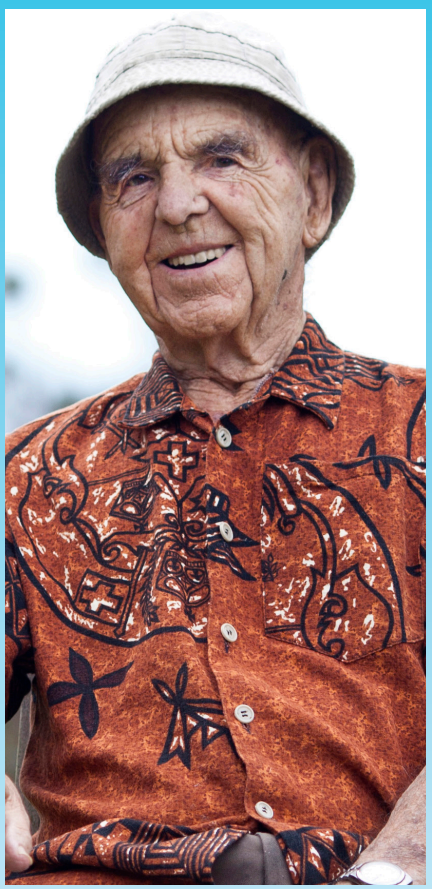

The impact of respiratory disease in New Zealand: 2014 update

UNIVERSITY of OTAGO
Te Whare Wānanga o Otāgo
NEW ZEALAND
SAPERE AUDE

te hā

the asthma foundation
Better respiratory health for New Zealanders

NATIONAL ASTHMA COUNCIL AUSTRALIA
ASTHMA FOUNDATION (NZ)
SENSITIVE CHOICE
SUPPORTING ASTHMA CARE

This report was prepared for the The Asthma and Respiratory Foundation of New Zealand (Inc).

Written by Dr Lucy Telfar Barnard, Professor Michael Baker, Dr Nevil Pierse and Jane Zhang

Reviewed by Dr Kyle Perrin, Teresa Demetriou and the Asthma Foundation Expert Advisory Group

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About the Asthma Foundation

The Asthma Foundation is New Zealand's sector authority on asthma and other respiratory illnesses. We advocate to government and raise awareness of respiratory illnesses, fund research for better treatments and educate on best practice. We provide resources on our website and support our affiliated asthma societies and trusts in providing education, support and advice. For more information, visit the Asthma Foundation's website http://www.asthmafoundation.org.nz/.

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3. EXECUTIVE SUMMARY

Overview

Chronic and serious respiratory illnesses continue to make a substantial contribution to New Zealand's health burden. Respiratory diagnoses account for 1 in 8 of all overnight hospitalisations in New Zealand.

This report covers six respiratory disease indicators: asthma, bronchiectasis, childhood bronchiolitis and pneumonia, chronic obstructive pulmonary disease (COPD), and total respiratory disease. We report incidence, prevalence, risks and determinants, using the most recent available data from the New Zealand Health Survey, and pharmaceutical prescriptions, hospitalisations and mortality datasets, over the period 2000-2013.

Across the study period, hospitalisation rates have increased for bronchiectasis, childhood bronchiolitis and total respiratory disease, remained static for asthma and COPD, and declined for childhood pneumonia. Mortality rates increased for bronchiectasis, remained static for childhood pneumonia and declined for asthma, COPD and total respiratory disease.

Across all respiratory health indicators, by the far the most relentless and disturbing pattern was the high degree of inequality, across both the socio-economic spectrum and different ethnic groups.

All indicators showed inequalities in health by ethnic group. Pacific peoples' respiratory health was consistently poorest across all indicators, followed by Māori, except for COPD, where Māori rates were higher. Asian peoples' rates, however, were often lower than the non-Māori, non-Pacific, non-Asian (non-MPA) comparison group.

Respiratory health inequalities by socio-economic deprivation were marked, with differences between the most and least deprived NZDep quintiles ranging from a rate ratio of 2.5, for childhood pneumonia, to 5.4, for childhood bronchiolitis. The effect of deprivation was near exponential: while differences across the first four quintiles were not always significant, all hospitalisation categories showed large and significant differences between the fourth and fifth quintiles.

There were also patterns in hospitalisation difference across age and gender, with all childhood rates higher in boys than girls, while most adult rates were higher in women than in men.

There was also a clear north to south gradient across all indicator conditions except COPD, with Counties Manukau most commonly experiencing the highest hospitalisation rates.

Total respiratory disease

The 2013 rate of respiratory hospitalisations was 1563.1 per 100,000 people. Total respiratory hospitalisations have been increasing at a rate of 14.3 hospitalisations per year over the study period. However, this increase appears as a two-tier effect – rates remained within the same range from 2000 to 2007, then increased sharply in 2008, and stayed at the higher rate to the end of the study period in 2013. Conversely, mortality rates declined over the same period, from 57.6 to 56.7 per 100,000 people per year

Respiratory hospitalisation rates were highest for the children aged under 15 years and adults aged over 65 years. Mortality rates were highest in adults aged over 65.

Respiratory hospitalisation rates were highest for Pacific peoples, with rates 2.6 times higher than for non-MPA. Māori rates were also significantly higher (rate ratio 2.1), while rates were lower for Asian peoples (rate ratio 0.9). These trends were repeated across all age groups. For mortality, however, Māori rates were highest.

There was a significant deprivation gradient in total respiratory hospitalisations and mortality. Hospitalisation rates in the most deprived NZDep quintile were 2.9 times higher than rates in the least deprived quintile, while mortality rates were 2.1 times higher. The deprivation gradient was present for both rates in all ethnic groups, but Pacific peoples' hospitalisation rates stood out further: Pacific peoples' living in the wealthiest quintile areas had higher respiratory hospitalisation rates than non-MPA people in the most deprived quintile areas.

Asthma

Medicated asthma prevalence showed no change during the study period in adults or children. The hospitalisation rate for asthma peaked in 2009 at 210 per 100,000 people, but overall showed no significant change. Asthma mortality rates, however, have declined by a small but significant amount over the study period, sitting at 1.6 deaths per 100,000 in 2011, compared to 1.9 in 2000.

Risks for asthma were consistent across measures. Prevalence, hospitalisation and mortality were significantly higher in Māori, and in more socioeconomically deprived neighbourhoods. In children, all asthma measures were higher for boys, whereas for adults, asthma measured higher for women.

Socio-economic differences in asthma hospitalisation rates saw rates 3.2 times higher in the most deprived NZDep2006 quintile 9-10, and 2.0 times higher in NZDep2006 quintile 7-8, compared to the wealthiest NZDep2006 quintile. These differences were almost identical to mortality differences, but roughly double the difference seen for prevalence.

2013 asthma hospitalisation rates were lower than the national average in all South Island DHBs, and higher than the national average in Auckland, Counties Manukau, Bay of Plenty, Lakes, and Whanganui DHBs, while mortality rates were highest in the Tairawhiti DHB.

Bronchiectasis

Although bronchiectasis is the rarest of the indicator conditions, the bronchiectasis hospitalisation rate increased by a significant 30% over the study period. Mortality rates also increased.

Being of Māori, Pacific or Asian ethnicity was a significant risk factor for bronchiectasis hospitalisation and death. The greatest disparity in hospitalisations by age and ethnicity was for Pacific children aged under 15 years, whose bronchiectasis hospitalisation rates of 62.5 per 100,000 were 7.4 times higher than for non-MPA. Overall, Pacific peoples were 6.4 times more likely to be hospitalised than non-MPA, Māori were 3.7 times more likely to be hospitalised, and Asian peoples 2.3 times more likely. Mortality differences were similar.

Bronchiectasis also showed strong socio-economic disparity, with hospitalisation rates 3.2 times higher in the most deprived compared to the least deprived neighbourhoods, and mortality rates 2.7 times higher. The steep hospitalisation rate increase for the most deprived quintile was more marked in Māori, Pacific and Asian ethnic groups.

Childhood bronchiolitis

Childhood bronchiolitis hospitalisation rates increased by nearly a third over the study period. Pacific rates were 4.3 times higher than non-MPA, and Māori rates 3.4 times higher. The rate for the most deprived quintile was 5.4 times the rate of the least deprived quintile. The combined effect of ethnicity and deprivation meant that Māori and Pacific children in the most deprived quintile were more than eight times as likely to be hospitalised as non-MPA children in the wealthiest quintile.

There were few deaths from childhood bronchiolitis, but all 9 deaths were in NZDep deciles 5-10; and were concentrated in Māori and Pacific children.

Childhood pneumonia

Overall, the outstanding differences in childhood pneumonia rates were for Pacific peoples, and for those in the most deprived quintile. Pacific children's pneumonia rates were 3.1 times higher than the non-MPA rate for hospitalisation, and 6.2 times higher for mortality; Māori children's rates were 1.6 and 5.4 times higher respectively. Hospitalisation rates for Asian children were 1.2 times higher. These differences were greater in children aged under 5 years.

Childhood pneumonia rates were highest in the most deprived areas, with hospitalisation rates 2.5 times higher in the most deprived NZDep quintile than in the least deprived. Over half of deaths were in the most deprived quintile.

COPD

COPD hospitalisation and mortality rates were lower for men than women in the 40 to 64 year age group, but higher for men in the 65+ age group. COPD rates were highest for Māori, at 3.5 times the non-MPA rate for hospitalisation and 2.2 times the rate for mortality. Pacific peoples' hospitalisation rates were 2.8 times higher, though mortality rates were not significantly different. Both measures were lowest for Asian peoples.

There was a strong deprivation gradient, with COPD hospitalisation rates 5.1 times higher in the most deprived NZDep quintile than in the least deprived, and mortality rates 2.7 times higher. The gradient was apparent for all ethnic groups..

Unlike other indicator conditions, COPD was relatively evenly spread across the country. The highest DHB rates were for Lakes, and West Coast.

Costs

We estimated the minimum cost burden of respiratory disease to New Zealand to be $5.66b in 2011. Of this, $5.18b were indirect costs from mortality and disability affected life years, and the remaining $484.4m were direct costs from hospitalisations, prescriptions and doctors' visits. We have costed asthma separately, at $799.6m, with $155.0m in direct costs, and $644.7 in indirect costs from work days lost, disability affected life years, and mortality.

4. INTRODUCTION

4.1. BACKGROUND

This report was commissioned by the New Zealand Asthma Foundation. The Foundation aims to assist people with asthma and respiratory diseases through contributing to the development of public policy, education and funded research, through advocacy on behalf of all people with respiratory conditions and through raising awareness of respiratory conditions in New Zealand. It aims to reduce hospital admissions caused by asthma and other respiratory conditions by 25%, by 2025.

Respiratory illnesses contribute a large part of New Zealand's total disease burden, collectively accounting for 6.3% of total health loss, almost all from chronic obstructive pulmonary disease (COPD, 3.7%) and asthma (1.6%)[1].

The Asthma Foundation has previously published three reports relevant to the burden of respiratory disease in New Zealand:

- 'Trying to Catch Our Breath – The Burden of Preventable Breathing Diseases in Children and Young People'[2] (2006) covers asthma, bronchiectasis, pneumonia, pertussis, general smoking-related respiratory illness, bronchiolitis, tuberculosis and obstructive sleep apnoea. Rates reported covered different periods, with the most recent figures given depending on condition, between 1999 and 2004.
- The Burden of Asthma in New Zealand[3] (2002) reports mortality to 1994, hospitalisation rates to 1999, and pharmaceutical costs to 2000. Economic costs include data for a similar period (i.e. to 2000).
- Chronic Obstructive Pulmonary Disease and Lung Cancer in New Zealand[4] (2003) includes data to 2002.

4.2. AIMS

This report updates analysis from earlier reports in 2002, 2003 and 2006; and identifies and measures indicator respiratory conditions to serve as markers for changes in levels of respiratory disease in New Zealand.

This report aims to:

1. identify a useful set of key indicators for ongoing monitoring of respiratory disease in New Zealand, including trends and health impacts;
2. choose indicators that build upon previous reports on the burden of respiratory disease in New Zealand focussing on COPD, asthma, bronchiolitis, and bronchiectasis;
3. provide key indicator data to support the development of the National Respiratory Health Strategy;
4. provide key indicator data which can be used as an advocacy tool to assist with raising the profile of respiratory health regionally and nationally;

5. provide key indicator data which can guide the Foundation in best use of resources in the future

The Foundation identified six conditions to include in this updated Impact Report. These are:

- Asthma (including asthma and wheeze in preschool children)
- Bronchiectasis
- Childhood bronchiolitis (<5 years)
- Childhood pneumonia (<5 years, 5-14 years)
- Chronic Obstructive Pulmonary Disease (COPD) in older adults (45-64, 65+)
- Total serious respiratory disease (i.e. hospitalisations and death)

Other conditions included in previous reports but not in this report include tuberculosis, pneumonia, pertussis, and lung cancer. Lung cancer makes a large contribution to New Zealand's health burden, but is well-monitored elsewhere. Tuberculosis, pneumonia and pertussis will be included in total respiratory disease but do not individually have sufficient health impact to warrant inclusion in the 2014 report.

The University of Otago also recommended including obstructive sleep apnoea as an indicator condition, as the Ministry of Health Burden of Disease report includes the condition as a contributor to overall health loss, and also a risk factor for other life-limiting conditions. Unfortunately, due to the absence of any data on the condition, it was not a viable indicator of respiratory health. However, we recommend future monitoring checks for and reports on any new data published on obstructive sleep apnoea.

5. INDICATOR SELECTION AND METHODS

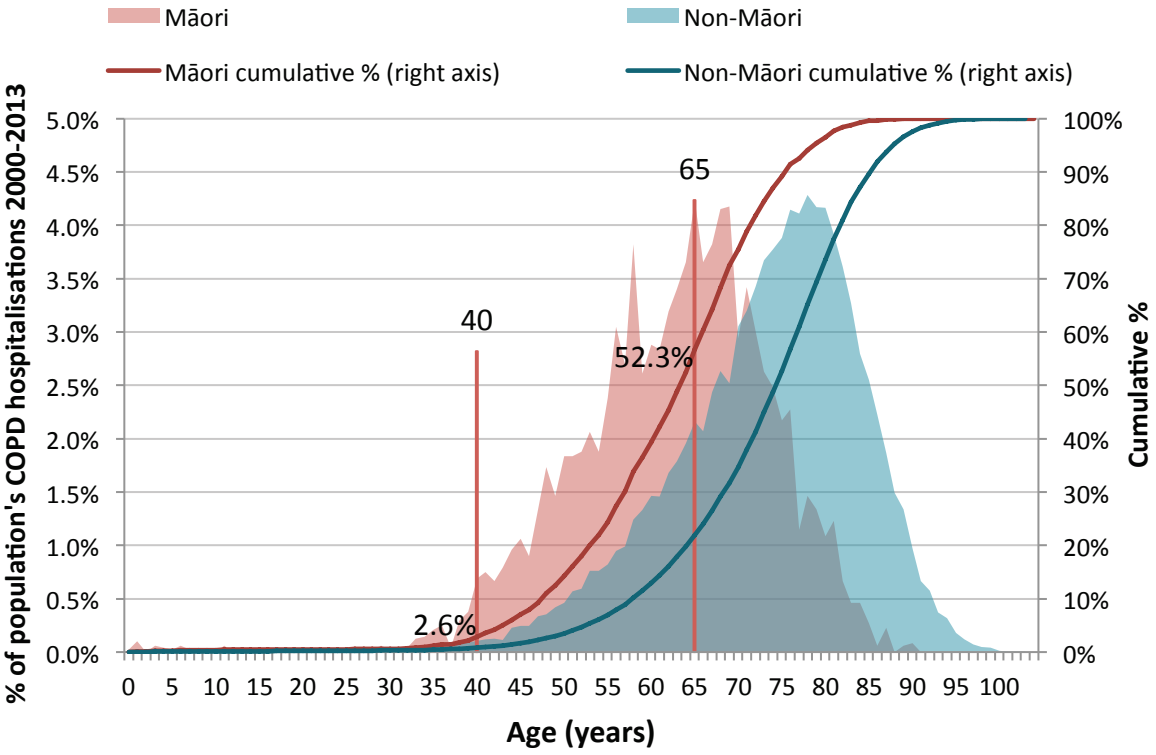
5.1. CONDITIONS

All respiratory conditions for monitoring were nominated by the Foundation. The conditions selected had been previously identified as making the largest contribution to New Zealand's respiratory burden[5].

Age groups for bronchiolitis and COPD were selected on the basis of disease distribution. 99% of bronchiolitis cases in the study period occurred in children under 5 years. For COPD hospitalisations, we selected a starting age of 40 as a round figure that would capture over 95% of cases (see Figure 1) in the ethnic group with the highest COPD hospitalisation rate (Māori).

ICD-10 codes used to identify indicator conditions in the hospitalisation and mortality data are included in Appendix 2.

Figure 1. Age distribution of COPD hospitalisations 2000-2013, Māori and non-Māori.



5.2. DATA SOURCES

The primary data sources for this report are administrative datasets, specifically the national pharmaceutical, hospitalisation and mortality data collections. Additional data on asthma

was included from the Ministry of Health's published results of the New Zealand Health Survey 2011-2012.

Table 1. Data sources for indicator conditions and risk factors.

Indicator condition	Indicator dataset	Measureable risk factors/determinants
Asthma	NZ Health Survey	Age Sex Ethnicity DHB Region NZDep
All measured indicators	NMDS (Hospitalisations)	
All measured indicators	Mortality Collection	
Total respiratory illness	Pharmaceutical Collection	

Future reports should also include NZ Health Survey data on consultations with respiratory specialists, and asthma prevalence by income, tobacco smoke exposure, obesity and household crowding. Timing prevented the Ministry of Health from providing that data for this report.

5.3. BURDEN

New Zealand's respiratory burden is measured here in three ways: the incidence of illness, the prevalence of illness, and the costs of illness. Incidence and prevalence time trends are reported from 2000, as being a rough average of the final date in earlier reports, and also the date of introduction of the ICD-10 clinical coding system.

5.3.1. INCIDENCE

Incidence is measured as the number of events per 100,000 of people per year. We have reported the incidence of hospital events and deaths for all indicator conditions. We have also reported the incidence of new cases of severe (i.e. hospitalised) bronchiectasis and COPD.

5.3.2. PREVALENCE

Prevalence measures the percentage of people in the population who have a given condition. Incidence and prevalence differ because incidence measures events, whereas prevalence can also measure chronic conditions. We have measured the prevalence of medicated asthma, bronchiectasis, and COPD.

The prevalence of medicated asthma is reported using Ministry of Health published data from the New Zealand Health Surveys in 2006-07 and 2011-12 and 2011-13. The survey questions were "Have you ever been told by a doctor that you have [your child has] asthma?", combined with any treatment answer to "What treatments do you now have [does your child now have] for asthma?"

Minima of the current prevalence of childhood bronchiectasis and total COPD were estimated as a cumulative count of individuals alive in 2012 who had been hospitalised with the condition since 1988.

5.3.3. COSTS

We report costs for 2011, as this is the most recent year for which mortality data was available.

The cost of asthma to the New Zealand economy was estimated at $349m in 2000.[6]

We have used more restricted data to measure the private and public costs of asthma and total serious respiratory disease.

Private costs have been estimated using pharmaceutical data. In addition to the "patient contribution" recorded in the data, we assume a corresponding doctor's visit for each non-repeat prescription. The New Zealand Health Survey 2011/12 reported the average cost of a GP visit for a child to be $21 for the 45% of parents who were charged; the other 55% of visits were free. We therefore assume an average GP visit cost of $9.45, (45% x $21). For adults we assume the NZHS 2011/12 reported average cost of $32.

Public costs have been estimated using pharmaceutical, hospitalisation and mortality data, and additional costs extrapolated from the 2013 New Zealand census, Statistics New Zealand data on the working population, the New Zealand Health Survey and a report on asthma rates in primary care[7]. Mortality costs are estimated from years of life lost based on average life expectancy at age of death[8], multiplied by a value per life year of $150,000[9].

Hospitalisation costs are summed from all 2011 publicly-funded hospitalisation discharges.

The method for calculating the total cost of pharmaceuticals is described in Telfar Barnard et al 2011[9]. The total pharmaceutical cost is the sum across all included prescriptions of:

Retail subsidy + dispensing fee - estimated 2011 Pharmac rebate

The estimated Pharmac rebate for 2011 was $161.5m total rebates/$924.8m expenditure[10] = 17.46%

The public cost of a doctor's visit was based on Ministry of Health standard GP subsidy of $31.11 for children aged under 6 years, $17.78 for children who were, or were children of, community services card (CSC) holders, $13.33 for CSC adults and non-CSC children 6-17.

As we did not have data on whether patients were CSC holders, we used 2008 figures on numbers of CSCs by category to estimate proportions of people aged 18 to 64, and 65+, with CSCs. We then applied these figures to proportions of people in NZDep deciles, and assigned

CSC subsidies to all people aged 6 to 64 in NZDep deciles 8 to 10, and to all people aged 65+ in deciles 6 to 10.

Estimating adult prescription and doctors' visit costs

In 1996/97, there were 126,800 GMS (GP medical subsidy) claims for treating children aged under 16 with asthma, and 106,300 for adults[11], giving a ratio of 1.19.

The ratio of child to adult asthma prevalence was 14.1/11.1=1.27.

Children aged under 15 were issued with 162,958 first (rather than follow-on/repeat) respiratory prescriptions in 2011, giving a rate of 14.3 prescriptions per 100 people. Applying this rate, reduced by the ratio of child to adult asthma prevalence (14.1:11.1) gives a figure of 503,492 first prescriptions for adults, or 50.2% of adult respiratory prescriptions.

The WaiMedCa study in 1994 found that 60.9% of respiratory prescriptions were for asthma.[12]

We have used the lower 50.2% figure as representing a more conservative estimate of adult asthma prescription rates.

Estimating the cost of days off school

The Home Heating study found children with asthma had 2.2 additional days off school per winter, compared to children without asthma. Analysis of hospitalisations for the period 2000 to 2007 found the winter, term-time hospitalisation rate for asthma in children under 15 years to be 98% of the rate for non-winter term-time hospitalisations. If the same ratio applies to days off school, 2.2 additional days off school in winter would mean 2.2 additional days off school in non-winter, and a total of 4.4 additional days off school per year. This is a higher estimate than the 1.6 additional days derived from 1993 NZHS figures.[13]

We have costed each day off school conservatively, as 8 hours at half the 2011/12 adult minimum wage of $13.50/hr.

Cost of days off school=[Asthma prevalence in under 15 year olds] * [population under 15] * [additional days off school] *[0.5*adult minimum wage]

=0.141 * 870,486 * 4.4 * $6.75

= $3,645,334.22

Estimating the cost of days off work

We used the same method to calculate the cost of days off work as used by Nick Wilson in 2000.[6] As the prevalence of asthma had not changed since then, we updated the figures by the increase in the average wage, and the increase in the working age population.

Estimating the cost of Emergency Department and Outpatient visits

We estimated the cost of Emergency Department (ED) and Outpatient (OP) visits by extrapolating from data in the primary care cohort to the total population. Asthma prevalence in that cohort was 4.8%, and asthma patients averaged 2.17 ED or OP visits each in the study year. The cost of an ED or OP visit was estimated at $254.85. Working from the 2013 New Zealand census population of 4,353,192, we estimated the total cost of ED and OP visits to be $53,247,667.

Estimating the cost of Years Lost to Disability (YLDs)

In 2001, Holt and Beasley estimated the cost of years lost to disability for asthma to be $340million. This figure was based on an estimated 17,000 YLDs at 20% of the $100,000 value of a life-year lost. The Ministry of Health estimated YLDs from asthma in 2006 to be 13,362. We do not have a more recent figure than 2006, but as asthma prevalence is unchanged since then it represents a better estimate than the 2001 figure. Increasing the 13,362 by the 5.07% increase in the population from the 2006 to 2013 censuses takes the current estimate of YLDs to 14,039. With the value of a life year now at $150,000, and applying the same arbitrary 20% value as Holt and Beasley, the cost of YLDs is estimated at $421,159,550.

The estimate of YLDs from total respiratory disease in 2006 was 34,581. Allowing for the population increase would take this estimate to 36,552. Respiratory hospitalisation rates have increased since 2006, so this should be a conservative estimate. At 20% of $150,000 per YLD, the YLD cost of total respiratory disease is estimated at $1,096,563,510.

6. NEW ZEALAND'S RESPIRATORY DISEASE BURDEN

6.1. LITERATURE

Because population prevalence data was available only for asthma and not for other indicator conditions, we conducted a focussed literature review seeking evidence on New Zealand rates and prevalence of the indicator conditions.

Our criteria for inclusion in the review were that the literature report original research measuring the rate or prevalence of the indicator condition (rather than including the rate or prevalence reported from another study) in the age-group(s) included in this report; and that the research was conducted in New Zealand after 31 December 1999.

We searched Medline using the search terms "New Zealand" AND ("rate" OR "prevalence") combined with each of the indicator conditions: "asthma OR wheeze"; "bronchiectasis"; "bronchiolitis"; "pneumonia"; "COPD OR 'chronic obstructive pulmonary disease'"; "sleep apnoea"; "respiratory AND (illness OR disease OR condition OR hospitalisations OR mortality OR death)"; with each search limited to publications from 2000 onwards, and limited to humans. There was no need to limit the search by language as all results were published in English.

This search turned up very few results. There were 7 papers providing prevalence for asthma, which are tabled in Appendix 3. There was one paper each for bronchiectasis and COPD, but none on bronchiolitis, pneumonia, OSA, or total serious respiratory disease. It is of particular concern that there is no literature on the current prevalence of OSA, given that the Ministry of Health has identified it as a significant contributor to New Zealand's total health burden. There was one paper reporting research conducted in 1999 (outside the study period), which estimated OSA prevalence in adults aged 30-59 to be 4.4% for Māori men, 4.1% for non-Māori men, 2.0% for Māori women, and 0.7% for non-Māori women[14]. Although it is outside the study period, it is the only available figure for the New Zealand national prevalence of OSA.

6.2. ASTHMA

6.2.1. PREVALENCE

Published studies of New Zealand asthma prevalence were of limited use for determining long-term trends in asthma rates, as each study measured asthma in different ways and/or across different age groups. Published rates are summarised in Table A 91.

Prevalence for medicated asthma was sourced from the most recently published New Zealand Health Survey data. For current asthma prevalence, some data covers the 2011-13 period, while others cover only 2011-12. The International Study of Asthma and Allergies in

Children (ISAAC) last measured New Zealand child asthma rates in 2001-03. Their measures are different to the definition used by the New Zealand Health Survey, so even their most similarly defined measure of prevalence rates, "current wheeze", which was 22.4% in 6-7 year olds, and 27.6% in 13-14 year olds[15], cannot be directly compared with New Zealand Health Survey prevalence figures.

It should also be noted that diagnostic practice for childhood asthma has changed over the study period. Current guidelines mean children aged under 5 who present with wheeze are now less likely to be diagnosed with asthma than in the past[16], and in particular wheeze in children aged under 3 is now seldom described as asthma.

Rates for asthma prevalence by age group and sex, and by ethnicity, NZDep2006 quintile and DHB, for children and adults, are shown in Figures 2 to 7.

Trends over time

There were no significant changes in medicated asthma prevalence between 2006-07 and 2011-13, for either children or adults (Table 2 and Table 3).

Table 2. Total child medicated asthma prevalence 2006 – 2013, age-standardised

Year	Total		Boys		Girls	
	%	95% CI	%	95% CI	%	95% CI
2006-07	14.9	(13.5–16.3)	15.5	(13.6–17.7)	14.2	(12.5–16.1)
2011-13	14.1	(12.8–15.4)	16.3	(14.4–18.3)	11.8	(9.7–14.1)

Table 3. Total adult medicated asthma prevalence 2006 – 2013, age-standardised

Year	Total		Men		Women	
	%	95% CI	%	95% CI	%	95% CI
2002-03*			10.6		16.4	
2006-07	11.5	(10.7–12.2)	9.6	(8.7–10.7)	13.2	(12.1–14.4)
2011-13	11.1	(10.6–11.7)	9.0	(8.3–9.7)	13.2	(12.5–14.0)

*N.B 2002-03 rates are only for adults aged 15-44.

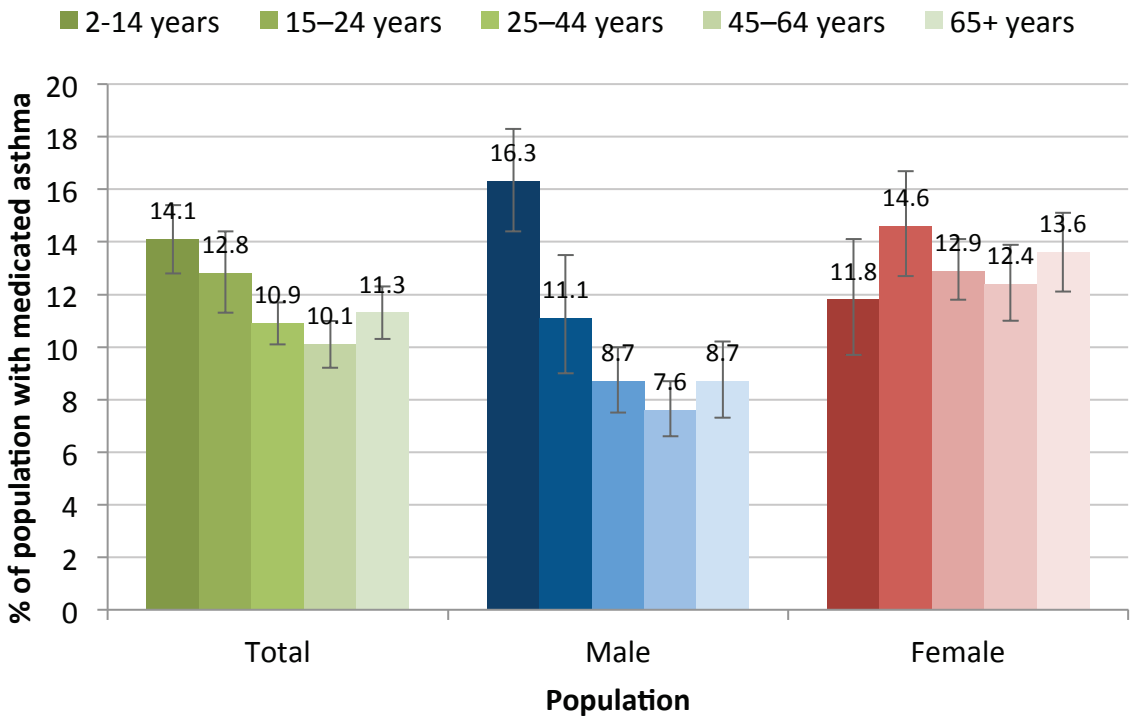
Risks and determinants

Boys had higher medicated asthma prevalence than girls (rate ratio 1.39); but men had lower prevalence than women (rate ratio 0.65).

Medicated asthma prevalence was significantly higher for Māori than for the rest of the population in both children (rate ratio 1.54) and adults (rate ratio 1.63). Prevalence was also higher for the most deprived NZDep2006 quintile than for the least deprived for both adults (rate ratio 1.33) and children (rate ratio 1.55)

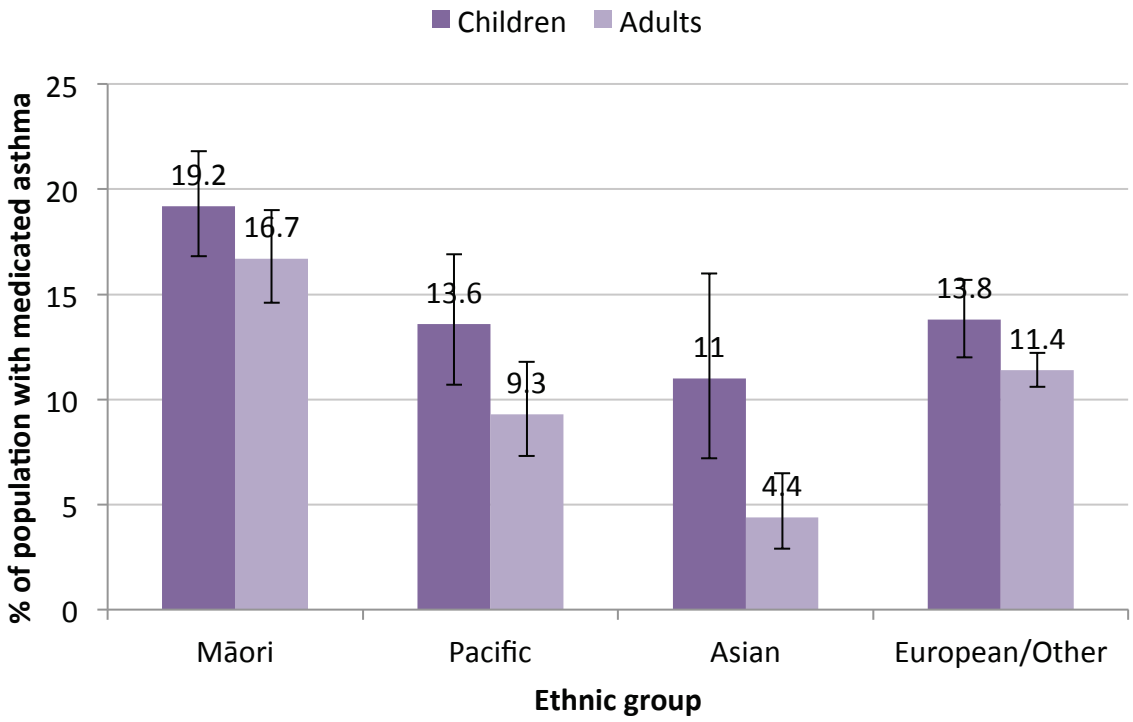
By region, medicated asthma rates were significantly higher than the rest of New Zealand in the Taranaki and Tairawhiti DHBs for children and in the Hutt DHB for adults; and significantly lower than the rest of New Zealand in the Auckland and Counties-Manukau DHBs (Table A 5).

Figure 2. Age-standardised medicated asthma rates by age group and sex, 2011-2013.



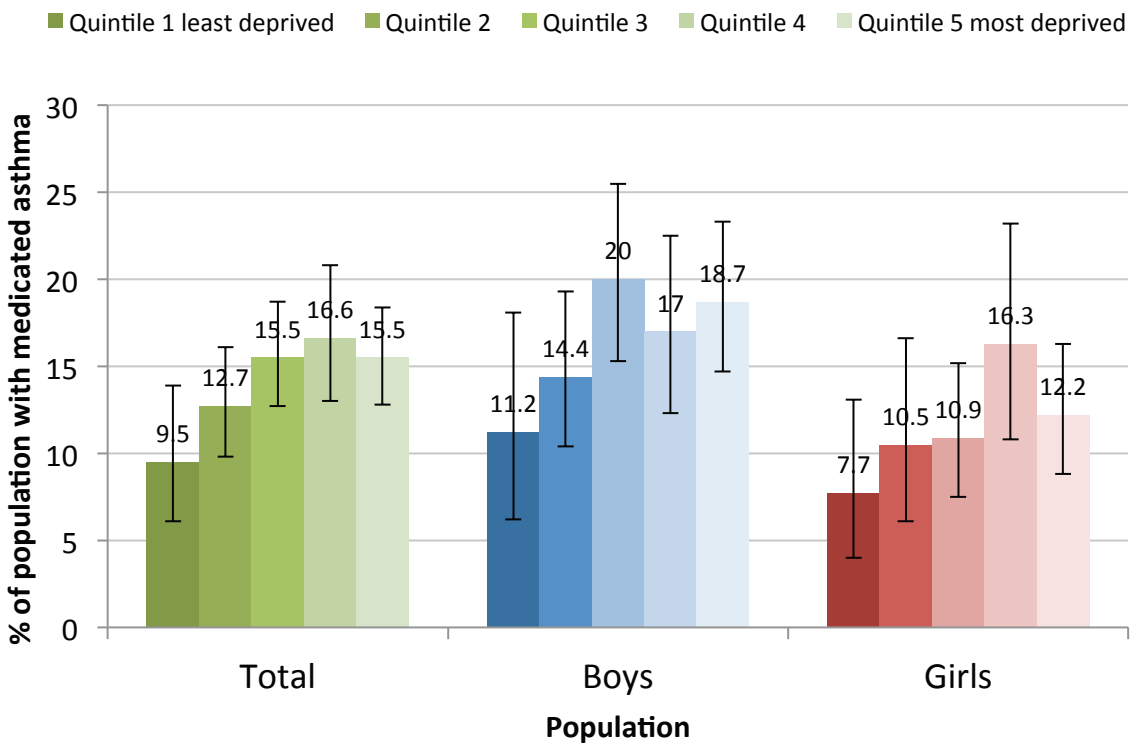
(See Table A 1 for data)

Figure 3. Medicated asthma prevalence by ethnic group 2011-2012, children and adults



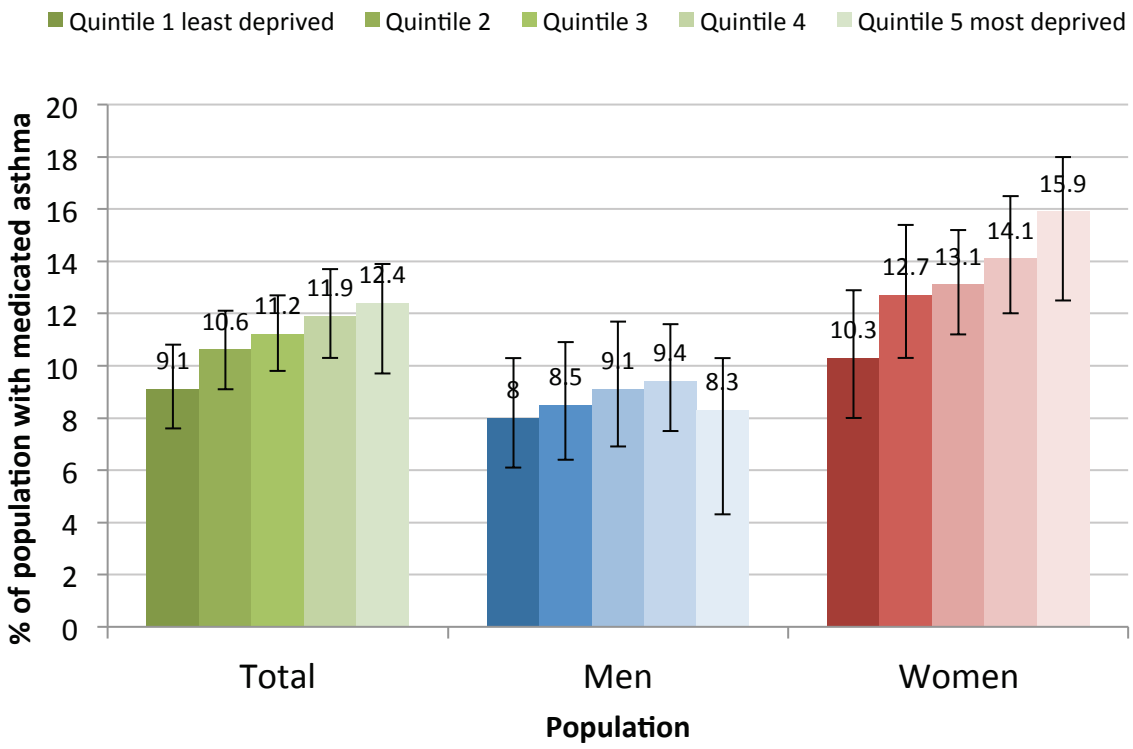
(See Table A 2 for data)

Figure 4. Child medicated asthma prevalence 2011-2012 by NZDep2006, unadjusted



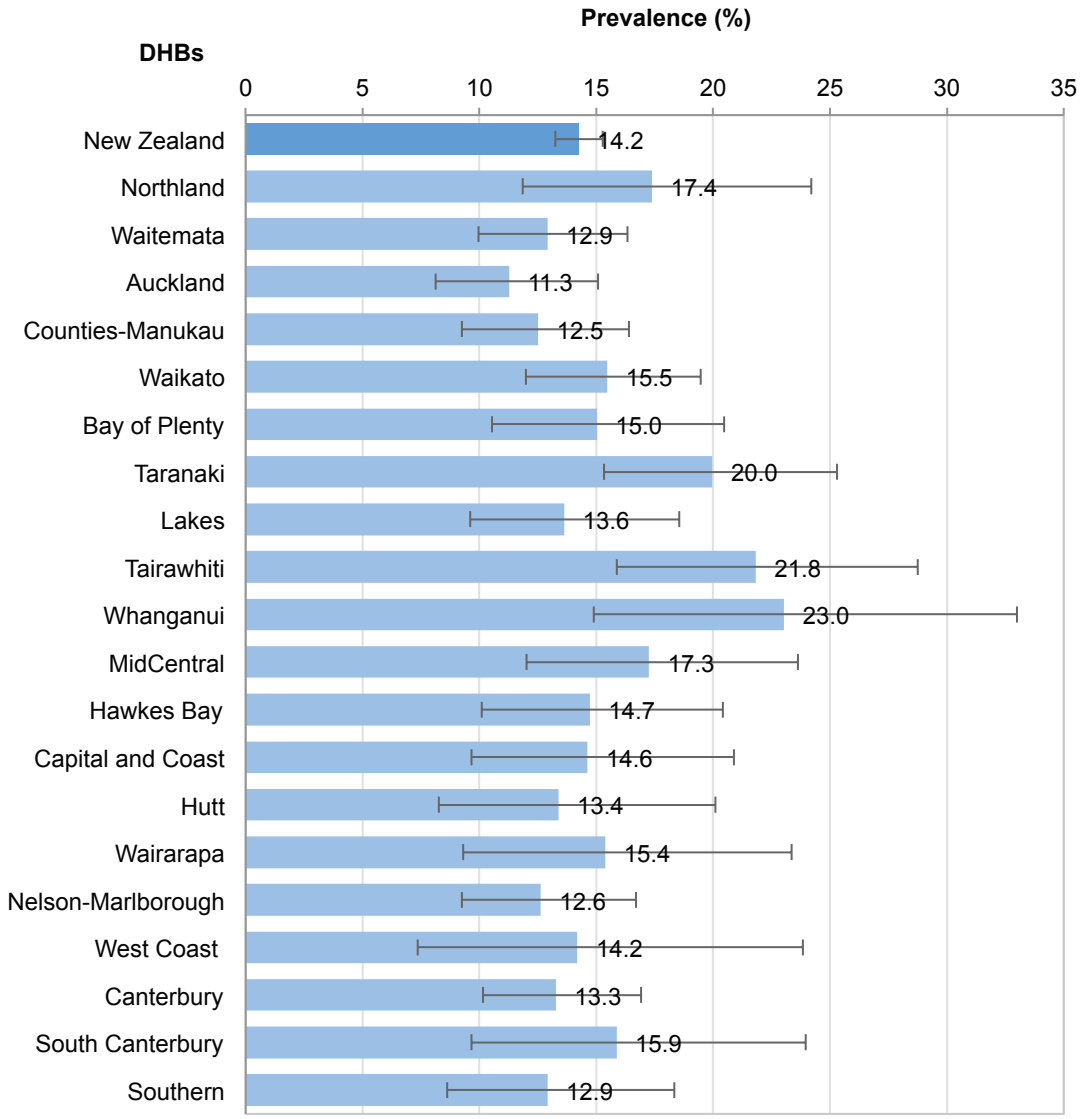
(See Table A 3 for data)

Figure 5. Adult medicated asthma prevalence 2011-2012 by NZDep2006, unadjusted



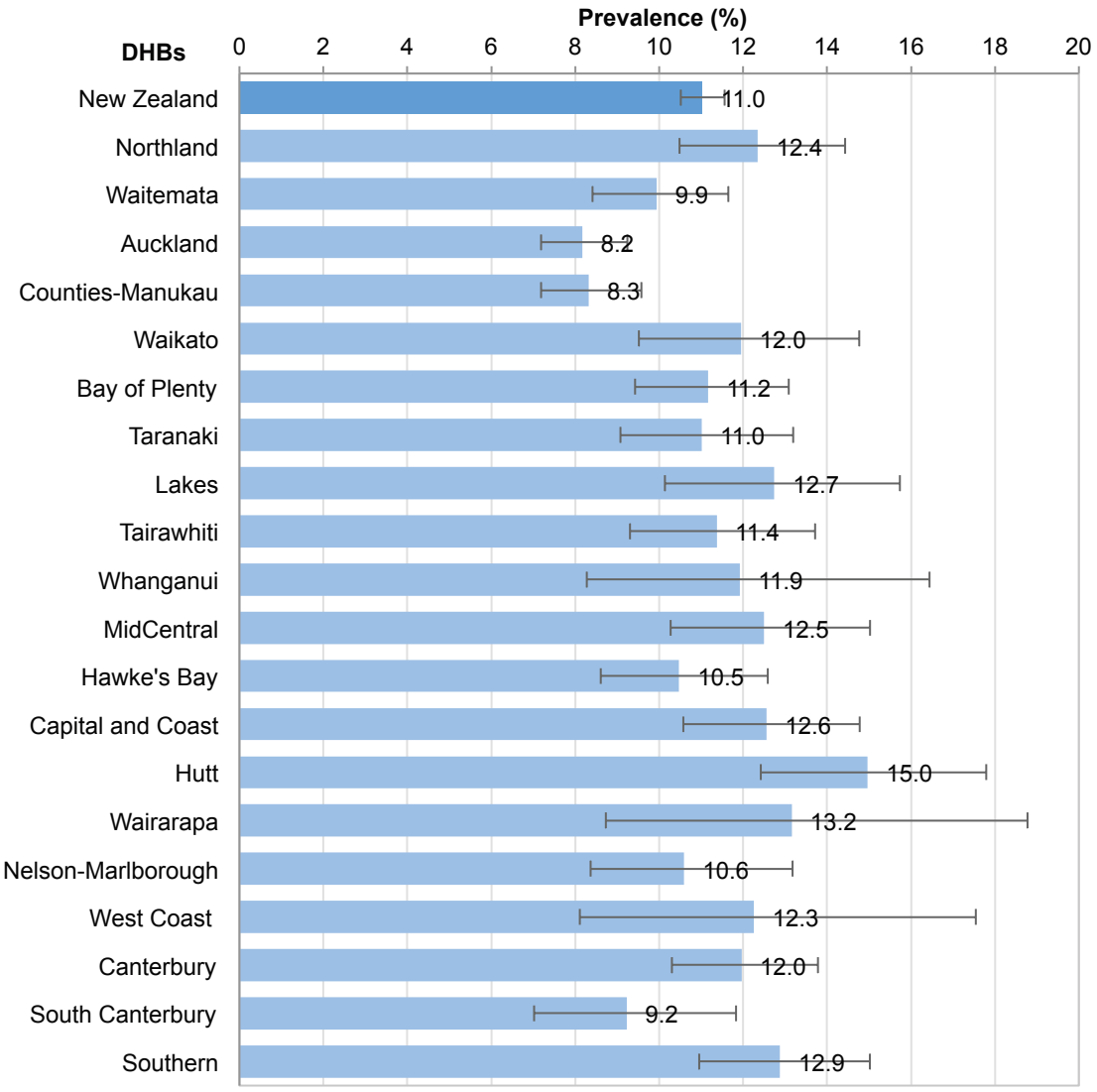
(See Table A 4 for data)

Figure 6. Children's (aged 2-14) medicated asthma prevalence by DHB, 2011-2013, unadjusted.



(See Table A 5 for data)

Figure 7. Adult medicated asthma prevalence by region 2011-2013, age-standardised



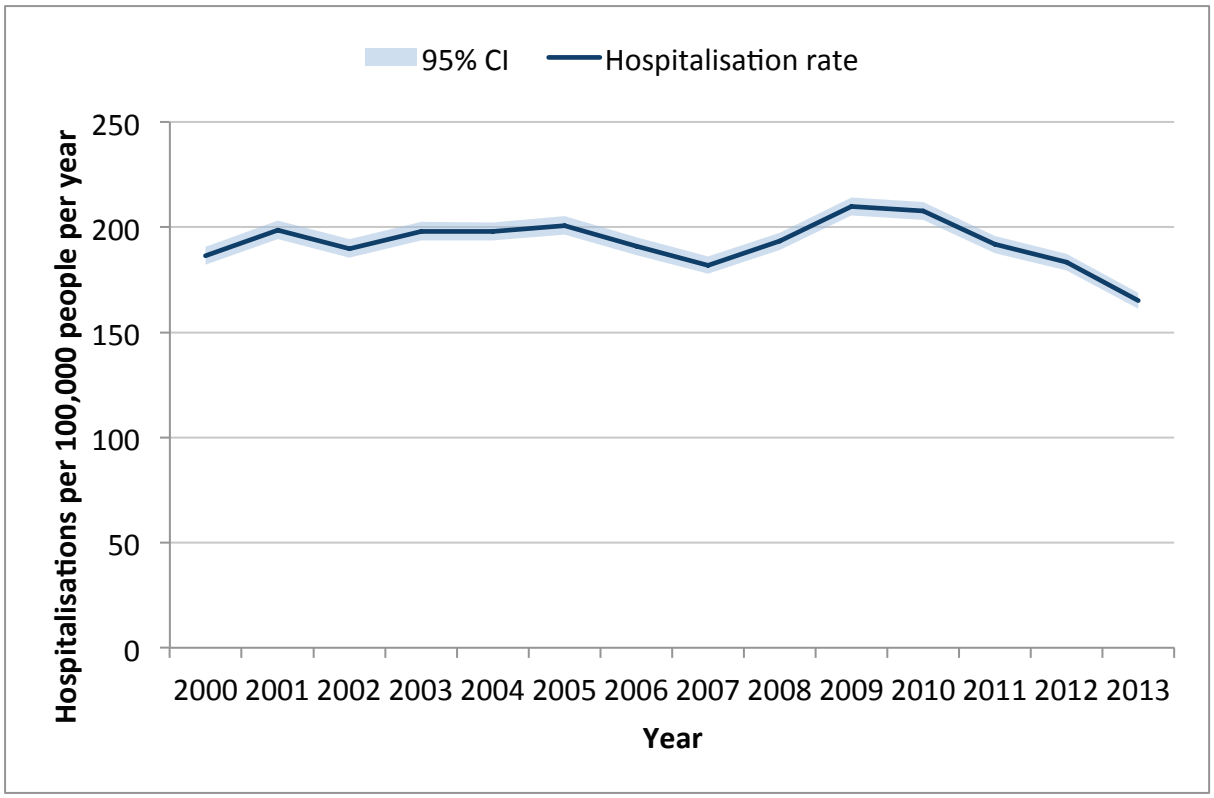
(See Table A 5 for data)

6.2.2. HOSPITALISATIONS

Trends over time

There was no significant trend in the asthma hospitalisation rate over the study period (Figure 8): while the hospitalisation rate in 2013 was lower than at any other point in the study period, it was too soon to tell whether the decline in hospitalisations from 2010-2013 represented a trend.

Figure 8. Asthma hospitalisations per 100,000 people per year, 2000-2013.



(See Table A 6 for data)

Risks and determinants

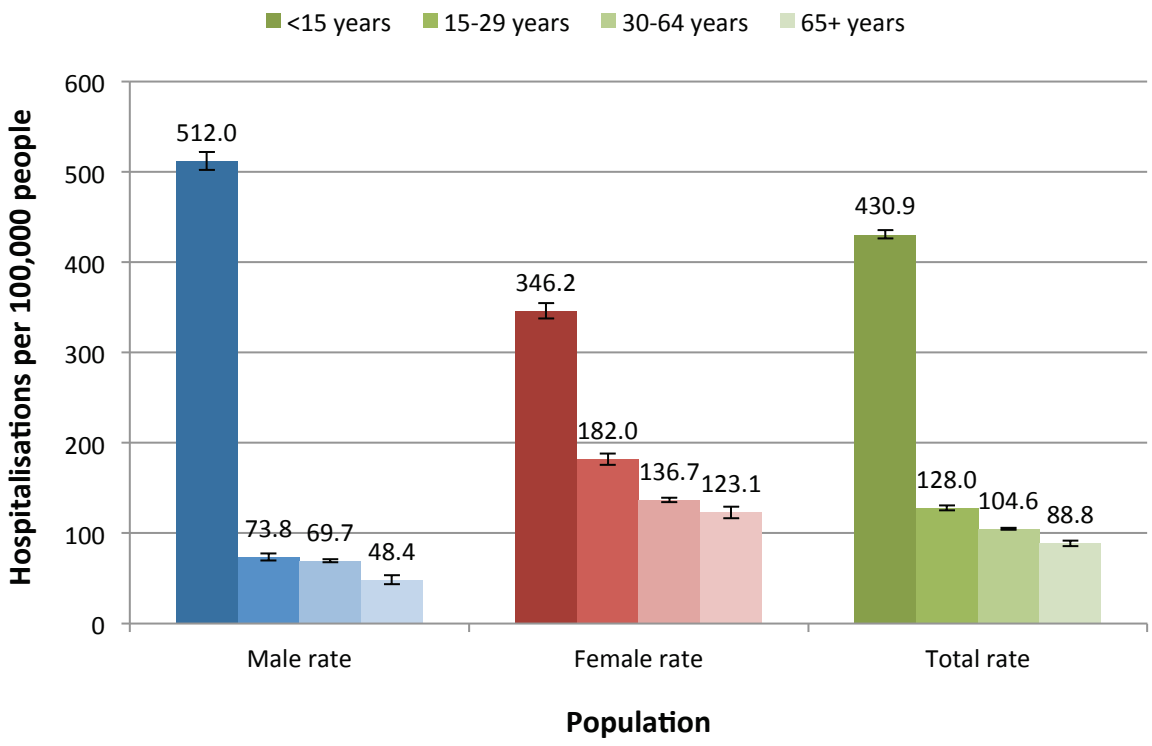
Most risks and determinants in prevalence were magnified in hospitalisation. Asthma hospitalisation rates in children under 15 years were more than 4 times the rates for adults aged 30-63 (rate ratio 4.12). Boys had substantially higher rates than girls (rate ratio 1.48), but men's asthma hospitalisation rates were half or less those of women (Figure 9, Table A 7).

Asthma hospitalisation rates by ethnic group reflect prevalence less clearly. While Māori rates are nearly 3 times higher than European/Other (rate ratio 2.94), Pacific rates are higher again (rate ratio 3.69), and Asian rates are also higher than European/Other (rate ratio 1.42). As these differences do not reflect differences in prevalence, they may indicate a health service gap (Figure 10).

There was a clear socio-economic gradient in asthma hospitalisation (Figure 12), with the most socioeconomically deprived areas having a hospitalisation rate more than 3 times that of the wealthiest areas (rate ratio 3.23).

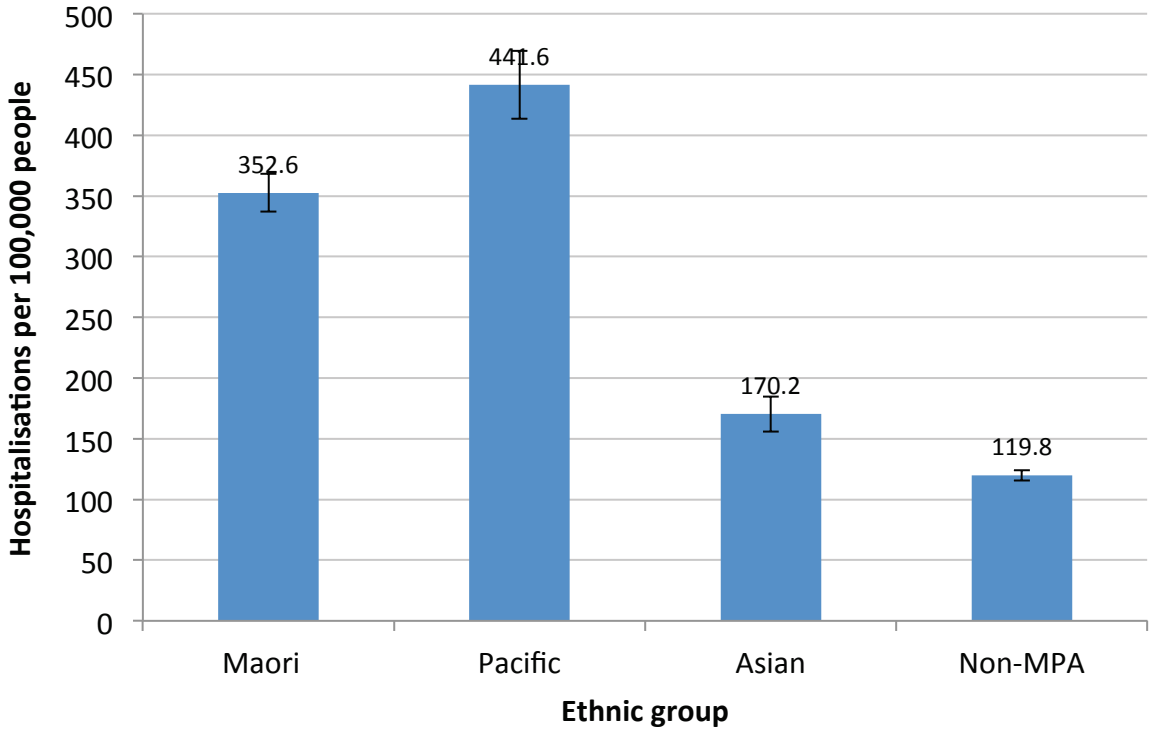
Hospitalisation also showed greater rate variation by DHB than was apparent in prevalence data. 2013 asthma hospitalisation rates were lower than the national average in all South Island DHBs, and higher than the national average in Auckland, Counties Manukau, Bay of Plenty, Lakes, and Whanganui DHBs (Table A 13).

Figure 9. Asthma hospitalisations per 100,000 people by age group and sex, 2013.



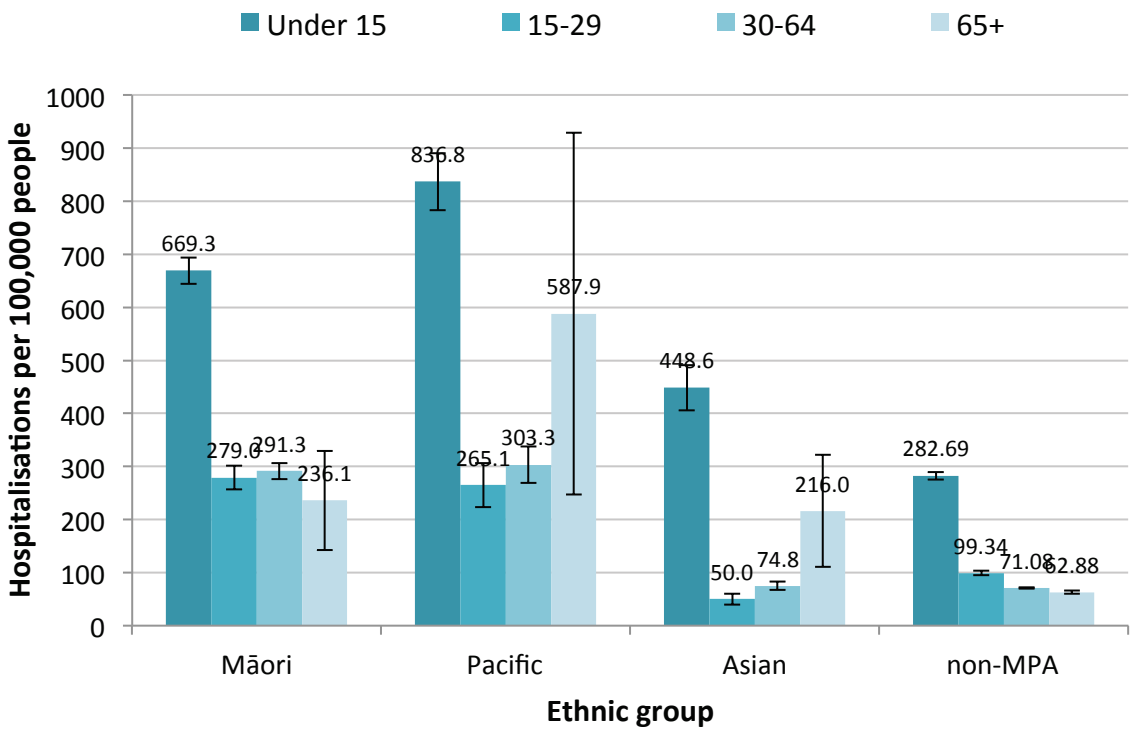
(See Table A 7 and Table A 8 for data)

Figure 10. Asthma hospitalisations per 100,000 people by ethnic group, 2013.



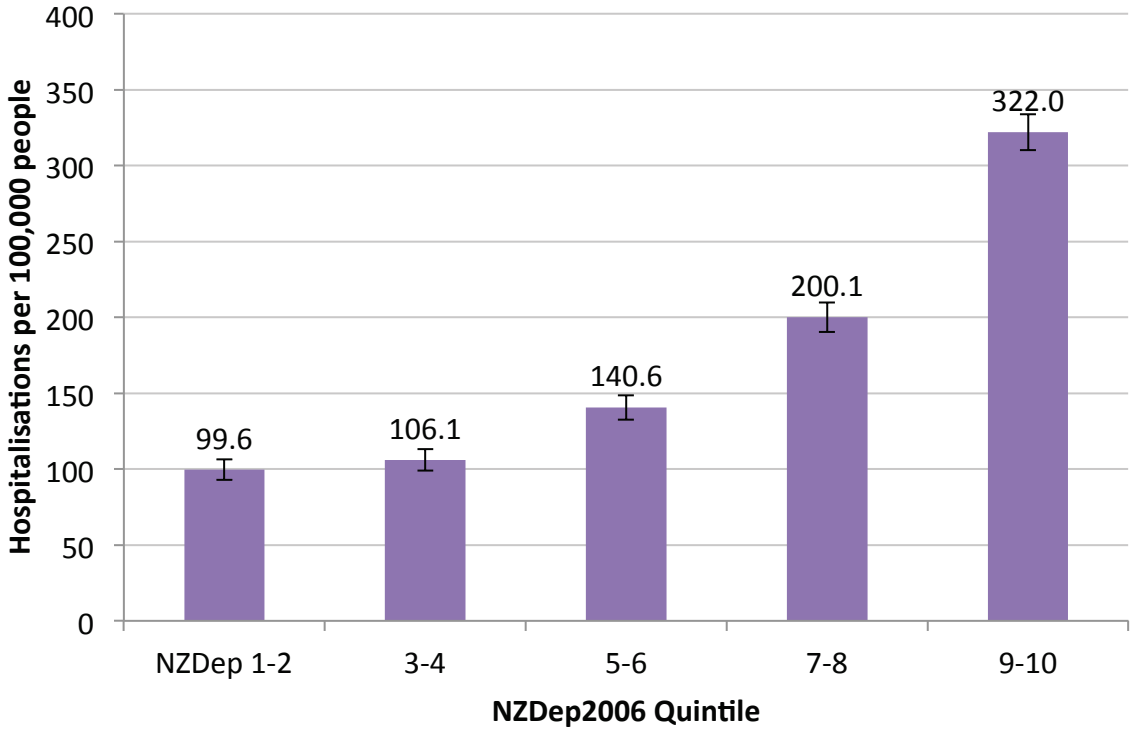
(See Table A 9 for data)

Figure 11. Asthma hospitalisations per 100,000 people by ethnic group and age group, 2013.



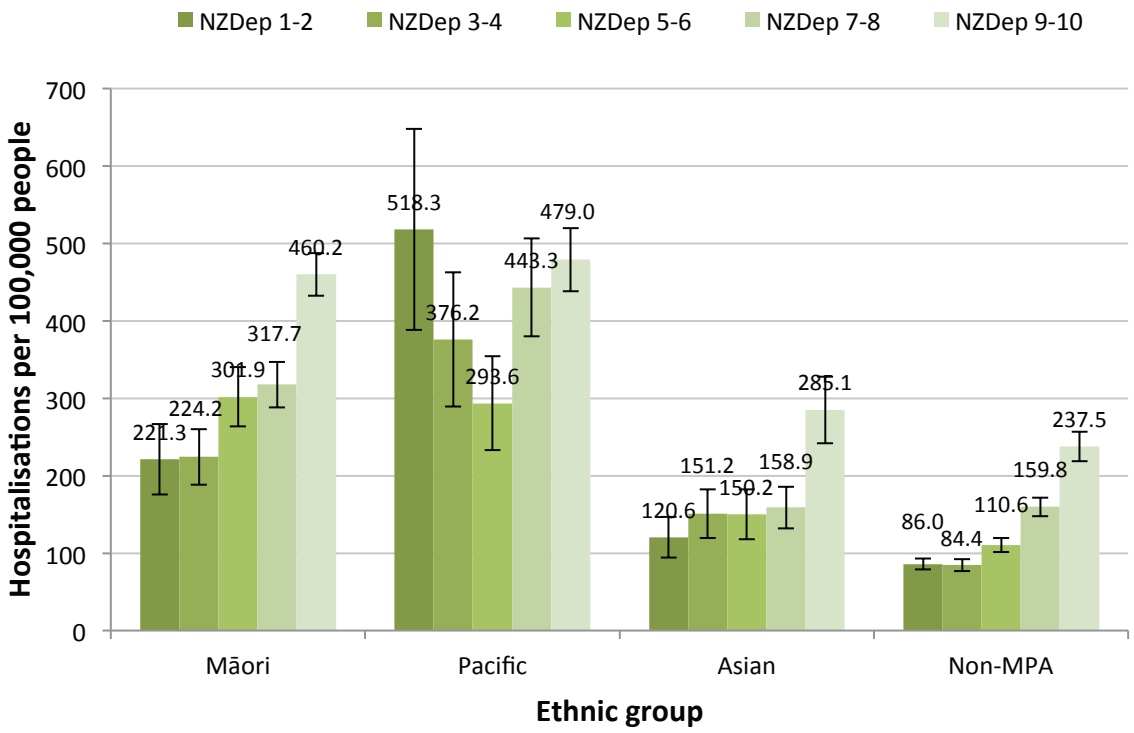
(See Table A 10 for data)

Figure 12. Asthma hospitalisations per 100,000 people by NZDep2006 quintile, 2013, age-adjusted.



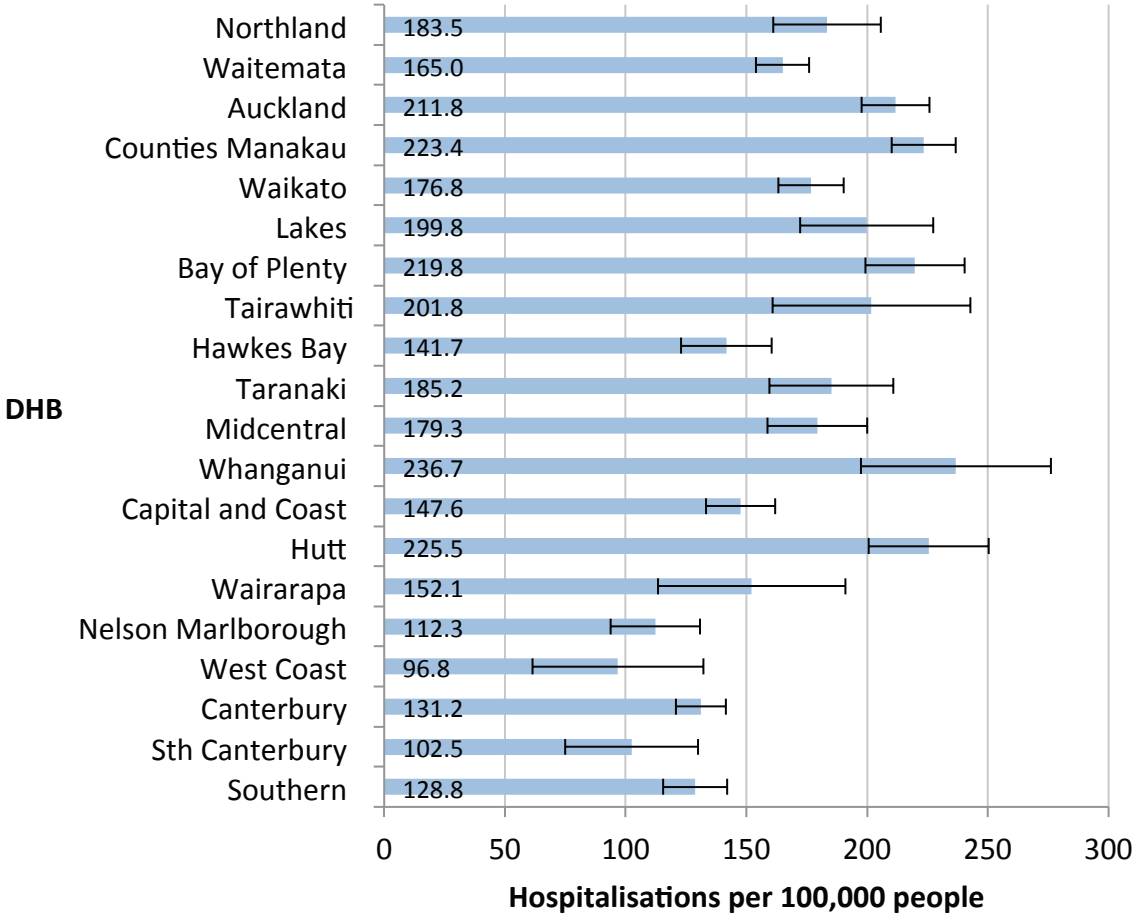
(See Table A 11 for data)

Figure 13. Asthma hospitalisations per 100,000 people by ethnic group and NZDep2006, 2013, age-adjusted.



(See Table A 12 for data)

Figure 14. Asthma hospitalisations per 100,000 people by DHB, 2013.

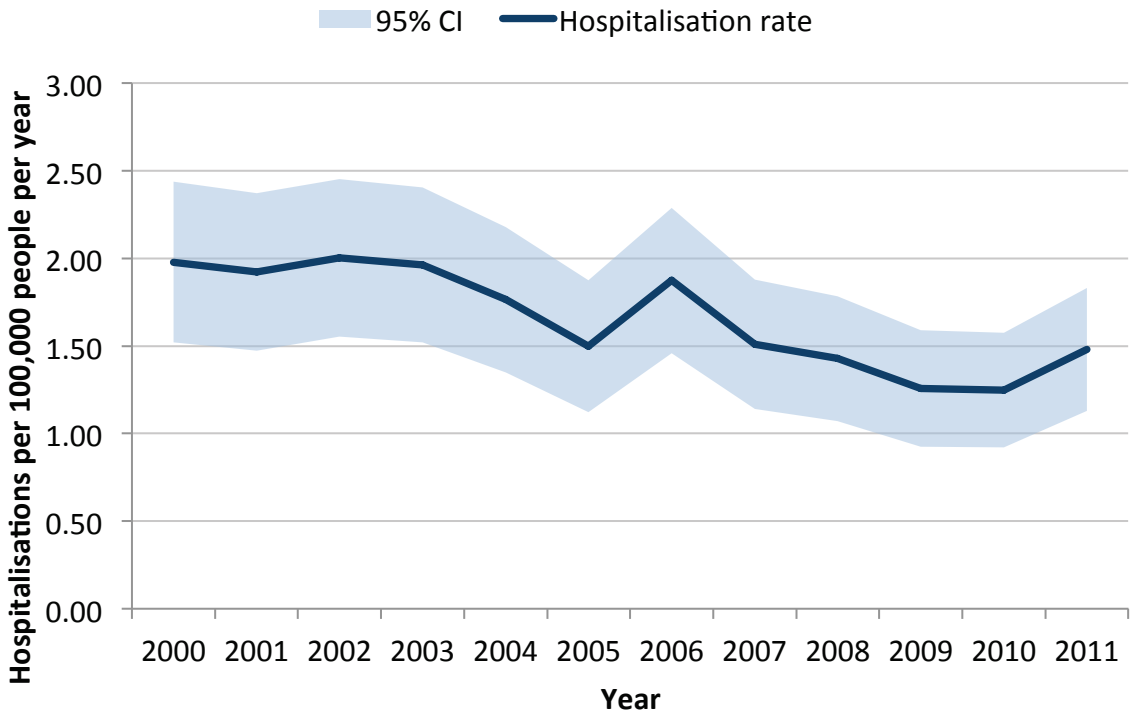


(see Table A 13 for data)

6.2.3. MORTALITY

There were 69 deaths from asthma in 2011. There was a small but significant decline in asthma mortality rates over the study period, of 0.07 deaths per year.

Figure 15. Asthma mortality rates 2000-2011, age-adjusted.



(See Table A 14 for data)

Risks and determinants

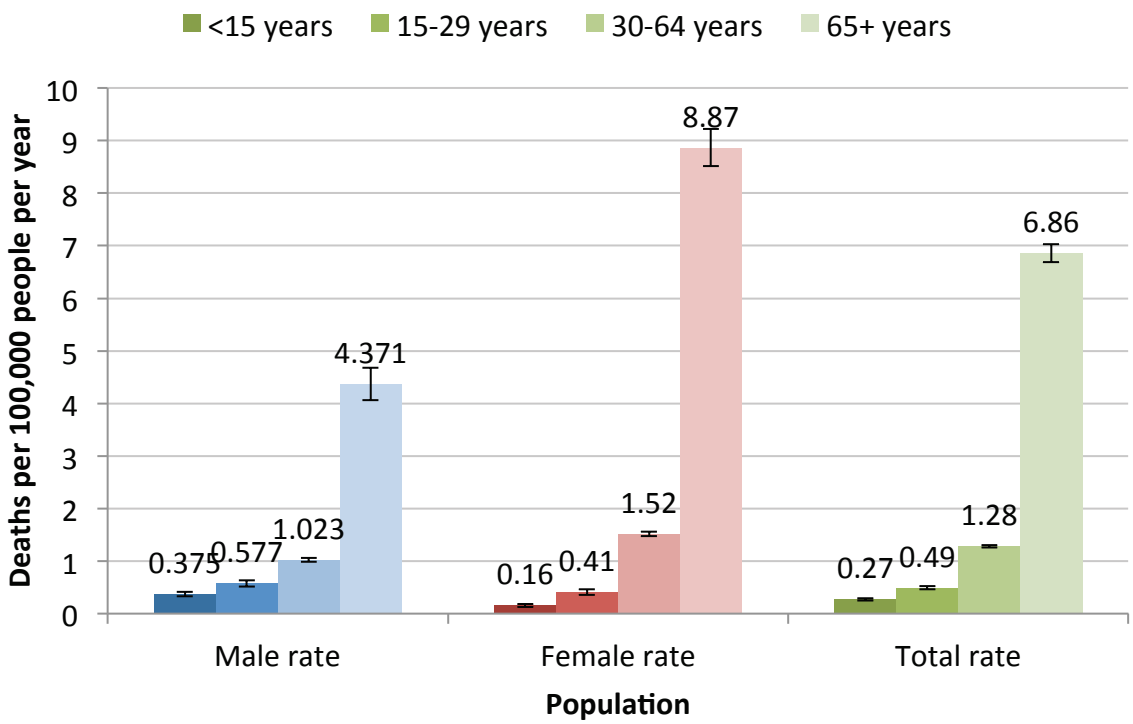
Asthma mortality rates were highest in people aged 65+, and higher in women than in men, though in children aged under 15 mortality rates were higher for boys (rate ratio 2.38) (Figure 16).

Asthma mortality rates were highest for Māori and Pacific peoples, with rates 4.8 and 5.8 times higher than rates for non-MPA (Figure 17 and Figure 18).

There were socio-economic differences in asthma mortality, with rates 3.1 times higher in the most deprived NZDep2006 quintile 9-10, and 2.1 times higher in NZDep2006 quintile 7-8, compared to the least deprived NZDep2006 quintile (Figure 19). There was insufficient data to measure socioeconomic gradients across ethnic groups (Figure 20).

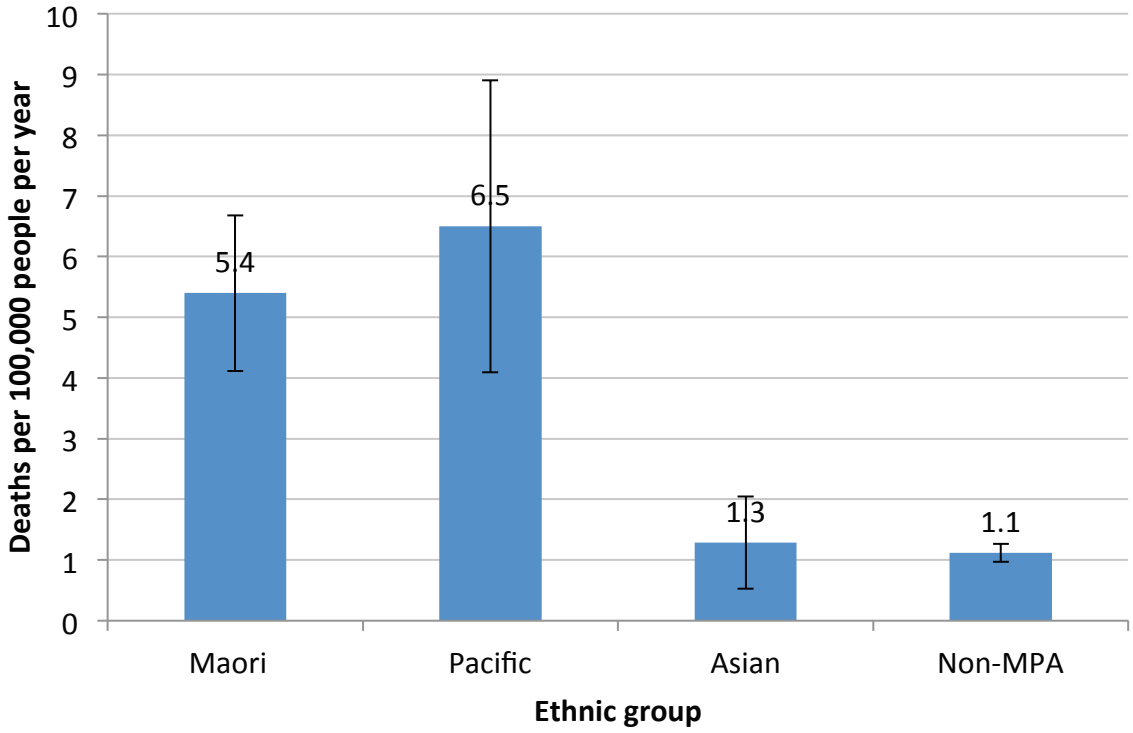
Asthma mortality rates were highest in the Tairawhiti DHB (Figure 21).

Figure 16. Asthma deaths per 100,000 people by age group and sex, 2006-2011.



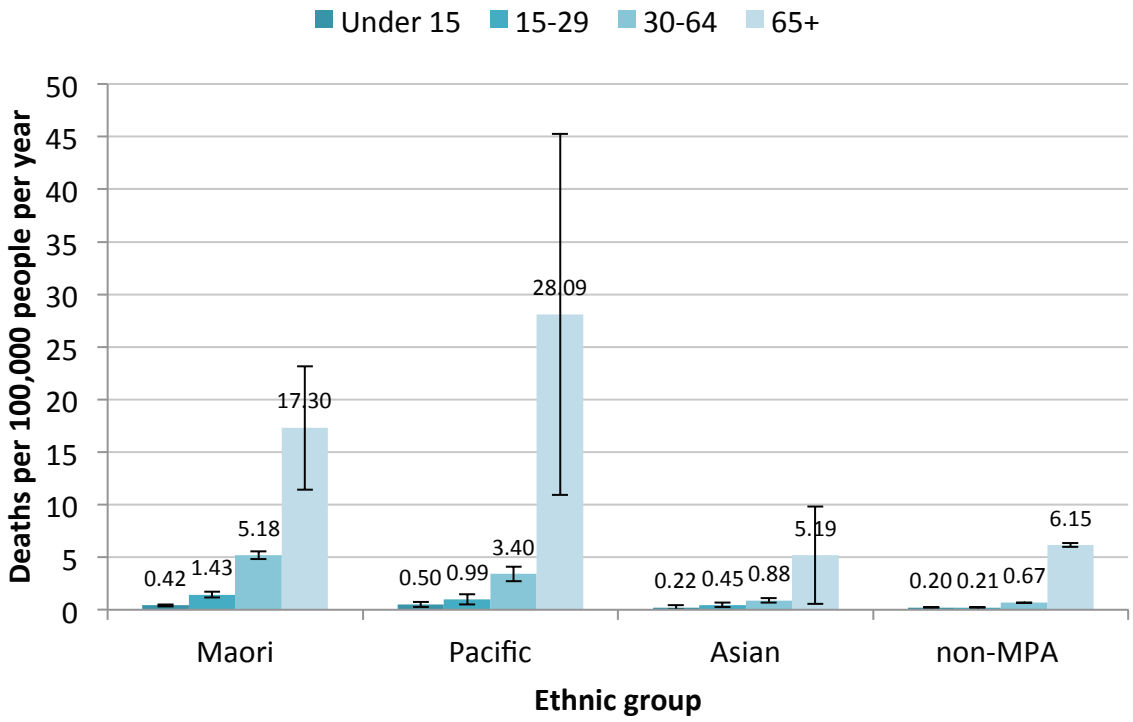
(See Table A 15 and Table A 16 for data)

Figure 17. Asthma mortality per 100,000 people per year by ethnic group, 2006-2011.



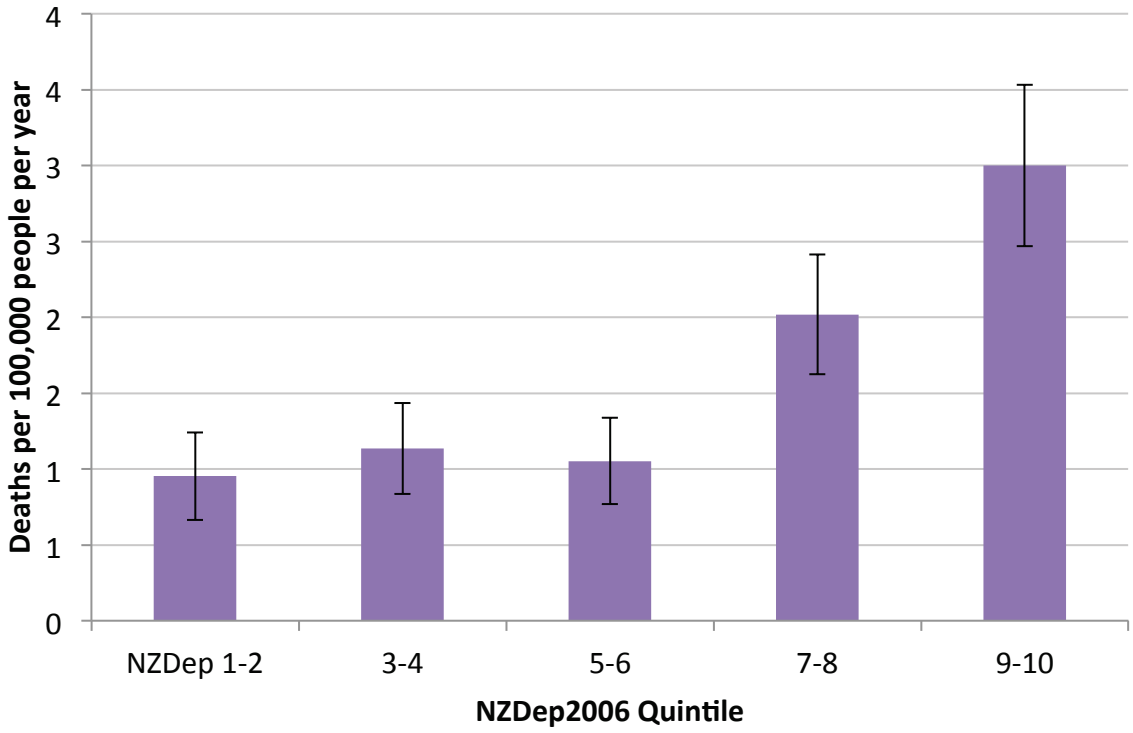
(See Table A 17 for data)

Figure 18. Asthma deaths per 100,000 people per year, by ethnic group and age group, 2006-2011.



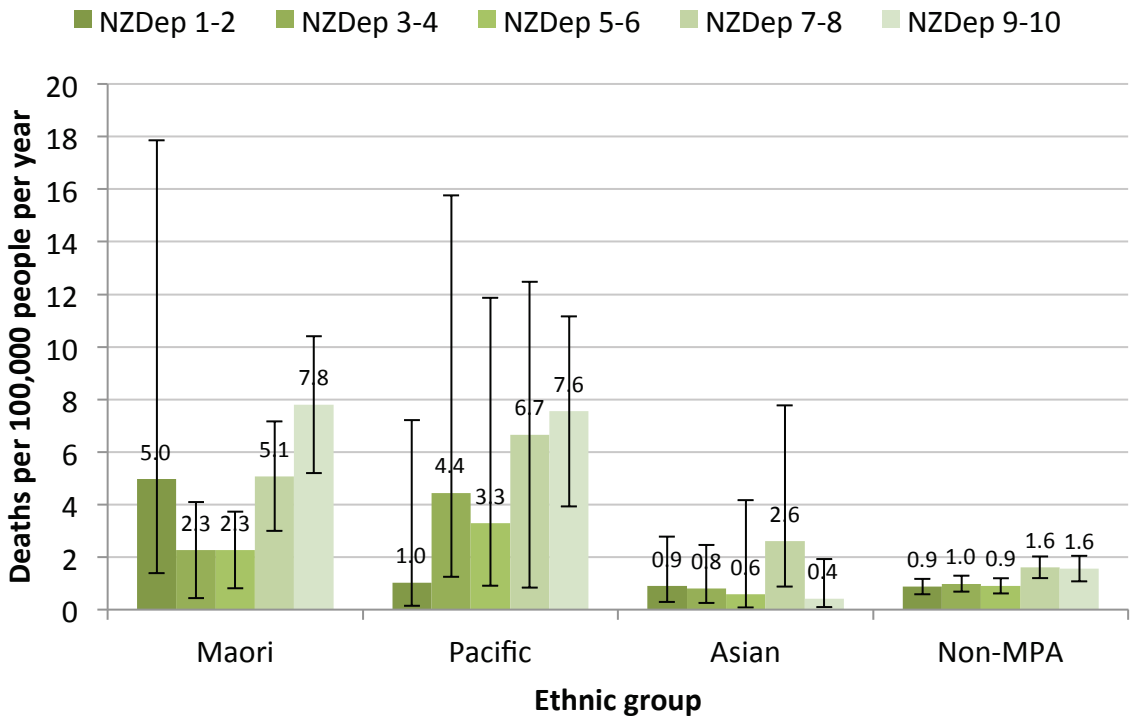
(See Table A 18 for data)

Figure 19. Asthma deaths per 100,000 people by NZDep2006 quintile, 2006-2011, age-adjusted.



(See Table A 19 for data)

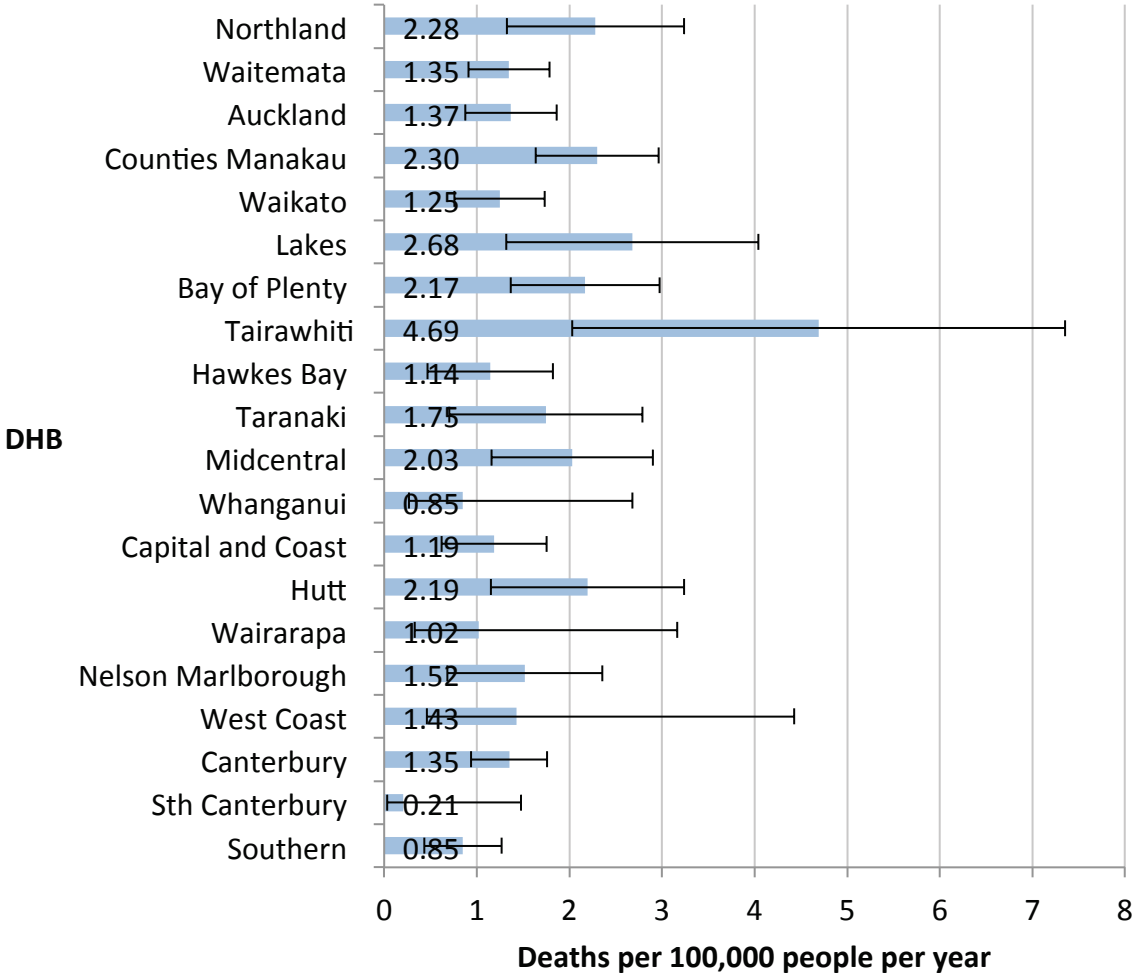
Figure 20. Asthma deaths per 100,000 people by ethnic group and NZDep2006, 2006-2011, age-adjusted.



(See Table A 20 for data)

N.B. Confidence intervals are wide. There was insufficient data to measure socio-economic gradients across ethnic groups.

Figure 21. Asthma deaths per 100,000 people per year, by DHB, 2006-2011, age-adjusted



(see Table A 21 for data)

6.3. BRONCHIECTASIS

6.3.1. PREVALENCE

We estimated the prevalence of severe bronchiectasis in 2012 by identifying living individuals hospitalised with bronchiectasis since 1988. In 2012 there were 4.226 people previously hospitalised with bronchiectasis, giving a population prevalence of 99.6 per 100,000 people. Prevalence was highest in Pacific peoples, with a population rate of 228.8 per 100,000, followed by Māori, with 128.8, and non-MPA with 98.1. Asian peoples had the lowest prevalence of severe bronchiectasis, at 40.1 people per 100,000.

6.3.2. INCIDENCE

The New Zealand incidence of new cases of bronchiectasis in children aged under 15 was estimated at 3.7 per 100,000 in 2001/2002[17].“ Incidence was highest in Pacific children at

17.8 compared with 4.8 in Māori, 1.5 in NZ European, and 2.4 other per 100,000 per year. Incidence varied significantly by region. The median age at diagnosis was 5.2 years; the majority had symptoms for more than two years." There were no published studies of prevalence, nor of the incidence of bronchiectasis in New Zealand adults.

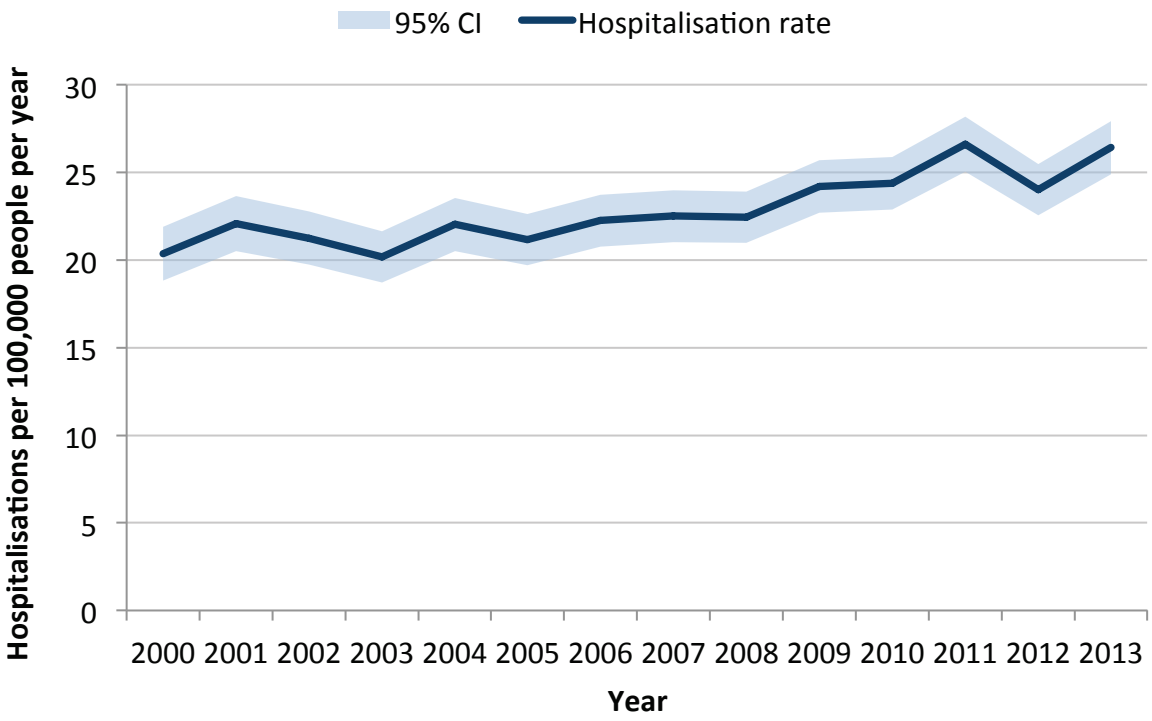
We measured the 2012 incidence of new cases of severe bronchiectasis in children aged under 15 by identifying bronchiectasis hospital admissions, and excluding cases where the patient had a previous hospital admission for bronchiectasis since 1996. This measure found 49 new cases of bronchiectasis in 2012, an incidence rate of 5.7 per 100,000. Incidence was highest in Pacific children at 17.1 compared with 9.4 in Māori, 2.1 in Asian children, and 2.6 in non-MPA children. The Pacific rate is similar to that in 2001/2002, but the Māori rate appears to have doubled. Rates for Asian and non-MPA were not measured in 2001/2002.

6.3.3. HOSPITALISATIONS

Trends over time 2000-2013

Even after adjusting for age, the bronchiectasis hospitalisation rate increased significantly over the study period (see Figure 22). The 2013 rate of 26.4 hospitalisations per 100,000 people represented an increase of 30% over the 2000 rate of 20.4 per 100,000.

Figure 22. Bronchiectasis hospitalisations per 100,000 people per year, 2000-2013.



(See Table A 22 for data)

Risks and determinants

Bronchiectasis hospitalisation rates were highest in the elderly, with 98.8 hospitalisations per 100,000 people aged 65+. Females had higher rates than males in the 30 to 64 and 65+ age groups, but lower rates in children aged under 15 years, and in adults 15-29.

Being of non-NZ European ethnicity was a significant risk factor for bronchiectasis hospitalisation. Pacific peoples were 6.4 times more likely to be hospitalised than NZ European/Other, Māori were 3.7 times more likely to be hospitalised, and Asian peoples 2.3 times more likely (Figure 24).

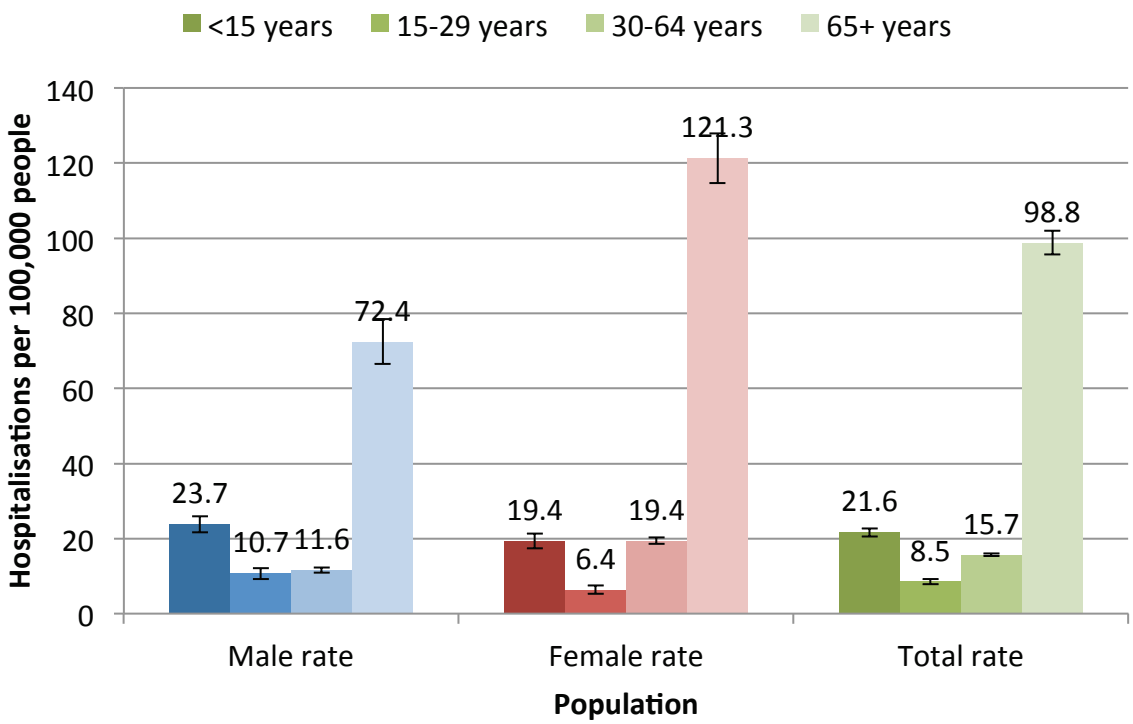
For Asian peoples, this difference was primarily due to a much higher bronchiectasis hospitalisation rate in adults aged 65+, whereas for Māori and Pacific peoples the disparity showed across all age-groups. The greatest disparity by age and ethnicity was for Pacific children aged under 15 years, whose bronchiectasis hospitalisation rates of 62.5 per 100,000 were 7.4 times higher than for non-MPA (Figure 25).

Bronchiectasis hospitalisations also showed strong socio-economic disparity. While rates increased gradually across the first four NZDep2013 quintiles, there was a steep increase in difference for the people living in the most deprived (NZDep 9-10) neighbourhoods, whose hospitalisation rate was not only 3.2 times higher than the wealthiest neighbourhoods, but nearly twice as high as the next most deprived NZDep 7-8 neighbourhoods (Figure 26).

The pattern of increasing rates with increasing deprivation was apparent, though not always significant, across all ethnic groups, but the steep increase in the most deprived quintile was more marked in Māori, Pacific and Asian ethnic groups (Figure 27).

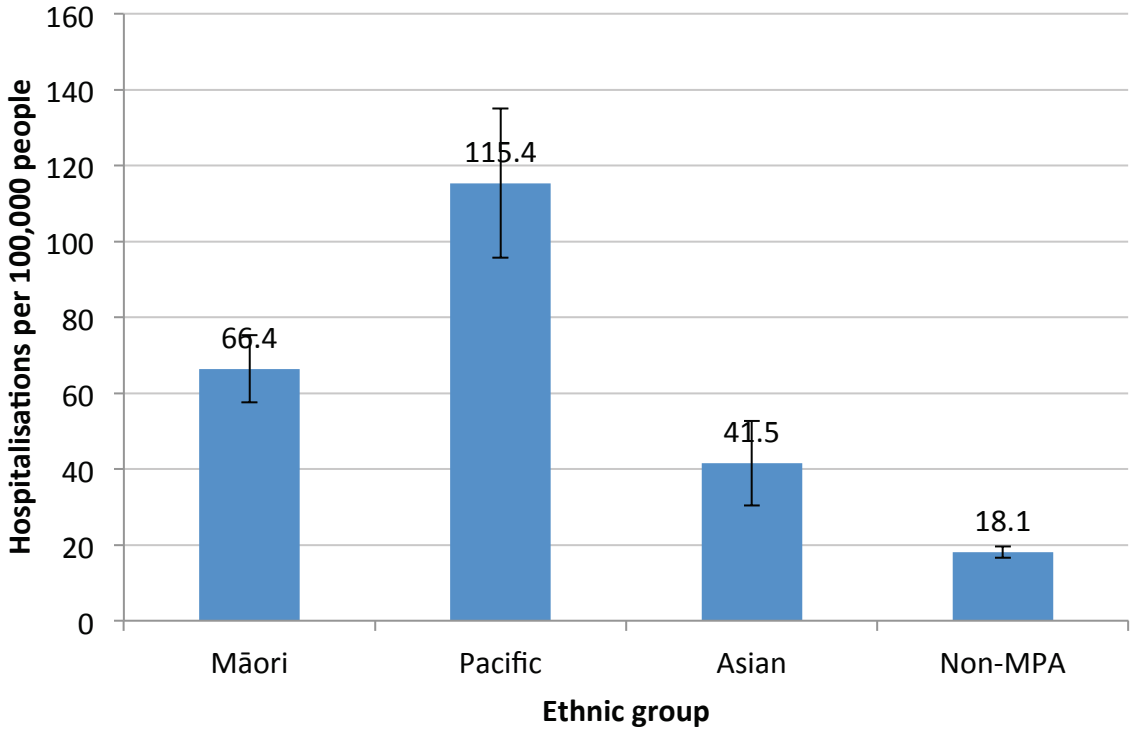
As with other respiratory illnesses, there was a rough north to south gradient in bronchiectasis hospitalisations. The highest rates were in Counties Manukau (49.2 per 100,000 people), Northland (42.2) and Auckland (38.5), compared to the national rate of 26.4 (Figure 28).

Figure 23. Bronchiectasis hospitalisations per 100,000 people by age group and sex, 2013.



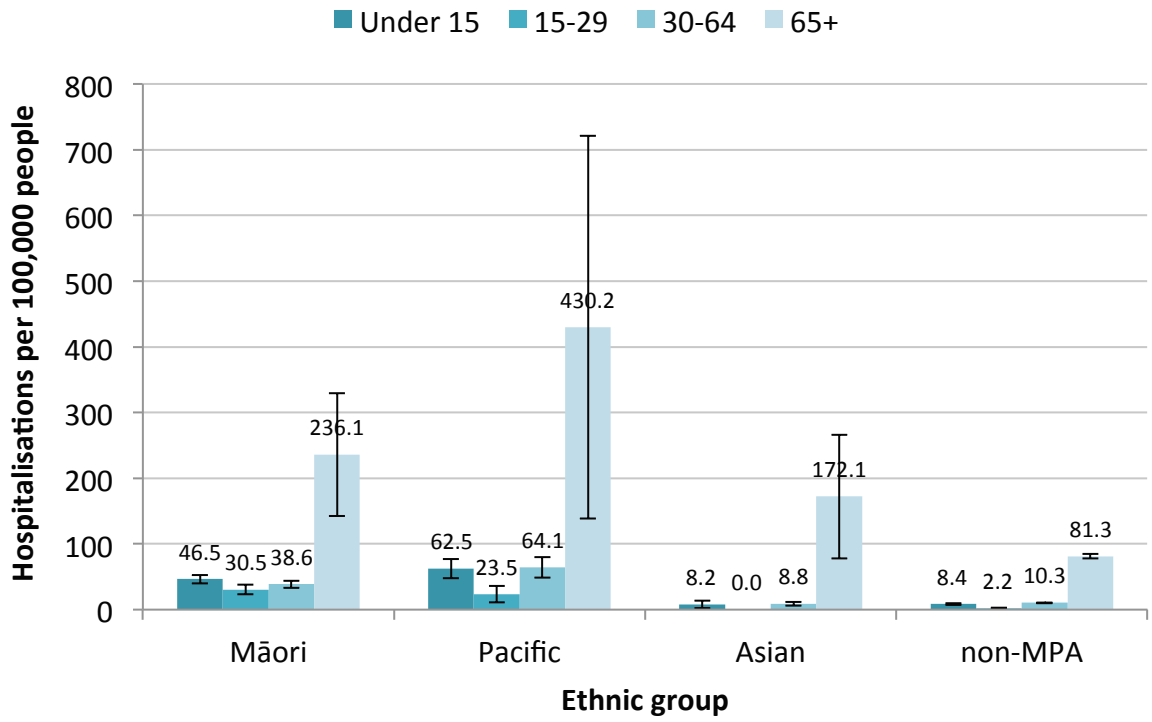
(See Table A 23 and Table A 24 for data)

Figure 24. Bronchiectasis hospitalisations per 100,000 people by ethnic group, 2013.



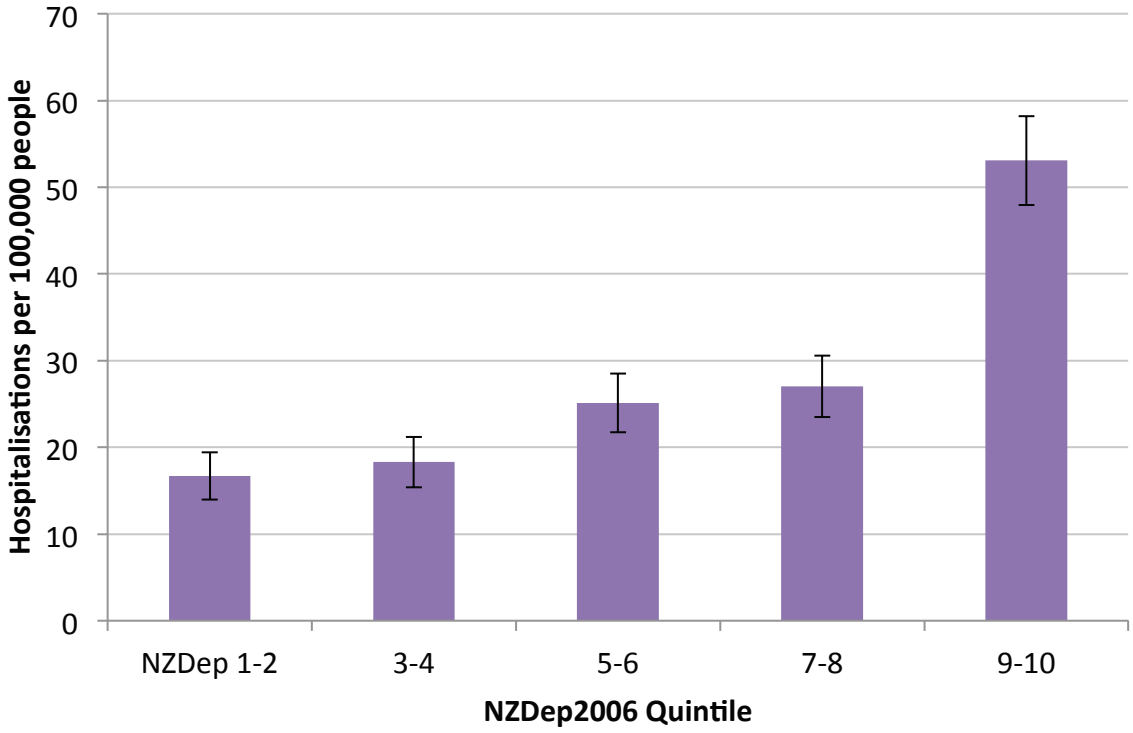
(See Table A 25for data)

Figure 25. Bronchiectasis hospitalisations per 100,000 people by ethnic group and age group, 2013.



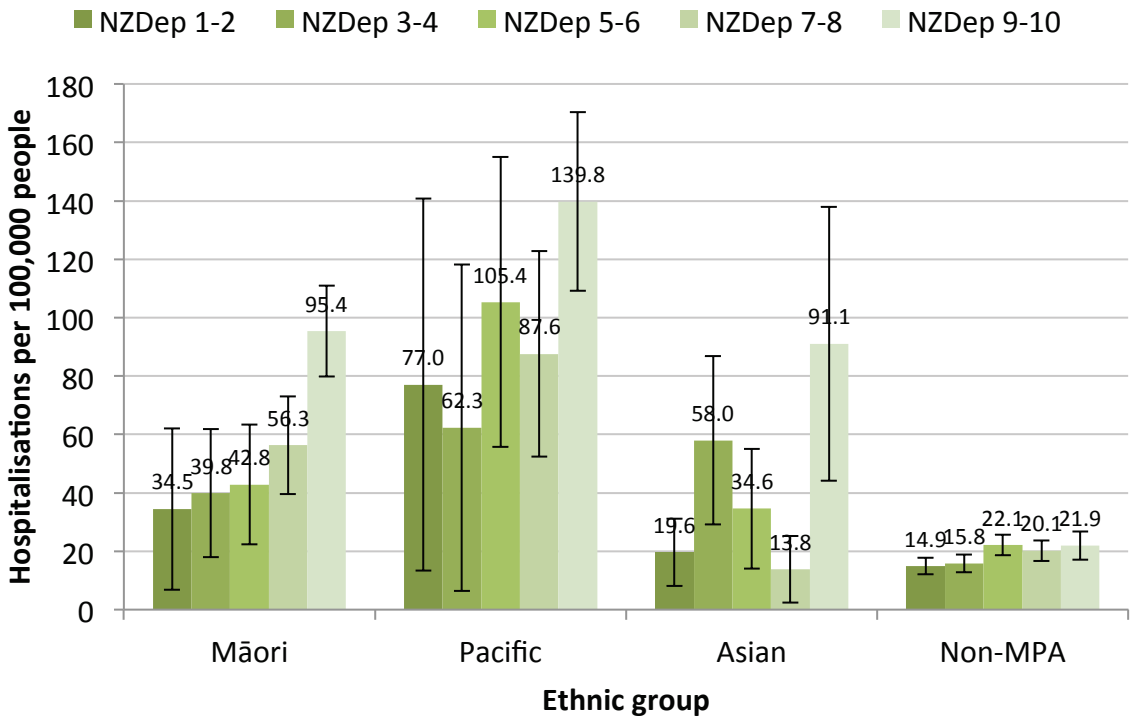
(See Table A 26 for data)

Figure 26. Bronchiectasis hospitalisations per 100,000 people by NZDep2006 quintile, 2013, age-adjusted.



(See Table A 27 for data)

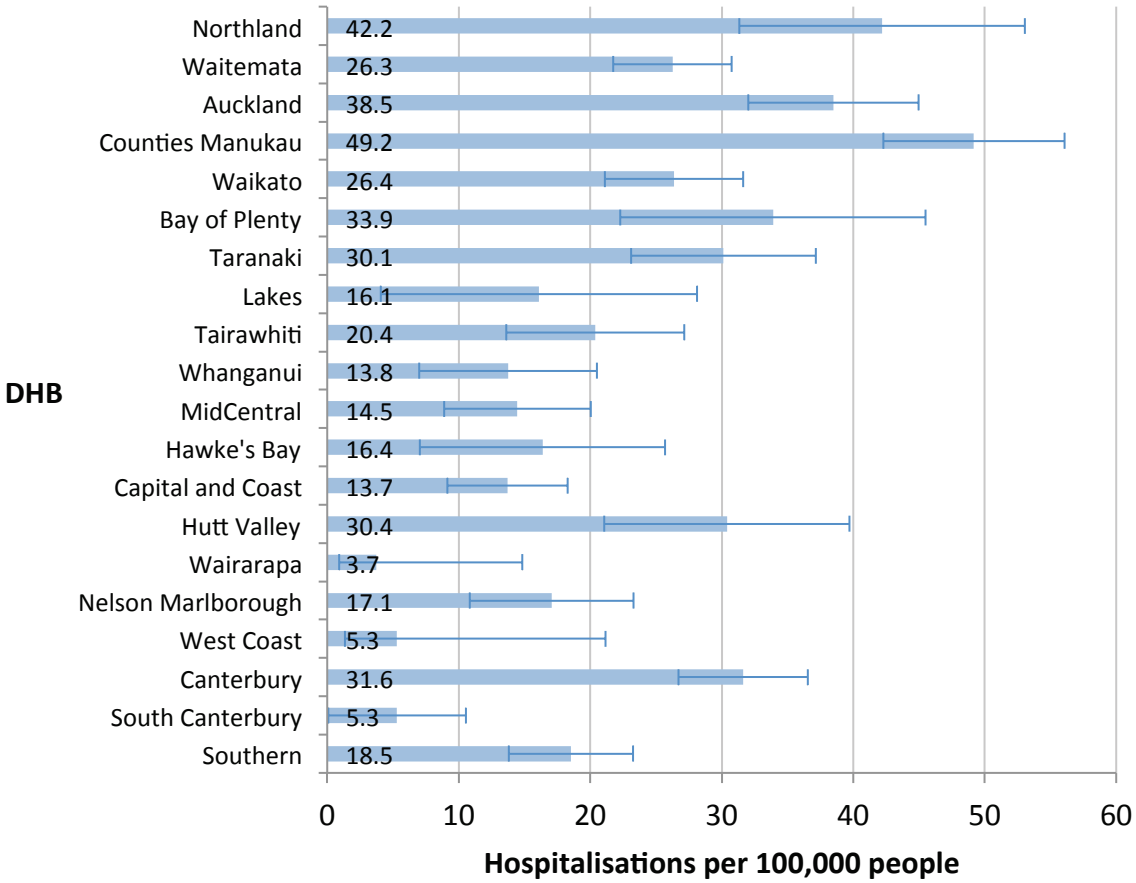
Figure 27. Bronchiectasis hospitalisations per 100,000 people by ethnic group and NZDep2006, 2013, age-adjusted.



(See Table A 28 for data)

N.B. Confidence intervals are wide for Māori, Pacific and Asian ethnic groups. Please see the associated text for interpretation.

Figure 28. Bronchiectasis hospitalisations per 100,000 people by DHB, 2013.

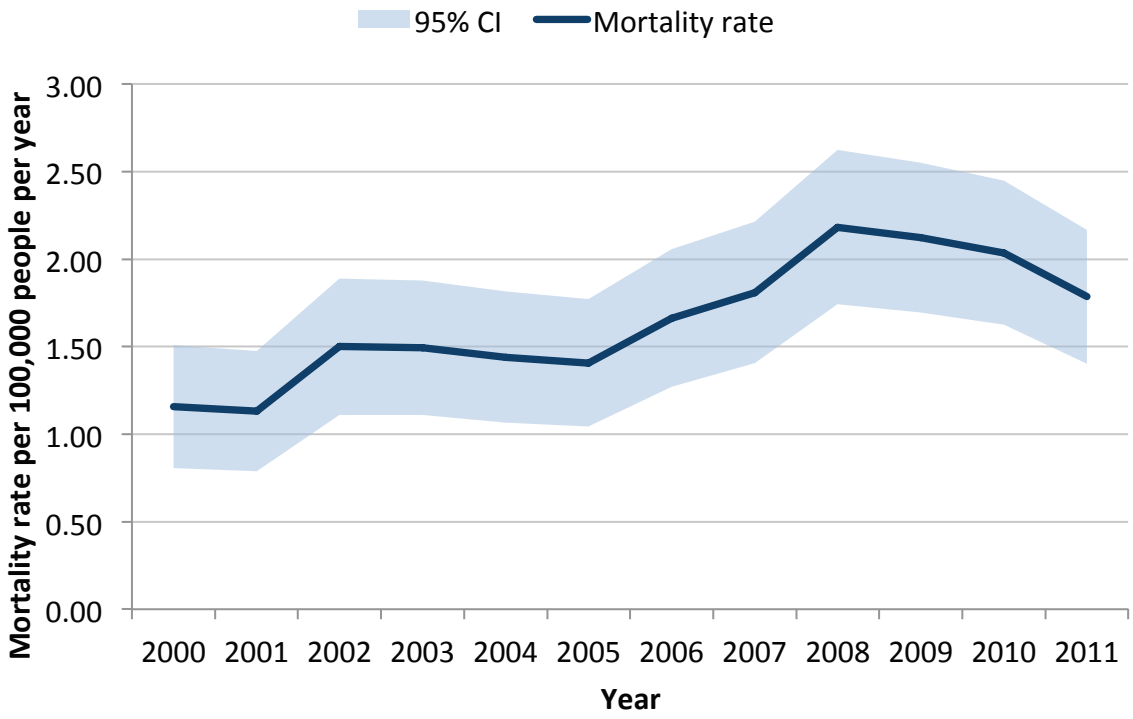


(see Table A 29 for data)

6.3.4. MORTALITY

Bronchiectasis mortality increased significantly over the study period, from 42 deaths per year in 2000-2001, to 84 deaths in 2011. This represented an age-adjusted increase of 0.08 deaths per 100,000 people per year.

Figure 29. Bronchiectasis mortality rates 2000-2011, age-adjusted.



(See Table A 30 for data)

Risks and determinants

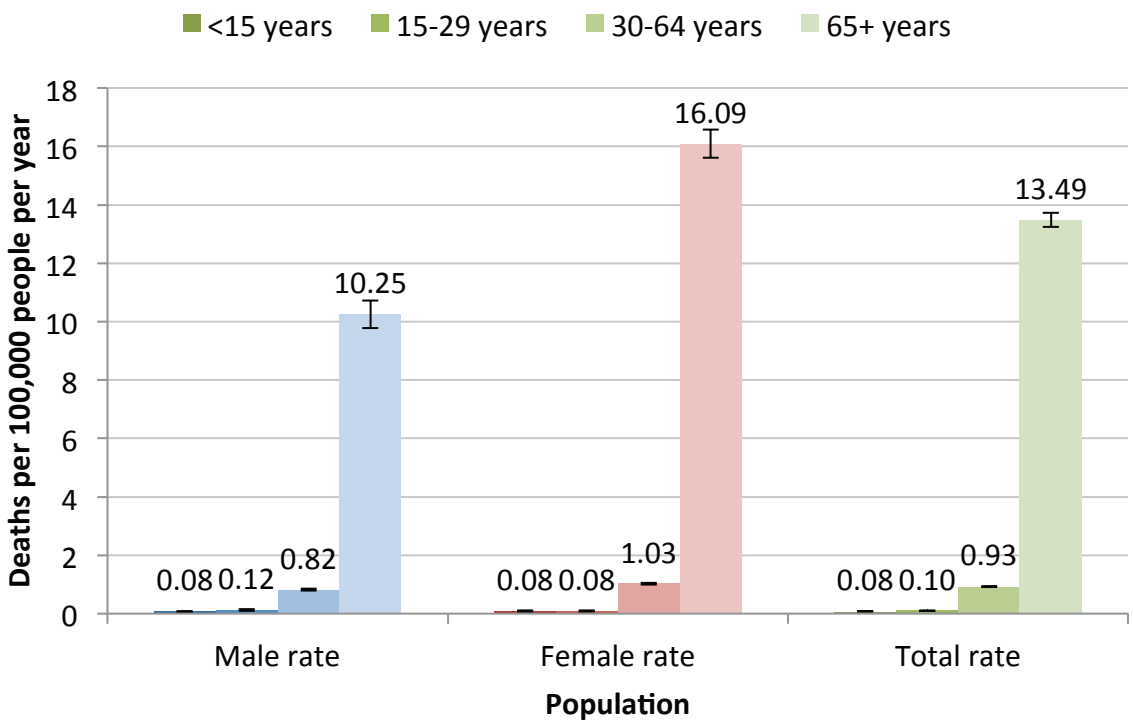
Bronchiectasis mortality rates were highest in people aged 65+, and were significantly higher in women than in men for people aged 30 and over (Figure 30).

Bronchiectasis mortality was highest for Pacific peoples, with rates 8.69 times higher than for non-MPA. Rates were also significantly higher for Māori, (rate ratio 3.94) and Asian peoples (rate ratio 1.99) (Figure 31). Most of the difference lay in differences in rates in the two older age groups (Figure 32).

There were socio-economic differences in bronchiectasis mortality. Mortality rates increased gradually across the first four NZDep2006 quintiles, then increasing markedly for the most deprived quintile. Rates for NZDep2006 9-10 were 2.7 times higher than in the least deprived quintile (Figure 33). However, the gradient was not apparent when rates were broken down by ethnicity (Figure 34).

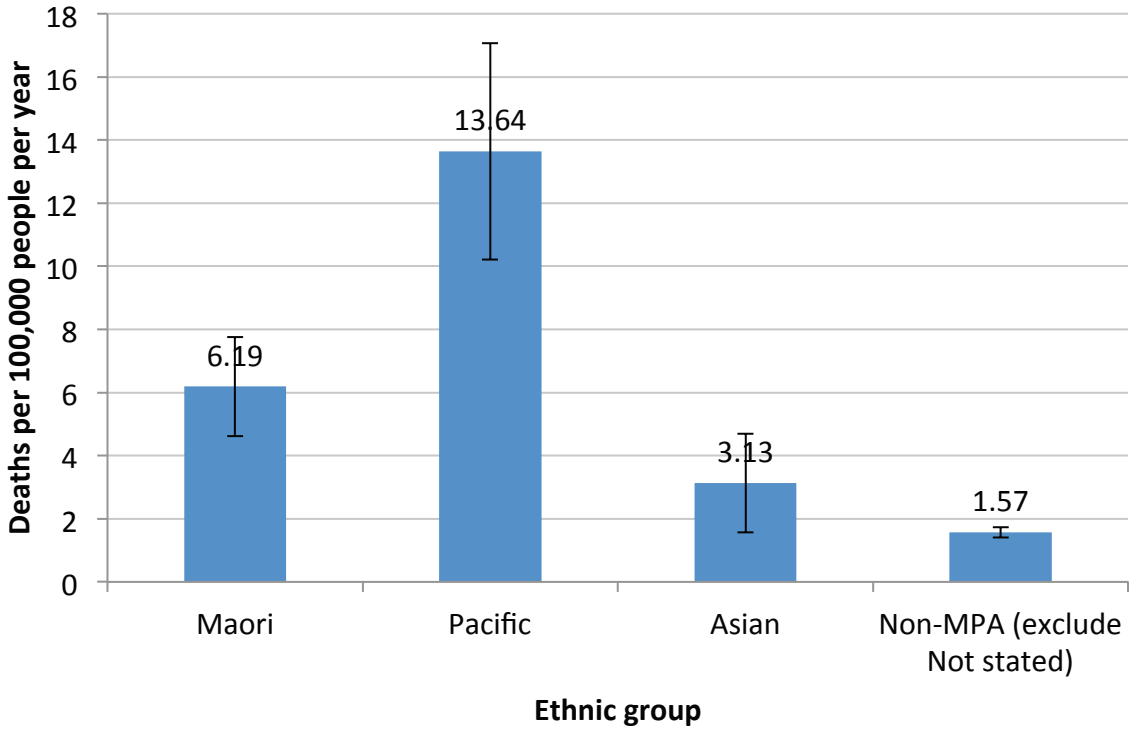
Bronchiectasis mortality rates were highest, and significantly higher than the national rate, in Counties Manukau and Auckland DHBs, and lowest in Wairarapa, where there were no deaths due to bronchiectasis over the 2006 to 2011 study period (Figure 35). Rates were also lower than average in 7 other DHBs.

Figure 30. Bronchiectasis deaths per 100,000 people by age group and sex, 2006-2011.



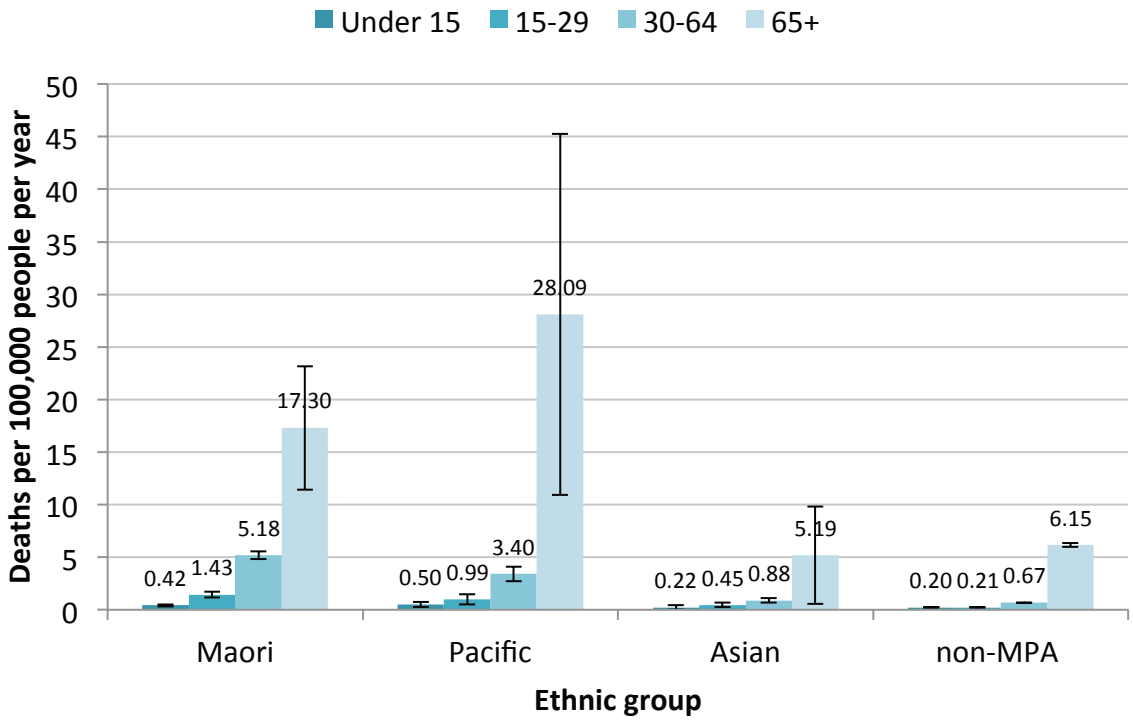
(See Table A 31 and Table A 32 for data)

Figure 31. Bronchiectasis mortality per 100,000 people per year by ethnic group, 2006-2011.



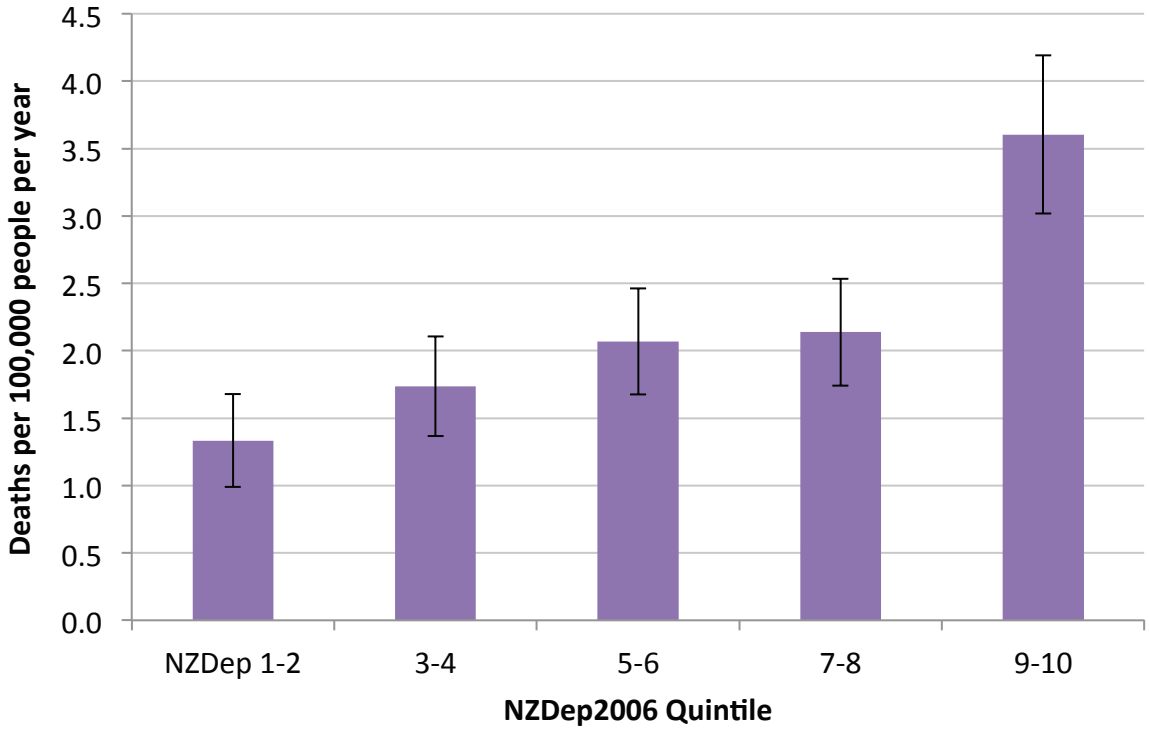
(See Table A 33 for data)

Figure 32. Bronchiectasis deaths per 100,000 people per year, by ethnic group and age group, 2006-2011.



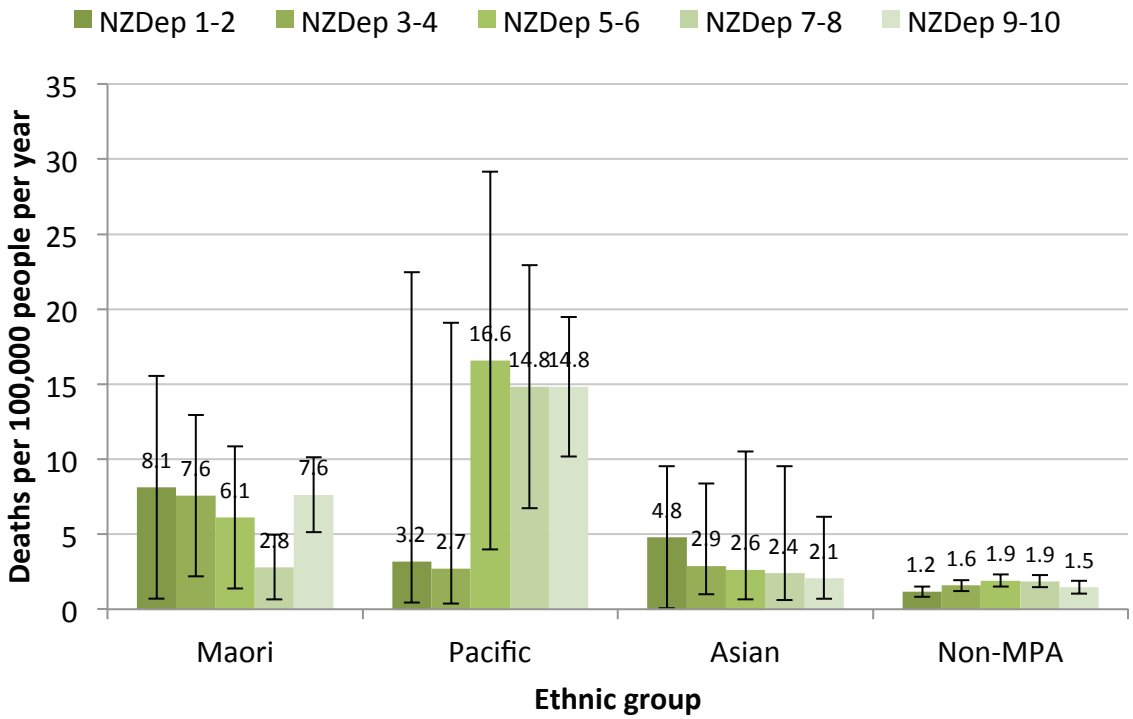
(See Table A 34 for data)

Figure 33. Bronchiectasis deaths per 100,000 people by NZDep2006 quintile, 2006-2011, age-adjusted.



(See Table A 35 for data)

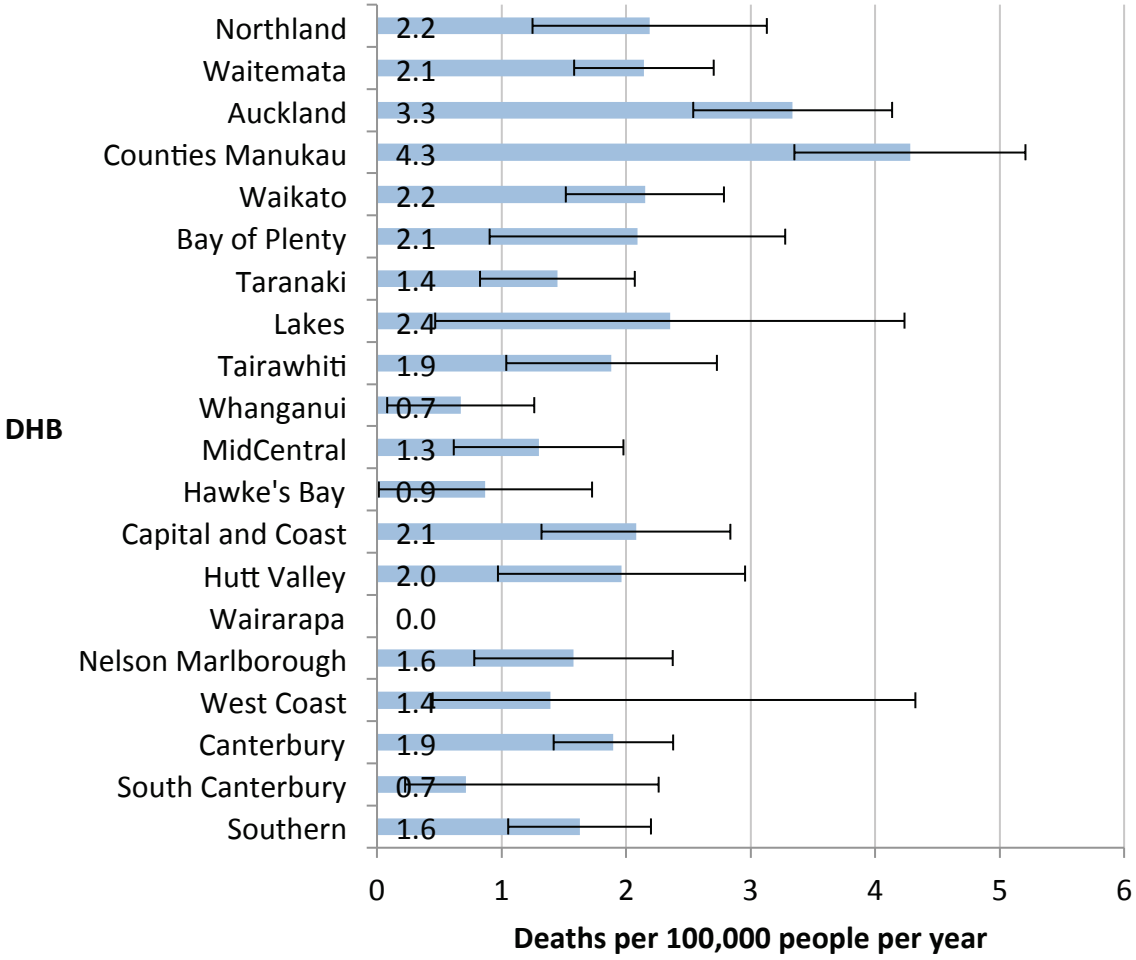
Figure 34. Bronchiectasis deaths per 100,000 people by ethnic group and NZDep2006, 2006-2011, age-adjusted.



(See Table A 36 for data)

N.B. Confidence intervals are too wide to establish a trend across quintiles for Māori, Pacific or Asian ethnic groups..

Figure 35. Bronchiectasis deaths per 100,000 people per year, by DHB, 2006-2011, age-adjusted



(see Table A 37 for data)

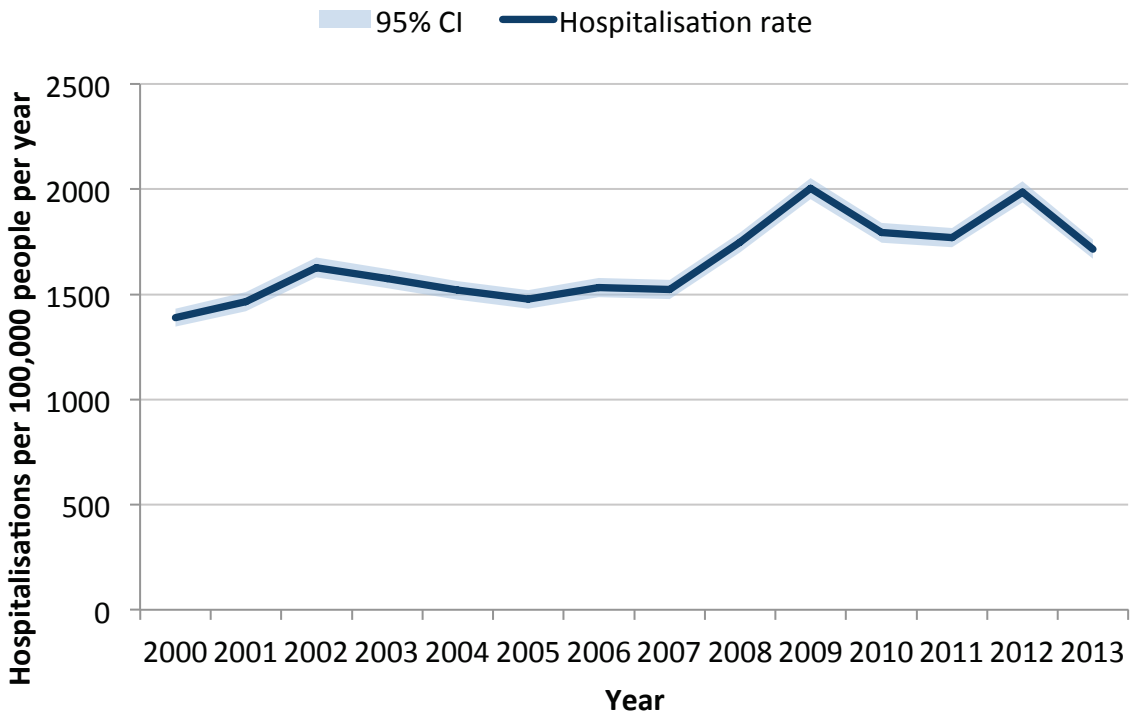
6.4. CHILDHOOD BRONCHIOLITIS

6.4.1. HOSPITALISATIONS

Trends over time 2000-2013

Childhood bronchiolitis hospitalisation rates have increased significantly over the study period (see Figure 36), by an estimated 35.2 hospitalisations per year. The overall hospitalisation rate has increased by nearly a third over the study period.

Figure 36. Childhood bronchiolitis hospitalisations per 100,000 people per year, 2000-2013.



(See Table A 38 for data)

Risks and determinants

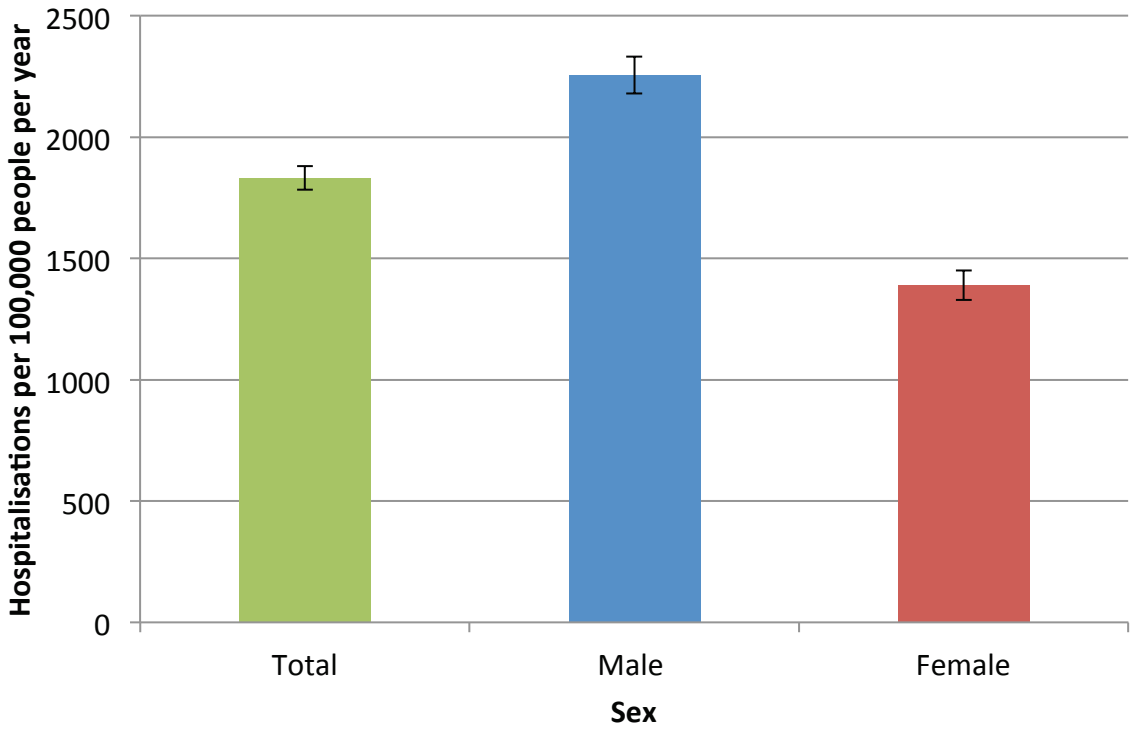
As with other childhood respiratory illness, bronchiolitis hospitalisation rates were higher for boys than for girls (rate ratio 1.62) (Figure 37).

Rates were lowest for Asian children, at 729.9 per 100,000, but highest for Pacific children, at 4229.7 per 100,000, and also high for Māori, at 3281.3 (Figure 38), with non-Māori, non-Pacific, non-Asian children having a rate of 977.1. These differences were significant: Pacific rates were 4.3 times higher than non-MPA, Māori rates 3.4 times higher, and Asian rates three quarters of non-MPA rates (rate ratio 0.75).

As with bronchiectasis, the deprivation gradient was exponential rather than linear. There were 2769 bronchiolitis hospitalisations for children in the most deprived neighbourhoods, making their rates 5.4 times the 370 hospitalisations in the least deprived neighbourhoods (Figure 39). The deprivation gradient persisted across all except the Asian ethnic group. The combined effect of ethnicity and deprivation meant that Māori and Pacific children in the most deprived quintile were more than eight times as likely to be hospitalised as NZ European/Other children in the wealthiest quintile (Figure 40).

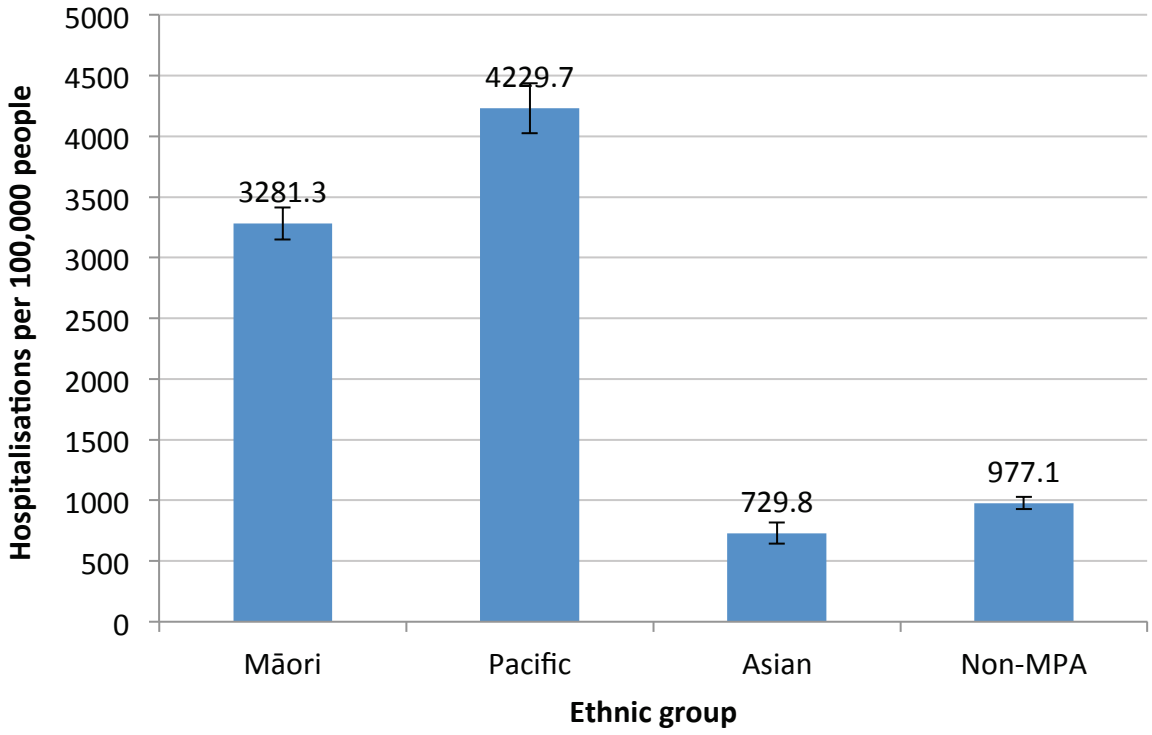
Across DHBs, childhood bronchiolitis rates were highest in Counties Manukau and Northland (Figure 41).

Figure 37. Childhood bronchiolitis hospitalisations per 100,000 people by sex, 2013.



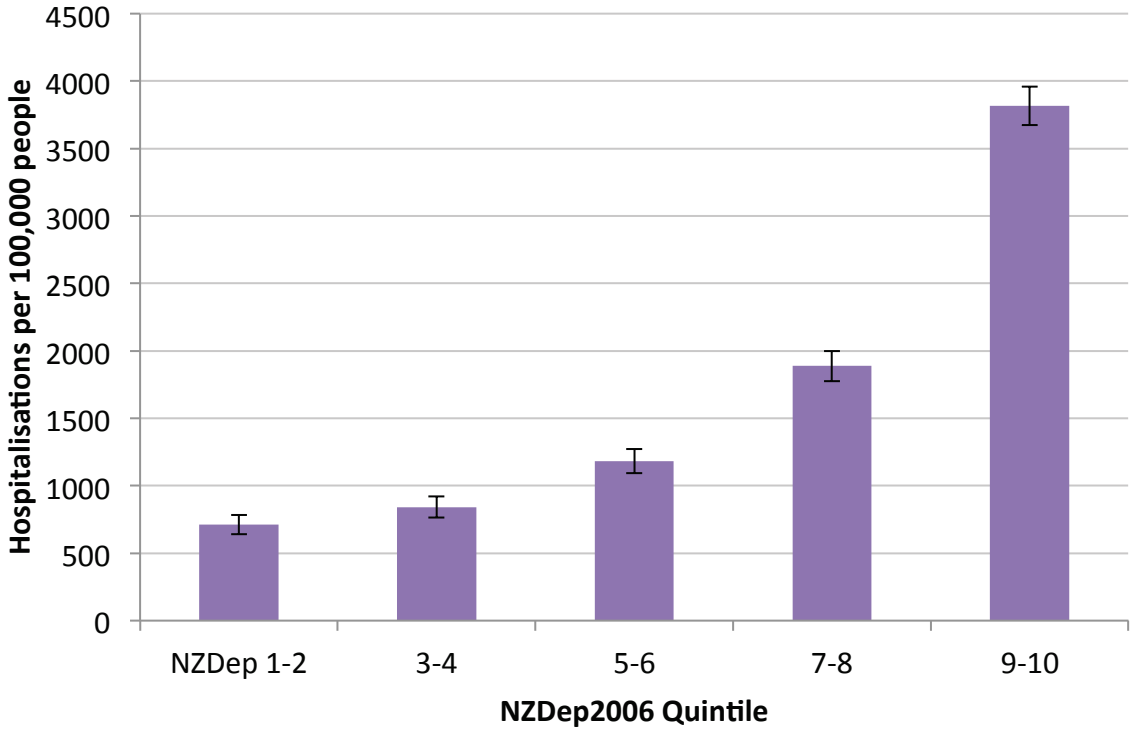
See Table A 39 for data

Figure 38. Childhood bronchiolitis hospitalisations per 100,000 people by ethnic group, 2013.



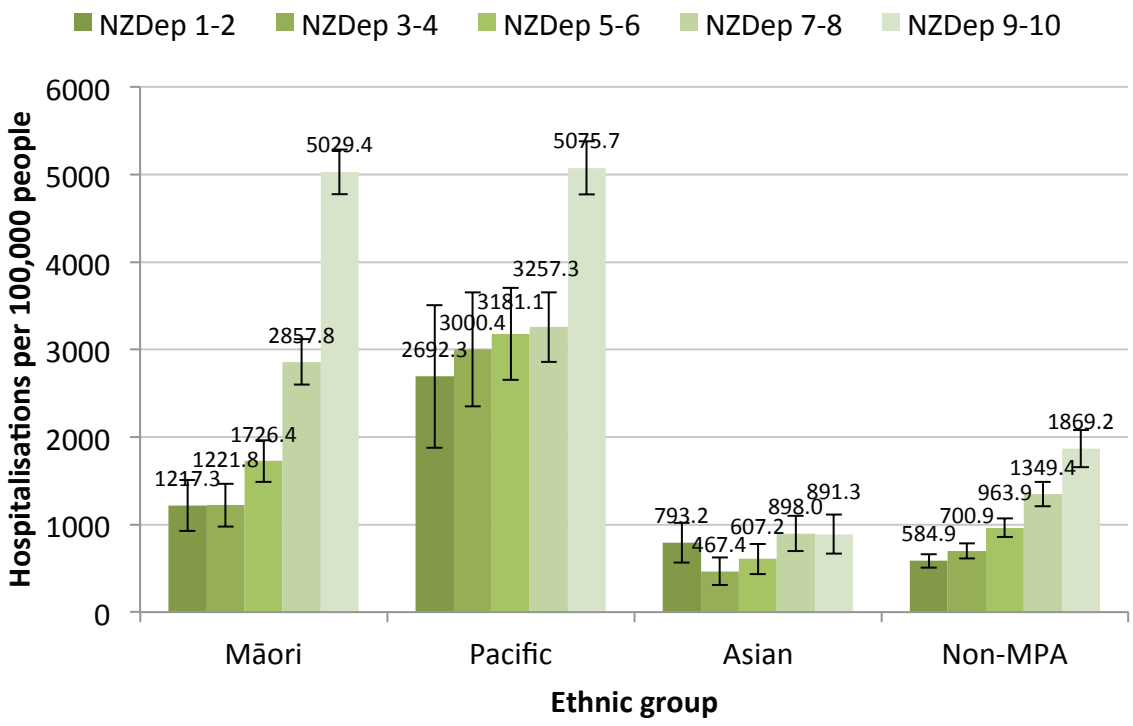
(See Table A 40 for data)

Figure 39. Childhood bronchiolitis hospitalisations per 100,000 people by NZDep2006 quintile, 2013, age-adjusted.



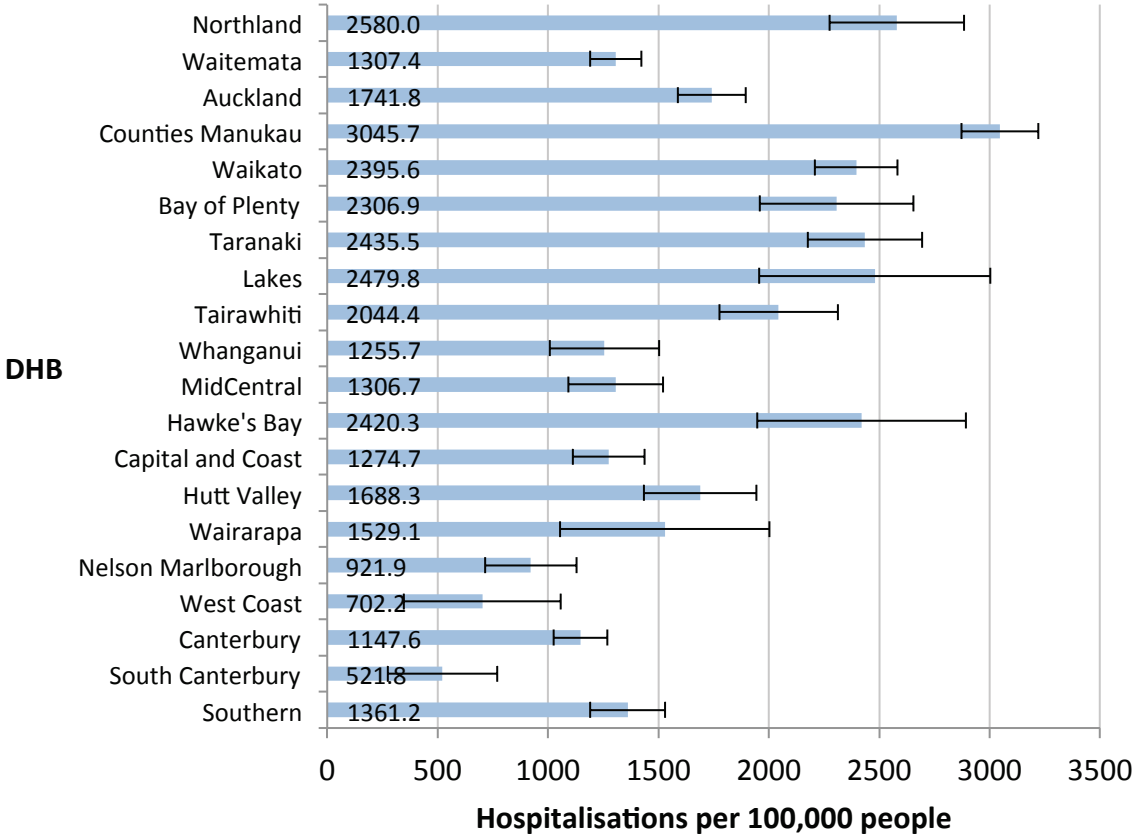
(See Table A 41 for data)

Figure 40. Childhood bronchiolitis hospitalisations per 100,000 people by ethnic group and NZDep2006, 2013, age-adjusted.



(See Table A 42 for data)

Figure 41. Childhood bronchiolitis hospitalisations per 100,000 people by DHB, 2013.

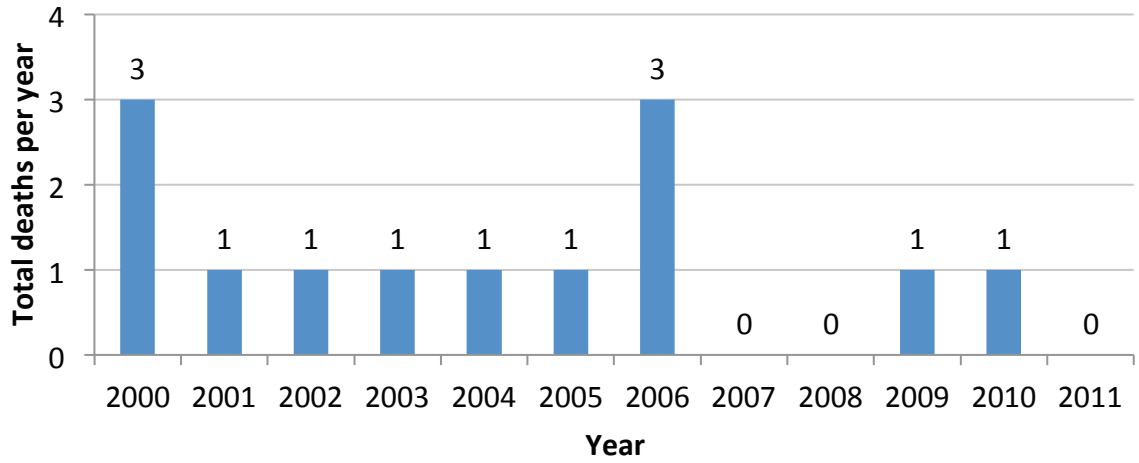


(see Table A 43 for data)

6.4.2. MORTALITY

Deaths from childhood bronchiolitis were rare, totalling 13 over the period 2000-2011.

Figure 42. Childhood bronchiolitis mortality numbers 2000-2011.



Risks and determinants

This section covers the 9 deaths over the ten years 2002-2011. As the number of deaths was so small, little analysis is possible.

Of the 9 childhood bronchiolitis deaths between 2002 and 2011, 4 were boys and 5 girls; there was therefore no significant difference in rates by sex.

Five of the deaths were Māori, three were Pacific children, and one was non-MPA. There were no deaths among Asian children. Māori children's mortality was thus 11.4 times higher than non-MPA, and Pacific children's mortality was 13.0 times higher.

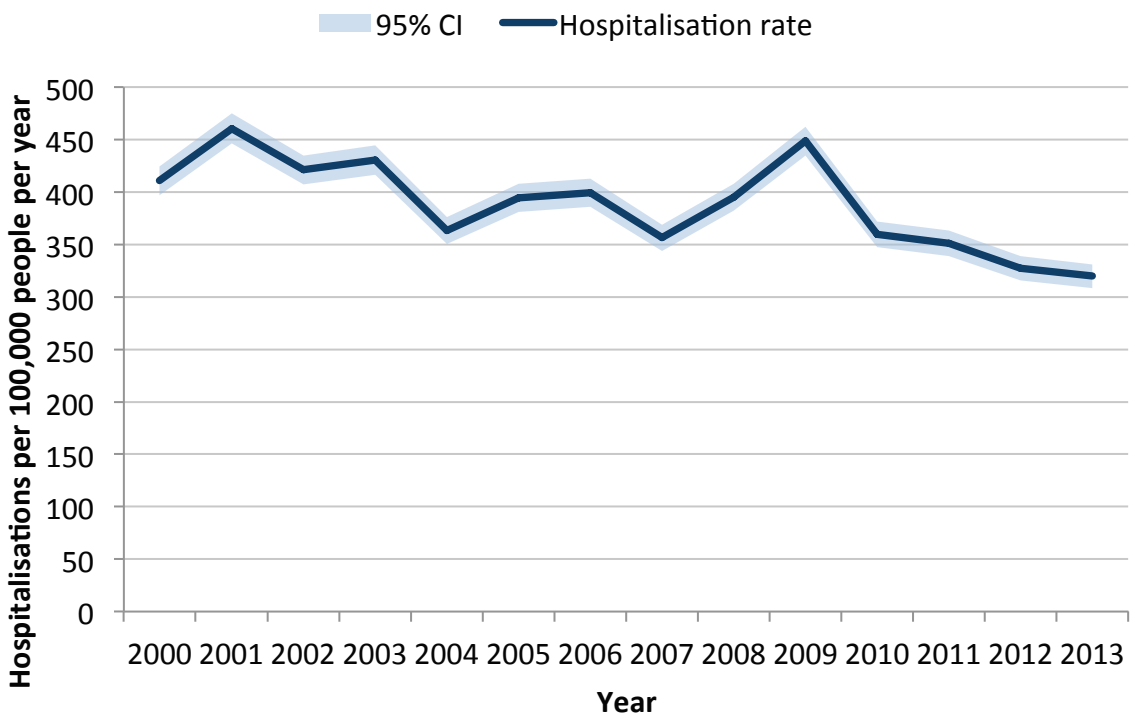
Six of the deaths were in NZDep 9-10, two in NZDep 7-8, and 1 in NZDep 5-6. There were no deaths in NZDep 1-4.

Four of the deaths were in Waikato DHB, 2 were in Counties Manukau, and there was one each in Waitemata, Auckland and Tairawhiti DHBs.

6.5. CHILDHOOD PNEUMONIA

6.5.1. HOSPITALISATIONS

Figure 43. Childhood pneumonia hospitalisations per 100,000 people per year, 2000-2013.



(See Table A 44 for data)

Trends over time

Childhood pneumonia rates declined significantly over the study period, by 7.45 hospitalisations per year, from an age adjusted 410.8 hospitalisations per 100,000 children in 2000, to 319.7 per 100,000 in 2013, meaning overall rates have dropped by more than a quarter over the study period (Figure 43).

Risks and determinants

Childhood pneumonia showed only a small overall difference between male and female rates, though there differences by sex varied within age sub-groups: boys under 5 years had significantly higher hospitalisation rates than girls (rate ratio 1.13), but there was no significant difference in rates for children aged 5 to 14 years (Figure 44).

Pacific children had the highest childhood pneumonia rates, at 797 hospitalisations per 100,000 children. This rate was 3.1 times higher than the non-MPA rate of 396.5 hospitalisations per 100,000. Rates for Māori children were 1.6 times higher, while rates for Asian children were 1.2 times higher (Figure 45).

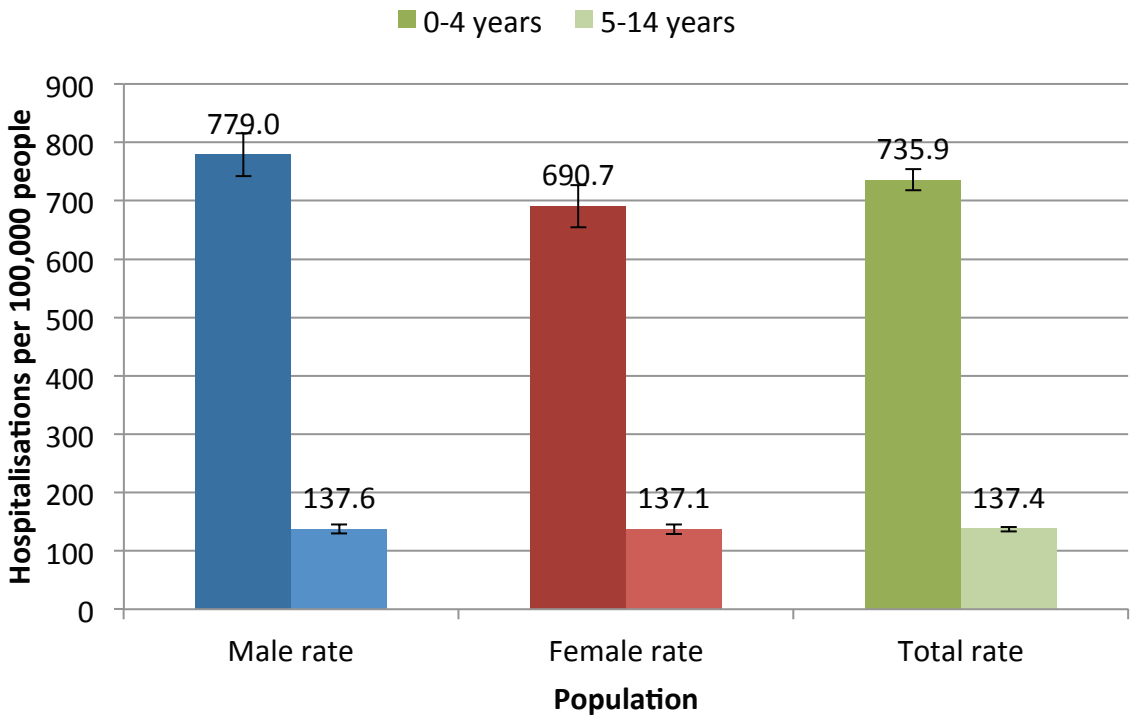
These differences came primarily from even greater differences in rates for children aged under 5 years (Figure 46).

Child pneumonia rates were highest in the most deprived areas, with rates 2.5 times higher in the most deprived NZDep quintile than in the least deprived (Figure 47).

Overall, the outstanding differences in childhood pneumonia rates were for Pacific peoples, and for those in the most deprived quintile. There was no significant difference in rates across the first four NZDep quintiles for Māori, Asian and non-MPA children (Figure 48).

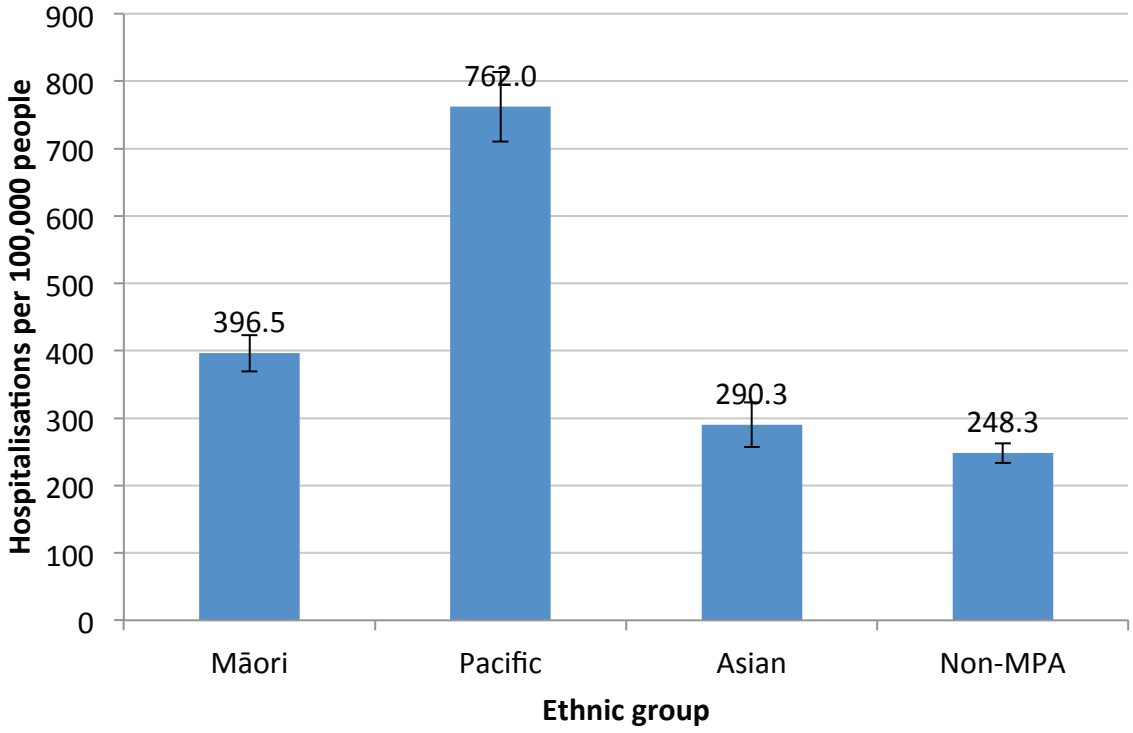
Across DHBs, the highest childhood pneumonia rates were in Hutt Valley, Auckland, Counties Manukau and Northland. Rates were lower than average across the South Island (Figure 49).

Figure 44. Childhood pneumonia hospitalisations per 100,000 people by age group and sex, 2013.



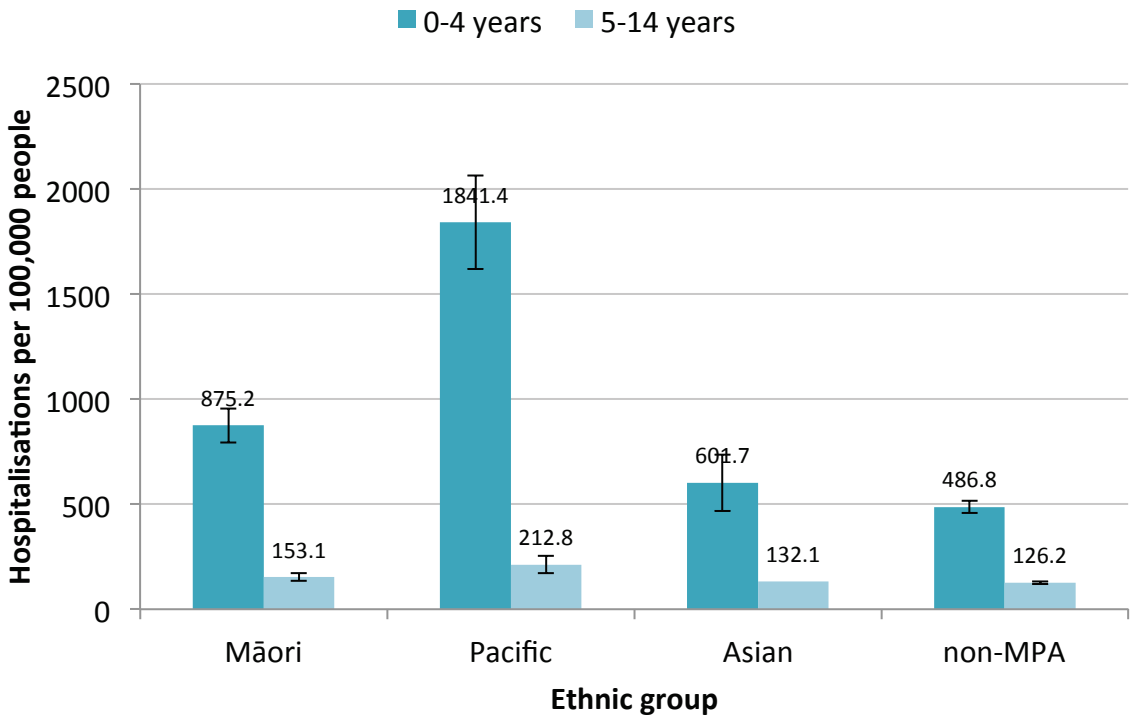
(See Table A 45 and Table A 46 for data)

Figure 45. Childhood pneumonia hospitalisations per 100,000 people by ethnic group, 2013.



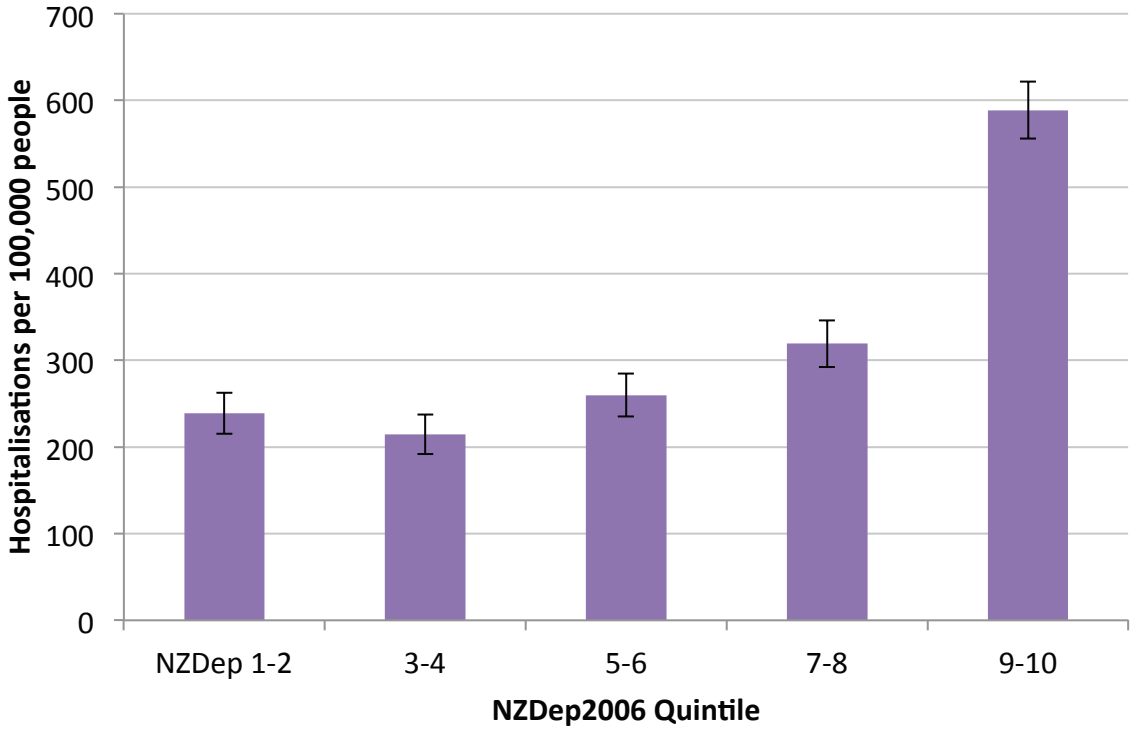
(See Table A 47 for data)

Figure 46. Childhood pneumonia hospitalisations per 100,000 people by ethnic group and age group, 2013.



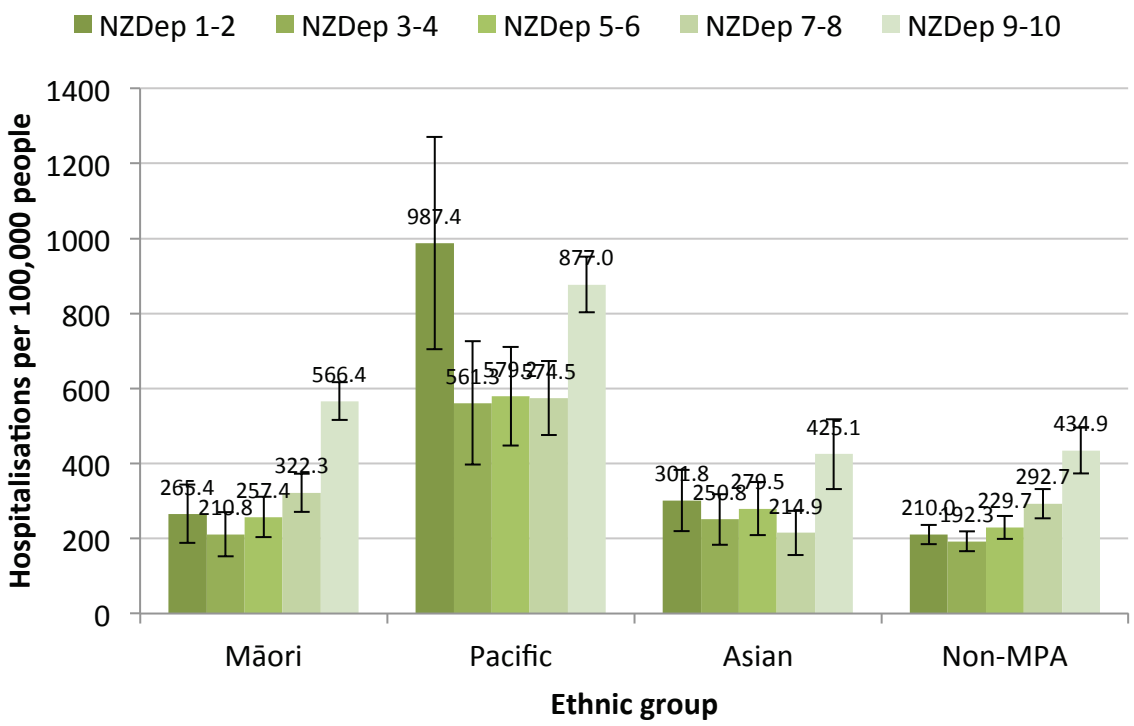
(See Table A 48 for data)

Figure 47. Childhood pneumonia hospitalisations per 100,000 people by NZDep2006 quintile, 2013, age-adjusted.



(See Table A 49 for data)

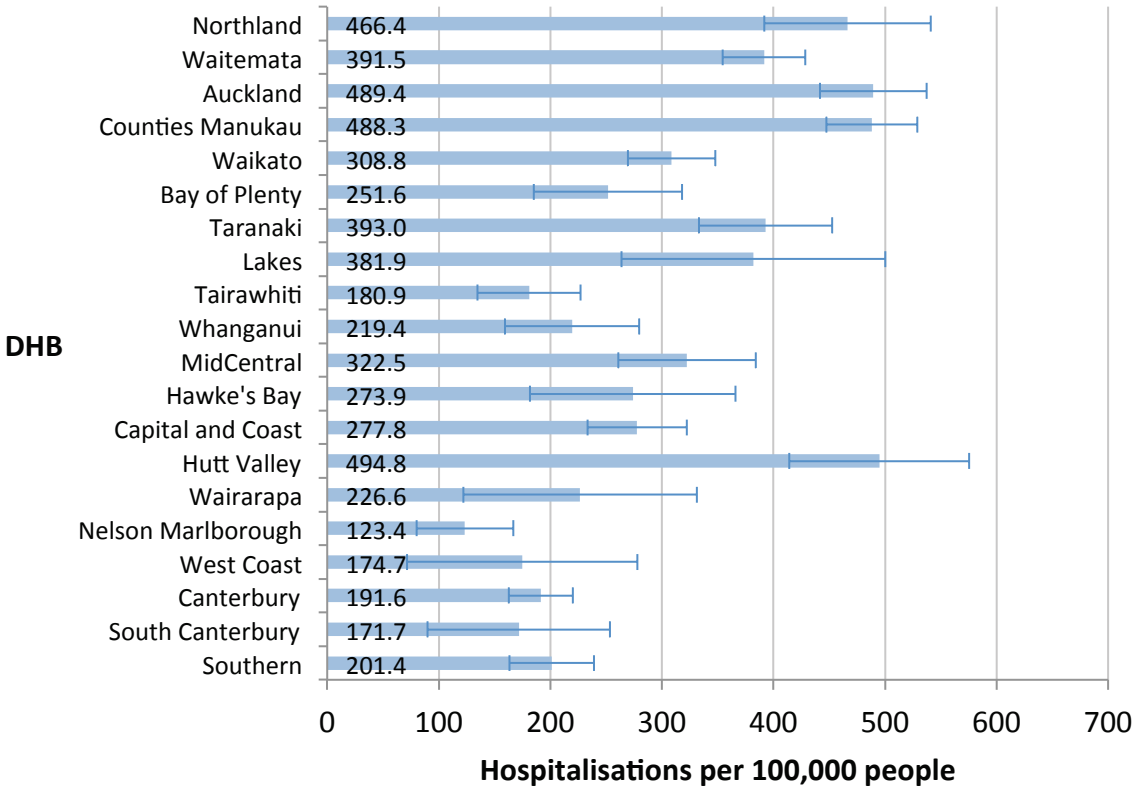
Figure 48. Childhood pneumonia hospitalisations per 100,000 people by ethnic group and NZDep2013, 2013, age-adjusted.



(See Table A 50 for data)

N.B. Confidence intervals are wide. The most deprived quintile (NZDep 9-10) had high rates for all ethnic groups, but differences in rates between other quintiles were not statistically significant.

Figure 49. Childhood pneumonia hospitalisations per 100,000 people by DHB, 2013.



(see Table A 51 for data)

6.5.2. MORTALITY

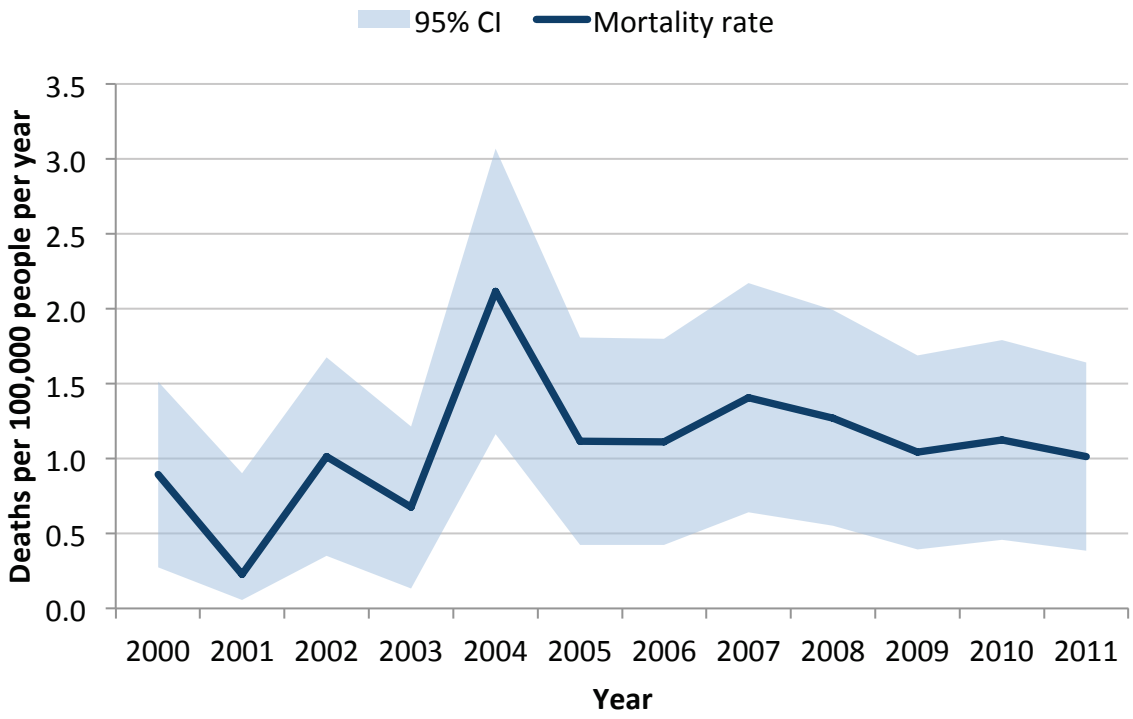
Mortality from childhood pneumonia showed no significant trend over the study period, but there was less annual variation in rates from 2005 – 2011 (Figure 50).

Risks and determinants

Pneumonia mortality rates for children aged under 5 years were 1.27 times higher in boys than in girls, while rates for children 5-14 were 2.22 times higher in boys (Figure 51).

There was extreme inequality in the distribution of childhood pneumonia mortality by ethnicity. Rates for non-MPA and Asian peoples were 0.5 and 0.7 deaths per 100,000 people per year. Rates for Māori and Pacific peoples were 2.8 and 2.3 deaths respectively per 100,000 people per year, making rates 5.42 times higher for Māori and 6.19 times higher for Pacific peoples (Figure 52). In absolute numbers, this meant that of the 110 deaths between 2002 and 2011 for non-MPA, 59 deaths were Māori, 35 Pacific, 5 Asian and 25 were non-MPA.

Figure 50. Childhood pneumonia mortality rates 2000-2011, age-adjusted.



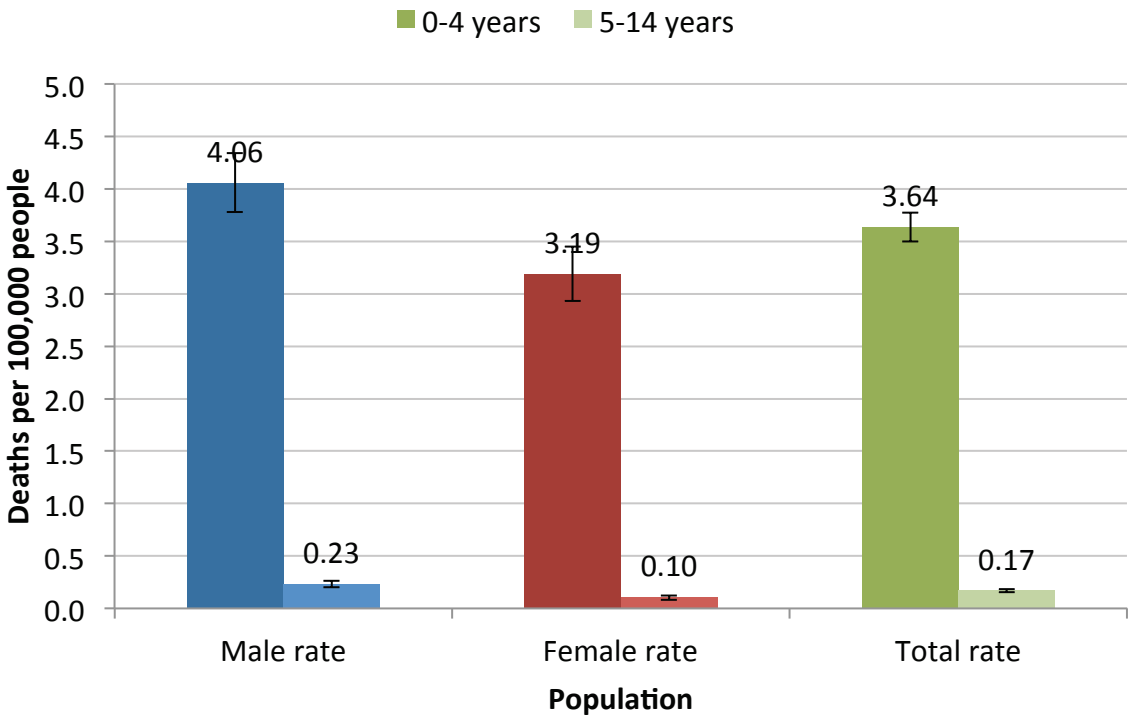
(See Table A 52 for data)

N.B. Confidence intervals are wide. The peak and trough in 2004 and 2001 respectively are significantly different from each other, but not from other years.

Socio-economic inequalities were even more marked. There was a clear trend of higher mortality with increasing deprivation. Over half of all deaths were in the most deprived quintile (Figure 53), for whom the mortality rate was 11.87 times higher than in the least deprived quintile.

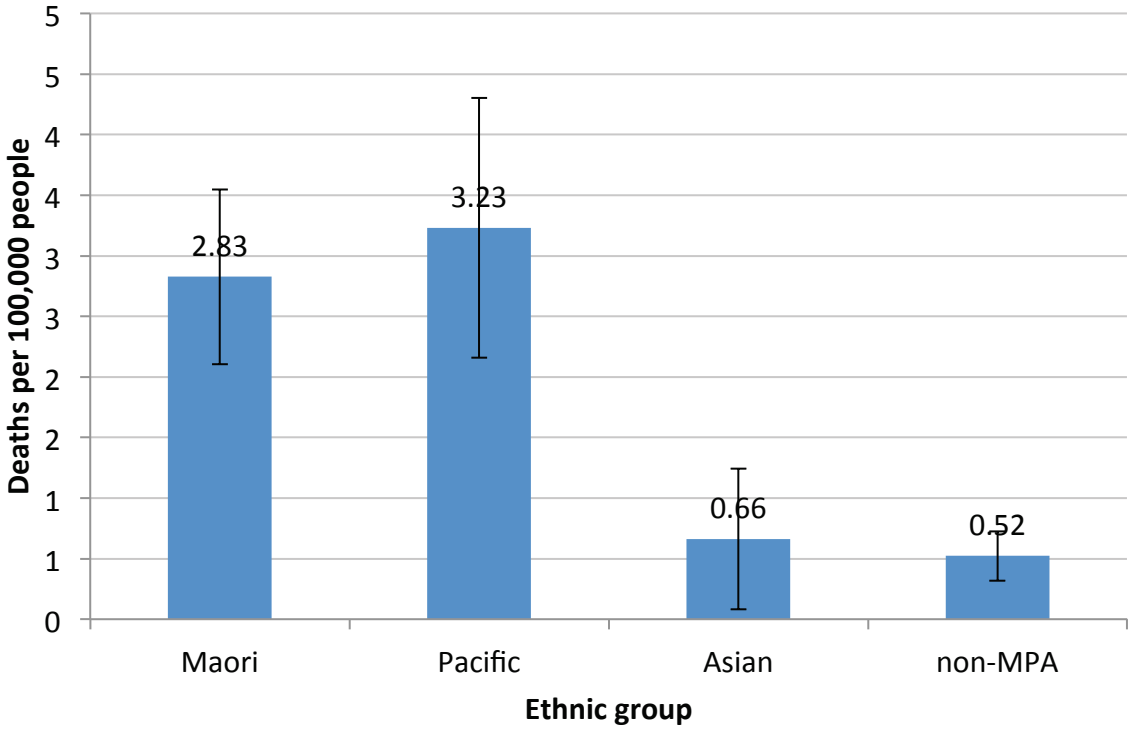
Childhood pneumonia mortality rates were highest, and significantly higher than the national average, in Counties Manukau and Waikato DHBs (Figure 54).

Figure 51. Childhood pneumonia deaths per 100,000 people by age group and sex, 2002-2011.



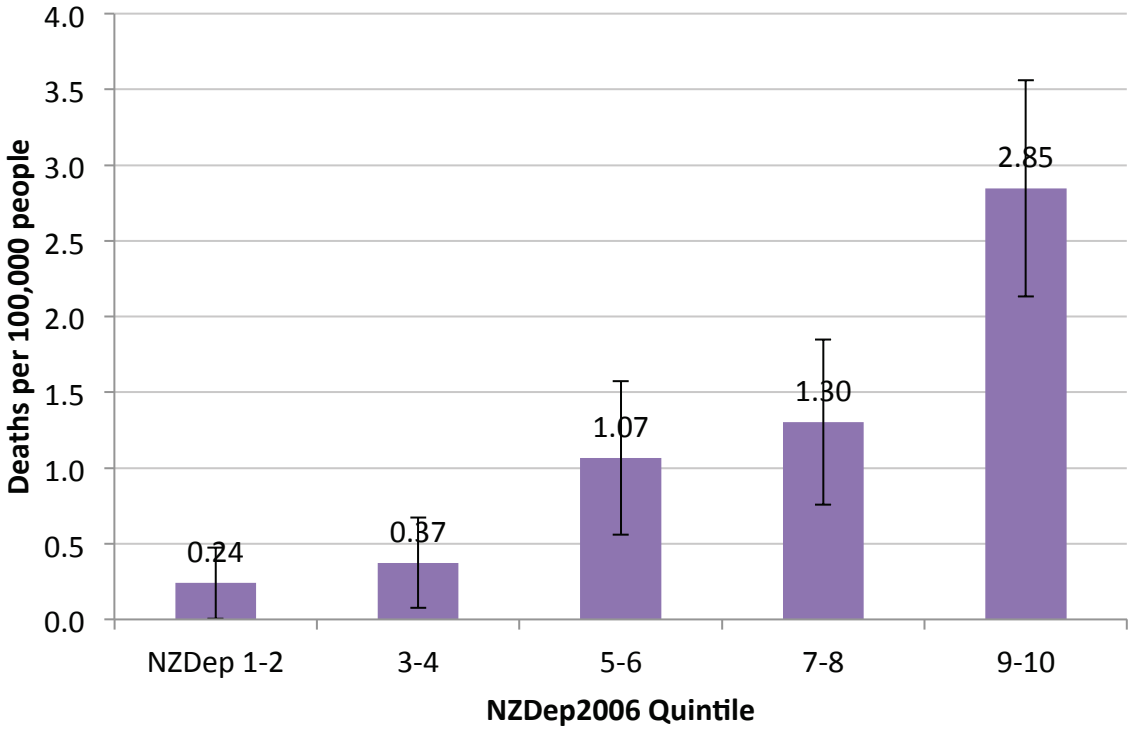
(See Table A 53 and Table A 54 for data)

Figure 52. Childhood pneumonia mortality per 100,000 people per year by ethnic group, 2002-2011.



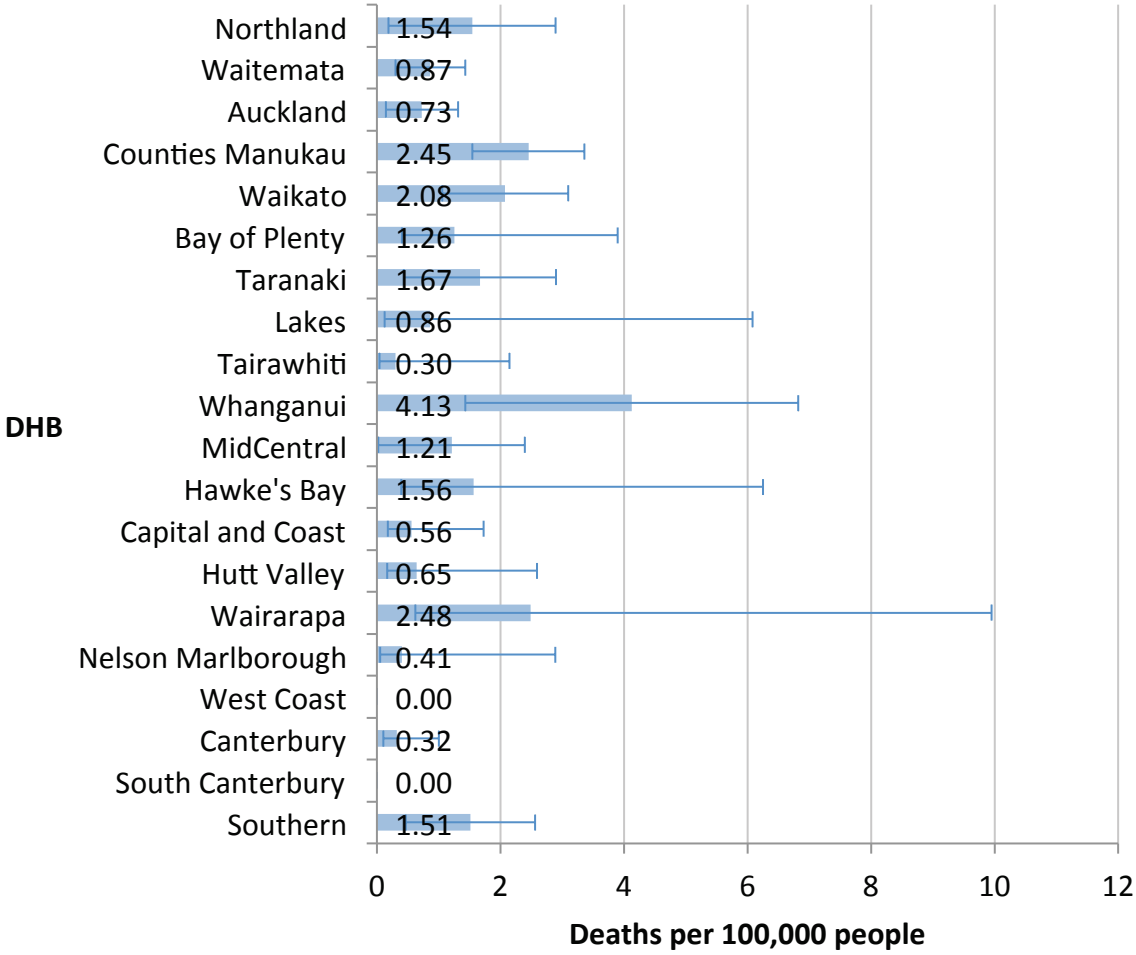
(See Table A 55 for data)

Figure 53. Childhood pneumonia deaths per 100,000 people by NZDep2006 quintile, 2002-2011, age-adjusted.



(See Table A 56 for data)

Figure 54. Childhood pneumonia deaths per 100,000 people per year, by DHB, 2002-2011, age-adjusted



(see Table A 57 for data)

6.6. COPD IN OLDER ADULTS (40+ YEARS)

6.6.1. PREVALENCE

The 2003/4 prevalence of COPD in adults aged 40 and over was estimated to be 14.2%[18]. This estimate used the "Global Initiative for Chronic Obstructive Lung Disease" (GOLD) definition for COPD.

A report on the burden of asthma and COPD in New Zealand reported that of 122,953 patients aged 45+ in their primary care cohort, 1871 or 2.3% were identified as having diagnosed and recently medicated COPD.[7]

There were no other studies of the incidence or prevalence of adult COPD during the study period.

We estimated the 2012 prevalence of severe COPD by identifying people who had been hospitalised with COPD between 1988 and 2012, and excluding those deceased by 31 December 2012. This method identified 28,515 New Zealanders living with COPD at the end of 2012, giving a total population prevalence of 0.67%. Population prevalence was highest for Māori, at 0.86%, followed by non-MPA, at 0.79%, and trailed by Pacific and Asian peoples at 0.57% and 0.10% respectively. Prevalence was a little higher for women (0.68%) than men (0.65%). 98% of cases people with COPD in 2012 were over the age of 40, making the population prevalence of ever-hospitalised COPD 1.4% in people aged 40 and over.

The average age of Māori with COPD was 65.4, compared with 68.9 for Pacific peoples, 71.7 for Asian peoples, and 76.3 for non-MPA. The difference in average ages suggests that the relatively high prevalence rate for non-MPA may be due to better survival rates rather than greater susceptibility.

Note that this measure includes only those hospitalised for COPD since 1988, and will not include those who have been able to effectively manage their COPD in the community and primary care. However, it is included here to provide a reference for future updates, bearing in mind that the 1.4% prevalence in adults aged 40 and over represents only 59% of the prevalence found in the primary care cohort, and just under 10% of the 2003/4 GOLD-defined COPD prevalence.

6.6.2. INCIDENCE

We estimated the 2012 incidence of severe COPD by identifying COPD hospital admissions in 2012 where the patient had not previously been hospitalised with COPD (since 1988, the start of data availability). There were 3,698 new cases of COPD in 2012, a total incidence rate of 87.2 per 100,000 people. Rates were highest for Māori, at 112.4, followed by non-MPA at 101.4, and lower for Pacific, at 68.3, and Asian peoples, at 19.5. Average age of onset was 70.7 years, and was earliest for Māori, at 62.2 years, followed by Pacific, at 63.5 years, Asian, at 69.1 years, and latest for non-MPA, at 73.3 years.

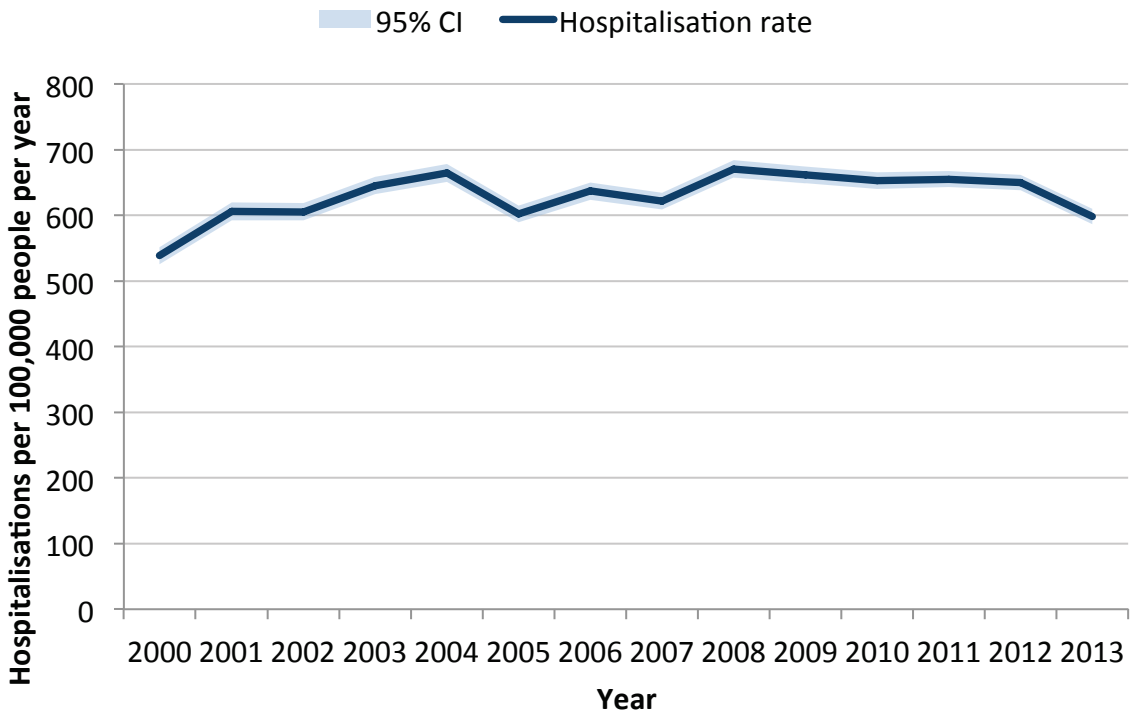
6.6.3. HOSPITALISATIONS

It should be noted that COPD hospitalisations may include cases of misdiagnosed bronchiectasis, and vice versa. Bronchiectasis hospitalisations are less common than COPD: if all bronchiectasis hospitalisations were in fact misdiagnosed COPD, it would increase the COPD rates by about 88 hospitalisations per 100,000 people per year (2012), about 6.9% of the total COPD burden. However, although the actual proportion of misdiagnoses is unknown, it is unlikely to be so large.

Trends over time

Although rates in 2000 were lower than in subsequent years, there was no significant trend in COPD hospitalisation rates over the study period (Figure 55).

Figure 55. COPD hospitalisations in adults aged 40+, per 100,000 people per year, 2000-2013.



(See Table A 58 for data)

Risks and determinants

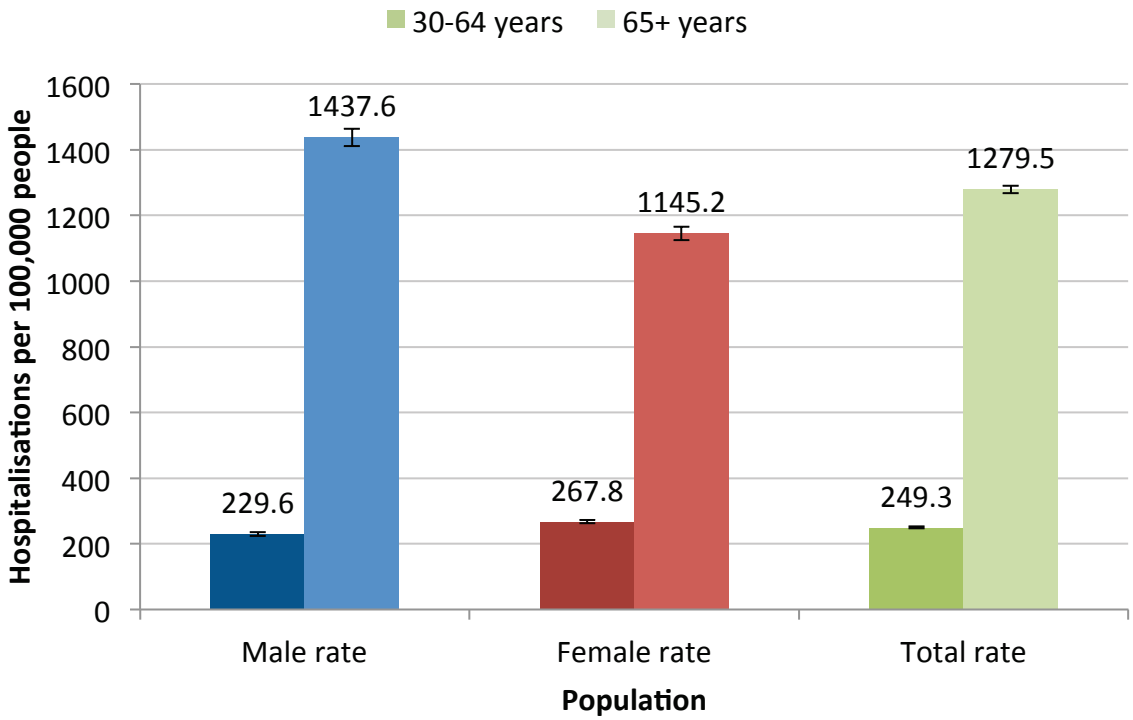
COPD hospitalisation rates were lower for men than women in the 40 to 64 year age group (rate ratio 0.9), but higher in the 65+ age group (rate ratio 1.3) (Figure 56).

COPD rates were highest for Māori, at 3.5 times the non-MPA rate, and Pacific peoples (rate ratio 2.8), and lowest for Asian peoples (rate ratio 0.5) (Figure 57).

There was a strong deprivation gradient, with COPD rates 5.1 times higher in the most deprived NZDep quintile than in the least deprived (Figure 59). The gradient persisted across Māori, Asian and non-MPA ethnic groups, but Pacific peoples had a two-tier effect, with rates similar across the first four NZDep quintiles, and higher rates in the most deprived quintile (Figure 60).

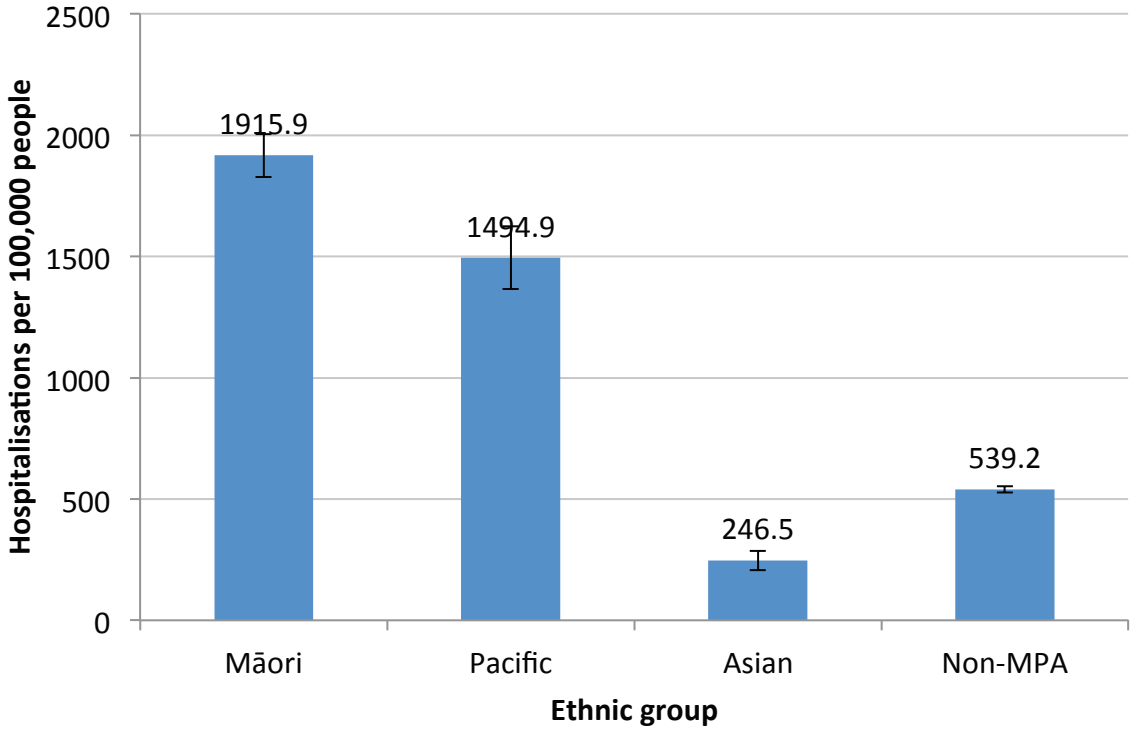
Unlike other indicator conditions, COPD was relatively evenly spread across the country. Highest DHB rates were for Lakes, and West Coast (Figure 61).

Figure 56. COPD hospitalisations in adults aged 40+, per 100,000 people, by age group and sex, 2013.



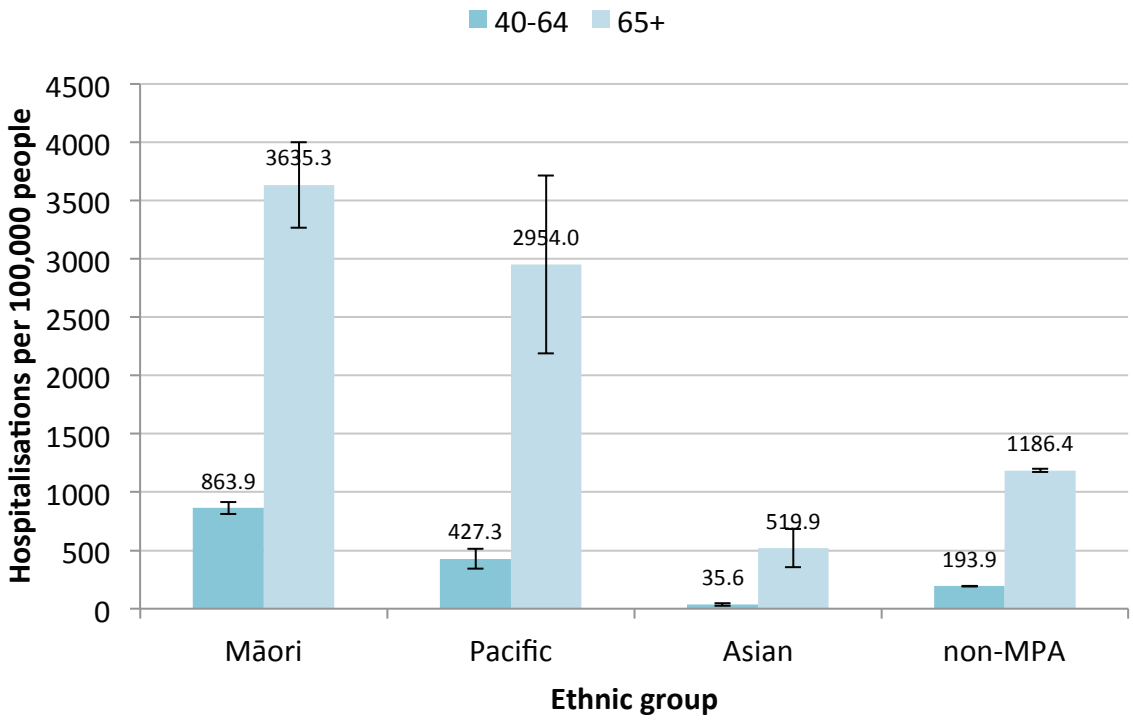
(See Table A 59 and Table A 60 for data)

Figure 57. COPD hospitalisations in adults aged 40+, per 100,000 people, by ethnic group, 2013.



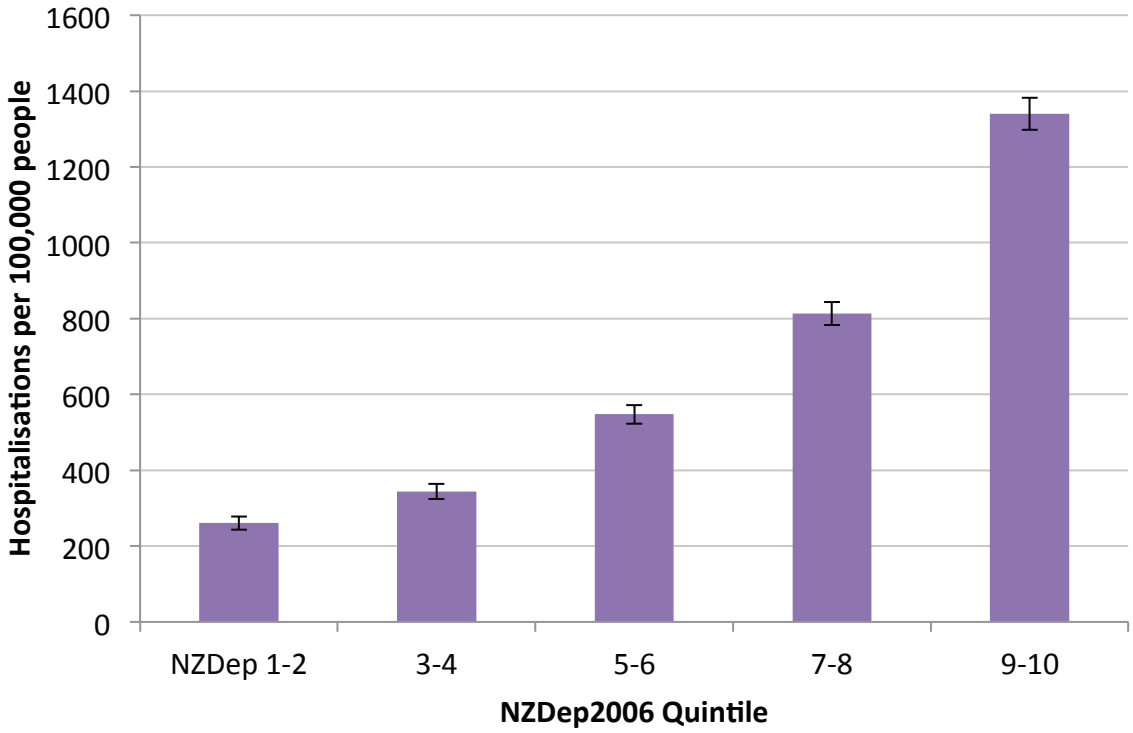
(See Table A 61 for data)

Figure 58. COPD hospitalisations in adults aged 40+, per 100,000 people, by ethnic group and age group, 2013.



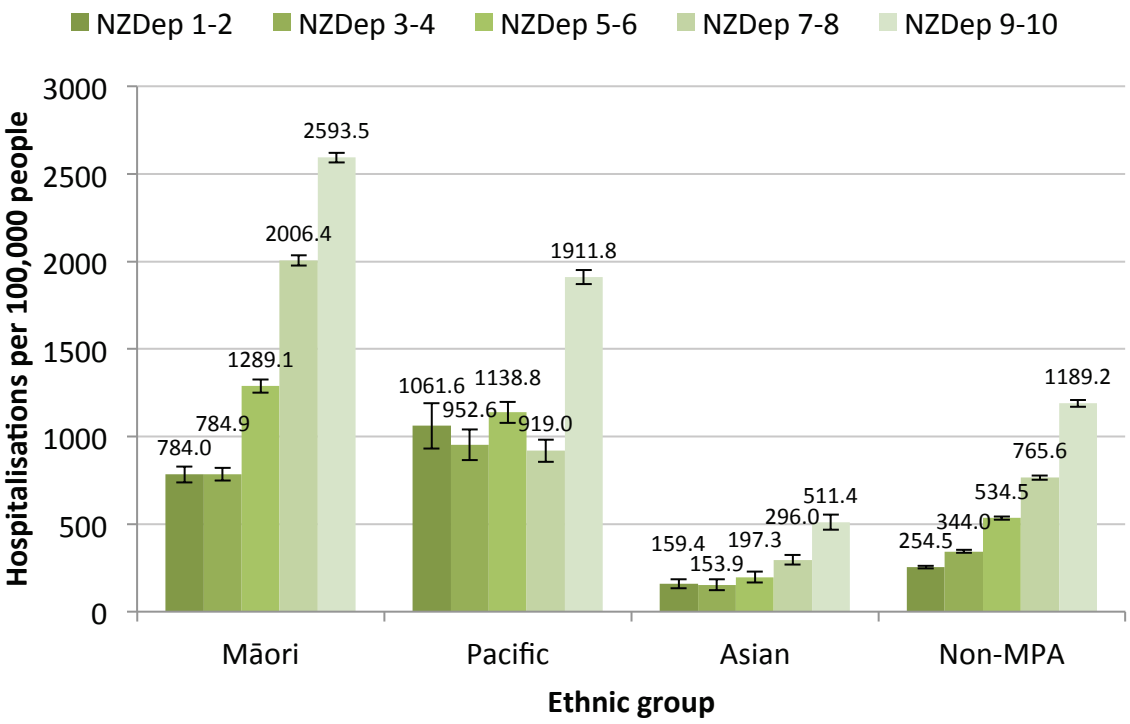
(See Table A 62 for data)

Figure 59. COPD hospitalisations in adults 40+, per 100,000 people, by NZDep2006 quintile, 2013, age-adjusted.



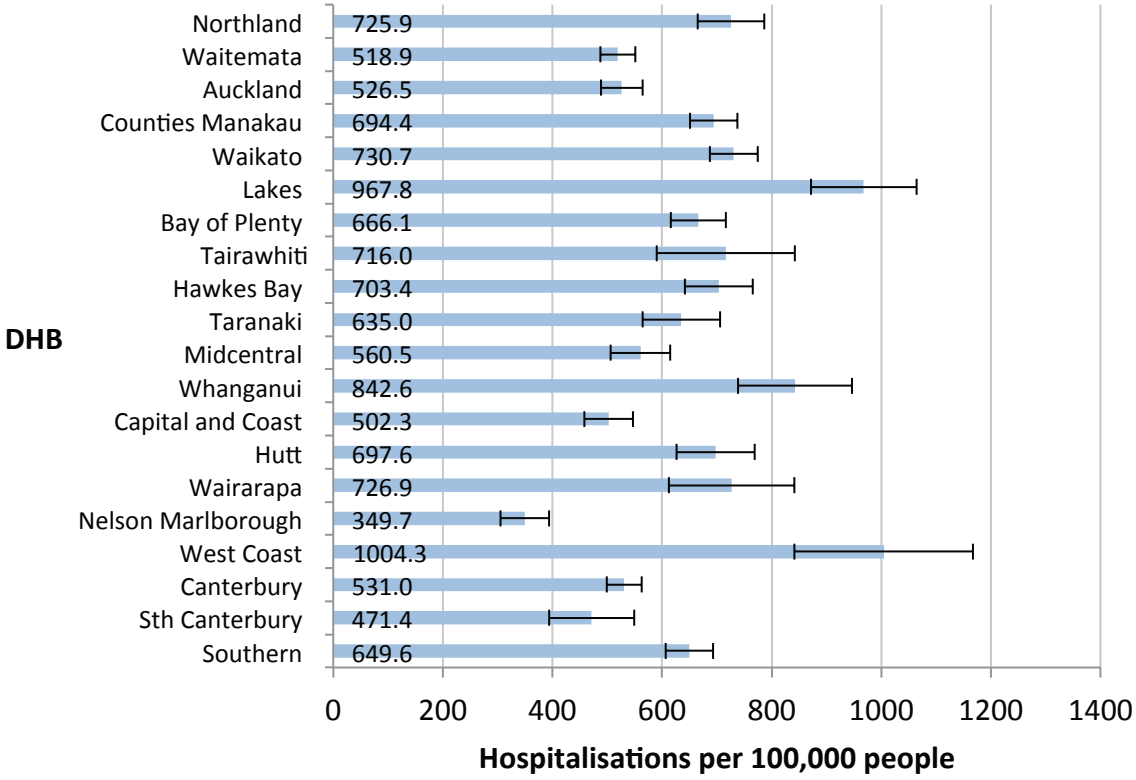
(See Table A 63 for data)

Figure 60. COPD hospitalisations in adults aged 40+, per 100,000 people, by ethnic group and NZDep2013, 2013, age-adjusted.



(See Table A 64 for data)

Figure 61. COPD hospitalisations in adults aged 40+, per 100,000 people, by DHB, 2013.



(see Table A 65 for data)

6.6.4. MORTALITY

Mortality due to COPD declined over the study period, from an age-adjusted 111.4 deaths per 100,000 in 2000, to 92.4 deaths per 100,000 in 2011. This represented a decline of 3.00 deaths per 100,000 people per year. If this trend were to continue, we would see COPD eliminated as a cause of death by 2042.

Risks and determinants

COPD mortality rates were higher in women than in men in the 40-64 years age group, but higher in men than in women in the 65+ years age group (Figure 63).

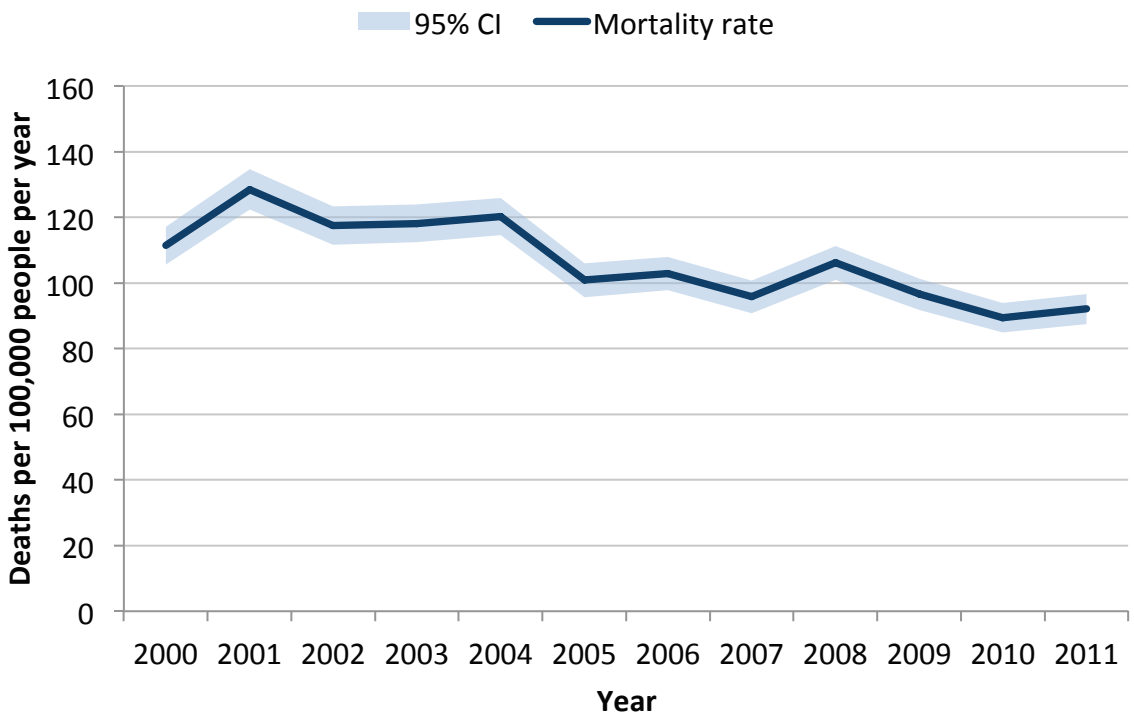
COPD mortality rates were highest in Māori, whose rate of 199.9 deaths per 100,000 people per year was 2.22 (95% CI 2.04-2.41) times higher than 90.2 rate for non-MPA. Pacific rates were not significantly different from non-MPA rates. However, the COPD mortality rate for Asian peoples was roughly a quarter of, and significantly lower than, rates for non-MPA (Figure 64). Similar patterns were observed for both measured age-groups (Figure 65).

COPD mortality rates also increased with increasing socio-economic deprivation, with deaths in NZDep2006 quintile 9-10 occurring at 2.65 times the rate in quintile 1-2 (Figure

66). Increasing COPD mortality with increasing deprivation was apparent in Māori and non-MPA ethnic groups, but was not statistically significant for Pacific or Asian peoles (Figure 67).

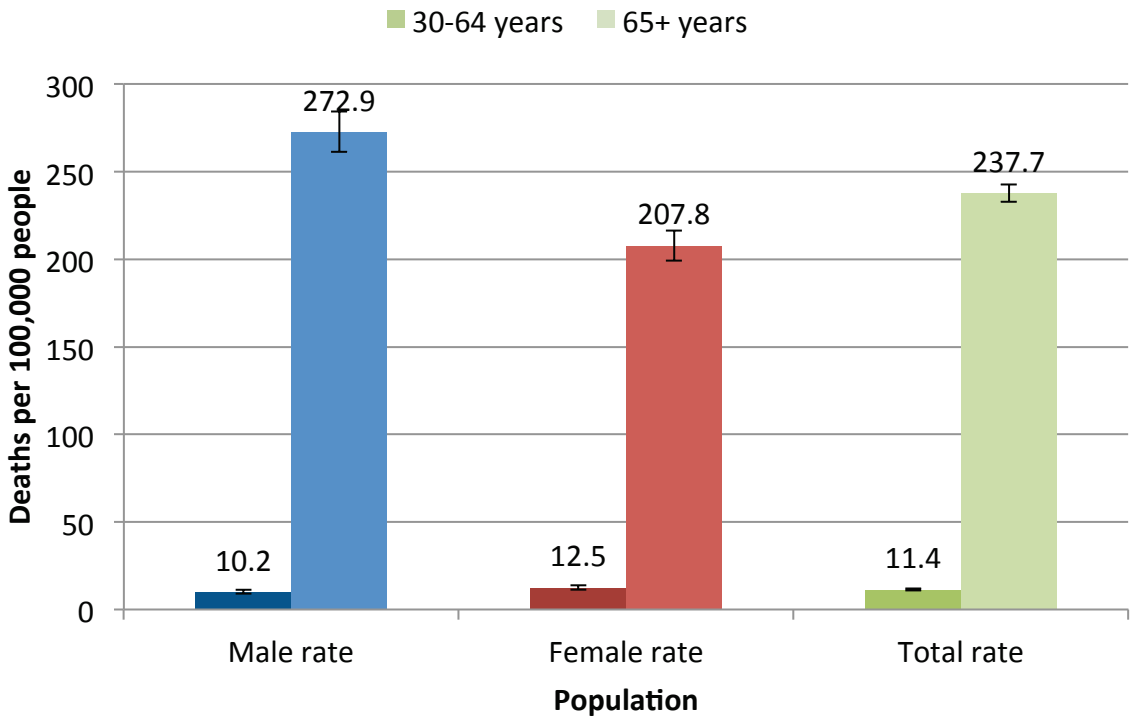
Adult COPD mortality rates for 2011 were significantly higher than the national average in Hawkes' Bay, Lakes and Wairarapa DHBs.

Figure 62. Adult COPD mortality rates 2000-2011, age-adjusted.



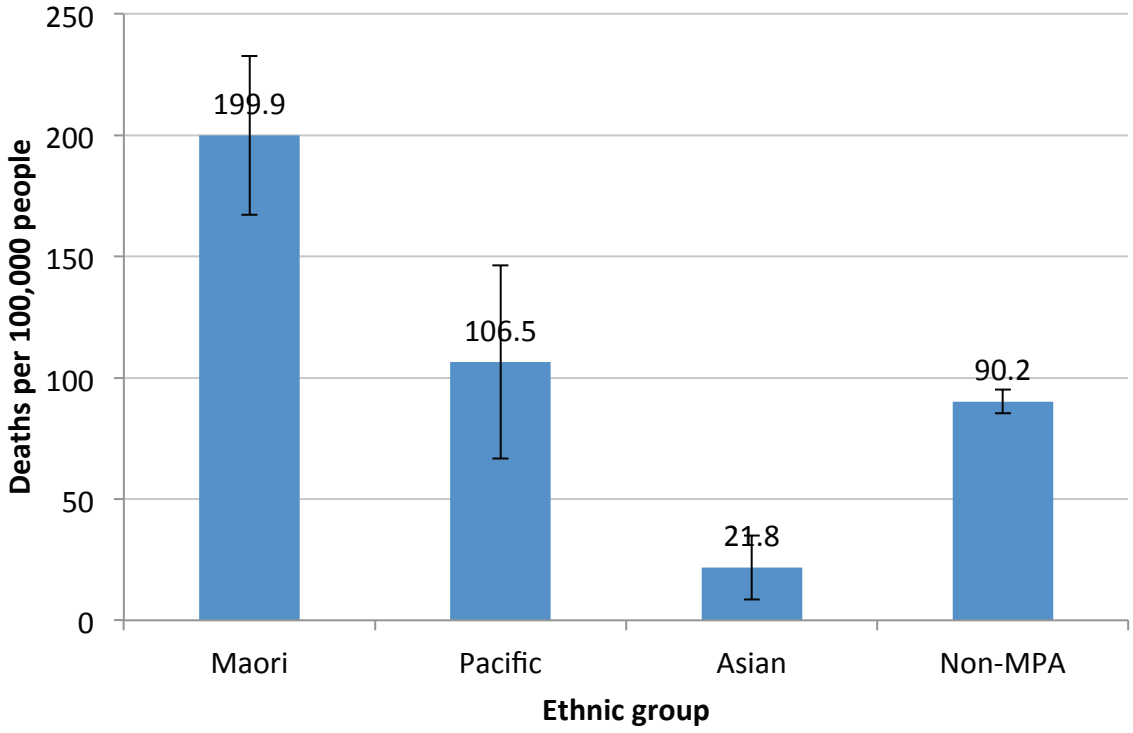
(See Table A 66 for data)

Figure 63. Adult COPD deaths per 100,000 people by age group and sex, 2011.



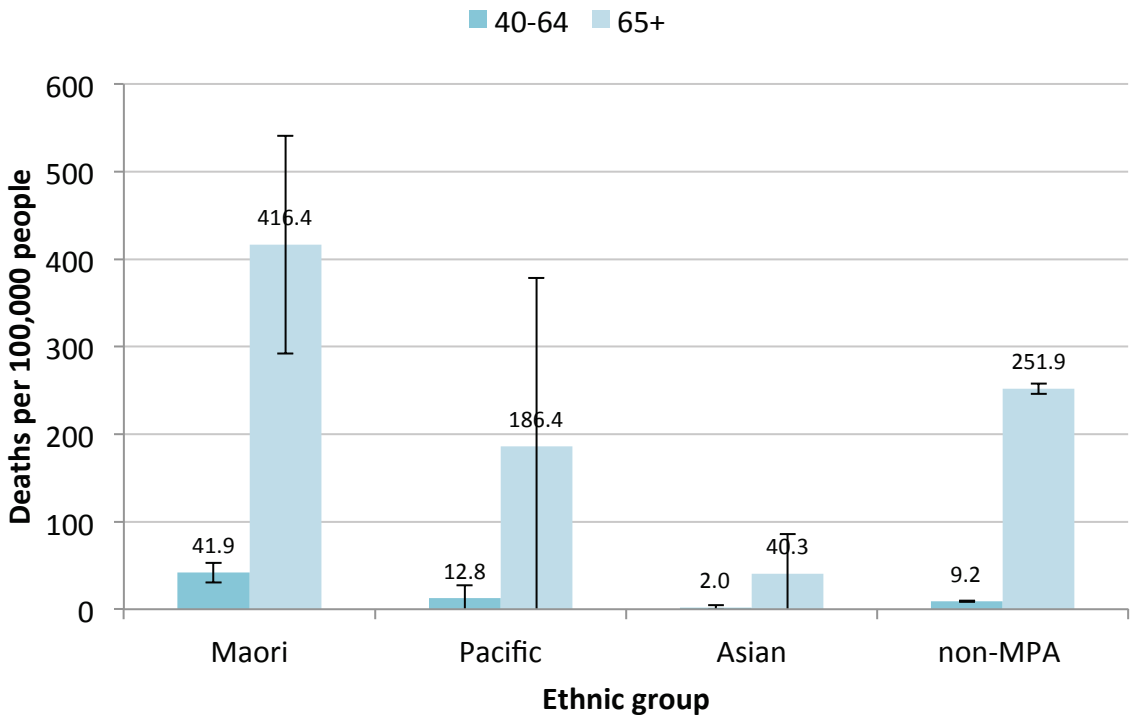
(See Table A 67 and Table A 68 for data)

Figure 64. Adult COPD mortality per 100,000 people per year by ethnic group, 2011.



(See Table A 69 for data)

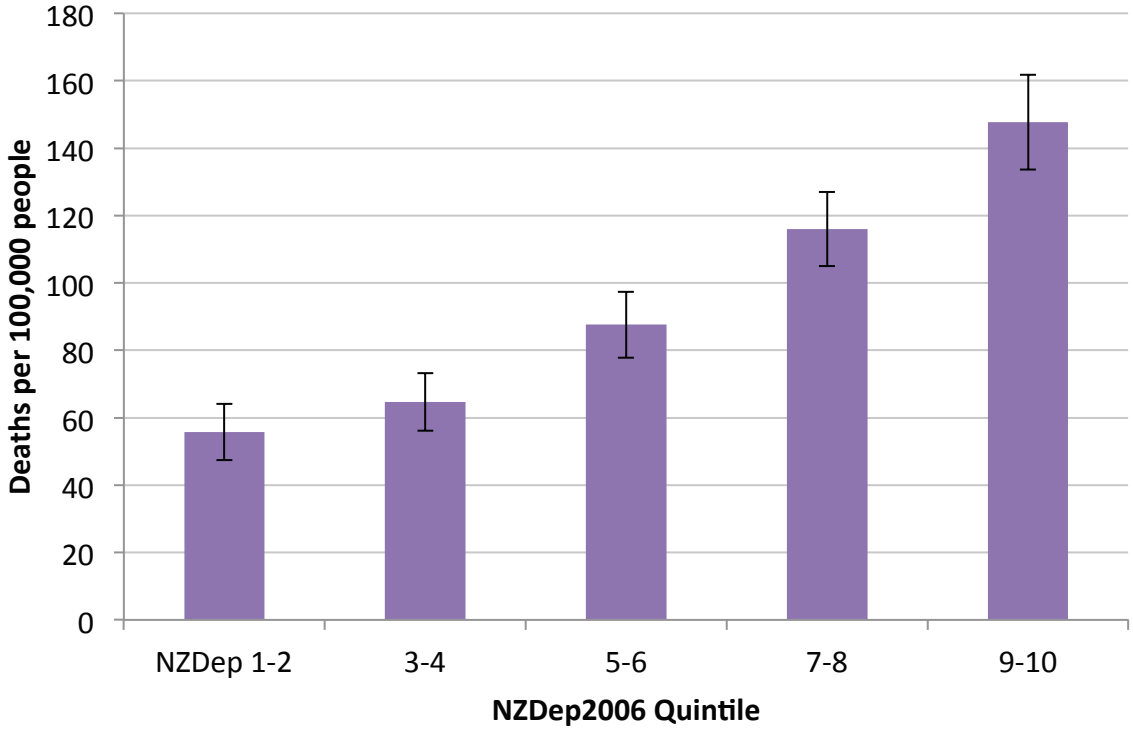
Figure 65. Adult COPD deaths per 100,000 people per year, by ethnic group and age group, 2011.



(See Table A 70 for data).

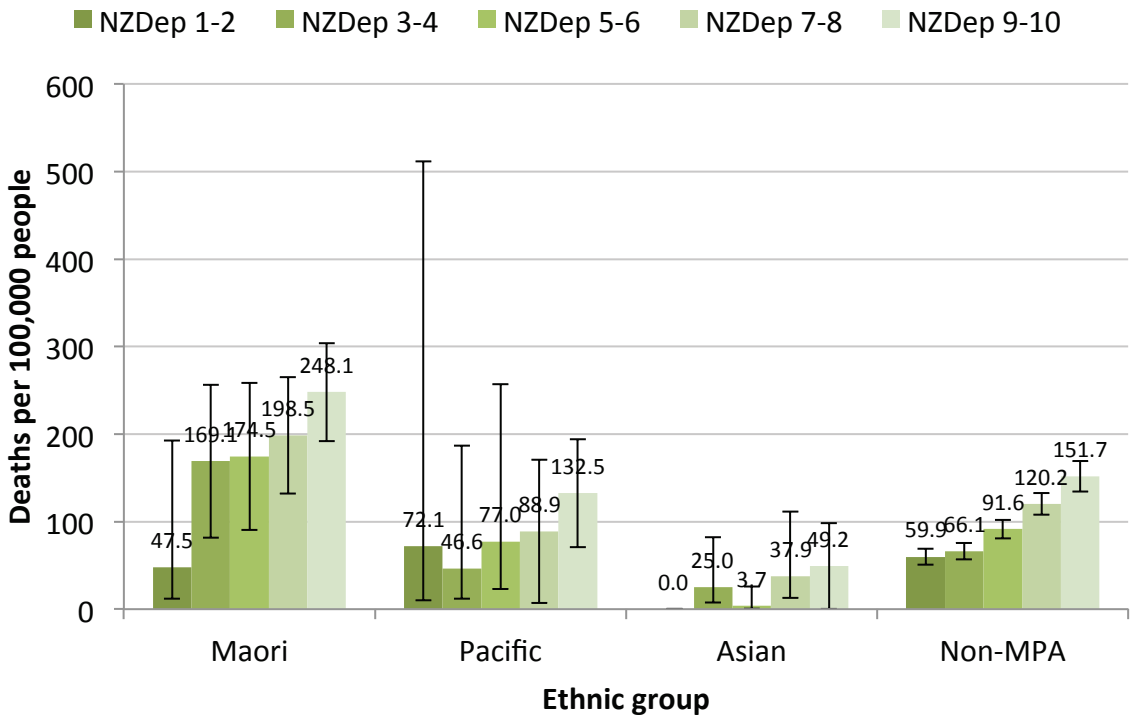
N.B. Confidence intervals for Pacific peoples aged 65+ are wide and should be interpreted with caution.

Figure 66. Adult COPD deaths per 100,000 people by NZDep2006 quintile, 2011, age-adjusted.



(See Table A 71 for data)

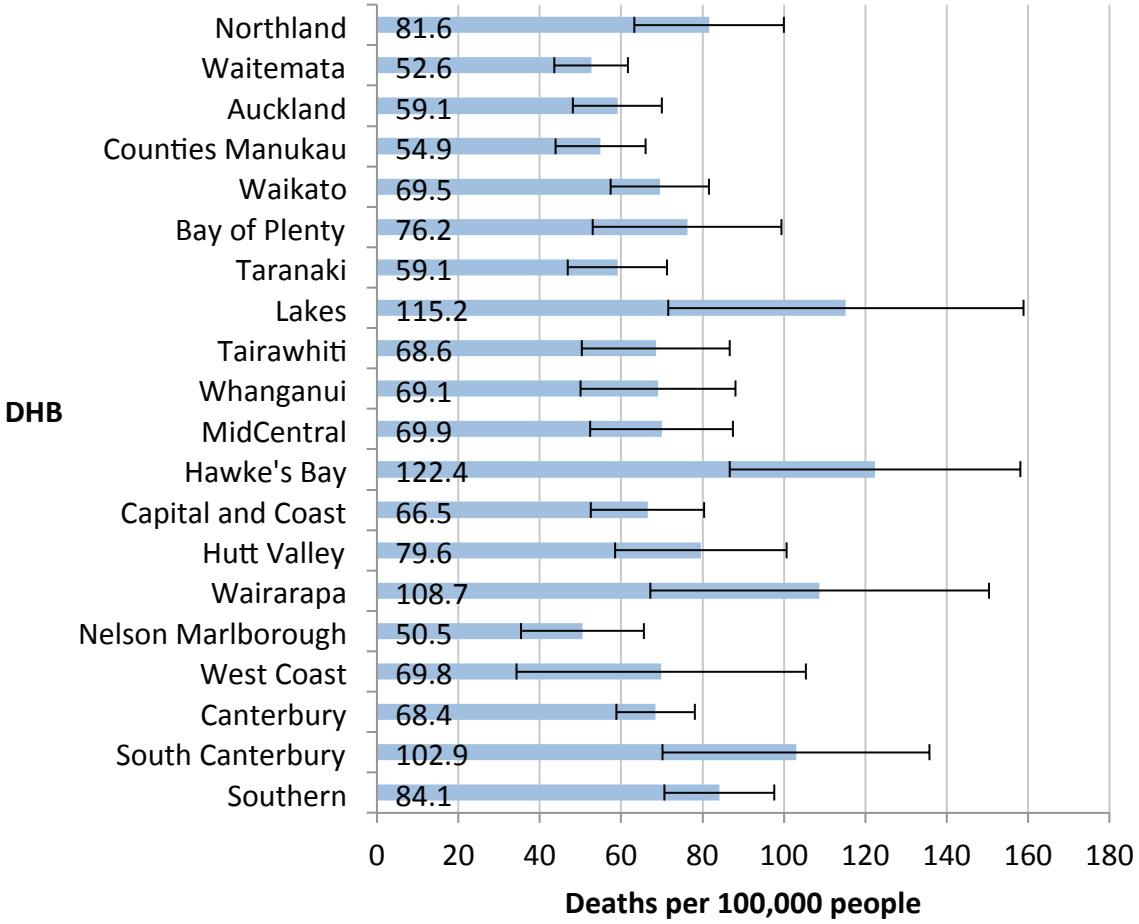
Figure 67. Adult COPD deaths per 100,000 people by ethnic group and NZDep2006, 2011, age-adjusted.



(See Table A 72 for data)

N.B. Confidence intervals were wide for Māori, Pacific and Asian ethnic groups. Trends of increasing mortality with increasing socioeconomic deprivation were not statistically significant for Pacific or Asian peoples.

Figure 68. Adult COPD deaths per 100,000 people per year, by DHB, 2011, age-adjusted



(see Table A 73 for data)

6.7. TOTAL SERIOUS RESPIRATORY DISEASE

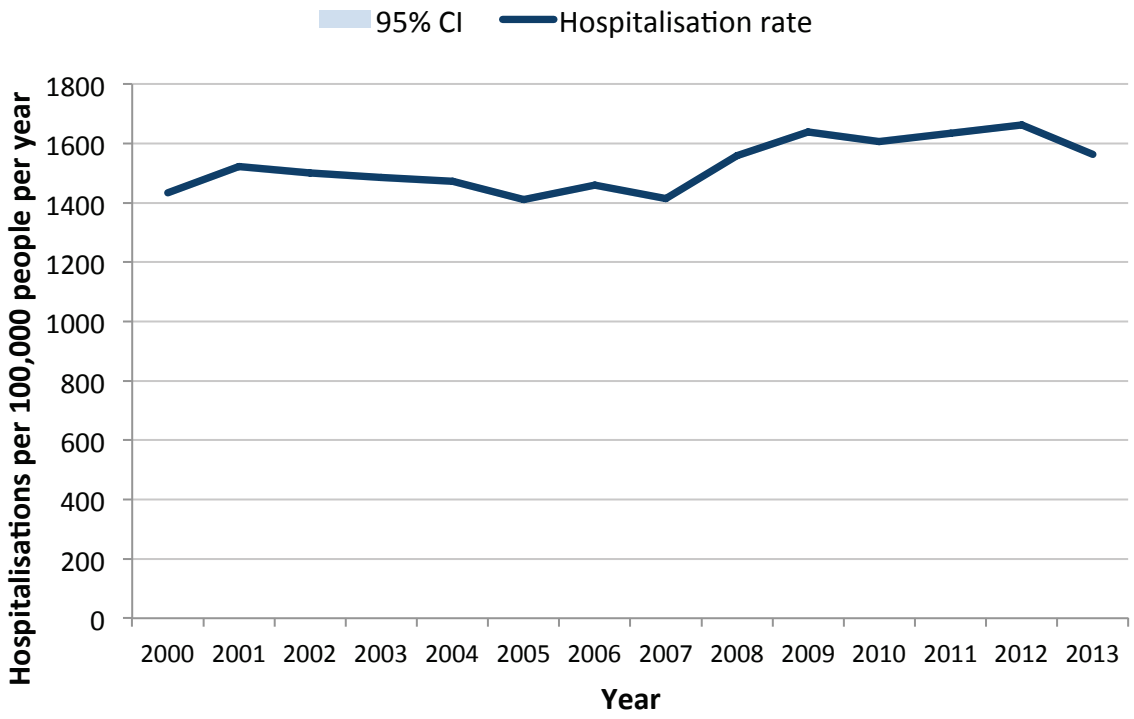
6.7.1. HOSPITALISATIONS

Trends over time 2000-2013

The 2013 rate of respiratory hospitalisations was 1563.1 per 100,000 people. Total respiratory hospitalisations have been increasing at a rate of 14.3 hospitalisations per year over the study period. However, this increase appears as a two-tier effect – rates remained within the same range from 2000 to 2007, then increased sharply in 2008, and stayed at the higher rate to the end of the study period in 2013. The arrival of influenza A(H1N1) in 2009 may have contributed to the rate remaining high, but cannot be responsible for the original increase in 2008 (Figure 69).

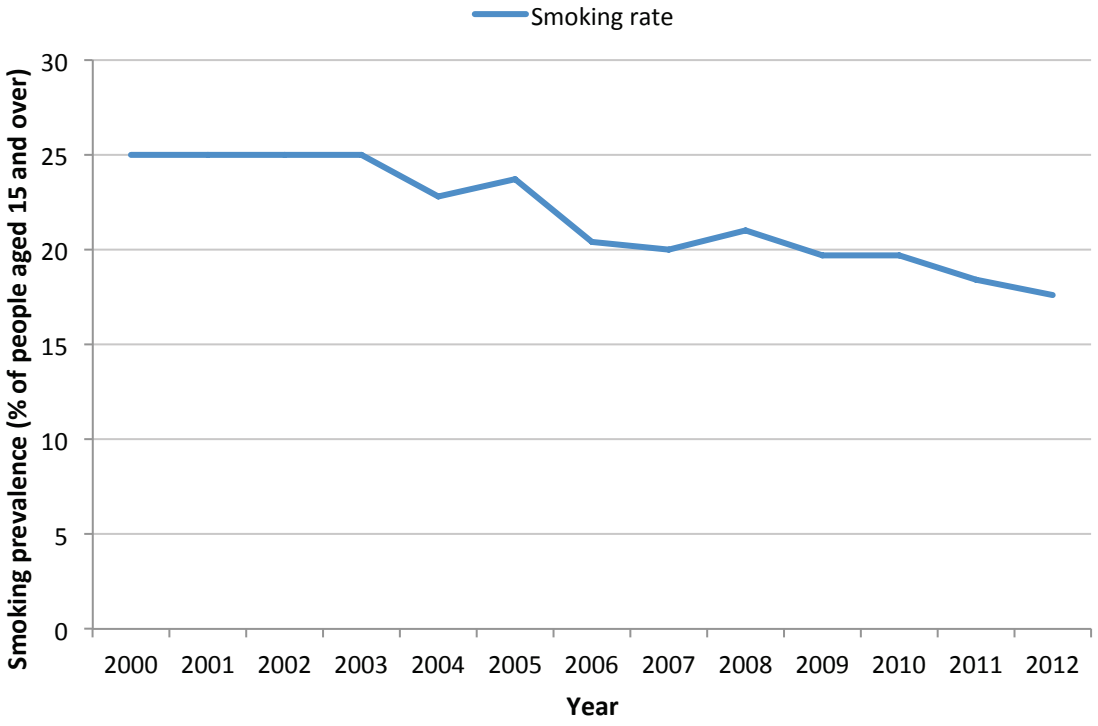
This increase has occurred despite a drop in tobacco smoking prevalence over a similar period (2000 – 2012) from 25% to 17.6%.[19]

Figure 69. Total respiratory hospitalisations per 100,000 people per year, 2000-2013.



(See Table A 74 for data)

Figure 70. New Zealand smoking prevalence 2000-2012.



Data sourced from Tobacco Control Data Repository, http://www.tcdata.org.nz/TobaccoSectorOverview.aspx, accessed 27 February 2015.

Risks and determinants

Respiratory hospitalisation rates were highest for the young (children aged under 15 years) and the elderly (adults aged over 65 years). Rates were higher for males than females in the young and the elderly, but higher for females than males in both age groups for adults aged 15 to 64 (Figure 71).

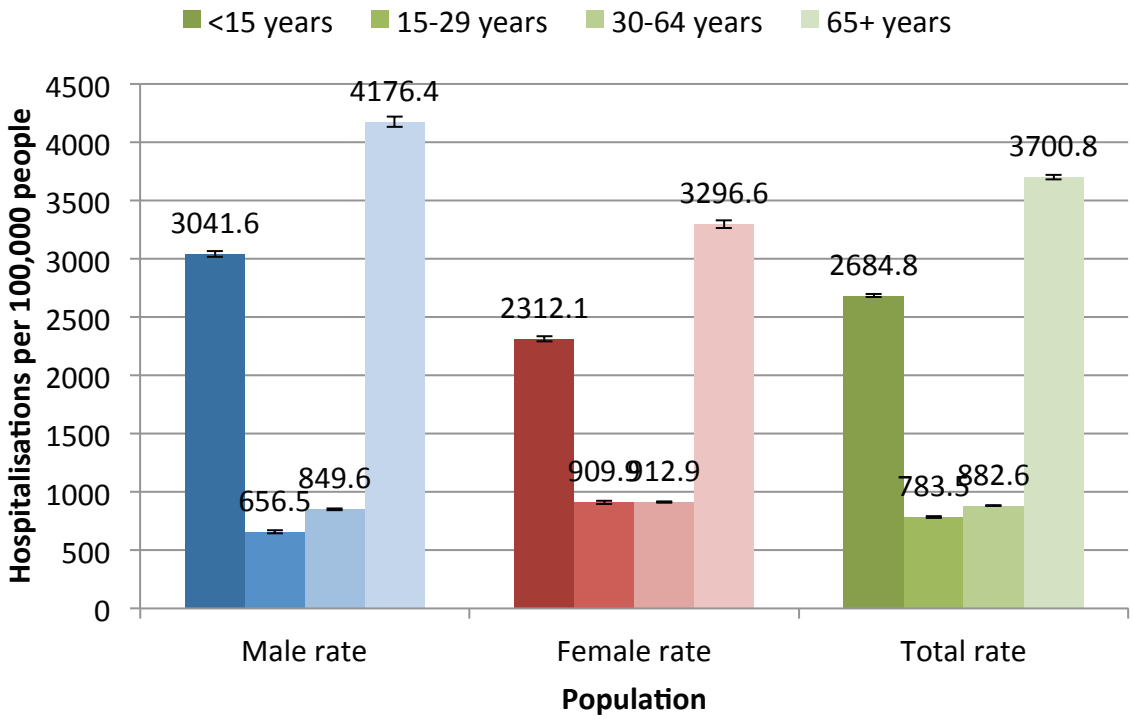
Respiratory hospitalisation rates were highest for Pacific peoples, with rates 2.6 times higher (95%CI 2.6-2.7) than for non-MPA. Māori rates were also significantly higher (rate ratio 2.1), while rates were lower for Asian peoples (rate ratio 0.9). These trends were repeated across all age groups (Figure 73).

There was a significant deprivation gradient in total respiratory hospitalisations, with rates in the most deprived NZDep quintile 2.9 times higher than rates in the least deprived quintile (Figure 74).

The deprivation gradient was present for Māori, Asian and non-MPA ethnic groups, but Pacific peoples' rates were similar across the first four quintiles, and higher in the most deprived quintile. However, Pacific rates across the first four quintiles were all higher than rates for non-MPA in the most deprived quintile: Pacific peoples living in wealthier areas still have poorer respiratory outcomes than non-MPA people in even the most deprived areas (Figure 75).

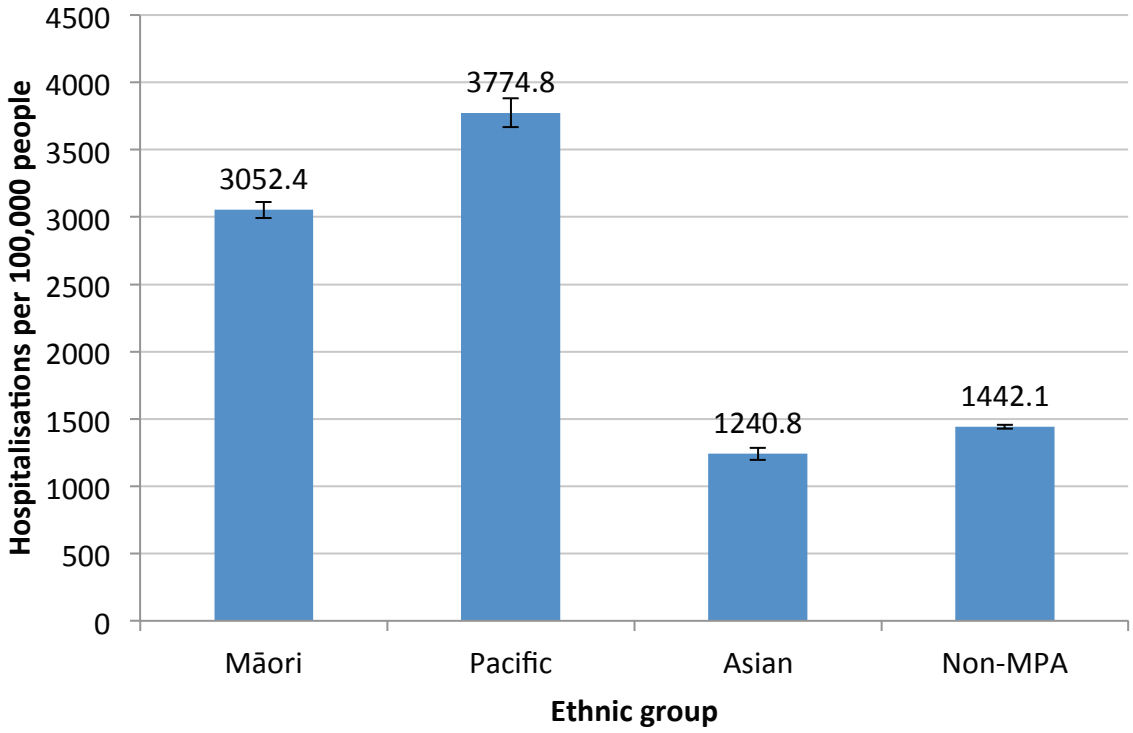
Total respiratory hospitalisation rates were highest in Counties Manukau, Lakes and Northland DHBs (Figure 76).

Figure 71. Total respiratory hospitalisations per 100,000 people by age group and sex, 2013.



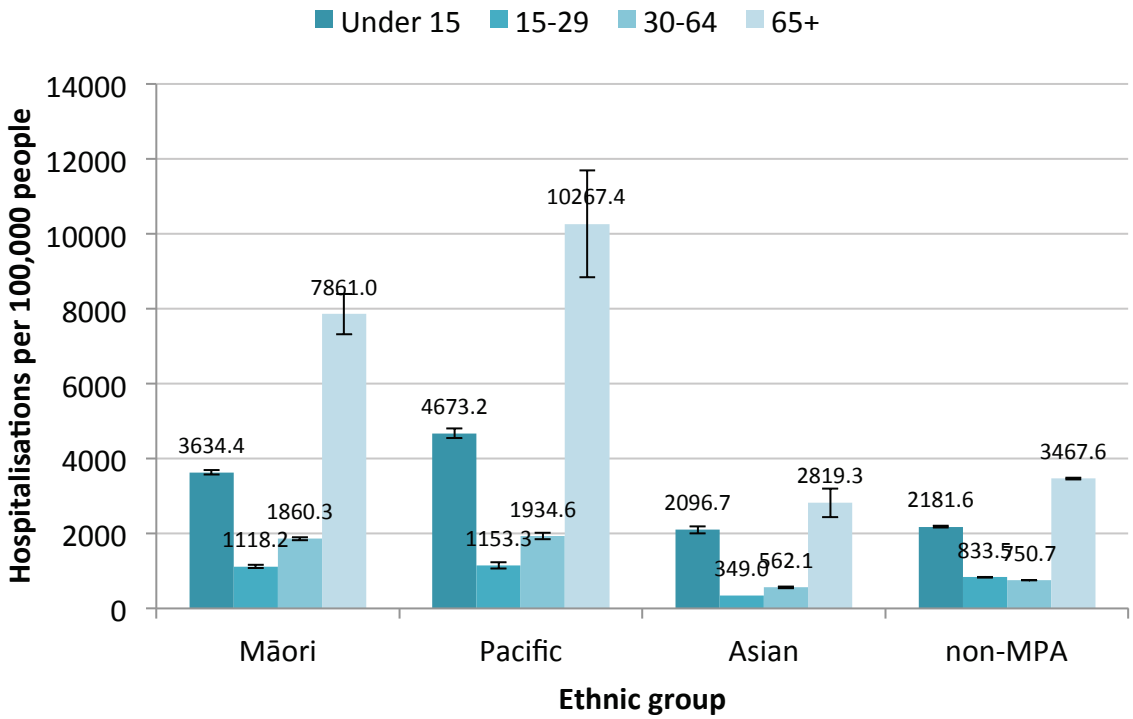
(See Table A 75 and Table A 76 for data)

Figure 72. Total respiratory hospitalisations per 100,000 people by ethnic group, 2013.



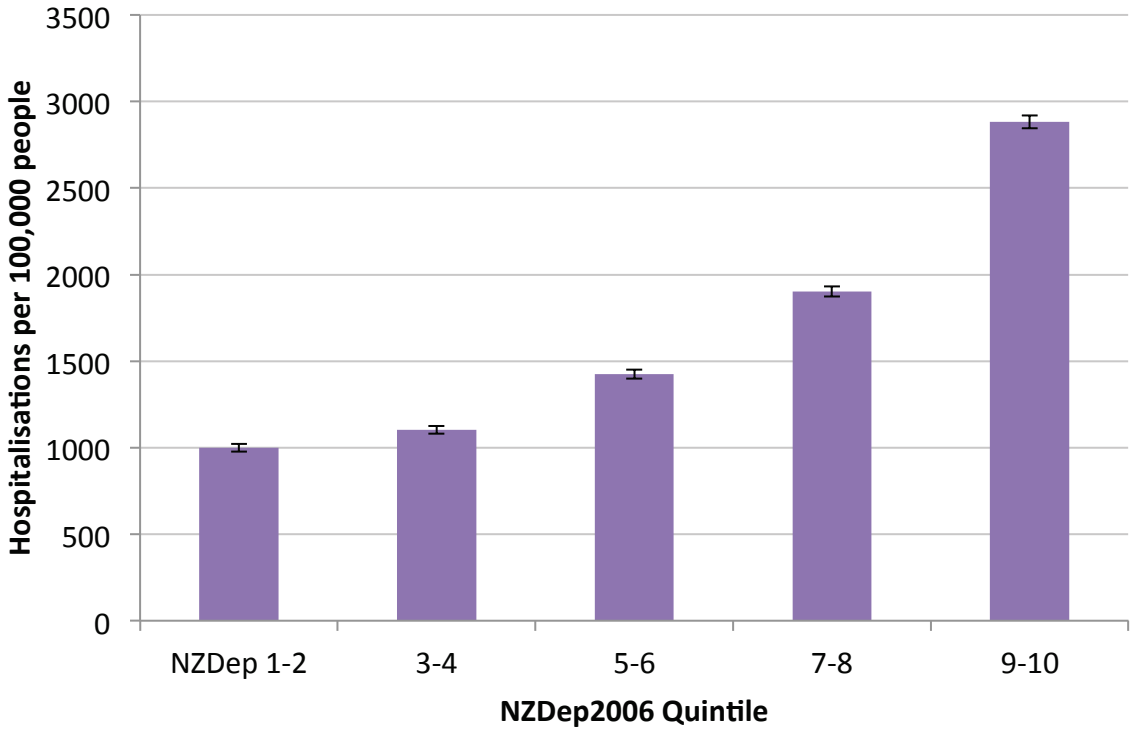
(See Table A 77 for data)

Figure 73. Total respiratory hospitalisations per 100,000 people by ethnic group and age group, 2013.



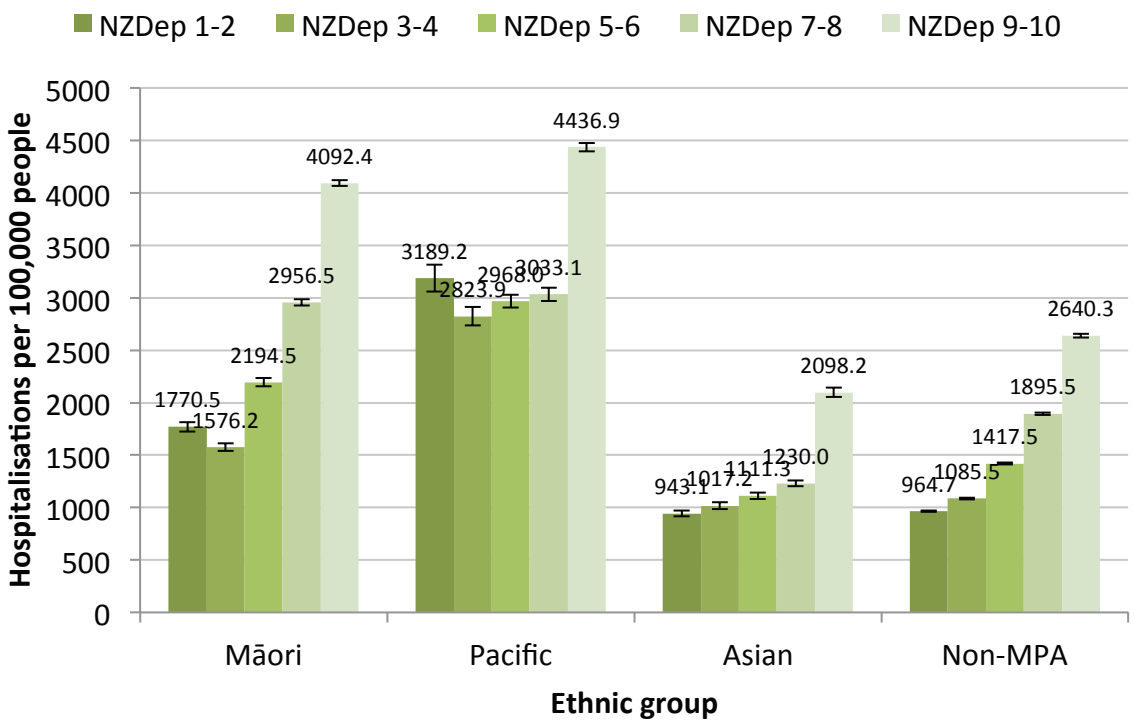
(See Table A 78 for data)

Figure 74. Total respiratory hospitalisations per 100,000 people by NZDep2013 quintile, 2013, age-adjusted.



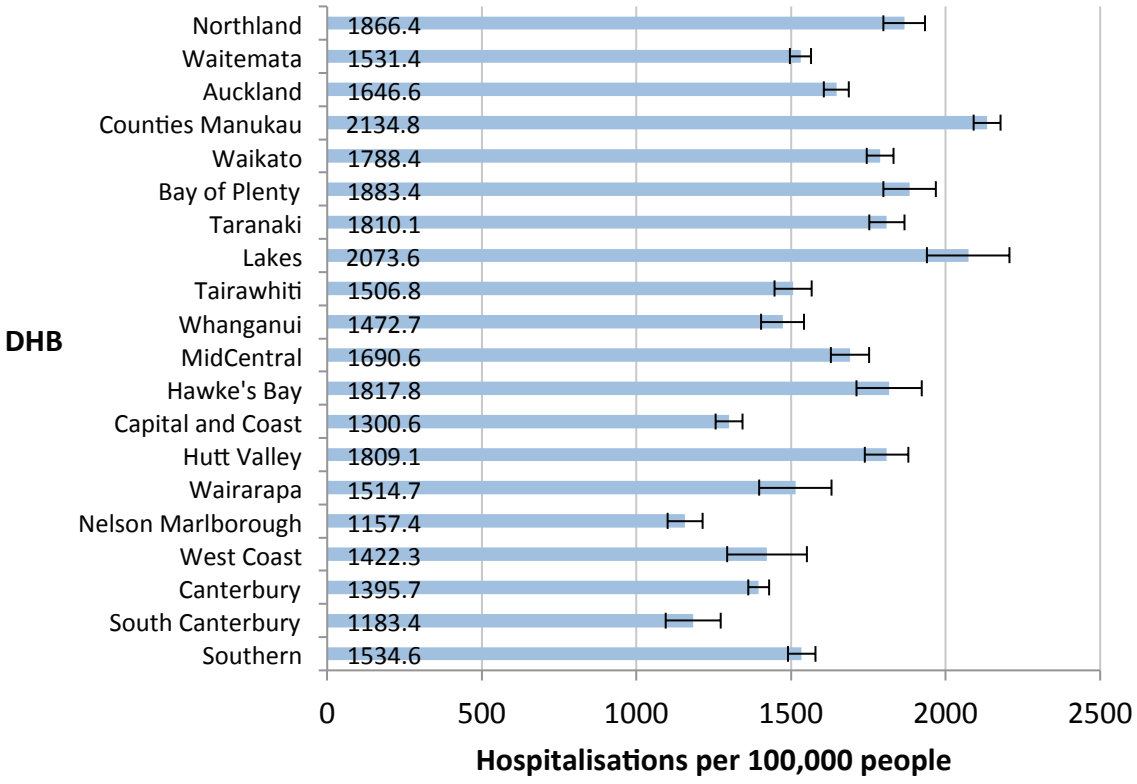
(See Table A 79 for data)

Figure 75. Total respiratory hospitalisations per 100,000 people by ethnic group and NZDep2006, 2013, age-adjusted.



(See Table A 80 for data)

Figure 76. Total respiratory hospitalisations per 100,000 people by DHB, 2013.

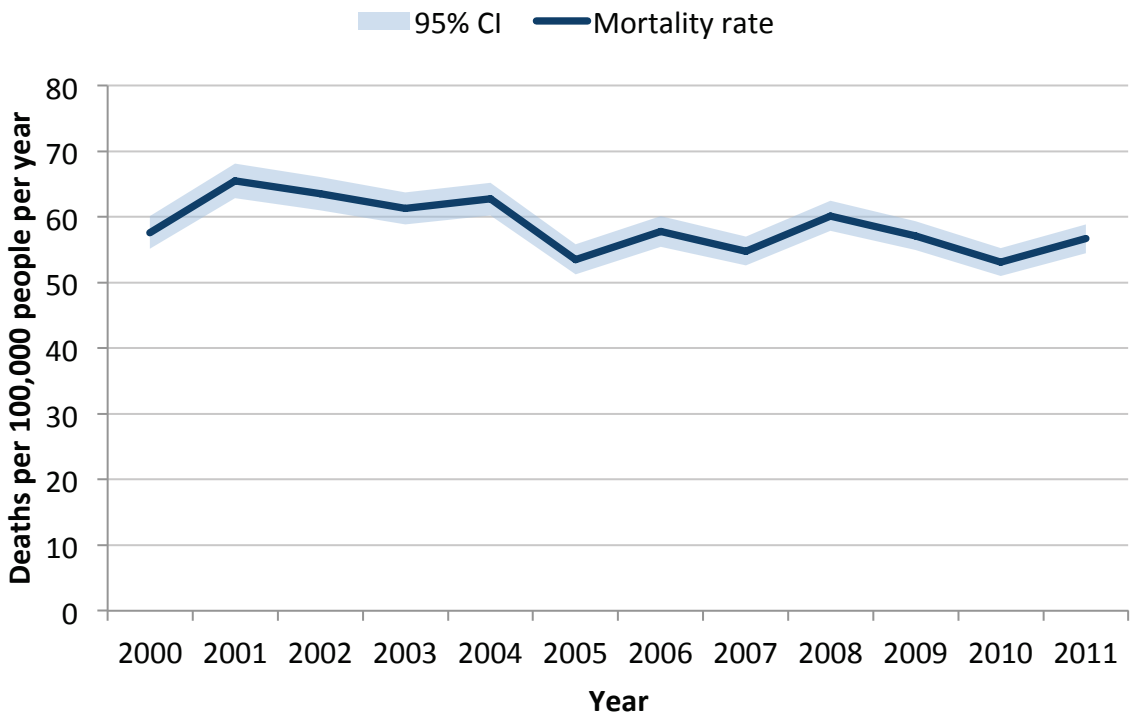


(see Table A 81 for data)

6.7.2. MORTALITY

Respiratory disease was the cause of 2676 deaths in 2011. Overall rates of respiratory disease have declined slightly, from 57.6 deaths per 100,000 people, to 56.7 deaths per 100,000 people. This decline was part of an overall trend of 0.69 less deaths per 100,000 people per year.

Figure 77. Total respiratory mortality rates 2000-2011, age-adjusted.



(See Table A 82 for data)

Risks and determinants

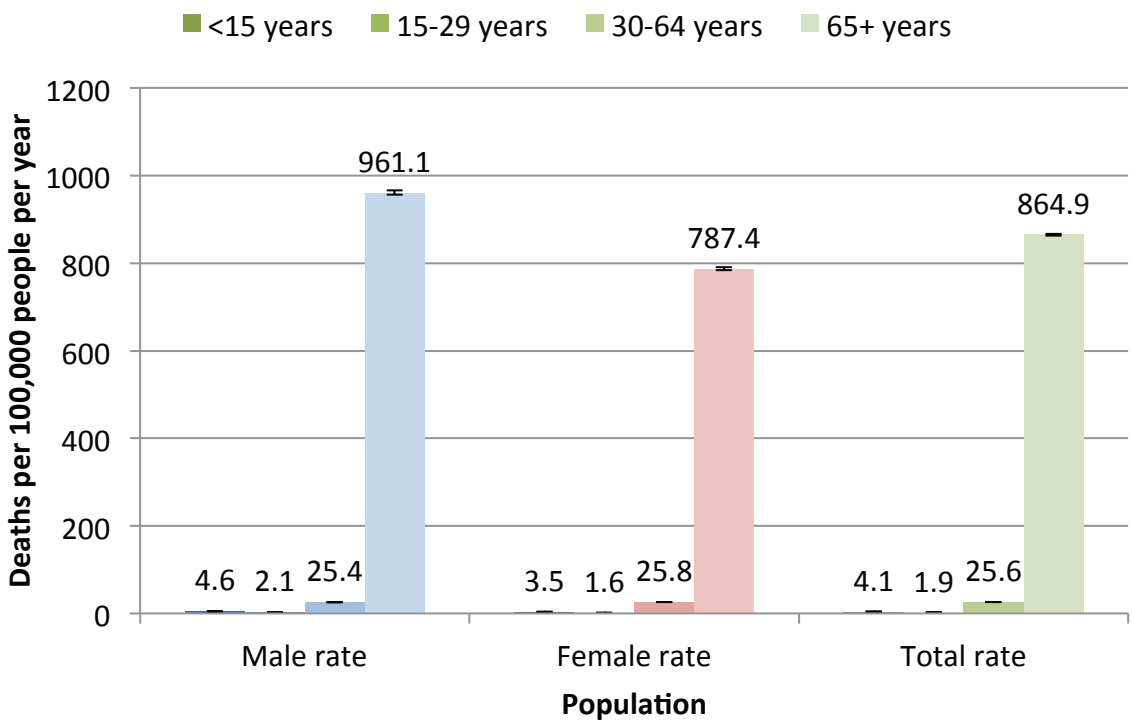
Mortality rates due to any respiratory disease were 33.8 times higher in people aged 65+ than in adults aged 30-64. Male rates were higher in men than women in the young (under 15 years) and the elderly (65+), but not significantly different in adults aged 30-64 (Figure 78).

Respiratory mortality rates were highest in Māori, just over double the rate for non-MPA (rate ratio 2.02; and also higher for Pacific peoples (rate ratio 1.54). However, the rate for Asian peoples was almost half that of non-MPA (rate ratio 0.54) (Figure 79).

Respiratory mortality rates also increased with increasing socio-economic deprivation. Rates for the most deprived quintile were just over twice as high as rates for the least deprived quintile (rate ratio 2.06) (Figure 81). These differences persisted across all ethnic groups (Figure 82).

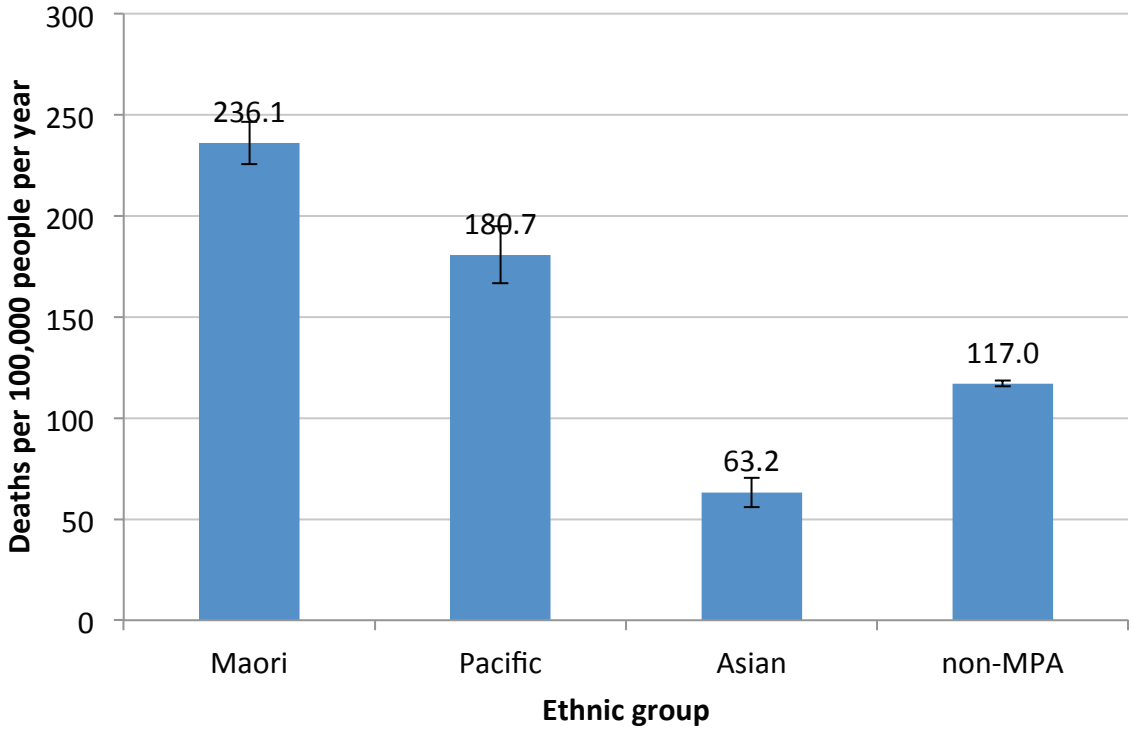
Total respiratory mortality rates were highest in Bay of Plenty, followed by Lakes DHB, and also significantly higher than the national average in the Northern, Waikato, Hawke's Bay, Hutt Valley, Wairarapa, West Coast and Southern DHBs (Figure 83).

Figure 78. Total respiratory deaths per 100,000 people by age group and sex, 2006-2011.



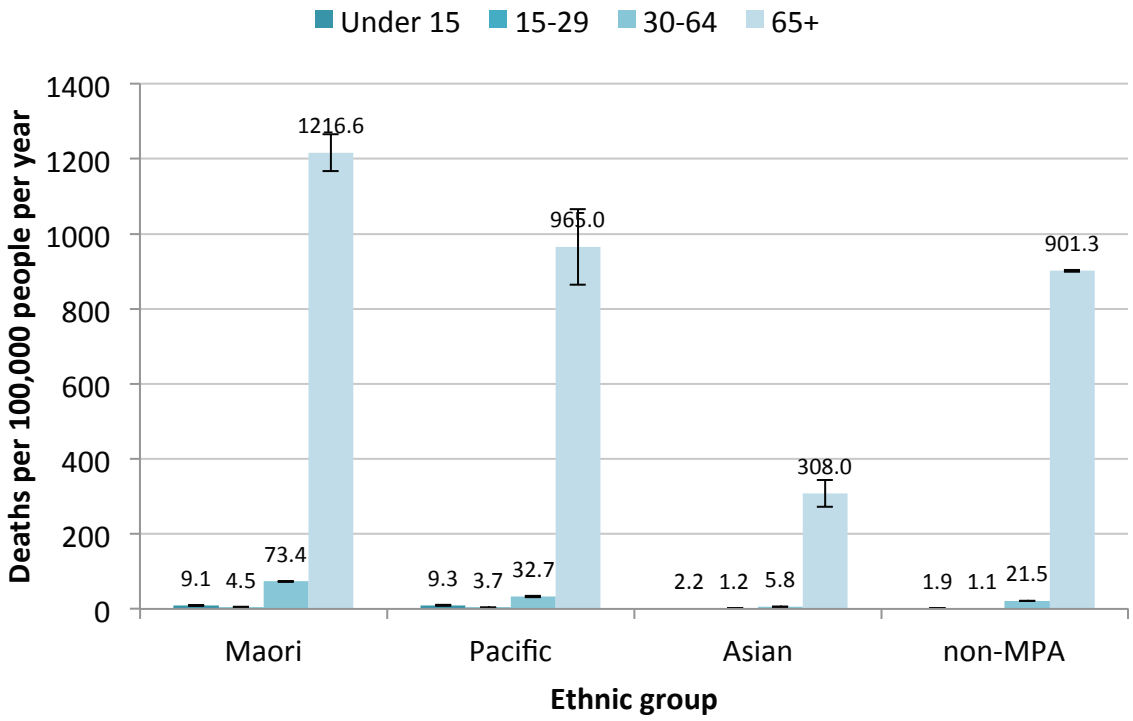
(See Table A 83 and Table A 84 for data)

Figure 79. Total respiratory mortality per 100,000 people per year by ethnic group, 2006-2011.



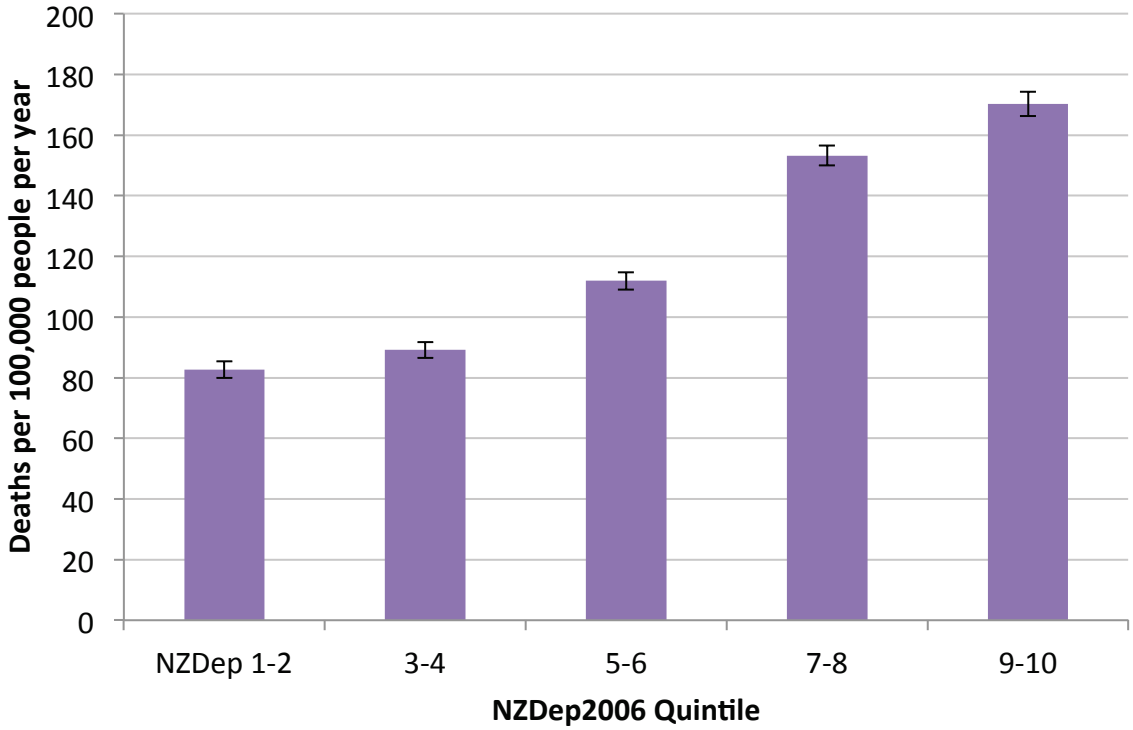
(See Table A 85 for data)

Figure 80. Total respiratory deaths per 100,000 people per year, by ethnic group and age group, 2006-2011.



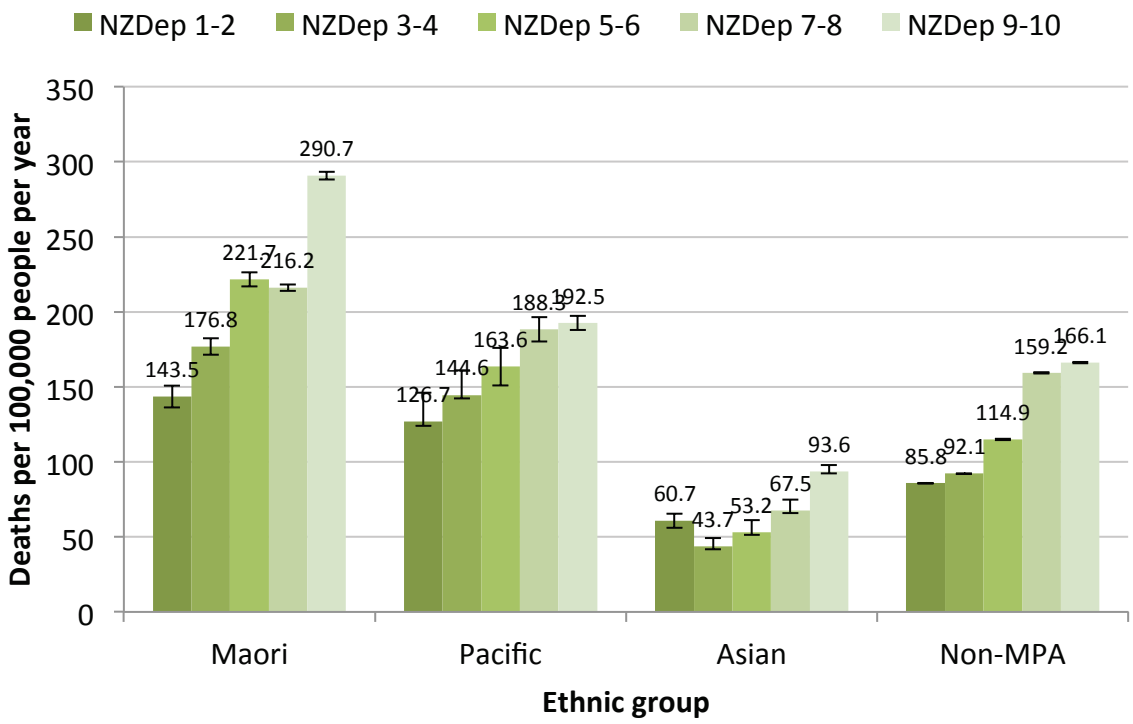
(See Table A 86 for data)

Figure 81. Total respiratory deaths per 100,000 people by NZDep2006 quintile, 2006-2011, age-adjusted.



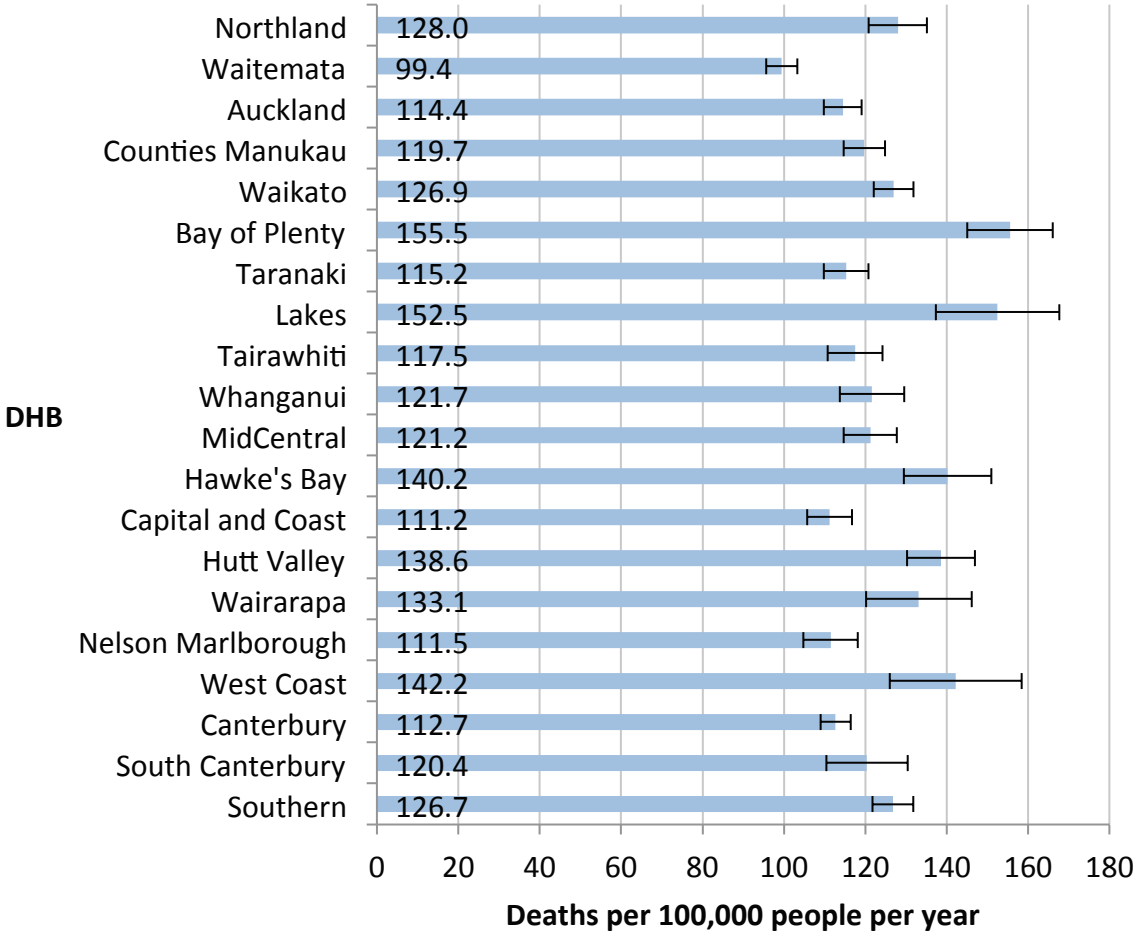
(See Table A 87 for data)

Figure 82. Total respiratory deaths per 100,000 people by ethnic group and NZDep2006, 2006-2011, age-adjusted.



(See Table A 88 for data)

Figure 83. Total respiratory deaths per 100,000 people per year, by DHB, 2006-2011, age-adjusted



(see Table A 89 for data)

6.8. COST SUMMARY

The total cost of respiratory (ICD-10 Chapter 10) deaths in 2011 was $4,083,235,487.50, from 27,222 life years lost.

The total cost of asthma (J45 and J46) deaths in 2011 was $201,196,500.06, from 1341 life years lost

The total cost of respiratory (ICD-10 Chapter 10) hospitalisations in 2011 was $362,834,978.79.

The total cost of asthma (J45 and J46) hospitalisations in 2011 was $17,484,409.38.

The total cost to New Zealand (whether paid by patients or the State) of respiratory prescriptions in 2011 was $78,326,849.00

Combining public and private costs of doctors' visits for any respiratory condition, we estimate a minimum total cost of $43,236,138.64

Using this figure, the cost of doctors' visits for asthma, for adults aged 15+ was estimated at $19,003,872, and the cost of prescriptions was estimated at $52,038,964.

Costs for work days lost, ED and OP visits and YLDs were calculated as outlined in the method section.

Therefore, across all costs, we estimate the minimum total cost of asthma and respiratory disease to the New Zealand economy to be:

	Childhood (0-14) asthma	Adult (15+) asthma	Total asthma
Work days lost	$3,645,334	$10,700,000	$14,345,334
Doctors' visits:	$5,378,617	$19,003,872	$24,382,489
Prescriptions:	$7,797,831	$52,038,964	$59,836,795
ED and OP visits:			$53,247,616
Hospitalisations:	$7,557,144	$9,927,261	$17,484,405
YLDs			$429,159,550
Mortality:	$0	$201,196,500	$201,196,500
TOTAL:	$24,378,926	$292,866,597	$799,652,689

	All respiratory
Doctors' visits:	$43,236,139
Prescriptions:	$78,326,849
Hospitalisations:	$362,834,979
YLDs:	$1,096,563,510
Mortality:	$4,083,235,488
TOTAL:	$5,664,196,965

These are minimum costs. They do not include the direct cost of emergency department visits, nor the indirect costs the long-term impact of interrupted schooling. Costs for total respiratory disease do not include work days lost or emergency department and outpatient visits.

7. RECOMMENDATIONS

1. Urgent new and extended programmes are needed to reduce the severe ethnic and socio-economic inequalities in respiratory disease.
2. The high concentration of respiratory disease in Counties Manukau; in Māori and Pacific peoples; and in the most socio-economically deprived neighbourhoods, suggest that targeted programmes could be effective in reducing not only inequalities, but also overall rates of respiratory disease.
3. We recommend research into the current national prevalence of obstructive sleep apnoea, in order to better estimate its impact on national health outcomes.

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9. APPENDIX 1 DATA TABLES

9.1. ASTHMA

9.1.1. PREVALENCE

Table A 1. Adult age-standardised medicated asthma rates by age-group and sex, 2011-2013

Population group	Total		Male		Female		M vs F	
	%	95% CI	%	95% CI	%	95% CI	RR	95% CI
Total children <15 years	14.1	(12.8–15.4)	16.3	(14.5–18.3)	11.7	(9.7–14.1)	1.39	(1.13–1.71)
Total adults	11.1	(10.6–11.7)	9.0	(8.3–9.7)	13.2	(12.5–14.0)	0.65	(0.57–0.75)
15–24 years	12.8	(11.3–14.4)	11.1	(9.0–13.5)	14.6	(12.7–16.7)		
25–44 years	10.9	(10.1–11.7)	8.7	(7.5–10.0)	12.9	(11.8–14.1)		
45–64 years	10.1	(9.2–11.0)	7.6	(6.6–8.7)	12.4	(11.0–13.9)		
65+ years	11.3	(10.3–12.3)	8.7	(7.3–10.2)	13.6	(12.1–15.1)		

Table A 2. Medicated asthma prevalence by ethnic group 2011-2012, children and adults

Population group	Children			Adults		
	%	95% CI	RR* to rest of population	%	95% CI	RR* to rest of population
Total	14.1	(12.8–15.4)		11.1	(10.6-11.7)	
Māori	19.2	(16.8–21.8)	1.54 (1.27-1.87)	16.7	(14.6–19.0)	1.63 (1.42-1.88)
Pacific	13.6	(10.7–16.9)	0.95 (0.74-1.22)	9.3	(7.3–11.8)	0.79 (0.62-1.02)
Asian	11.0	(7.2–16.0)	0.77 (0.53-1.10)	4.4	(2.9–6.5)	0.37 (0.26-0.52)
European/Other	13.8	(12.0–15.7)	Baseline	11.4	(10.6–12.2)	Baseline

Rate ratios are age and sex adjusted.

Table A 3. Child medicated asthma prevalence 2011-2012 by NZDep2006, unadjusted

NZDep quintile	Total		Boys		Girls	
	%	95% CI	%	95% CI	%	95% CI
1-2	9.5	(6.1–13.9)	11.2	(6.2–18.1)	7.7	(4.0–13.1)
3-4	12.7	(9.8–16.1)	14.4	(10.4–19.3)	10.5	(6.1–16.6)
5-6	15.5	(12.7–18.7)	20.0	(15.3–25.5)	10.9	(7.5–15.2)
7-8	16.6	(13.0–20.8)	17.0	(12.3–22.5)	16.3	(10.8–23.2)
9-10	15.5	(12.8–18.4)	18.7	(14.7–23.3)	12.2	(8.8–16.3)
Age-adjusted rate ratio 9-10 vs 1-2	1.55	(1.04–2.30)	1.48	(0.90–2.43)	1.66	(0.85–3.24)

Table A 4. Adult medicated asthma prevalence 2011-2012 by NZDep2006, unadjusted

NZDep quintile	Total		Men		Women	
	%	95% CI	%	95% CI	%	95% CI
1-2	9.1	(7.6–10.8)	8.0	(6.1–10.3)	10.3	(8.0–12.9)
3-4	10.6	(9.1–12.1)	8.5	(6.4–10.9)	12.7	(10.3–15.4)
5-6	11.2	(9.8–12.7)	9.1	(6.9–11.7)	13.1	(11.2–15.2)
7-8	11.9	(10.3–13.7)	9.4	(7.5–11.6)	14.1	(12.0–16.5)
9-10	12.4	(11.1–13.9)	8.3	(6.6–10.3)	15.9	(13.9–18.0)
Age-adjusted rate ratio 9-10 vs 1-2	1.33	(1.05–1.68)	1.06	(0.69–1.62)	1.53	(1.16–2.02)

Table A 5. Children (aged 2-14) and adult (aged 15+) medicated asthma prevalence by DHB 2011-2013

District Health Boards (DHB)	Unadjusted prevalence (2011-13)			
	Children		Adults	
	%	(95% CI)	%	(95% CI)
New Zealand	14.2	(13.2–15.3)	11.0	(10.5–11.6)
Northland	17.4	(11.8–24.2)	12.4	(10.5–14.4)
Waitemata	12.9	(10.0–16.3)	9.9	(8.4–11.6)
Auckland	11.3	(8.1–15.1)	**8.2**	**(7.2–9.2)***
Counties-Manukau	12.5	(9.3–16.4)	**8.3**	**(7.2–9.6)***
Waikato	15.5	(12.0–19.5)	12.0	(9.5–14.8)
Bay of Plenty	15.0	(10.5–20.5)	11.2	(9.4–13.1)
Taranaki	**20.0**	**(15.3–25.3)***	11.0	(9.1–13.2)
Lakes	13.6	(9.6–18.5)	12.7	(10.1–15.7)
Tairawhiti	**21.8**	**(15.9–28.8)***	11.4	(9.3–13.7)
Whanganui	23.0	(14.9–33.0)	11.9	(8.3–16.4)
MidCentral	17.3	(12.0–23.6)	12.5	(10.3–15.0)
Hawkes Bay	14.7	(10.1–20.4)	10.5	(8.6–12.6)
Capital and Coast	14.6	(9.7–20.9)	12.6	(10.6–14.8)
Hutt	13.4	(8.3–20.1)	**15.0**	**(12.4–17.8)***
Wairarapa	15.4	(9.3–23.4)	13.2	(8.7–18.8)
Nelson-Marlborough	12.6	(9.2–16.7)	10.6	(8.4–13.2)
West Coast	14.2	(7.4–23.8)	12.3	(8.1–17.5)
Canterbury	13.3	(10.2–16.9)	12.0	(10.3–13.8)
South Canterbury	15.9	(9.6–24.0)	9.2	(7.0–11.8)
Southern	12.9	(8.6–18.3)	12.9	(10.9–15.0)

Bold values were statistically significantly different from the NZ rate ($p<0.05$).

Data source: Ministry of Health New Zealand Health Survey data tables.

9.1.2. HOSPITALISATIONS

N.B. All rates are per 100,000 people

Table A 6. Asthma hospitalisations, rates and age-adjusted rates 2000-2013.

		Rate		
Year	**n**	**Raw**	**(age adj'd)**	**95% CI**
2000	7487	194.1	186.5	(182.3-190.8)
2001	8006	206.3	198.7	(194.3-203.1)
2002	7675	194.4	189.9	(185.6-194.2)
2003	8131	201.9	198.1	(193.8-202.5)
2004	8216	201.0	197.9	(193.6-202.2)
2005	8381	202.7	200.9	(196.5-205.2)
2006	8047	192.3	191.0	(186.8-195.2)
2007	7755	183.6	181.9	(177.9-186.0)
2008	8337	195.7	193.3	(189.2-197.5)
2009	9179	213.3	209.9	(205.6-214.2)
2010	9187	211.2	207.7	(203.4-211.9)
2011	8520	194.3	191.8	(187.7-195.9)
2012	8158	185.1	183.3	(179.3-187.3)
2013	7364	165.8	165.0	(161.2-168.8)
Trend 2000 -2013			-1.16	(-3.01-0.70), p=0.196

Table A 7. 2013 asthma hospitalisation rates and rate ratios by age group and sex

	Total			**Male**			**Female**			**M v F**	
Age (years)	**n**	**Rate**	**95% CI**	**n**	**Rate**	**95% CI**	**n**	**Rate**	**95% CI**	**RR**	**95% CI**
<15	3730	430.9	(426.2-435.6)	2264	512.0	(502.0-522.0)	1466	346.2	(337.6-354.8)	1.48	(1.43-1.53)
15-29	1081	128.0	(125.4-130.6)	311	73.8	(69.8-77.8)	770	182.0	(175.7-188.2)	0.41	(0.38-0.43)
30-64	2014	104.6	(103.6-105.7)	642	69.7	(67.9-71.4)	1372	136.7	(134.5-139)	0.51	(0.49-0.53)
65+	539	88.8	(85.7-91.8)	135	48.4	(43.5-53.3)	404	123.1	(116.5-129.7)	0.39	(0.36-0.43)

Table A 8. 2013 asthma hospitalisation age group rate ratios by sex

Age (years)	**Total**		**Male**		**Female**	
	RR	**95% CI**	**RR**	**95% CI**	**RR**	**95% CI**
<15	4.12	(4.01-4.23)	7.35	(7.04-7.67)	2.53	(2.44-2.62)
15-29	1.22	(1.18-1.27)	1.06	(0.99-1.13)	1.33	(1.28-1.39)
30-64	1.00	Baseline	1.00	Baseline	1.00	Baseline
65+	0.85	(0.81-0.89)	0.69	(0.64-0.76)	0.90	(0.85-0.95)

Table A 9. 2013 asthma hospitalisation rates and rate ratios by ethnic group.

Total Ethnicity	n	Rate			RR	95%CI
		Raw	Age adj'd	95% CI		
Māori	2473	413.1	352.6	(337.1-368.1)	2.94	(2.86-3.03)
Pacific	1471	497.1	441.6	(413.4-469.7)	3.69	(3.56-3.82)
Asian	722	153.1	170.2	(155.9-184.5)	1.42	(1.36-1.49)
Non-MPA	2959	109.5	119.8	(115.4-124.2)	1.00	Baseline

Table A 10. 2013 asthma hospitalisation rates by ethnic group and age.

	Māori			Pacific			Asian			non-MPA		
Age (years)	n	Rate	95% CI	n	Rate	95% CI	n	Rate	95% CI	n	Rate	95% CI
<15	1354	669.3	(644.2-694.3)	883	836.8	(783.1-890.6)	436	448.6	(405.9-491.3)	1273	282.7	(275.4-290)
15-29	402	279.0	(256.3-301.7)	203	265.1	(223.5-306.8)	66	50.0	(39.5-60.4)	448	99.3	(95.0-103.7)
30-64	641	291.3	(276.1-306.5)	303	303.3	(269.1-337.4)	161	74.8	(67.0-82.7)	920	71.1	(69.8-72.4)
65+	76	236.1	(142.6-329.7)	82	587.9	(247.2-928.7)	59	216.0	(110.5-321.5)	318	62.9	(59.8-66.0)

Table A 11. 2013 asthma hospitalisation rates by NZDep2006 quintile.

	n	Rate (raw)	Rate (age adj'd)	95% CI	RR	95% CI
NZDep 1-2	823	94.2	99.6	(92.7-106.5)	1.00	Baseline
3-4	872	102.2	106.1	(99.0-113.1)	1.07	(1.02-1.12)
5-6	1154	137.7	140.6	(132.5-148.7)	1.41	(1.35-1.47)
7-8	1643	198.0	200.1	(190.4-209.8)	2.01	(1.93-2.09)
9-10	2864	343.8	322.0	(310.0-333.9)	3.23	(3.11-3.36)

Table A 12. 2013 asthma hospitalisation rates by ethnic group and NZDep quintile.

		NZDep quintile				
Ethnic group		**1-2**	**3-4**	**5-6**	**7-8**	**9-10**
Māori	**Hosp_Num**	125	182	335	536	1292
	Rate (raw)	242.2	263.1	343.4	387.7	534.8
	Rate (age adj'd)	221.3	224.2	301.9	317.7	460.2
	95%CI	(175.6-267.1)	(188.4-260.0)	(263.8-340.0)	(288.2-347.1)	(432.5-487.9)
Pacific	**Hosp_Num**	84	105	127	306	848
	Rate (raw)	569.7	455.7	362.2	493.8	526.7
	Rate (age adj'd)	518.3	376.2	293.6	443.3	479
	95%CI	(388.4-648.2)	(289.4-462.9)	(233.1-354.1)	(380.1-506.4)	(438.3-519.7)

Asian	**Hosp_Num**	93	125	128	152	223
	Rate (raw)	114.3	124.9	126.2	146.2	263.3
	Rate (age adj'd)	120.6	151.2	150.2	158.9	285.1
	95%CI	(94.3-147.0)	(119.6-182.8)	(118.0-182.5)	(132.0-185.7)	(241.9-328.2)
NZ European/ Other	**Hosp_Num**	545	487	580	704	640
	Rate (raw)	77.8	77.2	101.5	143.3	210.1
	Rate (age adj'd)	86	84.4	110.6	159.8	237.5
	95%CI	(78.6-93.4)	(76.9-92.0)	(101.4-119.7)	(147.7-171.8)	(218.6-256.4)

Table A 13. 2013 asthma hospitalisation rates by DHB.

DHB	n	Rate (raw)	Rate (age adj'd)	95%CI
Northland	270	178.0	183.5	(161.2-205.7)
Waitemata	872	165.9	165.0	(154.1-176.0)
Auckland	886	203.0	211.8	(197.7-225.9)
Counties Manakau	1110	236.5	223.4	(210.1-236.7)
Waikato	647	180.1	176.8	(163.1-190.4)
Lakes	203	206.7	199.8	(172.2-227.4)
Bay of Plenty	445	216.0	219.8	(199.2-240.4)
Tairawhiti	95	217.6	201.8	(160.8-242.8)
Hawkes Bay	220	145.0	141.7	(122.9-160.5)
Taranaki	202	184.1	185.2	(159.6-210.8)
Midcentral	290	178.4	179.3	(158.6-200.0)
Whanganui	141	234.5	236.7	(197.4-276.1)
Capital and Coast	409	144.2	147.6	(133.2-162.0)
Hutt	317	229.1	225.5	(200.6-250.3)
Wairarapa	61	148.4	152.1	(113.3-191.0)
Nelson Marlborough	146	106.6	112.3	(93.9-130.8)
West Coast	29	90.2	96.8	(61.3-132.2)
Canterbury	605	125.5	131.2	(120.7-141.6)
Sth Canterbury	55	98.9	102.5	(74.9-130.0)
Southern	361	121.4	128.8	(115.5-142.1)

9.1.3. MORTALITY

Table A 14. Asthma mortality rates and age-adjusted rates 2000-2011.

		Rate		
Year	**n**	**Raw**	**(age adj'd)**	**95% CI**
2000	72	1.87	1.98	(1.5 - 2.4)
2001	71	1.83	1.92	(1.5 - 2.4)
2002	76	1.92	2.00	(1.6 - 2.5)
2003	76	1.89	1.96	(1.5 - 2.4)
2004	70	1.71	1.76	(1.4 - 2.2)
2005	61	1.48	1.50	(1.1 - 1.9)
2006	78	1.86	1.87	(1.5 - 2.3)
2007	64	1.52	1.51	(1.1 - 1.9)
2008	62	1.46	1.43	(1.1 - 1.8)
2009	55	1.28	1.26	(0.9 - 1.6)
2010	56	1.29	1.25	(0.9 - 1.6)
2011	69	1.57	1.48	(1.1 - 1.8)
Trend 2000 -2011			-0.07	(-0.10 - -0.04), p<0.005

Table A 15. Asthma mortality rates and rate ratios by age group and sex, 2006-2011.

	Total			**Male**			**Female**			**M v F**	
Age (years)	**n**	**Rate**	**95% CI**	**n**	**Rate**	**95% CI**	**n**	**Rate**	**95% CI**	**RR**	**95% CI**
<15	14	0.3	(0.2-0.3)	10	0.4	(0.3-0.4)	4	0.2	(0.1-0.2)	2.38	(1.36-4.18)
15-29	24	0.5	(0.5-0.5)	14	0.6	(0.5-0.6)	10	0.4	(0.4-0.5)	1.41	(0.95-2.1)
30-64	142	1.3	(1.3-1.3)	55	1.0	(1-1.1)	87	1.5	(1.5-1.6)	0.67	(0.57-0.79)
65+	204	6.9	(6.7-7)	58	4.4	(4.1-4.7)	146	8.9	(8.5-9.2)	0.49	(0.43-0.57)

Table A 16. Asthma mortality rate ratios by age group and sex, 2006-2011.

Age (years)	**Total**		**Male**		**Female**	
	RR	**95% CI**	**RR**	**95% CI**	**RR**	**95% CI**
<15	0.21	(0.16-0.27)	0.37	(0.26-0.51)	0.10	(0.06-0.17)
15-29	0.38	(0.31-0.47)	0.56	(0.42-0.75)	0.27	(0.2-0.37)
30-64	1.00	Baseline	1.00	Baseline	1.00	Baseline
65+	5.37	(4.84-5.95)	4.27	(3.57-5.11)	5.84	(5.14-6.64)

Table A 17. Asthma mortality rates and rate ratios by ethnic group, 2006-2011.

Total Ethnicity	n	Rate			RR	95%CI
		Raw	Age adj'd	95% CI		
Māori	104	3.1	5.4	(4.1-6.7)	4.83	(4.23-5.51)
Pacific	42	2.6	6.5	(4.1-8.9)	5.82	(4.81-7.04)
Asian	17	0.8	1.3	(0.5-2)	1.15	(0.86-1.54)
Non-MPA	224	1.4	1.1	(1-1.3)	1.00	Baseline

Table A 18. Asthma mortality rates by ethnic group and age, 2006-2011

	Māori			Pacific			Asian			non-MPA		
Age (years)	n	Rate	95% CI	n	Rate	95% CI	n	Rate	95% CI	n	Rate	95% CI
<15	5	0.4	(0.3-0.5)	3	0.5	(0.3-0.7)	1	0.2	(0-0.4)	6	0.2	(0.2-0.2)
15-29	12	1.4	(1.2-1.7)	4	1.0	(0.5-1.5)	3	0.5	(0.3-0.7)	6	0.2	(0.2-0.2)
30-64	63	5.2	(4.8-5.5)	18	3.4	(2.7-4.1)	8	0.9	(0.7-1.1)	54	0.7	(0.7-0.7)
65+	24	17.3	(11.4-23.2)	17	28.1	(10.9-45.3)	5	5.2	(0.6-9.8)	158	6.2	(6-6.3)

Table A 19. Asthma mortality rates NZDep2006 quintile, 2006-2011.

	n	Rate (raw)	Rate (age adj'd)	95% CI	RR	95% CI
NZDep 1-2	43	0.9	1.0	(0.7-1.2)	1.00	Baseline
3-4	55	1.1	1.1	(0.8-1.4)	1.19	(0.98-1.45)
5-6	53	1.1	1.1	(0.8-1.3)	1.10	(0.91-1.34)
7-8	102	2.1	2.0	(1.6-2.4)	2.12	(1.78-2.52)
9-10	123	2.6	3.0	(2.5-3.5)	3.15	(2.65-3.73)

Table A 20. Asthma mortality rates by ethnic group and NZDep quintile, 2006-2011.

		NZDep quintile				
Ethnic group		**1-2**	**3-4**	**5-6**	**7-8**	**9-10**
Māori	**Hosp_Num**	5	7	10	27	55
	Rate (raw)	1.9	1.9	1.8	3.4	3.9
	Rate (age adj'd)	5.0	2.3	2.3	5.1	7.8
	95%CI	(1.4-17.9)	(0.4-4.1)	(0.8-3.7)	(3-7.2)	(5.2-10.4)
Pacific	**Hosp_Num**	1	4	3	7	25
	Rate (raw)	1.5	3.5	1.7	2.0	2.8
	Rate (age adj'd)	1.0	4.4	3.3	6.7	7.6
	95%CI	(0.1-7.2)	(1.2-15.8)	(0.9-11.9)	(0.8-12.5)	(3.9-11.2)

Asian	**Hosp_Num**	3	3	1	4	2
	Rate (raw)	0.8	0.8	0.2	0.8	0.5
	Rate (age adj'd)	0.9	0.8	0.6	2.6	0.4
	95%CI	(0.3-2.8)	(0.3-2.5)	(0.1-4.2)	(0.9-7.8)	(0.1-1.9)
NZ European/ Other	**Hosp_Num**	35	42	39	64	42
	Rate (raw)	0.8	1.1	1.1	2.2	2.2
	Rate (age adj'd)	0.9	1.0	0.9	1.6	1.6
	95%CI	(0.6-1.2)	(0.7-1.3)	(0.6-1.2)	(1.2-2)	(1.1-2.1)

Table A 21. Asthma mortality rates by DHB, 2006-2011.

DHB	n	Rate (raw)	Rate (age adj'd)	95%CI
Northland	22	2.47	2.28	(1.3-3.2)
Waitemata	37	1.28	1.35	(0.9-1.8)
Auckland	30	1.24	1.37	(0.9-1.9)
Counties Manakau	48	1.85	2.30	(1.6-3.0)
Waikato	25	1.23	1.25	(0.8-1.7)
Lakes	15	2.54	2.68	(1.3-4.0)
Bay of Plenty	29	2.48	2.17	(1.4-3.0)
Tairawhiti	12	4.50	4.69	(2.0-7.4)
Hawkes Bay	11	1.24	1.14	(0.5-1.8)
Taranaki	11	1.76	1.75	(0.7-2.8)
Midcentral	21	2.20	2.03	(1.2-2.9)
Whanganui	3	0.80	0.85	(0.3-2.7)
Capital and Coast	17	1.06	1.19	(0.6-1.8)
Hutt	17	2.08	2.19	(1.2-3.2)
Wairarapa	3	1.29	1.02	(0.3-3.2)
Nelson Marlborough	13	1.67	1.52	(0.7-2.4)
West Coast	3	1.60	1.43	(0.5-4.4)
Canterbury	42	1.50	1.35	(0.9-1.8)
Sth Canterbury	1	0.31	0.21	(0-1.5)
Southern	16	0.93	0.85	(0.4-1.3)

9.2. BRONCHIECTASIS

9.2.1. HOSPITALISATIONS

N.B. All rates are per 100,000 people

Table A 22. Bronchiectasis hospitalisations, rates and age-adjusted rates 2000-2013.

		Rate		
Year	**n**	**Raw**	**(age adj'd)**	**95% CI**
2000	701	18.2	20.4	(18.8 - 21.9)
2001	776	20.0	22.1	(20.5 - 23.7)
2002	768	19.5	21.2	(19.7 - 22.8)
2003	747	18.5	20.2	(18.7 - 21.6)
2004	830	20.3	22.0	(20.5 - 23.5)
2005	806	19.5	21.2	(19.7 - 22.6)
2006	867	20.7	22.2	(20.8 - 23.7)
2007	897	21.2	22.5	(21 - 24)
2008	906	21.3	22.4	(21 - 23.9)
2009	991	23.0	24.2	(22.7 - 25.7)
2010	1014	23.3	24.4	(22.9 - 25.9)
2011	1126	25.7	26.6	(25.1 - 28.2)
2012	1038	23.5	24.0	(22.6 - 25.5)
2013	1161	26.1	26.4	(24.9 - 27.9)
Trend 2000 -2013			0.42	(0.28-0.57), p<0.005

Table A 23. 2013 bronchiectasis hospitalisation rates and rate ratios by age group and sex

	Total			**Male**			**Female**			**M v F**	
Age (years)	**n**	**Rate**	**95% CI**	**n**	**Rate**	**95% CI**	**n**	**Rate**	**95% CI**	**RR**	**95% CI**
<15	187	21.6	(20.6-22.7)	105	23.7	(21.6-25.9)	82	19.4	(17.3-21.4)	1.23	(1.07-1.41)
15-29	72	8.5	(7.8-9.2)	45	10.7	(9.2-12.2)	27	6.4	(5.2-7.6)	1.67	(1.33-2.11)
30-64	302	15.7	(15.3-16.1)	107	11.6	(10.9-12.3)	195	19.4	(18.6-20.3)	0.60	(0.53-0.67)
65+	600	98.8	(95.6-102.1)	202	72.4	(66.5-78.4)	398	121.3	(114.7-127.9)	0.60	(0.55-0.65)

Table A 24. 2013 bronchiectasis hospitalisation age group rate ratios by sex

Age (years)	Total		Male		Female	
	RR	95% CI	RR	95% CI	RR	95% CI
<15	1.38	(1.26-1.5)	2.05	(1.79-2.33)	1.00	(0.88-1.13)
15-29	0.54	(0.48-0.62)	0.92	(0.78-1.09)	0.33	(0.27-0.4)
30-64	1.00	Baseline	1.00	Baseline	1.00	Baseline
65+	6.30	(5.89-6.74)	6.24	(5.57-6.99)	6.24	(5.74-6.78)

Table A 25. 2013 bronchiectasis hospitalisation rates and rate ratios by ethnic group.

Total Ethnicity	n	Rate			RR	95%CI
		Raw	Age adj'd	95% CI		
Māori	299	50.0	66.4	(57.6-75.2)	3.67	(3.41-3.96)
Pacific	208	70.3	115.4	(95.7-135.1)	6.38	(5.82-6.99)
Asian	74	15.7	41.5	(30.4-52.7)	2.30	(2.00-2.63)
Non-MPA	592	21.9	18.1	(16.6-19.6)	1.00	Baseline

Table A 26. 2013 bronchiectasis hospitalisation rates by ethnic group and age.

	Māori			Pacific			Asian			non-MPA		
Age (years)	n	Rate	95% CI	n	Rate	95% CI	n	Rate	95% CI	n	Rate	95% CI
<15	94	46.5	(39.9-53.1)	66	62.5	(47.9-77.2)	8	8.2	(2.4-14)	38	8.4	(7.2-9.7)
15-29	44	30.5	(23-38.1)	18	23.5	(11.1-35.9)	0	n/a	n/a	10	2.2	(1.6-2.9)
30-64	85	38.6	(33.1-44.2)	64	64.1	(48.4-79.8)	19	8.8	(6.1-11.5)	133	10.3	(9.8-10.8)
65+	76	236.1	(142.6-329.7)	60	430.2	(138.7-721.7)	47	172.1	(77.9-266.2)	411	81.3	(77.8-84.8)

Table A 27. 2013 bronchiectasis hospitalisation rates by NZDep2006 quintile.

	n	Rate (raw)	Rate (age adj'd)	95% CI	RR	95% CI
NZDep 1-2	146	16.7	16.7	(14-19.4)	1.00	Baseline
3-4	154	18.0	18.3	(15.4-21.2)	1.09	(0.98-1.22)
5-6	213	25.4	25.1	(21.7-28.5)	1.50	(1.36-1.67)
7-8	225	27.1	27.0	(23.5-30.6)	1.62	(1.46-1.79)
9-10	423	50.8	53.1	(47.9-58.2)	3.18	(2.9-3.48)

Table A 28. 2013 bronchiectasis hospitalisation rates by ethnic group and NZDep quintile.

		NZDep quintile				
Ethnic group		**1-2**	**3-4**	**5-6**	**7-8**	**9-10**
Māori	**Hosp_Num**	12	16	22	60	189
	Rate (raw)	23.3	23.1	22.6	43.4	78.2
	Rate (age adj'd)	34.5	39.8	42.8	56.3	95.4
	95%CI	(6.8-62.1)	(17.9-61.8)	(22.3-63.3)	(39.6-73)	(79.9-110.9)
Pacific	**Hosp_Num**	8	5	25	36	134
	Rate (raw)	54.2	21.7	71.3	58.1	83.2
	Rate (age adj'd)	77	62.3	105.4	87.6	139.8
	95%CI	(13.3-140.7)	(6.4-118.2)	(55.7-155)	(52.4-122.8)	(109.1-170.5)
Asian	**Hosp_Num**	12	21	13	7	21
	Rate (raw)	14.8	21	12.8	6.7	24.8
	Rate (age adj'd)	19.6	58	34.6	13.8	91.1
	95%CI	(8.1-31.2)	(29.2-86.7)	(14.1-55.1)	(2.4-25.1)	(44.2-138)
NZ European/ Other	**Hosp_Num**	113	109	155	129	86
	Rate (raw)	16.1	17.3	27.1	26.3	28.2
	Rate (age adj'd)	14.9	15.8	22.1	20.1	21.9
	95%CI	(12.1-17.7)	(12.8-18.8)	(18.6-25.6)	(16.6-23.7)	(17.0-26.8)

Table A 29. 2013 bronchiectasis hospitalisation rates by DHB.

DHB	**n**	**Rate (raw)**	**Rate (age adj'd)**	**95%CI**
Northland	61	40.2	42.2	(31.3-53.1)
Waitemata	131	24.9	26.3	(21.8-30.8)
Auckland	138	31.6	38.5	(32-45)
Counties Manakau	203	43.3	49.2	(42.3-56.1)
Waikato	97	27.0	26.4	(21.1-31.6)
Lakes	33	33.6	33.9	(22.3-45.5)
Bay of Plenty	72	35.0	30.1	(23.1-37.2)
Tairawhiti	7	16.0	16.1	(4.1-28.1)
Hawkes Bay	35	23.1	20.4	(13.6-27.2)
Taranaki	16	14.6	13.8	(7-20.5)
Midcentral	26	16.0	14.5	(8.9-20.1)
Whanganui	12	20.0	16.4	(7.1-25.7)
Capital and Coast	35	12.3	13.7	(9.1-18.3)
Hutt	41	29.6	30.4	(21.1-39.7)
Wairarapa	2	4.9	3.7	(0.9-14.8)
Nelson Marlborough	29	21.2	17.1	(10.8-23.3)

West Coast	2	6.2	5.3	(1.3-21.2)
Canterbury	158	32.8	31.6	(26.7-36.6)
Sth Canterbury	4	7.2	5.3	(0.1-10.6)
Southern	59	19.8	18.5	(13.8-23.3)

9.2.1. MORTALITY

Table A 30. Bronchiectasis mortality rates and age-adjusted rates 2000-2011.

		Rate		
Year	**n**	**Raw**	**(age adj'd)**	**95% CI**
2000	42	1.09	1.16	(0.8 - 1.5)
2001	42	1.08	1.13	(0.8 - 1.5)
2002	57	1.44	1.50	(1.1 - 1.9)
2003	58	1.44	1.49	(1.1 - 1.9)
2004	57	1.39	1.44	(1.1 - 1.8)
2005	57	1.38	1.41	(1 - 1.8)
2006	69	1.65	1.66	(1.3 - 2.1)
2007	77	1.82	1.81	(1.4 - 2.2)
2008	95	2.23	2.18	(1.7 - 2.6)
2009	94	2.18	2.12	(1.7 - 2.6)
2010	94	2.16	2.04	(1.6 - 2.4)
2011	84	1.92	1.79	(1.4 - 2.2)
Trend 2000 -2011			0.08	(0.08 – 0.09), p<0.005

Table A 31. Bronchiectasis mortality rates and rate ratios by age group and sex, 2006-2011.

	Total			**Male**			**Female**			**M v F**	
Age (years)	**n**	**Rate**	**95% CI**	**n**	**Rate**	**95% CI**	**n**	**Rate**	**95% CI**	**RR**	**95% CI**
<15	4	0.1	(0.1-0.1)	2	0.1	(0.1-0.1)	2	0.1	(0.1-0.1)	0.95	(0.37-2.47)
15-29	5	0.1	(0.1-0.1)	3	0.1	(0.1-0.2)	2	0.1	(0.1-0.1)	1.52	(0.64-3.61)
30-64	103	0.9	(0.9-0.9)	44	0.8	(0.8-0.9)	59	1.0	(1-1.1)	0.80	(0.66-0.96)
65+	401	13.5	(13.2-13.7)	136	10.3	(9.8-10.7)	265	16.1	(15.6-16.6)	0.64	(0.58-0.7)

Table A 32. Bronchiectasis mortality rate ratios by age group and sex, 2006-2011.

Age (years)	Total		Male		Female	
	RR	95% CI	RR	95% CI	RR	95% CI
<15	0.08	(0.05-0.13)	0.09	(0.05-0.18)	0.08	(0.04-0.15)
15-29	0.11	(0.07-0.17)	0.15	(0.09-0.27)	0.08	(0.04-0.16)
30-64	1.00	Baseline	1.00	Baseline	1.00	Baseline
65+	14.54	(13.09-16.15)	12.52	(10.62-14.76)	15.64	(13.64-17.93)

Table A 33. Bronchiectasis mortality rates and rate ratios by ethnic group, 2006-2011.

Total Ethnicity	n	Rate				
		Raw	Age adj'd	95% CI	RR	95%CI
Māori	87	2.6	6.2	(4.6-7.8)	3.94	(3.45-4.5)
Pacific	75	4.7	13.6	(10.2-17.1)	8.69	(7.61-9.92)
Asian	19	0.9	3.1	(1.6-4.7)	1.99	(1.56-2.55)
Non-MPA	333	2.0	1.6	(1.4-1.7)	1.00	Baseline

Table A 34. Bronchiectasis mortality rates by ethnic group and age, 2006-2011

	Māori			Pacific			Asian			non-MPA		
Age (years)	n	Rate	95% CI	n	Rate	95% CI	n	Rate	95% CI	n	Rate	95% CI
<15	2	0.2	(0.1-0.2)	1	0.2	(0-0.3)	0	0.0	(0-0)	1	0.0	(0-0)
15-29	1	0.1	(0-0.2)	3	0.7	(0.3-1.2)	1	0.2	(0-0.3)	0	0.0	(0-0)
30-64	46	3.8	(3.5-4.1)	22	4.2	(3.4-4.9)	2	0.2	(0.1-0.3)	34	0.4	(0.4-0.4)
65+	38	27.4	(20-34.8)	49	81.0	(51.8-110.1)	16	16.6	(8.3-24.9)	298	11.6	(11.3-11.9)

Table A 35. Bronchiectasis mortality rates NZDep2006 quintile, 2006-2011.

	n	Rate (raw)	Rate (age adj'd)	95% CI	RR	95% CI
NZDep 1-2	59	1.2	1.3	(1-1.7)	1.00	Baseline
3-4	85	1.7	1.7	(1.4-2.1)	1.30	(1.11-1.53)
5-6	107	2.2	2.1	(1.7-2.5)	1.55	(1.33-1.81)
7-8	113	2.4	2.1	(1.7-2.5)	1.60	(1.37-1.87)
9-10	146	3.0	3.6	(3-4.2)	2.70	(2.33-3.13)

Table A 36. Bronchiectasis mortality rates by ethnic group and NZDep quintile, 2006-2011.

		NZDep quintile				
Ethnic group		**1-2**	**3-4**	**5-6**	**7-8**	**9-10**
Māori	**Hosp_Num**	7	11	10	9	50
	Rate (raw)	2.7	2.9	1.8	1.1	3.5
	Rate (age adj'd)	8.1	7.6	6.1	2.8	7.6
	95%CI	(0.7-15.5)	(2.2-13)	(1.4-10.9)	(0.6-5)	(5.1-10.1)
Pacific	**Hosp_Num**	1	1	8	17	47
	Rate (raw)	1.5	0.9	4.5	4.8	5.3
	Rate (age adj'd)	3.2	2.7	16.6	14.8	14.8
	95%CI	(0.4-22.5)	(0.4-19.1)	(4-29.2)	(6.7-22.9)	(10.2-19.5)
Asian	**Hosp_Num**	5	4	2	2	4
	Rate (raw)	1.4	0.9	0.4	0.4	1.0
	Rate (age adj'd)	4.8	2.9	2.6	2.4	2.1
	95%CI	(0.1-9.5)	(1-8.4)	(0.7-10.5)	(0.6-9.5)	(0.7-6.2)
NZ European/ Other	**Hosp_Num**	46	69	87	86	45
	Rate (raw)	1.1	1.8	2.5	2.9	2.3
	Rate (age adj'd)	1.2	1.6	1.9	1.9	1.5
	95%CI	(0.8-1.5)	(1.2-1.9)	(1.5-2.3)	(1.5-2.3)	(1-1.9)

Table A 37. Bronchiectasis mortality rates by DHB, 2006-2011.

DHB	**n**	**Rate (raw)**	**Rate (age adj'd)**	**95%CI**
Northland	21	2.4	2.2	(1.2-3.1)
Waitemata	56	1.9	2.1	(1.6-2.7)
Auckland	68	2.8	3.3	(2.5-4.1)
Counties Manukau	84	3.2	4.3	(3.4-5.2)
Waikato	44	2.2	2.2	(1.5-2.8)
Bay of Plenty	12	2.0	2.1	(0.9-3.3)
Taranaki	21	1.8	1.4	(0.8-2.1)
Lakes	6	2.2	2.4	(0.5-4.2)
Tairawhiti	19	2.1	1.9	(1.0-2.7)
Whanganui	5	0.8	0.7	(0.1-1.3)
MidCentral	14	1.5	1.3	(0.6-2.0)
Hawke's Bay	4	1.1	0.9	(0-1.7)
Capital and Coast	29	1.8	2.1	(1.3-2.8)
Hutt Valley	15	1.8	2.0	(1.0-3.0)
Wairarapa	0	0.0	0.0	(0-0)
Nelson Marlborough	15	1.9	1.6	(0.8-2.4)
West Coast	3	1.6	1.4	(0.4-4.3)
Canterbury	60	2.1	1.9	(1.4-2.4)

South Canterbury	3	0.9	0.7	(0.2-2.3)
Southern	31	1.8	1.6	(1.1-2.2)

9.3. CHILDHOOD BRONCHIOLITIS

9.3.1. HOSPITALISATIONS

N.B. All rates are per 100,000 people

Table A 38. Childhood bronchiolitis hospitalisations, rates and age-adjusted rates 2000-2013.

		Rate	
Year	**n**	**Raw**	**95% CI**
2000	3937	1389.2	(1345.8 - 1432.5)
2001	4119	1465.9	(1421.1 - 1510.7)
2002	4576	1627.7	(1580.5 - 1674.8)
2003	4438	1574.7	(1528.3 - 1621)
2004	4323	1518.7	(1473.4 - 1564)
2005	4198	1476.5	(1431.8 - 1521.2)
2006	4382	1532.2	(1486.8 - 1577.5)
2007	4464	1523.0	(1478.4 - 1567.7)
2008	5263	1748.3	(1701.0 - 1795.5)
2009	6156	2003.8	(1953.8 - 2053.9)
2010	5636	1793.0	(1746.2 - 1839.8)
2011	5616	1769.0	(1722.8 - 1815.3)
2012	6275	1987.5	(1938.3 - 2036.6)
2013	5351	1715.4	(1669.5 - 1761.4)
Trend 2000 -2013		35.2	(16.94-53.43), p=0.001

Table A 39. 2013 childhood bronchiolitis hospitalisation rates and rate ratios by sex

Total			**Male**			**Female**			**M v F**	
n	**Rate**	**95% CI**	**n**	**Rate**	**95% CI**	**n**	**Rate**	**95% CI**	**RR**	**95% CI**
5351	1832.3	(1783.2-1881.4)	3368	2255.9	(2179.7-2332.1)	1983	1389.2	(1328.0-1450.3)	1.62	(1.58-1.67)

Table A 40. 2013 childhood bronchiolitis hospitalisation rates and rate ratios by ethnic group.

Total Ethnicity	**n**	**Rate**			
		Raw	**95% CI**	**RR**	**95%CI**
Māori	2332	3281.3	(3148.1-3414.5)	3.36	(3.25-3.47)
Pacific	1601	4229.7	(4022.6-4436.9)	4.33	(4.18-4.48)
Asian	262	729.8	(641.5-818.2)	0.75	(0.7-0.8)
Non-MPA	1419	977.1	(926.3-1027.9)	1.00	Baseline

Table A 41. 2013 childhood bronchiolitis hospitalisation rates by NZDep2006 quintile.

	n	Rate (raw)	95% CI	RR	95% CI
NZDep 1-2	370	712.7	(640.1-785.4)	1.00	Baseline
3-4	451	841.2	(763.6-918.9)	1.18	(1.1-1.26)
5-6	659	1184.1	(1093.7-1274.5)	1.66	(1.56-1.77)
7-8	1099	1887.2	(1775.7-1998.8)	2.65	(2.5-2.8)
9-10	2769	3816.9	(3674.7-3959.1)	5.36	(5.08-5.64)

Table A 42. 2013 childhood bronchiolitis hospitalisation rates by ethnic group and NZDep quintile.

	Māori			Pacific			Asian			non-MPA		
NZDep quintile	**n**	**Rate (raw)**	**95%CI**	**n**	**Rate (raw)**	**95%CI**	**n**	**Rate (raw)**	**95%CI**	**n**	**Rate (raw)**	**95%CI**
1-2	68	1217.3	(928-1506.7)	42	2692	(1878.1-3506.6)	46	793	(564-1022.5)	224	585	(508.3-661.5)
3-4	96	1221.8	(977.4-1466.3)	82	3000	(2350.9-3649.8)	34	467	(310.3-624.4)	246	701	(613.3-788.4)
5-6	198	1726.4	(1485.9-1966.9)	140	3181	(2654.1-3708.0)	47	607	(433.6-780.8)	305	964	(855.8-1072.1)
7-8	464	2857.8	(2597.8-3117.9)	257	3257	(2859.0-3655.5)	75	898	(694.8-1101.2)	350	1349	(1208-1490.7)
9-10	1504	5029.4	(4775.2-5283.6)	1079	5076	(4772.9-5378.6)	60	891	(665.7-1116.8)	294	1869	(1655.5-2082.8)

Table A 43. 2013 childhood bronchiolitis hospitalisation rates by DHB.

DHB	n	Rate (raw)	95%CI
Northland	275	2580.0	(2275-2884.9)
Waitemata	486	1307.4	(1191.2-1423.6)
Auckland	489	1741.8	(1587.4-1896.2)
Counties Manakau	1167	3045.7	(2871.0-3220.5)
Waikato	629	2395.6	(2208.4-2582.9)
Lakes	169	2306.9	(1959.0-2654.7)
Bay of Plenty	341	2435.5	(2177.0-2694.0)
Tairawhiti	86	2479.8	(1955.7-3003.9)
Hawkes Bay	223	2044.4	(1776.0-2312.7)
Taranaki	99	1255.7	(1008.3-1503.1)
Midcentral	143	1306.7	(1092.5-1520.8)
Whanganui	101	2420.3	(1948.3-2892.3)
Capital and Coast	233	1274.7	(1111.0-1438.4)
Hutt	168	1688.3	(1433.0-1943.6)
Wairarapa	40	1529.1	(1055.2-2002.9)
Nelson Marlborough	76	921.9	(714.6-1129.1)
West Coast	15	702.2	(346.9-1057.6)
Canterbury	346	1147.6	(1026.7-1268.5)

Sth Canterbury	17	521.8	(273.7-769.8)
Southern	248	1361.2	(1191.8-1530.6)

CHILDHOOD PNEUMONIA

9.3.2. HOSPITALISATIONS

N.B. All rates are per 100,000 people

Table A 44. Childhood pneumonia hospitalisations, rates and age-adjusted rates 2000-2013.

Year	n	Rate		
		Raw	(age adj'd)	95% CI
2000	3513	399.8	410.8	(397.2 - 424.4)
2001	3909	445.6	460.6	(446.1 – 475.0)
2002	3572	404.3	421.1	(407.3 - 434.9)
2003	3650	410.1	430.3	(416.3 - 444.3)
2004	3107	347.9	363.4	(350.6 - 376.2)
2005	3391	380.9	394.5	(381.2 - 407.7)
2006	3428	385.9	399.5	(386.2 - 412.9)
2007	3119	350.0	356.6	(344.1 - 369.1)
2008	3525	393.6	395.2	(382.1 - 408.2)
2009	4062	450.8	448.6	(434.8 - 462.4)
2010	3305	363.9	359.5	(347.3 - 371.8)
2011	3256	357.5	351.3	(339.2 - 363.4)
2012	3027	332.7	327.2	(315.5 - 338.9)
2013	2937	323.2	319.7	(308.2 - 331.3)
Trend 2000 -2013			-7.45	(-12.03- -2.87), p=0.004

Table A 45. 2013 childhood pneumonia hospitalisation rates and rate ratios by age group and sex

	Total			Male			Female			M v F	
Age (years)	n	Rate	95% CI	n	Rate	95% CI	n	Rate	95% CI	RR	95% CI
<5	2149	735.9	(717.6-754.1)	1163	779.0	(742.3-815.6)	986	690.7	(654.7-726.8)	1.13	(1.08-1.18)
5-14	788	137.4	(133.4-141.4)	403	137.6	(129.8-145.5)	385	137.1	(129-145.3)	1.00	(0.94-1.07)

Table A 46. 2013 childhood pneumonia hospitalisation age group rate ratios by sex

Age (years)	Total		Male		Female	
	RR	95% CI	RR	95% CI	RR	95% CI
<5	5.36	(5.15-5.57)	5.66	(5.36-5.98)	5.04	(4.76-5.33)
5-14	1.00	Baseline	1.00	Baseline	1.00	Baseline

Table A 47. 2013 childhood pneumonia hospitalisation rates and rate ratios by ethnic group.

Total Ethnicity	n	Rate			RR	95%CI
		Raw	Age adj'd	95% CI		
Māori	823	406.8	396.5	(369.4-423.6)	1.60	(1.53-1.67)
Pacific	841	797.0	762.0	(710.4-813.5)	3.07	(2.94-3.21)
Asian	297	305.6	290.3	(257.2-323.4)	1.17	(1.1-1.24)
Non-MPA	1092	242.5	248.3	(233.6-263.1)	1.00	Baseline

Table A 48. 2013 childhood pneumonia hospitalisation rates by ethnic group and age.

	Māori			Pacific			Asian			non-MPA		
Age (years)	n	Rate	95% CI	n	Rate	95% CI	n	Rate	95% CI	n	Rate	95% CI
<5	622	875.2	(793.6-956.8)	697	1841.4	(1619.2-2063.6)	216	601.7	(467.8-735.6)	707	486.8	(457-516.6)
5-14	201	153.1	(134.7-171.6)	144	212.8	(170.6-255.1)	81	132.1	(95.4-168.9)	385	126.2	(119-133.4)

Table A 49. 2013 childhood pneumonia hospitalisation rates by NZDep2006 quintile.

	n	Rate (raw)	Rate (age adj'd)	95% CI	RR	95% CI
NZDep 1-2	391	221.4	239.0	(215.3-262.8)	1.00	Baseline
3-4	346	210.3	214.5	(191.9-237.1)	0.90	(0.84-0.96)
5-6	424	263.3	260.0	(235.2-284.7)	1.09	(1.02-1.16)
7-8	537	332.4	319.4	(292.3-346.4)	1.34	(1.25-1.42)
9-10	1239	614.2	588.9	(556-621.7)	2.46	(2.33-2.6)

Table A 50. 2013 childhood pneumonia hospitalisation rates by ethnic group and NZDep quintile.

		NZDep quintile				
Ethnic group		**1-2**	**3-4**	**5-6**	**7-8**	**9-10**
Māori	**Hosp_Num**	45	49	86	152	491
	Rate (raw)	256.9	211.4	264.2	333.5	588.6
	Rate (age adj'd)	265.4	210.8	257.4	322.3	566.4
	95%CI	(187.8-343)	(151.8-269.8)	(203.0-311.8)	(271.0-373.6)	(516.2-616.5)
Pacific	**Hosp_Num**	47	45	74	131	544
	Rate (raw)	944.9	581.6	613.4	607.7	919.3
	Rate (age adj'd)	987.4	561.3	579.2	574.5	877
	95%CI	(704.8-1270)	(397.3-725.4)	(447.1-711.3)	(476.0-673.0)	(803.2-950.7)

Asian	**Hosp_Num**	52	53	61	51	80
	Rate (raw)	301	256.2	292.3	242	462.8
	Rate (age adj'd)	301.8	250.8	279.5	214.9	425.1
	95%CI	(219.8-383.8)	(183.3-318.4)	(209.2-349.8)	(155.7-274.2)	(331.6-518.7)
NZ European/ Other	**Hosp_Num**	258	206	215	219	194
	Rate (raw)	192.3	186.9	229.9	300.5	451.9
	Rate (age adj'd)	210	192.3	229.7	292.7	434.9
	95%CI	(184.2-235.7)	(166.1-218.6)	(199.0-260.4)	(253.9-331.5)	(373.6-496.2)

Table A 51. 2013 childhood pneumonia hospitalisation rates by DHB.

DHB	n	Rate (raw)	Rate (age adj'd)	95%CI
Northland	150	458.0	466.4	(391.8-541.1)
Waitemata	428	396.3	391.5	(354.4-428.6)
Auckland	402	508.9	489.4	(441.6-537.3)
Counties Manakau	554	489.8	488.3	(447.6-529.0)
Waikato	240	309.3	308.8	(269.7-347.9)
Lakes	55	248.0	251.6	(185.1-318.0)
Bay of Plenty	167	383.7	393.0	(333.4-452.7)
Tairawhiti	40	372.8	381.9	(263.5-500.4)
Hawkes Bay	59	178.7	180.9	(134.8-227.1)
Taranaki	51	220.2	219.4	(159.2-279.6)
Midcentral	105	319.8	322.5	(260.8-384.2)
Whanganui	34	273.6	273.9	(181.8-366.0)
Capital and Coast	149	280.4	277.8	(233.2-322.4)
Hutt	145	497.4	494.8	(414.3-575.4)
Wairarapa	18	220.8	226.6	(121.8-331.3)
Nelson Marlborough	31	119.6	123.4	(79.9-166.9)
West Coast	11	178.9	174.7	(71.5-278.0)
Canterbury	172	190.6	191.6	(163.0-220.2)
Sth Canterbury	17	167.8	171.7	(90.1-253.4)
Southern	109	200.4	201.4	(163.6-239.2)

9.3.1. MORTALITY

Table A 52. Childhood pneumonia mortality rates and age-adjusted rates 2000-2011.

Year	n	Rate		
		Raw	(age adj'd)	95% CI
2000	8	0.91	0.89	(0.3 - 1.5)
2001	2	0.23	0.23	(0.1 - 0.9)
2002	9	1.02	1.01	(0.4 - 1.7)
2003	6	0.67	0.68	(0.1 - 1.2)
2004	19	2.13	2.12	(1.2 - 3.1)
2005	10	1.12	1.12	(0.4 - 1.8)
2006	10	1.13	1.11	(0.4 - 1.8)
2007	13	1.46	1.41	(0.6 - 2.2)
2008	12	1.34	1.27	(0.6 - 2)
2009	10	1.11	1.04	(0.4 - 1.7)
2010	11	1.21	1.13	(0.5 - 1.8)
2011	10	1.10	1.01	(0.4 - 1.6)
Trend 2000 -2011			-0.01	(-0.03 - 0.02), p=0.668

Table A 53. Childhood pneumonia mortality rates and rate ratios by age group and sex, 2002-2011.

	Total			Male			Female			M v F	
Age (years)	n	Rate	95% CI	n	Rate	95% CI	n	Rate	95% CI	RR	95% CI
<5	100	3.6	(3.5-3.8)	57	4.1	(3.8-4.3)	43	3.2	(2.9-3.5)	1.27	(1.05-1.54)
5-14	10	0.2	(0.2-0.2)	7	0.2	(0.2-0.3)	3	0.1	(0.1-0.1)	2.22	(1.15-4.28)

Table A 54. Childhood pneumonia hospitalisation age group rate ratios by sex, 2002-2011.

Age (years)	Total		Male		Female	
	RR	95% CI	RR	95% CI	RR	95% CI
<5	21.54	(15.72-29.52)	17.61	(12.04-25.77)	30.74	(17.43-54.2)
5-14	1.00	Baseline	1.00	Baseline	1.00	Baseline

Table A 55. Childhood pneumonia mortality rates and rate ratios by ethnic group, 2002-2011.

Total Ethnicity	n	Rate				
		Raw	Age adj'd	95% CI	RR	95%CI
Māori	59	3.0	2.8	(2.1-3.5)	5.42	(4.32-6.8)
Pacific	35	3.5	3.2	(2.2-4.3)	6.19	(4.83-7.94)
Asian	5	0.6	0.7	(0.1-1.2)	1.27	(0.8-2.02)
Non-MPA	25	0.5	0.5	(0.3-0.7)	1.00	Baseline

Table A 56. Childhood pneumonia mortality rates NZDep2006 quintile, 2002-2011.

	n	Rate (raw)	Rate (age adj'd)	95% CI	RR	95% CI
NZDep 1-2	4	0.2	0.2	(0-0.5)	1.00	Baseline
3-4	6	0.4	0.4	(0.1-0.7)	1.56	(0.85-2.88)
5-6	17	1.1	1.1	(0.6-1.6)	4.45	(2.62-7.54)
7-8	22	1.4	1.3	(0.8-1.8)	5.43	(3.24-9.1)
9-10	61	3.0	2.8	(2.1-3.6)	11.87	(7.27-19.39)

Table A 57. Childhood pneumonia mortality rates by DHB, 2002-2011.

DHB	n	Rate (raw)	Rate (age adj'd)	95%CI
Northland	5	1.44	1.54	(0.2-2.9)
Waitemata	9	0.86	0.87	(0.3-1.4)
Auckland	6	0.79	0.73	(0.1-1.3)
Counties Manakau	28	2.50	2.45	(1.5-3.4)
Waikato	16	2.07	2.08	(1.1-3.1)
Lakes	3	1.26	1.26	(0.4-3.9)
Bay of Plenty	7	1.61	1.67	(0.4-2.9)
Tairawhiti	1	0.86	0.86	(0.1-6.1)
Hawkes Bay	1	0.29	0.30	(0-2.1)
Taranaki	9	3.96	4.13	(1.4-6.8)
Midcentral	4	1.18	1.21	(0-2.4)
Whanganui	2	1.45	1.56	(0.4-6.3)
Capital and Coast	3	0.58	0.56	(0.2-1.7)
Hutt	2	0.65	0.65	(0.2-2.6)
Wairarapa	2	2.45	2.48	(0.6-10)
Nelson Marlborough	1	0.39	0.41	(0.1-2.9)
West Coast	0	0.00	0.00	(0-0)
Canterbury	3	0.33	0.32	(0.1-1)
Sth Canterbury	0	0.00	0.00	(0-0)
Southern	8	1.49	1.51	(0.5-2.6)

9.4. COPD IN OLDER ADULTS

9.4.1. HOSPITALISATIONS

N.B. All rates are per 100,000 people

Table A 58. COPD hospitalisations in adults aged 40+, rates and age-adjusted rates 2000-2013.

Year	n	Rate		
		Raw	(age adj'd)	95% CI
2000	6858	532.6	538.4	(525.6 - 551.2)
2001	7917	600.9	606.2	(592.8 - 619.6)
2002	8083	597.7	605.3	(592.0 - 618.5)
2003	8795	632.9	645.6	(632.1 - 659.2)
2004	9281	649.7	664.8	(651.2 - 678.4)
2005	8603	586.2	602.4	(589.6 - 615.2)
2006	9321	617.3	637.1	(624.1 - 650.1)
2007	9338	602.5	621.6	(609.0 - 634.3)
2008	10315	649.2	670.8	(657.8 - 683.7)
2009	10418	640.4	661.6	(648.9 - 674.3)
2010	10552	634.3	652.7	(640.3 - 665.2)
2011	10874	640.6	655.1	(642.7 - 667.4)
2012	11102	641.7	650.1	(638.0 - 662.2)
2013	10497	594.9	598.4	(587.0 - 609.9)
Trend 2000 -2013			4.25	(-0.50 - 9.01), p=0.075

Table A 59. 2013 COPD in adults aged 40+ hospitalisation rates and rate ratios by age group and sex

	Total			Male			Female			M v F	
Age (years)	n	Rate	95% CI	n	Rate	95% CI	n	Rate	95% CI	RR	95% CI
40-64	2730	249.3	(246.5-252.1)	1215	229.6	(224.0-235.2)	1515	267.8	(262.1-273.4)	0.86	(0.83-0.89)
65+	7767	1279.5	(1267.9-1291)	4009	1437.6	(1410.9-1464.2)	3758	1145.2	(1125-1165.4)	1.26	(1.23-1.28)

Table A 60. 2013 COPD in adults aged 40+ hospitalisation age group rate ratios by sex

Age (years)	Total		Male		Female	
	RR	95% CI	RR	95% CI	RR	95% CI
40-64	1.00	Baseline	1.00	Baseline	1.00	Baseline
65+	5.13	(5.02-5.24)	6.26	(6.07-6.46)	4.28	(4.16-4.4)

Table A 61. 2013 COPD in adults aged 40+ hospitalisation rates and rate ratios by ethnic group.

Total Ethnicity	n	Rate			RR	95%CI
		Raw	Age adj'd	95% CI		
Māori	2139	1481.9	1915.9	(1826.5-2005.2)	3.55	(3.46-3.64)
Pacific	613	1005.2	1494.9	(1365.8-1624)	2.77	(2.65-2.9)
Asian	177	141.0	246.5	(206.4-286.6)	0.46	(0.42-0.5)
Non-MPA	7519	583.2	539.2	(527-551.4)	1.00	Baseline

Table A 62. 2013 COPD in adults aged 40+ hospitalisation rates by ethnic group and age.

	Māori			Pacific			Asian			non-MPA		
Age (years)	n	Rate	95% CI	n	Rate	95% CI	n	Rate	95% CI	n	Rate	95% CI
40-64	969	863.9	(812.6-915.3)	201	427.3	(341.2-513.5)	35	35.6	(23.7-47.6)	1519	193.9	(190.4-197.4)
65+	1170	3635.3	(3268.2-4002.5)	412	2954.0	(2190.2-3717.8)	142	519.9	(356.3-683.6)	6000	1186.4	(1173-1199.7)

Table A 63. 2013 COPD in adults aged 40+ hospitalisation rates by NZDep2006 quintile.

	n	Rate (raw)	Rate (age adj'd)	95% CI	RR	95% CI
NZDep 1-2	871	224.2	260.8	(243.3-278.3)	1.00	Baseline
3-4	1183	327.2	343.9	(324.3-363.6)	1.32	(1.26-1.38)
5-6	1874	554.3	547.3	(522.6-572.1)	2.10	(2.02-2.18)
7-8	2777	867.7	813.5	(783.1-843.8)	3.12	(3-3.24)
9-10	3784	1348.0	1340.3	(1297.6-1383)	5.14	(4.96-5.33)

Table A 64. 2013 COPD in adults aged 40+ hospitalisation rates by ethnic group and NZDep2013 quintile.

		NZDep quintile				
Ethnic group		**1-2**	**3-4**	**5-6**	**7-8**	**9-10**
Māori	**Hosp_Num**	62	96	227	515	1238
	Rate (raw)	490.7	578.3	992.9	1564.6	2094.8
	Rate (age adj'd)	784.0	784.9	1289.1	2006.4	2593.5
	95%CI	(566.3-1001.7)	(614.4-955.3)	(1099.7-1478.4)	(1819.1-2193.7)	(2433.7-2753.4)
Pacific	**Hosp_Num**	25	29	47	86	426
	Rate (raw)	738.8	585.9	658.8	685.1	1294.1
	Rate (age adj'd)	1061.6	952.6	1138.8	919.0	1911.8
	95%CI	(621.8-1501.5)	(571-1334.2)	(764.6-1513)	(711.7-1126.4)	(1713.2-2110.5)

Asian	**Hosp_Num**	21	24	24	43	65
	Rate (raw)	79.8	81.8	90.0	176.6	347.7
	Rate (age adj'd)	159.4	153.9	197.3	296.0	511.4
	95%CI	(81.3-237.6)	(88.3-219.5)	(110.1-284.5)	(201.6-390.4)	(369.1-653.7)
NZ European/ Other	**Hosp_Num**	758	1026	1557	2114	2057
	Rate (raw)	227.0	346.0	584.6	904.0	1381.0
	Rate (age adj'd)	254.5	344.0	534.5	765.6	1189.2
	95%CI	(236.3-272.8)	(322.9-365.1)	(507.9-561.1)	(732.4-798.7)	(1136.8-1241.7)

Table A 65. 2013 COPD in adults aged 40+ hospitalisation rates by DHB.

DHB	n	Rate (raw)	Rate (age adj'd)	95%CI
Northland	548	768.9	725.9	(664.9-786.9)
Waitemata	1002	492.9	518.9	(486.8-551.1)
Auckland	724	486.2	526.5	(487.9-565)
Counties Manakau	1016	627.2	694.4	(651.4-737.4)
Waikato	1072	746.3	730.7	(686.9-774.4)
Lakes	388	964.0	967.8	(871.3-1064.3)
Bay of Plenty	678	728.9	666.1	(615.7-716.5)
Tairawhiti	124	713.4	716.0	(589.8-842.1)
Hawkes Bay	493	739.0	703.4	(641.2-765.6)
Taranaki	311	661.2	635.0	(564.2-705.7)
Midcentral	410	598.7	560.5	(506-614.9)
Whanganui	253	919.9	842.6	(738.3-946.9)
Capital and Coast	492	477.1	502.3	(457.9-546.8)
Hutt	365	669.9	697.6	(626-769.2)
Wairarapa	156	788.7	726.9	(612.6-841.2)
Nelson Marlborough	243	367.5	349.7	(305.7-393.8)
West Coast	147	976.5	1004.3	(841.5-1167.1)
Canterbury	1079	537.2	531.0	(499.3-562.7)
Sth Canterbury	144	522.8	471.4	(393.8-549.1)
Southern	850	678.4	649.6	(605.9-693.3)

9.4.1. MORTALITY

Table A 66. Adult COPD mortality rates and age-adjusted rates 2000-2011.

		Rate		
Year	**n**	**Raw**	**(age adj'd)**	**95% CI**
2000	1441	111.9	111.4	(105.6 - 117.2)
2001	1709	129.7	128.5	(122.4 - 134.6)
2002	1597	118.1	117.5	(111.7 - 123.3)
2003	1641	118.1	118.2	(112.5 - 123.9)
2004	1705	119.4	120.2	(114.5 - 125.9)
2005	1470	100.2	100.9	(95.8 - 106.1)
2006	1540	102.0	102.9	(97.7 - 108)
2007	1471	94.9	95.8	(90.9 - 100.7)
2008	1671	105.2	106.1	(101 - 111.2)
2009	1563	96.1	96.6	(91.8 - 101.4)
2010	1482	89.1	89.4	(84.8 - 94)
2011	1568	92.4	92.1	(87.5 - 96.7)
Trend 2000 -2011			-3.00	(-3.02 - -2.97), p<0.005

Table A 67. COPD in adults aged 40+ mortality rates and rate ratios by age group and sex, 2011.

	Total			**Male**			**Female**			**M v F**	
Age (years)	**n**	**Rate**	**95% CI**	**n**	**Rate**	**95% CI**	**n**	**Rate**	**95% CI**	**RR**	**95% CI**
40-64	125	11.4	(10.8-12)	54	10.2	(9-11.4)	71	12.5	(11.3-13.8)	0.81	(0.69-0.97)
65+	1443	237.7	(232.7-242.7)	761	272.9	(261.3-284.5)	682	207.8	(199.2-216.4)	1.31	(1.25-1.38)

Table A 68. COPD in adults aged 40+ age group mortality rate ratios by sex, 2011.

Age (years)	**Total**		**Male**		**Female**	
	RR	**95% CI**	**RR**	**95% CI**	**RR**	**95% CI**
40-64	1.00	Baseline	1.00	Baseline	1.00	Baseline
65+	20.82	(19.06-22.75)	26.74	(23.39-30.57)	16.56	(14.71-18.65)

Table A 69. COPD in adults aged 40+ mortality rates and rate ratios by ethnic group, 2011.

Total Ethnicity	**n**	**Rate**				
		Raw	**Age adj'd**	**95% CI**	**RR**	**95%CI**
Māori	181	125.4	199.9	(167.1-232.6)	2.22	(2.04-2.41)
Pacific	32	52.5	106.5	(66.7-146.3)	1.18	(0.98-1.42)
Asian	13	10.4	21.8	(8.6-35)	0.24	(0.18-0.32)
Non-MPA	1346	104.4	90.2	(85.4-95.1)	1.00	Baseline

Table A 70. COPD in adults aged 40+ mortality rates by ethnic group and age, 2011.

	Māori			Pacific			Asian			non-MPA		
Age (years)	n	Rate	95% CI	n	Rate	95% CI	n	Rate	95% CI	n	Rate	95% CI
40-64	47	41.9	(30.6-53.2)	6	12.8	(-2.1-27.6)	2	2.0	(-0.8-4.9)	72	9.2	(8.4-9.9)
65+	134	416.4	(292.1-540.6)	26	186.4	(-5.5-378.3)	11	40.3	(-5.3-85.8)	1274	251.9	(245.8-258.1)

Table A 71. COPD in adults aged 40+ mortality rates by NZDep2006 quintile, 2011.

	n	Rate (raw)	Rate (age adj'd)	95% CI	RR	95% CI
NZDep 1-2	175	45.0	55.8	(47.4-64.1)	1.00	Baseline
3-4	221	61.1	64.7	(56.2-73.3)	1.16	(1.05-1.28)
5-6	308	91.1	87.6	(77.8-97.5)	1.57	(1.44-1.72)
7-8	435	135.9	116.0	(105-127)	2.08	(1.91-2.27)
9-10	428	152.5	147.7	(133.7-161.7)	2.65	(2.43-2.89)

Table A 72. COPD in adults aged 40+ mortality rates by ethnic group and NZDep quintile, 2011.

		NZDep quintile				
Ethnic group		**1-2**	**3-4**	**5-6**	**7-8**	**9-10**
Māori	**Hosp_Num**	2	17	22	42	98
	Rate (raw)	15.8	102.4	96.2	127.6	165.8
	Rate (age adj'd)	47.5	169.1	174.5	198.5	248.1
	95%CI	(11.7-192.5)	(81.7-256.5)	(90.6-258.4)	(132.1-264.9)	(192-304.1)
Pacific	**Hosp_Num**	1	2	3	5	21
	Rate (raw)	29.6	40.4	42.1	39.8	63.8
	Rate (age adj'd)	72.1	46.6	77.0	88.9	132.5
	95%CI	(10.2-512)	(11.6-186.6)	(23.1-257.3)	(7.1-170.7)	(70.9-194.2)
Asian	**Hosp_Num**	0	3	1	4	5
	Rate (raw)	0.0	10.2	3.7	16.4	26.7
	Rate (age adj'd)	0.0	25.0	3.7	37.9	49.2
	95%CI	(0-0)	(7.6-81.9)	(0.5-26.1)	(12.9-111.4)	(0-98.4)
NZ European/ Other	**Hosp_Num**	172	199	283	385	306
	Rate (raw)	51.5	67.1	106.2	164.6	205.4
	Rate (age adj'd)	59.9	66.1	91.6	120.2	151.7
	95%CI	(50.9-68.9)	(56.9-75.4)	(80.9-102.3)	(108-132.3)	(134.4-169)

Table A 73. COPD in adults aged 40+ mortality rates by DHB, 2011.

DHB	n	Rate (raw)	Rate (age adj'd)	95%CI
Northland	81	113.7	81.6	(63.3-100)
Waitemata	136	66.9	52.6	(43.6-61.7)
Auckland	115	77.2	59.1	(48.1-70)
Counties Manukau	98	60.5	54.9	(43.9-66)
Waikato	136	94.7	69.5	(57.4-81.6)
Bay of Plenty	42	104.4	76.2	(53.1-99.4)
Taranaki	90	96.8	59.1	(46.8-71.3)
Lakes	27	155.3	115.2	(71.5-158.8)
Tairawhiti	61	91.4	68.6	(50.4-86.7)
Whanganui	51	108.4	69.1	(50-88.1)
MidCentral	69	100.8	69.9	(52.4-87.5)
Hawke's Bay	50	181.8	122.4	(86.7-158.1)
Capital and Coast	90	87.3	66.5	(52.6-80.4)
Hutt Valley	57	104.6	79.6	(58.6-100.6)
Wairarapa	31	156.7	108.7	(67.1-150.4)
Nelson Marlborough	47	71.1	50.5	(35.3-65.6)
West Coast	15	99.6	69.8	(34.3-105.4)
Canterbury	198	98.6	68.4	(58.8-78.1)
South Canterbury	44	159.8	102.9	(70.2-135.7)
Southern	154	122.9	84.1	(70.6-97.6)

9.5. TOTAL SERIOUS RESPIRATORY DISEASE

9.5.1. HOSPITALISATIONS

N.B. All rates are per 100,000 people

Table A 74. Total respiratory hospitalisations, rates and age-adjusted rates 2000-2013.

Year	n	Rate		
		Raw	(age adj'd)	95% CI
2000	53442	1385.3	1433.2	(1420.9 - 1445.5)
2001	57125	1472.1	1522.3	(1509.6 - 1534.9)
2002	57007	1443.8	1500.9	(1488.4 - 1513.3)
2003	57032	1416.2	1484.8	(1472.5 - 1497.1)
2004	57218	1399.8	1472.1	(1460 - 1484.3)
2005	55780	1349.3	1410.9	(1399.2 - 1422.7)
2006	58274	1392.6	1458.5	(1446.6 - 1470.5)

2007	57570	1363.0	1413.8	(1402.2 - 1425.4)
2008	64480	1513.7	1558.1	(1546.1 - 1570.2)
2009	69188	1608.1	1638.7	(1626.4 - 1650.9)
2010	69015	1586.3	1606.5	(1594.5 - 1618.6)
2011	71083	1621.4	1634.9	(1622.8 - 1646.9)
2012	73021	1656.5	1662.0	(1649.9 - 1674.1)
2013	69310	1560.3	1563.1	(1551.4 - 1574.7)
Trend 2000 -2013			14.31	(5.03-23.60), p=0.006

Table A 75. 2013 total respiratory hospitalisation rates and rate ratios by age group and sex

	Total			Male			Female			M v F	
Age (years)	**n**	**Rate**	**95% CI**	**n**	**Rate**	**95% CI**	**n**	**Rate**	**95% CI**	**RR**	**95% CI**
<15	23240	2684.7529	(2673.0-2696.5)	13449	3041.6	(3017.1-3066)	9791	2312.1	(2289.9-2334.4)	1.32	(1.3-1.33)
15-29	6617	783.46819	(777.0-790.0)	2767	656.5	(644.6-668.4)	3850	909.9	(895.9-923.9)	0.72	(0.7-0.74)
30-64	16988	882.58108	(879.6-885.6)	7829	849.6	(843.4-855.8)	9159	912.9	(907-918.8)	0.93	(0.92-0.94)
65+	22465	3700.7751	(3681.1-3720.4)	11647	4176.4	(4131-4221.8)	10818	3296.6	(3262.3-3330.9)	1.27	(1.25-1.28)

Table A 76. 2013 total respiratory hospitalisation age group rate ratios by sex

Age (years)	**Total**		**Male**		**Female**	
	RR	**95% CI**	**RR**	**95% CI**	**RR**	**95% CI**
<15	3.04	(3.01-3.07)	3.58	(3.53-3.63)	2.53	(2.5-2.57)
15-29	0.89	(0.88-0.9)	0.77	(0.76-0.79)	1.00	(0.98-1.02)
30-64	1.00	Baseline	1.00	Baseline	1.00	Baseline
65+	4.19	(4.15-4.23)	4.92	(4.85-4.98)	3.61	(3.56-3.66)

Table A 77. 2013 total respiratory hospitalisation rates and rate ratios by ethnic group.

Total Ethnicity	**n**	**Rate**				
		Raw	**Age adj'd**	**95% CI**	**RR**	**95%CI**
Māori	15587	2603.9	3052.4	(2990.9-3113.9)	2.12	(2.09-2.14)
Pacific	9179	3101.6	3774.8	(3668.4-3881.3)	2.62	(2.58-2.66)
Asian	4478	949.3	1240.8	(1195.7-1285.9)	0.86	(0.84-0.88)
Non-MPA	40837	1511.7	1442.1	(1427.8-1456.5)	1.00	Baseline

Table A 78. 2013 total respiratory hospitalisation rates by ethnic group and age.

	Māori			Pacific			Asian			non-MPA		
Age (years)	n	Rate	95% CI	n	Rate	95% CI	n	Rate	95% CI	n	Rate	95% CI
<15	7353	3634.4	(3576.0-3692.9)	4931	4673.2	(4546.2-4800.2)	2038	2096.7	(2004.4-2189.0)	9824	2181.6	(2161.3-2201.9)
15-29	1611	1118.2	(1072.7-1163.7)	883	1153.3	(1066.4-1240.2)	461	349.0	(321.3-376.7)	3759	833.5	(821.0-846.1)
30-64	4093	1860.3	(1821.8-1898.7)	1933	1934.6	(1848.4-2020.9)	1209	562.1	(540.5-583.7)	9717	750.7	(746.6-754.9)
65+	2530	7861.0	(7321.1-8401.0)	1432	10267.4	(8843.5-11691.4)	770	2819.3	(2438.2-3200.3)	17537	3467.6	(3444.8-3490.4)

Table A 79. 2013 total respiratory hospitalisation rates by NZDep2006 quintile.

	n	Rate (raw)	Rate (age adj'd)	95% CI	RR	95% CI
NZDep 1-2	8181	936.8	998.3	(976.4-1020.2)	1.00	Baseline
3-4	9141	1070.9	1101.9	(1079.3-1124.6)	1.10	(1.09-1.12)
5-6	11883	1418.1	1423.7	(1398.1-1449.3)	1.43	(1.41-1.45)
7-8	16070	1936.2	1903.1	(1873.6-1932.7)	1.91	(1.88-1.93)
9-10	23986	2879.1	2882.8	(2845.7-2919.9)	2.89	(2.85-2.92)

Table A 80. 2013 total respiratory hospitalisation rates by ethnic group and NZDep quintile.

		NZDep quintile				
Ethnic group		1-2	3-4	5-6	7-8	9-10
Māori	Hosp_Num	705	987	1771	3431	8681
	Rate (raw)	1366.3	1426.6	1815.5	2481.5	3593.0
	Rate (age adj'd)	1770.5	1576.2	2194.5	2956.5	4092.4
	95%CI	(1580.2-1960.8)	(1452.7-1699.7)	(2060.1-2328.9)	(2831.7-3081.3)	(3982.3-4202.5)
Pacific	Hosp_Num	399	541	813	1654	5767
	Rate (raw)	2706.0	2348.1	2318.6	2669.0	3581.6
	Rate (age adj'd)	3189.2	2823.9	2968.0	3033.1	4436.9
	95%CI	(2795.7-3582.8)	(2499.5-3148.3)	(2671.5-3264.4)	(2834-3232.2)	(4277.5-4596.4)
Asian	Hosp_Num	646	753	827	944	1305
	Rate (raw)	794.3	752.5	815.4	908.2	1540.8
	Rate (age adj'd)	943.1	1017.2	1111.3	1230.0	2098.2
	95%CI	(856.8-1029.4)	(927.9-1106.5)	(1014.2-1208.3)	(1131.1-1328.9)	(1950.9-2245.4)
NZ European/ Other	Hosp_Num	6426	6881	8495	10185	8821
	Rate (raw)	917.2	1090.8	1487.0	2073.0	2895.6
	Rate (age adj'd)	964.7	1085.5	1417.5	1895.5	2640.3
	95%CI	(940.7-988.8)	(1059.4-1111.5)	(1386.6-1448.3)	(1856.9-1934)	(2582-2698.5)

Table A 81. 2013 total respiratory hospitalisation rates by DHB.

DHB	n	Rate (raw)	Rate (age adj'd)	95%CI
Northland	3009	1983.7	1866.4	(1798.7-1934.2)
Waitemata	7820	1488.0	1531.4	(1497.4-1565.4)
Auckland	6539	1498.6	1646.6	(1606.1-1687.1)
Counties Manakau	9581	2041.6	2134.8	(2091-2178.5)
Waikato	6577	1830.4	1788.4	(1745.1-1831.6)
Lakes	1892	1926.8	1883.4	(1798.3-1968.5)
Bay of Plenty	3983	1933.5	1810.1	(1753.2-1867.1)
Tairawhiti	946	2167.2	2073.6	(1940.6-2206.6)
Hawkes Bay	2447	1613.1	1506.8	(1446.7-1566.9)
Taranaki	1703	1551.7	1472.7	(1402.4-1543)
Midcentral	2877	1769.8	1690.6	(1628.5-1752.6)
Whanganui	1178	1959.4	1817.8	(1712.7-1922.9)
Capital and Coast	3456	1218.2	1300.6	(1257-1344.2)
Hutt	2480	1792.2	1809.1	(1737.8-1880.4)
Wairarapa	678	1649.2	1514.7	(1398.1-1631.3)
Nelson Marlborough	1664	1214.6	1157.4	(1100.6-1214.1)
West Coast	473	1471.2	1422.3	(1293.1-1551.5)
Canterbury	6692	1387.9	1395.7	(1362.2-1429.2)
Sth Canterbury	718	1290.9	1183.4	(1094.2-1272.7)
Southern	4592	1543.9	1534.6	(1490-1579.2)

9.5.1. MORTALITY

Table A 82. Total respiratory mortality rates and age-adjusted rates 2000-2011.

		Rate		
Year	n	Raw	(age adj'd)	95% CI
2000	2060	53.4	57.6	(55.1 - 60.1)
2001	2407	62.0	65.5	(62.9 - 68.1)
2002	2391	60.6	63.5	(61 - 66.1)
2003	2358	58.6	61.3	(58.8 - 63.8)
2004	2469	60.4	62.7	(60.3 - 65.2)
2005	2161	52.3	53.5	(51.3 - 55.8)
2006	2395	57.2	57.8	(55.5 - 60.1)
2007	2328	55.1	54.8	(52.6 - 57)
2008	2623	61.6	60.2	(57.8 - 62.5)
2009	2557	59.4	57.1	(54.9 - 59.4)

2010	2439	56.1	53.1	(51 - 55.2)
2011	2676	61.0	56.7	(54.5 - 58.8)
Trend 2000 -2011			-0.69	(-0.70 - -0.68), p<0.005

Table A 83. Total respiratory mortality rates and rate ratios by age group and sex, 2006-2011.

	Total			Male			Female			M v F	
Age (years)	n	Rate	95% CI	n	Rate	95% CI	n	Rate	95% CI	RR	95% CI
<15	212	4.1	(4-4.1)	123	4.6	(4.5-4.8)	89	3.5	(3.4-3.6)	1.32	(1.16-1.5)
15-29	91	1.9	(1.8-1.9)	51	2.1	(2-2.2)	40	1.6	(1.5-1.7)	1.29	(1.05-1.57)
30-64	2842	25.6	(25.5-25.7)	1365	25.4	(25.2-25.6)	1477	25.8	(25.6-25.9)	0.99	(0.95-1.02)
65+	25719	864.9	(863-866.8)	12752	961.1	(956.5-965.7)	12967	787.4	(784.1-790.8)	1.22	(1.21-1.24)

Table A 84. Total respiratory mortality rate ratios by age group and sex, 2006-2011.

Age (years)	Total		Male		Female	
	RR	95% CI	RR	95% CI	RR	95% CI
<15	0.16	(0.15-0.17)	0.18	(0.17-0.2)	0.14	(0.12-0.15)
15-29	0.07	(0.07-0.08)	0.08	(0.07-0.09)	0.06	(0.05-0.07)
30-64	1.00	Baseline	1.00	Baseline	1.00	Baseline
65+	33.80	(33.17-34.44)	37.84	(36.83-38.88)	30.56	(29.77-31.37)

Table A 85. Total respiratory mortality rates and rate ratios by ethnic group, 2006-2011.

Total Ethnicity	n	Rate				
		Raw	Age adj'd	95% CI	RR	95%CI
Māori	2728	80.4	236.1	(225.5-246.6)	2.02	(1.97-2.06)
Pacific	828	51.9	180.7	(166.6-194.8)	1.54	(1.49-1.6)
Asian	368	17.3	63.2	(56-70.4)	0.54	(0.51-0.57)
Non-MPA	24963	152.5	117.0	(115.6-118.5)	1.00	Baseline

Table A 86. Total respiratory mortality rates by ethnic group and age, 2006-2011

	Māori			Pacific			Asian			non-MPA		
Age (years)	n	Rate	95% CI	n	Rate	95% CI	n	Rate	95% CI	n	Rate	95% CI
<15	109	9.1	(8.6-9.6)	56	9.3	(8.3-10.3)	10	2.2	(1.5-2.8)	57	1.9	(1.9-2)
15-29	38	4.5	(4-5)	15	3.7	(2.8-4.6)	8	1.2	(0.9-1.5)	32	1.1	(1.1-1.2)
30-64	893	73.4	(72-74.7)	173	32.7	(30.6-34.8)	53	5.8	(5.3-6.3)	1733	21.5	(21.4-21.7)
65+	1688	1216.6	(1167.4-1265.9)	584	965.0	(864.4-1065.6)	297	308.0	(272.3-343.7)	23141	901.3	(899-903.6)

Table A 87. Total respiratory mortality rates NZDep2006 quintile, 2006-2011.

NZDep quintile	n	Rate (raw)	Rate (age adj'd)	95% CI	RR	95% CI
1-2	3477	70.2	82.7	(79.9-85.4)	1.00	Baseline
3-4	4337	89.1	89.2	(86.5-91.8)	1.08	(1.06-1.1)
5-6	5837	122.1	111.9	(109-114.8)	1.35	(1.33-1.38)
7-8	8253	173.8	153.2	(149.9-156.6)	1.85	(1.82-1.89)
9-10	6884	143.7	170.3	(166.3-174.3)	2.06	(2.02-2.1)

Table A 88. Total respiratory mortality rates by ethnic group and NZDep quintile, 2006-2011.

		NZDep quintile				
Ethnic group		**1-2**	**3-4**	**5-6**	**7-8**	**9-10**
Māori	**Hosp_Num**	101	190	375	626	1436
	Rate (raw)	38.4	50.2	69.2	78.7	101.7
	Rate (age adj'd)	143.5	176.8	221.7	216.2	290.7
	95%CI	(109.7-177.3)	(147.1-206.6)	(195-248.4)	(196.3-236)	(272.4-309)
Pacific	**Hosp_Num**	22	52	73	175	495
	Rate (raw)	32.0	45.4	41.0	49.9	56.0
	Rate (age adj'd)	126.7	144.6	163.6	188.3	192.5
	95%CI	(68.4-185.1)	(100.6-188.6)	(121.6-205.5)	(156.6-220.1)	(172.7-212.3)
Asian	**Hosp_Num**	58	53	58	84	95
	Rate (raw)	16.2	12.3	12.5	17.5	24.3
	Rate (age adj'd)	60.7	43.7	53.2	67.5	93.6
	95%CI	(43.2-78.1)	(30.5-56.8)	(38-68.4)	(51.7-83.4)	(72-115.3)
NZ European/ Other	**Hosp_Num**	3296	4042	5333	7373	4874
	Rate (raw)	79.3	105.8	154.0	248.6	254.3
	Rate (age adj'd)	85.8	92.1	114.9	159.2	166.1
	95%CI	(82.9-88.7)	(89.3-95)	(111.8-118)	(155.5-162.8)	(161.3-170.8)

Table A 89. Total respiratory mortality rates by DHB, 2006-2011.

DHB	n	Rate (raw)	Rate (age adj'd)	95%CI
Northland	1241	139.3	128.0	(120.8-135.1)
Waitemata	2579	89.2	99.4	(95.6-103.3)
Auckland	2329	95.9	114.4	(109.8-119.1)
Counties Manakau	2168	83.4	119.7	(114.6-124.8)
Waikato	2575	126.5	126.9	(122-131.8)
Lakes	850	144.1	155.5	(145-166)

Bay of Plenty	1685	144.1	115.2	(109.7-120.7)
Tairawhiti	389	145.8	152.5	(137.3-167.6)
Hawkes Bay	1181	132.8	117.5	(110.8-124.2)
Taranaki	921	147.2	121.7	(113.8-129.5)
Midcentral	1303	136.7	121.2	(114.6-127.8)
Whanganui	655	175.5	140.2	(129.4-150.9)
Capital and Coast	1545	96.6	111.2	(105.6-116.7)
Hutt	1051	128.7	138.6	(130.2-147)
Wairarapa	403	173.9	133.1	(120.1-146.2)
Nelson Marlborough	1060	135.8	111.5	(104.8-118.2)
West Coast	295	156.9	142.2	(125.9-158.4)
Canterbury	3545	126.7	112.7	(109-116.4)
Sth Canterbury	562	173.8	120.4	(110.4-130.4)
Southern	2455	143.0	126.7	(121.7-131.8)

10. APPENDIX 2 INDICATOR DEFINITIONS

ICD-10 codes defining indicator conditions:

- Asthma:
  - J45 Asthma
  - J46 Status asthmaticus
- Bronchiectasis:
  - J47 Bronchiectasis
  - Q33.4 Congenital bronchiectasis
- Bronchiolitis:
  - J21 Bronchiolitis
- Childhood pneumonia
  - J10.0 Influenza with pneumonia, other influenza virus identified
  - J11.0 Influenza with pneumonia, virus not identified
  - J12 Viral pneumonia, not elsewhere classified
  - J13 Pneumonia due to Streptococcus pneumoniae
  - J14 Pneumonia due to Haemophilus influenzae
  - J15 Bacterial pneumonia, not elsewhere classified
  - J16 Pneumonia due to other infectious organisms, not elsewhere classified
  - J17* Pneumonia in diseases classified elsewhere
  - J18 Pneumonia, organism unspecified
- COPD:
  - J40-42 with previous or subsequent J43 or J44 hospitalisation
  - J43 Emphysema
  - J44 COPD
- Total serious respiratory disease:
  - All ICD-10 Chapter 10 (J-codes)

11. APPENDIX 3 LITERATURE SEARCH RESULTS

Table A 90. Literature search publication numbers and filtering

Condition	Medline publications returned	Remaining after abstract screening	Remaining after full text screening
Asthma	115	12	7
Bronchiectasis	8	2	1
Childhood bronchiolitis	7	0	0
Childhood pneumonia	39	3	0
COPD in adults	24	3	1
OSA	8	2	0
Total respiratory	97	1	0

Table A 91. Asthma prevalence in published studies

Publication	Data year	NZ Location	n	Age; Ethnicity	Outcome measured	Rate/ prevalence
Cohet et al 2004[20]	2002	Greater Wellington	2539 controls	6-7 years; all	Wheezing ever	44.5%
					Wheezing last 12 months	24.3%
					More than one wheezing attach in past 12 months	24.0%
					Night waking in past 12 months	14.8%
					Severe wheeze in past 12 months	4.1%
					Asthma ever	32.8%
					Exercise wheeze	16.9%
					Night cough in past 12 months	30.8%
Bates et al 2013[21]	2008-2010	Rotorua	1637	18-65 years; all	current asthma, defined as: *"ever been diagnosed by a doctor as having asthma"*, plus either wheeze in the last 12 months or current use of asthma medication.	16.7%
					Wheeze or whistling	28.5%
					Woken with chest tightness	14.7%
					Shortness of breath at rest	9.7%
					Woken by shortness of breath	8.7%
					Woken by coughing	23.3%
					Ever asthma diagnosis	24.2%
					Current asthma treatment	13.1%
Crampton et al 2004[22]	2001-2002	All New Zealand	10 506 GP visits	All; all	"For profit" GP visit for asthma	5.0%
					"Not for profit" GP visit for asthma	9.1%

Publication	Data year	NZ Location	n	Age; Ethnicity	Outcome measured	Rate/ prevalence
Douwes et al 2007[23] N.B. High (23.2%) smoking rate in population	Not stated	Rural, lower half North Island	1328	25-49 years; all	Woken by shortness of breath in past 12 months	12.9%
					Wheeze in past 12 months	25.4%
					Asthma medication in past 12 months	11.0%
					Asthma ever	23.3%
					Doctor diagnosed asthma ever	22.2%
Ellison-Loschmann et al 2009[15] and various; aka ISAAC III	2001-2003	All New Zealand	10873	6-7 years; all (extrapolated)	Wheezing ever	40.9%
					Current wheeze	22.4%
					>=4 wheezing attacks	7.2%
					Night waking from wheeze	13.3%
					Speech-limiting wheeze	3.7%
					Asthma ever	30.3%
					Exercise wheeze	16.0%
					Night cough	28.2%
			13317	13-14 years; all (extrapolated)	Wheezing ever	46.5%
					Current wheeze	27.6%
					>=4 wheezing attacks	6.4%
					Night waking from wheeze	11.2%
					Speech-limiting wheeze	6.2%
					Asthma ever	33.4%
					Exercise wheeze	38.3%
					Night cough	28.8%
Eng et al 2010[24], Eng et al 2011[25]	2004-2006	All New Zealand	2903	20-64 years; all	Woken by shortness of breath in past 12 months	9.7%
					Asthma attack in past 12 months	8.7%
					Currently taking asthma medication	9.5%
					Current asthma	17.1%
					Wheeze in past 12 months	23.7%
					Ever had asthma	21.4%
					Doctor-diagnosed asthma	19.7%
					Adult-onset asthma	9.3%
					Doctor-diagnosed adult-onset asthma	8.5%
Watson et al 2013[26]		Northern New Zealand	369	18 months; European & Polynesian (not disaggregated)	Wheeze in the last 12 months	118/369= 32.0%

The Asthma Foundation
PO Box 1459
Wellington 6140

Tel: 64 4 499 4592
Fax: 64 4 499 4594

Email: info@asthmafoundation.org.nz
www.asthmafoundation.org.nz

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