Influenza Updates

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

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Preparation for the Southern Hemisphere influenza season

With winter and the influenza season approaching over the next few month in many countries in the southern hemisphere, we expect that the number of samples submitted to the Centre will increase leading up to the next WHO Consultation on the Composition of Influenza Vaccines for the Southern Hemisphere in September 2018.

Please note the following points:

- please send us your samples as soon as possible after collection, as they are most useful when they have been collected recently
- we accept both viral isolates and/or original clinical specimens
- we need to receive samples by the end of August in order to process them in time for the Consultation.

Timing for sending samples to a WHO Collaborating Centre

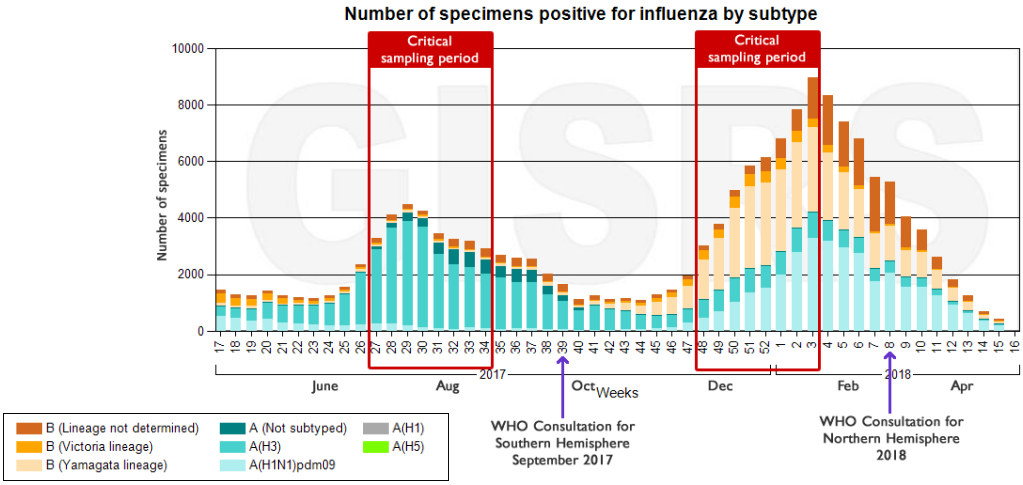


Figure adapted from FluNet: http://www.who.int/influenza/gisrs_laboratory/flunet/en/; circulation of influenza viruses, Western Pacific Region of WHO

WHO Shipping Fund Project reminder

The WHO Shipping Fund Project (SFP) is available to assist National Influenza Centres in covering the cost of shipping samples to WHO Collaborating Centres up to four times per year. The recommended timing of the four shipments is:

1) December to mid-January;
2) July to mid-August, to support the WHO vaccine composition recommendation;
3) and 4) early or late in the influenza season, or after unusual events, at your own discretion.

If you have any questions about shipping samples or would like information about accessing the WHO Shipping Fund, please contact us at *whoflu@influenzacentre.org*.

WHO Collaborating Centre for Reference and Research on Influenza VIDRL

Doherty Institute
A joint venture between the University of Melbourne and the Royal Melbourne Hospital

A world first: a cell-based influenza vaccine component

The first fully cell-based vaccine component was produced by Seqirus and recently distributed in the USA during the 2017-2018 Northern Hemisphere season. This cell-derived component of the vaccine used an A(H3N2) virus that was first isolated at our Centre from a sample originally submitted by the National Public Health Laboratory in Singapore (A/Singapore/GP2050/2015). This was the first time that a fully cell-derived influenza vaccine component has been produced and used in humans and marks a significant alternative to using egg-derived virus seeds and egg grown influenza vaccines which overcomes unwanted egg adaptions. The production of the cell-derived vaccine component is the culmination of an ongoing collaboration between the Centre and Seqirus over many years. It is expected that more cell-seed derived virus components will be added to this vaccine in future formulations.

Welcome to Dr Annette Fox

We are pleased to introduce Dr Annette Fox, Senior Research Scientist, who joined the Centre in January. Annette has an extensive background in immunology, virology, serology and molecular biology. After studying mucosal γδ T cells for her PhD at The University of Melbourne, Annette undertook a post-doctoral position at The Walter And Eliza Hall Institute where she initiated novel research on innate immunity and transplantation. From 2001-2005, she led studies on tuberculosis immunity in The Gambia for the UK Medical Research Council. In 2006, Annette joined the Oxford University Clinical Research Unit (OUCRU) in Hanoi, Vietnam, where she developed a program of research on influenza and dengue immunity, pathogenesis and transmission. In 2013 Annette joined the Department of Microbiology and Immunology at The University of Melbourne. She now brings her vast experience to the Centre and her research will focus on identifying determinants and correlates of immunity to influenza that can be used to improve vaccine effectiveness. This includes studies that evaluate whether prior influenza exposures through infection and vaccination can induce phenomena such as memory B cell interference and antibody focusing that could limit immune responses and protection.

Upcoming meetings and conferences

Staff from our Centre will be attending and presenting posters and talks at the following meetings during 2018. Please contact us if you would like to meet us at any of these meetings.

7th Australasian Vaccines & Immunotherapeutics Development Meeting
16–18 May 2018; Melbourne, Australia
http://avid2018.org/
This meeting aims to bring together researchers working in fundamental immunology, translational researchers, clinical investigators and biopharmaceuticals to help translate fundamental research findings to the clinic. This meeting considers a broad range of diseases, including cancer, infectious diseases such as influenza and autoimmunity diseases.

Viruses in May
17–19 May 2018; Katoomba, Australia
https://www.rcpa.edu.au/Events/Viruses-in-May
This conference is for scientists, pathologists and clinicians working in viral diseases. Themes for this conference include rapid point of care testing, parechovirus and other emerging viral threats, vaccination for prevention of viral illness, and viral infections of Aboriginal Australians.

American Thoracic Society Annual Meeting
18–23 May 2018; San Diego CA, USA
http://conference.thoracic.org/about/index.php
This international conference is focused on pulmonary, critical care and sleep conditions. Specialty areas represented at the conference include: allergies and immunology; behavioral science; cardiology; environmental and occupational health; infectious disease; and pediatric pulmonary, critical care, and sleep.

16th National Immunisation Conference
5–7 June 2018; Adelaide, Australia
https://www.phaa.net.au/events/event/16th-national-immunisation-conference-2018
This bi-ennial conference focuses the prevention and control of vaccine preventable diseases. The theme for 2018 will be *"Immunisation for all: Gains, gaps and goals".* Several staff members from the Centre will be presenting talks.

Recent activity at the Centre (1 January — 31 March 2018)

Below is a summary of surveillance activities at the Centre from 1 January to 31 March. We anticipate that the next few months will be an increasingly busy time for the Centre as the Southern Hemisphere influenza season commences.

Samples received

The Centre received 719 influenza samples from the laboratories and institutions listed below during the period 1 January—31 March, 2018

AUSTRALIA: Royal Darwin Hospital, John Hunter Hospital, Westmead Hospital, Queensland Health Forensic and Scientific Services, SA Pathology, VIDRL, Pathwest QEII Medical Centre

CAMBODIA: Institut Pasteur du Cambodge

MACAU: Public Health Laboratory

MALAYSIA: Institute for Medical Research, University Malaya

NEW CALEDONIA: Institut Pasteur

PHILIPPINES: Research Institute for Tropical Medicine

SINGAPORE: National Public Health Laboratory

SRI LANKA: Medical Research Institute

TAIWAN: Center for Disease Control

THAILAND: Thai National Influenza Center

	Antigenic analysis: A total of 454 influenza isolates were analysed by HI assay.				**Neuraminidase inhibitor susceptibility:** A total of 789 influenza isolates were tested by neuraminidase inhibition (NAI) assay for susceptibility to oseltamivir, zanamivir, peramivir and laninamivr.				**Genetic analysis:** Sequencing was performed on 295 HA, 295 NA, 228 MP and 64 NS genes from 295 viruses by Sanger sequencing or Next Generation Sequencing (NGS) techniques.			
Country of submitting laboratory	**No. of viruses analysed by HI assay***				**No. of viruses tested by NAI assay***				**No. of viruses sequenced by NGS or Sanger sequencing**			
	A(H1N1)pdm09	A(H3N2)	B/Victoria	B/Yamagata	A(H1N1)pdm09	A(H3N2)	B/Victoria	B/Yamagata	A(H1N1)pdm09	A(H3N2)	B/Vic	B/Yam
Australia	31	58	5	30	36	142	8	72	17	125	7	23
Brazil						7		2		8		2
Cambodia	15	26	1	3	17	26	1	8	6	15	1	3
Fiji		1		1	1	8	1	18		1		
Malaysia	57	10		2	86	37	42	3	8	9	4	1
New Caledonia	1	1			2	3					4	3
New Zealand					1	16		36	3	1		2
Philippines	9	9	1	5	9	9	1	7	3	4	1	4
Singapore	38	49	13	22	39	49	13	23		2		
Solomon Islands												1
Sri Lanka	2	18	5	5	2	18	5	5	1	16	3	3
Thailand	9	13		14	9	13		14	3	8		3
Total	**162**	**185**	**25**	**82**	**202**	**328**	**71**	**188**	**41**	**189**	**20**	**45**

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

Isolation of viruses in eggs

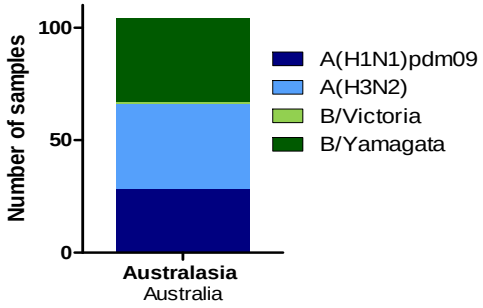
The Centre undertakes primary isolation of selected viruses in eggs to obtain potential vaccine strains. From 1 January to 31 March 2018, 3 A(H1N1)pdm09, 8 A(H3N2) and 3 B/Victoria viruses were successfully isolated in eggs at the Centre.

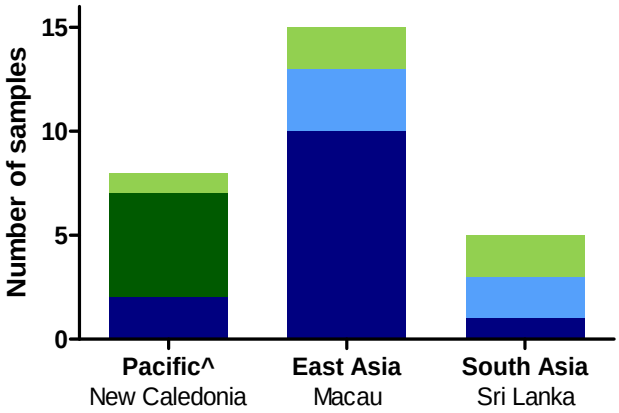
Surveillance update: Virus activity 1 January—31 March 2018

The data below are results for viruses collected between 1 January and 31 March 2018 that have been analysed at the Centre as of 27 April 2018.

Virus types/subtypes†

The type and subtype/lineage of 132 viruses have been determined. Of viruses analysed to date, there is an even distribution between A (H1N1)pdm09 (31.1%), A(H3N2) (32.6%) and B/ Yamagata viruses (31.8%).

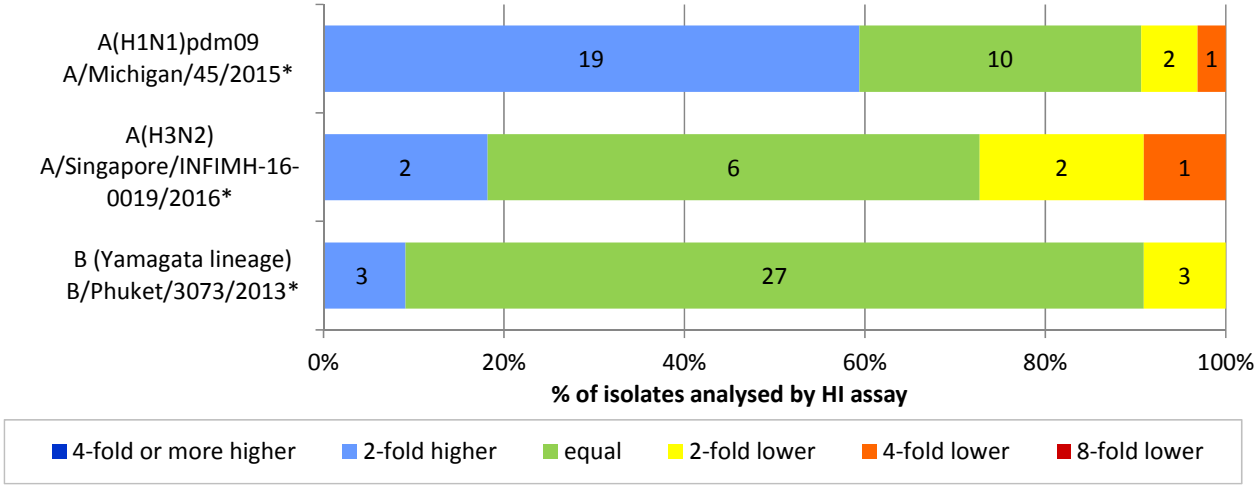




† *Subtypes and lineages are based on analysis of the HA and in some cases confirmed by genetic analysis of NA.*

Antigenic analysis

Haemagglutination inhibition (HI) assays indicate that all A(H1N1)pdm09, A(H3N2)and B/Yamagata isolates tested were antigenically similar to the 2018 Southern Hemisphere vaccine strains. Due to very small number of B/Victoria viruses received, to date no B/Victoria viruses collected during 2018 have been analysed by HI assay.



** indicates strains included in the Southern Hemisphere 2018 WHO vaccine recommendations.*

Neuraminidase inhibitor susceptibility

Viral isolates are routinely tested for their susceptibility to the antiviral drugs oseltamivir (Tamiflu), zanamivir (Relenza), peramivir and laninamivir using the neuraminidase inhibition (NAI) assay. Of 104 viruses tested, none showed highly reduced inhibition to any of the neuraminidase inhibitors.

Type/subtype	No. viruses tested by NAI assay
A(H1N1)pdm09	35
A(H3N2)	33
B/Victoria	3
B/Yamagata	33

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.

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