murdoch children's research institute

COVID-19 and Children's Surveillance Report

Number 21

Compiled: 10 June 2022

murdoch children's research institute

The Royal Children's Hospital Melbourne

THE UNIVERSITY OF MELBOURNE

Contents

To subscribe and receive these reports, please email: asiapacific.health@mcri.edu.au

Aim

- To provide a summary on the latest COVID-19 surveillance data in children and adolescents, with a focus on Australian States and Territories as well as specific countries that are relevant to the Australian context because of their size, COVID-19 epidemiology, the mitigation measures in place and data availability.
- Data on Multisystem Inflammatory Syndrome in Children (MIS-C), otherwise known as Paediatric Inflammatory Multisystem Syndrome (PIMS-TS), is included where available.

Methods

- This report is updated using the most recently available data from government websites.
- Excess mortality data are sourced from EuroMOMO and Our World in Data. Excess mortality refers to the number of deaths from all causes during a crisis above and beyond what we would have expected to see under 'normal' conditions.[1] In this case, we are interested to compare the number of deaths during the COVID-19 pandemic compared to the expected number of deaths had the pandemic not occurred.
- Caveat: The number of cases in both unvaccinated and vaccinated children increases if school mitigation measures are few, or there are changes to testing criteria and the adoption of screening in schools which identifies asymptomatic cases. In the absence of random sampling of the population by age group or seroprevalence surveys, trends in case numbers are relatively an unreliable indicator to determine how much SARS-CoV-2 is circulating. Due to the nature of the testing, the number of cases and the age distribution of cases will be biased towards the age groups that are tested most. This means that if there is asymptomatic screening in school-age children then it will appear that children contribute more to case numbers than any other age group. Additionally, several countries have changed their testing requirements to no longer test asymptomatic cases and do not require reporting unless at high risk, making it difficult to compare case numbers between countries due to different testing rates. A comparison of testing rates by country is shown on page 7.

Overview

- The Omicron variant of concern[2] has been detected in 192 countries[3] (up from 188 countries in the last report) and is the predominant variant worldwide due to its high transmissibility. Subvariant BA.2 has replaced BA.1 as the predominant Omicron subvariant in most regions included in this report, including New South Wales (NSW), Canada, Denmark, Finland, the Netherlands and the UK. BA.2.12.1 is now the predominant variant in the USA. BA.4 has replaced BA.2 as the predominant variant in South Africa. Genomic surveillance data is not publicly available for the Australian Capital Territory (ACT), Tasmania, Victoria and Singapore.
- With the predominance of Omicron in many settings and with vaccines having lower effectiveness against infection for this variant, the age distribution of cases has changed. Reports from NSW, the UK and Denmark, regions which have intensive surveillance, indicate that transmission mainly occurred in 20-29 year olds initially, with cases in children and adolescents increasing as schools reopened after the end-of-year holidays, which in most settings have now declined. However, in the absence of population-based random sampling for testing and changes to testing, it is problematic to compare case trends between and within countries. The UK is the only country in this report that undertakes random sample infection surveys.[4]
- Additionally, PCR/rapid antigen tests (RAT) underestimate the true infection rates. In the UK, seroprevalence surveys found that 97.6% of children aged 8-11 years had evidence of prior infection with SARS-CoV-2 by the third week of Feb 2022 during the Omicron (BA.1) wave.[5] In the USA, 68% of children aged 1-4 years, 77% aged 5-11 years and 74% aged 12-17 years were infected over six months, highlighting the high transmissibility of the Omicron variant.[6]
- Hospitalisations in children and adolescents has declined even in children who are too young to be vaccinated.

[1] Our World in Data. Excess mortality during the Coronavirus pandemic (COVID-19). London, United Kingdom: Global Change Data Lab; 2022. https://ourworldindata.org/excess-mortality-covid
[2] World Health Organization (WHO). Update on Omicron 28 November 2021. Geneva, Switzerland: WHO; 2021. https://www.who.int/news/item/28-11-2021-update-on-omicron
[3] GISAID. Tracking of Variants. Munich, Germany: GISAID; 2022. https://www.gisaid.org/hcov19-variants/
[4] Dean N. Tracking COVID-19 infections: time for change. Nature. 8 February 2022. https://www.nature.com/articles/d41586-022-00336-8
[5] Office for National Statistics (ONS). Coronavirus (COVID-19) antibody and vaccination data for the UK. London, United Kingdom: ONS; 2022. https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/datasets/coronaviruscovid19antibodydataforteuk
[6] Clarke KEN, Kim Y, Jones J, et al. Pediatric infection-induced SARS-CoV-2 seroprevalence estimation using commercial laboratory specimens: how representative is it of the general U.S. pediatric population? [Preprint]. SSRN. 2022. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4092074

School mitigation measures

- All countries in this report reopened schools during the Omicron period.
- School mitigation measures include RATs and multiple measures in many countries.
- Currently, there are no mask mandates for primary school-age children in any Australian state or territory. Victoria and Western Australia had a mask mandate for year 3 onwards until the end of term 1 2022. NSW and Victoria mandated masks for secondary school students until late Feb 2022. The ACT requires masks for high school students who are household contacts. Tasmania requires all school staff and secondary school students to wear masks. No Nordic countries have had mask mandates for children and several countries have never recommended masks for children. England does not have a mask mandate in most places including schools, whereas Scotland requires masks for specific circumstances in secondary schools. Singapore and South Africa require masks in schools.
- Finland and Denmark have lifted all restrictions since Feb 2022. The Netherlands and England have removed most restrictions.
- Although vaccines generally have lower effectiveness against Omicron infection, they are still highly effective against severe disease.
- All countries included in this report are offering vaccination to primary school-age children and adolescents, except for South Africa. First dose coverage rates range from ~6-80% among 5-11 year olds and ~54-99% among 12-15 year olds.

Trends in cases and hospitalisations

- **Cases:** Following the peak in cases and reopening of schools in Victoria and NSW in Feb 2022, cases, hospitalisations, ICU admissions and deaths declined with subvariant BA.1. This pattern was similarly observed after schools reopened in 2020 with the ancestral strain, and in 2021 with the Delta variant. School cases occur but there was no evidence during these periods that they drive community transmission, as the peak of the BA.1 wave occurred during the school holidays and reflected broader community transmission. However, cases amongst school-age children increased in the ACT and Tasmania following school reopening in Feb 2022. This also coincided with an increase in testing availability during school term. During term 1, cases in school-age children peaked in NSW and the ACT in mid-Mar and in Tasmania in late Mar to early Apr 2022, 2-4 weeks before school holidays commenced. BA.2 replaced BA.1 as the predominant subvariant in NSW and Victoria. Omicron subvariants BA.4, BA.5 and BA.2.12.1 have been detected in both states (detected in sewerage samples in Victoria). Cases continue to decline in school age children in ACT, NSW and Tasmania in Term 2.
- Fine age category breakdown by year of age is not available for children except for England and The Netherlands which both showed an age-dependent increase in case rates up to about 13 years of age. This pattern was seen for all variants. This may be due to younger children being more efficient at clearing the virus.[7]
- A study in children <5 years infected with the Omicron and Delta variants in the US found that incidence rates increased from 1.0-1.5 (Delta period) to 2.4-5.6 cases per 1000 persons per day (Omicron emergence). Monthly rates peaked in Jan 2022 during the Omicron period at 8.6 cases per 1000 persons per day. Omicron infection was higher in children aged 0-2 years compared to 3-4 years.[8]
- For educational staff, the Netherlands found similar case rates in educational staff vs the general adult population. During 14 Mar to 24 Apr 2022, of 60,496 people tested and working in education or childcare, 64.7% were positive. In comparison, 65.1% of the 1,060,385 adults tested were positive in the same period.[9]
- Some countries had an increase in cases in children and adolescents with schools reopening during the Omicron period, which mostly declined within a few weeks.
- **Hospitalisations:** Similarly, hospitalisations briefly increased in children, but this has been a combination of admission for COVID-19 treatment and incidentally testing positive when admitted for an unrelated condition. This has declined even in children too young to be vaccinated.
- In the USA, the increase in paediatric hospitalisations during the Omicron wave was seen more so in the 0-4 year old age group but was higher in 0-2 year olds compared to 3-4 year olds.[10] The rate of hospitalisations during the peak of the Omicron wave (first week of January 2022) was highest in children aged 0-4 years at 14.5 per 100,000 children (five times that of Delta peak of 2.9).[11] Hospitalisation rates were lowest in the 5-11 year age group at approximately 3 per 100,000, which is the lowest of all age groups. The monthly hospitalisation rate of unvaccinated adolescents aged 12-17 years was six times higher than fully vaccinated adolescents (23.5 vs 3.8 per 100,000). Hospitalisations in children aged 0-4 years decreased by mid-February 2022 to 3.9 per 100,000. Recent data is not yet available for the 12-17 year age groups.[12]

[7] Mallapaty S. Kids show mysteriously low levels of COVID antibodies. Nature. 10 March 2022. https://www.nature.com/articles/d41586-022-00681-8
[8] Wang L, Berger NA, Kaelber DC, et al. Incidence rates and clinical outcomes of SARS-CoV-2 infection with the Omicron and Delta variants in children younger than 5 years in the US. JAMA Pediatrics. 2022. https://doi.org/10.1001/jamapediatrics.2022.0945
[9] National Institute for Public Health and the Environment (RIVM). Research results from GGD data about children and COVID-19. Amsterdam, The Netherlands: Ministry of Health, Welfare and Sport; 2022. https://www.rivm.nl/en/coronavirus-covid-19/children-and-covid-19/research-results-ggd-data
[10] Pediatric COVID-19 update: 7 January 2022. New York, USA: New York State Department of Health; 2022. https://www.health.ny.gov/press/releases/2022/docs/pediatric_covid-19_hospitalization_report_summary.pdf
[11] Marks KJ, Whitaker M, Anglin O, et al. Hospitalizations of children and adolescents with laboratory-confirmed COVID-19 – COVID-NET, 14 States, July 2021 – January 2022. MMWR. 2022:71(7);271-8. https://www.cdc.gov/mmwr/volumes/71/wr/mm7107e4.htm
[12] Marks KJ, Whitaker M, Anglin O, et al. Hospitalizations of infants and children aged 0-4 years with laboratory-confirmed COVID-19 – COVID-NET, 14 States, March 2020 – February 2022. MMWR. 2022:71(11);429-36. https://www.cdc.gov/mmwr/volumes/71/wr/mm7111e2.htm?s_cid=mm7111e2_w

- During the Omicron wave in South Africa, paediatric cases were higher than in the three previous SARS-CoV-2 waves and hospitalisations in children uncharacteristically increased ahead of adults. Nearly two-thirds (63%) of the paediatric hospitalisations were in children aged 0-4 years and 44% of these had a primary diagnosis of COVID-19.[13]
- In Europe, there has not been a substantial increase in excess mortality in children aged 0-14 years throughout the Omicron period.[14]
- There is no evidence that school re-opening during the Omicron BA.1 period (and BA.2 for Denmark) has increased community transmission or increased excess mortality in all ages. Where reported, excess mortality has declined, except for temporary increases in Denmark and the Netherlands which are now declining.

Clinical summary

- During the Omicron BA.1 surge, the clinical manifestations in children have been similar to other common paediatric respiratory viral infections. Croup has been a common reason for admission in the 0-4 year age group with admission to ICU for monitoring and treatment.[15]
- In the United States, acute upper airway disease in SARS-CoV-2 positive children increased during the Omicron wave (1.5% pre-Omicron vs 4.1% Omicron). More than one-fifth of children hospitalised with SARS-CoV-2 and upper airway disease developed severe disease.[16]
- An analysis of paediatric hospitalisation data in England (Dec 2020 to Jan 2022 spanning Alpha, Delta and Omicron waves) found that amongst children hospitalised with COVID-19, 10% (15/147) were admitted with severe COVID-19 presenting as pneumonitis, mainly during the Alpha wave (10/15, 67%) and in older children and adolescents (9/15, 60% aged 12-18 years) with comorbidities (11/15, including 8 with immunosuppression). One third (49/147, 33%) had SARS-CoV-2 as a likely contributor to hospitalisation. The remaining 56% (83/147) incidentally tested positive for SARS-CoV-2 when admitted for an unrelated non-infectious condition.[17]
- An analysis of children <5 years infected with the Omicron and Delta variants in the US found that the risk of severe clinical outcomes in children infected with Omicron were significantly lower than those with Delta.[18]
- During the Omicron period (mid-Dec 2021 to late Feb 2022) in the USA, COVID-19-associated hospitalisation rates in children aged 5-11 years were approximately twice as high among unvaccinated as among vaccinated children. There were no underlying medical conditions in 30% of children and 19% were admitted to ICU. Children with diabetes and obesity were more likely to experience severe COVID-19.[19]
- In South Africa, most of these children (88%) required standard ward care and 20% needed oxygen therapy, while 5% were ventilated and 3% died during the study period. All children were unvaccinated against COVID-19.[20]
- **MIS-C:** Data from the US and UK both show that despite a large increase in cases during BA.1, the number of MIS-C cases did not increase. MIS-C declined in the USA.[21] A UK study found that compared with the Alpha wave, there were fewer cases of MIS-C relative to SARS-CoV-2 cases during both the initial and subsequent Delta waves, and continuing into the Omicron wave despite extensive spread of BA.1.[22] Compared to the Alpha wave, the proportion of MIS-C cases to SARS-CoV-2 cases were lower in pre-vaccine Delta, post-vaccine Delta and Omicron waves, at 56%, 66% and 95% lower respectively.
- A multinational study from North America, Latin America and Europe of 557 critically ill children hospitalised for COVID-19 from 55 sites, found that half had comorbidities, hospital mortality was 10% and higher in children <2 years (15%, odds ratio 1.94) and most who died had pulmonary disease. When adjusted for confounders, mortality-associated factors included cardiac (adjusted OR 2.89) or pulmonary comorbidities (aOR 4.43), admission hypoxemia (aOR 2.44) and lower respiratory symptoms (aOR 2.96). Lower mortality was associated with MIS-C (aOR 0.25), receiving methylprednisolone (aOR 0.5), intravenous immunoglobulin (aOR 0.32) and anticoagulation (aOR 0.49), but these associations might be limited to children >2 years.[23]

[13] Cloete J, Kruger A, Masha M, et al. Paediatric hospitalisations due to COVID-19 during the first SARS-CoV-2 omicron (B.1.1.529) variant wave in South Africa: a multicentre observational study. Lancet Child & Adolescent Health. 2022:6(5);294-302. https://www.thelancet.com/journals/lanchi/article/PIIS2352-4642(22)00027-X/fulltext
[14] EuroMOMO. Graphs and maps. Copenhagen, Denmark: Statens Serum Institut (SSI); 2022. https://www.euromomo.eu/graphs-and-maps
[15] Omicron drives record cases of child COVID hospitalisations. Financial Times. 17 January 2022. https://www.ft.com/content/28be9d3f-0b12-4c33-bda9-fbff375c0b7e
[16] Martin B, DeWitt PE, Russell S, et al. Acute upper airway disease in children with the Omicron (B.1.1.529) variant of SARS-CoV-2 - a report from the US National COVID Cohort Collaborative. JAMA Pediatrics. 2022. https://jamanetwork.com/journals/jamapediatrics/fullarticle/2791278
[17] Zsigmdond B, Breathnach AS, Mensah A, et al. Hospitalisations in children with confirmed SARS-CoV-2 infection during December 2020 to January 2022: retrospective single-centre cohort, London, England. SSRN. 2022. https://dx.doi.org/10.2139/ssrn.4038380
[18] Wang L, Berger NA, Kaelber DC, et al. Incidence rates and clinical outcomes of SARS-CoV-2 infection with the Omicron and Delta variants in children younger than 5 years in the US. JAMA Pediatrics. 2022. https://doi.org/10.1001/jamapediatrics.2022.0945
[19] Shi DS, Whitaker M, Marks KJ, et al. Hospitalizations of children aged 5-11 years with laboratory-confirmed COVID-19 - COVID-NET, 14 States, March 2020 - February 2022. MMWR. 2022:71(16);574-81. https://www.cdc.gov/mmwr/volumes/71/wr/mm7116e1.htm?s_cid=mm7116e1_w
[20] Cloete J, Kruger A, Masha M, et al. Paediatric hospitalisations due to COVID-19 during the first SARS-CoV-2 omicron (B.1.1.529) variant wave in South Africa: a multicentre observational study. Lancet Child & Adolescent Health. 2022:6(5);294-302. https://www.thelancet.com/journals/lanchi/article/PIIS2352-4642(22)00027-X/fulltext
[21] Does Omicron hit kids harder? Scientists are trying to find out. Nature. 04 February 2022. https://www.nature.com/articles/d41586-022-00309-x
[22] Cohen JM, Carter MJ, Cheung CR, et al. Lower risk of paediatric inflammatory multisystem syndrome (PIMS-TS) with the Delta variant of SARS-CoV-2 [Preprint]. medRxiv. 2022. https://www.medrxiv.org/content/10.1101/2022.03.13.22272267v1
[23] Gonzalez-Dambrauskas S, Vasquez-Hoyos P, Camporesi A, et al. Paediatric critical COVID-19 and mortality in a multinational prospective cohort. Lancet Regional Health - Americas. 2022:12;100272. https://www.sciencedirect.com/science/article/pii/S2667193X22000898?via%3Dihub

New updates

- **MIS-C:** A study in Denmark found that the risk of MIS-C was significantly lower among vaccinated vs unvaccinated children aged 0-17 years (risk ratio 0.11). The risk of MIS-C among unvaccinated children during the Omicron wave was significantly lower than during the Delta wave (RR 0.12) and wild-type wave (RR 0.14).[24]
- **Mortality:** A study in England between Mar 2020 to Dec 2021 found that amongst children who died within 100 days of SARS-CoV-2 infection, 43.8% died of COVID-19. SARS-CoV-2 was responsible for 1.2% of all deaths in children with an infection fatality rate of 0.7 per 100,000.[25]

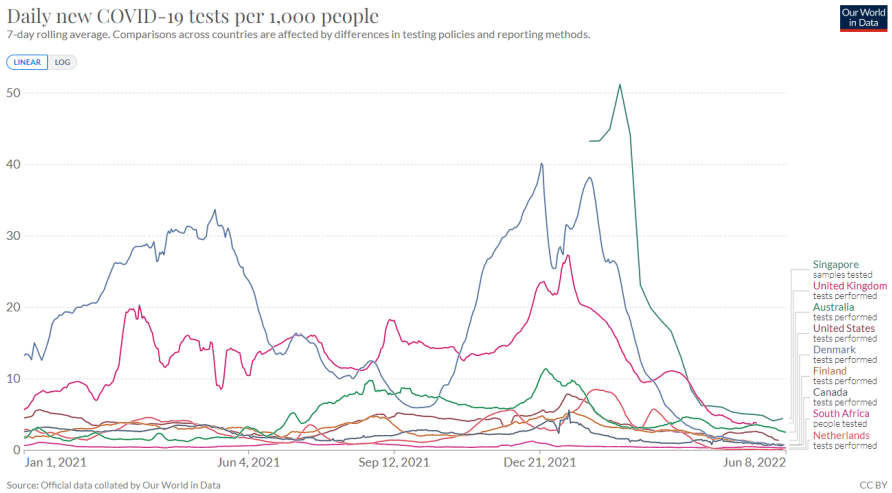
[24] Holm M, Espenhain L, Glenthoj J, et al. Risk and phenotype of multisystem inflammatory syndrome in vaccinated and unvaccinated Danish children before and during the Omicron wave. JAMA Pediatrics. 2022. https://doi.org/10.1001/jamapediatrics.2022.2206
[25] Bertran M, Amin-Chowdhury Z, Davies H, et al. COVID-19 deaths in children and young people: active prospective national surveillance, March 2020 to December 2021, England [Preprint]. SSRN. 2022. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4125501

Summary of COVID-19 epidemiology in children and adolescents

Country	Predominant variants	Cases	Hospitalisations	MIS-C/PIMS-TS	Deaths^
ACT, Australia	Not reported	↓	Stable	Not reported	0
NSW, Australia	Omicron BA.2	Stable	↓*	Not reported	4[b]
TAS, Australia	Not reported	↓	Not available	Not reported	0
VIC, Australia	Omicron BA.2	Stable	Not available	Not reported	2[b]
Canada	Omicron BA.2	↓	Not available	Not reported	50[b]
Denmark	Omicron BA.2	Stable	↓*	44 cases[+]	7[b]
England, UK	Omicron BA.2	↓	Stable	Not reported	90[b,#,±]
Finland	Omicron BA.2	↓	Not available	Not reported	0
Netherlands	Omicron BA.2	Stable	Stable	Not reported	Not reported
Scotland, UK	Omicron BA.2	↓*	↓*	Not reported	5[a,#]
Singapore	Not reported	↓	Stable	5 cases[-]	0
South Africa	Omicron BA.4	↓	↓*	Not reported	880[b]
USA	Omicron BA.2.12.1	Stable	↑	8525 cases	1086[b]

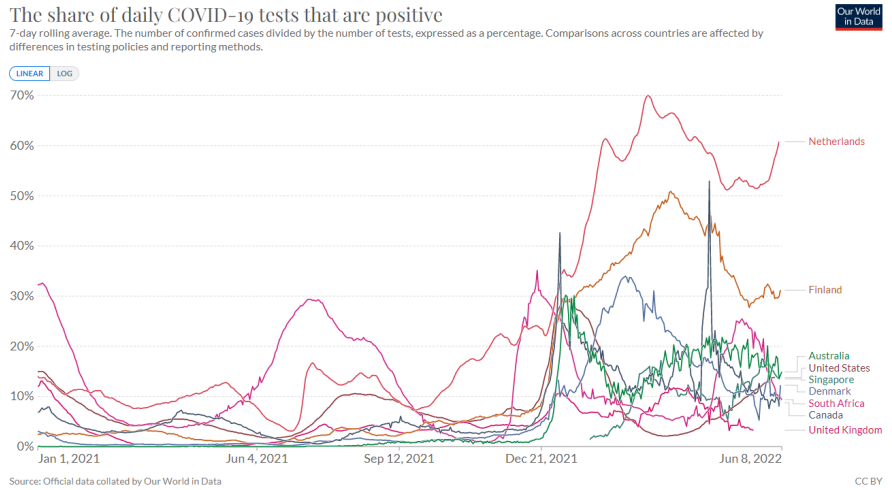
Note: Trends and values are for children only, unless otherwise specified.
**Available data includes both children and adults.*
[+]During the Omicron period (1 Nov 2021 – 1 Feb 2022). [-]Last reported 8 Nov 2021. [±]Last reported 7 Apr 2022.
^Age range for child deaths between 0-19y except Scotland (0-14y) and USA (0-17y). Deaths [a]due to COVID-19 or [b]with COVID-19. [#]In the past year.

Testing rates per capita[26]



Country	Testing rates per 1000 people (seven-day average)	Positive test rate (%)
Australia	1.70	14.9
Canada	0.71	8.7
Denmark	0.76	12.2
Finland	0.75	31.2
Netherlands	0.11	60.8
Singapore	4.44	17.3
South Africa	0.32	13.5
UK	3.80	3.3
USA	1.39	13.8

Testing positivity rates[27]



[26] Our World in Data. Coronavirus pandemic (COVID-19): explore the global situation. London, United Kingdom: Global Change Data Lab; 2022. https://ourworldindata.org/coronavirus#explore-the-global-situation
[27] Our World in Data. Coronavirus pandemic (COVID-19): explore the global situation. London, United Kingdom: Global Change Data Lab; 2022. https://ourworldindata.org/coronavirus#explore-the-global-situation

Summary

- In **Australia**, COVID-19 Public Health and Social Measures (PHSM) and trends differ by State/Territory.
  - Nationwide, approximately 53% of 5-11 year olds and 85% of 12-15 year olds have received at least one dose of vaccine.
  - From early Apr 2022, a second booster dose is offered to all aged 65 years and older and high-risk groups, including Indigenous Australians 50 years and older, individuals living in aged or disability care and immunocompromised individuals aged 16 years and older. From late May 2022, the second booster dose is extended to all aged 16-64 years with a medical condition that increases their risk of severe COVID-19 illness and people with disability with significant or complex health needs. From mid-Jun 2022, the first booster dose is extended to children 12-15 years at risk of severe disease (sever immunocompromise, disability with significant or complex health needs, or complex and/or multiple health conditions).
  - Australia has one of the highest testing rates per capita globally.[28]
  - Excess mortality increased by 20.5% in Jan to Feb 2022. COVID-19 was the fourth most common cause of death in Feb.[29]
- The **ACT** closed schools for holidays in early Apr and reopened in late Apr 2022.
  - Masks are no longer required in most settings and the advice to work from home has been removed.
  - Schools have multi-layered mitigation strategies in place, including mask-wearing only for high school students who are household contacts. RATs are now provided as needed.
  - Approximately 80% of 5-11 year olds and >99% of 12-15 year olds have received at least one dose of vaccine.
  - Case numbers are declining in all ages. Cases are highest in the 18-39 year age group and lowest in the 65+ year age group. Children across the state were offered RATs in the first eight weeks of the school year (Jan to Feb 2022), during which time they were likely to be over-represented in case numbers and the percentage contribution to total cases due to increased testing.
  - The hospitalisation rates for 0-17 year olds was very low at 1 per 100,000 and now nearing 0. It is unknown how many are incidental. Of all the hospitalisations in <17 years, 75% are unvaccinated.
  - There have been no deaths in children throughout the entire pandemic.
- **NSW** schools closed for holidays in early Apr and reopened in late Apr 2022.
  - Masks are no longer required in most settings and advice to work from home has been removed.
  - Schools have multi-layered mitigation strategies in place, including RATs for symptomatic individuals and close contacts and maximising classroom ventilation.
  - Approximately 50% of 5-11 year olds and 83% of 12-15 year olds have received at least one dose of vaccine.
  - Case numbers are high but stabilising. Cases declined in school-age children 2-3 weeks before term 1 school holidays, which may be due to reductions in testing. Children across the state were offered weekly RATs until the end of Feb 2022, during that time they were likely to be over-represented in case numbers and the percentage contribution to total cases due to increased testing.
  - There is no data on hospitalisation trends by age, but overall hospitalisations are declining.
  - Four children have died with COVID-19 throughout the entire pandemic.
- **Tasmania** closed schools for holidays in mid-Apr and reopened in early May 2022.
  - Masks are no longer required in most settings.
  - Schools have multi-layered mitigation strategies in place, including mask-wearing for all school staff and secondary school students, RATs for symptomatic individuals and close contacts, cohorting and supply of air-purification devices.
  - Approximately 63% of 5-11 year olds and 87% of 12-15 year olds have received at least one dose of vaccine.
  - Cases are declining in all ages. Case numbers in school-age children started declining two weeks before term 1 school holidays commenced. Cases are highest in the 30-49 year age group, followed by the 0-19 age groups, and lowest in the 70+ age group. Children across the state are offered RATs through schools so are likely to be over-represented in case numbers and the percentage contribution to total cases due to increased testing.
  - Hospitalisations and deaths are no longer available by age group, but there have been no deaths in children throughout the entire pandemic.
- **Victoria** closed schools for holidays in early Apr and reopened in late Apr 2022.
  - Masks are no longer required in most settings and advice to work from home has been removed. Schools have mitigation strategies in place, including improved ventilation and RAT testing (previously twice weekly screening but now only for symptomatic testing).

[28] Our World in Data. Total COVID-19 tests per 1,000 people. London, United Kingdom: Global Change Data Lab; 2022. https://ourworldindata.org/grapher/full-list-cumulative-total-tests-per-thousand-map?tab=table
[29] Australian Bureau of Statistics (ABS). Provisional mortality statistics. Canberra, Australia: ABS; 2022. https://www.abs.gov.au/statistics/health/causes-death/provisional-mortality-statistics/latest-release

- Approximately 56% of 5-11 year olds and 89% of 12-15 year olds have received at least one dose of a COVID-19 vaccine.
- Case numbers are high but stabilizing.
  - Children were offered RATs twice weekly in term 1 2022, so were tested more and therefore likely to be over-represented in case numbers and the percentage contribution to all cases, although testing compliance is not known and the daily breakdown by age for PCR/RATs is not available.
  - Since 8 Jan 2022, both PCR and RAT positive results are considered positive cases.
  - Subvariants BA.4, BA.5 and BA.2.12.1 have been detected in sewerage samples, although genomic surveillance data is not regularly available. As of early Jun 2022, 97% of sewerage samples are of subvariant BA.2, while BA.4 and BA.2.12.1 are detected at 3% and <1% respectively.
- There is no hospitalisation data available by age, but overall numbers in all ages are stable.
- Two children have died with COVID-19 throughout the entire pandemic.

- In **Europe and North America**, the downward trend continues in many countries and regions, although some regions experienced a new increase due to both an increase in Omicron subvariant BA.2, which is more transmissible, and the easing of restrictions.
- **Canada** closed its schools for a one-week holiday in mid-Mar 2022.
  - PHSM vary by province.
  - Approximately 56% of 5-11 year olds and 88% of 12-17 year olds have received at least one dose of vaccine.
  - There was an initial steep increase in cases due to the Omicron (BA.1) variant followed by a steep downward trend in all age groups. BA.2 became the predominant variant which caused a temporary steep increase in mid-Apr 2022. Cases are now declining.
  - There is no data on hospitalisation trends by age.
  - There have been 50 deaths with COVID-19 in children aged 0-19 years throughout the entire pandemic.
- **Denmark** closed its schools for one-week holidays in mid-Feb and mid-Apr 2022. Excess mortality in all age groups dramatically declined over the Omicron period but slightly increased before decreasing and stabilising over the past two months.[30]
  - All restrictions have been lifted from Feb 2022.
  - Approximately 46% of 5-11 year olds and 81% of 12-15 year olds have received at least one dose of vaccine.
  - Cases are low and stable in all age groups, although testing is now only recommended for individuals at increased risk for severe disease.
  - Hospitalisations are no longer reported by age group, but overall numbers continue to decline.
  - There have been seven deaths with COVID-19 in children aged 0-19 years throughout the entire pandemic.
- **England** closed its schools for holidays from early to mid-Apr 2022. Excess mortality in all age groups continues to dramatically decline over the Omicron period.[31]
  - Most restrictions have been lifted since late Feb 2022. Some remain in place including advice to stay home if positive and mask-wearing in healthcare settings only. Free PCRs and RATs are no longer available for most people since early Apr 2022.
  - Approximately 9% of 5-11 year olds, 54% of 12-15 year olds and 66% of 16-17 year olds have received at least one dose of vaccine.
  - Cases across all age groups peaked in late Dec 2021 to early Jan 2022 with BA.1 and then decreased. Cases increased with subvariant BA.2 in late Feb to early Apr but have since declined in all age groups. This decrease coincided with the end of provision of free universal testing for the general public.
    - Case rates are highest in the 80+ year age group and lowest in the 0-19 age group.
    - Case rates in England remained lower than Scotland, Wales and Northern Ireland despite having had fewer restrictions.[32]
  - Hospitalisations remain stable for most age groups, except in the 75+ age group which is declining but remains high. Hospitalisations remain lowest in children and are stable.
  - Deaths are no longer available by age group but total deaths in all age groups are decreasing.
- **Finland** closed its schools for a one-week holiday in mid-Feb 2022. Excess mortality fluctuated above and below the historical average over the Omicron period but is currently low and continues to decrease.[33]
  - Few restrictions remain in place and masks are recommended indoors.
  - Approximately 26% of 5-11 year olds and 79% of 12-17 year olds have received at least one dose of vaccine.
  - Cases peaked in Apr 2022 and are declining in all age groups. Cases are highest in the 25-64 year age group.

[30] EuroMOMO. Graphs and maps. Copenhagen, Denmark: Statens Serum Institut (SSI); 2022. https://www.euromomo.eu/graphs-and-maps
[31] EuroMOMO. Graphs and maps. Copenhagen, Denmark: Statens Serum Institut (SSI); 2022. https://www.euromomo.eu/graphs-and-maps
[32] Office for National Statistics (ONS). Coronavirus (COVID-19) Infection Survey, UK: 13 May 2022. London, United Kingdom: ONS; 2022. https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/bulletins/coronaviruscovid19infectionsurveypilot/13may2022
[33] EuroMOMO. Graphs and maps. Copenhagen, Denmark: Statens Serum Institut (SSI); 2022. https://www.euromomo.eu/graphs-and-maps

  - Specialist care admissions remain low and stable in children.
  - There have been no deaths in children throughout the entire pandemic.
- **The Netherlands** closed its schools for one-week holidays in mid-late Feb and late Apr to early Mar 2022. Excess mortality declined over the Omicron period, before increasing slightly and decreasing over the past two months and is now at baseline. [34]
  - Few restrictions remain in place, including mask-wearing in airports only and advice to test if symptomatic.
  - Approximately 3% of 5-11 year olds and 66% of 12-17 year olds are fully vaccinated.
  - Cases due to BA.1 were on a steep downward trend when restrictions eased, including removal of mask-wearing, until late Feb 2022. Subvariant BA.2 resulted in a steep upward trend over a few weeks, followed by a steep decline. There was an age-related increase in cases in children up to 13 years of age.
  - Hospitalisations increased with Omicron (BA.1 and BA.2) but have since declined. There was an increase in the 70+ year age groups, especially in 90+ year olds, but rates are now declining. Rates remained stable and lowest in children. Between Jan 2021 and Apr 2022, children <18 years accounted for 2.3% of all hospital admissions with COVID-19.
  - The number of deaths with COVID-19 in children is not reported.
- **Scotland** closed its schools for a one-week holiday in mid-Feb and a two-week holiday in early to mid-Apr 2022. Excess mortality in all age groups remains low and stable over the Omicron period. [35]
  - Most restrictions have been lifted. Some remain in place including mask-wearing on public transport and some indoor settings. From May 2022, testing is only available to high-risk groups and healthcare workers. Asymptomatic close contacts are not required to isolate and there is reduced isolation time for cases.
  - Approximately 20% of 5-11 year olds, 68% of 12-15 year olds and 81% of 16-17 year olds have received at least one dose of vaccine.
  - Cases across all age groups peaked in Jan and then decreased, before increasing again in mid-Mar 2022 due to BA.2 and are now decreasing. Cases are no longer reported by age group.
  - Hospitalisations in children increased with the BA.2 wave but then decreased. Hospitalisations are no longer reported by age group.
  - There have been five deaths due to COVID-19 in children aged 0-14 years in the past year.
- **Singapore** closed its schools for a one-week holiday in mid-Mar 2022.
  - From late Apr 2022, restrictions have eased further to include mask-wearing indoors only (including schools), and removal of work from home advice, physical distancing requirements and density limits.
  - Approximately 93% of the entire population has received at least one dose of vaccine. All children aged 5-11 years are offered vaccine.
  - Following a peak in cases with BA.2, there was a decline in case numbers. Cases slightly increased again but are currently decreasing and primarily in the 20-59 year age groups.
  - Overall hospitalisations are stable and admissions remain lowest in children.
  - A total of five cases of MIS-C have been reported, all from the Delta wave in mid-late 2021. There has been one ICU admission due to MIS-C up until 8 Nov 2021.
  - There have been no deaths in children throughout the entire pandemic.
- **South Africa** closed its schools for holidays in mid-Mar to early Apr 2022. Overall excess mortality declined over the Omicron period and has slightly increased since mid-Apr. [36]
  - Few restrictions remain in place, including mandatory indoor mask-wearing for all aged six years and older. Asymptomatic cases are not required to isolate.
  - Approximately 50% of the entire population is fully vaccinated. Vaccination is only offered to those aged 12 years and older.
  - There was a rapid increase in cases due to Omicron BA.1 in all age groups followed by a rapid decrease. Omicron subvariant BA.2 overtook BA.1 as the predominant variant in late Jan 2022 but there was no increase in case numbers. Cases then increased again with BA.4 and BA.5 overtaking BA.2 as the predominant variants but are now decreasing. BA.4 is now the predominant variant.
  - Overall hospitalisations increased with the BA.4 wave but remained lower than the increase seen with BA.1. Hospitalisations are now decreasing.
  - There have been 880 deaths with COVID-19 in children aged 0-19 years throughout the entire pandemic. This accounts for <1% of all COVID-19 deaths in the country.
- The **United States** closed its schools for a one-week holiday between Mar-Apr 2022, which varied by location. Excess mortality in all age groups declined over the Omicron period and stabilised. [37]
  - The US Centres for Disease Control and Prevention (CDC) recommend multi-layered PHSM, but adoption varies by State and Territory.
  - Approximately 36% of 5-11 year olds and 70% of 12-17 year olds have received at least one dose of vaccine.

[34] EuroMOMO. Graphs and maps. Copenhagen, Denmark: Statens Serum Institut (SSI); 2022. https://www.euromomo.eu/graphs-and-maps
[35] EuroMOMO. Graphs and maps. Copenhagen, Denmark: Statens Serum Institut (SSI); 2022. https://www.euromomo.eu/graphs-and-maps
[36] Our World in Data. Excess mortality during the Coronavirus pandemic (COVID-19). London, United Kingdom: Global Change Data Lab; 2022. https://ourworldindata.org/excess-mortality-covid
[37] Our World in Data. Excess mortality during the Coronavirus pandemic (COVID-19). London, United Kingdom: Global Change Data Lab; 2022. https://ourworldindata.org/excess-mortality-covid

- Cases are on an upward trend in all age groups due to the recent predominance of BA.2 and BA.2.12.1. BA.2.12.1 has replaced BA.2 as the predominant sub-variant.
- Hospitalisations remain low in children, although there is an upward trend in 0-4 year olds.
- There have been 1086 deaths with COVID-19 in children aged 0-17 years throughout the entire pandemic. This accounts for 0.1% of all COVID-19 deaths in the country. Texas has had the highest number of child deaths (148) and there are three states that have reported zero deaths throughout the entire pandemic. [38]
- A total of 8525 cases of MIS-C have been reported, including 69 deaths. There was no increase in MIS-C despite the surge of Omicron cases.
- Hospitalisations and deaths include all children who test positive, irrespective of the reason for admission or death, so is likely an overestimate of hospitalisations and deaths due to COVID-19.

[38] American Academy of Pediatrics (AAP). Children and COVID-19: State-Level Data Report. Illinois, US: AAP; 2021. https://www.aap.org/en/pages/2019-novel-coronavirus-covid-19-infections/children-and-covid-19-state-level-data-report/

List of abbreviations

Abbreviation	Term
ACT	Australian Capital Territory
CDC	US Centres for Disease Control and Prevention
MIS-C	Multisystem inflammatory syndrome in children
NSW	New South Wales
OR/aOR	Odds ratio/adjusted odds ratio
PCR	Polymerase chain reaction
PHSM	Public health & social measures
PIMS-TS	Paediatric inflammatory multisystem syndrome
RAT	Rapid antigen testing
TTIQ	Test, trace, isolate, quarantine

Australia: Australian Capital Territory

(population 430,000)

PHSM[39]

From mid Mar 2022, masks are no longer required in most settings except public transport, hospitals and schools, QR check-in and proof of vaccination for certain venues only and advice to work from home removed.

Schools & mitigation[40]

Schools closed for holidays in early Apr and returned in late Apr 2022. Density limits no longer apply and masks are only required for high school students who are household contacts. RATs were provided to staff and students for the first eight weeks of the school year and are now provided as needed.

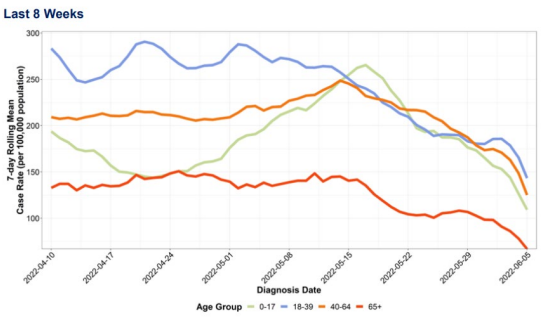
Vaccination coverage[41,42]

Age group (years)	1st dose (%)	2nd dose (%)	3rd/booster (%)
5-11	80.1	68.2	-
12-15	>99.0	>99.0	-
16+	>99.0	>99.0	76.8

Fourth dose for immunocompromised recommended from early Jan 2021; booster dose available to all eligible adults aged 18y+ and 16-17y from 3 Feb 2022, 12-15y at risk of severe disease from 14 Jun 2022; second booster dose available to all 65y+ and high-risk groups from 4 Apr 2022, and 16-64y with a medical condition predisposing to severe COVID-19 or people with disability with significant health needs from 30 May 2022. Three primary dose recommendation extended to all severely immunocompromised people aged 5y+ from mid-Jan 2022. Vaccination for 5-11y available from 10 Jan 2022.

Cases by age group[43]

Figure 3: Rolling mean of COVID-19 case rate by age group and diagnosis date[a]



Notes:
[a]The DIAGNOSIS DATE will be the TRUE ONSET DATE if known, otherwise it will be earliest of the SPECIMEN DATE, the NOTIFICATION DATE or the NOTIFICATION RECEIVED DATE.

Omicron (BA.2) is the predominant variant.

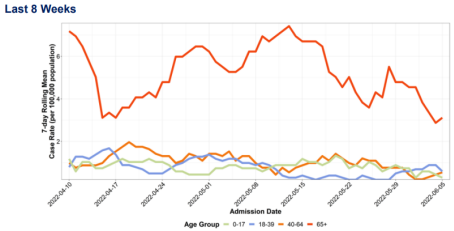
Hospitalisations in children[44]

Table 5: Hospitalised COVID-19 cases[a] by age group and vaccination status

Age Group	4 doses of COVID-19 vaccine N (%)	3 doses of COVID-19 vaccine N (%)	2 doses of COVID-19 vaccine N (%)	1 dose of COVID-19 vaccine N (%)	Unvaccinated N (%)	Unvalidated/ Unknown N (%)	TOTAL Pandemic
0–17	0 (0%)	1 (1%)	23 (16%)	12 (8%)	107 (75%)	0 (0%)	143 (100%)
18–39	1 (0%)	48 (22%)	85 (39%)	9 (4%)	73 (33%)	4 (2%)	220 (100%)
40–64	3 (1%)	79 (30%)	87 (33%)	8 (3%)	80 (31%)	4 (2%)	261 (100%)
65+	10 (2%)	186 (42%)	141 (32%)	15 (3%)	70 (16%)	19 (4%)	441 (100%)
TOTAL[a]	14 (1%)	314 (29%)	336 (32%)	44 (4%)	330 (31%)	27 (3%)	1,065 (100%)

Notes:
[a]Cases admitted to an ACT hospital, including those with a residential address in the ACT or another state or territory.
[z]25 cases admitted to an ACT hospital with admission date outside the reporting period were notified to ACT Health in the most recent reporting period.

Figure 6: Rolling mean of hospitalised[a] COVID-19 case rate by date of admission



Note:
[a]Cases admitted to an ACT hospital, including those with a residential address in the ACT or another state or territory. If the case was admitted to an ACT hospital on multiple occasions, the earliest date of the hospital admission is used in the reporting week. Admissions are counted whether it was for COVID-related reasons or for other reasons.

Deaths by age group[45]

Table 1: Case status by test type

	Test type	WEEK 23[a] Ending 05/06/2022	TOTAL[b]
New Cases	PCR	2,685	82,809
	RAT	2,289	53,329
	Total	**4,974**	**136,138**
New Deaths		3	66

Note:
[a]Cases notified to ACT Health during the reporting period.
[b]Total cases since the start of the pandemic, March 2020.
Total COVID-19 cases since March 2020 may not reflect the sum of cases from last week's reporting period and this week's reporting period. Case numbers may change due to reclassifying some of the cases following further investigation or merging of duplicate records.

Deaths are not available by age group. There have been 0 deaths in children throughout the entire pandemic.

[39] https://www.covid19.act.gov.au/restrictions/current-restrictions
[40] https://www.education.act.gov.au/public-school-life/covid-school-arrangements
[41] https://www.health.gov.au/resources/collections/covid-19-vaccination-daily-rollout-update
[42] https://twitter.com/ACTHealth
[43] https://www.covid19.act.gov.au/updates/act-covid-19-statistics
[44] https://www.covid19.act.gov.au/updates/act-covid-19-statistics
[45] https://www.covid19.act.gov.au/updates/act-covid-19-statistics

Australia: New South Wales

(population 8.2 million)

PHSM[46]

From late Feb 2022, masks are no longer required in most settings, QR check-in and proof of vaccination for certain venues only, reduced TTIQ and advice to work from home removed.

Schools & mitigation[47]

Schools closed for holidays in early Apr and returned in late April 2022. Masks are no longer required in most school settings and RATs are provided to symptomatic individuals and close contacts. Vaccination and maximising ventilation continue to be encouraged.

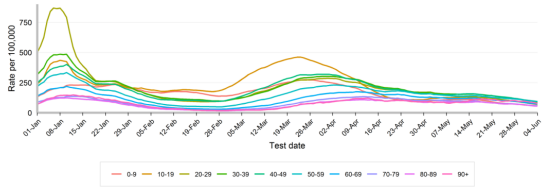
Vaccination coverage[48,49]

Age group (years)	1st dose (%)	2nd dose (%)	3rd/booster (%)
5-11	49.9	37.8	-
12-15	82.8	79.1	-
16+	96.5	95.0	64.0

Fourth dose for immunocompromised recommended from early Jan 2021, booster dose available to all eligible adults aged 18y+ and 16-17y from 3 Feb 2022, 12-15y at risk of severe disease from 14 Jun 2022; second booster dose available to all 65y+ and high-risk groups from 4 Apr 2022, and 16-64y with a medical condition predisposing to severe COVID-19 or people with disability with significant health needs from 30 May 2022. Three primary dose recommendation extended to all severely immunocompromised people aged 5y+ from mid-Jan 2022. Vaccination for 5-11y available from 10 Jan 2022.

Cases by age group[50]

Figure 5. Daily seven-day rolling average rate of people reported with COVID-19 per 100,000 population, by age group and test date, NSW, in the four weeks to 4 June 2022



Omicron (BA.2) is the predominant variant.

Table 3. Variants of concern (VOCs) identified by whole genome sequencing (WGS) of virus from people who tested positive for SARS CoV-2 by PCR, by test date, NSW, in the four weeks to 4 June 2022

Variant	Week ending			
	14 May	21 May	28 May	04 June
Omicron (BA.1)	4	4	2	0
Omicron (BA.2)	643	462	352	6
Omicron (BA.2.12.1)	26	37	45	0
Omicron (BA.3)	0	1	0	0
Omicron (BA.4)	7	24	44	2
Omicron (BA.5)	8	46	66	5
Recombinant (XM)*	0	0	1	0
Recombinant (XE)*	0	0	1	0
Total	688	574	511	13

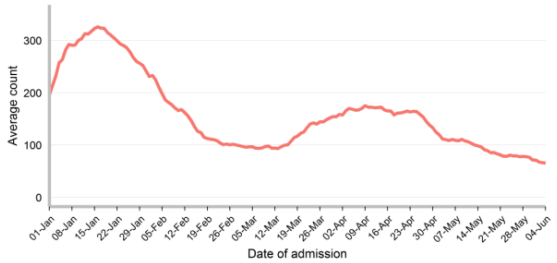
* Recombinant virus sequences occur when two separate virus strains merge, forming a new, single strain that contains genomic regions of both co-infecting strains.

Hospitalisations in children and deaths by age group[51]

Table 1. Number of people with a COVID-19 diagnosis in the previous 14 days who were admitted to hospital, admitted to ICU or reported as having died in the week ending 4 June 2022

	Admitted to hospital (but not to ICU)	Admitted to ICU	Deaths
Gender			
Female	235	20	49
Male	225	19	37
Age group (years)			
0-9	28	2	0
10-19	9	0	0
20-29	22	1	0
30-39	38	1	1
40-49	22	5	2
50-59	39	4	1
60-69	51	8	3
70-79	87	10	14
80-89	122	7	30
90+	42	1	35

Figure 1. Daily seven-day rolling average of people with COVID-19 admitted to hospital within 14 days of their diagnosis, NSW, 1 January to 4 June 2022



Some admissions in <12y children are for social reasons as parents are hospitalised for treatment of COVID-19. Graph is not available by age group.

Four children have died with COVID-19 throughout the pandemic, including one 15 year old with pneumococcal meningitis, one three-year-old with underlying genetic disorder, one two-year-old with no major pre-existing conditions and one two-month-old baby.

[46] https://www.nsw.gov.au/covid-19/stay-safe/rules
[47] https://education.nsw.gov.au/covid-19/advice-for-families
[48] https://www.health.gov.au/resources/collections/covid-19-vaccination-daily-rollout-update
[49] https://twitter.com/NSWHealth
[50] https://www.health.nsw.gov.au/Infectious/covid-19/Pages/weekly-reports.aspx
[51] https://www.health.nsw.gov.au/Infectious/covid-19/Pages/weekly-reports.aspx

Australia: Tasmania

(population 540,000)

PHSM[52]

From mid Mar 2022, masks are no longer required in most settings except public transport, hospitals and schools and QR check-in and proof of vaccination for certain venues only.

Schools & mitigation[53]

Schools closed for holidays in mid-Apr and returned in early May 2022. Masks for staff in all schools and secondary students, RATs are provided to symptomatic individuals and close contacts, cohorting and supply of air-purification devices. Vaccination continues to be encouraged.

Vaccination coverage[54]

Age group (years)	1st dose (%)	2nd dose (%)	3rd/booster (%)
5-11	63.4	51.0	-
12-15	87.0	82.7	-
16+	>99.0	>99.0	72.7

Fourth dose for immunocompromised recommended from early Jan 2021, booster dose available to all eligible adults aged 18y+ and 16-17y from 3 Feb 2022, 12-15y at risk of severe disease from 14 Jun 2022; second booster dose available to all 65y+ and high-risk groups from 4 Apr 2022, and 16-64y with a medical condition predisposing to severe COVID-19 or people with disability with significant health needs from 30 May 2022. Three primary dose recommendation extended to all severely immunocompromised people aged 5y+ from mid-Jan 2022. Vaccination for 5-11y available from 10 Jan 2022.

Cases by age group[55]

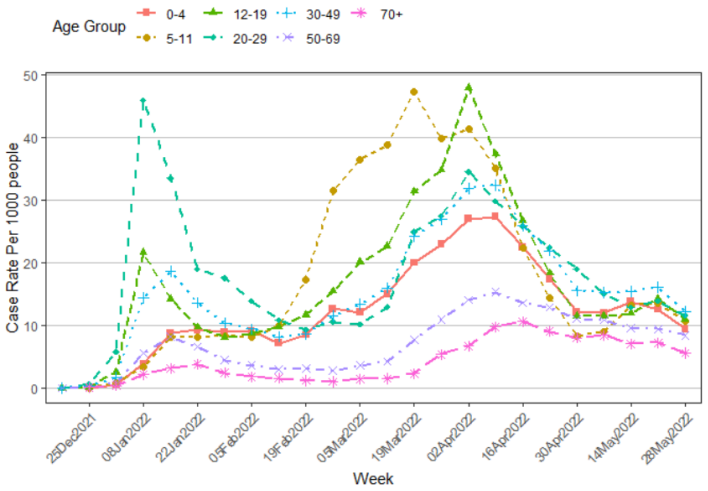


Figure 3: Weekly number of COVID-19 cases per 1000 people (rate) notified in Tasmania since 15 December 2021, by age group.

Hospitalisations in children and deaths by age group[56]

3.2 Clinical severity and deaths in reported COVID-19 cases by age group

Table 11: Number of cases hospitalised with COVID-19, number of cases hospitalised due to COVID-19, number of cases with COVID-19 admitted to ICU (for any reason), and deaths for which COVID-19 was a cause or contributing factor from 15 December 2021 to 28 May 2022, by age group.

Age Group (years)	All Hospital Admissions with COVID-19	Hospital Admissions due to COVID-19*	Intensive Care Admissions	Deaths
0-4	67	41	4	-
5-11	18	3	-	-
12-15	14	4	-	-
16-19	14	2	1	-
20-29	99	27	5	-
30-39	98	26	2	-
40-49	76	34	4	1
50-59	99	41	4	3
60-69	149	65	7	12
70-79	183	87	8	11
80-84	109	60	-	7
85+	137	61	-	25
Total	**1,063**	**451**	**35**	**59**

*Age group is based on age provided at time of PCR testing or reporting of a positive RAT. This table excludes interstate and overseas residents who were diagnosed and managed for COVID-19 in Tasmania. Only recorded deaths, where the death was caused or contributed to by COVID-19 have been included. Reason for hospital and/or ICU admission is based on COVID-19 diagnosis at discharge date.

There have been 0 deaths in children throughout the entire pandemic.

[52] https://www.coronavirus.tas.gov.au/families-community/current-restrictions
[53] https://www.coronavirus.tas.gov.au/families-community/schools-and-childcare
[54] https://www.health.gov.au/resources/collections/covid-19-vaccination-daily-rollout-update
[55] https://www.coronavirus.tas.gov.au/facts/tasmanian-statistics/weekly-report
[56] https://www.coronavirus.tas.gov.au/facts/tasmanian-statistics/weekly-report

Australia: Victoria

(population 6.6 million)

PHSM[57]

From late Feb 2022, masks are no longer required in most settings, QR check-in for certain venues only, proof of vaccination to attend some premises, reduced TTIQ and advice to work from home removed.

Schools & mitigation[58]

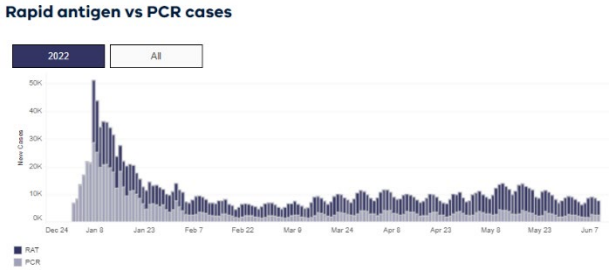
Schools closed for holidays in early Apr and returned in late Apr 2022. Masks are no longer required for all students and RATs are provided for twice-weekly testing. Vaccination continues to be encouraged.

Vaccination coverage[59, 60]

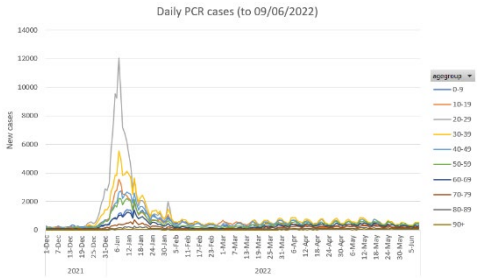
Age group (years)	1st dose (%)	2nd dose (%)	3rd/booster (%)
5-11	56.3	42.0	-
12-15	89.0	85.2	-
16+	95.6	94.1	67.8

Fourth dose for immunocompromised recommended from early Jan 2022, booster dose available to all eligible adults aged 18y+ and 16-17y from 3 Feb 2022, 12-15y at risk of severe disease from 14 Jun 2022; second booster dose available to all 65y+ and high-risk groups from 4 Apr 2022, and 16-64y with a medical condition predisposing to severe COVID-19 or people with disability with significant health needs from 30 May 2022. Three primary dose recommendation extended to all severely immunocompromised people aged 5y+ from mid-Jan 2022. Vaccination for 5-11y available from 10 Jan 2022.

Cases by age group[61]



From 8 Jan 2022, both PCR and RAT positive results are considered positive cases. Age distribution is only available for PCR positive cases, as displayed on the graph.



As of early Jun 2022, 97% of sewerage samples are of subvariant BA.2, while BA.4 and BA.2.12.1 are detected at 3% and <1% respectively.[64]

Hospitalisations in children[62]

Current cases in hospital: 512
Current cases in ICU: 21
No age breakdown

Deaths by age group[63]

People who have passed away with COVID-19

10/06/2022

Age group	Total
00-09	1
10-19	1
20-29	8
30-39	21
40-49	32
50-59	133
60-69	257
70-79	728
80-89	1,363
90+	1,044
Total	3,588

Two children have died with COVID-19 throughout the pandemic, including one 15 year old and one child under 10 with multiple underlying conditions and in palliative care.

[57] https://www.coronavirus.vic.gov.au/coronavirus-covidsafe-settings
[58] https://www.coronavirus.vic.gov.au/education-information-about-coronavirus-covid-19
[59] https://www.health.gov.au/resources/collections/covid-19-vaccination-daily-rollout-update
[60] https://twitter.com/VicGovDH
[61] Data from: https://www.coronavirus.vic.gov.au/victorian-coronavirus-covid-19-data
[62] https://www.coronavirus.vic.gov.au/victorian-coronavirus-covid-19-data
[63] https://www.coronavirus.vic.gov.au/additional-covid-19-case-data#cases-in-hospital
[64] https://www.health.vic.gov.au/media-releases/coronavirus-update-for-victoria-2-june-2022

Canada

(population 38 million)

PHSM[65]

Standard PHSM including TTIQ and mask wearing encouraged in shared spaces and subject to local advice.

Schools & mitigation[66]

Schools closed for a one-week holiday in mid-Mar 2022. Standard PHSM and additional measures depending on local advice: physical distancing, cohorting, masks when required, screening tests.

Vaccination coverage[67]

Age group (years)	1st dose (%)	Fully vacc.* (%)	3rd/booster (%)
5-11	56.4	42.0	-
12-17	87.8	84.1	17.6
Total pop.	84.9	81.7	48.6

*Canada also uses the J&J/Janssen vaccine which is a single-dose vaccine.

Third/booster doses have been available to high-risk individuals in phases since Sep 2021. Vaccination of 12y+ commenced mid-May and 5-11y in mid-Nov 2021.

Cases by age group[68, 69]

Figure 3. COVID-19 cases (n=3,734,848 [1]) in Canada by date [2] as of June 3, 2022, 9 am EST ([by age - 10 year groups] [3])

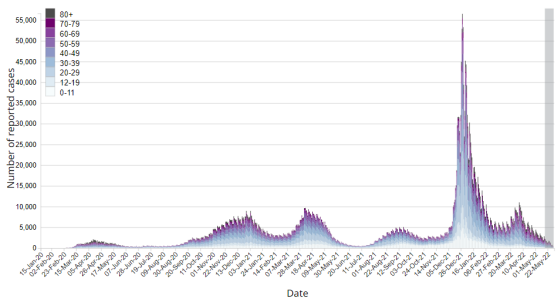
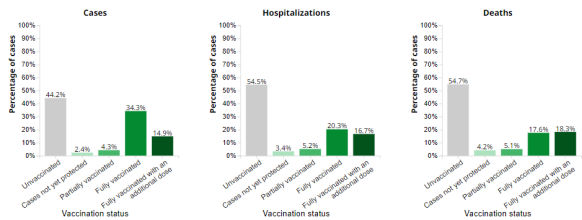
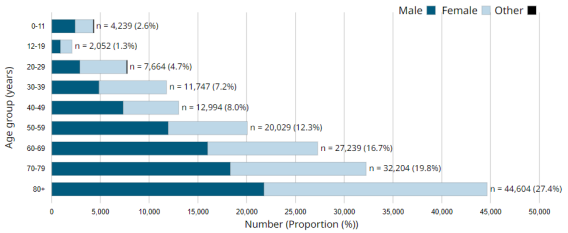


Figure 5. [Distribution] of confirmed COVID-19 cases reported to PHAC by vaccination status as of May 22, 2022



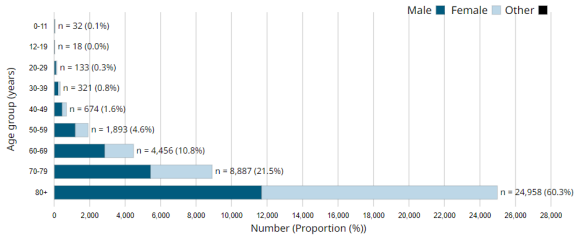
Hospitalisations in children[70]

Figure 7. Age and gender [4] distribution of COVID-19 cases [hospitalized] in Canada as of June 3, 2022, 9 am EST (n=162,772 [1])



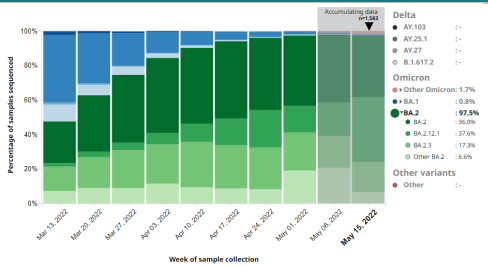
Deaths by age group[71]

Figure 7. Age and gender [4] distribution of COVID-19 cases [deceased] in Canada as of June 3, 2022, 9 am EST (n=41,372 [1])



There have been 50 deaths with COVID-19 in children aged 0-19y throughout the pandemic.

Genomic surveillance[72]



Omicron (BA.2) is the predominant variant.

[65] https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/prevention-risks.html
[66] https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/guidance-documents/planning-2021-2022-school-year-vaccination.html
[67] https://health-infobase.canada.ca/covid-19/vaccination-coverage/
[68] https://health-infobase.canada.ca/covid-19/epidemiological-summary-covid-19-cases.html
[69] http://www.bccdc.ca/schools/news-resources/data-for-k12
[70] https://health-infobase.canada.ca/covid-19/epidemiological-summary-covid-19-cases.html
[71] https://health-infobase.canada.ca/covid-19/epidemiological-summary-covid-19-cases.html
[72] https://health-infobase.canada.ca/covid-19/epidemiological-summary-covid-19-cases.html

Denmark

(population 5.9 million)

PHSM[73]

All restrictions lifted from February 2022.

Schools & mitigation[74]

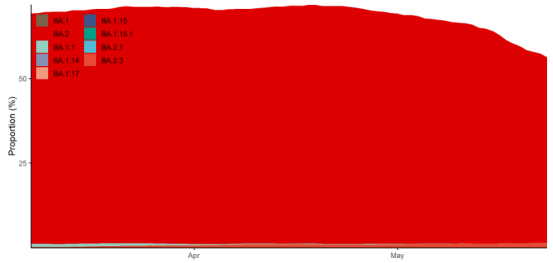
Schools closed for one-week holidays in mid-Feb and mid-Apr 2022. Standard PHSM, close contacts are not required to isolate but encouraged to get tested.

Vaccination coverage[75]

Age group (years)	1st dose (%)	2nd dose (%)	3rd/ booster (%)
5-11	46.4	38.3	-
12-15	80.9	79.0	0.4
16-19	89.6	88.4	45.6
12+	81.9	80.4	61.7

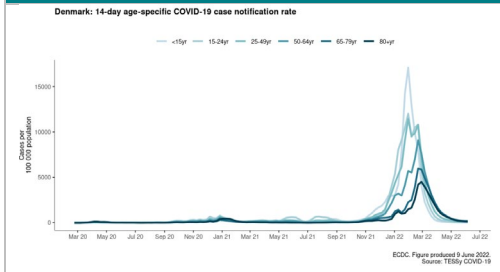
Commenced 3rd/booster vaccination for people 65y+ in late Oct and for all adults from late Nov 2021. Vaccination for 5-11y age group commenced late Nov 2021.

Genomic surveillance[76]



Omicron (BA.2) is the predominant variant.

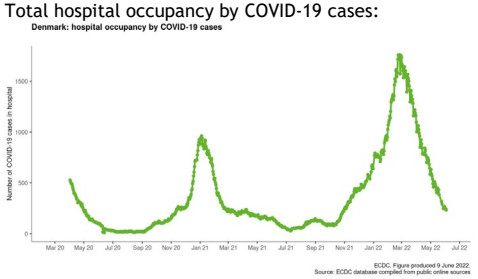
Cases by age group[77]



Hospitalisations in children[78]

Not reported by age

Total hospital occupancy by COVID-19 cases:

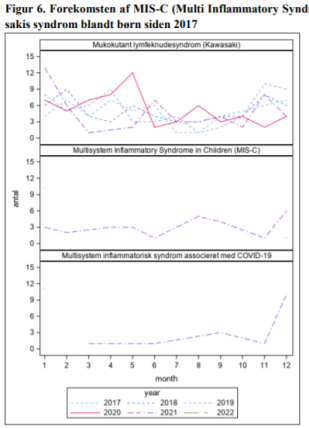


Deaths by age group[79]

Total of 7 deaths with COVID-19 in children aged 0-19y throughout the pandemic.

MIS-C[80]

Prevalence of MIS-C and Kawasaki syndrome in children since 2017



Data to Report #10, 14 Feb 2022

[73] https://en.coronasmitte.dk/rules-and-regulations
[74] https://en.coronasmitte.dk/rules-and-regulations
[75] https://experience.arcgis.com/experience/9824b03b114244348ef0b10f69f490b4/page/page_3/
[76] https://covid19genomics.dk/statistics
[77] https://covid19-country-overviews.ecdc.europa.eu/countries/Denmark.html
[78] https://covid19-country-overviews.ecdc.europa.eu/countries/Denmark.html
[79] https://covid19.ssi.dk/overvagningsdata/ugentlige-opgorelser-med-overvaagningsdata
[80] https://www.sst.dk/-/media/Udgivelser/2022/Corona/Vaccination/Notat-vaccination-af-boern-5-11-aar.ashx

England, UK

(population 56.6 million)

PHSM[81]

Most restrictions have been lifted. Some remain in place including an advice to stay home if positive for COVID-19 and mask-wearing in healthcare settings only. Free PCRs and RATs are no longer available to most people.

Schools & mitigation[82]

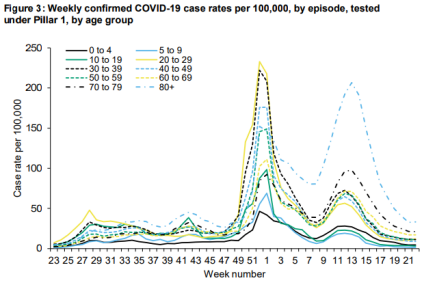
Schools closed for holidays from early to mid-Apr 2022. Standard PHSM only.

Vaccination coverage[83]

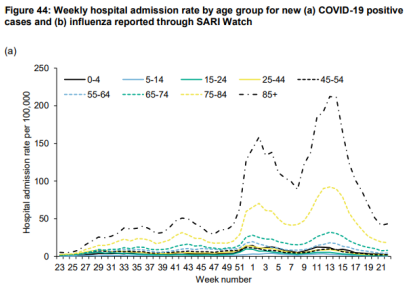
Age group (years)	1st dose (%)	2nd dose (%)	3rd/booster (%)
5-11	8.9	0.4	-
12-15	53.6	34.8	0.6
16-17	65.6	49.7	13.1
12+	93.0	86.9	68.3

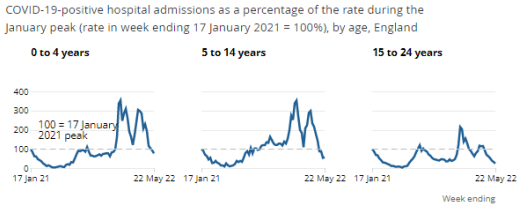
Third/booster dose available for all 16y+ and other high-risk groups. Vaccination for 16-17y commenced mid-Aug, 12-15y mid-Sep 2021 (initially as single dose) and 5-11y late Feb 2022.

Cases by age group[84]

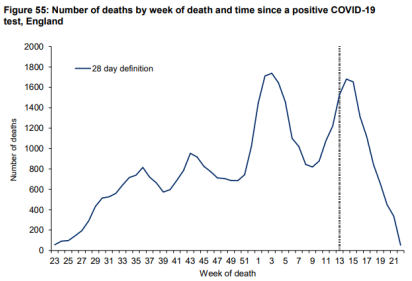


Hospitalisations in children[85, 86]



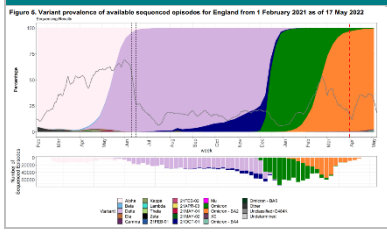


Deaths by age group[87]



Note: Deaths are no longer available by age group.

Genomic surveillance[88]



Omicron (BA.2) is the predominant variant.

[81] https://www.gov.uk/guidance/covid-19-coronavirus-restrictions-what-you-can-and-cannot-do
[82] https://www.gov.uk/government/publications/actions-for-schools-during-the-coronavirus-outbreak/schools-covid-19-operational-guidance
[83] https://coronavirus.data.gov.uk/details/vaccinations?areaType=nation&areaName=England
[84] https://www.gov.uk/government/statistics/national-flu-and-covid-19-surveillance-reports-2021-to-2022-season
[85] https://www.gov.uk/government/statistics/national-flu-and-covid-19-surveillance-reports-2021-to-2022-season
[86] https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/articles/coronaviruscovid19latestinsights/hospitals
[87] https://www.gov.uk/government/statistics/national-flu-and-covid-19-surveillance-reports-2021-to-2022-season
[88] https://www.gov.uk/government/publications/investigation-of-sars-cov-2-variants-technical-briefings

Finland

(population 5.5 million)

PHSM[89]

Gradual easing of restrictions from Feb 2022. From early March 2022, advice to work from home removed. Masks are recommended indoors and on public transport.

Schools & mitigation[90]

Schools closed for one-week holiday in mid-Feb 2022.

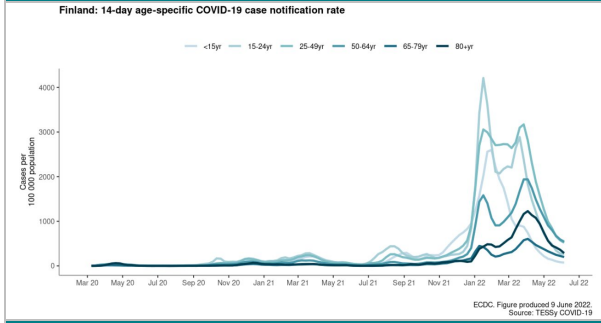
Standard PHSM, cohorting and ventilation.

Vaccination coverage[91]

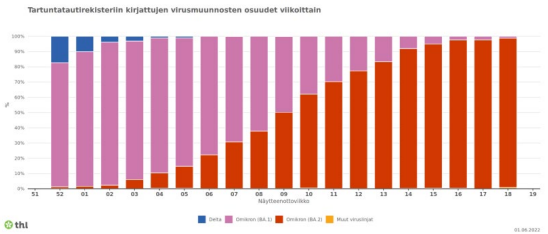
Age group (years)	1st dose (%)	2nd dose (%)	3rd/booster (%)
5-11	26.0	13.3	-
12-17	78.5	72.4	3.3
18+	89.7	87.5	65.0

Third/booster dose is recommended for all aged 18y+. Fourth dose recommended for 12y+ with severe immunodeficiency. Vaccine offered to 12y+ in early Aug and 5-11y children from late Dec 2021.

Cases by age group[92]



Genomic surveillance[95]

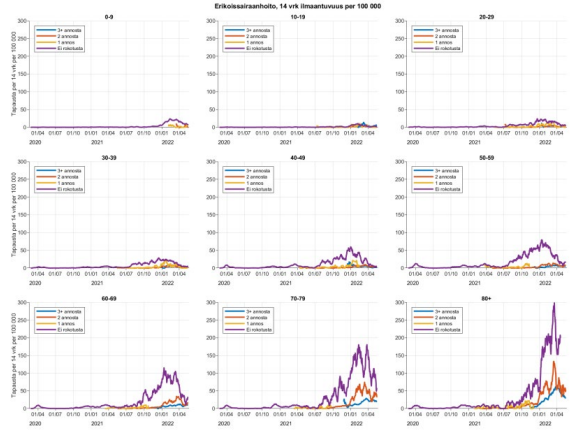


Kuvaaja 19. *Tartuntatautirekisteriin kirjattujen virusmuunnosten viikoittaiset osuudet viikosta 52–2021 viikkoon 18-2022.*

Omicron (BA.2) is the predominant variant.

Hospitalisations in children[93]

Rate of admission to specialist care by age group:

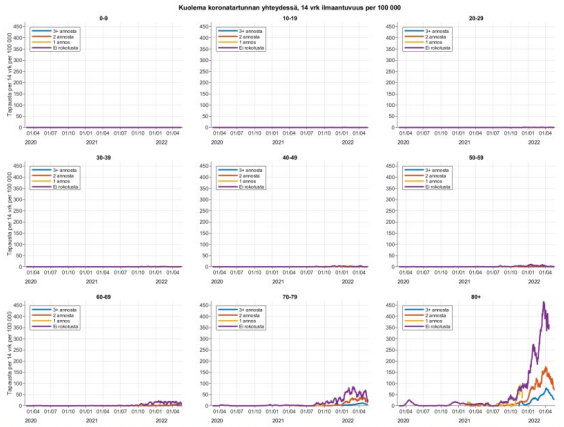


Kuvaaja 7. *Erikoissairaanhoidon ilmaantuvuus (tapausta / 100 000 henkilöä / 14 vuorokautta) ikäryhmittäin rokotusstatuksen mukaan.*

Purple (unvaccinated); yellow (single dose); red (two doses); blue (three doses)

Deaths by age group[94]

Rate of deaths by age group:



Kuvaaja 15. *Covid-19-tartunnan yhteydessä tapahtuneiden kuolemien ilmaantuvuus (tapausta / 100 000 henkilöä / 14 vuorokautta) ikäryhmittäin rokotusstatuksen mukaan.*

Purple (unvaccinated); yellow (single dose); red (two doses); blue (three doses)

There have been 0 deaths in children throughout the entire pandemic.

[89] https://valtioneuvosto.fi/en/information-on-coronavirus/current-restrictions
[90] https://okm.fi/documents/1410845/65547855/MoEC+THL+recommendations+to+education+and+early+childhood+education+and+care+1.3.2022.pdf/61cad874-6b78-84e4-a885-3a61ca69cd10
[91] https://sampo.thl.fi/pivot/prod/en/vaccreg/cov19cov/summary_cov19ageareacov
[92] https://covid19-country-overviews.ecdc.europa.eu/countries/Finland.html
[93] https://thl.fi/fi/web/infektiotaudit-ja-rokotukset/ajankohtaista/ajankohtaista-koronaviruksesta-covid-19/tilannekatsaus-koronaviruksesta/koronaviruksen-seuranta
[94] https://experience.arcgis.com/experience/92e9bb33fac744c9a084381fc35aa3c7
[95] https://thl.fi/fi/web/infektiotaudit-ja-rokotukset/ajankohtaista/ajankohtaista-koronaviruksesta-covid-19/tilannekatsaus-koronaviruksesta/koronaviruksen-seuranta

Netherlands

(population 17.4 million)

PHSM[96]

Most restrictions have been lifted. Some remain in place including mask-wearing in airports only and advice to test if symptomatic.

Schools & mitigation[97]

Schools closed for one-week holidays in mid-late Feb and late Apr to early May 2022.

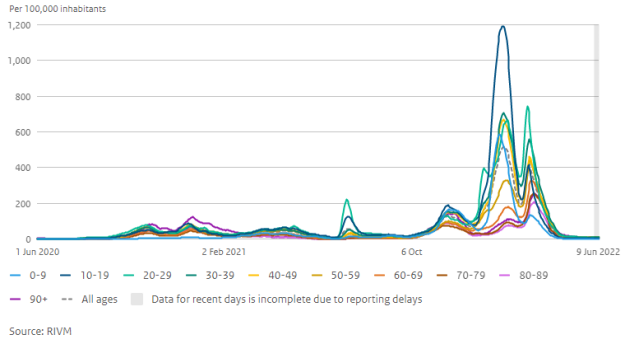
Standard PHSM, mask wearing required for secondary school staff and students, twice-weekly RAT screening for staff and secondary school students, ventilation, quarantine arrangements based on case numbers within a cohort.

Vaccination coverage[98]

Age group (years)	Fully vacc. (%)	3rd/booster (%)
5-11	3.0	-
12-17	66.0	2.0
18+	83.2	64.0

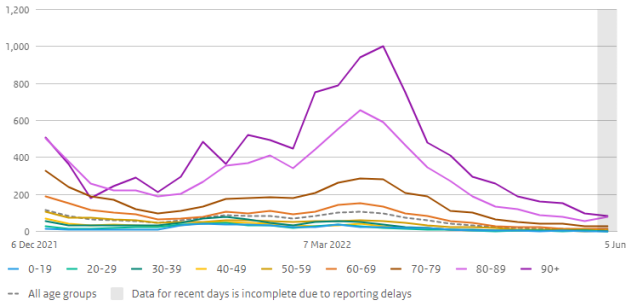
Note: The Netherlands also uses the J&J/Janssen vaccine which is a single-dose vaccine. Third/booster dose available for all 18y+. Vaccine offered to 12-17y from early Jul 2021 and 5-11y from mid-Jan 2022.

Cases by age group[99]



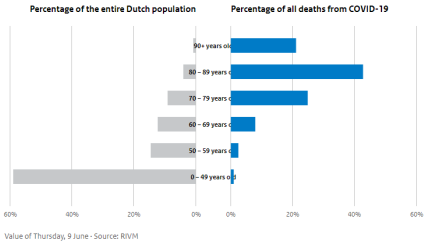
Source: RIVM

Hospitalisations in children[100]



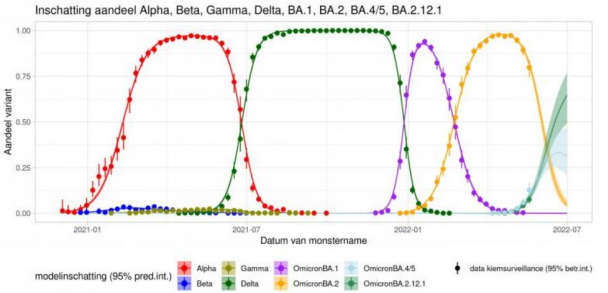
Source: NICE via RIVM

Deaths by age group[101]



The number of deaths in children is not known as the Netherlands provides a total sum of all deaths between 0-49 years.

Genomic surveillance[102]



Omicron (BA.2) is the predominant variant.

[96] https://www.government.nl/topics/coronavirus-covid-19/tackling-new-coronavirus-in-the-netherlands/coronavirus-measures-in-brief
[97] https://www.rivm.nl/en/coronavirus-covid-19/children-and-covid-19
[98] https://coronadashboard.government.nl/landelijk/vaccinaties
[99] https://coronadashboard.government.nl/landelijk/positief-geteste-mensen
[100] https://coronadashboard.government.nl/landelijk/ziekenhuis-opnames
[101] https://coronadashboard.government.nl/landelijk/sterfte
[102] https://www.rivm.nl/en/coronavirus-covid-19/virus/variants

Scotland, UK

(population 5.5 million)

PHSM[103]

Most restrictions have been lifted. Some remain in place including mask-wearing on public transport and some indoor settings. From May 2022, testing is only available to high-risk groups and healthcare workers. Asymptomatic close contacts are not required to isolate and reduced isolation time for cases.

Schools & mitigation[104]

Schools closed for a one-week holiday in mid-Feb and a two-week holiday in early to mid-Apr 2022. Standard PHSM only.

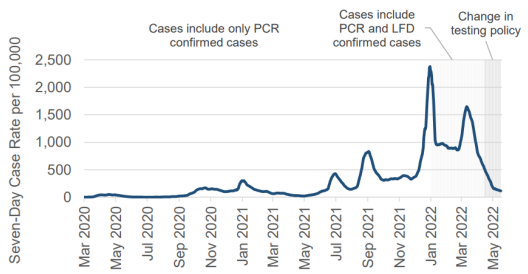
Vaccination coverage[105]

Age group (years)	1st dose (%)	2nd dose (%)	3rd/booster (%)
5-11	19.9	1.3	-
12-15	67.5	46.3	1.4
16-17	80.8	59.2	18.4
12+	94.6	88.1	74.3

Third/booster dose available for all 18y+ and other high-risk groups. Vaccination for 16-17y commenced mid-Aug, 12-15y mid-Sep 2021 (initially as single dose) and 5-11y late Feb 2022 (coverage data not available).

Cases by age group[106]

Figure 5: Seven-day combined PCR and LFD case rate (including reinfections) per 100,000 for Scotland by specimen date. Data to 20 May 2022[22 23].



Data is no longer available by age group.

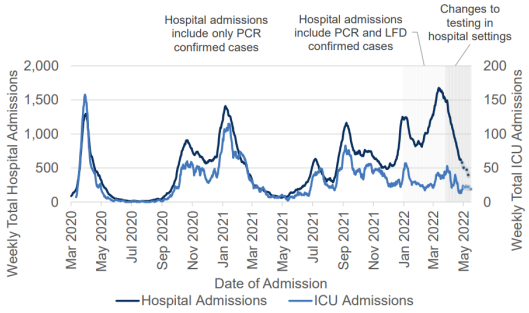
Omicron (BA.2) is the predominant variant.

Hospitalisations in children[107]

Data is no longer available by age group.

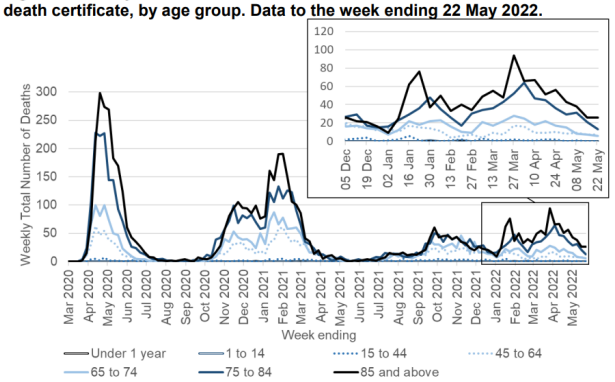
Total weekly COVID-19 admissions:

Figure 7: Weekly total of Covid-19 admissions to hospital and ICU with a positive Covid test in Scotland. Hospital admission data to 17 May 2022 and ICU admission data to 22 May 2022[37 38].



Deaths by age group[108, 109]

Figure 8: Weekly total number of deaths where Covid-19 was mentioned on the death certificate, by age group. Data to the week ending 22 May 2022.



There have been 5 deaths due to COVID-19 in children aged 0-14y in the past year.

[103] https://www.gov.scot/coronavirus-covid-19/
[104] https://www.gov.uk/government/publications/emergency-planning-and-response-for-education-childcare-and-childrens-social-care-settings
[105] https://coronavirus.data.gov.uk/details/vaccinations?areaType=nation&areaName=Scotland
[106] https://www.gov.scot/collections/coronavirus-covid-19-the-state-of-the-epidemic/
[107] https://scotland.shinyapps.io/phs-covid19-education/_w_852fb58e/
[108] https://www.gov.scot/collections/coronavirus-covid-19-the-state-of-the-epidemic/
[109] https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/vital-events/general-publications/weekly-and-monthly-data-on-births-and-deaths/deaths-involving-coronavirus-covid-19-in-scotland

Singapore

(population 5.5 million)

PHSM[110]

From late Apr 2022, restrictions have eased further to include mask-wearing indoors only, advice to work from home removed, physical distancing requirements removed, and density limits removed.

Schools & mitigation[111]

Schools closed for one-week holiday in mid-Mar 2022.

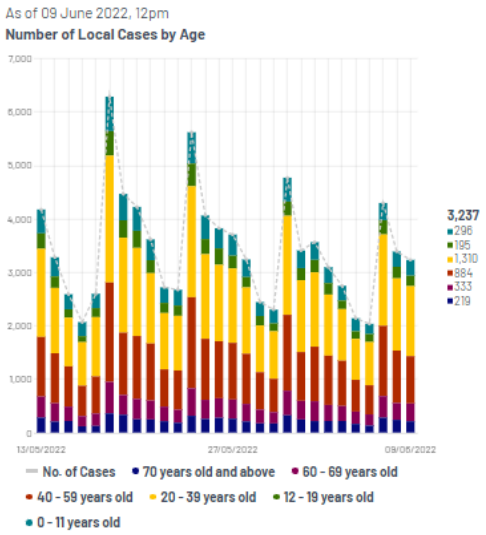
From late Apr 2022, standard PHSM, removal of cohorting and density limits, masks are still required indoors for all students and staff.

Vaccination coverage[112]

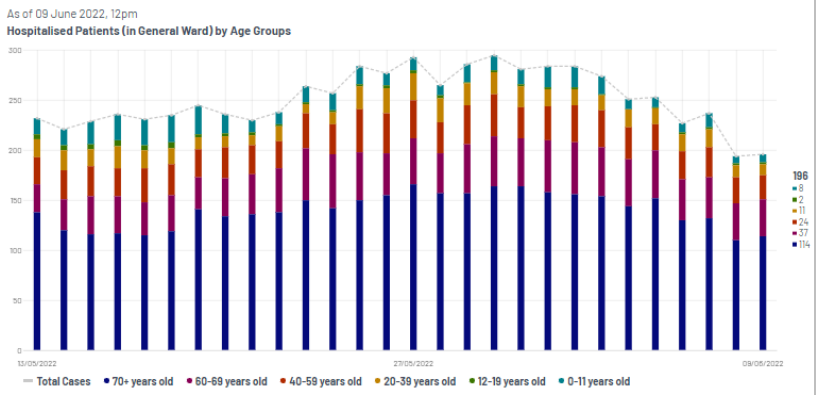
Age group (years)	1st dose (%)	2nd dose (%)	3rd/booster (%)
Total pop.	93.0	92.0	77.0

Third/booster dose available for all aged 12y+. Vaccination for 12y+ commenced early June and 5-11y late Dec 2021. From 14 Feb 2022, all 18y+ must receive a booster dose within 270 days of their 2nd dose to be considered fully vaccinated. The same applies to all 12-17y from 14 Mar 2022.

Cases by age group[113]

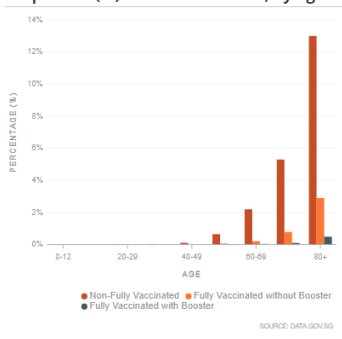


Hospitalisations in children[114]



One child was admitted to ICU due to MIS-C and there have been five reported cases of MIS-C throughout the entire pandemic, last reported 8 Nov 2021.

Deaths by age group[115]



1 May 21 to 15 May 22

Age	Non-Fully Vaccinated	Fully Vaccinated (Without Booster)	Fully Vaccinated (With Booster)
0-12	0.0	0.0	0.0
13-19	0.0	0.0	0.0
20-29	0.014	0.0	0.0
30-39	0.030	0.0	0.00076
40-49	0.11	0.011	0.0042
50-59	0.65	0.064	0.0032
60-69	2.2	0.21	0.040
70-79	5.3	0.78	0.10
80+	13	2.9	0.49
Total	**0.47**	**0.11**	**0.029**

1 May 21 to 15 May 22

There have been 0 deaths in children throughout the entire pandemic.

[110] https://www.moh.gov.sg/covid-19-phase-advisory
[111] https://www.moe.gov.sg/faqs-covid-19-infection
[112] https://www.moh.gov.sg/
[113] https://www.moh.gov.sg/
[114] https://www.moh.gov.sg/
[115] https://www.moh.gov.sg/covid-19/statistics/

South Africa

(population 60.4 million)

PHSM[116]

Further easing of restrictions from Apr 2022 to include asymptomatic cases are not required to isolate, mandatory indoor mask-wearing 6y+ with exceptions.

Schools & mitigation[117]

Schools closed for holidays in mid-Mar to early Apr 2022.
Standard PHSM, indoor mask-wearing.

Vaccination coverage[118]

Age group (years)	Fully vaccinated* (%)
18+	50.3

*Note: South Africa also uses the J&J/Janssen vaccine which is a single-dose vaccine.
Vaccination is available for all aged 12y+. Coverage data for 12-17y not available.

Cases by age group[119]

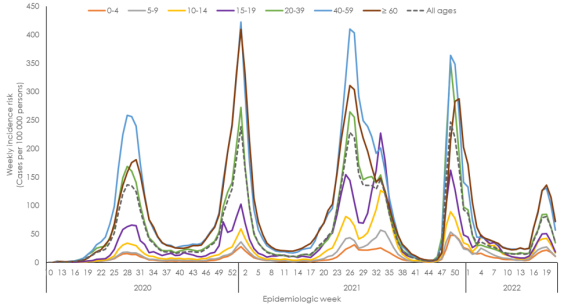
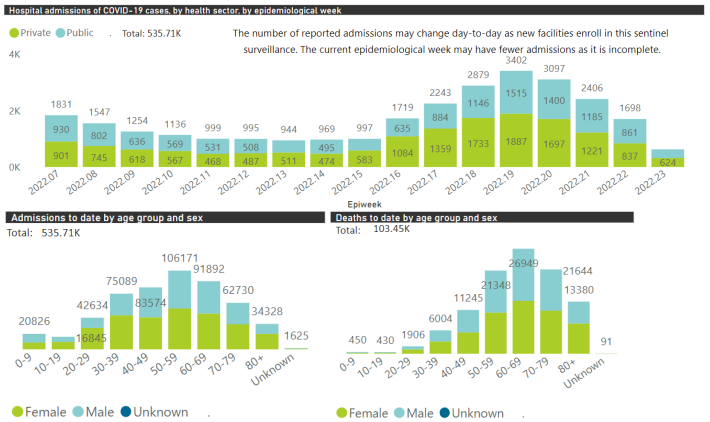


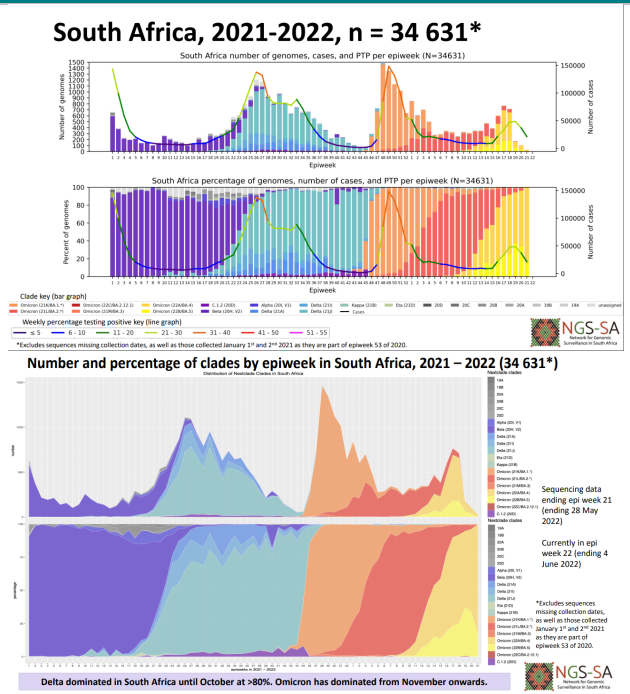
Figure 4: Weekly incidence risk of laboratory-confirmed cases of COVID-19 by age group in years and epidemiologic week South Africa 3 March 2020 – 28 May 2022 (n = 3 917 600, 36 367 missing age)

Hospitalisations in children and deaths by age group[120]



Total of 880 deaths with COVID-19 in children 0-19y throughout the entire pandemic.
Deaths in children account for <1% of all deaths in South Africa.

Genomic surveillance[121]



Omicron (BA.4) is now the predominant variant.

[116] https://www.gov.za/covid-19/resources/regulations-and-guidelines-coronavirus-covid-19
[117] https://www.gov.za/covid-19/resources/regulations-and-guidelines-coronavirus-covid-19
[118] https://sacoronavirus.co.za/latest-vaccine-statistics/
[119] https://www.nicd.ac.za/diseases-a-z-index/disease-index-covid-19/surveillance-reports/weekly-epidemiological-brief/
[120] https://www.nicd.ac.za/diseases-a-z-index/disease-index-covid-19/surveillance-reports/daily-hospital-surveillance-datcov-report/
[121] https://www.nicd.ac.za/diseases-a-z-index/disease-index-covid-19/sars-cov-2-genomic-surveillance-update/

USA
(population 332.8 million)

PHSM[122]

The US CDC recommends indoor mask wearing for all aged 2y+ in areas of high community transmission, physical distancing, hand & surface hygiene, TTIQ, but adoption varies by State/Territory.

Schools & mitigation[123]

Schools closed for a one-week holiday between Mar-Apr 2022.

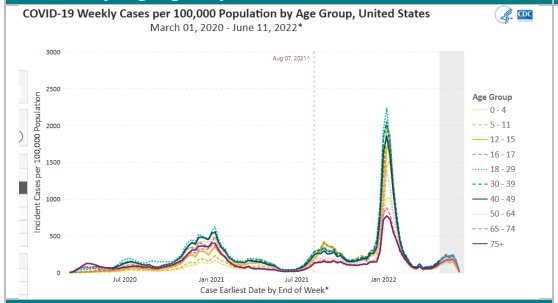
Standard PHSM, cohorting, masks, PCR & RAT screening, but adoption varies by State/Territory.

Vaccination coverage[124,125]

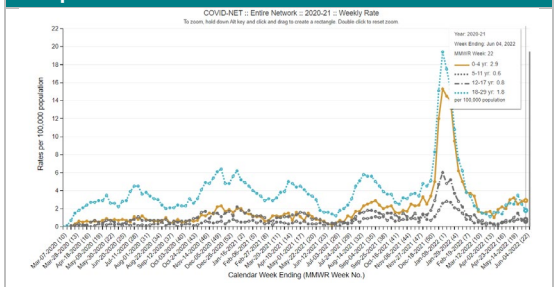
Age group (years)	1st dose (%)	Fully vaccinated* (%)	3rd/booster (%)
5-11	36.0	29.3	-
12-17	69.6	59.6	26.3
18+	89.4	76.7	50.4

*Note: The US also uses the J&J/Janssen vaccine which is a single-dose vaccine.
Third/booster dose for 65y+ and other high-risk individuals from Sep 2021, expanded to all 18y+ from late Nov 2021 and 12y+ from early Jan 2022. Vaccination offered to 12y+ from May and 5-11y from Nov 2021.

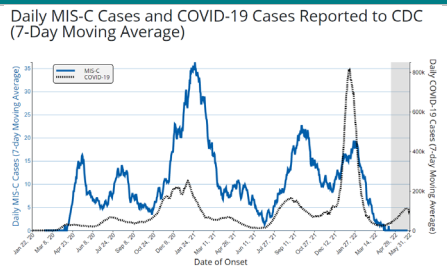
Cases by age group[126]



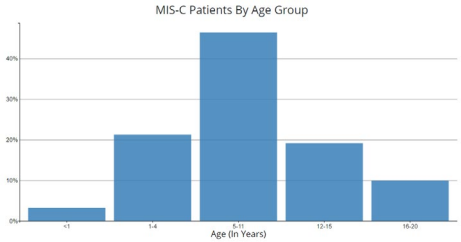
Hospitalisations in children[132]



MIS-C[127]

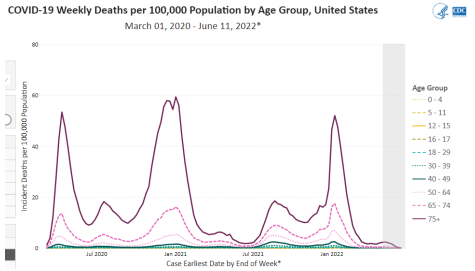


The shaded area on the right side of the figure represents the most recent six weeks of data, for which reporting of MIS-C cases is still incomplete.



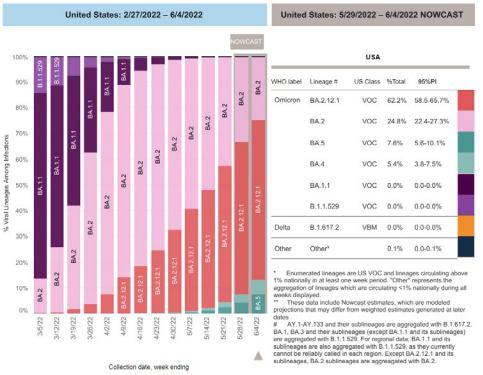
There have been 8525 cases of MIS-C throughout the entire pandemic, including 69 deaths. The median age of MIS-C cases was 9y and half were between 5-13y.

Deaths by age group[128,129]



Total 1086 deaths with COVID-19 in children 0-17y throughout the entire pandemic, accounting for 0.1% of all deaths in the US.
There is marked variation by State/Territory and case fatality rates are between 0-0.01% for the vast majority of States and Territories[131]:
e.g. Texas (n=148); California (n=71); New York City (n=36); Alaska (n=2); District of Columbia (n=0)

Genomic surveillance[130]



Omicron (BA.2.12.1) is the predominant variant.

[122] https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html
[123] https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/k-12-guidance.html
[124] https://covid.cdc.gov/covid-data-tracker/#vaccinations_vacc-total-admin-rate-total
[125] https://covid.cdc.gov/covid-data-tracker/#vaccination-demographics-trends
[126] https://covid.cdc.gov/covid-data-tracker/#demographicsovertime
[127] https://covid.cdc.gov/covid-data-tracker/#mis-national-surveillance
[128] https://covid.cdc.gov/covid-data-tracker/#demographicsovertime
[129] https://www.cdc.gov/nchs/nvss/vsrr/covid_weekly/index.htm
[130] https://covid.cdc.gov/covid-data-tracker/#variant-proportions
[131] https://www.aap.org/en/pages/2019-novel-coronavirus-covid-19-infections/children-and-covid-19-state-level-data-report/
[132] https://gis.cdc.gov/grasp/COVIDNet/COVID19_3.html

USA: Impact of vaccination on disease incidence

Seven-day incidence per 100,000 population in people who received at least one dose of vaccine, by age group. [133]

[133] https://covid.cdc.gov/covid-data-tracker/#vaccinations-cases-trends

Authors

Darren Suryawijaya Ong
Research Assistant, Asia-Pacific Health, Murdoch Children's Research Institute

Dr John Hart
Senior Research Fellow, Asia-Pacific Health, Murdoch Children's Research Institute

Professor Fiona Russell
Director, Child and Adolescent Health PhD Program, Department of Paediatrics, The University of Melbourne
Group Leader, Asia-Pacific Health, Murdoch Children's Research Institute

To subscribe and receive these reports, please email: asiapacific.health@mcri.edu.au

Murdoch Children's Research Institute
50 Flemington Rd, Parkville
Victoria 3052 Australia
ABN 21 006 566 972

https://www.mcri.edu.au/research/themes/infection-and-immunity/asia-pacific-health