

Nirsevimab immunisation of infants and respiratory syncytial virus (RSV)-associated hospitalisations, Western Australia, 2024: a population-based analysis

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Respiratory syncytial virus (RSV) is a major cause of acute lower respiratory tract infections in young children; it is the leading cause in Australia of hospitalisations during the first year of life.^{1,2} Nirsevimab (trade name Beyfortus), a monoclonal antibody that binds RSV, provides protection against RSV-associated lower respiratory tract disease.^{3,4} On 24 November 2023, nirsevimab was registered in Australia for preventing RSV lower respiratory tract disease in neonates and infants born during or entering their first RSV season, and children up to 24 months of age who remain vulnerable to severe RSV disease through their second RSV season.⁵

On 4 March 2024, the Western Australian government committed \$11 million to the most age-inclusive universal nirsevimab program in Australia.⁶ In most WA regions, RSV transmission is highly seasonal, typically starting in May and ending in October.⁷ From 2 April 2024, all WA infants born during 1 October 2023 – 30 September 2024 were eligible to receive nirsevimab in primary care services and birthing hospitals,⁶ as were Aboriginal children and children with conditions associated with severe RSV disease born during 1 October 2022 – 30 September 2023.^{6,8}

We assessed the association between nirsevimab coverage of infants and the number of RSV-associated hospitalisations in a population-based cohort. We obtained the number of births in WA during 2022–2024 from the WA Registry of Births, Deaths and Marriages;⁹ we obtained the numbers of children under one year of age or aged 1–2 years who received nirsevimab during 2 April – 30 September 2024 from the Australian Immunisation Register¹⁰ on 6 January 2025. The catch-up cohort included infants born before 1 May 2024; the newborn cohort included infants born on or after 1 May 2024.

Laboratory-confirmed RSV infections and associated hospitalisations became notifiable in WA under the *Public Health Act* 2016 on 16 July 2021.¹¹ We extracted data for all notified RSV infections in children under five years of age with dates of specimen collection during 2022–2024 from the WA Notifiable Infectious Disease Database (WANIDD) on 6 January 2025. Patient administration data systems are matched weekly with WANIDD using birthdate, surname, and first name initial. An admission was deemed an RSV-associated hospitalisation if a positive RSV test result was recorded for a specimen collected between ten days before and seven days after an admission to hospital. We restricted the quantitative comparison of RSV-associated hospitalisations by year to weeks 18–52 (May to December) to reduce bias caused by unusually high number of

RSV infections in early 2022 following the easing of coronavirus disease 2019 pandemic control measures. The mean number of RSV-associated hospitalisations in 2022 and 2023 was defined as the expected number for 2024.

The WA Chief Health Officer has approved the publication of aggregated notifiable disease surveillance data, and our analysis was determined to pose no risks requiring submission to a human research ethics committee, in accordance with the *Public and Aboriginal Health Directorate Interim Policy on Non-Research and Review and Approval of Lower Risk Research* (unpublished WA Health document), on 26 August 2024.

The annual number of births in WA was stable during 2022–2024 (2022: 31 709; 2023: 32 282; 2024: 30 825). Of 30 920 eligible infants, 21 922 (71%) received nirsevimab during April–September 2024: 12 195 of 18 654 (65%) in the catch-up cohort and 9727 of 12 266 (79%) in the newborn cohort. Of 30 657 children aged 1–2 years, 1221 (4%) received nirsevimab. The cumulative number of RSV-associated hospitalisations of infants under one year of age was markedly lower in 2024 than in 2022 and 2023, but not that of children aged one to less than five years (**Box 1**).

The numbers of RSV-associated hospitalisations by age group were similar during the winter RSV seasons of 2022 and 2023, and declined with age, as is usual. In 2024, the number of RSV-associated hospitalisations of infants under one year of age was 505 lower than expected (57% lower); the numbers of hospitalisations in older age groups were similar to those in 2022 and 2023 (**Box 2**).

With 71% of nirsevimab-eligible infants receiving RSV prophylaxis during April–September 2024, the number of RSV-associated hospitalisations in WA was 57% lower than expected during May–December 2024, equivalent to one hospitalisation averted per 43 infants immunised. The number of hospitalisations of children aged one to less than five years was not affected, suggesting that the marked decline in hospitalisations of infants was not attributable to an aberrantly light RSV season in 2024. Further, a contemporary case–control study found that nirsevimab was 86.4% effective in averting RSV-associated hospitalisations of infants in WA.¹² As the cost of an infant RSV hospital admission is estimated to be \$12 346 to \$13 695,^{2,13} averting 505 admissions is likely to have saved \$6.2–6.9 million in hospital costs.

Our assessment has limitations. First, our ecological evaluation cannot establish causality. Second, only two years of baseline data were available. Third, cost data based on one study only may

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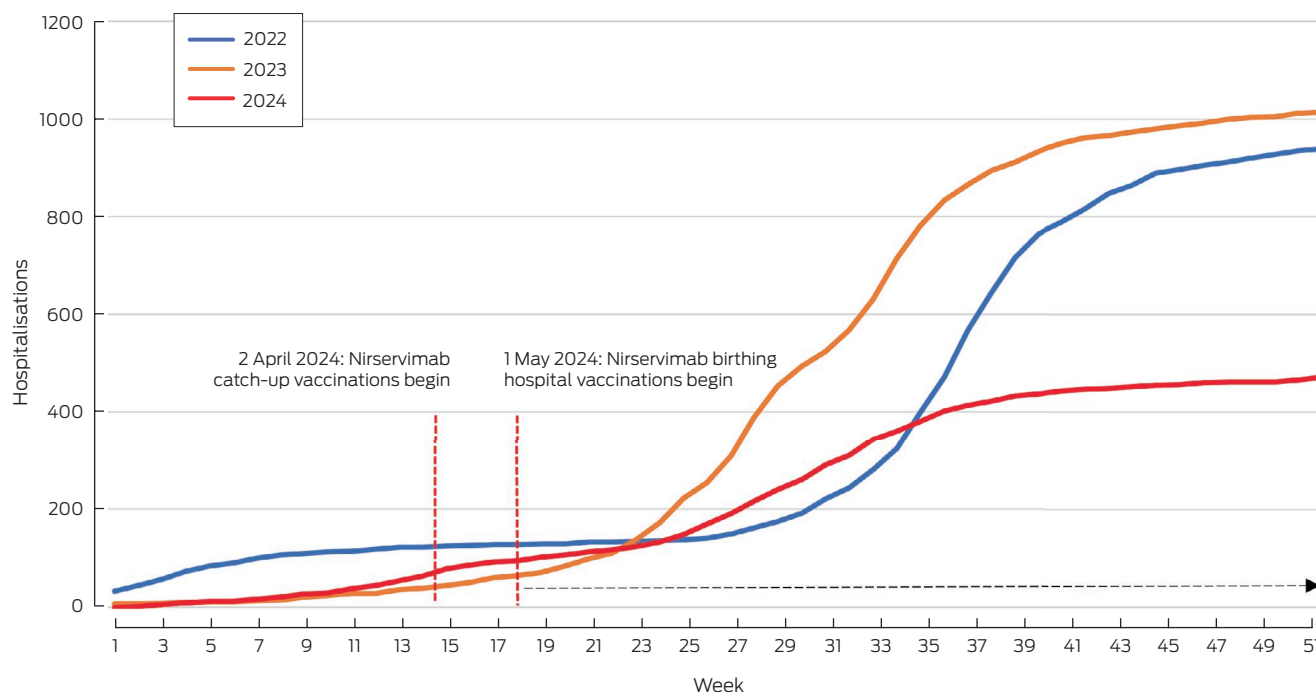
not be robust. Finally, our case definition and matching process enabled timely identification of RSV-associated hospitalisations, but may be imperfect. In a separate analysis, however, our process identified more than 96% of hospitalisations of infants ultimately assigned International Classification of Diseases, revision 10 (ICD-10) codes for RSV bronchiolitis, pneumonia,

or bronchitis in the final WA hospitalisation data collection for 2022 and 2023 (data not shown).

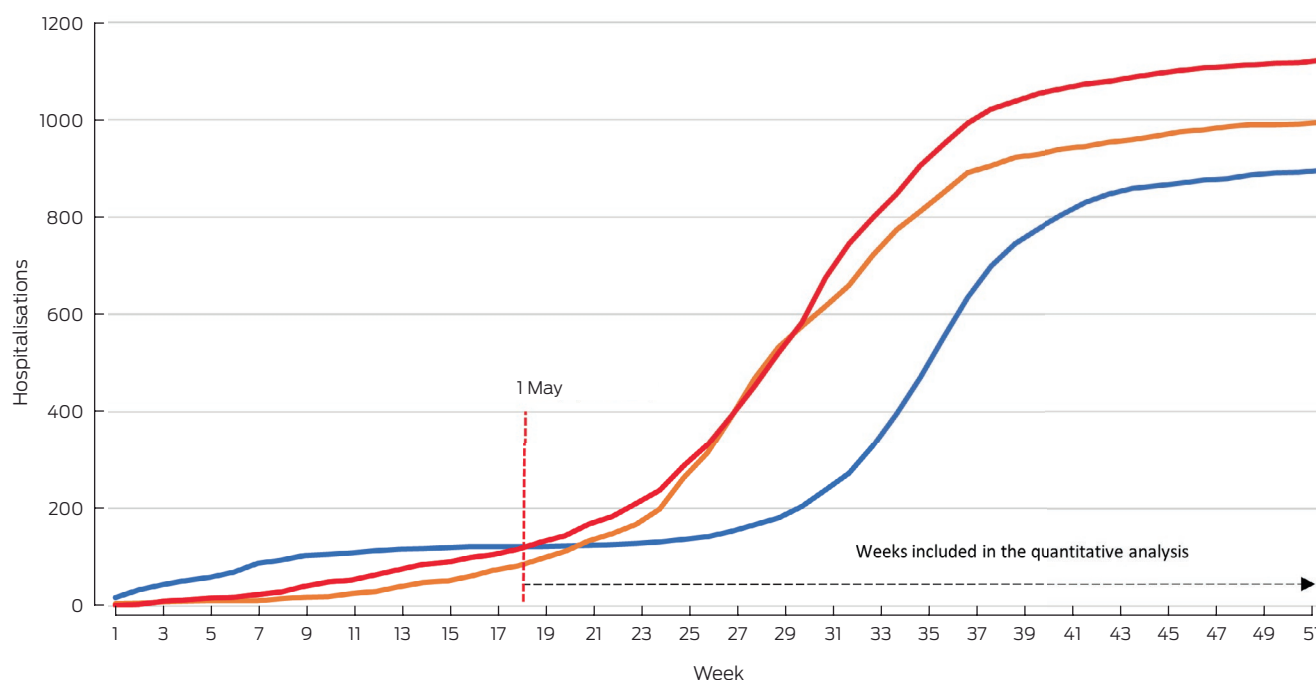
We examined the impact of a universal infant nirsevimab program on the tertiary health care system in WA. Immunising 71% of infants prior to and during the RSV season was

1 Cumulative number of respiratory syncytial virus (RSV)-associated hospitalisations of infants and children under five years of age, Western Australia, 2022–2024

A. Infants under one year of age



B. Children aged one to less than five years



2 Respiratory syncytial virus (RSV)-associated hospitalisations of infants and children under five years of age, Western Australia, 2022–2024, by age group

Age group (years)	2022	2023	Mean (2022/2023)	Difference (2024 v 2022/2023 mean)		
				2024	Absolute	Proportion
0 to <1	812	954	883	378	–505	–57%
1 to <2	436	532	484	540	56	12%
2 to <3	182	209	196	276	81	41%
3 to <4	102	100	101	117	16	16%
4 to <5	54	79	67	78	12	18%

associated with 57% fewer admissions with the leading cause of hospitalisation of infants in Australia.

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Data sharing: De-identified aggregate data can be made available on request pending approval of the relevant data custodians and stewards and in accordance with applicable laws. ■

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