

## Viral aetiology of acute lower respiratory infections in a birth cohort of Western Australian children

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### Objectives

Acute lower respiratory infections (ALRI) such as bronchiolitis, pneumonia and influenza are a common cause of childhood morbidity. The relative importance of individual respiratory viruses associated with these infections may fluctuate in different populations. Knowledge of the aetiology of ALRI is important so that preventive strategies, such as vaccination, may be targeted appropriately. We sought to describe the virus-specific burden of ALRI in children born in Western Australia (WA).

### Approach

We identified a birth cohort of children born in WA from 1996 to 2012. ALRI-coded hospital admissions and routine laboratory data regarding the detection of respiratory viruses pertaining to these children were extracted and linked through the WA Data Linkage Unit. Hospitalisation and laboratory data were restricted to Jan 2000 to Jun 2013 as laboratory data were only available for this period.

Repeat hospital admissions for ALRI within 14 days of each other were collapsed into the same episode of infection. Virus detection was defined as detection via culture, immunofluorescence or molecular methods from a respiratory sample 48 hours pre- or post-hospitalisation. We estimated the proportion of ALRI episodes in children aged up to 17 years with a laboratory test recorded and identified the viruses detected. Using person-time-at-risk as the denominator, we calculated the virus-specific rates of ALRI in 2000-2012 in the birth cohort.

### Results

Of 469,589 children born 1996-2012, 7.0% were admitted to hospital at least once for ALRI between Jan 2000 and Jun 2013. Bronchiolitis and pneumonia were the most common diagnoses, collectively accounting for 73.3% (n=32,815) of all ALRI episodes.

45.4% of ALRI episodes (n=20,323) in children aged 0-17 years linked to a laboratory test record. Of those with a laboratory record, 60.0% tested positive for one or more viruses, most commonly respiratory syncytial virus (RSV; n=7671). Of those with at least 1 virus detected, 4.7% had 2 or more viruses detected, with RSV-adenovirus being the most common viral pair.

Among children aged under 5 years, rates of virus-related ALRI hospitalisation were highest in children aged 1-2 months (37.2 per 1000 child-years), corresponding to the peak in RSV-related hospitalisations (30.6 per 1000 child-years). By contrast, rates of adenovirus-related hospitalisations were highest in children aged 6-11 months (1.7 per 1000 child-years).

### Conclusion

This study demonstrates the power of using linked data to assess the virus-specific burden of ALRI in a population of children. Future work will focus on viral-viral coinfection and its impact on clinical outcomes.

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