CHRONIC LOWER RESPIRATORY DISEASES

Introduction

Chronic lower respiratory diseases, including asthma, chronic suppurative lung disease and bronchiectasis, affect the airways and other structures of the lung causing symptoms including: difficulty breathing, chronic cough, tiredness and sputum production.[1,2] There is a high degree of inequality across the socioeconomic spectrum and between ethnic groups in rates of respiratory disease.[3]

Chronic lower respiratory diseases are a component of the health status of individuals and also reflect the environments within which children live, work, and play. Common risk factors include poverty, poorly heated homes and household crowding, poor nutrition, frequent or severe lower respiratory infections during childhood, exposure to tobacco smoke and environmental air pollution.[1,2] Bronchiectasis is a chronic lung disease that causes a decline in lung function and is associated with repeated acute lower respiratory infections especially during the first year of life.[4,5] Household crowding is associated with an increased risk of hospitalisation with severe infections with respiratory syncytial virus (RSV) which is the most common cause of lower respiratory tract infections in children worldwide.[6,7] The effects of air pollution may begin before birth increasing the susceptibility of the unborn child to respiratory and other diseases. Children who develop chronic respiratory disease are also more likely than other children to experience adverse effects of air pollution.[8]

The following section reviews the community prevalence of asthma using information from the New Zealand Health Survey. Chronic lower respiratory diseases are reviewed using information from the National Minimum Dataset and the National Mortality Collection. Detailed information about hospitalisations for individual conditions is available in the 2015 NZCYES reports at www.otago.ac.nz/nzcyes. The section concludes with a brief overview of evidence for good practice for these conditions.

Data sources and methods

Indicators

Prevalence of asthma (medicated)
Rates of chronic lower respiratory diseases among 0–24 year olds

Definition

Prevalence of asthma
Asthma diagnosed by doctor and using inhalers, medicine, tablets, pills or other medication. Child respondents (aged 2–14 years) are defined as having asthma if the child's parents or caregivers had ever been told by a doctor that the child has asthma and if they now take treatments for asthma (inhalers, medicine, tablets or pills).[a] Adult respondents (aged 15+ years) are defined as having asthma if they had ever been told by a doctor that they have asthma and if they were taking treatments for asthma (inhalers, medicine, tablets or pills, or any other treatments). Medication can be taken daily to prevent symptoms, or only when needed to relieve symptoms.[a]
Rates
Hospitalisations of 0–24 year olds with a chronic lower respiratory disease per 1,000 population

Data sources

Prevalence of asthma (medicated)
New Zealand Health Survey (2006/07–2014/15, see Error! Reference source not found.

Numerator:	Sum of the weights for the respondents in the group
Denominator:	Sum of the weights for all respondents/ population group

Rates of chronic lower respiratory diseases among 0–24 year olds

Numerator:	National Minimum Dataset
Denominator:	Statistics New Zealand Estimated Resident Population (with linear extrapolation being used to calculate denominators between Census years)

Additional information

Rates of chronic lower respiratory diseases: A chronic lower respiratory disease was the principal diagnosis or was documented as one of the first 15 diagnoses. Chronic lower respiratory diseases comprises asthma (and wheeze), bronchitis, bronchiectasis, emphysema and other lower respiratory. Codes used for identifying cases are documented in Error! Reference source not found.

References

[a.] Ministry of Health. 2015. Indicator Interpretation Guide 2014/15: New Zealand Health Survey. Wellington: Ministry of Health.

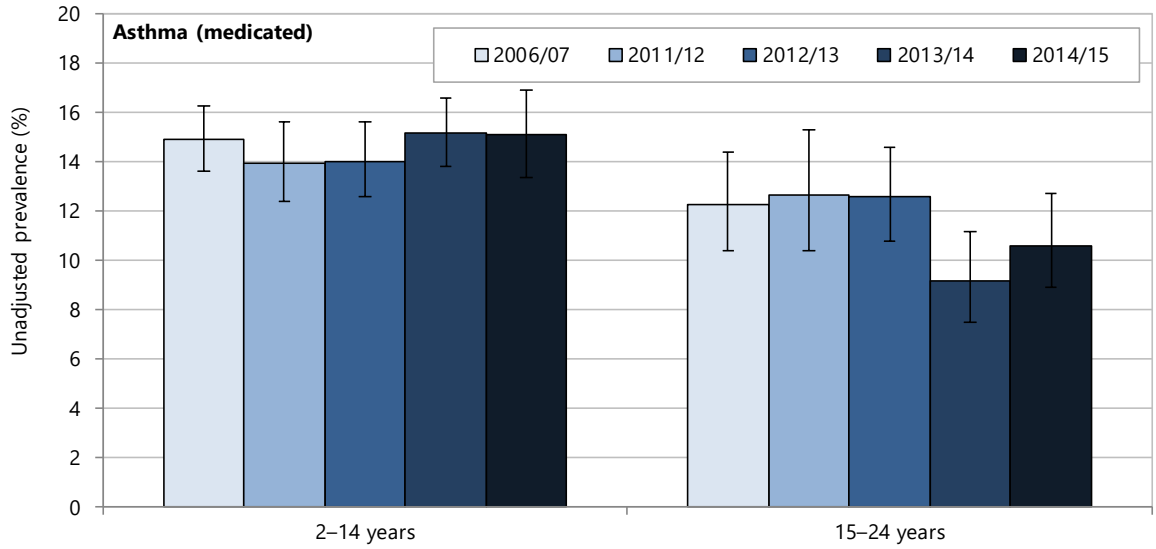
National trends and distribution

There was a total of 32 deaths of 0–24 year olds where a chronic lower respiratory disease was the underlying cause of death in New Zealand between 2009 and 2013, as documented within the National Mortality Collection. The majority of these deaths (26) were due to asthma (including status asthmaticus and wheeze).

Over the five years of the NZHS 2006/07 to 2014/15, from 14% to 15% of 2–14 year olds and 9% to 12% of 15–24 year olds were reported to be using medication for asthma diagnosed by a doctor. Prevalence has been stable over time with some variation from survey year to survey year (**Figure 1**).

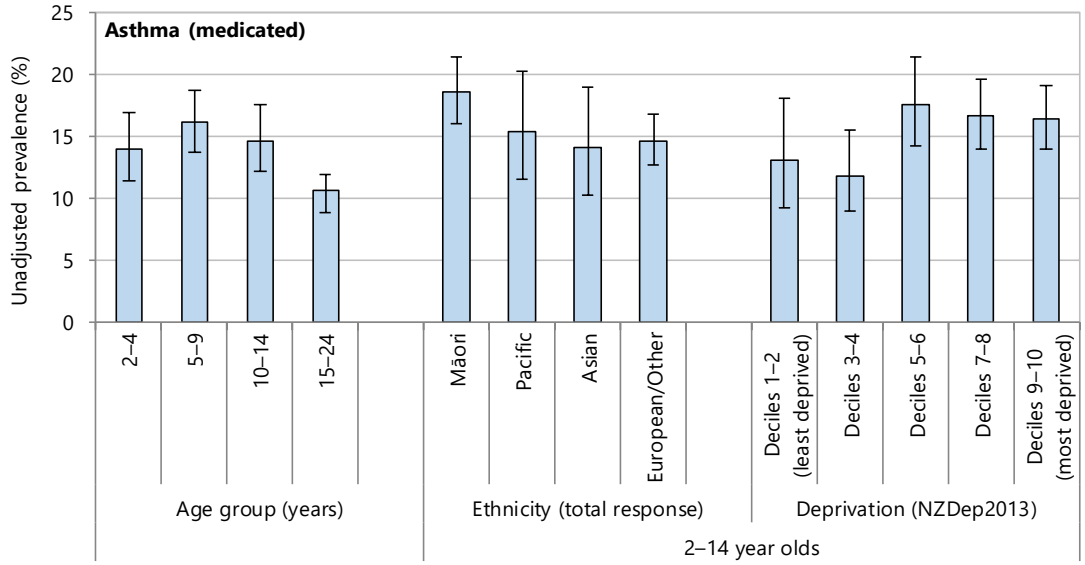
In the 2014/15 NZHS year the prevalence of asthma (medicated) was highest among 5–9 year olds and the prevalence rate for 15–24 year olds was significantly lower than that for 5–9 and 10–14 year olds (**Figure 2**). Among 2–14 year olds, prevalence was significantly higher for Māori compared with other ethnic groups. There was no significant difference in prevalence by NZDep2013 score of home address, nor by gender (**Figure 1; Figure 2**).

Figure 1. Asthma (medicated) in 2–24 year olds, by age group and survey year, NZ Health Surveys 2006/07–2014/15



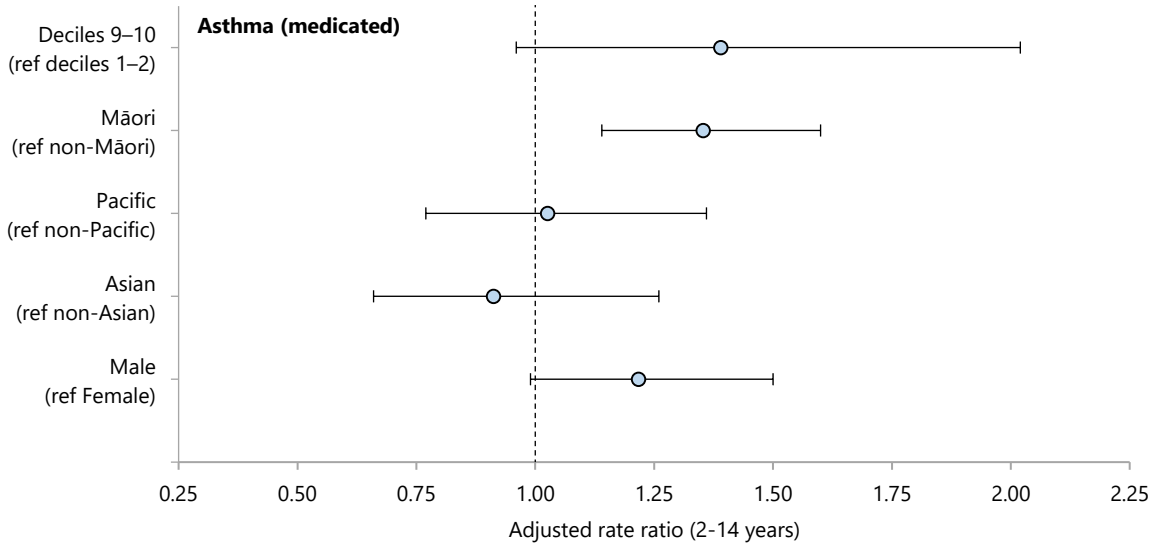
Source: New Zealand Health Survey

Figure 2. Asthma (medicated), by demographic factor, NZ Health Survey 2014/15



Source: New Zealand Health Survey

Figure 3. Comparisons for 2–14 year olds diagnosed with asthma, by demographic factors, NZ Health Survey 2014/15



Source: New Zealand Health Survey. Ethnicity is total response

The number of 0–24 year olds hospitalised with chronic lower respiratory diseases during 2011 to 2015 is presented in

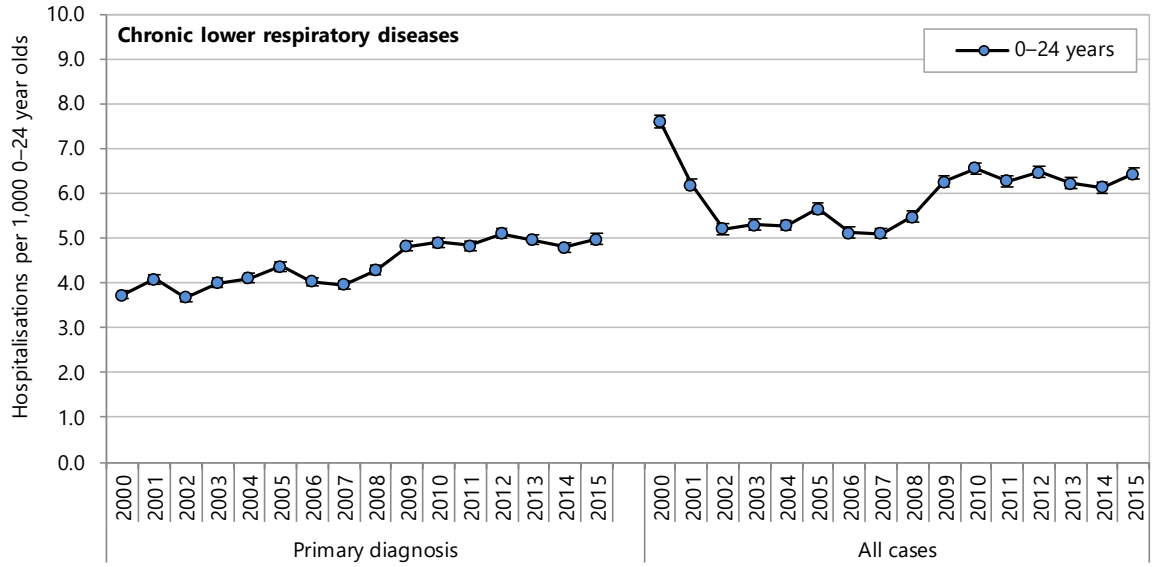
Table 1. It also presents the number of hospital discharges in which chronic lower respiratory diseases were documented as the primary diagnosis or as any diagnosis. The rate of hospitalisations where a chronic lower respiratory disease was the primary diagnosis has increased since 2000 (**Figure 4**).

Table 1. Individuals aged 0–24 years hospitalised with chronic lower respiratory diseases using primary diagnosis compared to all cases, New Zealand 2011–2015

	Unique individuals *(n)*	Hospitalisations *(n)*		Ratio All:Primary
		Primary diagnosis	All cases	
Chronic lower respiratory diseases				
Hospitalisation				
0–24 years	29,184	37,909	48,433	1.28
0–14 years	25,094	33,314	41,913	1.26
15–24 years	4,236	4,595	6,520	1.42
Chronic lower respiratory diseases in 0–24 years year olds				
Asthma and wheeze	28,195	35,982	45,274	1.26
Bronchiectasis	729	1,362	2,516	1.85
Bronchitis	341	197	384	1.95
Emphysema	124	24	137	5.71
Other	219	344	525	1.53

Source: National Minimum Dataset. 'All cases' corresponds to hospitalisations with chronic lower respiratory diseases listed in any of the first 15 diagnoses; The sum of the age groups may total to more than the 0–24 year old total

Figure 4. Hospitalisations for chronic lower respiratory diseases in 0–24 year olds, New Zealand 2000–2015



Numerator: National Minimum Dataset, Denominator: Statistics NZ Estimated Resident Population. 'All cases' corresponds to hospitalisations with chronic lower respiratory diseases listed in any of the first 15 diagnoses

Demographic distribution

Table 2 presents the demographic distribution of individuals with chronic lower respiratory diseases in New Zealand between 2011 and 2015. Chronic lower respiratory diseases were significantly higher among males, and among 0–4 and 5–14 year olds (compared to 15–24 year olds). There was a strong social gradient among these individuals, with statistically significant increases in prevalence in each deprivation quintile (NZDep deciles 3–4 to 9–10) compared with those living in least deprived areas (deciles 1–2). The rate of chronic lower respiratory diseases was significantly lower for European/Other ethnicities than for the other ethnic groups.

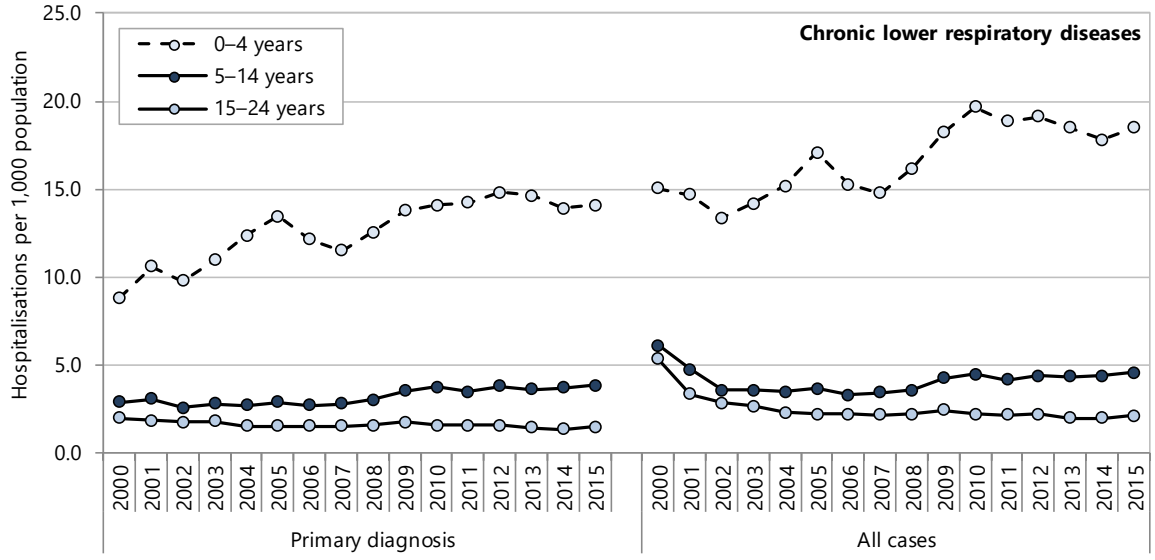
Table 2. Individuals aged 0–24 years hospitalised with chronic lower respiratory diseases, by demographic factor, New Zealand 2011–2015

Variable	Unique individuals 2011–2015 *(n)*	Rate per 1,000 population	Rate ratio	95% CI
Chronic lower respiratory diseases* in 0–24 year olds				
New Zealand				
NZ Deprivation Index quintile				
Deciles 1–2	3,458	2.44	1.00	
Deciles 3–4	4,005	3.00	1.23	1.17–1.29
Deciles 5–6	4,895	3.40	1.39	1.33–1.46
Deciles 7–8	7,173	4.42	1.81	1.74–1.89
Deciles 9–10	11,351	6.11	2.51	2.41–2.60
Prioritised ethnicity				
Māori	9,815	5.44	2.06	2.00–2.12
Pacific	5,300	7.48	2.83	2.74–2.92
Asian/Indian	2,825	2.95	1.11	1.07–1.16
MELAA	490	4.86	1.84	1.68–2.01
European/Other	10,860	2.64	1.00	
Gender				
Female	12,516	3.33	1.00	
Male	16,670	4.25	1.27	1.24–1.30
Age group (years)				
0–4	18,079	11.59	8.58	8.30–8.88
5–14	8,040	2.69	2.00	1.92–2.07
15–24	4,236	1.35	1.00	

Numerator: National Minimum Dataset, Denominator: Statistics NZ Estimated Resident Population. * Chronic lower respiratory diseases in any of the first 15 diagnoses; Rate per 100,000 age-specific population; Rate ratios are unadjusted; Ethnicity is Level 1 prioritised; Decile is NZDep2013

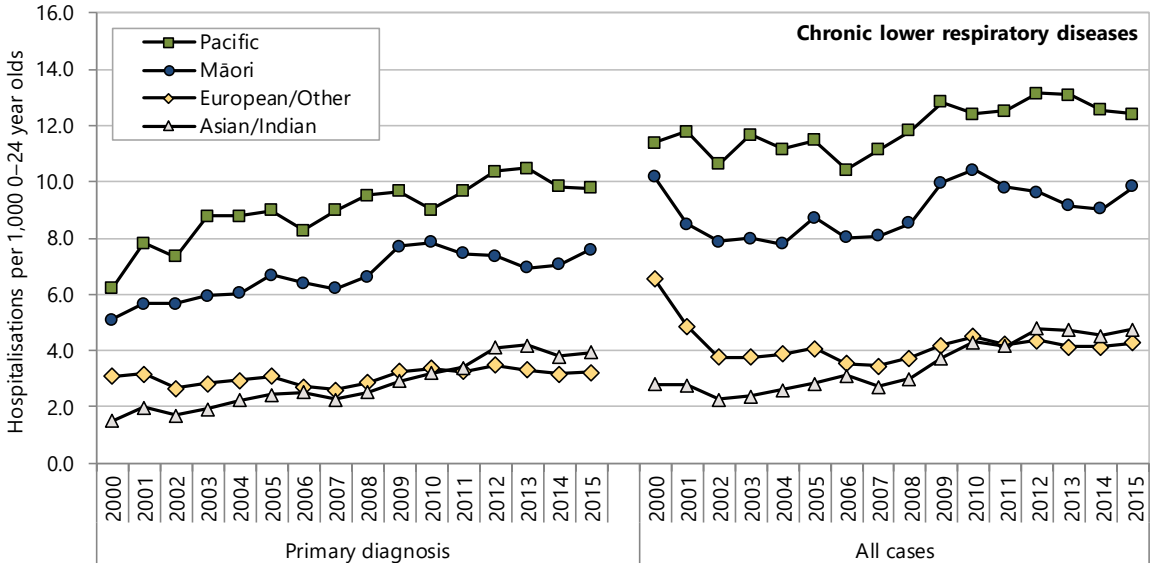
Since 2000, both primary diagnosis and all cases hospitalisations for chronic lower respiratory diseases have increased considerably for 0–4 year olds (**Figure 5**). Over the same period, the primary diagnosis hospitalisation rate gradually increased for Pacific, Māori, and Asian/Indian ethnic groups, and remained relatively constant for European/Other (**Figure 6**).

Figure 5. Hospitalisations involving chronic lower respiratory diseases in 0–24 year olds, by age group, New Zealand 2000–2015



Numerator: National Minimum Dataset, Denominator: Statistics NZ Estimated Resident Population. 'All cases' corresponds to hospitalisations with chronic lower respiratory diseases listed in any of the first 15 diagnoses

Figure 6. Hospitalisations involving chronic lower respiratory diseases in 0–24 year olds, by ethnicity, New Zealand 2000–2015

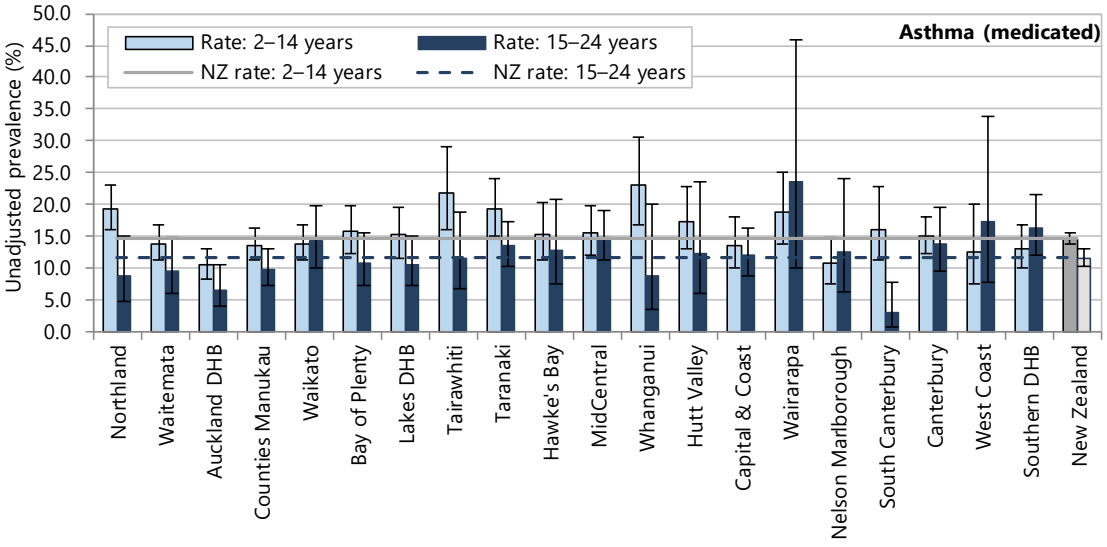


Numerator: National Minimum Dataset, Denominator: Statistics NZ Estimated Resident Population. 'All cases' corresponds to hospitalisations with chronic lower respiratory diseases listed in any of the first 15 diagnoses

Regional trends and distribution

Figure 7 shows the prevalence of asthma in each DHB, as reported in the NZ Health Survey. Prevalence of asthma in 2–14 year olds was similar to the national prevalence in all South Island DHBs.

Figure 7. Asthma (medicated) in 2–14 year olds, by district health board, NZ Health Survey 2011–2014



Source: NZ Health Survey

Table 3 presents the number of individuals resident in each district health board that had a chronic lower respiratory disease diagnosis during 2011 to 2015. It also presents the number of hospital discharges in which a chronic lower respiratory disease was documented as the primary diagnosis or any diagnosis. The All:Primary diagnosis ratio reflects the extent to which hospitalisations of 0–24 year olds with chronic respiratory conditions occur when one of these conditions condition is not the primary diagnosis and it provides an indication of the extent to which using only the primary diagnosis undercounts chronic respiratory disease related hospitalisations. A high ratio may be associated with more thorough documentation and it may also indicate that children with chronic respiratory diseases are often hospitalised for other conditions. The hospitalisation rate for chronic lower respiratory disease generally increased since 2000 for Southern DHB, decreased for

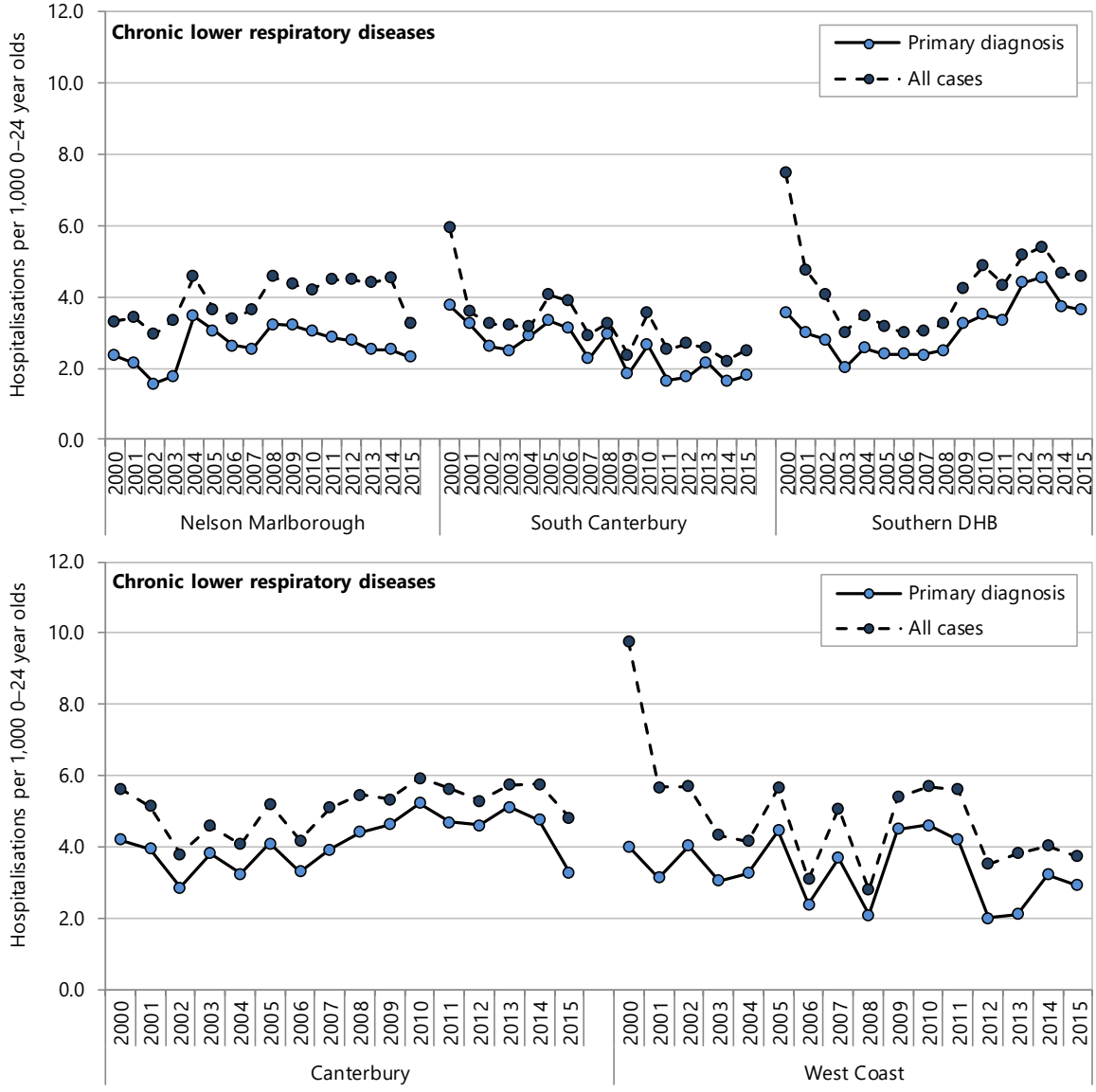
South Canterbury, Canterbury and West Coast DHBs, and remained relatively constant for Nelson Marlborough with some year-to-year variability (**Figure 8**).

Table 3. Hospitalisations for chronic lower respiratory diseases in 0–24 year olds, South Island DHBs vs New Zealand 2011–2015

DHB	Unique individuals *(n)*	Hospitalisations *(n)*		Ratio All:Primary
		Primary diagnosis	All cases	
Chronic lower respiratory diseases in 0–24 year olds				
Nelson Marlborough	539	546	889	1.63
South Canterbury	157	154	214	1.39
Canterbury	2,698	3,721	4,519	1.21
West Coast	139	144	206	1.43
Southern	1,488	2,038	2,503	1.23
New Zealand	29,184	37,909	48,433	1.28

Source: National Minimum Dataset. 'All cases' corresponds to hospitalisations with chronic lower respiratory diseases listed in any of the first 15 diagnoses; Sum of DHBs may equal more than NZ total due to some individuals changing DHB of domicile during the period

Figure 8. Hospitalisations for chronic lower respiratory diseases in 0–24 year olds, South Island DHBs 2000–2015



Numerator: National Minimum Dataset, Denominator: Statistics NZ Estimated Resident Population. 'All cases' corresponds to hospitalisations with chronic lower respiratory diseases listed in any of the first 15 diagnoses

Evidence for good practice

Possibilities for prevention

Childhood respiratory disease can be prevented or ameliorated by several basic measures including: improving childhood nutrition, promoting breastfeeding, complete and timely immunisation, improving living conditions to prevent crowding, avoiding tobacco smoke exposure and reducing indoor air pollution. Avoiding smoking during pregnancy and avoidance of passive smoke exposure after birth can reduce asthma severity in children.[8,9] The emphasis needs to be on smoking cessation, as exposure to environmental tobacco smoke remains high even when smoking parents maintain smoke-free homes and cars.[10] Legislation and political action on clean air makes a difference and can significantly reduce hospitalisations for respiratory disease.[8]

Interventions to effectively reduce disparities in respiratory health are essential and will require change from individuals, health care providers and health policy leaders to create the broad societal change needed to address the wider determinants of health.[11] Addressing social determinants of health and improving health service delivery are both important.[5] Health service providers need appropriate clinical skills to understand patients' beliefs, attitudes, experiences, and behaviours and demonstrate cross-cultural communication and competence in interactions with patients.[11] Measures to prevent premature birth and to reduce acute lower respiratory infections are important equity issues to reduce bronchiectasis in indigenous children.[4,5]

An effective approach to addressing respiratory disease includes ready access to highly skilled health care, early (rather than late) intervention, close links between the various components of the health sector and high levels of health literacy.[2] Asthma severity and hospitalisation rates can be reduced through better treatment, improved access to primary care and educational interventions for parents, children and healthcare providers.[12] Observed disparities in the dispensing of preventive asthma treatment to Māori and Pacific children need to be addressed.[13,14] Technology such as mobile phones, combined with a culturally sensitive approach, can be used to facilitate adherence to treatment.[15] It may be appropriate to trial interventions such as patient education delivered by health-care professionals and long-term follow-up after acute care visits provided that an appropriate plan is in place to monitor effectiveness.[11]

Vaccination against non-typeable *Haemophilus influenza* can help to prevent infections for children who have chronic suppurative lung diseases.[5] Long term treatment with weekly azithromycin can decrease pulmonary exacerbations in indigenous children with chronic suppurative lung disease but is also associated with carriage of azithromycin-resistant bacteria.[16] Vaccination with palivizumab is safe and effective for preventing RSV hospitalisation in infants at high risk of severe infection, but it is expensive and requires monthly intravenous injection.[7] Randomised controlled trials are being undertaken in Auckland and Christchurch to study the efficacy and safety of maternal RSV vaccination in the third-trimester of pregnancy and particularly whether this can prevent RSV infection in their infants.[17]

Evidence-based health care for children and young people with chronic lower respiratory diseases

Timely diagnosis and effective treatment are important components of secondary and tertiary prevention of chronic lower respiratory disease, including reducing the number and severity of exacerbations for children with the conditions and in particular reducing the need for hospitalisation.[5,8,18] These national and international guidelines, systematic reviews, other publications and websites relevant to the management of chronic lower respiratory diseases are suggestions for further reading.

New Zealand guidelines

- Asthma and Respiratory Foundation of New Zealand. 2015. Te Hā Ora (The Breath of Life): National Respiratory Strategy. Wellington: The Asthma Foundation. https://www.asthmafoundation.org.nz/about-us/advocacy/national-respiratory-strategy
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International guidelines

- Global Initiative for Asthma. 2016. Global Strategy for Asthma Management and Prevention. http://ginasthma.org/2016-gina-report-global-strategy-for-asthma-management-and-prevention/
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Evidence-based medicine reviews

- Anderson LM, et al. 2015. Community coalition-driven interventions to reduce health disparities among racial and ethnic minority populations. *Cochrane Database of Systematic Reviews, (6).* http://dx.doi.org/10.1002/14651858.CD009905.pub2
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Other relevant publications

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