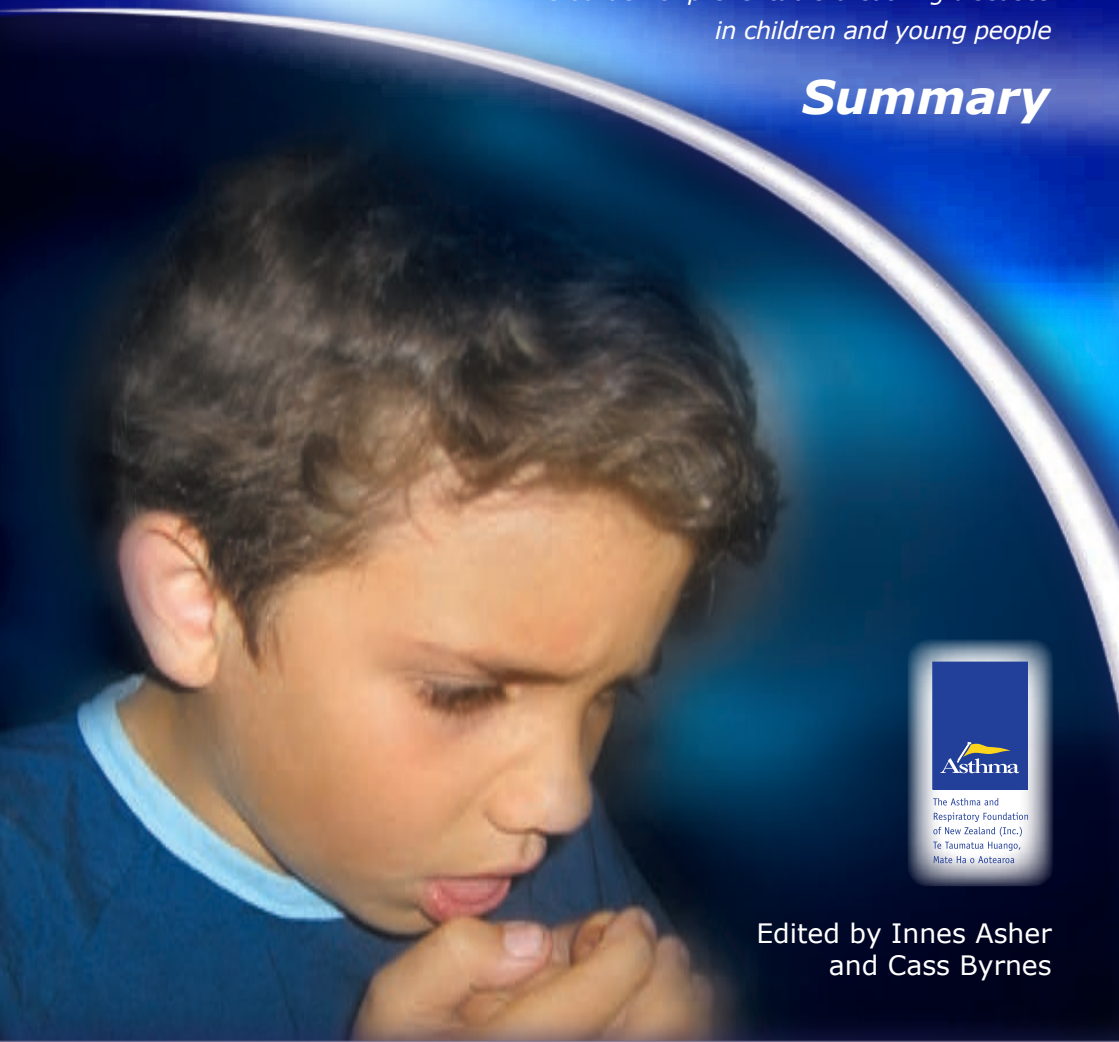


Trying to Catch Our Breath

*The burden of preventable breathing diseases
in children and young people*

Summary



The Asthma and
Respiratory Foundation
of New Zealand (Inc.)
Te Taumatua Huangō,
Māte Ha o Aotearoa

Edited by Innes Asher
and Cass Byrnes

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Summary

It is disturbing that many children in New Zealand suffer from breathing difficulty and respiratory diseases, and that our rates for many conditions are higher than comparable countries. What is most concerning is that much of this burden of disease is preventable.

This summary document discusses the context of respiratory disease in New Zealand, describes the major diseases and their effects, and recommends what can be done to reduce the burden to individual children, their families, and society, with both immediate and long-term benefits. The full version of the document is available from the Asthma and Respiratory Foundation of NZ web site (www.asthmanz.co.nz). This document and the full version were written because of serious concern among New Zealand paediatricians that these diseases should be documented and addressed. The authors of the chapters are New Zealand authorities in their field.

Included in this document are smoking related respiratory illness and the major lower respiratory diseases: pertussis, pneumonia, bronchiolitis, tuberculosis, bronchiectasis and asthma. In addition children with obstructive sleep apnoea are discussed. Upper respiratory infections are very common, but are not covered in this document: the common cold, tonsillopharyngitis, otitis media, sinusitis and viral croup. Sudden unexpected death in infancy is also not included.

Is it possible to describe these conditions as preventable? This term implies that some actions could be taken to avoid the illness occurring in the first place, or to prevent the condition worsening or becoming severe or persistent, and/or to avoid hospital admission. Our Ministry of Health categorises hospitalisations as potentially avoidable or unavoidable. Among the Top 10 causes of potentially avoidable hospital admissions in New Zealanders aged 0-24 years, the majority are respiratory conditions.

Abundant research has identified many of the issues which need to be addressed to prevent these conditions, but a need for further research has been identified in specific areas. This monograph gives information about the respiratory health of New Zealand children, and the size of the burden to these children, their families and society, and makes research-based recommendations to improve outcomes. The scope of factors which may help reduce the high rates of these conditions indicate that far reaching changes are needed in Government policy and its implementation across all sectors, District Health Board performance, and public and health professional education.

In addition, the Paediatric Society of New Zealand has identified many changes to service delivery which will address these diseases, and these recommendations require implementation: Through the Eyes of the Child, Respiratory Services (1998) (updated as Respiratory Service Guidelines 2003); National Review of Sleep Services for children and young people in New Zealand: facilities and expertise (2002); Three best practice evidence-based guidelines: Management of asthma in children aged 1-15 years (2005), Wheeze and chest infection in infants under 1 year (2005), and Assessment of sleep disordered breathing in childhood (2005).

Chapter 1: The Socioeconomic Context of Respiratory Disease

Professor Innes Asher

Since the mid 1980s policy changes were associated with increasing inequality and poverty. Those likely to have had the most adverse impact on the health of children are listed in Table 1.

Table 1: Changes in policy adversely affecting child health.

<ul style="list-style-type: none">• 1984 Market-based reforms introduced.• 1986 GST introduced on all basic consumption including food, clothing and health services.• 1986-2008 Family income support not indexed.• 1991 Benefits cut.• 1991 The universal family benefit abolished.• 1991 The Employment Contracts Act introduced.• 1992-1999 11,000 state houses sold off.• 1993-2000 Market rents for state houses.• 1996 Child Tax Credit introduced excluding the poorest children.

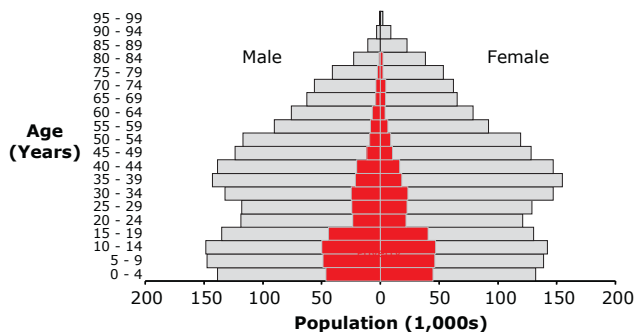
It is not surprising that these changes had major impacts on health because income is widely recognised as the most important health determinant, determining the ability to purchase nutritional food; the size, adequacy and location of housing; the ability to afford to heat the home, to buy clothing, bedding, soap and towels; the ability to pay for phone and transport, participate in sport, visit the doctor, and access medicines and education. Many families became unable to afford all

of these essential items for their children. The proportion of children living in poverty (defined as living in a household with an income below 60% of the median family income net of housing costs) increased from 16% in 1987/88 to a staggering 29% (300,000) children in 2000/2001 (Figure 1).

The deteriorating outcomes for the health and well being of children, and their relationship to inadequate incomes have been documented in numerous reports over the last decade. The cumulative effects of long term inadequate nutrition, crowded substandard housing and living conditions, and unaffordable or inaccessible primary health care over the last 15-20 years have taken a lasting toll on the health of hundreds of thousands of New Zealand children in the short and long term. New Zealand children have very high rates of preventable diseases and injury compared with other similar countries like the UK and Australia, which have more generous economic support for families with children. Until the poor economic situation of New Zealand children in poverty is addressed, this alarming situation is likely to continue into the next decades.

Respiratory or “breathing” disorders feature highly among the health burden, but, apart from asthma, they have had little public recognition. New cases of bronchiectasis are rapidly increasing. Compared with our neighbouring Pacific nations we have higher rates of admission for diseases such as pneumonia and whooping cough. The danger is that we are accustomed to these high rates of preventable disease as the “normal” child health picture in New Zealand, even though the rates are exceedingly high in comparison with other OECD countries, and some developing countries have better preventive health policies, and thus better outcomes. Although policies to reduce smoking have improved, the serious health effects from vehicle exhaust emissions on children have been ignored. New Zealand is the only OECD country which does not have compulsory vehicle exhaust emission testing as part of the warrant of fitness.

Figure 1: The population of New Zealand in 5 year age bands, with the proportion in poverty estimated in red.



Chapter 2: Healthcare Delivery

Jim Reid

The Primary Health Care Strategy promises that “Doctors, nurses, community health workers and others in primary health care will work together to reduce health inequalities and to address the causes of poor health status. Services will be readily available at a cost people can afford.” While much has been achieved in the four years since publication, for some families the cost is still too high for them to afford visits to the doctor or their prescription medicines. Progress is however being made on universal access funding.

The continual restructuring is confusing to the public, disruptive to the health professionals, confusing to management, and costly. Many general practitioners now estimate that at least one third of their time is engaged in compliance requirements and paper work.

For children and young people to access healthcare there must be availability, trust in the provider, trust in the appropriateness of the provision of the service including cultural appropriateness, confidentiality, and it must be affordable. However in most cases payment is still a requirement. For a long time all children in New Zealand under the age of six were treated free, and in many cases this still applies, but as this benefit has eroded, the concept of free access is now far from universal. The cost especially of after hours services can be high for many parents. Prescription charges were introduced in the mid-1980, but these extra costs are unaffordable for some families.

While adequate access to primary health care is paramount, specialist care also needs to be available within reasonable time, and at reasonable cost. In the public hospital system there is no direct cost to the patient, but on many occasions the waiting time in this system is inappropriately long.

Chapter 3: The Context for Maori Tamariki and Taitamariki

Maire Harwood

Inequalities in incidence and mortality rates, the quality of care and resultant disability exist for most infectious and non communicable respiratory disease in Maori children compared with non Maori children. They are at risk of poor health caused by the unequal distribution of, and access to, sufficient disposable income, adequate housing, educational opportunities and effective, available and acceptable health care. Woven in with the social and economic determinants of health is the impact of ethnicity. Maori at all educational, occupational and income levels have poorer health status than non Maori. Any improvements in socio-economic, housing and education will advance the wellbeing of Maori children suffering respiratory disease but the betterment of Maori political status will also contribute to health gain.

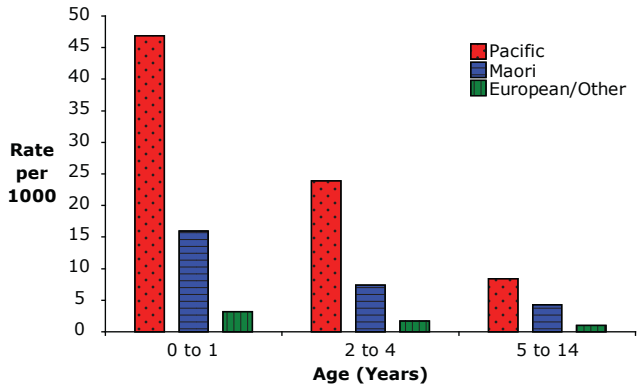
The quality of health care provided to Maori children must be monitored to ensure that services are working to reduce health disparities and to attain equitable outcomes, and accurate ethnicity data is necessary so that the standard of care for Maori children with respiratory illness can be measured against best practice. Evidence based guidelines, such as guidelines for the management of paediatric asthma, community acquired pneumonia and tuberculosis, have examples of audit tools for clinicians and consumers to utilise for this purpose. Many District Health Boards (DHBs) have also identified specific targets for Maori, child and respiratory health that may assist providers.

One example is paediatric asthma. Although the prevalence of paediatric asthma in New Zealand is similar for Maori and non-Maori, Maori children with asthma have more severe symptoms when presenting to the health provider for routine or acute care, require hospitalisation for asthma almost twice as often as non Maori children; and require more time off school because of asthma. Despite an increased need for adequate asthma management, Maori children with asthma appear to be further disadvantaged when it comes to acceptable asthma care. They are less likely to receive adequate education, to have an asthma action plan and to be prescribed preventive medication. Other commonly cited barriers for Maori with asthma include cost for consultation, access to transport and telephone and the attitude of the doctor/provider including bias and discrimination.

Infectious disease is also an issue. Maori children have higher rates of community acquired pneumonia and are hospitalised with more severe pneumonia than European children in New Zealand. Significant ethnic disparities in tuberculosis incidence rates exist and Maori children aged less than 15 years account for 15% of all cases of TB compared with 3% of European and 17% of Pacific children.

The well being of Maori tamariki and taitamariki must be protected, with the removal of the inequalities in respiratory illness rates, health care and health outcomes that exist for Maori children.

Figure 2: Paediatric pneumonia hospitalisation rates by age and ethnic group in Auckland, 1993 to 1996.



Chapter 4: The Context for Pacific Children

Teuila Percival

As a group, Pacific children are excessively burdened with poor health and socio-economic disadvantage. Respiratory disease is the leading cause of morbidity or ill health for Pacific children. Much of this respiratory morbidity is preventable. Ethnic diversity and differing languages, culture and degree of acculturation affect the ability of Pacific children and their families to access effective health care and social services.

Pacific people in New Zealand are largely from Samoa, Tonga, Nuie, Cook Islands, Tuvalu and Tokelau, making up 6.5% of the New Zealand population. The Pacific population is relatively youthful group compared with greater New Zealand with 39% of Pacific aged less than 15 years of age. Compared with most New Zealanders, Pacific children are disadvantaged in health, housing, education and household income. Pacific families have lower household median annual income than that of all other ethnic groups. Forty-two percent of Pacific people live in

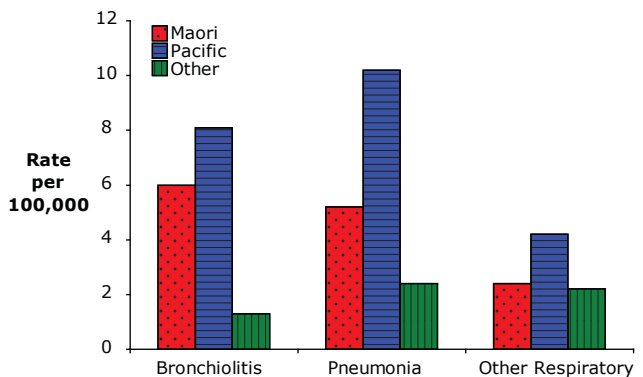
the most deprived neighbourhoods compared with 10% of total New Zealanders. Pacific families are also more likely to live in overcrowded and poor housing (damp and cold) compared with other New Zealanders.

Pacific children have hospitalisation rates for preventable diseases higher than Maori, European and other ethnic groups, with respiratory disease a particular concern. Their hospitalisation rates are almost three times that of other children for lower respiratory tract infections. Compared with NZ European children they also have more severe disease when hospitalised with pneumonia. Pacific children have disproportionately high rates of bronchiectasis thought to be mainly due to socio-economic deprivation and low immunisation. Pacific children also have a 50% higher hospitalisation rate for asthma than the New Zealand average, and a higher prevalence of tuberculosis.

Pacific people are more likely to forego visiting a GP than other New Zealanders even though they recognise there is a need, mostly because of the cost. Similarly the commonest reason given for not picking up a prescription is cost. Pacific people are also less likely to be seen as secondary care outpatients and less likely to attend primary care for screening or health promotion. Other factors impacting on Pacific children's health are environmental tobacco smoke exposure with almost one third of Pacific adults still smoking. Less than half of Pacific babies are still fully breastfed at three months of age with a further rapid decline in rates in the six to twelve months age group.

The way forward for Pacific children and their families requires a commitment to health promotion and addressing the underlying determinants of our children's health such as education, housing and household income, improving access to health services as well as their effectiveness, and lessening their cost. Improving the health and well-being of Pacific children requires medium and long term strategies for positive change.

Figure 3: Respiratory infection admissions, Counties Manukau, children under 15 years, 1999.



Chapter 5: Immunisation Delivery

Nikki Turner

Immunisation is well recognised as one of the most important public health achievements of the 20th century but the ability to deliver has not matched the ability of the technology. Children continue to suffer unnecessarily from high rates of vaccine-preventable diseases in NZ despite the availability of high quality safe and effective vaccines. Until the New Zealand national immunisation register tracks all children, there is no easy way of finding children who have missed out on immunisation services.

High immunisation coverage may be gained and maintained by enhancing access and provider-based interventions and strategies to increase community demand. Key aspects of delivery include financing the system effectively, focussing on provider practice, appropriate integrated information systems and community support. The inadequacy of the immunisation benefit subsidy, particularly to cover the costs of the harder to access children, has been frequently highlighted as a problem. Local initiatives have shown it is possible to achieve and maintain higher coverage rates and show the key characteristics of committed teams and integrated processes at the primary health care level.

A big barrier to achieving immunisation in New Zealand is parental concerns. For our most vulnerable children, parents frequently have considerable logistic, financial and at times cultural barriers to overcome to complete an immunisation event. It does not take much to seed a degree of doubt or fear in a struggling parent to make the likelihood of achieving a full and timely course of immunisation even more remote.

The current NZ approach to immunisation service delivery is clearly inadequate. If we are to have a genuine commitment to improving immunisation rates for our children, there need to be more resources provided both at the service delivery end, and at the community support and awareness end. Furthermore a real commitment to health gains for our children must include consideration of the important new vaccines, and new vaccine strategies that are being taken up by many more progressive child-focused Western countries. Until such time our children will continue to suffer unnecessarily.

Table 2: Immunisation coverage estimates for pertussis antigen.

Country	% Immunised	Year of Estimate
Niue	100	1997
Tokelau	100	1994
Sweden	99	1997
Samoa	99	1997
France	97	1997
UK	95	1997
Tonga	95	1997
USA	94	1995
Canada	93	1994
Cook Islands	91	1997
Australia	86	1997
New Zealand	84	1994
New Zealand	81	1998*

* data obtained from the NZ Ministry of Health Immunisation Coverage Surveillance report

Chapter 6: The Burden of Smoking-related Respiratory Illness in Children and Young People

Philip Pattemore

Cigarette smoke contains many chemicals including cell poisons, carcinogens, and substances active on blood vessels such as nicotine itself, which is also highly addictive when inhaled. Therefore it is not surprising that exposure to significant amounts of cigarette smoke has detrimental effects on the embryo and foetus (exposed via tobacco constituents in mother’s blood that cross the placenta) and on children (exposed via side stream and exhaled smoke and volatile smoke constituents on clothing). Cigarette smoke is a leading preventable cause of disease and death in children.

A crude estimate of exposure is 14,000-19,000 NZ babies exposed in utero per year and approximately at least 160,000 children under 15 years of age are exposed. 1996 data suggested over 50% of children under five who lived with a smoker were exposed to smoking inside the home. In a study in San Diego county, ETS exposure of infants was 5–8 times higher in households of smokers

trying to protect their children by smoking outdoors than in households of non-smokers. ETS exposure of infants was 2-6 times higher in households of smokers who smoked indoors than in households of smokers who smoked outdoors.

Major risk factors for smoking among NZ fourth formers were parental smoking, poor knowledge of adverse health effects and watching televised sports, accounting for 36.1% of the total smoking prevalence.

In summary, exposure to cigarette smoke causes a wide spectrum of significant health effects in children, both before and after birth, and increases the risk of children becoming smokers themselves. The prevalence of smoking in adults and in teenagers is showing a very slow decline but, disappointingly, as many as a third of pregnant mothers and parents of small children continue to expose their children to cigarette smoke. A large number of illnesses, hospitalisations, operations, and even deaths in children are the result.

Table 3: Estimated respiratory health risks and burden of health effects in New Zealand children.

Conditions	Increase in Risk	Estimated Annual Burden of Childhood Illness Due to Smoking
Sudden infant death syndrome (SIDS) (50% of cases attributable)	2-5 fold	50 deaths
Infant lung function	Decreased	
Infant wheezing	Increased	
Infant admission to hospital, any cause (14% of admissions attributable)	1.5 fold	500 admissions
Respiratory illnesses including: Otitis media Pharyngotonsillitis Rhinitis & sinusitis Bronchitis, bronchiolitis & pneumonia	1.5-4 fold	27,000 general practitioner consultations for respiratory illness and asthma 1,500 glue ear operations
Severity of asthma and other chronic respiratory disorders	Increased	15,000 episodes of asthma
Physical fitness and lung function	Decreased	
Likelihood of smoking uptake	1.7-6.6 fold	

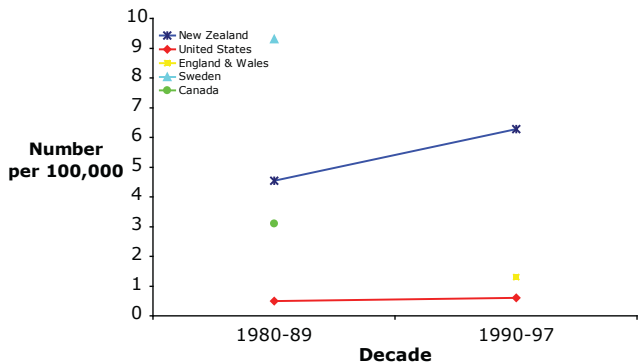
Chapter 7: New Zealand's Excessive Pertussis Disease Burden

Cameron Grant

Pertussis (whooping cough) causes a prolonged coughing illness. It is most severe in babies, and sometimes fatal. Although mortality rates have declined dramatically pertussis continues to kill infants in New Zealand, and infants can die despite intensive care. The average pertussis hospital admission rate in New Zealand during the 1980s was 5 to 10 times higher than those reported from England and Wales and the United States.

Successful prevention requires immunisation coverage of 90-95%. On time delivery of immunisations is essential to preventing severe disease in infants.

Figure 4: International comparison of average annual pertussis hospital discharge rates during the 1980s and 1990s.



Our excessive disease burden from pertussis is primarily because of low immunisation coverage and even lower on-time immunisation coverage. New Zealand has never had, and still does not have, a primary care system capable of delivering immunisations on time to all of its children. There has only been a small increase in immunisation coverage over the past 25 years. Currently between 80% and 90% of children receive the primary series with only 50% to 60% of children receiving these immunisations on time.

Poverty related factors are important barriers to immunisation. Health system factors are also important. Research to date on health system barriers to immunisation in New Zealand has been relatively sparse.

Clear and comprehensive recommendations have repeatedly been made for improving immunisation delivery in New Zealand. A lack of accountability in the health care system and frequent changes to health policy have prevented these recommendations from being introduced.

Chapter 8: What Does Pneumonia Cost New Zealand?

Cameron Grant and Richard Milne

Pneumonia remains a common and serious health problem in both developed and developing countries. Pneumonia is fundamentally different in children compared with adults. Most children with pneumonia present with cough or difficulty breathing, but only the minority of children with these symptoms have pneumonia. Among children with pneumonia in New Zealand, many are managed in primary care setting, but those with more severe symptoms are admitted to hospital.

Pneumonia is more common in New Zealand than in other developed countries. The national pneumonia hospital admission rate for children aged 0 to 14 years (4.0 per 1,000) is about five times higher than in the United States. Hospital admission rates are highest for the youngest children: 15.3 per 1000 children for children aged less than 2 years, 5.6 for children aged 2 to 4 years, 1.7 for children aged 5 to 9 years and 0.73 for children aged 10 to 14 years. Each year more than 3,000 children are hospitalised with pneumonia in New Zealand.

The pneumonia admission rate differs by ethnicity. At Starship Children's Hospital, the admission rate for children 0 to 14 years of age is 14.0 per 1000 for Pacific, 6.7 per 1000 for Maori and 2.7 per 1,000 for European/other children. It should be noted that even for non-Maori, non-Pacific ('European/other') children the pneumonia hospitalisation rate is three to five time greater than contemporary rates from the United States.

Table 4 shows the estimated costs of hospital admissions and emergency department visits for children less than 15 years of age. Each year New Zealand spends over five million dollars on inpatient hospital costs, more than one million dollars on emergency department costs for paediatric pneumonia, and approximately \$400,000 on primary care for pneumonia. Based only on direct medical costs, pneumonia in children under 15 years of age costs New Zealand at least seven million dollars per year.

No estimate has been made of the subsequent health care costs that occur, but longitudinal studies that have followed populations of children through into adult life have demonstrated that having pneumonia as a young child is associated with poorer lung function in adult life. Pneumonia in childhood can cause permanent lung damage leading to chronic lung disease, for example bronchiectasis and eventually respiratory failure in adult life.

Table 4: Estimated annual costs of pneumonia in New Zealand based upon hospital admissions, emergency department visits and General Practitioner consultations.

	Age Group (Years)				Total
	0 to 1	2 to 4	5 to 9	10 to 14	
Hospital admissions					
Number of children admitted to hospital with pneumonia	1702	948	490	193	3,333
Costs per admission*	\$1,560	\$1,263	\$1,709	\$1,486	
Emergency department cost for each admission	\$191	\$191	\$191	\$191	
Costs per year	\$2,980,202	\$1,378,392	\$931,000	\$323,661	\$5,613,255
Emergency department consultations without admission to hospital					
Number of children [†]	2049	1906	845	922	5,722
Emergency department cost per visit	\$191	\$191	\$191	\$191	
Annual costs for emergency department visits [†]	\$391,359	\$364,046	\$161,395	\$176,102	\$1,092,902
General practitioner consultations [§]					
National cost estimate [¶]	\$125,550	\$122,570	\$109,324	\$32,356	\$389,800
Total	\$3,497,111	\$1,865,008	\$1,202,719	\$532,119	\$7,095,957

* Based on Starship Children's Hospital ward plus general paediatrics charges.

[†] Estimates based on the proportion of children that present to Starship Children's Hospital Emergency Department who are diagnosed with and treated for pneumonia but are not admitted to hospital.

[‡] Cost based upon Starship Children's Hospital Emergency Department.

[§] Includes General Medical Services benefit, and charges for antibiotics and chest radiographs.

[¶] Extrapolated from Royal New Zealand College of General Practitioners database.

Chapter 9: The Burden of Bronchiolitis in New Zealand

Cass Byrnes

Bronchiolitis affects children less than 2 years of age with peak incidence at 3-6 months. It is caused mainly by a Respiratory Syncytial Virus (RSV), spread by close contact with infected individuals. The child has a raised breathing rate, wheeze, increased work of breathing, fever and can have difficulty feeding. In most children the illness lasts about a week, recovering with no specific treatment. About 2% of previously healthy children require hospitalisation for supportive treatment with feeding, fluids, oxygen and more rarely ventilatory support. Most children will have 2-4 RSV infections in the first 7 years of life, sometimes causing only a common cold.

Currently more than 3000 infants per year are admitted for bronchiolitis in New Zealand, and rates of admission for children under one year more than doubled from 26.6/1000 in 1988 to 58.1/1000 in 1998. Bronchiolitis is among the top ten causes of potentially avoidable hospitalisations in the Auckland and Waikato regions. Bronchiolitis is responsible for an average of 2.8/1000 avoidable admissions across the country but is higher in some of these regions such as 4.6/1000 in South Auckland. It is the third cause of preventable admission in both Maori and Pacific Island communities (Table 5).

The risk of admission for bronchiolitis is increased by residence in an area of social and material deprivation with risk factors including household crowding and exposure to environmental tobacco smoke, while breast feeding is protective. Although death for bronchiolitis in New Zealand is rare, in previously healthy children the risk of death is increased by low birth weight, a shorter gestational age, a low 5-minute apgar score, multiple birth, and a greater number of siblings, mother being unmarried or of young age, smoking during pregnancy, and a lower education level.

Severe RSV is associated with increase in wheezing, lower respiratory tract infections and asthma diagnosis up to 6 years of age. There is increased risk of respiratory symptoms and chronic productive cough continuing at age 5-8 years. While most children with wheeze will not go on to have asthma, RSV may be a risk factor for development of asthma.

Although most disease occurs in otherwise normal infants, mortality and hospitalisation is increased in high risk groups (prematurity, chronic lung disease, congenital heart disease, immune compromise and infants less than 3 months of age). Improvement of the socio-economic standing of our poorest communities, reducing domestic crowding, reducing cigarette smoke exposure and promotion of breast feeding may be cost effective measures to reduce disease rates and, in particular, the severity of disease. Awareness of, and adherence to, the new best practice evidence based guideline for “Wheeze and Chest Infection in the less than 1 year old”²¹⁷ may contribute to cost reduction by reducing unnecessary investigations and drug treatment where only supportive treatment is appropriate. Prevention by use of prophylactic immunoglobulin may become cost effective in high risk infants and revisiting the cost analysis should be considered.

Table 5: Numbers of potentially avoidable hospitalisations for bronchiolitis per thousand children.

	New Zealand	South Auckland	Urban Waikato
Overall	2.8	4.6	3.5
Maori	4.2	6.0	6.9
Pacific Island	6.3	8.4	5.0

Chapter 10: Tuberculosis in Children

Lesley Voss

In New Zealand (NZ) there were significant decreases in the rate of Tuberculosis (TB) from the 1960s but since the early 1990s this decline has reached a plateau and the rate has remained around 10-11 per 100,000 population per year.

Young children infected with *Mycobacterium tuberculosis* are at high risk of developing active disease and have a higher risk of disseminated disease or meningitis. TB in children occurs in most cases by contact with an infectious adult. Over a 10 year period from 1992 to 2001, 401 children under 16 years were notified with TB disease in NZ. Disproportionately high rates were found in the under 5 year olds, with ethnic disparities were also seen with a much higher rate in Pacific children under 16 years at 15.2 per 100,000 which is significantly higher than that in Maori (6.4 per 100,000) and European (0.6 per 100,000), and an extremely high rate in African children (not unexpected as most African these children are recent arrivals in NZ and reflect the TB incidence in the country of birth).

Many affected children are born in NZ but living with parents and family who are born overseas, who have rates similar to their country of origin. Thus the current NZ BCG programme recommends children who live with household members from high risk countries should receive BCG (Table 6). The BCG vaccine is most effective in preventing severe forms of disease and death in young children.

Young children, with TB disease require treatment with a minimum of three drugs for six months, while those with severe disease require up to twelve months treatment with often four drugs in the early stages. This is a huge burden of medication for the young child to tolerate and requires intensive community nursing and support. Those with severe disease often required prolonged hospital stays and tend to bear the majority of long-term morbidity, particularly neurological complications, and occasional deaths. Those with severe pulmonary disease can progress to long-term chronic lung problems with the development of bronchiectasis.

The indirect costs to the family and the community include the family burden of getting children to take daily medication for six months (frequently with more than one child in a household being treated) and the economic pressures that occur with hospitalisation and regular visits to healthcare services. The societal implications of this disease are immeasurable, with stigma, isolation and fear of exposure being a very real concern for a family living with TB. The NZ Ministry of Health 2001 publication “An integrated approach to infectious disease: Priorities for action” places TB in the highest priority with targets to reduce the TB burden in the Pacific to half the current levels by 2010, specifically through a 50% reduction in current TB rates for Maori and Pacific peoples by 2010. In New Zealand TB in children is associated with socio-economic deprivation (Figure 10-2). An ongoing commitment from the government, along with a partnership between workers within the field and affected communities, is crucial to achieve these goals and reduce the burden of disease in children.

Figure 5: Deprivation in childhood TB cases versus all NZ children.

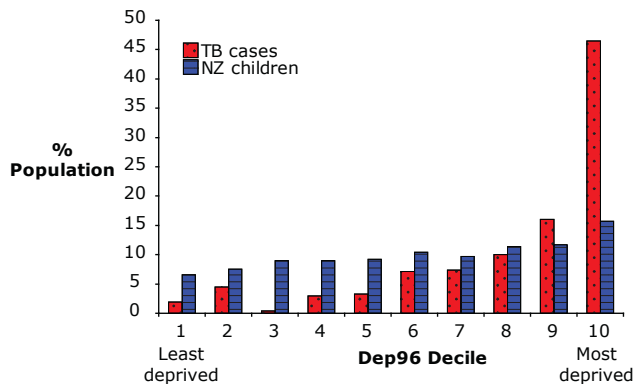


Table 6: Neonatal BCG Eligibility Criteria 2002.

Neonatal BCG should be offered to infants at increased risk of TB, defined as those who:
<ul style="list-style-type: none">• Will be living in a house or family/whanau with a person with either current TB or a past history of TB;• Have one or both parent who identify as being Pacific people;• Have parents or household members who within the last 5 years have lived for a period of six months or longer** in countries where there is a high incidence of TB*; or• During their first five years will be living for three months or longer in a high-incidence country.
<p>* All countries except Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Holland, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Monaco, New Zealand, Norway, Slovakia, Switzerland, the UK, and USA.</p> <p>** This indication is not absolute.</p>

Chapter 11: The Burden of Bronchiectasis in New Zealand Children

Cass Byrnes

Bronchiectasis (Bx) is a type of lung scarring where the airways become dilated and cystic, resulting in mucus pooling and recurrent infection in these damaged areas. It is usually the result of either severe or recurrent lower respiratory tract infection in a previously healthy child. In turn Bx then leads to recurrent pneumonia which results in increasing morbidity and disability, progression of disease, and ultimately respiratory failure and death.

In most developed countries the incidence of Bx has fallen in the 20th century due to improved living conditions, improved vaccination programmes and antibiotic treatment of chest infections, but not in New Zealand. The incidence is 7 times greater than the only other comparable national study in Finnish children and equates to 1 in 1,700 births being diagnosed with Bx before the age of 15 years, equating to a prevalence of 1 in 3,000 children overall, but 1 in 625 Pacific children.

In New Zealand about 88% have disease affecting both sides of the chest and 63% have 3 or more of the 6 lobes of the lung involved, suggesting we are diagnosing only the worst cases. Thus the rate of disease given is likely to be a serious underestimate. The median age at diagnosis in children in the NZ National study is only 5.2 years, with the first hospitalisation at a median age of 1 year of age and the persistent cough starting around 3 years of age.

Children with Bx are disproportionately found living in poorer socioeconomic circumstances, with lower than average complete immunisation and higher than average smoking among household members.

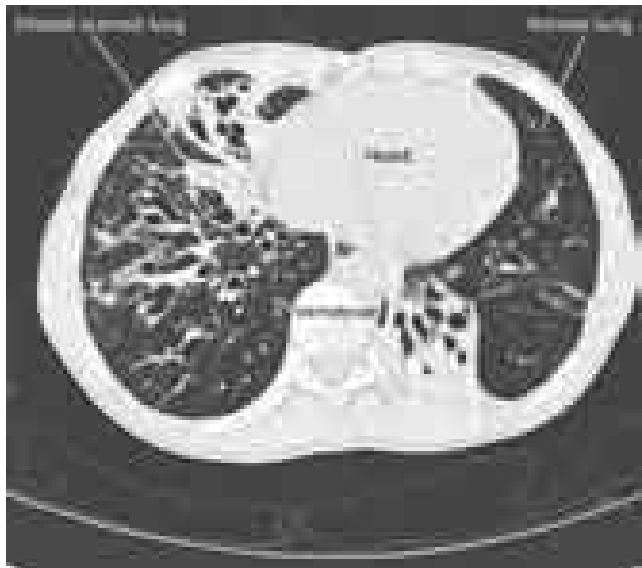
While the basic management strategies needed for most of the children (physiotherapy, oral antibiotics) are cheap, the burden of this disease is financially expensive, in days at work lost by adult sufferers and parents of affected children, school days lost and loss of working years in adults who die in the 20-50 year decades, with the years prior to their final respiratory failure spent becoming increasingly disabled. Patients attend out-patient clinics 2-4 times per year and at least one hospital admission per year is common.

Deaths from Bx are reported at 50 per 100,000 in Maori and Pacific People. Compared to asthma, Bx causes a tenth the hospital admissions and half the number of deaths overall. In some age groups (early adulthood) more adults die of Bx than of asthma. It results in 75% more admissions and nearly five times as many deaths as cystic fibrosis.

While the aim is to increase awareness, diagnosis and treatment to improve the current statistics and the individuals' quality of life, prevention is the key. The number of children who suffer from this chronic debilitating respiratory disease will only reduce when their quality of life and socioeconomic status improves.

Despite a Government report a decade ago identifying Bx as a concern because it is the 8th highest cause of death in Pacific women, the figures given above suggest the situation has not improved from that time.

Figure 6: CT scan of bronchiectasis illustrating typical features of airway dilatation with sputum plugging.



Chapter 12: Obstructive Sleep Apnoea in Children

Gillian Nixon

Obstructive sleep apnoea (OSA), a condition in which breathing during sleep is compromised by obstruction of the upper airway, is more common in children than epilepsy, diabetes or cystic fibrosis. Symptoms suggestive of OSA include snoring most nights, frequent daytime mouth breathing, observed cyanosis or apnoea during sleep, difficulty breathing during sleep and parental concern about the child's breathing. Unlike the condition in adults, daytime sleepiness may not be a feature of with OSA in children. Untreated OSA can result in a degree of growth impairment, problems with learning, attention and behaviour. Severe complications of this condition include failure to thrive, heart failure, permanent neurological injury, intellectual disability and death in some cases.

OSA is one of the most common respiratory disorders of childhood, affecting an estimated 1-2% of normal children. It occurs in children of all ages, from neonates to adolescents. It is most common in pre-school children, when the tonsils and adenoids are at their largest size in relation to the size of the upper airway. However, there is increasing evidence that OSA is very common in children with obesity, and thus the prevalence in older children is likely to rise in coming years.

International standards recommend formal confirmation of the diagnosis by multi-channel physiologic recordings during sleep (polysomnography). Currently we do not have the resources in New Zealand to provide polysomnography to confirm the diagnosis of OSA in the large group of children who snore and thus national guidelines (Paediatric Society of New Zealand 2005) have recommended an alternative approach to assessment and treatment in the New Zealand environment.

Adenotonsillectomy is the first line treatment in children with OSA and enlarged tonsils and adenoids. This surgery leads to resolution of OSA in the vast majority of cases. Significant improvements in growth, cognitive functioning and daytime behaviour have also been demonstrated in children who have had adenotonsillectomy for OSA. In those for whom adenotonsillectomy is not indicated or is not fully effective, continuous positive airway pressure by mask (nasal CPAP) may be indicated, and this requires specialist care to initiate and adjust to the unique requirements of each child, with close follow-up.

Children with undiagnosed OSA are high users of health care services, spending more days in hospital, having more visits to the emergency department, and receiving more prescriptions for drugs. These costs reduce after adenotonsillectomy. These costs do not include the costs of parental absence from work, direct financial costs to the family of affected children or costs of educational under-achievement secondary to OSA.

This data suggests that early recognition of OSA in children will not only reduce morbidity for the child, but will also lead to a significant reduction in costs to public health care. The Paediatric Society of New Zealand's best practice evidence based guideline "Assessment of Sleep-Disordered Breathing in Childhood" needs publicity and implementation.

Chapter 13: Asthma

Ian Shaw

New Zealand has one of the highest asthma prevalence rates in the world, about one in four children, over 200,000 children, are affected. Wheeze disturbing sleep in the last 12 months occurs in about 3.5% children. Rates of hospital admissions due to asthma are highest in children, being about double that of adults, with the majority occurring in those less than 5 years. There are small differences in prevalence between ethnic groups, but the greatest difference between ethnic groups is the presence of more severe symptoms among Maori and Pacific children compared with European.

Whilst admissions remain high, numbers fell in the 1990s, and remained relatively constant in July 1999 – June 2004. However while rates have gradually decreased in NZ Europeans, rates for Maori and Pacific people have risen. In children aged less than 5 hospitalisation rates per 1000 for NZ Europeans were 7.8 whilst Maori were 20.5 and Pacific children 24.6, and there are regional variations. Rural hospitalisation rates were higher than urban areas.

Studies suggest that the majority of children with asthma do not have good control, associated with low asthma pharmaceutical use which is an odds with the recommendations of asthma management guidelines. PHARMAC identified asthma as the most heavily under treated disease group in their gap analysis of 2002. In children there is low usage of long acting β agonists despite the high average daily dose of inhaled corticosteroids. Given the high level of poor

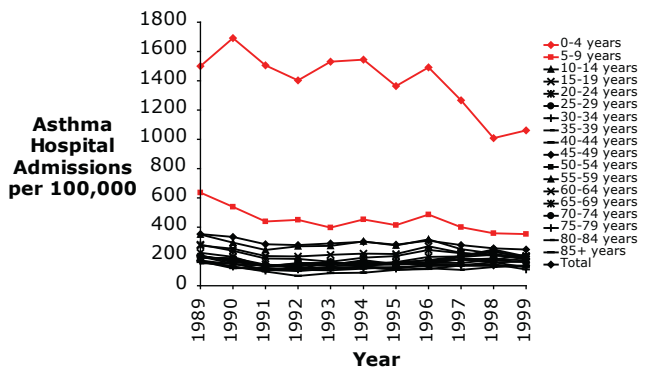
control it is likely that there is a substantial cost to the work force by days off work for parents in addition to days lost from school.

While socioeconomic status in childhood has little impact on the prevalence of asthma, many studies that suggest that socio-economic disadvantage adversely affects asthma management and results in increased hospital admissions. The cost of GP visits has been identified as one significant barrier, and location of health services is another. Preventive strategies include addressing smoking prevalence, poor housing and air pollution (vehicle exhaust emissions).

The Paediatric Society of New Zealand has produced the best practice evidence based guideline “Management of Asthma in Children Aged 1-15 Years”. Implementation of this guideline should lead to improved asthma outcomes.

It is important to reduce the burden of asthma. The key barriers identified in New Zealand are socio economic deprivation with implications for access to health care services and pharmaceuticals. Closely linked with this is poor education and issues with infrastructure noting that a significant barrier for many Maori including location of health services. Specific strategies to target the high needs identified in Maori and Pacific children need to be developed. Whilst this will include strategies to address cost there needs to be specific approaches to addressing issues of location, transport, communication and education.

Figure 7: Asthma Hospital Admissions in New Zealand, 1989-99.



Key Recommendations

For Government:

1. Introduce a governmental obligation to monitor and report on child poverty.
2. Create strategies and a time line to reduce and eliminate child poverty.
3. Strengthen the New Zealand housing strategy to provide sufficient resources to enable universal access of children to uncrowded, insulated and affordable housing.
4. Resource the provision of easily accessible, free primary health care, 24 hours a day, 7 days a week, and free prescriptions, for children and young people.
5. Continue increases in the tax and real price of tobacco.
6. Seek to eliminate the subtle marketing of tobacco to young people through international films, sports coverage, and sponsorship of educational groups or material.
7. Require tobacco companies to show graphic health warnings on cigarette packets.
8. Introduce government policies to encourage healthier eating, and encourage physical exercise.
9. Legislate for compulsory vehicle exhaust emission testing as part of Warrant of Fitness to reduce air pollution.
10. Develop an inter-sectorial approach to prevention of tuberculosis (TB) (immigration, housing, health, education and justice sectors).

For the Ministry of Health:

11. Monitor and report on national indicators of child and youth respiratory health and wellbeing with accurate ethnicity data, and set accountable targets for their improvement.
12. Include respiratory illness as a health priority in the NZ Health Strategy.
13. Develop initiatives which lead to increased capacity of Maori health work force to work with tamariki and their whanau.
14. Increase immunisation levels focusing particularly on early immunisation for pertussis through a broad public communication strategy, improved funding for immunisation service delivery, and completion of the roll out of the National Immunisation Register.
15. Develop more well resourced and accessible programmes to prevent and treat obesity.

16. Implement widespread education of the public and health professionals about the conditions in this document.
17. Implement the Paediatric Society of New Zealand documents:
 - a) 3 best practice evidence-based guidelines (2005):
 - (i) Management of asthma in children aged 1-15 years;
 - (ii) Wheeze and chest infection in infants under 1 year; (iii) Assessment of sleep disordered breathing in childhood.
 - b) Through the Eyes of the Child, Respiratory Services 1998 with update, Respiratory Service Guidelines 2003.
 - c) National Review of Sleep Services for Children and Young People, 2002.

For the Ministry of Transport:

18. Introduce compulsory vehicle emission testing for all vehicles as part of Warrant of Fitness.

For District Health Boards (DHBs):

19. Monitor and report on DHB indicators of child and youth respiratory health and wellbeing with accurate ethnicity data, and set accountable targets for their improvement.
20. District Health Boards which identify high rates of respiratory disease in children should develop local strategies to reduce these levels, and monitor the outcomes.
21. District Health Boards with poorly serviced areas need to develop strategies to address service delivery and health care provision for respiratory diseases.
22. District Health Boards need to have specific strategies for Maori children and young people.
23. District Health Boards need to have specific strategies for Pacific children and young people.
24. Develop the capacity of Maori health work force to work with tamariki and their whanau.
25. Develop strategies to improve early childhood nutrition, including breast-feeding rates.
26. Implement a 'Systems Approach' to identify smoking and smoke exposure in every patient, including exposure of children to tobacco smoke in the home. Identification needs to be patient-friendly but should ensure that all involved health professionals are aware that patients are exposed to this major risk to health.

27. Improve policies, education and programmes to aid smoke addicted people to reduce and give up smoking to reduce the smoke exposure of infants. This would include support of smoking cessation among adults and parents, using a systems approach.
28. Develop more accessible programmes to prevent and treat obesity.
29. Implement widespread education of the public and health professionals about the conditions in this document.
30. Continuing implementation of TB control programmes to detect infectious cases of TB before spread to children occurs and implementation of programmes in the health system, immigration and housing to help reduce spread of disease.
31. Development of community-based education programmes in at risk groups to remove the stigma of TB and bronchiectasis.
32. Increase general public and medical staff awareness of key respiratory symptoms including snoring, and persistent productive or mucousy cough in a child of more than 6-8 weeks duration.
33. Implement the Paediatric Society of New Zealand documents:
 - a) 3 best practice evidence-based guidelines 2005:
 - (i) Management of asthma in children aged 1-15 years;
 - (ii) Wheeze and chest infection in infants under 1 year; and (iii) Assessment of sleep disordered breathing in childhood.
 - b) Through the Eyes of the Child, Respiratory Services 1998 with update, Respiratory Service Guidelines 2003.
 - c) National Review of Sleep Services for Children and Young People, 2002.

For universities, other tertiary education institutions and health providers:

34. Develop the capacity of Maori health work force to work with tamariki and their whanau.
35. Develop the capacity of Pacific health work force to work with their children and families.
36. Promote further research into prevention of pneumonia, bronchiectasis and sleep breathing problems in children.

