

# Lower respiratory tract infection hospitalisations (0–4 years)

This report presents information on lower respiratory tract infection (LRTI) hospitalisation rates among children aged 0–4 years in Aotearoa New Zealand.

## Key facts

- The number of LRTI hospitalisations among 0-4 year olds increased from 9415 in 2021 to 9968 in 2022.
- LRTI hospitalisations during winter returned to pre-COVID levels, but hospitalisations stayed high throughout the remainder of 2022, compared to 2019 levels.
- Infants (under one-year-old) continue to have the highest LRTI hospitalisation rates, but the rate for 1-year-olds (4546.8 per 100,000) was the highest recorded since 2001.
- Pacific children had three times the rate of LRTI hospitalisations as European/Other children in 2022.

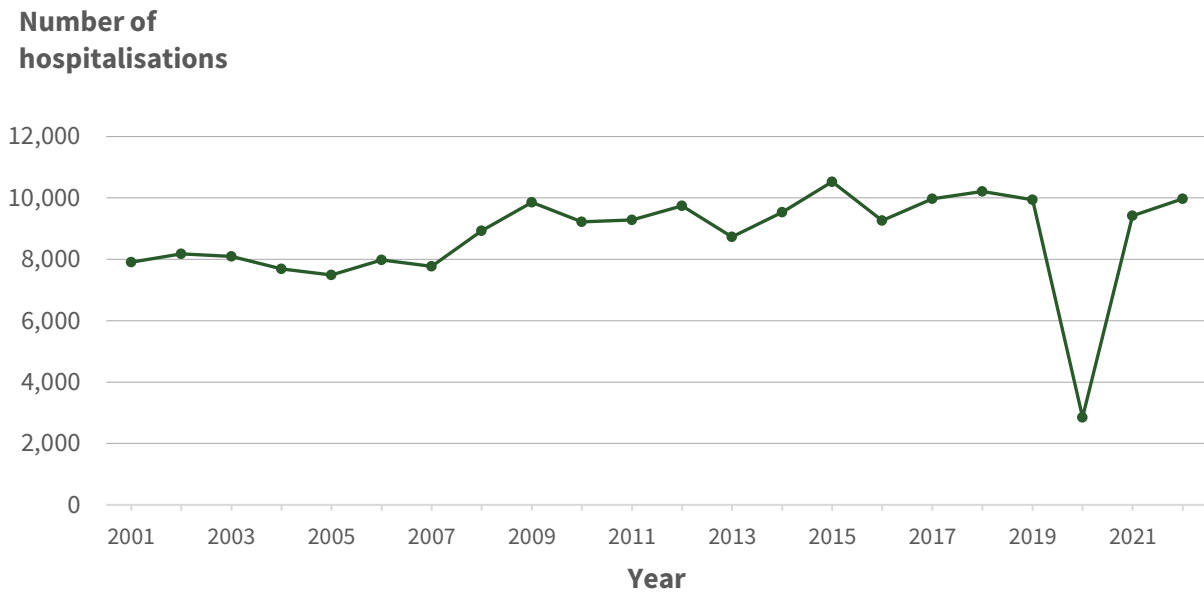
## Poor indoor and outdoor air quality increases the risk of lower respiratory tract infections among children

Lower respiratory tract infections (LRTI) refer to infections of the windpipe (trachea), lungs, and airways (bronchi, bronchioles). These include pneumonia, bronchitis, and bronchiolitis. Household crowding, second-hand smoke exposure (Baker et al 2013; U.S. Department of Health and Human Services 2007), and outdoor air pollution (Mehta et al 2013) increase the risk of lower respiratory tract infections in young children. Compared with other developed countries, New Zealand has high rates of LRTI hospitalisation among young children (Trenholme et al 2013). For more background information, please visit our [website](#).

## LRTI hospitalisations returned to pre-COVID-19 levels after a drop in 2020

In 2022, hospitalisations due to LRTI in children under five reached 9968, marking an increase from 9415 in 2021. This demonstrates a threefold rise in hospitalisations since the COVID-19 pandemic in 2020 (Figure 1).

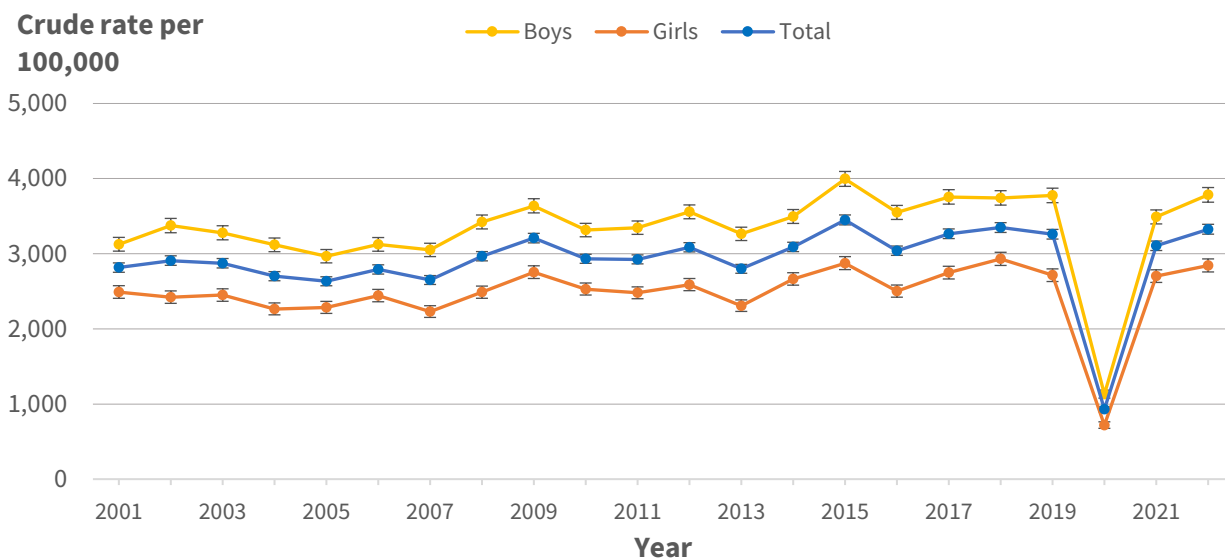
**Figure 1: Number of lower respiratory tract infection hospitalisations in children aged 0–4 years, 2001–2022**



Source: National Minimum Dataset, Ministry of Health 2023

The hospitalisation rate for LRTI in children increased from 3105.6 per 100,000 (95%CI 3043.2–3169.0) in 2021 to 3325.7 per 100,000 (95%CI 3260.7–3391.6) in 2022 (Figure 2). The significantly lower rate in 2020 coincided with the onset of the nationwide COVID-19 lockdown on March 25, 2020. With the gradual relaxation of COVID-19 restrictions, hospitalisation rates have reverted to levels comparable to those seen before the pandemic.

**Figure 2: Lower respiratory tract infection hospitalisations in children aged 0–4 years, by sex, 2001–2022 (crude rate per 100,000)**



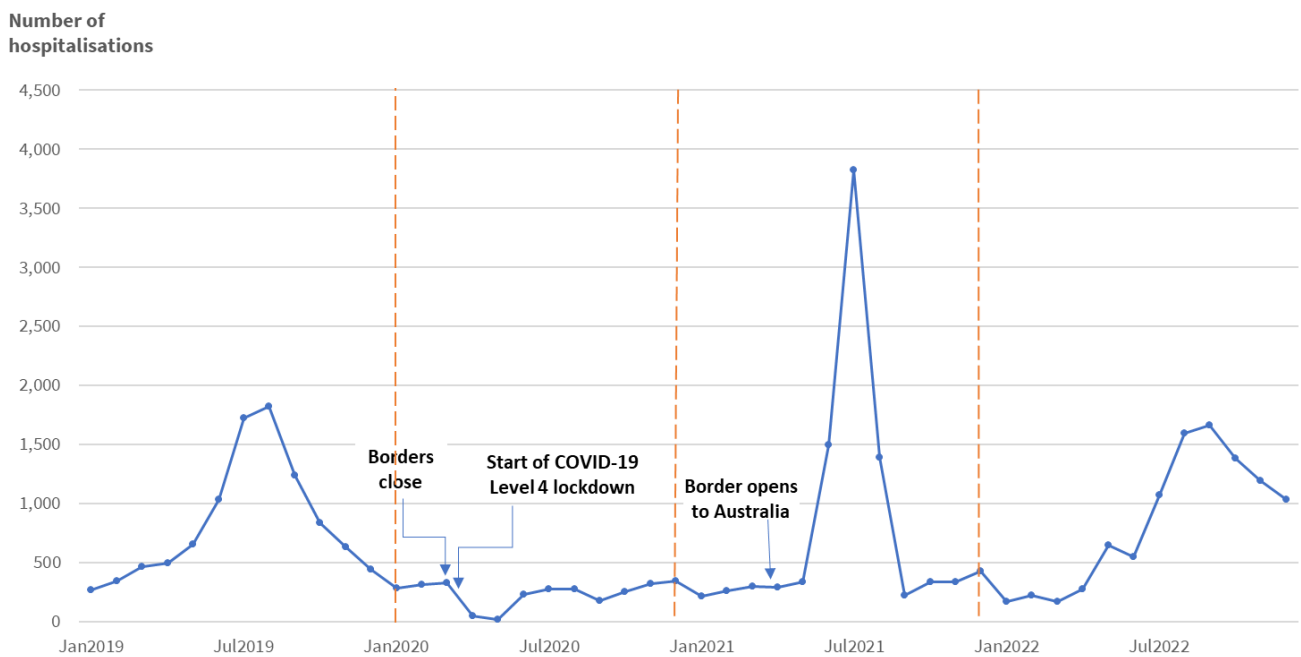
Note: 95% confidence intervals have been presented as vertical bars.

Source: National Minimum Dataset, Ministry of Health 2023

## Usual winter peak returned to pre-COVID-19 levels

LRTI hospitalisations during the 2022 winter season have reverted to pre-COVID-19 levels. Nevertheless, they remained notably high for the rest of the year compared to the levels observed in 2019 (Figure 3).

**Figure 3: Number of lower respiratory tract infection hospitalisations in children aged 0–4 years, by month, 2019–2022**

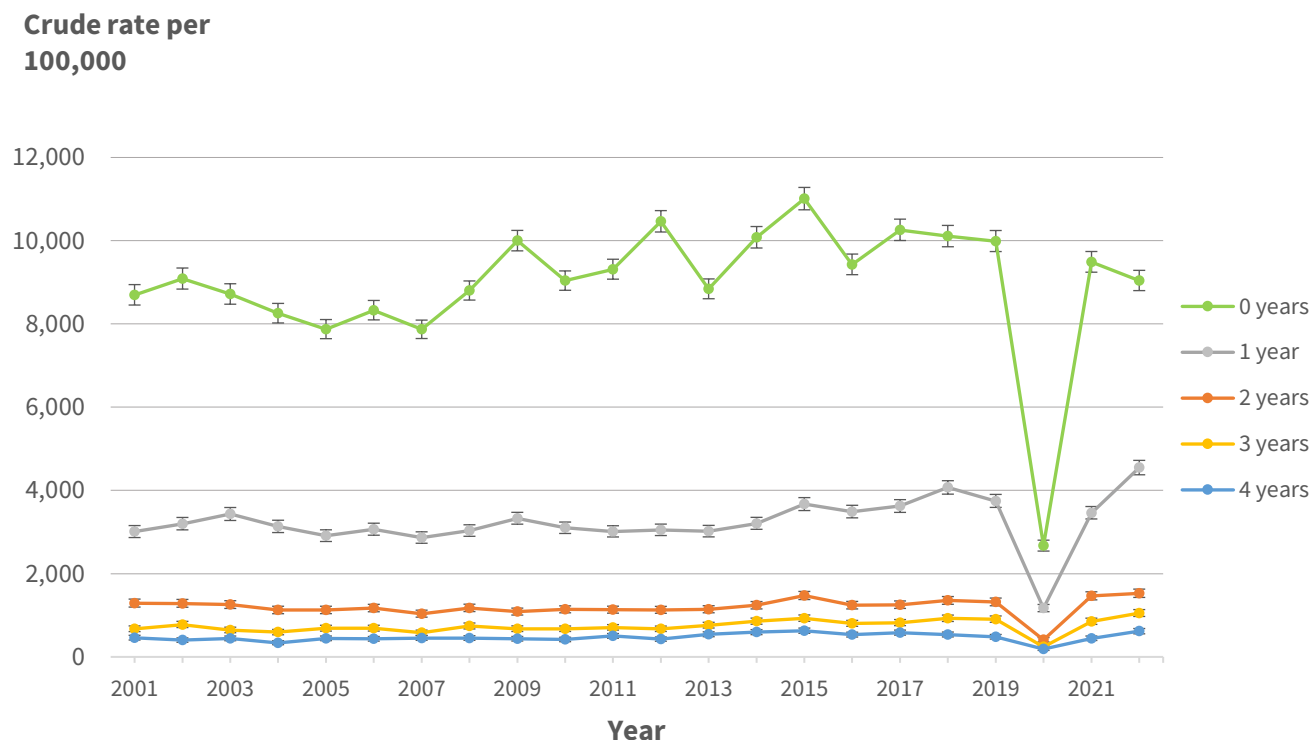


Source: National Minimum Dataset, Ministry of Health 2023

## Infants continued to have the highest LRTI hospitalisation rates

In 2022, infants (under one-year-old) had the highest rate (9042.1 per 100,000; 95%CI 8801.4–9287.6) of LRTI hospitalisations compared to children aged 1–4 years (Figure 4). Notably, while the rate for infants decreased in 2022, there was a significant surge in rates for 1-year-olds, climbing from 3461.5 per 100,000 (95%CI 3314.6–3613.2) in 2021 to 4546.8 per 100,000 (95%CI 4376.4–4722.2) in 2022, marking the highest rate recorded since 2001.

**Figure 4: Lower respiratory tract infection hospitalisations in children aged 0–4 years, by age, 2001–2022 (crude rate per 100,000)**



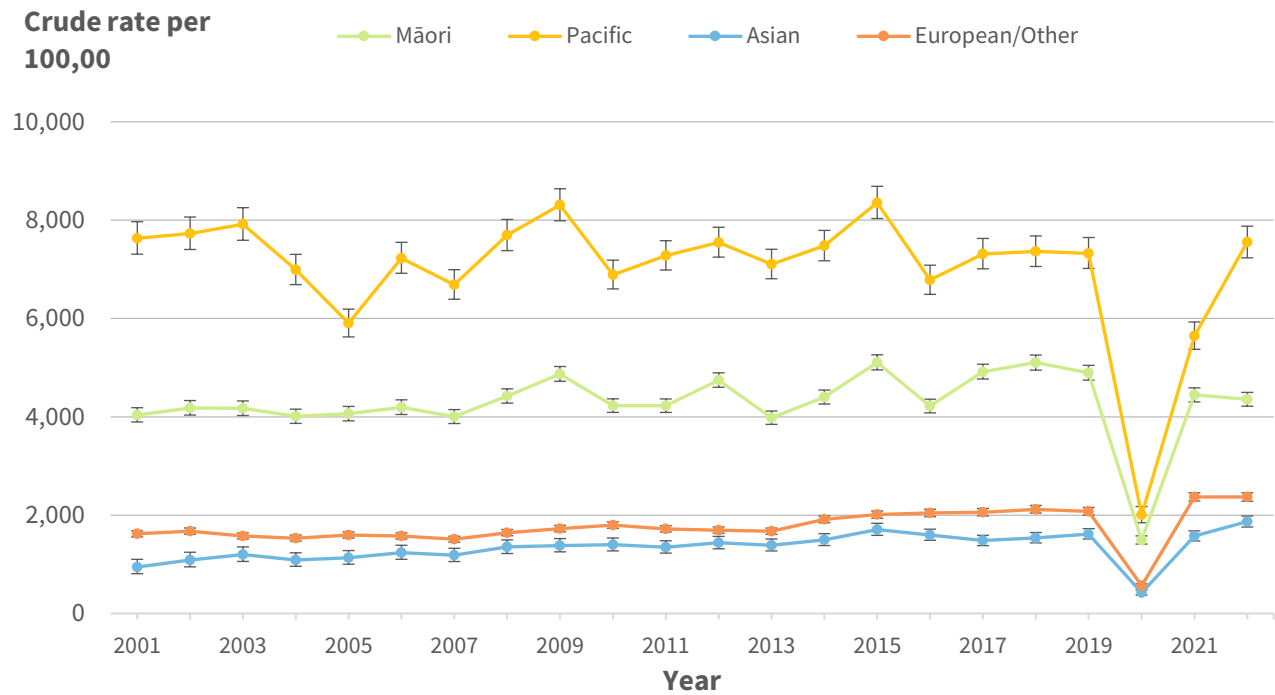
Note: 95% confidence intervals have been presented as vertical bars.  
 Source: National Minimum Dataset, Ministry of Health 2023

## Pacific and Māori children were disproportionately affected by LRTI

Rates of LRTI for Pacific and Māori children have been consistently higher than those for European/Other children since 2001 (Figure 5). In 2022, the LRTI hospitalisation rate was three times as high for Pacific children aged 0–4 years (7550.3 per 100,000; 95%CI 7233.7–7877.2) than European/Other children (2367.8 per 100,000; 95%CI 2284.4–2453.5).

Between 2021 and 2022, there was a 33% rise in hospitalisation rates for Pacific children. Likewise, Asian children saw an 18% increase during the same period. However, hospitalisation rates remained consistent for Māori and European/Other children throughout those years.

**Figure 5: Lower respiratory tract infection hospitalisations in children aged 0–4 years, by ethnic group (prioritised), 2001–2022 (crude rate per 100,000)**

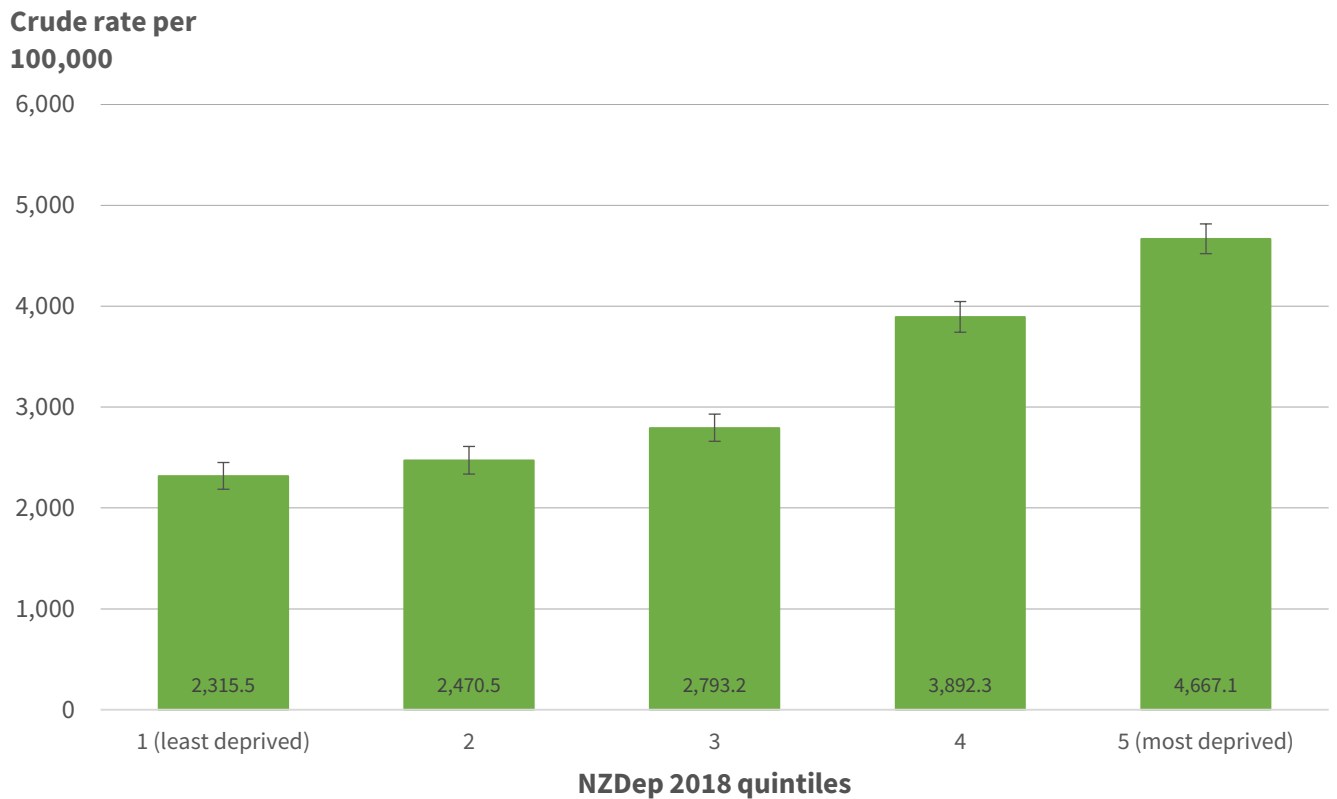


Note: 95% confidence intervals have been presented as vertical bars.  
 Source: National Minimum Dataset, Ministry of Health 2023

### Higher LRTI hospitalisation rates in more deprived areas

In 2022, LRTI hospitalisation rates were much higher in more socioeconomically deprived areas (Figure 6). Children living in the most deprived areas (NZDep2018 quintile 5) had two times the rate of LRTI hospitalisation as children living in the least deprived areas (quintile 1) (rate ratio = 2.02)

**Figure 6: Lower respiratory tract infection hospitalisations in children aged 0–4 years, by NZDep 2018 quintiles, 2022 (crude rate per 100,000)**



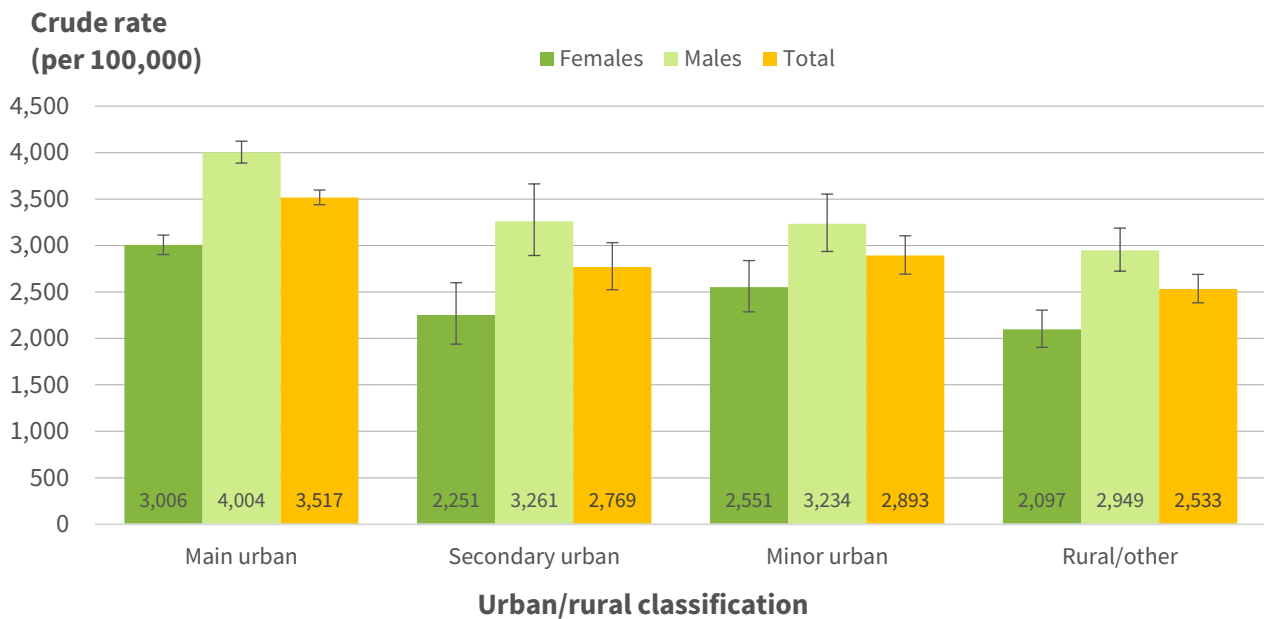
Note: 95% confidence intervals have been presented as vertical bars.  
Source: National Minimum Dataset, Ministry of Health 2023

## Higher LRTI hospitalisation rates in urban areas

LRTI hospitalisation rates for 2022 were higher for children living in main urban areas (3517.3 per 100,000; 95%CI 3438.0–3596.0) than for children living in rural areas (2532.6 per 100,000; 95%CI 2382.0–2689.2) (Figure 7).

Across all urban and rural categories, there was a noticeable contrast between male and female rates. The most significant difference between male and female rates appears to be prominent among residents in rural areas, followed closely by those in main urban areas.

**Figure 7: Lower respiratory tract infection hospitalisations in children aged 0–4 years, by urban/rural classification, 2022 (crude rate per 100,000)**



Note 1: 95% confidence intervals have been presented as vertical bars.

Note 2: The Statistics New Zealand urban-rural classification for 2013 has been used. Main urban areas are major towns and cities with a population of 30,000 or more. Secondary urban areas are smaller towns with a population of 10,000–29,999 people. Minor urban areas are towns with a population of 1,000–9,999. Rural areas include rural centres, and rural areas outside of these.

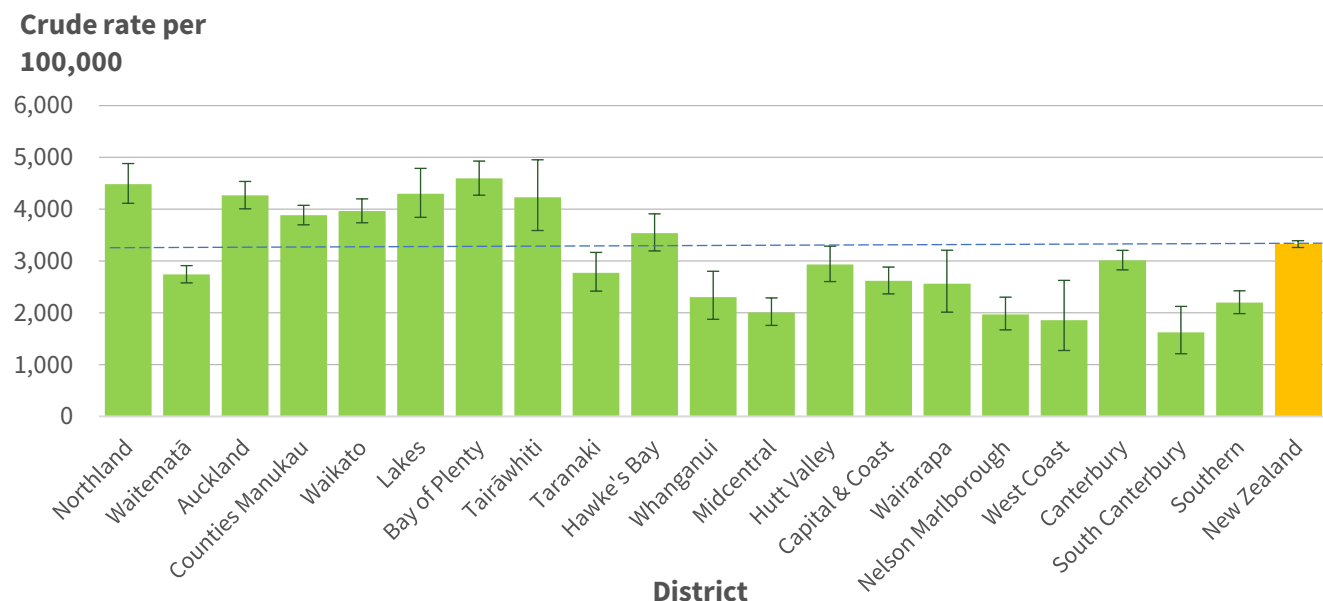
Source: National Minimum Dataset, Ministry of Health 2023

## High LRTI hospitalisation rates in Northland, Auckland, Counties Manukau, Waikato, Lakes, Bay of Plenty, and Tairāwhiti

Children living in Northland, Auckland, Counties Manukau, Waikato, Lakes, Bay of Plenty, and Tairāwhiti districts had relatively high rates in 2022 (Figure 8).



**Figure 8: Lower respiratory tract infection hospitalisations in children aged 0–4 years, by district, 2022 (crude rate per 100,000)**



Note: 95% confidence intervals have been presented as vertical bars.

Source: National Minimum Dataset, Ministry of Health 2023

## Data for this indicator

This indicator is an analysis of data from the National Minimum Dataset, provided to EHINZ by the Ministry of Health in August 2023.

This indicator reports on LRTI hospitalisations among children aged 0–4 years with a primary diagnosis in the following ICD-10AM codes:

- pneumonia (J12, J13, J14, J15, J16, J18)
- bronchitis (J20)
- bronchiolitis (J21)
- unspecified acute lower respiratory tract infection (J22).

For additional information, see the [Metadata](#) sheet.

## References

Baker MG, Goodyear R, Telfar-Barnard L, et al. 2012. The distribution of household crowding in New Zealand: An analysis based on 1991 to 2006 Census data. Wellington: He Kainga Oranga/ Housing and Health Research Programme, University of Otago.

Mehta S, Shin H, Burnett R, et al. 2013. Ambient particulate air pollution and acute lower respiratory infections: a systematic review and implications for estimating the global burden of disease. *Air Qual Atmos Health* 6: 69–83.

Trenholme AA, Byrnes CA, McBride C, et al. 2013. Respiratory health outcomes 1 year after admission with severe lower respiratory tract infection. *Pediatric Pulmonology* 48: 772–79

U.S. Department of Health and Human Services. 2007. Children and Secondhand Smoke Exposure. Excerpts from *The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.

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