



Government of Western Australia  
North Metropolitan Health Service  
Mental Health, Public Health and Dental Services

# Epidemiology Of Notifiable Infectious Diseases In Metropolitan Perth

Annual report 2022



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## Epidemiology of notifiable infectious diseases in metropolitan Perth: Annual report 2022.

Metropolitan Communicable Disease Control  
Mental Health, Public Health and Dental Services  
North Metropolitan Health Service

Note: For this report, the geographical boundaries of metropolitan Perth are defined by the area within the East, North and South Metropolitan Health Services (EMHS, NMHS and SMHS). The use of the term 'Aboriginal' within this document refers to Australians of both Aboriginal and Torres Strait Islander people. The term "Aboriginal" is used in preference to "Aboriginal and Torres Strait Islander" in recognition that Aboriginal people are the original inhabitants of Western Australia. No disrespect is intended to our Torres Strait Islander colleagues and community.

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The NMHS acknowledges the traditional owners of the land, the Noongar people.

We pay our respects to the elders past and present and recognise the continuing cultural and spiritual practices of the Noongar people.

Metropolitan Communicable Disease Control would like to acknowledge the assistance of medical, nursing and scientific staff working in general practices, hospitals and laboratories, for their assistance with public health follow-up of persons with notifiable diseases, and their essential contributions to prevention and control of communicable diseases in the Perth metropolitan area.

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## Executive summary

Metropolitan Communicable Disease Control (MCDC) is responsible for the public health management of notifiable infectious diseases along with strategies to prevent communicable disease, including through immunisation, in metropolitan Perth. This report is to inform health care providers and stakeholders about local trends in communicable disease epidemiology in 2022 and highlight related public health actions and issues requiring attention.



### COVID-19 and its impacts

- WA recorded **1.28 million COVID-19 cases** and **828 COVID-19 related deaths** in 2022.
- The **COVID-19 pandemic response in WA** shifted towards minimising harm assisted by high vaccination coverage. The public health response focused on minimising transmission in high risk settings.
- Removal of border restrictions led to the return of **travel related enteric diseases** including hepatitis A, typhoid and paratyphoid.

### Sexually-transmitted infections and blood-borne viruses

- **Infectious syphilis notifications continued to increase**, including among pregnant women, people experiencing homelessness, and women of childbearing age.
- MCDC continued to respond to the **syphilis outbreak in metropolitan Perth** using a collaborative and coordinated approach involving multiple stakeholders, and the establishment of the Syphilis Response Team.
- **Hepatitis C and hepatitis B** continued to trend down with both declining in 2022.

### New, emerging, and vaccine-preventable diseases

- MCDC managed **7 cases of mpox** (previously referred to as monkeypox), a zoonotic disease endemic to West Africa that spread widely in 2022 with cases confirmed in at least 74 countries.
- There were 141 notifications of **invasive group-A streptococcus (iGAS)** in its first full year of being notifiable, requiring significant public health input.

### Childhood immunisation

- Overall, **immunisation coverage appears to be trending downward** since 2021 likely due to the focus on COVID-19 and the reduced awareness about childhood immunisation.
- Despite these trends, there was a **1.2% increase in coverage among Aboriginal children** at 12 months of age in 2022.
- **MCDC implemented and expanded several projects in 2022** to improve coverage in priority populations.

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## Background

### Purpose

The aim of this annual report is to inform healthcare providers and other stakeholders about important trends in notifiable infectious diseases and immunisation coverage in metropolitan Perth in 2022. The **Metropolitan Communicable Disease Control (MCDC)** team was established on 1 July 2016 and has responsibility for the public health management of notifiable diseases for the East, North and South Metropolitan Health Services (EMHS, NMHS, SMHS).

### Notifiable diseases

Under the [Public Health Act 2016](#)<sup>1</sup> (Part 9), any medical practitioner or nurse practitioner attending a patient with a notifiable infectious disease has a legal obligation to report it to the Western Australian Department of Health (WA DOH), in practice to the Communicable Disease Control Directorate (CDCD). Similar obligations apply to pathology laboratories where test results indicate a notifiable disease.

Information on persons with notifiable diseases and related conditions is entered into the **Western Australian Notifiable Infectious Diseases Database (WANIDD)**, except for Human Immunodeficiency Virus (HIV) infection, antibiotic resistant organisms, acute rheumatic fever and rheumatic heart disease, for which separate databases are maintained. Communicable disease notifications are used to inform disease surveillance, public health management, policy and interventions, and enhance prevention and control of these diseases, including through testing, contact tracing and immunisation. A list of current notifiable infectious diseases and related conditions in Western Australia (WA), along with case definitions, fact sheets, guidelines and data, is available [online](#)<sup>2</sup>.

## Data sources

### Notification data

Notifiable diseases data for metropolitan Perth and WA were extracted from WANIDD on the 28<sup>th</sup> of March 2023 and are subject to revision. Data were retrieved using an **optimal date of onset of disease** (ODOO) from 1 January to 31 December 2022. Exceptions to this were diseases with a long delay between diagnosis and onset of disease, namely, non-infectious syphilis, tuberculosis, leprosy, Creutzfeldt-Jakob disease, and unspecified hepatitis B and C. These diseases were retrieved by the **date of receipt** of notification (DOR) from 1 January to 31 December 2022. National notification rates for 2022 were provided by the **National Notifiable Diseases Surveillance System (NNDSS)**<sup>3</sup>, which is maintained by the Australian Government Department of Health and Ageing. Aggregate COVID-19 data for metropolitan

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<sup>1</sup> Government of Western Australia, Department of Justice. Western Australian Legislation – Public Health Act 2016 [https://www.legislation.wa.gov.au/legislation/statutes.nsf/main\\_mrtitle\\_13791\\_homepage.html](https://www.legislation.wa.gov.au/legislation/statutes.nsf/main_mrtitle_13791_homepage.html)

<sup>2</sup> Government of Western Australia, Department of Health. Notification of infectious diseases and related conditions [https://ww2.health.wa.gov.au/Articles/N\\_R/Notification-of-infectious-diseases-and-related-conditions](https://ww2.health.wa.gov.au/Articles/N_R/Notification-of-infectious-diseases-and-related-conditions)

<sup>3</sup> Australian Government, Department of Health. National Notifiable Diseases Surveillance System <http://www9.health.gov.au/cda/source/cda-index.cfm>

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Perth were extracted on the 13<sup>th</sup> April 2023 from open source data repositories<sup>4,5</sup> that collected and collated data from the WA Health public facing dashboard<sup>6</sup>, media releases and laboratories that submitted data to the **Global Initiative on Sharing All Influenza Data (GISAIID)**.

## Population data

Population data for metropolitan Perth and for the state of WA for 2021 were provided by the Epidemiology Branch, Public and Aboriginal Health Division, WA DOH. As this data was not available for 2022, a 2022 Perth metropolitan estimate of 2 183 252 was derived from 2022 ABS projections and the WA DOH 2021 population data.<sup>7</sup>

## Immunisation data

The **Australian Immunisation Register (AIR)** provides quarterly reports of immunisation coverage for three age groups: 12-<15 months, 24-<27 months, and 60-<63 months. Approval was provided by the AIR Data Steward for usage of these data from the quarterly reports for 2022 under the condition that data suppression rules for AIR data releases were complied with to protect the privacy of individuals (see Appendix 2).<sup>8</sup> CDCD provided collated data on vaccine wastage and rabies post-exposure prophylaxis for 2022.<sup>9</sup>

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<sup>4</sup> COVID-19 in Australia. <https://www.covid19data.com.au/>

<sup>5</sup> Khare, S., et al (2021) GISAIID's Role in Pandemic Response. *China CDC Weekly*, 3(49): 1049-1051. doi: 10.46234/ccdcw2021.255 PMID: 8668406

<sup>6</sup> Government of Western Australia. Department of Health. Coronavirus COVID-19 in Western Australia, <https://experience.arcgis.com/experience/359bca83a1264e3fb8d3b6f0a028d768>

<sup>7</sup> Australian Bureau of Statistics. Population Projections, Australia. <https://www.abs.gov.au/statistics/people/population/population-projections-australia/2017-base-2066#western-australia>

<sup>8</sup> AIR Data (personal communication), AIR Stewardship, Data Quality and Use, Immunisation and Communicable Disease Branch, Population Health Division, Primary and Community Care Group, Department of Health and Aged Care, Australian Government, on 27 March 2023.

<sup>9</sup> Vaccine Orders (personal communication), Vaccine Management, Immunisation Program, Communicable Disease Control Directorate, Department of Health, on 28 May 2023.

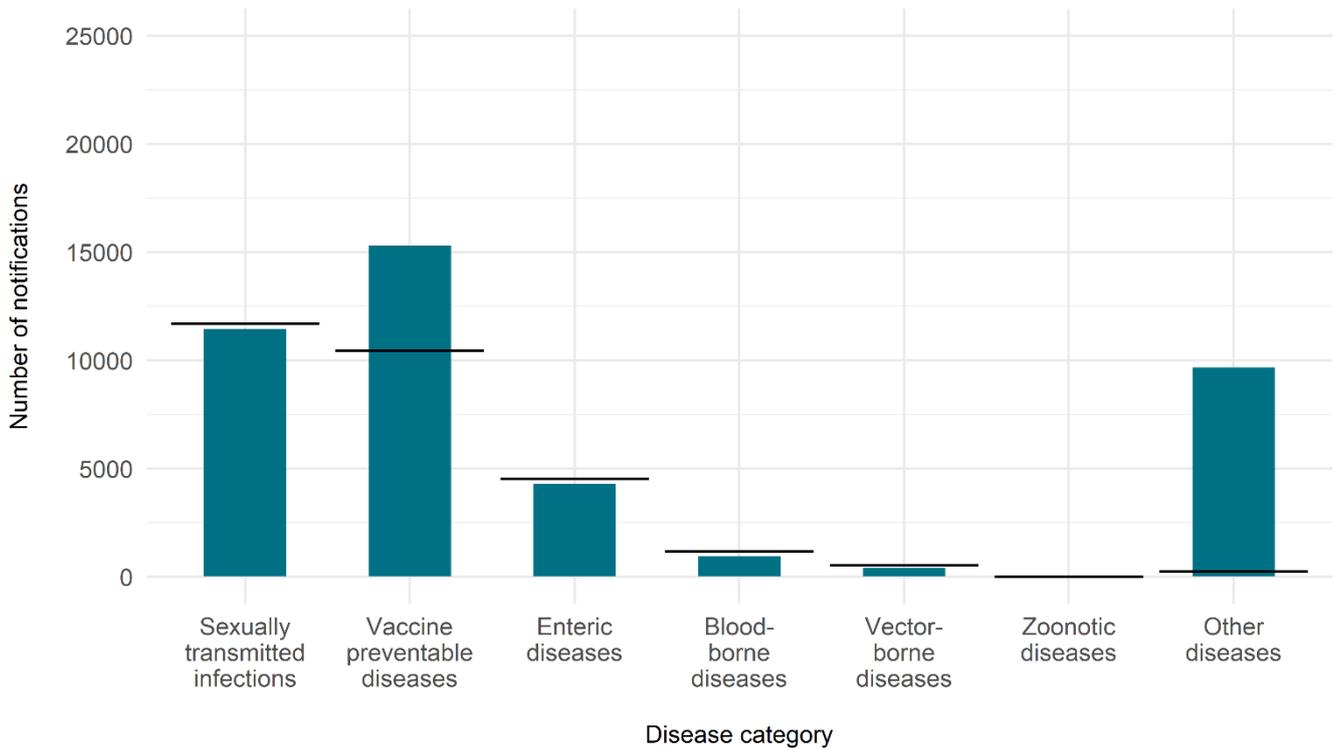


## Overview of notifiable diseases

MCDC received 42 905 notifications for notifiable diseases in 2022 in metropolitan Perth, not including COVID-19. This was a 49.8% increase from 28 634 notifications received on average in the previous five years (2017 to 2021). The relative proportion of notifications by disease category is demonstrated by **Figure 1** below. Vaccine preventable infections were the largest contributor to disease notifications in metropolitan Perth, accounting for 35.6% of the total notifications received in 2022.

Compared with 2021, there were increases in the number of notifications for all disease categories except for blood borne viruses. Vaccine preventable diseases increased significantly from 4 858 notifications in 2021 to 15 284 notifications in 2022, primarily driven by a rise in influenza notifications from 21 notifications in 2021 to 10 548 notifications in 2022. Sexually transmitted infection notifications increased by 2% despite a fall in chlamydia notifications, with increases in syphilis and gonorrhoea notifications. A resurgence of travel-related diseases was observed in 2022, including increases in notifications for hepatitis A, paratyphoid fever and typhoid fever, and a significant increase in overseas acquired disease overall.

Compared with the previous five years, there was a large increase in the ‘other diseases,’ (**Figure 1**) as iGAS and respiratory syncytial virus were made notifiable. Vaccine preventable diseases were also above their five-year average due to an increase in influenza notifications. All other disease categories were below the average for the previous five years.



**Figure 1: Number of notifications by disease category in 2022 (blue) not including COVID-19. The black lines represent the average number of notifications across previous 5 years (2017 to 2021) by disease category.**



The total number of notifications for each disease notified in metropolitan Perth between 2018 and 2022 is presented below in **Table 1**. The 2022 crude notification rates for each disease are also presented and compared with state and national rates where available. Most diseases notified in metropolitan Perth occurred at rates similar to WA overall and nationally. Rates of influenza and campylobacter were lower in metropolitan Perth compared to Australia overall. Conversely, hepatitis C and infectious syphilis were higher in WA overall, compared with the national rate. Communicable disease notification data by geographical health service area are presented in **Appendix 1**.

**Table 1: Metropolitan Perth notifications 2018 – 2022 & notification rates for Perth, WA & Australia in 2022.**

Notifiable disease	Number of notifications per year					2022 notification rate per 100 000 population		
	2018	2019	2020	2021	2022	Metro	WA	National
<b>Blood-borne viruses</b>								
Hepatitis B (newly acquired)	20	16	11	7	6	0.3	0.3	0.3
Hepatitis B (unspecified)	394	373	423	405	350	15.6	15.0	19.2
Hepatitis C (newly acquired)	97	89	73	73	50	2.2	2.4	2.1
Hepatitis C (unspecified)	658	600	611	697	543	24.2	26.6	23.9
Hepatitis D	7	10	2	9	5	0.2	0.2	0.3
<b>Enteric diseases</b>								
Campylobacteriosis	2729	2881	2284	2437	3121	138.9	145.6	160.4
Cholera	0	0	0	0	0	0	0	0
Cryptosporidiosis	65	122	425	53	194	8.6	9.9	7.8
Hepatitis A	11	22	5	1	12	0.5	0.5	0.5
Hepatitis E	2	4	3	0	0	0	0	0.1
Listeriosis	5	7	6	4	8	0.4	0.3	0.3
Paratyphoid fever	9	9	0	0	1	0	0	0.2
Salmonellosis	1602	1699	1369	639	693	30.8	34.5	39.4
Shiga toxin-producing E.coli	79	119	80	83	123	5.5	8.0	3.1
Shigellosis	123	277	103	38	94	4.2	6.9	5.4
Typhoid fever	12	18	7	1	15	0.7	0.6	0.6
Vibrio parahaemolyticus	14	12	3	33	5	0.2	0.2	NN
Yersiniosis	10	22	14	32	26	1.2	1.9	NN
<b>Sexually transmitted infections</b>								
Chlamydia	9016	9176	8397	8719	8632	384.1	396.8	359.8
Lymphogranuloma venereum	5	2	3	0	0	0	0	NN
Gonorrhoea	2327	2912	2286	1871	2161	96.2	118.3	127.0
Syphilis (congenital)	1	0	3	1	1	0	0.2	0.1
Syphilis (infectious)	311	333	465	478	552	26.1	32.4	24.0
Syphilis (non-infectious)	168	154	179	159	133	5.9	8.4	9.5
<b>Vaccine-preventable diseases</b>								
Diphtheria	0	0	0	0	1	0	0	0.1
Haemophilus influenzae type B	0	1	1	0	0	0	0	0

Influenza	4663	18468	981	21	10548	469.4	503.2	891.3
Measles	33	42	4	0	0	0	0	0
Meningococcal disease (invasive)	23	12	5	5	14	0.6	0.7	0.5
Mumps	17	17	7	0	0	0	0	0.2
Pertussis	916	440	99	40	21	0.9	1.2	1.8
Pneumococcal disease (invasive)	124	150	73	108	125	5.6	8.7	7.2
Rotavirus	220	443	154	531	289	13.2	13.2	24.6
Rubella	1	1	2	1	0	0.1	0.1	0
Tetanus	1	0	1	1	0	0	0	0
Varicella-Zoster	3579	3420	3977	4150	4317	192.1	192.7	116.6
<b>Vector-borne diseases</b>								
Murray Valley encephalitis virus	1	0	0	0	0	0	0	0
Japanese encephalitis virus	1	0	0	0	0	0	0	0.2
Barmah Forest virus	7	5	3	4	6	0.3	0.9	1.3
Chikungunya virus	1	9	3	0	8	0.4	0.4	0.1
Dengue virus	118	275	48	0	61	2.7	2.5	1.9
Malaria	44	52	22	9	33	1.5	1.4	0.8
Rickettsial disease (typhus)	10	20	9	7	8	0.4	0.7	NN
Ross River virus	347	261	237	375	282	12.5	15.8	11
Zika virus	1	0	0	0	1	0	0	NN
<b>Zoonotic diseases</b>								
Brucellosis	0	0	0	0	0	0	0	0.1
Leptospirosis	5	4	0	0	1	0	0.1	0.8
Psittacosis	0	0	0	0	0	0	0	0.2
Q Fever	6	3	2	1	4	0.2	0.2	1.8
<b>Other diseases</b>								
Botulism	0	0	0	0	0	0	0	0
Creutzfeldt-Jakob disease	6	7	7	5	5	0.2	0.2	NN
Haemolytic uraemic syndrome	0	0	0	2	1	0	0	0
Legionellosis	37	29	60	47	48	2.1	2.2	2.6
Leprosy	1	1	3	3	2	0.1	0.1	0
Melioidosis	2	2	0	3	0	0	0.2	NN
Tuberculosis	115	127	131	131	80	3.6	3.6	5.0
Invasive Group A streptococcus	NN	NN	NN	12	141	6.3	8.2	4.5
Acute post-streptococcal glomerulonephritis	0	0	0	4	3	0.1	0.5	NN
Respiratory syncytial virus	NN	NN	NN	330	9385	417.6	418.5	364.6
Mpox	NN	NN	NN	NN	7	0.3	0.3	0.6

Data retrieved from WANIDD; disease rows were excluded where no cases occurred locally, statewide and nationally in the past 5 years. Data for rheumatic heart disease, antibiotic resistant organisms and HIV are collected and managed separately; NN=not notifiable. Varicella-Zoster includes chickenpox and shingles as well as those unspecified. From July 2018, the case definitions for shigella and rotavirus were altered; the former contributing to a larger number of notifications, and the latter having no substantial impact on number of notifications. From September 2018, the case definition for pertussis was made more stringent. From June 2021, invasive Group A streptococcal and respiratory syncytial virus were added as notifiable diseases.



# WA opens borders once high COVID-19 vaccination coverage achieved

A new strain of coronavirus, later termed SARS-CoV-2, emerged in December 2019. Initially identified as the cause of a viral pneumonia cluster in Wuhan in China, COVID-19 cases were soon reported across several different countries, including Australia. The first locally acquired confirmed case of [COVID-19](#) in WA was diagnosed on 7 March 2020. A worldwide pandemic of COVID-19 was declared by the World Health Organisation (WHO) on 11 March 2020. Soon after, WA declared a State of Emergency under the *Emergency Management Act 2005* from 16 March 2020 and closed its borders from the 24 March 2020, permitting only essential travel and requiring travellers to test and quarantine for 14 days. Public Health Operations, a dedicated COVID-19 team that emerged from MDCD, oversaw the state-wide COVID-19 contact tracing response along with some other public health functions and contributed to the broader response in preventing sustained community transmission in WA between 2020 and 2021.

WA opened its borders in March 2022 after second dose COVID-19 vaccine coverage surpassed 90% and a less severe variant of COVID-19 (Omicron) emerged. Cases subsequently rose rapidly and peaked in May 2022 (**Figure 2**) following the gradual removal of public health measures including venue capacity limitations, contact restrictions and mask mandates. With cases numbers increasing, Public Health Operations shifted its objective from minimising transmission to minimising harm by focusing on reducing transmission in high risk settings such as residential aged care homes, congregate living, and health care facilities. Hospitalisations peaked in July with a daily mean of 346 hospital admissions that had, or recently had, COVID-19. A similar rise was not observed in cases in the same time period likely because of reduced community testing and reporting.

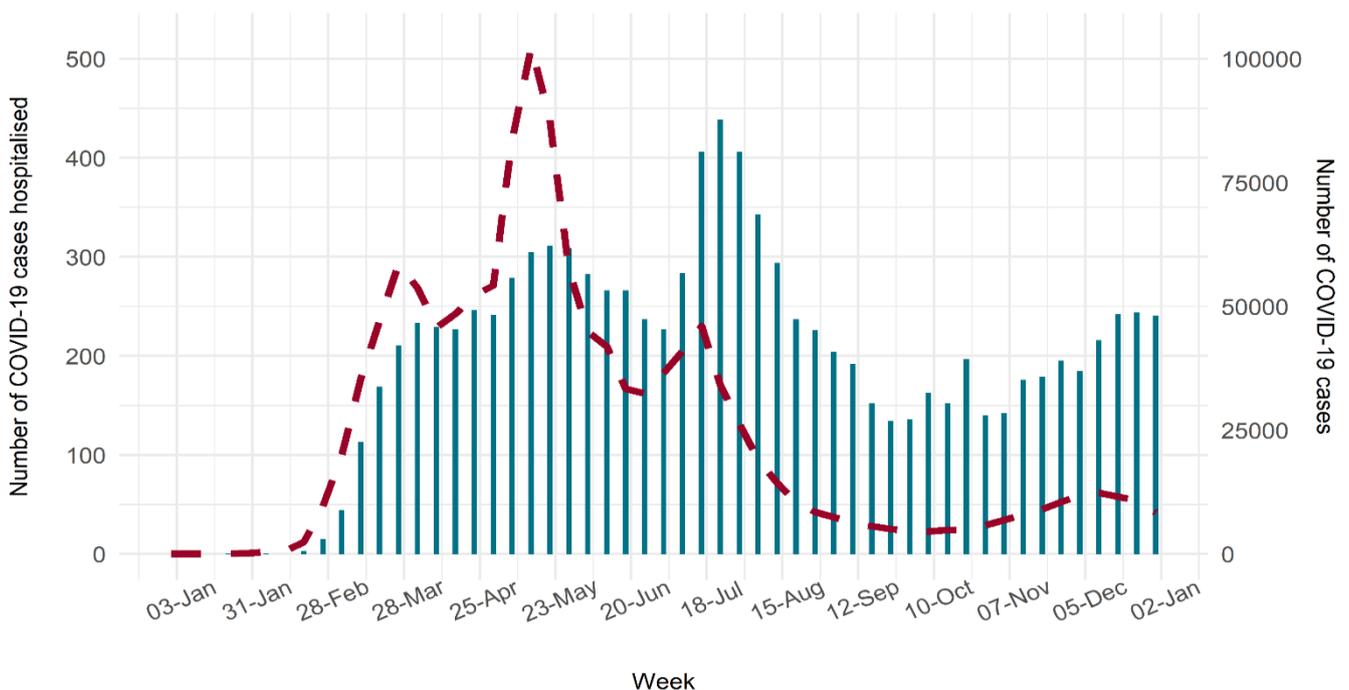


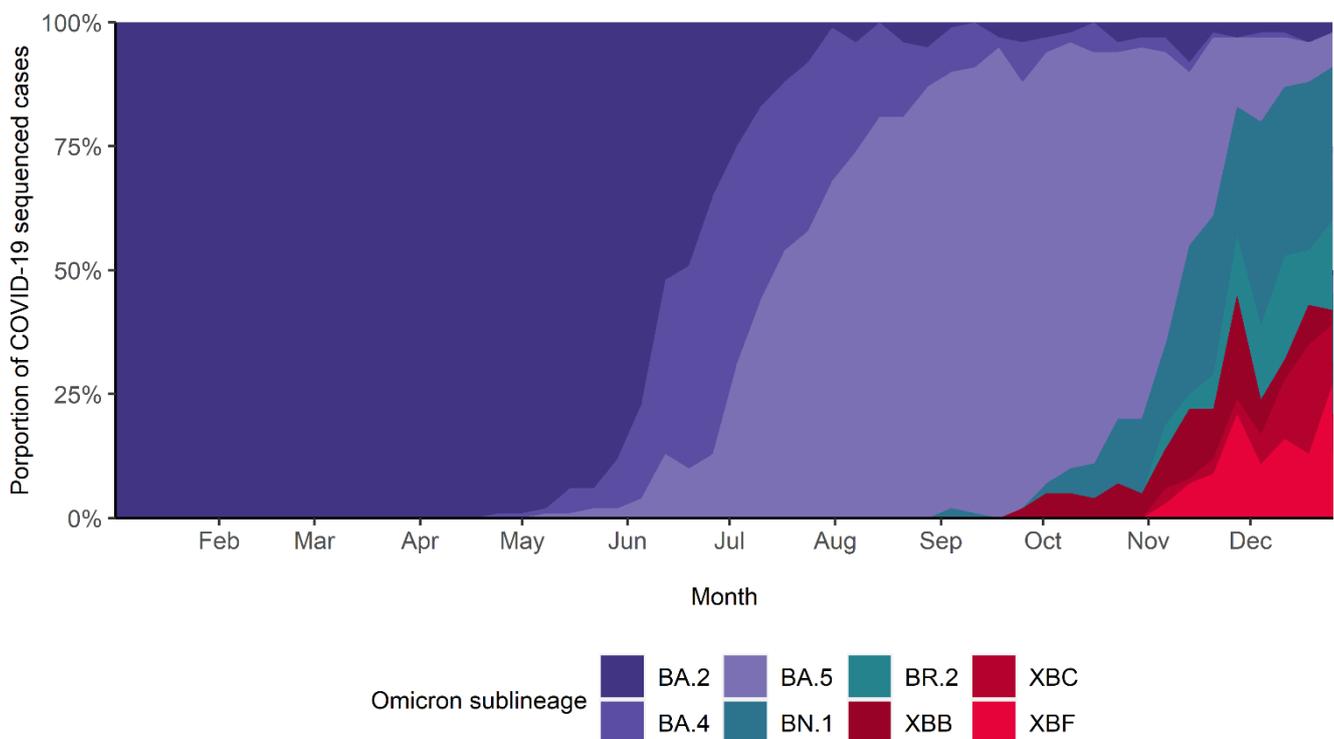
Figure 2: Number of COVID-19 cases hospitalised (blue, left axis) and new COVID-19 cases (red, right axis) by week in 2022 across Western Australia.

There were a total of 1.28 million COVID-19 cases and 828 COVID-19 related deaths reported within WA in 2022.<sup>10</sup> Most COVID-19 related deaths were concentrated in older age groups, with 38.1% between 80 and 89 years and 31% older than 90 years (**Table 2**).

**Table 2: Number of COVID-19 deaths by age group in 2022 across Western Australia.**

Age group (years)	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90+
Deaths (n=828)	<5 (<1%)	<5 (<1%)	<5 (<1%)	<5 (<1%)	10 (1.2%)	30 (3.6%)	59 (7.1%)	151 (18.2%)	315 (38.1%)	256 (31.0%)

There were 36 633 cases recorded as reinfections, defined as a positive COVID-19 test occurring at least 28 days after previously recovering from the virus.<sup>11</sup> Reinfections were highest in December 2022 with 10 890 reinfections, which may reflect the changing Omicron sublineage composition from BA.2 and BA.4 in the first half of the year, to BA.5, BN.1, XBC and XBF in the second half of the year (**Figure 3**).



**Figure 3: Monthly proportion of SARS-CoV-2 Omicron sublineage in Western Australia in 2022 based on open-source data from Outbreak.info.**

<sup>10</sup> Government of Western Australia. Department of Health. COVID-19 weekly surveillance report. <https://www.health.wa.gov.au/~media/Corp/Documents/Health-for/Infectious-disease/COVID19/Weekly-surveillance-report/COVID-19-Weekly-Surveillance-report-26-December-2022-01-January-2023.pdf>

<sup>11</sup> Government of Western Australia. Department of Health. COVID-19 weekly surveillance report. <https://www.health.wa.gov.au/~media/Corp/Documents/Health-for/Infectious-disease/COVID19/Weekly-surveillance-report/COVID-19-Weekly-Surveillance-report-26-December-2022-01-January-2023.pdf>

# Sexually transmissible infections

## Syphilis notifications continue to rise

The number of infectious [syphilis](#) notifications in metropolitan Perth continued to rise with 552 notifications in 2022, a 15.5% increase from 2021 (**Figure 4**). A total of 112 359 tests for syphilis were performed in metropolitan Perth in 2022, a 4.2% increase from 2021. This is in the context of the ongoing syphilis outbreak in metropolitan Perth, which was first declared in July 2020 by the WA Chief Health Officer. MCDC undertakes extensive follow up of every syphilis notification, including reviewing current and previous results to determine stage of disease, ensuring cases are adequately treated, providing public health advice on risk-reducing behaviours, and assisting with contact tracing to prevent further spread.

As part of the syphilis outbreak response, MCDC has also delivered education sessions to health care providers; established a database for surveillance and management of all cases particularly those at highest risk; engaged with vulnerable and priority populations; collaborated on the King Edward Memorial Hospital’s Syphilis in Pregnancy guidelines; advocated for increased routine testing including additional pregnancy screening; and facilitated multiagency case management meetings for pregnant cases and cases experiencing homelessness.

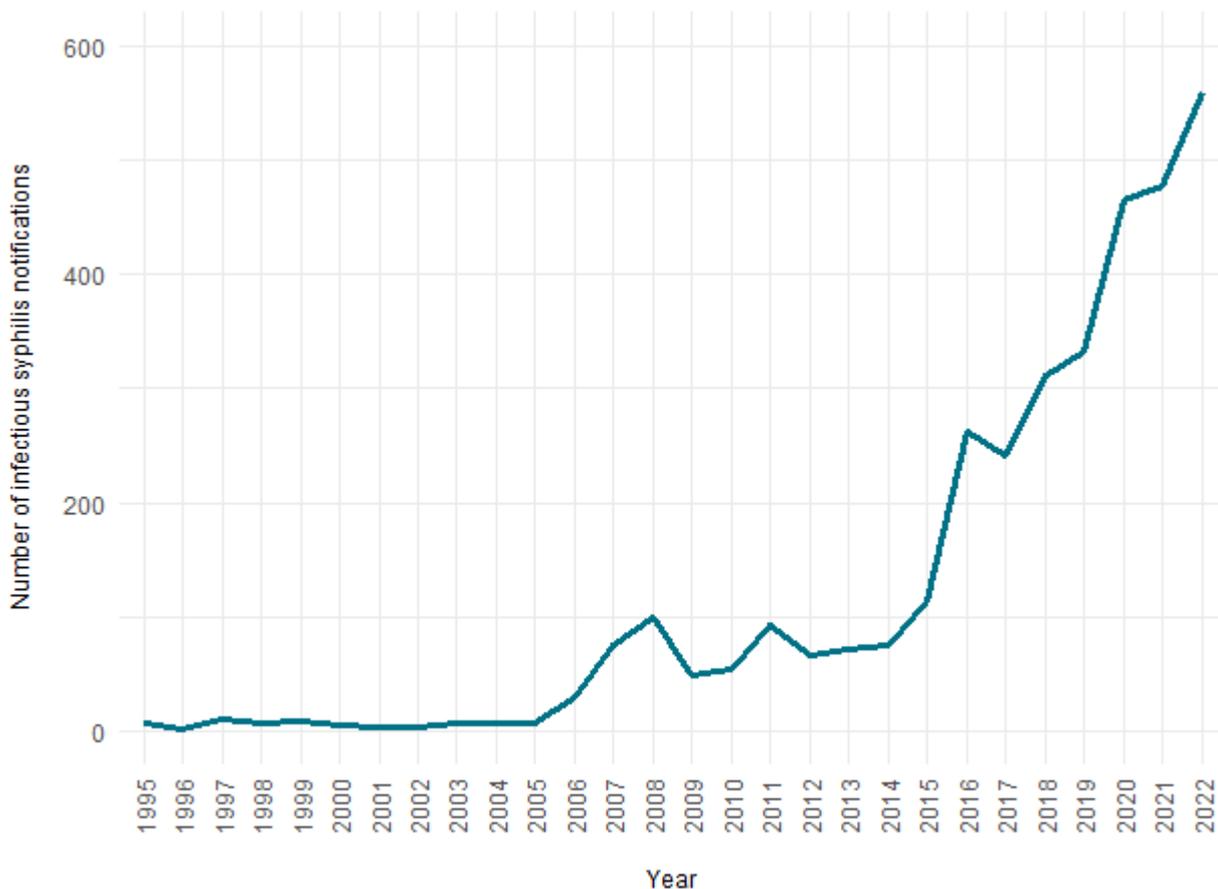
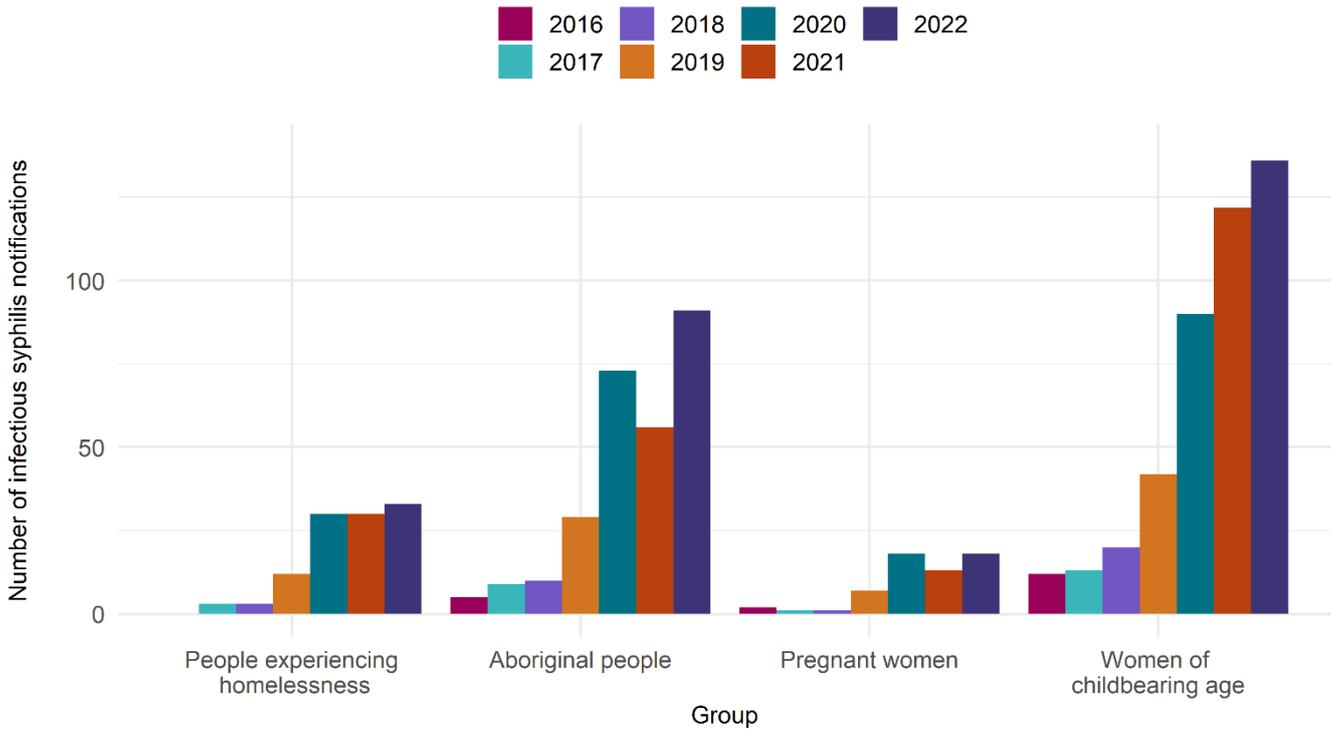


Figure 4: Number of notifications of infectious syphilis over time in metropolitan Perth.

## Syphilis continues to affect priority groups

In the ten years prior to 2016, syphilis in metropolitan Perth predominantly occurred among men who have sex with men (MSM). During the current outbreak, infectious syphilis has increasingly occurred among priority groups, including people experiencing homelessness, Aboriginal people, pregnant women, and women of child-bearing age (Figure 5).



**Figure 5: Number of infectious syphilis notifications among pregnant women, people experiencing homelessness, Aboriginal people, and women of childbearing age from 2016 to 2022 (categories are not mutually exclusive) in metropolitan Perth.**

There were 33 infectious syphilis notifications among people experiencing homelessness (6.0% of notifications), compared to 30 notifications in 2021 (6.3%). There are additional complexities that impact the management of infectious syphilis cases and their contacts in people experiencing homelessness. Difficulties can arise due to the lack of a regular doctor, challenges in contacting and locating cases, and complex social and medical histories, including co-morbid mental health concerns, substance use, or exposure to domestic violence.



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## Syphilis during pregnancy

Women of childbearing age and women who are known or suspected to be pregnant are priority groups for syphilis management and follow up, due to the risk of congenital syphilis. Congenital syphilis is a serious condition that can result in miscarriage, stillbirth and severe medical problems in the newborn, potentially causing a range of lifelong disabilities including organ, brain, and nerve damage, and bony and dental abnormalities. The risk of vertical transmission is particularly high in untreated primary and secondary syphilis (70% risk). Risk persists at lower levels during untreated early latent (40%) and late latent (10%) syphilis, and tertiary syphilis.<sup>12</sup>

Syphilis is part of routine screening recommended for all pregnant women at the first antenatal booking visit and, since May 2021, at 28 and 36 weeks (or at time of birth if delivery is before 36 weeks). Further screening is recommended at birth and six weeks post-partum in regional outbreak areas where syphilis notification rates per population are higher. The King Edward Memorial Hospital *Syphilis in pregnancy* guidelines are available [online](#).

In 2022, the number of infectious syphilis notifications among women of childbearing age increased to 136 (24.6% of notifications), compared to 122 notifications in 2021 (25.5%). Women of childbearing age with suspected or confirmed syphilis should be considered for pregnancy testing, to enable early identification and protect the health of both mother and child.

Syphilis cases among pregnant women continue to be a critical issue in metropolitan Perth, with 18 women diagnosed with infectious syphilis whilst pregnant in 2022 (an increase from 13 women in 2021). MCDC has a role in active monitoring of pregnant women diagnosed with infectious and newly-diagnosed non-infectious syphilis for the length of the pregnancy; confirming effective treatment of pregnant cases and their partners to prevent reinfection; supporting antenatal clinic referrals and attendance; ensuring regular rapid plasma reagin (RPR) monitoring and follow up of results; producing neonatal management plans to guide the investigation and management of the mother and neonate at birth, and documentation of neonatal outcomes after delivery.

## A case of congenital syphilis

There was one case of congenital syphilis in metropolitan Perth in 2022. This case occurred in challenging circumstances, where antenatal care had been scarce and maternal syphilis was undiagnosed and untreated until after birth. MCDC undertakes a review for every case of congenital syphilis, involving key stakeholders, to understand and address barriers to care. This case highlighted the importance of ensuring antenatal care including opportunistic syphilis screening for pregnant women.

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<sup>12</sup> Government of Western Australia, Women and Newborn Health Service. Syphilis in pregnancy [accessed 11 October 2022] <https://www.kemh.health.wa.gov.au/~/-/media/HSPs/NMHS/Hospitals/WNHS/Documents/Clinical-guidelines/Obs-Gyn-Guidelines/Syphilis-in-Pregnancy.pdf?thn=0>

## Chlamydia and gonorrhoea notifications plateauing and testing decreasing

There were 8632 notifications for [chlamydia](#) in 2022, reflecting a plateau in case numbers since around 2011 (**Figure 5**). There were 2161 notifications for [gonorrhoea](#) in 2022, which was a 15.5% increase compared to 2021, but remains 25% lower than the notification peak recorded in 2019. The increase in gonorrhoea notifications was observed despite a decrease in gonorrhoea testing in metropolitan Perth, from 163 317 tests in 2021, to 134 184 in 2022. The number of tests for chlamydia similarly decreased, with 136 367 tests in 2022 compared to 167 305 in 2021.

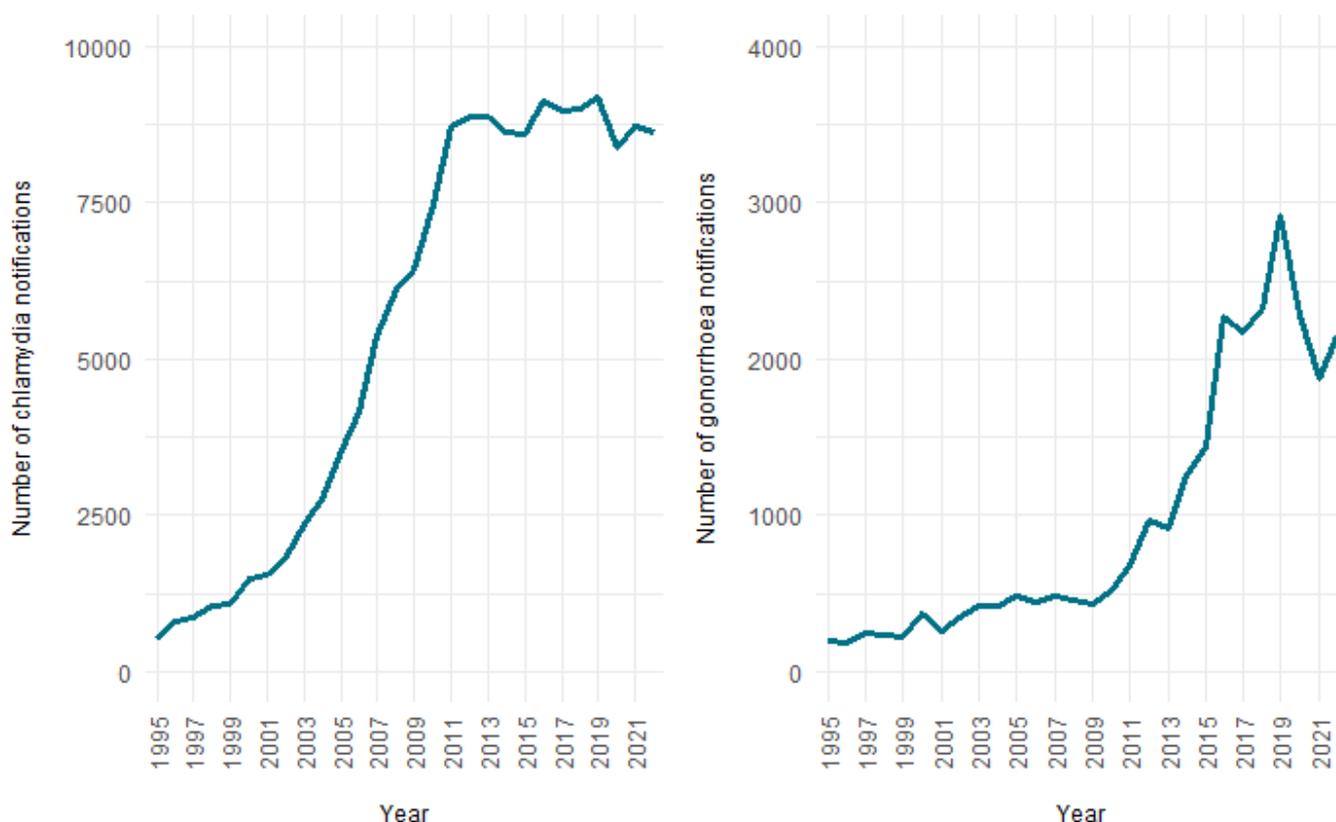


Figure 5: Number of chlamydia (left) and gonorrhoea (right) notifications over time in metropolitan Perth.

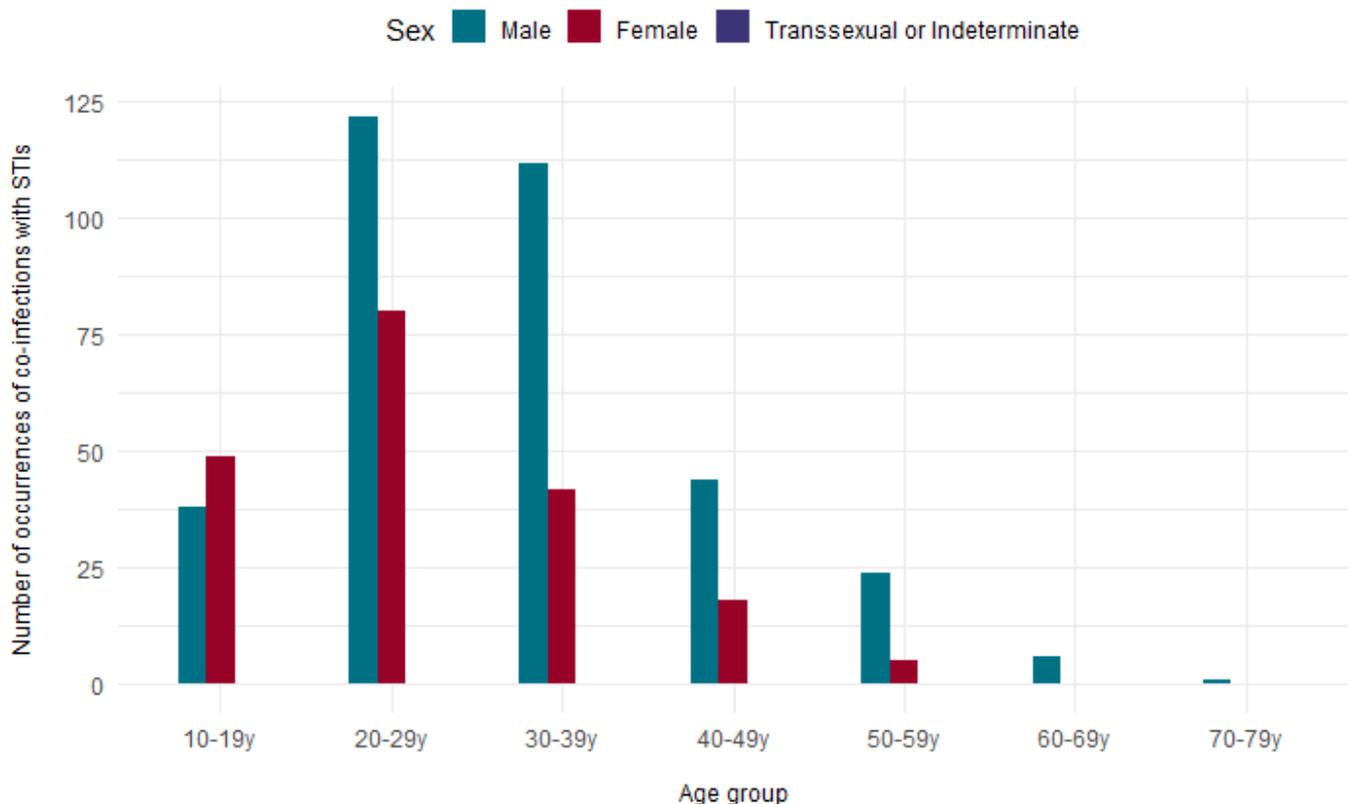
## Co-infections with sexually transmitted infections

Coinfections with **sexually transmitted infections (STIs)** are common, as people engaging in high risk sexual behaviours are at risk of contracting any infection that is sexually transmitted and even when treated are at risk of re-infection. In 2022, there were 541 people notified to MCDC for two or more notifiable STIs (excluding HIV which is not notified to MCDC) detected on specimens collected within three days of each other, accounting for 1115 notifications in total. This was a 4.4% increase from the 518 people notified for STI co-infections in 2021.

Of the total occurrences of STI co-infections, 86.7% were for chlamydia and gonorrhoea, 7.6% were for chlamydia and syphilis, 3% were for gonorrhoea and syphilis, and 1.6% were for

chlamydia, gonorrhoea and syphilis. Most coinfections were among young people, with 37.3% among people aged 20 to 29 years (**Figure 6**). Most (65.8%) occurrences of coinfections were among males and 13.0% were among Aboriginal people.

In the context of growing antimicrobial resistance and growing re-infection risk, conducting a test of cure is recommended for people with chlamydia and/or gonorrhoea. When one STI is diagnosed, testing for other STIs including syphilis serology should be undertaken (if not already arranged) as co-infections are common and are increasingly notified in metropolitan Perth.



**Figure 6: Number of occurrences of co-infections with STIs in metropolitan Perth in 2022 grouped by age group and sex.**

The WA [Silver Book](#) provides recommendations on STI screening among different priority groups, providing guidance on STI screening for people who are asymptomatic and STI testing among people with genital symptoms.

Sexual health specialist services (responsible for 15.2% of notifications) have played an integral role both in the specialised management of people with STIs and in providing expert clinical guidance for many of the STI cases notified to MCDC.



# Blood-borne viruses patterns changing

## Hepatitis C rates trending down

There were 593 notifications for hepatitis C virus in metropolitan Perth in 2022, a 33.7% decrease from 2016 (Figure 7) which is the year that new hepatitis C treatments became widely available in Australia. In comparison to 2021, the hepatitis C testing rate decreased by 7% and the test positivity rate decreased by 11%.<sup>13</sup>

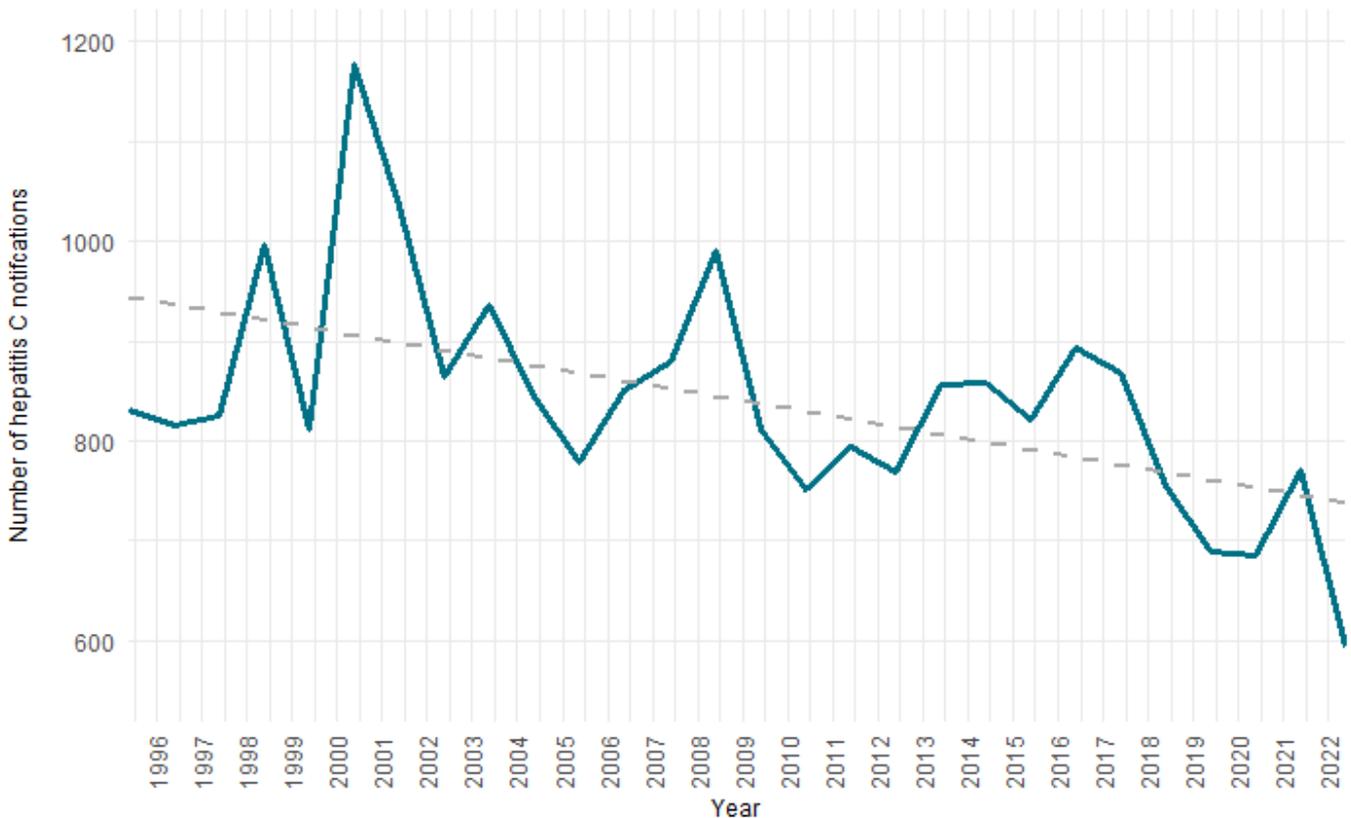


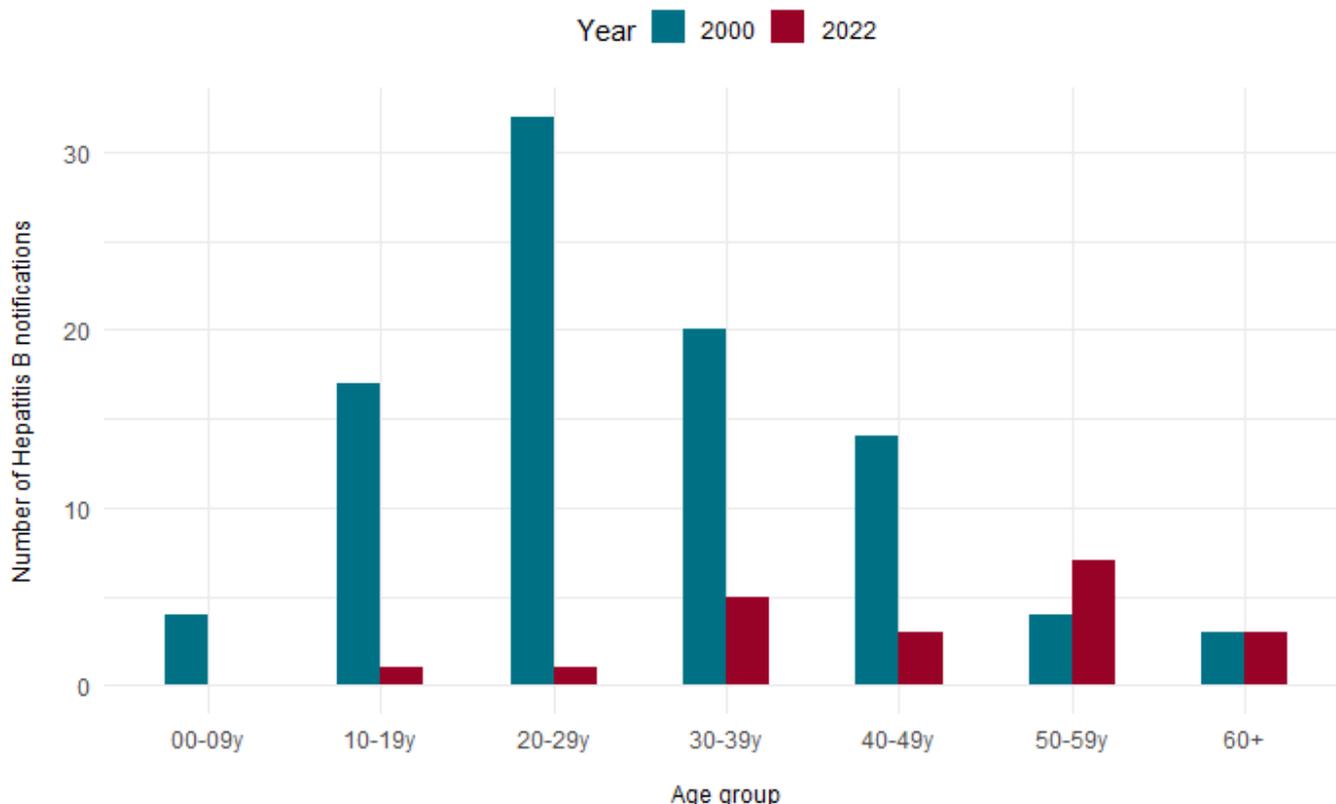
Figure 7: Number of hepatitis C notifications over time, 1995-2022; dashed line represents the trend (y axis commences at n=550) in metropolitan Perth.

Of the total hepatitis C notifications in 2022, 70.1% were men, 29.2% were Aboriginal people and 24.5% were in people tested while in the criminal justice system. There were 50 newly acquired hepatitis C notifications in 2022, a 46.8% decrease from 2016. Among those newly infected, 80.8% were men and 44.2% were Aboriginal people. The median age at diagnosis for the newly acquired hepatitis C notifications was 27 years of age. Of the newly acquired hepatitis C notifications, 51.9% were for people within the criminal justice system at the time of notification, similar to the proportion in 2021. The WA Department of Justice has a hepatitis C testing and treatment program which may contribute to the high levels of case ascertainment in that setting.

<sup>13</sup> Government of Western Australia, Department of Health. Notifiable Sexually Transmissible Infections and Blood-borne Viruses in Western Australia [accessed 02 June 2023].

## Hepatitis B notifications declining

There were 356 notifications for [hepatitis B](#) in metropolitan Perth in 2022, a 37.6% decrease from the year 2000 when hepatitis B vaccination was introduced to the **National Immunisation Program (NIP)** infant schedule in Australia. Likely due to the success of the vaccination program, the number of notifications among people born in Australia has decreased substantially, from 94 in 2000, to 20 in 2022 (a 79.8% decrease, **Figure 8**).



**Figure 8: Number of notifications of hepatitis B among people born in Australia by age group in 2000 (blue) and 2022 (red) in metropolitan Perth.**

Of the total notifications in 2022, five (1.4%) were newly acquired hepatitis B infections. The majority of newly acquired infections were unvaccinated. Of the total notifications in 2022, five were for Aboriginal people (1.4% of notifications) compared to the 14 in 2000 (2.4% of notifications). In 2022, there were 3 notifications (0.8% of notifications) among people within the criminal justice system at the time of notification, compared to 23 notifications in 2000 (4% of notifications).

There is a safe and effective vaccination available for hepatitis B, given at birth, then at 2, 4 and 6 months of age. The NIP funds catch-up immunisation for people up until the age of 19, and additionally for refugees and humanitarian entrants. Specific groups at increased risk of exposure are also recommended to receive the hepatitis B vaccine, such as household contacts of people with hepatitis B, Aboriginal people and people within the criminal justice system.

# Influenza resurgence after border opening

MCDC recorded 10 548 notifications in 2022 with the removal of the border restrictions and reduction in public health and social measures to limit respiratory infections. This was the second highest number of notifications in the last 10 years, with the highest number of notifications recorded in 2019 with 18 468. Influenza notifications in 2022 were 36.9% higher than the 5-year average pre-COVID-19. The increase was concentrated in influenza type A with this type comprising 99.2% of genotyped cases in 2022 (of which 88.1% were H3N2 and 11.9% were H1N1), compared to an annual average of 70.8% of genotyped cases between 2015 and 2019. Influenza notifications peaked in July with 2476 notifications (23.5%) that month (Figure 9).

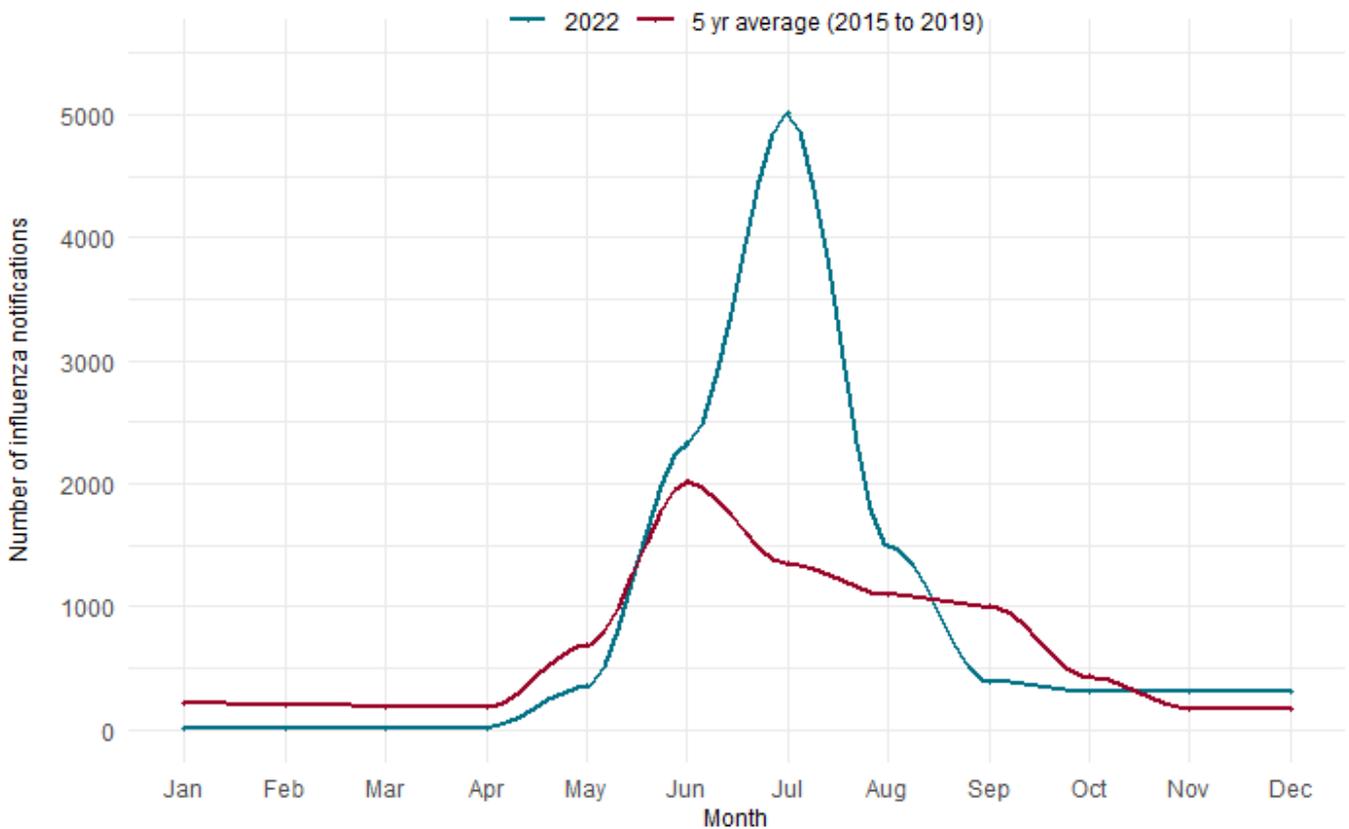


Figure 9: Number of influenza notifications in metropolitan Perth by month for 2022 and 5 year average (2015 to 2019).

Of notified influenza cases in 2022, 10.5% were hospitalised in 2022, which was lower than the 19.2% of notifications hospitalised annually on average between 2015 and 2019, likely because of the higher rates of testing and case ascertainment (Figure 10). Higher rates of vaccination also likely contributed to the better health outcomes, with the WA Health Department offering free influenza vaccination to all Western Australians over the age of six months for the first time in 2022 to reduce the impact of influenza when opening of the borders. Across most age groups, unvaccinated cases experienced higher hospitalisation rates than vaccinated cases in 2022 (Figure 11).



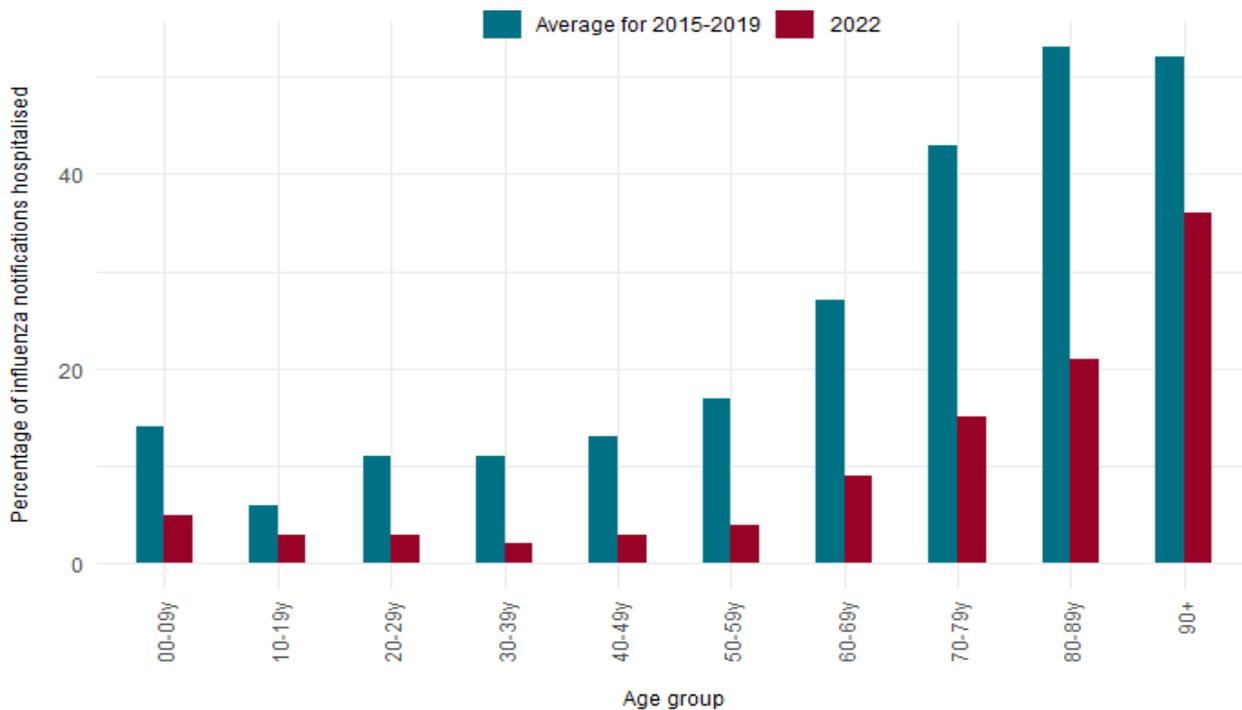


Figure 10: Proportion of influenza notifications that were hospitalised in 2022 and the average proportion hospitalised from 2015-2019, by age group

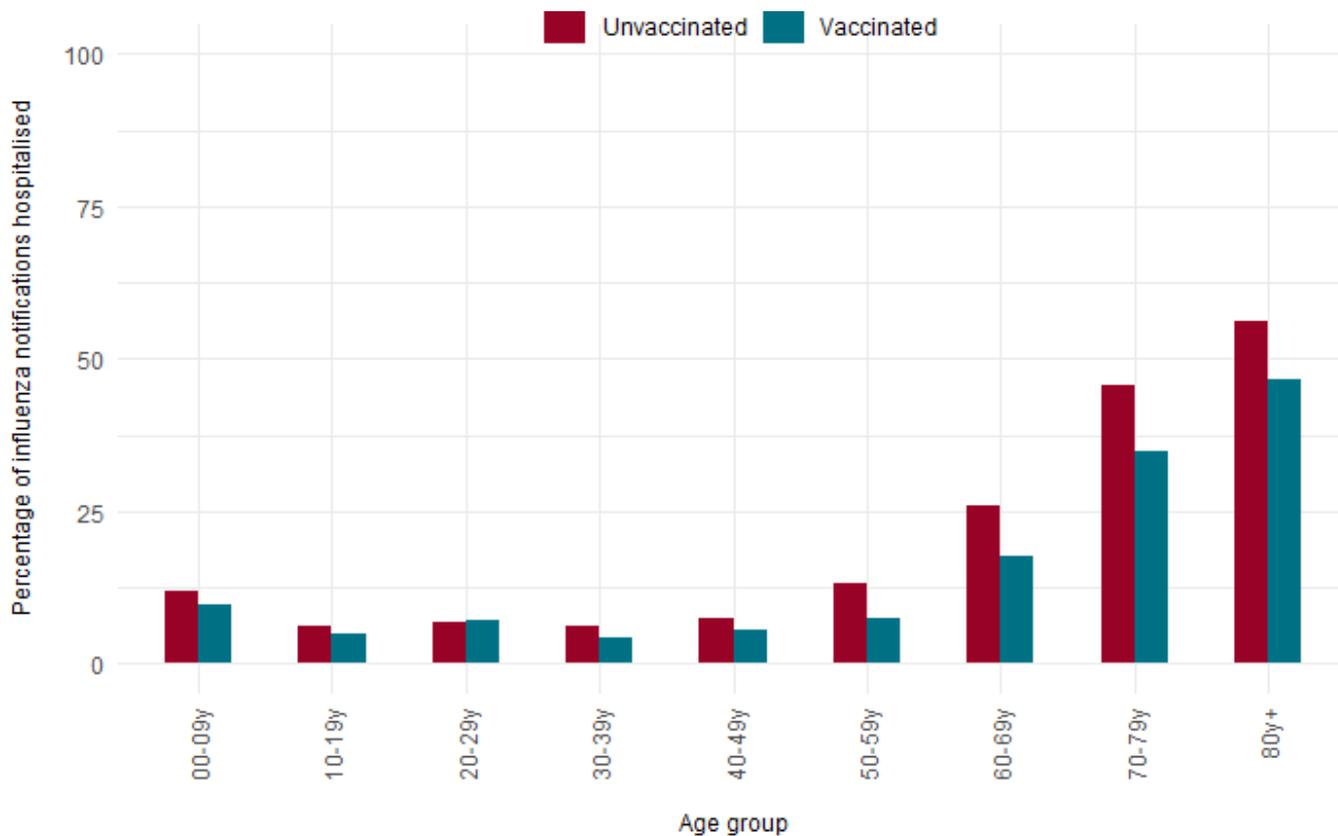


Figure 11: Percentage of influenza notifications that were hospitalised in 2022 stratified by immunisation status.

## Institutional outbreaks of acute respiratory infection

MCDC receives notifications from residential care facilities (RCFs) for potential outbreaks of respiratory pathogens. RCFs in metropolitan Perth were encouraged to notify MCDC if one resident or staff member became symptomatic with acute respiratory symptoms to ensure appropriate surveillance and testing, as part of the COVID-19 response.

There were 790 notifications from RCFs for potential acute respiratory outbreaks in 2022, an increase from the 170 potential outbreaks in RCFs in 2021. COVID-19 was detected in 756 outbreaks, rhinovirus in 13, influenza in 5, RSV in 4 and no pathogen detected in 12. The number of influenza outbreaks in RCFs was significantly lower than pre-COVID-19 years despite the high number of total notifications in the community overall, with 85 RCF outbreaks recorded in 2019, 13 in 2018, and 24 in 2017 (**Figure 12**). The discrepancy was likely due to a combination of public health measures used to mitigate transmission in RCFs, including strengthening of facility infection control planning, increased use of PPE, and physical distancing and visitor restrictions, as well as increased influenza testing in the community.

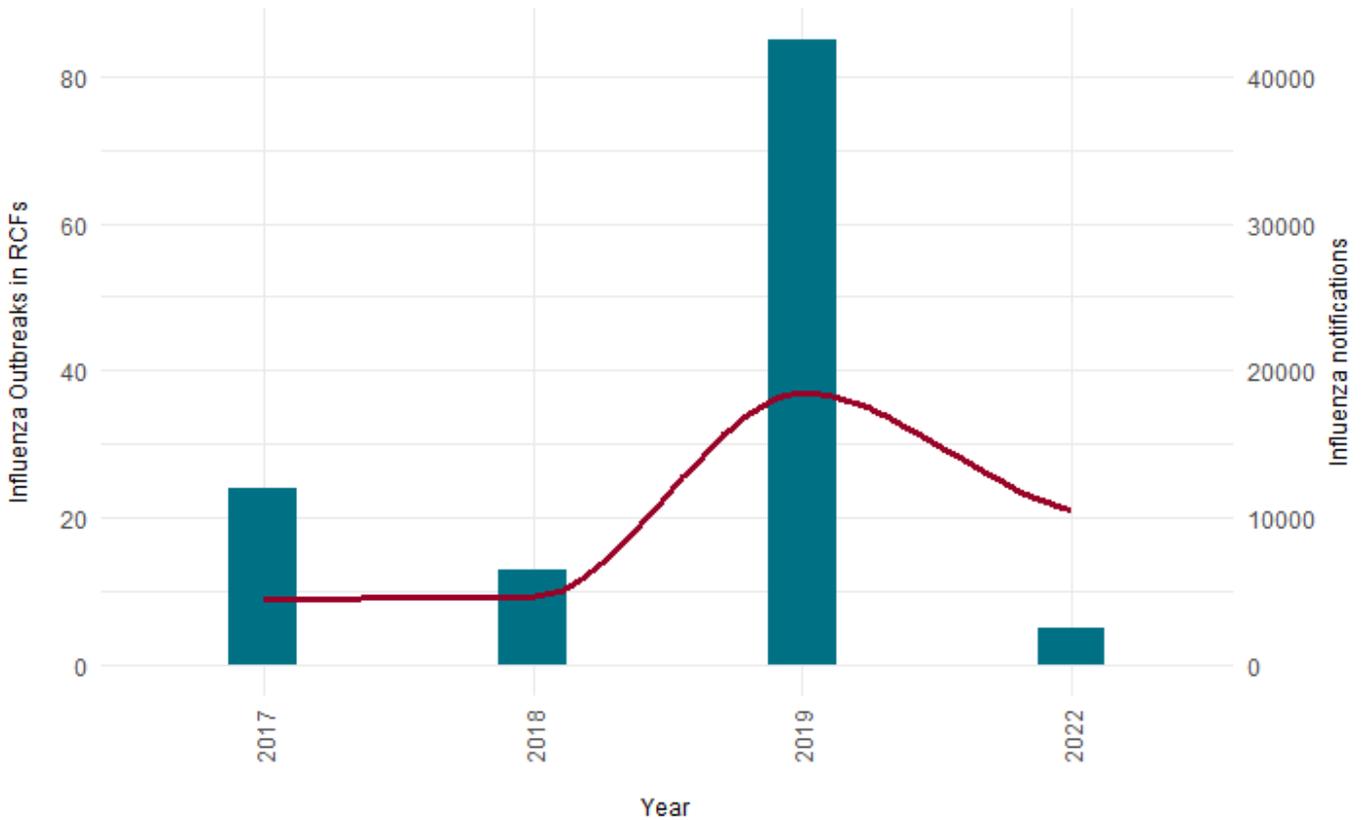


Figure 12: Number of influenza outbreaks in 2017-2019 and 2022 (blue), and the number of influenza notifications in the respective years (red).



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## Vaccine-preventable diseases

### No measles notifications

Measles is a highly infectious viral illness with potentially severe complications. Worldwide, 123 981 cases of measles were reported in 2021, a 22.1% reduction from 159 073 reported measles cases in 2020.<sup>14</sup> Preliminary reports suggest that cases have increased globally in 2022. Endemic transmission of measles has been eliminated in Australia because of high immunisation coverage and strong public health responses, with measles cases being either imported from overseas or among contacts of imported cases.

For the **second** year in a row, and only the second time since 2003, there were no notifications for measles in metropolitan Perth in 2022. This was likely influenced by reductions in overseas travel due to the COVID-19 pandemic.<sup>15</sup> However, globally measles vaccination coverage has fallen over recent years due to disruption of routine immunisation services by the COVID-19 pandemic,<sup>16</sup> putting travellers at increased risk of measles and WA at ongoing risk of imported cases.

In 2019, the WA DOH introduced free measles, mumps, rubella (MMR) vaccine for adults born after 1965 who have not already received two documented doses of a measles-containing vaccine. Adults born after 1965 are less likely to have had a measles vaccine or may have had only one dose due to changing immunisation schedules over the years. Measles vaccine is now given at 12 and 18 months of age as part of the National Immunisation Program (NIP) schedule.

### Invasive meningococcal disease similar to pre-COVID years

In 2022, there were 14 notifications for invasive meningococcal disease in metropolitan Perth, an increase compared to the five notifications in 2021 and similar to the twelve notifications prior to border restrictions and heightened public health measures in 2019. The age of the notifications ranged from 0 to 92 years, with Aboriginal people over-represented among cases.

Serogroups W135 and (to a lesser extent) Y meningococci emerged as significant causes of invasive meningococcal disease in WA from 2015, peaking in 2017 when these two strains comprised 71% of all meningococcal cases in metropolitan Perth (**Figure 13**). Consequently, the WA DOH introduced a State-funded meningococcal ACWY immunisation program for the two highest risk age groups: 15 to 19-year-olds starting from April 2017 and 1 to 4-year-olds starting from July 2018. The vaccine was then added to the NIP at 12 months of age in July 2018, replacing the serogroup C meningococcal vaccine which had been on the NIP since 2003. In April 2019, meningococcal ACWY was added to the NIP for adolescents 14 to 19 years of age. The number of meningococcal notifications due to serogroups W135 and Y has since declined. Collectively serogroup W135 and Y were responsible for five of the meningococcal notifications in 2022, all of whom were not vaccinated.

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<sup>14</sup> World Health Organisation. Measles reported cases and incidence [accessed 7 October 2022]

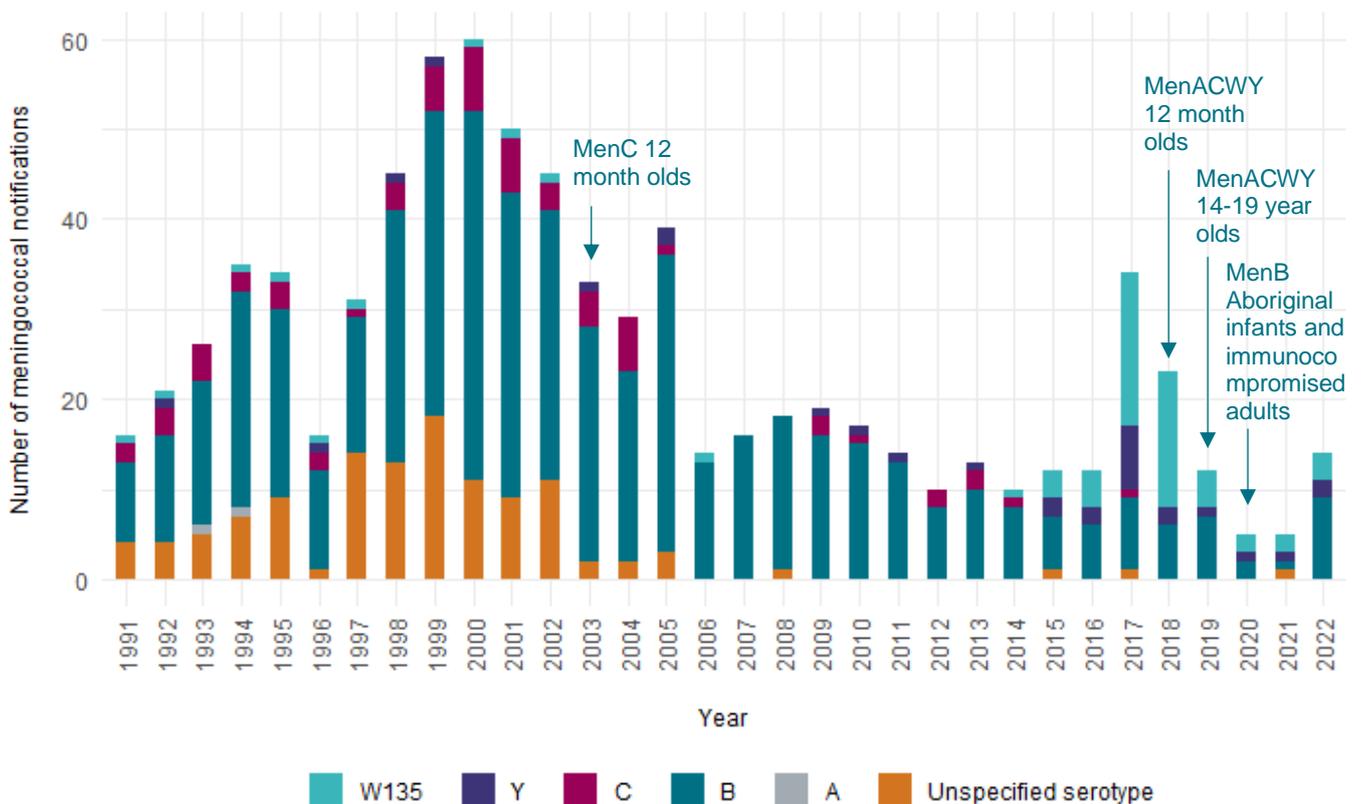
<https://immunizationdata.who.int/pages/incidence/MEASLES.html?CODE=Global&YEAR=>

<sup>15</sup> World Health Organisation. Measles reported cases and incidence [accessed 7 October 2022]

<https://immunizationdata.who.int/pages/incidence/MEASLES.html?CODE=Global&YEAR=>

<sup>16</sup> Venkatesan, P. (2022). Worrying global decline in measles immunisation. *The Lancet Microbe*, 3(1), e9.





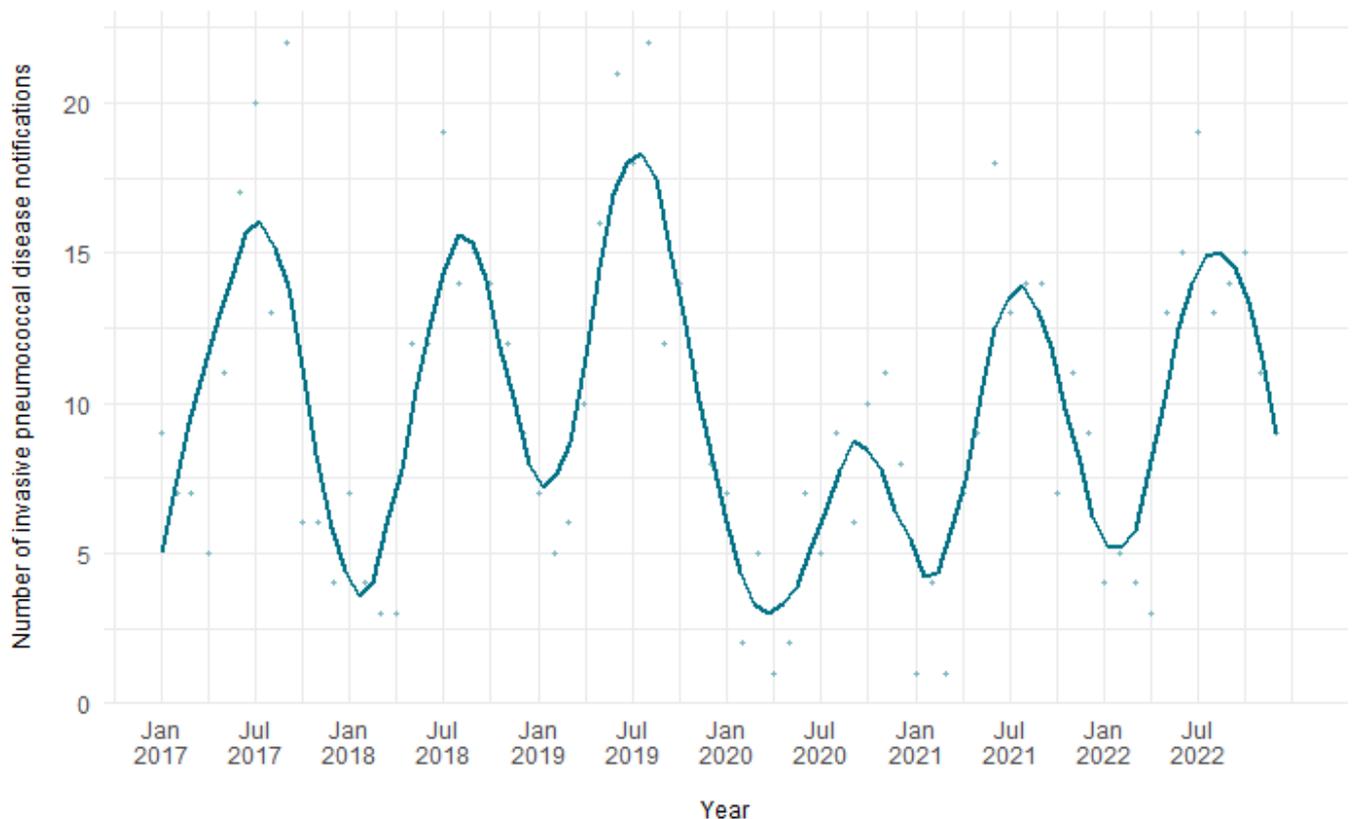
**Figure 13: Number of invasive meningococcal disease notifications since surveillance commenced (1991 – 2022), by serotype.**

After peaking in 2000, the incidence of serogroup B meningococcal disease has gradually decreased. Nonetheless serogroup B was the most commonly notified serogroup in 2022, accounting for 9 notifications. Vaccines specifically for serogroup B have been available on private prescription in Australia since 2014.<sup>17</sup> Meningococcal B vaccine was added to the NIP in July 2020 for all Aboriginal and Torres Strait Islander children aged less than 12 months (with further funded catch-up vaccinations available for those under 2 years) and for all Australians with specific immunocompromising medical conditions. Serogroup C has remained virtually eliminated since 2015 with the exception of the last case notified in 2017.

<sup>17</sup> National Centre for Immunisation Research and Surveillance. Significant events in meningococcal vaccination practice in Australia, <https://ncirs.org.au/sites/default/files/2023-04/Meningococcal-history-April%202023.pdf>

## Invasive pneumococcal disease notifications remain steady

Invasive [pneumococcal](#) disease describes a spectrum of clinical conditions including bacterial pneumonia, meningitis and sepsis that are caused by the different serotypes of *Streptococcus pneumoniae*, some of which are vaccine preventable. There were 125 notifications for invasive pneumococcal disease in 2022 for metropolitan Perth, a 15.7% increase from 108 in 2021, continuing the return to more typical numbers after an uncharacteristically low number of notifications and late seasonal peak observed in 2020. Among the 2022 notifications, 15.2% of notifications were among Aboriginal people. The age of cases ranged from 0 to 98 years, with 26.4% of notifications for children under 5 years.



**Figure 14: Number of invasive pneumococcal disease notifications in metropolitan Perth over the past six years. The points represent the number of notifications by month. The smoothed curve represents the overall trend.**

Over time, the distribution of serotypes responsible for invasive pneumococcal disease notifications in metropolitan Perth has changed (**Figure 15**). The conjugate vaccine PCV7, which targets seven serotypes, was introduced to the NIP firstly for Aboriginal infants and children with medical risk conditions in 2003, and later for all infants in 2005 (with a catch-up program for children up to 2 years of age). Subsequently the number of invasive pneumococcal disease notifications due to the PCV7 serotypes declined, though this was accompanied by the emergence of new invasive serotypes (known as the 'serotype replacement' phenomenon). The PCV13 vaccine, which superseded PCV7 in July 2011, covered an additional six serotypes, leading to a reduction in notifications caused by these serotypes.

Adjustments were made to the timing of the PCV13 vaccines on the infant vaccination schedule in 2018, with a shift from three primary infant doses to two primary infant doses plus a booster at 12 months of age.<sup>18</sup> Aboriginal children in WA continued to receive three primary infant doses followed by a booster at 12 months of age. These adjustments to the PCV13 vaccine timing were intended to provide improved coverage against these serotypes and may have contributed to the reduced numbers of notifications resulting from them. In 2020, a dose of 13vPCV was funded for Aboriginal adults at 50 years of age.

The PPV23 is a vaccine containing pneumococcal capsular polysaccharides for 23 serotypes. PPV23 is poorly immunogenic in infants and not part of the routine childhood immunisation schedule. Since 1999, PPV23 has been funded in Australia for Aboriginal adults aged over 50 and individuals medically at risk who are aged over 15 years. In 2020, 23vPPV dose was recommended 12 months after the new 13vPCV dose with a booster 5-10 years later for children aged >12 months with any risk condition.<sup>19</sup> Moreover, in 2020, a dose of 23vPPV was funded under the NIP for Aboriginal children in WA at 4 years of age with a second dose 5-10 years later.

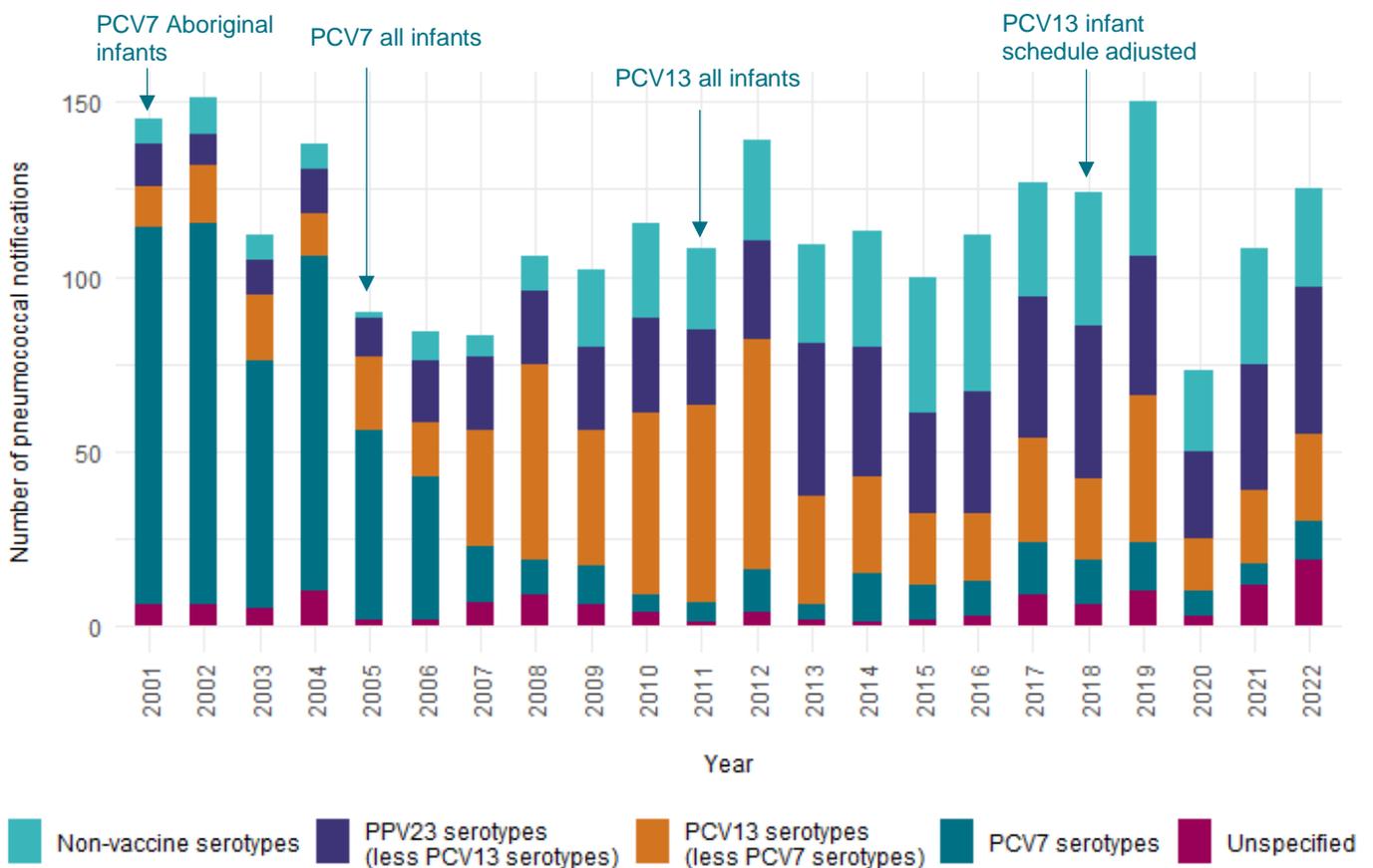


Figure 15: Number of invasive pneumococcal disease notifications since becoming notifiable in 2001, by serotype.

<sup>18</sup> National Centre for Immunisation Research and Surveillance. Pneumococcal vaccines for Australians. [https://www.ncirs.org.au/sites/default/files/2020-07/Pneumococcal-fact-sheet\\_1%20July%202020\\_FINAL.pdf](https://www.ncirs.org.au/sites/default/files/2020-07/Pneumococcal-fact-sheet_1%20July%202020_FINAL.pdf)

<sup>19</sup> National Centre for Immunisation Research and Surveillance. Significant events in pneumococcal vaccination practice in Australia. <https://ncirs.org.au/sites/default/files/2023-04/Pneumococcal-history-April%202023.pdf>

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The most common serotypes causing invasive pneumococcal disease in metropolitan Perth for 2022 were serotype 22F and 3 (24% each, former contained in PPV23, latter contained in PCV13 and PPV23), followed by serotype 8 (8%, contained in PPV23) and 19F (7%, contained in PCV7, PCV13 and PPV23).

Overall, 44% of invasive pneumococcal disease notifications were unvaccinated and a further 18.4% were partially vaccinated. Of the unvaccinated invasive pneumococcal disease notifications, 12.7% were for PCV 7 serotypes, 25.5% were for PCV13 serotypes (less PCV7), 34.5% were for PPV23 serotypes (less PCV13) and 27.3% were for non-vaccine serotypes.

### **Pertussis continuing to trend downwards**

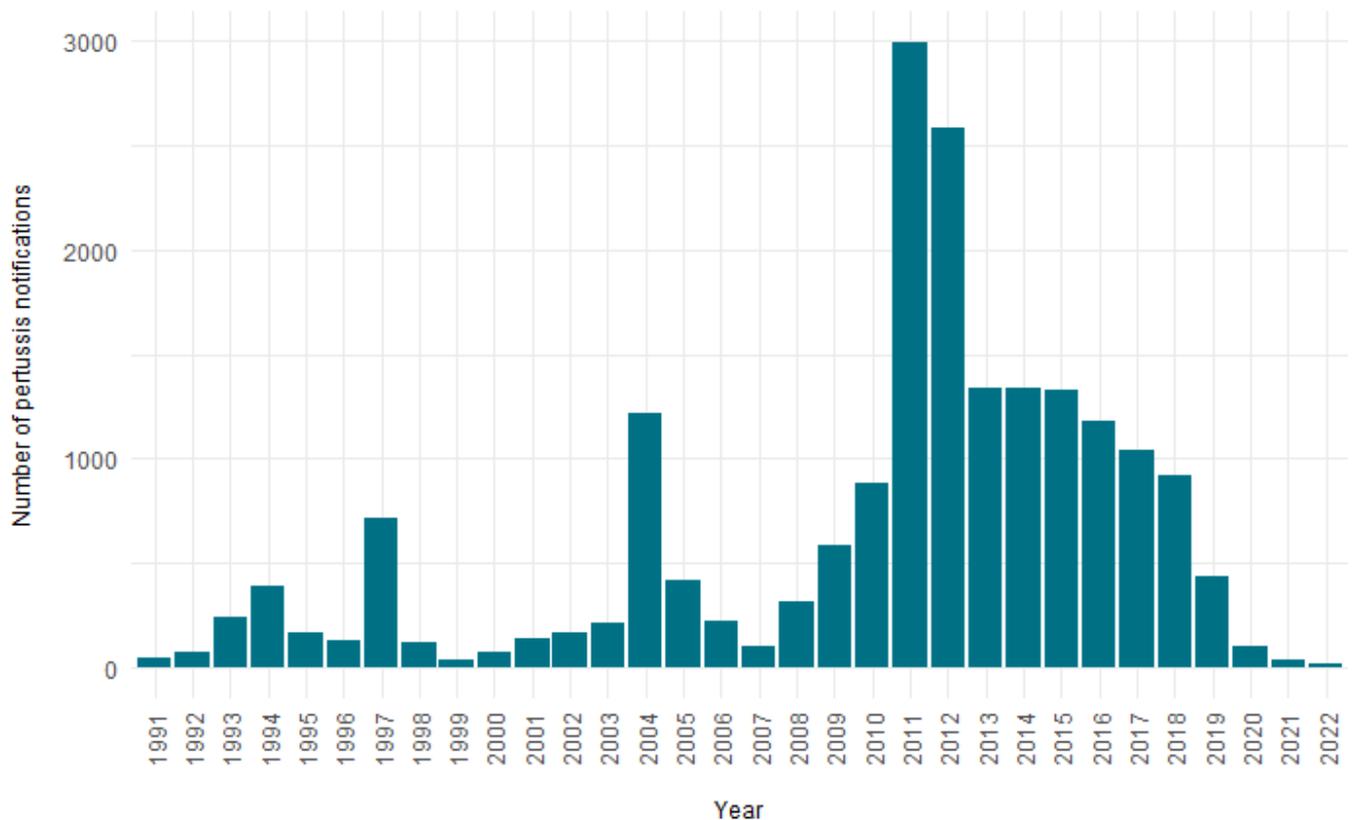
In 2022, there were 21 notifications for [pertussis](#) in metropolitan Perth, a 47.5% decrease from 40 notifications in 2021. The number of pertussis notifications peaked in February and March (three and four notifications for each month respectively), remaining otherwise low for the rest of 2022.

Pertussis is endemic in metropolitan Perth, and numbers of notifications have previously demonstrated cyclical peaks (**Figure 16**). This periodicity has been altered in the past decade, with the most recent peak observed in 2011-2012. Changes to reporting are partly responsible, with mucosal IgA not contributing to the case definition prior to 2014 and after 2018; however, numbers of cases diagnosed using other means have also decreased. Changes to the immunisation program have included re-introduction of booster doses at 18 months of age in 2016 (having previously been removed in 2003), recommendation for vaccination in pregnancy (since 2013), funding under the NIP for pertussis vaccination in pregnancy in 2018 (following State funding since 2015), and a broadened window for vaccination during pregnancy in 2019.<sup>20</sup> These changes have also likely contributed to the low number of pertussis notifications in 2022. It was hypothesized that COVID-19 restrictions contributed to lower notifications in 2020 and 2021 however notifications did not increase following the easing of restrictions, despite the increases observed for other respiratory notifiable diseases.

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<sup>20</sup> National Centre for Immunisation Research and Surveillance. Significant events in DTP vaccination practice. <https://ncirs.org.au/sites/default/files/2022-11/Diphtheria-tetanus-pertussis-history-November%202022.pdf>





**Figure 16: Number of pertussis notifications in metropolitan Perth by year.**

There were no notifications for pertussis in infants under the age of 6 months in 2022, as was the case in 2021. Infants under the age of 6 months are at higher risk of more severe pertussis disease, as they are yet to receive all three doses of the primary vaccination course and consequently are not yet fully vaccinated. Pertussis immunisation during pregnancy (between 20 to 32 weeks gestation) is important as the placental transfer of maternal antibodies helps to provide early protection to infants.

Across WA, 68.7% of pregnant women were vaccinated for pertussis at some time during their pregnancy in 2022, a reduction compared to 73.4% in 2021.<sup>21</sup> However, there was an increase in the proportion of pregnant women with unknown pertussis immunisation status, from 16.2% in 2021 to 19.9% in 2022, reflecting reduced ascertainment and/or reporting of pertussis immunisation status. Prioritisation of COVID-19 immunisation for pregnant women, and initial recommendations for delays between administration of COVID-19 vaccines and other vaccines (now rescinded), and vaccine fatigue,<sup>22</sup> may have affected immunisation coverage in pregnant women.

<sup>21</sup> Government of Western Australia, Department of Health. Western Australia's Mothers and Babies summary information: Pertussis vaccination [accessed 1 September 2022] [https://ww2.health.wa.gov.au/Reports-and-publications/Western-Australias-Mothers-and-Babies-summary-information/data?report=mns\\_pertv\\_y](https://ww2.health.wa.gov.au/Reports-and-publications/Western-Australias-Mothers-and-Babies-summary-information/data?report=mns_pertv_y)

<sup>22</sup> Su Z, Cheshmehzangi A, McDonnell D, da Veiga CP, Xiang YT. Mind the "Vaccine Fatigue". *Front Immunol.* 2022 Mar 10;13:839433. doi: 10.3389/fimmu.2022.839433. PMID: 35359948; PMCID: PMC8960954.

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## Diphtheria likely acquired from canine companion animals

MCDC received a notification for diphtheria in 2022, the first case of diphtheria since 2017 and only the third since 1990. Toxigenic *Corynebacterium ulcerans*, one of three causal agents of diphtheria, was isolated from a wound sustained by a vaccinated Western Australian resident (vaccinated for diphtheria/tetanus during childhood and had a booster 11 years prior to this incident). The case required a short admission in hospital, and received a diphtheria/tetanus booster and antibiotics. *C. ulcerans* was not isolated from household contacts. However, *C. ulcerans* was isolated from two pet dogs that lived in the house, with genome sequencing showing near identical sequences supporting zoonotic transmission. This case adds to the growing evidence of the zoonotic transmission potential of *C. ulcerans*, and the threat of this emerging bacterium to long-term progress towards diphtheria elimination.

## Enteric diseases and food outbreaks

### Gastroenteritis in childcare, schools and residential care

MCDC receives notifications of gastroenteritis outbreaks from childcare centres, schools, and RCFs in metropolitan Perth. A gastroenteritis outbreak is defined as two or more people experiencing diarrhoea and/or vomiting within a 24-hour period. Advice is provided to facilities on the collection of specimens, hygiene precautions, and isolation requirements.

Across metropolitan Perth, 34 gastroenteritis outbreaks in childcare centres were notified in 2022, a 71.9% decrease from the 121 outbreaks in childcare centres in 2021. MCDC was notified of three outbreaks of gastroenteritis in schools, a decrease from the eight outbreaks in schools in 2021. The significant decrease was likely due the increased vigilance of the education sector to communicable diseases, spurred by COVID-19 and the concordant measures taken to minimise transmission.

A similar decrease was observed in RCFs. In 2022, 47 gastroenteritis outbreaks in RCFs were reported to MCDC, a decrease from the 75 outbreaks in RCFs reported in 2021. Among these, 28 were attributed to norovirus. Other organisms implicated in RCF outbreaks in 2022 included rotavirus, campylobacter and aeromonas. In total, there were 11 hospitalisations across all RCF gastroenteritis outbreaks, and five deaths.

### Return of enteric travel-related notifications

There were 4312 notifications for enteric diseases in metropolitan Perth in 2022, 4.7% less than the 4 524 notifications on average observed in the previous 5 years (2017-2021). With relaxation of border restrictions and resumption of travel, an increase was observed in overseas acquired enteric diseases actively managed by MCDC including typhoid, paratyphoid and hepatitis A. MCDC recorded 22 notifications from this category in 2022, more than 10 times the 2 notifications in 2021 and 33.3% less than the 10 year average between 2009 and 2019 (**Figure 17**). The number of overseas arrivals in 2022 increased to approximately half of pre-COVID-19 levels.



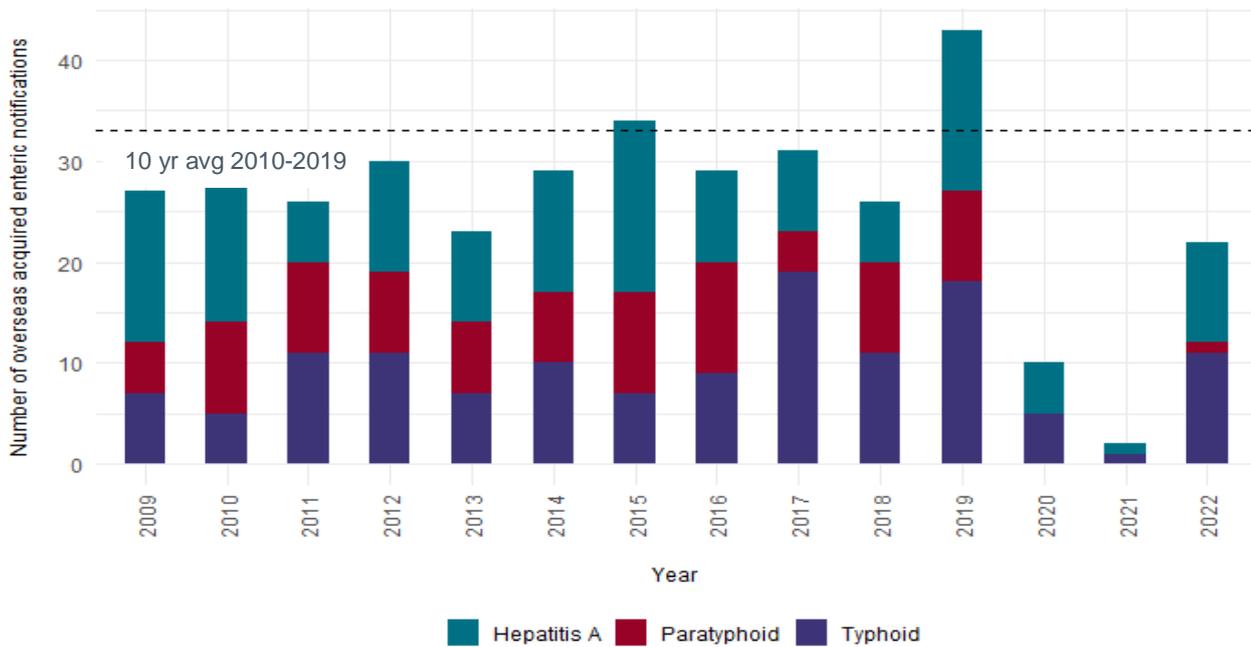


Figure 17: Number of overseas acquired enteric notifications in metropolitan Perth actively managed by MCDC (typhoid, paratyphoid and hepatitis A), by year, with the 10 year average between 2009 and 2019 (dotted line).

[Campylobacteriosis](#) was responsible for a majority of enteric infections (3 121 notifications, 73.4%) in 2022 (Figure 18). Salmonellosis was responsible for five of the 12 notifiable enteric disease outbreaks reported to MCDC in 2022.

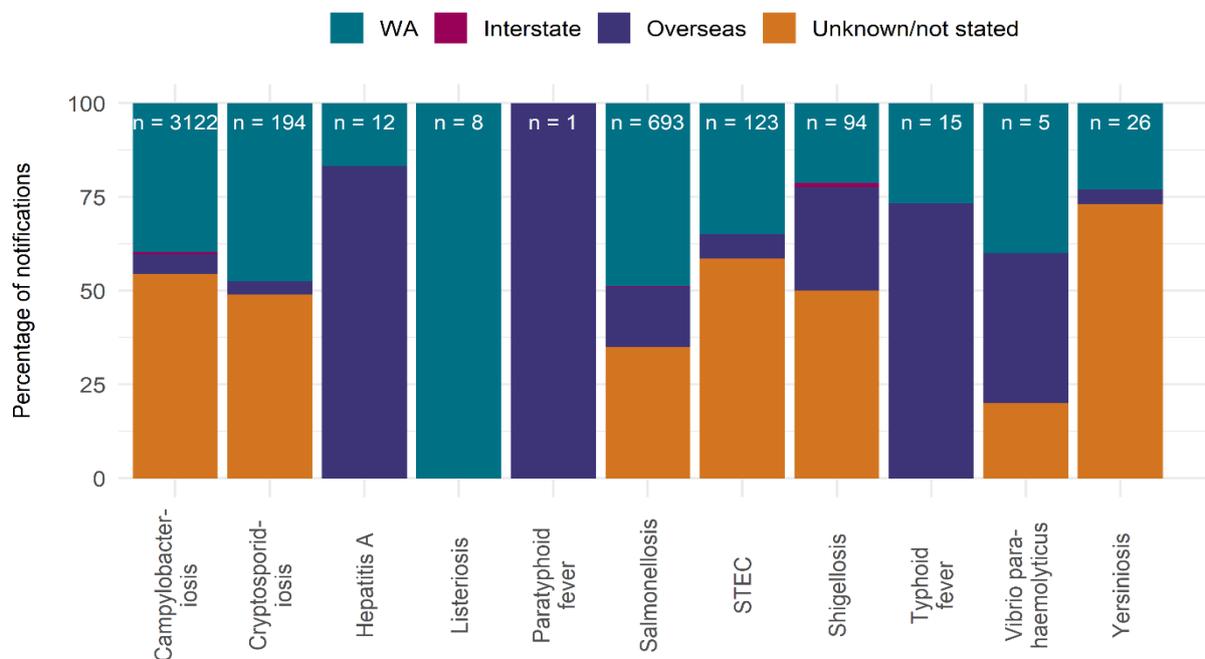


Figure 18: Enteric disease by place of acquisition in 2022; STEC= Shiga-toxin producing Escherichia coli.

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## Three cases of locally acquired typhoid

Most cases of typhoid fever in metropolitan Perth are acquired overseas from endemic countries, and locally acquired cases are rare. MCDC received three notifications of ***Salmonella typhi*** from people with no recent travel history. Two of these cases likely acquired typhoid from long-term asymptomatic carriers of typhoid after *Salmonella typhi* was isolated from their household members, highlighting the importance of testing household contacts if there is no history of international travel or clear source. Genomic sequencing helped track the transmission route of the third case; the sequence closely matched an unrelated overseas acquired case.



# Emerging and newly notifiable diseases

## Introductions of mpox successfully contained

**Mpox** is a zoonotic disease that is endemic to West and Central Africa with regular cases identified in humans since the 1970s. Transmission occurs through contact with infected animals including rodents, mice, rats, monkey and other primates. However, in 2022, sustained human to human transmission was observed, triggering a global outbreak across 110 countries. Transmission occurred primarily through sexual contact, with 98% of global cases identifying as MSM. Common symptoms included a rash, skin lesions, fever, headache and lymphadenopathy.

MCDC actively managed seven cases of mpox within metropolitan Perth in 2022. All cases likely acquired mpox overseas, with the majority having recently travelled to the United States or Europe. Early identification of cases, prompt exclusion and contact tracing combined with a vaccination program that targeted high risk groups prevented any local transmission occurring in WA.

## Invasive Group A streptococcus newly notifiable

In July 2021, iGAS was made a nationally notifiable disease in Australia, and subsequently was made notifiable in WA from August 2021. IGAS can present in various clinical presentations, including severe potentially fatal diseases (sepsis, necrotising fasciitis and streptococcal toxic shock syndrome). There were 141 notifications for iGAS in metropolitan Perth in 2022, of which 60% were male and 7% were Aboriginal. Ages of the cases ranged from 8 months to 94 years, with those under 10 years of age the most affected group (27%).

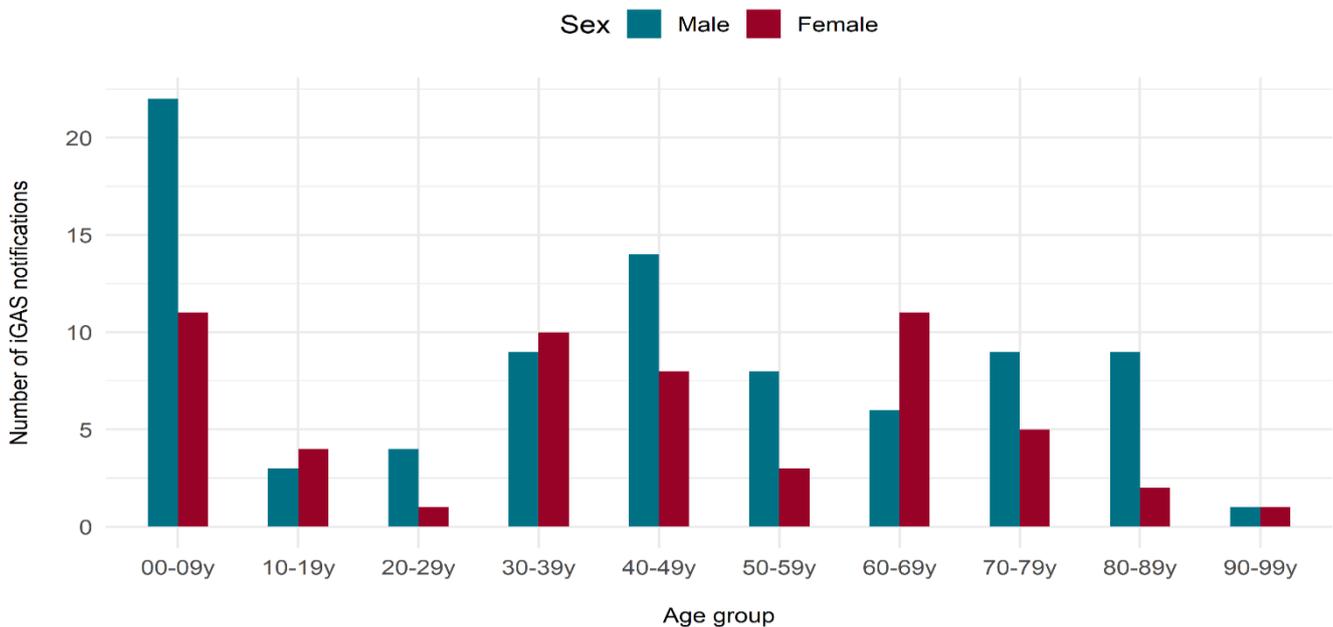


Figure 19: iGAS notifications by sex and age group in 2022.

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# Immunisation

## Annual immunisation data summary

Annual immunisation coverage for children at 12, 24 and 60 months of age was calculated as the number of children classified as ‘fully immunised’ according to the AIR definition (see **Appendix 3**) divided by the number of children enrolled in Medicare (as reported by AIR), annualised based on quarterly AIR coverage reports (see **Figure 20A**). The immunisation coverage among Aboriginal children is also presented across the age groups.

Across Australia, the benchmark for immunisation coverage is considered to be 95% as per the Department of Health Annual Report 2021-22.<sup>23</sup> This differs from the immunisation coverage target of 90% stated in the Western Australian Immunisation Strategy 2016-23.<sup>24</sup> Immunisation coverage in metropolitan Perth exceeded the target of 90% across all age-cohorts in 2022.

There are 33 Local Government Areas (LGAs) in metropolitan Perth. **Appendix 2** shows the immunisation coverage in each of the age cohorts by LGA in 2022. Bayswater, Mosman Park, South Perth, Subiaco, Victoria Park all achieved over 95% coverage in the 12 month-old cohort, and Bassendean, Subiaco, and Victoria Park all achieved over 95% coverage in the 60 month-old cohort.

## Metropolitan immunisation coverage over time

**Figures 20B** present the trends in immunisation coverage for Aboriginal and all children across metropolitan Perth from 2019 to 2022. Overall, immunisation coverage appears to be trending downward since 2021 likely due to the focus on COVID-19 and the reduced awareness about the importance of childhood immunisation. However, despite these trends, there was a 1.2% increase in coverage among Aboriginal children at 12 months of age in 2022. There continues to be a difference in immunisation coverage between Aboriginal and all children at 12 and 24 months of age. MCDC undertook several programs in 2022 which aim to close the gap in coverage between Aboriginal and non-Aboriginal children.

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<sup>23</sup> Australian Government, Department of Health. Department of Health Annual Report 2021-22 [accessed 14 November 2022] <https://www.health.gov.au/sites/default/files/documents/2022/10/departement-of-health-annual-report-2021-22.pdf>

<sup>24</sup> Government of Western Australia, Department of Health. Western Australian Immunisation Strategy 2016–2023 [accessed 5 September 2022] [https://ww2.health.wa.gov.au/~/\\_/media/Files/Corporate/general-documents/Immunisation/PDF/13187-WA-Immunisation-Strategy-2016-2023.pdf](https://ww2.health.wa.gov.au/~/_/media/Files/Corporate/general-documents/Immunisation/PDF/13187-WA-Immunisation-Strategy-2016-2023.pdf)



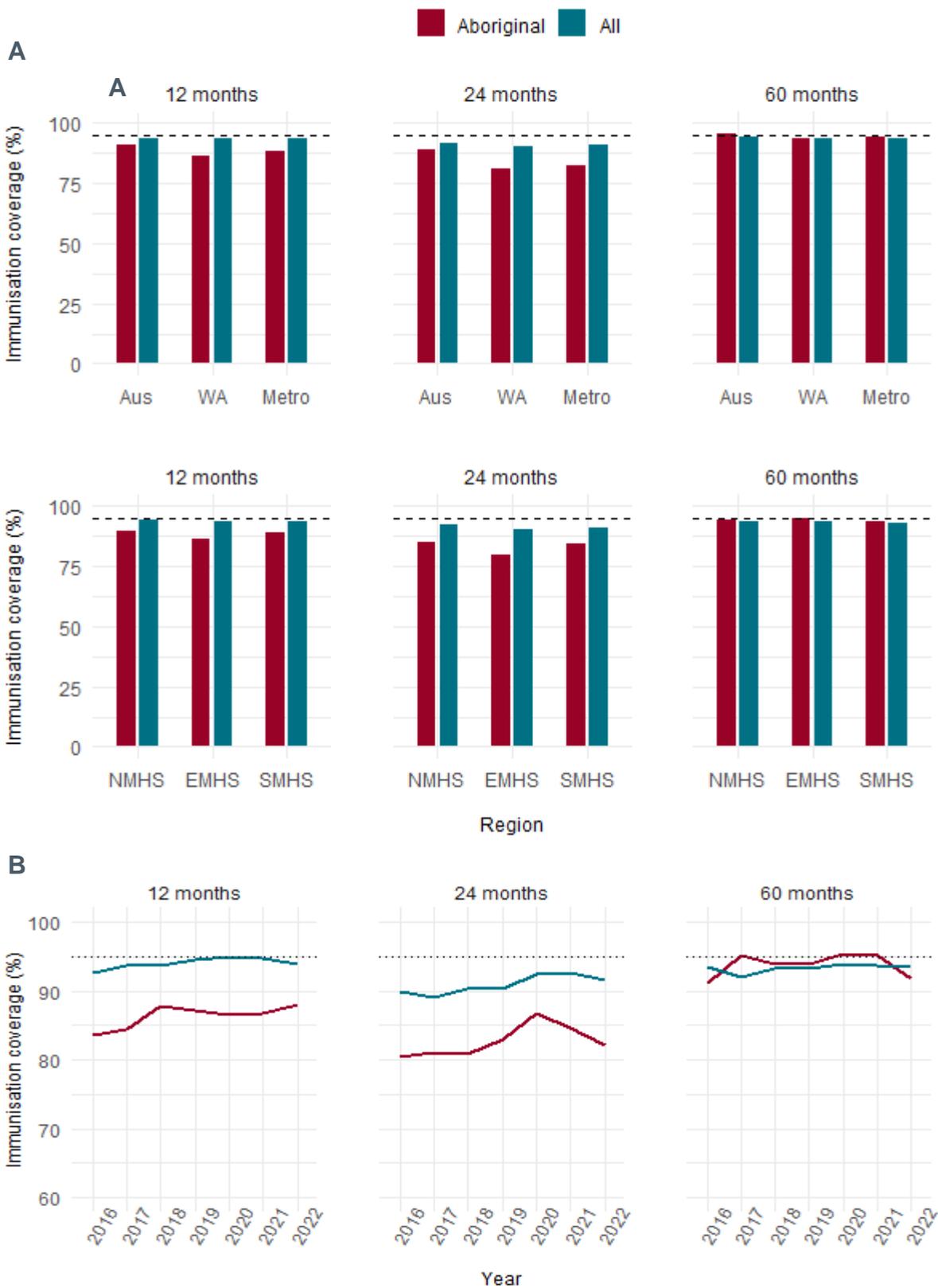


Figure 20 (A): Immunisation coverage by age cohort and region. (B): Perth metropolitan coverage by age cohorts and year. Dotted lines represent 95% benchmark for immunisation coverage in Australia.



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## Immunisation projects for priority groups

The **Moorditj Start** pilot program commenced in November 2021 and provides culturally-safe support to parents of Aboriginal infants to assist families to commence the immunisation schedule on time. Both reminders and practical supports (including transport, booking and home visiting) can be offered. The pilot program was completed in November 2022 and will be expanded to all metropolitan Aboriginal families in 2023. The program is supported by the **Koorlongka packs** project, which provided an immunisation promotional pack to families in the pilot program in 2022.

The **Moorditj Kids** program continues to support Aboriginal families whose children are overdue for immunisation and offers a culturally-safe home visiting service staffed by an Aboriginal Health Liaison Officer and immunisation nurse. In 2022, 1425 families were contacted and 74 received a home visit.

The **Moorditj Teens** pilot program in 2022 aimed to address the gap in coverage of human papillomavirus (HPV) vaccine for Aboriginal adolescents. The program offers reminders, booking, transport and home visiting for 13-year old Aboriginal adolescents in year 8 who have not received HPV vaccine.

MCDC continues to actively follow up overdue children in priority local government areas with low immunisation coverage. Support is also provided for children who are not up to date prior to pre-school or childcare enrolment. MCDC engages with immunisation providers to provide education on developing catch-up plans and culturally safe immunisation practices. Education is also provided to maternity service providers and at community events regarding vaccination in pregnancy.

## Routine provider support for immunisation

### Immunisation catch ups

Families and immunisation providers are supported by MCDC to produce immunisation catch up plans for children who are overdue for vaccination. In 2022, 652 catch up plans were developed for children in metropolitan Perth. MCDC liaises with healthcare providers to ensure that vaccinations administered overseas are recorded in AIR, such as by facilitating access to translation services for records in languages other than English. Providers are then supported to develop catch-up plans, when required, so that children are protected from infectious diseases and families can access Commonwealth support services.

### Cold chain breaches

Most vaccines must be stored within a recommended temperature range of +2°C to +8°C to ensure that potency is maintained. A cold chain breach is defined as vaccine storage temperatures outside the recommended range. Metropolitan immunisation providers are required to notify MCDC of cold chain breaches affecting government-funded vaccines. MCDC provides advice on whether vaccines should be discarded, based on multiple factors, including the nature of the breach, the cumulative breach time and the vaccines involved. MCDC managed 554 cold chain breaches in 2022.

MCDC also provides advice on appropriate cold chain management, to minimise the risk of a cold chain breach. In 2022, MCDC supported metropolitan immunisation providers to conduct



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an electronic self-audit of cold chain management practices. A total of 842 metropolitan providers were invited to participate in the audit and of these, 724 participated. The survey assessed specific criteria required for cold chain management, consistent with the national guidelines. Providers were given automated feedback at the conclusion of the survey. Individualised follow-up, including education, was undertaken by the MCDC Immunisation Team Clinical Nurse Specialist as needed.

### **Rabies and Australian Bat Lyssavirus post-exposure prophylaxis**

MCDC provides advice to doctors and practice nurses regarding post-exposure prophylaxis (PEP) for rabies, and authorises the use of WA DOH-funded supplies according to national guidelines. In metropolitan Perth in 2022, 68 courses of rabies PEP were arranged. The rate of rabies PEP of 3.2 per 100 000 population in 2022 was lower than in recent pre-COVID-19 years (9.3 per 100 000 population in 2018 and 11.1 per 100 000 in 2019) as international arrivals started to normalise towards the end of 2022. As with the last four pre-COVID-19 years (2016-2019), Indonesia was the most common country for rabies prone exposures, and dogs and monkeys were the most commonly implicated animal.



# Appendix

## Appendix 1: Communicable disease notification rate by geographical health service area

Notifiable Disease	2022 notification rate per 100 000 population					
	North	East	South	Metro	WA	National
<b>Blood-borne disease</b>						
Hepatitis B (newly acquired)	0.1	0.5	0	0.2	0.3	0.2
Hepatitis B (unspecified)	12.6	23.8	12.5	16.4	15.8	20.8
Hepatitis C (newly acquired)	0.7	3.3	3.4	2.4	2.4	2.1
Hepatitis C (unspecified)	13.5	33.3	29.5	25.3	27.9	24.3
Hepatitis D	0.4	0	0.3	0.2	0.3	0.2
<b>Enteric diseases</b>						
Campylobacteriosis	140.7	142.9	153.1	145.3	151.6	155.9
Cholera	0	0	0	0	0	0
Cryptosporidiosis	9.6	12.1	5.1	9	10.4	7.8
Hepatitis A	0.1	1.1	0.4	0.6	0.5	0.5
Hepatitis E	0	0	0	0	0	0
Listeriosis	0.5	0.3	0.3	0.4	0.3	0.3
Paratyphoid fever	0	0	0.1	0	0	0.2
Salmonellosis	31.6	32.3	33.1	32.3	36.2	39.5
Shiga toxin-producing E.coli	4.5	7.3	5.5	5.8	8.4	3.2
Shigellosis	4	5	4	4.4	7.2	5.2
Typhoid fever	0.4	1	0.7	0.7	0.6	0
Vibrio parahaemolyticus	0.1	0.5	0	0.2	0.2	0
Yersiniosis	1.9	1	3.4	2	1.9	0
<b>Sexually transmitted infections</b>						
Chlamydia	357.2	463.7	382.6	401.6	414.7	360.2
Lymphogranuloma venereum	0	0	0	0	0	0
Gonorrhoea	77.3	135	87.2	100.2	123.3	128.8
Syphilis (infectious)	19.8	38.3	19.5	26.1	32.4	23.1
Syphilis (non-infectious)	5.3	8.2	4.6	6.1	8.4	8.9
Syphilis (congenital)	0	0.1	0	0	0.2	0.1
<b>Vaccine preventable diseases</b>						
Diphtheria	0	0	0.1	0	0	0.1
Haemophilus influenzae type B	0	0	0	0	0	0
Influenza	502.8	511.1	452.1	489.8	525.4	892.8
Measles	0	0	0	0	0	0
Meningococcal disease (invasive)	0.5	0.5	0.9	0.7	0.7	0.5
Mumps	0	0	0	0	0	0.2
Pertussis	0.9	0.7	1.3	1	1.2	1.8



Pneumococcal disease (invasive)	4.6	7.1	5.8	5.8	8.7	7.2
Rotavirus	11.5	14.8	14	13.4	13.9	24.3
Rubella	0	0.1	0	0	0	0
Tetanus	0	0	0	0	0	0
Varicella-Zoster	207.5	184.4	211.9	200.9	201.5	116.1
<b>Vector-borne diseases</b>						
Murray Valley encephalitis virus	0	0	0	0	0	0
Kunjin/West Nile virus	0	0	0	0	0	0
Japanese encephalitis virus	0	0	0	0	0	0
Barmah Forest virus	0.1	0.3	0.4	0.3	1	1.2
Chikungunya virus	0.4	0.1	0.6	0.4	0.4	0.1
Dengue virus	2.7	2.6	3.1	2.8	2.6	1.6
Malaria	2.3	1.2	1	1.5	1.4	0.7
Rickettsial disease (typhus)	0.4	0.7	0.1	0.4	0.8	0
Ross River Virus	6.9	14.3	18.3	13	16.5	0
Zika	0	0	0.1	0	0	0.8
<b>Zoonotic diseases</b>						
Leptospirosis	0	0	0.1	0	0.2	1.7
Psittacosis	0	0	0	0	0	0.1
Q Fever	0	0.5	0.1	0.2	0.3	0
<b>Other diseases</b>						
Brucellosis	0	0	0	0	0	0
Botulism	0	0	0	0	0	0
Creutzfeldt-Jakob disease	0.1	0.4	0.1	0.2	0.2	0
Haemolytic uraemic syndrome	0	0	0	0	0	0
Legionellosis	3.8	1.5	1.3	2.2	2.4	2.5
Leprosy	0	0.3	0	0.1	0.1	0
Melioidosis	0	0	0	0	0.2	0
Tuberculosis	4.2	4.9	1.9	3.7	3.8	4.9
Invasive Group A Streptococcus	6.5	7.2	6	6.6	8.6	4.5
Acute Post-Streptococcal Glomerulonephritis	0.1	0.1	0.1	0.1	0.5	0
Respiratory Syncytial Virus	438.8	445.8	425.4	437	437.9	364.1

## Appendix 2: Immunisation coverage by Local Government Area

Local Government Area (LGA)	Age Group	Immunisation coverage for all children (%)
Armadale	12 months	93.5
	24 months	91.28
	60 months	94.99
Bassendean	12 months	93.52
	24 months	92.35
	60 months	96.24
Bayswater	12 months	95.77
	24 months	93.05
	60 months	94.22
Belmont	12 months	92.82
	24 months	87.12
	60 months	92.11
Cambridge	12 months	91.77
	24 months	93.75
	60 months	93.9
Canning	12 months	93.9
	24 months	90.25
	60 months	93.95
Claremont	12 months	94.06
	24 months	88.3
	60 months	91.59
Cockburn	12 months	93.34
	24 months	91.36
	60 months	92.83
Cottesloe	12 months	91.67
	24 months	91.3
	60 months	94.67
East Fremantle	12 months	91.18
	24 months	88.57
	60 months	93.41
Fremantle	12 months	90.6
	24 months	86.77
	60 months	90.63
Gosnells	12 months	94.11
	24 months	90.37
	60 months	93.46

Joondalup	12 months	93.84
	24 months	92.49
	60 months	92.93
Kalamunda	12 months	92.66
	24 months	91.94
	60 months	93.63
Kwinana	12 months	94.5
	24 months	91.83
	60 months	94.34
Mandurah	12 months	90.94
	24 months	90.79
	60 months	92.53
Melville	12 months	94.25
	24 months	92.12
	60 months	92.97
Mosman Park	12 months	≥ 95.00*
	24 months	91.67
	60 months	90.24
Mundaring	12 months	89.32
	24 months	88.12
	60 months	91.06
Murray	12 months	93.21
	24 months	86.94
	60 months	92.28
Nedlands	12 months	92.26
	24 months	91.61
	60 months	92.69
Peppermint Grove	12 months	NP*
	24 months	NP*
	60 months	NP*
Perth	12 months	90.29
	24 months	80.41
	60 months	86.75
Rockingham	12 months	92.67
	24 months	90.51
	60 months	92.43
Serpentine-Jarrahdale	12 months	94.92
	24 months	90.79
	60 months	94.61



South Perth	12 months	≥ 95.00*
	24 months	92.11
	60 months	92.29
Stirling	12 months	94.1
	24 months	91.84
	60 months	92.36
Subiaco	12 months	97.16
	24 months	93.2
	60 months	95.22
Swan	12 months	93.66
	24 months	90.97
	60 months	94.79
Victoria Park	12 months	≥ 95.00*
	24 months	91.37
	60 months	95.65
Vincent	12 months	94.4
	24 months	91.85
	60 months	90.62
Wanneroo	12 months	94.43
	24 months	91.7
	60 months	94.8
Waroona	12 months	91.67
	24 months	80.56
	60 months	89.13

\*The following data suppression rules have been applied to protect the privacy of individuals as per the requirements of AIR data publication<sup>25</sup>:

1. Not Published (NP) indicates the number of individuals for that row is less than 25.
2. ≥ 95.00 indicates that the number of individuals for that row is between 25 and 100, and the coverage rate for that population is equal to or greater than 95%.
3. ≥ 99.00 indicates that the number individuals for that row is greater than 100, and the coverage rate for that population is equal to or greater than 99%.

<sup>25</sup> AIR Data (personal communication) AIR Stewardship, Data Quality and Use, Immunisation and Communicable Disease Branch, Population Health Division, Primary and Community Care Group, Department of Health and Aged Care, Australian Government, on 14 April 2023.

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## Appendix 3: AIR criteria for determining whether a child is classified as fully vaccinated

To be considered fully vaccinated in 2022:

A 12-<15 month old child requires three doses of **diphtheria, tetanus and pertussis vaccine (DTPa)**, polio, and hepatitis B vaccines; two or three doses of **Haemophilus influenzae type b (HiB)**; and two doses of pneumococcal vaccine.

A 24-<27 month old child requires four doses of DTPa; three doses of polio, hepatitis B, and pneumococcal vaccines; three or four doses of HiB; two doses of **measles, mumps and rubella vaccine (MMR)**; one dose of **meningococcal C (menC)** and varicella vaccines.

A 60-<63 month old child requires a record on the AIR of dose 4 or 5 of a DTP- containing vaccine; and dose 4 of a polio containing vaccine.



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## Appendix 4: List of acronyms used in this report

<b>AIR:</b>	Australian Immunisation Register
<b>APSGN:</b>	Acute post-streptococcal glomerulonephritis
<b>CDCD:</b>	Communicable Disease Control Directorate
<b>EMHS:</b>	East Metropolitan Health Service
<b>DOR:</b>	Date of receipt
<b>GAS:</b>	Group A streptococcus
<b>GP:</b>	General Practitioner
<b>HIV:</b>	Human Immunodeficiency Virus
<b>ICU:</b>	Intensive Care Unit
<b>iGAS:</b>	Invasive Group A Streptococcus
<b>LGA:</b>	Local Government Area
<b>MCDC:</b>	Metropolitan Communicable Disease Control
<b>MMR:</b>	Measles, mumps, rubella vaccine
<b>MSM:</b>	Men who have sex with men
<b>NGO:</b>	Non-government organisations
<b>NIP:</b>	National Immunisation Program
<b>NMHS:</b>	North Metropolitan Health Service
<b>NNDSS:</b>	National Notifiable Diseases Surveillance System
<b>ODOO:</b>	Optimal date of onset of disease
<b>PEP:</b>	Post-exposure prophylaxis
<b>PHOps:</b>	Public Health Operations
<b>RCF:</b>	Residential care facility
<b>RPR:</b>	Rapid plasma reagin
<b>RSV:</b>	Respiratory syncytial virus
<b>SMHS:</b>	South Metropolitan Health Service
<b>STI:</b>	Sexually transmitted infection
<b>WA:</b>	Western Australian
<b>WA DOH:</b>	Western Australian Department of Health
<b>WANIDD:</b>	Western Australian Notifiable Infectious Diseases Database

