

Hearing loss amongst Pacific children in New Zealand

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Introduction

The aim of this paper is to address the question "are New Zealand's health services meeting the needs of Pacific children in New Zealand with respect to childhood hearing impairment?" The paper focuses on the most important cause of childhood hearing impairment under age five years, glue ear, otherwise known as otitis media with effusion (OME). OME is the presence of glue-like fluid in the middle ear cavity arising as a result of recent viral infection or other causes of irritation. The glue-like fluid often reduces the conduction of sound waves to the inner ear.

The Pacific population in New Zealand is a significant and growing minority. Indeed, Auckland is the world's largest Polynesian city. Pacific cultures add tremendous richness and diversity to the New Zealand cultural landscape. In 1991, 3.9% of the New Zealand population was of Pacific origin.¹ The Census figure for 1996 will undoubtedly show an increase, with a higher proportion of children².

Childhood hearing impairment is important because it may cause long term, and sometimes very serious, problems. The effects of early mild to moderate childhood hearing loss include delay in receptive and expressive speech and language development; reduction in academic achievement; and disturbed emotional and social development³.

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Natural history of OME

Chalmers et al. found that the prevalence of bilateral OME at age five years in New Zealand was 7.9%⁴. National Audiology Centre figures show that audiometry^a failure at school entry is 8.3%⁵. The majority of these failures are due to OME.

International estimates of prevalence of OME suggest a bimodal distribution with peaks of between 15 to 20% at ages two years and five years⁶. Various studies have reported that over 80% of children have an episode of OME during the first year of life, and nearly 100% by age three⁷.

Failure rates for tympanometry^b at age three years in the 1994–1995 year were 9.0% overall, and 22.1% for Pacific children⁵. It must be noted that different areas use different criteria for defining failure, and there is likely to be over-reporting in some areas. All the same, it is obvious that Pacific children are markedly more at risk than their European peers.

Similarly, rates of audiometry failure at school entry (five years of age) are substantially higher for and Pacific and Maori children. Overall the new entrant failure rate is 8.3%, compared with 16.2% for Pacific children, and 14.1% for Maori children⁵.

Risk factors

Fluid persists in the middle ear for weeks to months following every episode of acute otitis media (AOM)⁸. A study carried out in Boston found that recurrent acute otitis media, and prolonged duration of OME following AOM were associated with male gender, sibling history of ear infection, not breast feeding, and early occurrence of the first episode of AOM^{8,9}. Teele et al. found no association between recurrent AOM or prolonged OME and socioeconomic status or current parental smoking, although univariate analysis suggested that the latter factor may be significant in children under one year of age¹⁰.

a Pure tone audiometry measures the ability to hear pure tones of different frequencies delivered at different volumes.

b Tympanometry is a technique for assessing middle ear function and the presence of middle ear fluid using sound waves to measure the mobility of the ear drum (tympanic membrane). Tympanometry does not assess hearing.

Table 1. National well child interventions for hearing

<i>Age</i>	<i>Intervention</i>
Within 24 hours of birth	• assessment of risk of SNHI*
Six weeks	• questioning on hearing† (audiology checks for infants assessed at birth as at risk of hearing loss)
Three months	• questioning on hearing†
Five months	• questioning on hearing†
Eight to 10 months	• questioning on hearing† • tympanometry
15 months	• questioning on hearing† • tympanometry
21–24 months	• questioning on hearing†
Three years	• questioning on hearing† • tympanometry
School new entrant (five years)	• tympanometry • audiology assessment

Source: Ministry of Health, 1996b. WellChild Tamariki Ora, National Schedule.

**At risk categories include: history of severe neonatal jaundice; extreme prematurity; in utero infections; structural craniofacial abnormalities; suspicion of hearing impairment; family history of congenital hearing loss. (ASLHA 1994).*

† The questionnaire Can Your Child Hear? is commonly used.

A number of other studies have found passive smoking to be associated with both incidence and duration of OME^{11,12,13,14}. Etzel et al.¹² estimated that 8% of cases of OME and 18% of days with OME may be attributed to passive smoking. A further risk factor for OME identified over the past 15 years is child care in group facilities¹⁴. The relative risk of OME for children in group child care has been found to be less than 2.0^{15,16}.

A Dunedin study found that two or more sources of family adversity in the child's home environment increased the risk of OME, and that OME occurred most commonly in the spring and winter months⁴. Family adversity was scored according to the following factors: (1) low socioeconomic status; (2) large family size; (3) parental separation; (4) low maternal mental ability; (5) poor maternal mental health; and (6) poor family relationships. Further research is required to elucidate the causal links between family adversity and OME.

Other studies have demonstrated a high incidence of middle ear disease amongst American Indians, Alaskan and Canadian Eskimos, and Australian Aborigines^{8,17,18,19,20}. Similarly, children in day care have been found to have significantly more episodes of AOM than children in home care²¹.

For the June 30 Year 1994–1995 the total number of grommet operations performed in New Zealand was 6,326. The standardised discharge ratio for Pacific people was 0.5, compared with 1.00 overall (standardised discharge ratio is the ratio of observed to expected discharge rates, age and gender adjusted)²². Given the high rates of audiometry failure (see *Figure 1*), the low discharge ratio for Pacific children suggests that Pacific children are referred for surgical treatment much less frequently than non-Pacific children.

Long term effects

Studies from Dunedin⁴ and Boston¹⁰ found that children with prolonged episodes of bilateral OME had increased risk of delayed speech and language development, behavioural problems and learning difficulties. OME during the first three years of life is considered to be most significant because this is the most important time for speech and language development²³.

Current policy and services

Much policy work has been done in the area of childhood hearing impairment. Many components of the national well child schedule relate indirectly to hearing, speech and language development, and socialisation. *Table 1* lists only those

components which relate directly to hearing screening. It should be emphasised that there are many potential benefits for children and families arising from contact with wellchild health professionals, over and above those associated with hearing screening.

The screening services described in Table 1 are largely provided by child health nurses (for example Plunket Nurses), Vision Hearing Testers, Public Health Nurses, general practitioners, and practice nurses⁵. Vision Hearing Testers carry out tympanometry and audiology screening. Child health nurses are generally employed by publicly funded organisations such as the Plunket Society. Vision Hearing Testers and Public Health Nurses are usually employed by Crown Health Enterprises (public hospitals), whereas general practitioners are usually self-employed. Most practice nurses in New Zealand are employed by general practitioners, and are subsidised by the state.

Current trends

The above policies and services aim to reduce childhood hearing impairment in New Zealand. To evaluate the effect of these policies and services the following targets have been set by the Public Health Commission, and are being monitored by the Ministry of Health^{7,24}.

“To reduce hearing loss in children in the under five year age group at school entry from 10.5 percent in 1991 to 8 percent or less for Maori, Pacific, and non-Maori children by 1995 and to 5 percent or less by the year 2000.”

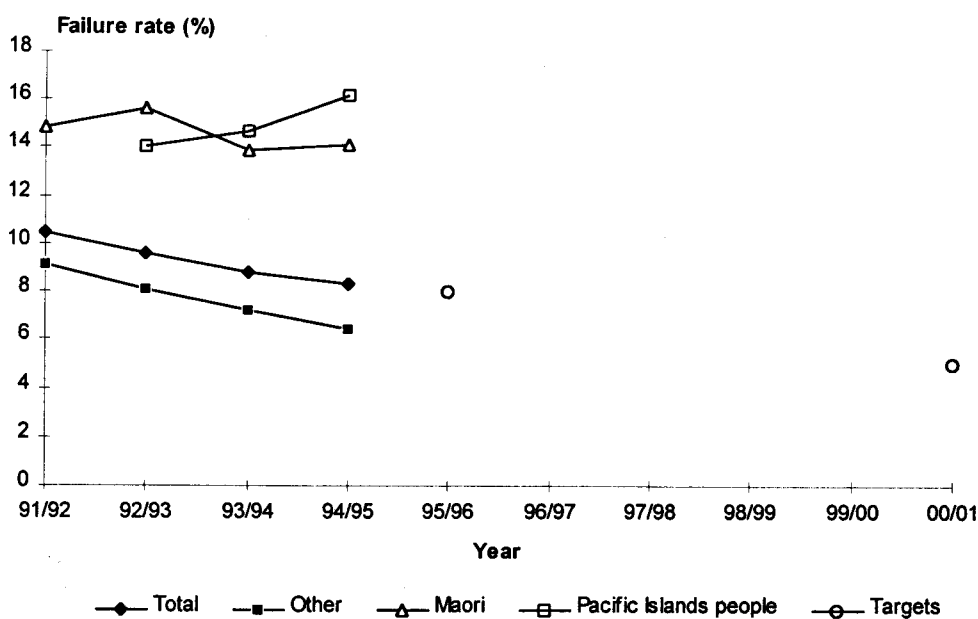
Figure 1 illustrates current pure tone audiometry failure rates for new school entrants (age five years), in relation to these targets. The failure rate of hearing tests at school entry (as opposed to preschoolers) is considered to accurately reflect the prevalence of hearing loss in New Zealand children, as coverage data from the National Audiology Centre indicate that close to 100 percent of five year olds are reached by the school entry hearing loss screening programme.

It is likely that the total hearing failure rate target of 8.0 percent for 1995 will be met. The failure rate in non-Maori is well below the 1995 target, and if the current rate of decrease is maintained the year 2000 target of 5 percent should be achieved. However, the 1995 target will not be met in Pacific children, nor does the year 2000 target look achievable without substantial increases in primary and secondary prevention. As Figure 1 illustrates, the failure rate in Pacific children has risen from 14.0 percent in 1992/93 to 16.2 percent in 1994/95. It seems clear that current screening programmes and prevention strategies aimed at reducing hearing loss in children under five are not, by themselves, sufficient to meet national goals for the population groups in greatest need²⁴.

The Public Health Commission²⁵ stated that:

“The single most significant means by which rates of child hearing loss will be reduced in New Zealand is to improve the accessibility of primary and secondary health care services including screening, referral, health promotion, and primary prevention to Maori and Pacific children.”

Figure 1. Average hearing test failure rate (%) for new school entrants, by ethnicity, 1991/92–1994/95



Source: National Audiology Centre 1995

We support the need for improved access to primary and secondary services, which are currently underutilised by Pacific children. However, the trend illustrated in *Figure 1* suggests that current screening and treatment services are not sufficient in themselves, and increased emphasis might be placed on primary prevention. We are not aware of any intervention studies which address the issue of primary prevention for OME, and thus such strategies, once implemented, should be evaluated. Primary prevention strategies are best directed at reducing known risk factors, and might include:

1. Health promotion strategies aimed at reducing family adversity, such as culturally appropriate support programmes for low income families, large families, and single parent families.
2. Health promotion strategies aimed at reducing passive smoking.
3. Strategies aimed at maintaining high rates and duration of breast feeding amongst Pacific families.

“ According to published studies fruitful areas for intervention might involve reducing exposure of children to tobacco smoke, decreasing levels of family adversity and increasing breast feeding rates and duration. ”

Discussion

The question posed at the start of this article, concerning the adequacy of New Zealand's health services for Pacific children, has several dimensions. For example, it is not clear that the medical model generally adopted in New Zealand, which emphasises screening followed by medical and surgical treatment of identified cases of hearing impairment, is the most appropriate or effective for Pacific children.

Perhaps the medical model would be strengthened if more emphasis were placed on primary prevention, ie prevention of ear infections that cause OME. According to published studies fruitful areas for intervention might involve reducing exposure of children to tobacco smoke, decreasing levels of family adversity and increasing breast feeding rates and duration. The current wellchild schedule provides scope for primary prevention²⁶ however reduction of family adversity would require broader social policies aimed at supporting, and assisting families experiencing adversity. As breast feeding rates are high amongst Pacific mothers,² it is unlikely that substantial gains will be made by focusing on this particular risk factor. Unfortunately, no intervention studies evaluating primary prevention strategies appear to have been carried out. Similarly, further research is required to identify the intermediate factors linking family adversity and OME.

A further dimension concerns the ages at which screening should be carried out. It has been found that screening for OME can be successfully carried out in children under the age of three years, in areas with high proportions of Pacific people²⁷. However, there is little evidence addressing the long-term benefits of screening for OME in this younger age group for the population in general, or Pacific children in particular^{28,29,30}.

We support the need for improved access to primary and secondary services, and believe that further research is urgently required to (a) determine whether the high rates of audiometry failure at school entry are associated with long term problems in Pacific children, and (b) determine which interventions are most effective in preventing long-term problems. Such research would provide a solid basis for implementing health policy which may address, in the long term, the over-representation of Pacific children with OME. In the interim, committing more resources to primary prevention, aimed at family adversity, passive smoking and breast feeding, might

be the next logical intervention in addressing a worsening trend for hearing impairment in Pacific children in New Zealand.

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Large families, overcrowding, smoking and alcohol abuse within the home are important risk factors for the health of Pacific children.

Ate Moala

In Making a Difference: Strategic Initiatives for the Health of Pacific Peoples