Influenza Updates

The newsletter of the WHO Collaborating Centre for Reference and Research on Influenza in Melbourne

@WHOCCFluMelb

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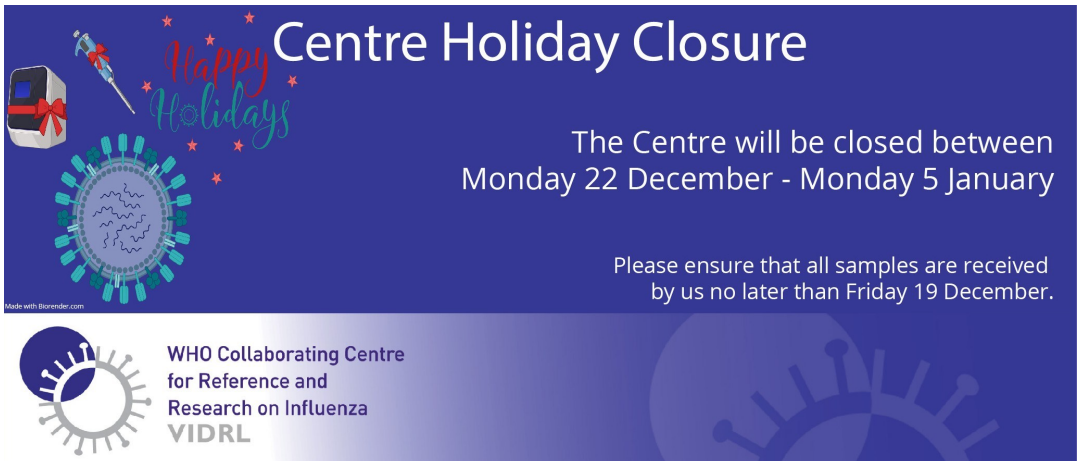
Reflection on 2025: Thank you for your hard work and support.

As the year draws to a close, we would like to thank all of the laboratories that sent us influenza and RSV samples in 2025. It has been an exceptionally busy year for influenza around the world, as we have received more samples than any other year in the Centre's history. Some of the year highlights include:

- The Centre hosted the 16th Australian Influenza Symposium at the Doherty Institute in Melbourne and had over 250 registrations.
- The Centre received over 13,000 samples from 22 countries.
- The Centre hosted staff from laboratories and National Influenza Centres for training in techniques relevant to laboratory-based surveillance of influenza and RSV from Thailand, Philippines, South Africa, Fiji, Papua New Guinea, Tonga, Vanuatu, Kiribati and China.
- Several influenza viruses were isolated by the Centre that were suitable for egg-based and cell-based influenza vaccine production including the 2026 WHO Southern Hemisphere recommended A(H3N2) viruses A/Singapore/GP20238/2024 and A/Sydney/1359/2024, respectively.



WHO Shipping Fund Project reminder

Virus sharing with WHO CCs and use of WHO Shipping Fund Project (SFP)

Please ship new influenza positive specimens collected from your national surveillance (clinical specimens/isolates), including both seasonal and zoonotic viruses (if any), to one of the WHO CCs of GISRS. Information on the selection of specimens and shipping logistics can be found on the WHO website:

a. Seasonal: https://www.who.int/publications/i/item/WHO-WHE-IHM-GIP-2017.6 b. Unsubtypeable and other non-seasonal (IVPP): https://www.who.int/publications/i/item/operational-guidance-on-sharing-influenza-viruses c. Timing of shipment: start shipping now! To allow WHO CCs to finish comprehensive virus characterization before the February VCM, **your shipments should reach the recipient CC before the end of January at the latest.**

b. The associated shipping cost can be covered by WHO Shipment Fund Project (SFP) or by national/ institutional funding or by WHO CCs directly

a. The current measures regarding using SFP towards the end of 2025 were communicated on 18 Sept (message sent to GISRS). Here is a summary:

i. Low- and lower-middle-income countries, as well as PIP priority countries, may use the SFP for one additional shipment in 2025, regardless of previous SFP use this year. Please refer to the World Bank classification for the list of beneficiary countries.

ii. All other countries may benefit from the SFP for one shipment unless they have already used the SFP in 2025. If they have already used the SFP they will not be eligible for additional shipments by the SFP, and should undertake timely shipment to a CC using alternative funding options (see above).

iii. Exceptional circumstances: If more shipments are required in any countries (e.g., unusual outbreaks), please contact us urgently using the email and telephone indicated below. We will facilitate emergency shipments as we always do.

iv. Identical packages of aliquots sent to multiple CCs will not be accepted via SFP.

b. All questions related to SFP and logistics associated with shipping viruses should be addressed to Focal Point in the Global Influenza Programme (GIP) @Christian Fuster at fusterc@who.int or tel: + 41 22 791 2869.

c. Please reach out to WHO CCs for potential direct support for specific shipments sent to them, in case your shipments cannot be covered by WHO SFP or by national/institutional funding.

d. Please note that CDC is able to cover the cost of up to 4 shipments per year from NICs/national influenza laboratories from countries to CDC. To initiate shipping logistics to CDC, please contact InfluenzaVirusSurveillance@cdc.gov.

Highlight from the 16th Australian Influenza Symposium, 2025

The Centre hosted the 16th Australian Influenza Symposium (AIS) on 13-14 November 2025 at the Peter Doherty Institute for Infection and Immunity, Melbourne. The AIS featured an exceptional lineup of Australian and international experts who shared insights across influenza, RSV, and other respiratory viruses. The AIS had over 250 registrants including participants from Brunei, Fiji, India, Indonesia, Malaysia, Papua New Guinea and South Africa as part of the SK Biosciences (Korea) AIS Travelling Scholars Program 2025.

Participants in the AIS Travelling Scholars Program (left), The 16th AIS featured talks and panel discussions on influenza and other respiratory viruses (right).

Recent Fellowship award

Dr. Michelle Wille was recently awarded a Fellowship of The Australasian Virology Society (FAVS) to reflect her exceptional professional achievement and distinction in the field of virology, as well commitment to the Australasian Virology Society.

Michelle Willie

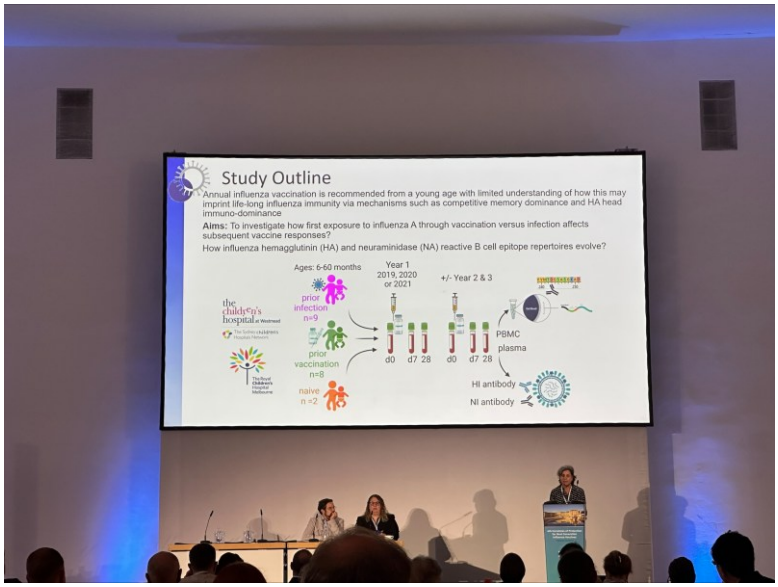
Training

Jessica Miller co-facilitated a 3 day training on the WHO Pandemic Influenza Severity Assessment (PISA) in Putrajaya, Malaysia between November 25-27, 2025. Thirty participants from national and sub-national health departments in Malaysia, Singapore, and Brunei attended the training. The training introduced participants to the different methods used to calculate influenza severity thresholds and provided participants the opportunity to develop, present and assess their own influenza severity thresholds.

Jessica Miller was a co-facilitator at the PISA training workshop in Malaysia

Highlights from the 4th Correlates of Protection for Next Generation Influenza Vaccines Conference

Annie Zhu and Annette Fox attended the 4th Correlates of Protection for Next Generation Influenza Vaccines Conference held in Vienna, Austria on 15-17 October 2025. Annie Zhu gave a presentation titled "A(H3N2) Antibody and B Cell Response in Repeat Compared to Naïve Vaccinees" and Annette Fox gave a presentation titled "Influenza Vaccine Responses Among Young Children first Exposed to Influenza Antigens via Infection Versus Vaccination ".



Annie Zhu (left) and Annette Fox (right) present their research at a meeting in Vienna, Austria

Featured Publications

Dapat C, Peck H, Jelley L, **Diefenbach-Elstob T**, Slater T, **Hussain S**, Britton P, Cheng AC, Wood T, Howard-Jones A, **Deng YM, Miller JE**, Huang QS, **Barr IG**. Extended influenza seasons in Australia and New Zealand in 2025 due to the emergence of influenza A(H3N2) subclade K viruses. Euro Surveill. 2025 Dec;30(49):2500894. doi: 10.2807/1560-7917.ES.2025.30.49.2500894. PMID: 41383175; PMCID: PMC12701333.

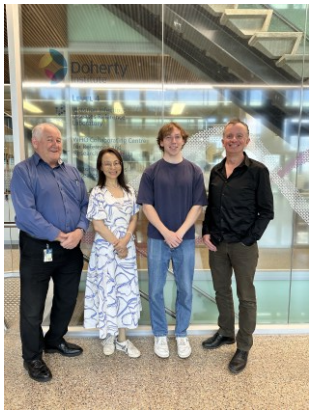
Farrukee R, Chang JJ, Zhang J, **Barnes JB**, Zhang SX, Tan SM, **Reading PC**, Coin LJM. Characterising the Transcriptomic Response to Interferon and Infection in European Domestic Ferret Respiratory Tissues Using Long-Read RNA Sequencing. Immunology. 2025 Oct 7. doi: 10.1111/imm.70042. Epub ahead of print. PMID: 41058038.

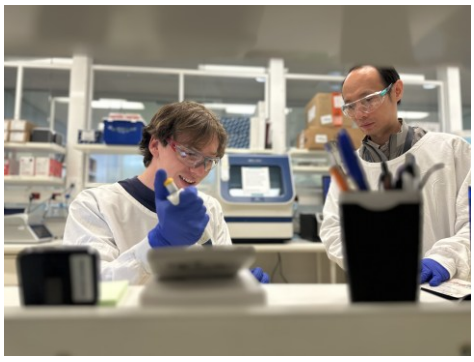
Kikawa C, Huddleston J, Loes AN, Turner SA, Lee J, **Barr IG**, Cowling BJ, Englund JA, Greninger AL, Harvey R, Hasegawa H, Ho F, Lacombe K, Leung NHL, Lewis NS, **Peck H**, Watanabe S, Smith DJ, Bedford T, Bloom JD. Near real-time data on the human neutralizing antibody landscape to influenza virus to inform vaccine-strain selection in September 2025. Virus Evol. 2025 Nov 3;11(1):veaf086. doi: 10.1093/ve/veaf086. PMID: 41287634; PMCID: PMC12640540.

Gartner MJ, Smith ML, **Dapat C,** Liaw YW, Tran T, Suryadinata R, Chen J, Sun G, Shepherd RA, Taiaroa G, Roche M, Lee WS, Robinson P, Polo JM, Subbarao K, Neil JA. Contemporary seasonal human coronaviruses display differences in cellular tropism compared to laboratory-adapted reference strains. J Virol. 2025 Sep 23;99(9):e0068425. doi: 10.1128/jvi.00684-25. Epub 2025 Aug 27. PMID: 40862615; PMCID: PMC12456146.

Recent Honours graduate

In 2025, Ted Gibson completed his Honours project at the University of Melbourne under the supervision of A/Prof Yi-Mo Deng and Dr Xiaomin Dong from the Centre. His project focused on optimising target enrichment with hybridization capture next generation sequencing (NGS) for respiratory viruses (RSV and influenza) samples that may contain degraded RNA and therefore be of poor quality. He compared a number of commercial kits and custom-designed probe sets, as well as modifications to sample preparation and treatment . The methods established were tested on RSV and influenza viruses, and demonstrated its advantage over routine amplicon-based NGS. Ted's project obtained excellent results and provided useful information for further development of in-house hybridization capture NGS approaches.





Ian Barr, Yi-Mo Deng, Ted Gibson and Patrick Reading (left), Ted Gibson and Xiaomin Dong (right).

Recent activities at the Centre (1 January— 30 November 2025)

Below is a summary of surveillance activities at the Centre during this current reporting period. The Southern Hemisphere influenza season in 2025 has been especially busy for us, with high levels of influenza cases in Australia. We have received and processed an unprecedented number of samples this year, with further isolation and characterisation of samples still underway.

Samples received:

The Centre received influenza samples from the laboratories and institutions listed below during the period 1 January — 30 November 2025.

AUSTRALIA: CANBERRA HOSPITAL, ICPMR WESTMEAD, PRINCE OF WALES HOSPITAL, THE CHILDREN'S HOSPITAL AT WESTMEAD, ROYAL DARWIN HOSPITAL, PATHOLOGY QUEENSLAND, PUBLIC & ENVIRONMENTAL HEALTH, FORENSIC AND SCIENTIFIC SERVICES, QUEENSLAND CHILDREN'S HOSPITAL, SA PATHOLOGY, PRINCESS ALEXANDRA HOSPITAL, HOBART PATHOLOGY, ROYAL HOBART HOSPITAL, AUSTRALIAN CLINICAL LABS (ACL) , ALFRED HOSPITAL, AUSTIN PATHOLOGY, DOREVITCH PATHOLOGY, MONASH MEDICAL CENTRE, ROYAL CHILDREN'S HOSPITAL, ROYAL MELBOURNE HOSPITAL, VICTORIAN INFECTIOUS DISEASES REFERENCE LABORATORY, PATHWEST LABORATORY MEDICINE (QEII), SA PATHOLOGY

BHUTAN: NATIONAL INFLUENZA CENTRE

BRUNEI:NATIONAL VIROLOGY REFERENCE LABORATORY, DEPARTMENT OF LABORATORY SERVICES

CAMBODIA: INSTITUT PASTEUR DU CAMBODGE

COOK ISLANDS: TE MARAE ORA MINISTRY OF HEALTH

FIJI: CENTRE FOR DISEASE CONTROL

INDIA: NATIONAL INSTITUTE OF VIROLOGY, PUNE

REPUBLIC OF KIRIBATI:MINISTRY OF HEALTH & MEDICAL SERVICES

NEPAL:NATIONAL PUBLIC HEALTH LABORATORY

NEW CALEDONIA:CENTRE HOSPITALIER DE NOUVELLE CALÉDONIE

NEW ZEALAND: WELLINGTON, INSTITUTE OF ENVIRONMENTAL SCIENCE AND RESEARCH LIMITED

PAPUA NEW GUNIEA:INSTITUTE OF MEDICAL RESEARCH

PHILIPPINES:RESEARCH INSTITUTE FOR TROPICAL MEDICINE

SAMOA:TUPUA TAMASES MEAOLE HOSPITAL

SINGAPORE: NATIONAL PUBLIC HEALTH LABORATORY

SOLOMON ISLANDS: NATIONAL REFERRAL HOSPITAL

SOUTH AFRICA: NATIONAL INSTITUTE FOR COMMUNICABLE DISEASES

SRI LANKA: MEDICAL RESEARCH INSTITUTE

TAHITI:INSTITUT LOUIS MALARDÉ

THAILAND:NATIONAL INSTITUTE OF HEALTH

TIMOR-LESTE:LABORATORIO NACIONAL DA SAÚDE

VANUATU: VCH LABORATORY DEPARTMENT

Isolation of viruses in eggs and QMCs:

The Centre undertakes primary isolation of selected viruses in eggs and Qualified MDCK cells. (QMCs) to obtain potential vaccine strains. From 1 January — 30 November 2025, 11 A(H1N1)pdm09, 16 A(H3N2) and 2 B/Victoria viruses were successfully isolated in eggs and 21 A(H1N1)pdm09, 34 A(H3N2) and 12 B/Victoria viruses were successfully isolated in QMCs at the Centre.

Recent activities at the Centre (1 January— 30 November 2025) continued

Antigenic analysis
6322 viruses analysed by haemagglutination inhibition (HI)

Antiviral drug susceptibility
2966 viruses analysed by neuraminidase inhibition (NAI)

Sequencing
4146 viruses analysed
4146 HA genes
4146 NA genes
3479 MP genes
636 NS genes

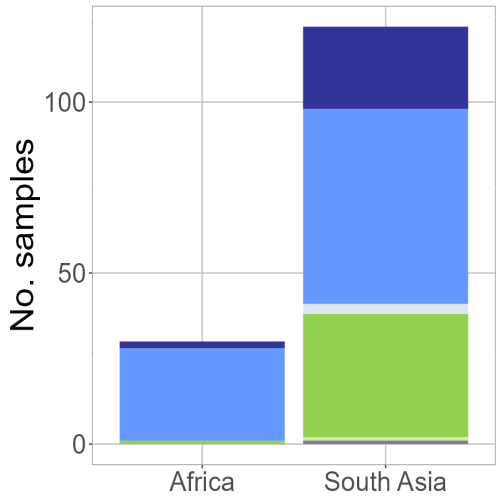
Country of submitting laboratory	No. of viruses analysed by HI assay*			No. of viruses tested by NAI assay*			No. of viruses sequenced by NGS			
	A(H1N1)pdm09	A(H3N2)	B/Victoria	A(H1N1)pdm09	A(H3N2)	B/Victoria	A(H1N1)pdm09	A(H3N2)	B/Victoria	A unsubtyped
Australia	3247	892	938	1502	244	306	2124	673	761	10
Bhutan	3	7	11	3	5	11	3	8	11	0
Brunei	86	8	6	52	7	2	13	6	8	0
Cambodia	55	34	21	53	32	19	18	25	20	0
Cook Islands	4	0	1	4	0	1	4	0	1	0
Fiji	3	121	3	2	1	3	2	2	3	0
India	10	25	13	10	22	11	4	14	7	0
Nepal	3	22	8	1	20	8	4	22	6	0
New Caledonia	84	93	9	63	83	0	35	64	7	0
New Zealand	36	48	112	35	0	110	19	48	23	0
Papua New Guinea	5	2	2	5	2	2	3	2	5	0
Philippines	1	0	2	1	0	2	6	1	15	0
Samoa	2	0	0	2	0	0	3	0	0	0
Singapore	58	56	42	57	54	42	4	1	0	0
Solomon Islands							0	10	0	0
South Africa	2	27	1	0	25	1	0	4	1	0
Sri Lanka	21	15	12	20	14	11	32	23	16	0
Tahiti	4	2	3	4	2	2	4	2	3	2
Thailand	14	15	16	12	14	14	14	14	11	0
Timor-Leste	22	66	27	6	60	2	9	6	8	0
Vanuatu	0	0	2	0	0	2	0	0	2	0
	3660	**1433**	**1229**	**1832**	**585**	**549**	**2301**	**925**	**908**	**12**

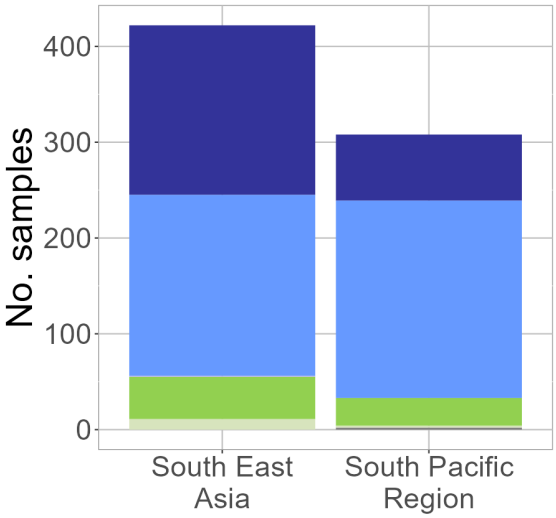
Surveillance update: Virus activity 1 January — 30 November 2025

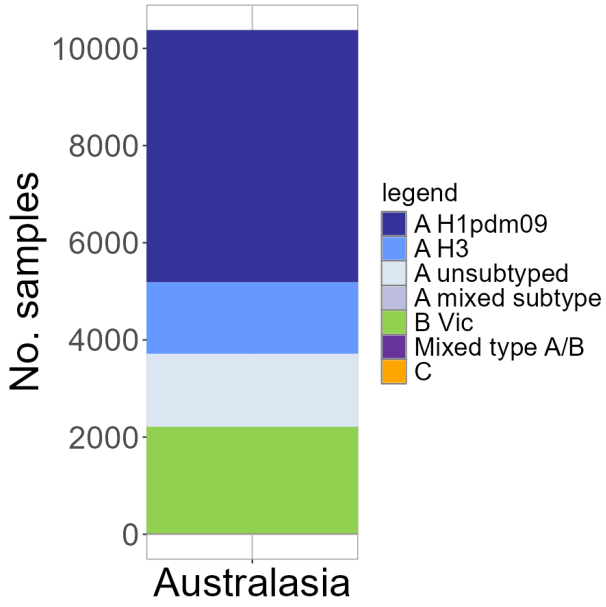
The data below are results for viruses collected or sampled between 1 January and 30 November 2025 that have been analysed at the Centre as of 3 December 2025.

Virus types/subtypes*
The type and subtype/lineage of 10758 viruses have been determined.

50% A(H1N1)pdm09
15% A(H3N2)
21.3% B/Victoria
13.5% A unsubtyped







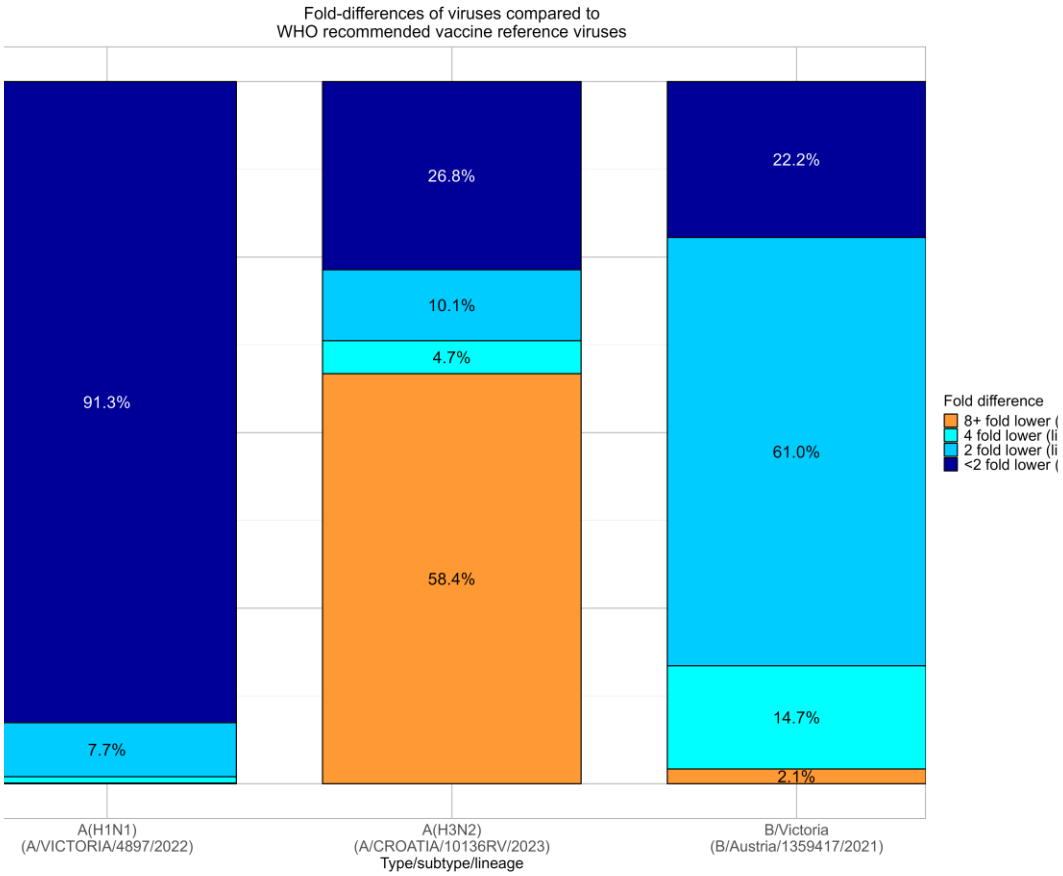
Subtypes and lineages are based on analysis of the HA and in some cases con[5]rmed by genetic analysis of NA.

Surveillance update: Virus activity 1 January—30 November 2025 continued

Antigenic analysis*

A total of 6322 viruses were tested using the haemagglutination inhibition (HI) assay.

Viruses were identified as low-reactors if their titre with reference antiserum was at least 8-fold lower than the titre of the reference virus. The vast majority of A(H1N1)pdm09 and B/Victoria lineage viruses were antigenically similar to their respective reference viruses. While over half of the A(H3N2) were low reactors to the respective viruses reference viruses.

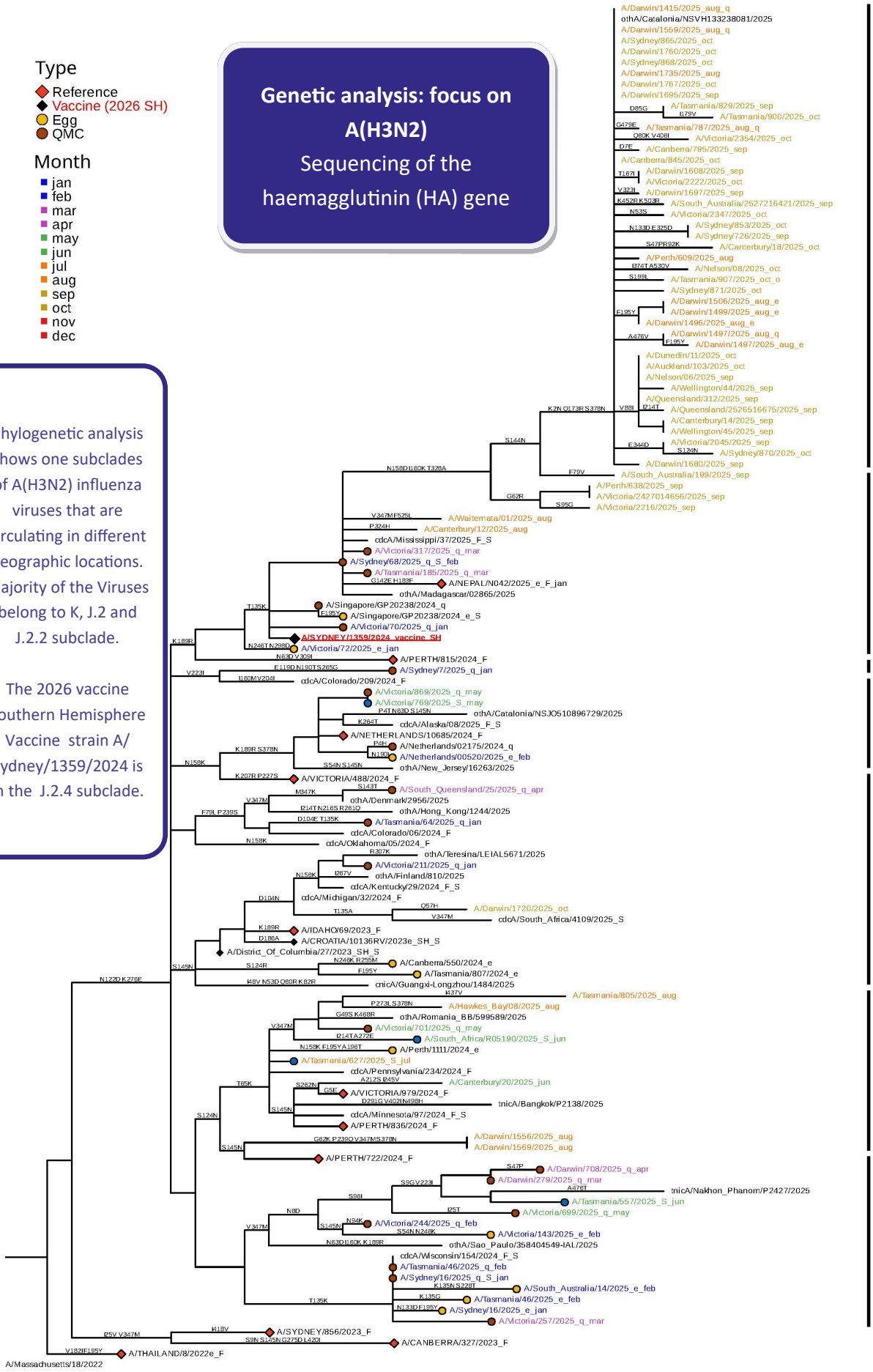


* *Subtypes and lineages are based on analysis of the HA and in some cases confirmed by genetic analysis of NA.*

Surveillance update: Virus activity 1 January—30 November 2025 continued

Genetic analysis: focus on A(H3N2)

Sequencing of the haemagglutinin (HA) gene



Phylogenetic analysis shows one subclades of A(H3N2) influenza viruses that are circulating in different geographic locations. Majority of the Viruses belong to K, J.2 and J.2.2 subclade.

The 2026 vaccine Southern Hemisphere Vaccine strain A/ Sydney/1359/2024 is in the J.2.4 subclade.

Surveillance update: Virus activity 1 January — 30 November 2025 continued

Antiviral drug susceptibility testing:
2494 viruses tested by neuraminidase inhibition (NAI) assay

Testing for susceptibility to the antiviral drugs oseltamivir (Tamiflu), zanamivir (Relenza), peramivir, and laninamivir showed that 35 viruses had highly reduced inhibition by Oseltamivir and Peramivir

Type/ subtype/ lineage	Oseltamivir			Peramivir			Laninamivir			Zanamivir		
	Normal inhibition	Reduced inhibition	Highly reduced Inhibition	Normal inhibition	Reduced inhibition	Highly reduced Inhibition	Normal inhibition	Reduced inhibition	Highly reduced Inhibition	Normal inhibition	Reduced inhibition	Highly reduced Inhibition
A(H1N1) pdm09	1592	0	35	1591	1	35	1627	0	0	1626	1	0
A(H3N2)	390	0	0	390	0	0	390	0	0	390	0	0
B/Victoria	477	0	0	477	0	0	477	0	0	477	0	0
Total	**2459**	**0**	**35**	**2458**	**1**	**35**	**2494**	**0**	**0**	**2493**	**1**	**0**

Viruses with reduced inhibition by antiviral drugs in the NAI assay undergo genetic analysis of the neuraminidase gene to detect mutations associated with the functional change. The relationship between reduced inhibition and the clinical effectiveness of a neuraminidase inhibitor is not well understood. Further studies would be required to determine whether a virus with reduced inhibition in the NAI assay is clinically resistant.

Viruses with highly reduced inhibition to one or more NAI

Type/subtype/lineage		Country of submitting laboratory	NAI(s) with highly reduced inhibition (marked with *)			
			Oseltamivir	Peramivir	Laninamivir	Zanamivir
A(H1N1)pdm09	A/VICTORIA/56/2025	Australia	*	*		
	A/CANBERRA/257/2025	Australia	*	*		
	A/QUEENSLAND/	Australia	*	*		
	A/ SOUTHQUEENSLAND/17/2025	Australia	*	*		
	A/TASMANIA/323A/2025	Australia	*	*		
	A/TASMANIA/323B/2025	Australia	*	*		
	A/SOUTHAUSTRALIA/45/2025	Australia	*	*		
	A/VICTORIA/952/2025	Australia	*	*		

Viruses with highly reduced inhibition to one or more NAI continued

Type/subtype/lineage		Country of submitting laboratory	NAI(s) with highly reduced inhibition (marked with *)			
			Oseltamivir	Peramivir	Laninamivir	Zanamivir
A(H1N1)pdm09	A/SOUTHQUEENSLAND/61/2025	Australia	*	*		
	A/DARWIN/959/2025	Australia	*	*		
	A/DARWIN/959A/2025	Australia	*	*		
	A/QUEENSLAND/IN001022/2025	Australia	*	*		
	A/QUEENSLAND/IN001538/2025	Australia	*	*		
	A/VICTORIA/1063/2025	Australia	*	*		
	A/SOUTHQUEENSLAND/86/2025	Australia	*	*		
	A/VICTORIA/1168/2025	Australia	*	*		
	A/VICTORIA/1172/2025	Australia	*	*		
	A/VICTORIA/1191/2025	Australia	*	*		
	A/VICTORIA/1214/2025	Australia	*	*		
	A/SINGAPORE/GP6091/2025	Singapore	*	*		
	A/SINGAPORE/GP6605/2025	Singapore	*	*		
	A/SINGAPORE/NUH0483/2025	Singapore	*	*		
	A/SYDNEY/359/2025	Australia	*	*		
	A/VICTORIA/1260/2025	Australia	*	*		
	A/VICTORIA/1261/2025	Australia	*	*		
	A/VICTORIA/1262/2025	Australia	*	*		
	A/VICTORIA/1264/2025	Australia	*	*		
	A/VICTORIA/1265/2025	Australia	*	*		
	A/VICTORIA/1266/2025	Australia	*	*		

Viruses with highly reduced inhibition to one or more NAI continued

Type/subtype/lineage		Country of submitting laboratory	NAI(s) with highly reduced inhibition (marked with *)			
			Oseltamivir	Peramivir	Laninamivir	Zanamivir
A(H1N1)pdm09	A/VICTORIA/1271/2025	Australia	*	*		
	A/CANBERRA/530/2025	Australia	*	*		
	A/VICTORIA/1553/2025	Australia	*	*		
	A/VICTORIA/1560/2025	Australia	*	*		
	A/SYDNEY/645/2025	Australia	*	*		
	A/VICTORIA/1789/2025	Australia	*	*		

WHO Collaborating Centre for Reference and Research on Influenza

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