 (0.72,1.67)	0.681		23.4	0.94 (0.84,1.04)	0.224	
Consumption of fast food	Never or occasionally	8.1			0.368	0.9			0.108	29.1			**0.014**
	Once or twice per week	8.9	1.04 (0.91,1.19)	0.584		1.3	1.18 (0.87,1.61)	0.288		25.4	**0.90 (0.82,0.99)**	**0.024**	
	Three or more times a week	11.0	1.15 (0.94,1.42)	0.182		2.2	**1.49 (1.03,2.16)**	**0.035**		22.2	**0.81 (0.68,0.95)**	**0.012**	
Frequency of exercise	Never or occasionally	9.3			0.899	1.9			0.379	23.8			0.481
	Once or twice per week	9.1	1.03 (0.81,1.31)	0.836		1.2	0.74 (0.44,1.26)	0.273		26.7	1.03 (0.90,1.17)	0.693	
	Three or more times a week	8.4	1.05 (0.81,1.37)	0.701		1.3	0.90 (0.47,1.73)	0.745		26.5	1.07 (0.95,1.20)	0.290	

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Supplementary Table 2. (Cont'd)

Question	Response category	Current symptoms of eczema				Current symptoms of severe eczema				Eczema ever			
		%	Odds ratio* (95% CI)	*p* value*	*p* value* (overall)	%	Odds ratio* (95% CI)	*p* value*	*p* value* (overall)	%	Odds ratio* (95% CI)	*p* value*	*p* value* (overall)
Frequency of television viewing	Less than 1 hour	9.3			0.422	1.0			0.242	26.9			0.758
	1 hour but less than 3 hours	8.2	0.88 (0.72,1.06)	0.180		1.0	0.99 (0.58,1.70)	0.964		26.3	0.95 (0.80,1.13)	0.564	
	3 hours but less than 5 hours	8.9	0.95 (0.77,1.16)	0.582		1.3	1.19 (0.66,2.15)	0.560		26.3	0.99 (0.86,1.15)	0.915	
	5 hours or more	9.7	0.98 (0.77,1.25)	0.868		1.9	1.52 (0.84,2.75)	0.171		25.2	1.01 (0.86,1.18)	0.938	
Cooking fuel	Electricity only	8.7			**<0.001**	1.3			0.065	26.0			**0.045**
	Gas only	7.2	0.83 (0.68,1.03)	0.092		1.1	0.88 (0.56,1.39)	0.586		25.6	1.00 (0.89,1.13)	0.949	
	Fire/Wood only	9.5	1.00 (0.42,2.42)	0.994		3.2	2.64 (0.59,11.77)	0.204		15.9	0.62 (0.30,1.28)	0.200	
	Other fuel only	13.3	1.62 (0.52,5.06)	0.405		3.3	2.20 (0.27,18.14)	0.463		16.7	0.75 (0.31,1.82)	0.527	
	Multiple fuels	12.3	**1.49 (1.27,1.75)**	**<0.001**		1.8	1.36 (0.97,1.90)	0.077		28.9	**1.18 (1.04,1.33)**	0.008	
Heating fuel	Electricity only	8.2			**<0.001**	1.3			**0.047**	23.3			**<0.001**
	Gas only	8.0	1.08 (0.92,1.27)	0.361		1.5	1.22 (0.77,1.92)	0.400		25.9	1.11 (0.99,1.26)	0.080	
	Fire/Wood only	7.9	1.15 (1.00,1.32)	0.056		1.0	0.93 (0.64,1.33)	0.675		25.6	1.10 (1.00,1.21)	0.057	
	Other fuel only	12.0	**1.64 (1.03,2.61)**	**0.036**		4.0	**3.27 (1.39,7.70)**	**0.007**		22.7	0.99 (0.67,1.45)	0.962	
	Multiple fuels	10.9	**1.55 (1.32,1.81)**	**<0.001**		1.3	1.15 (0.81,1.63)	0.440		31.4	**1.37 (1.23,1.53)**	**<0.001**	
Current paracetamol use	Never	5.3			**<0.001**	1.3			**0.007**	18.4			**<0.001**
	At least once a year	7.1	**1.34 (1.04,1.72)**	**0.024**		0.9	0.75 (0.45,1.27)	0.285		23.2	**1.21 (1.04,1.40)**	**0.016**	
	At least once a month	11.1	**2.05 (1.61,2.61)**	**<0.001**		1.6	1.25 (0.83,1.88)	0.278		30.3	**1.55 (1.35,1.79)**	**<0.001**	
Number of older siblings	0 siblings	7.7			0.201	1.1			0.146	27.3			0.236
	1 sibling	8.6	1.14 (0.95,1.36)	0.158		1.2	1.13 (0.72,1.77)	0.603		26.8	0.97 (0.86,1.09)	0.587	
	2 siblings	9.0	1.16 (0.93,1.46)	0.189		1.0	0.89 (0.47,1.68)	0.719		25.6	0.91 (0.80,1.04)	0.184	
	3 or more siblings	10.6	**1.22 (1.02,1.47)**	**0.032**		2.2	1.51 (0.93,2.46)	0.094		23.7	**0.86 (0.74,1.00)**	**0.049**	
Number of younger siblings	0 siblings	8.8			**0.017**	1.2			**0.026**	26.8			0.810
	1 sibling	7.9	0.85 (0.73,1.00)	0.056		1.0	0.78 (0.52,1.16)	0.222		26.4	0.98 (0.89,1.08)	0.654	
	2 siblings	8.8	0.90 (0.74,1.09)	0.291		1.1	0.73 (0.42,1.27)	0.270		25.4	0.95 (0.84,1.07)	0.377	
	3 or more siblings	11.5	1.08 (0.88,1.32)	0.458		2.5	1.33 (0.89,2.00)	0.163		24.9	0.95 (0.83,1.09)	0.491	

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Supplementary Table 2. (Cont'd)

Question	Response category	Current symptoms of eczema				Current symptoms of severe eczema				Eczema ever			
		%	Odds ratio* (95% CI)	*p* value*	*p* value* (overall)	%	Odds ratio* (95% CI)	*p* value*	*p* value* (overall)	%	Odds ratio* (95% CI)	*p* value*	*p* value* (overall)
Parity (version 1)	Not eldest	9.2			**0.027**	1.4			0.638	25.6			0.263
	Eldest	7.2	**0.81 (0.67,0.98)**	**0.031**		1.0	0.86 (0.58,1.27)	0.441		27.0	1.06 (0.95,1.19)	0.294	
	Only child	10.1	1.16 (0.89,1.50)	0.278		1.3	0.99 (0.43,2.28)	0.973		28.4	1.16 (0.96,1.41)	0.123	
Parity (version 2)	Not eldest	9.2			0.081	1.4			0.536	25.6			0.188
	Eldest	7.6	0.86 (0.72,1.02)	0.081		1.1	0.87 (0.57,1.34)	0.536		27.2	1.08 (0.97,1.20)	0.188	
Birth in New Zealand	No	6.8			**<0.001**	1.3			0.904	15.7			**<0.001**
	Yes	9.2	**1.63 (1.27,2.08)**	**<0.001**		1.3	1.03 (0.67,1.58)	0.904		28.3	**1.91 (1.57,2.32)**	**<0.001**	
Years lived in New Zealand	9 years or more	9.2			**0.003**	1.3			0.432	28.1			**<0.001**
	0-2 years	6.8	**0.60 (0.37,0.97)**	**0.036**		1.9	1.44 (0.75,2.75)	0.271		13.0	**0.45 (0.35,0.57)**	**<0.001**	
	3-5 years	6.3	**0.57 (0.38,0.85)**	**0.007**		1.1	0.80 (0.38,1.67)	0.546		12.5	**0.41 (0.31,0.53)**	**<0.001**	
	6-8 years	7.2	0.71 (0.48,1.04)	0.082		1.2	0.92 (0.40,2.14)	0.847		18.9	**0.66 (0.53,0.82)**	**<0.001**	
Maternal education	Tertiary Institution	8.0			0.218	1.3			**0.044**	24.8			**<0.001**
	No education	10.7	1.19 (0.96,1.47)	0.106		1.3	0.77 (0.53,1.11)	0.160		29.8	**1.31 (1.15,1.50)**	**<0.001**	
	Primary school	9.8	1.05 (0.68,1.61)	0.821		3.6	2.08 (0.94,4.58)	0.071		15.9	**0.64 (0.44,0.93)**	**0.018**	
	Secondary school	8.3	0.96 (0.83,1.11)	0.606		1.3	0.84 (0.63,1.12)	0.236		25.3	1.03 (0.95,1.11)	0.485	
Frequency of truck traffic in street of residence	Never	7.0			0.117	0.8			0.076	24.7			0.284
	Seldom	8.5	1.15 (0.93,1.42)	0.186		1.2	1.41 (0.79,2.52)	0.249		26.4	1.07 (0.98,1.16)	0.156	
	Frequently through the day	9.8	1.26 (0.98,1.61)	0.070		1.4	1.47 (0.79,2.73)	0.224		26.5	1.10 (1.00,1.21)	0.056	
	Almost the whole day	10.9	**1.40 (1.05,1.88)**	**0.021**		2.4	**2.35 (1.22,4.51)**	**0.010**		25.4	1.09 (0.93,1.26)	0.293	
Current cat in the home	No	8.6			**0.022**	1.0			**<0.001**	23.6			0.072
	Yes	9.0	**1.20 (1.03,1.39)**	**0.022**		1.5	**2.24 (1.50,3.33)**	**<0.001**		27.6	1.08 (0.99,1.17)	0.072	
Current dog in the home	No	8.8			0.478	1.4			0.853	25.6			0.906
	Yes	8.9	1.05 (0.92,1.20)	0.478		1.3	0.96 (0.64,1.44)	0.853		26.8	1.00 (0.94,1.08)	0.906	
Current maternal smoking	No	8.3			0.078	1.1			**0.017**	26.3			0.547
	Yes	10.2	1.13 (0.99,1.28)	0.078		2.0	**1.45 (1.07,1.98)**	**0.017**		25.7	0.97 (0.89,1.06)	0.547	

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Supplementary Table 2. (Cont'd)

Question	Response category	Current symptoms of eczema				Current symptoms of severe eczema				Eczema ever			
		%	Odds ratio* (95% CI)	*p* value*	*p* value* (overall)	%	Odds ratio* (95% CI)	*p* value*	*p* value* (overall)	%	Odds ratio* (95% CI)	*p* value*	*p* value* (overall)
Number of smokers in the home	No smokers	7.6			0.122	0.9			**0.046**	26.6			**0.015**
	1 smoker	9.2	1.12 (0.94,1.32)	0.209		1.6	1.51 (1.00,2.28)	0.050		25.7	0.97 (0.86,1.10)	0.662	
	2 smokers	10.9	**1.27 (1.04,1.55)**	**0.019**		2.2	**1.80 (1.19,2.72)**	**0.006**		27.7	1.09 (0.96,1.23)	0.190	
	3 or more smokers	11.3	1.20 (0.92,1.56)	0.182		2.0	1.37 (0.82,2.29)	0.229		23.6	**0.88 (0.79,0.99)**	**0.030**	

*Statistically significant (at the 95% level) associations are identified by bold type.

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