Influenza Updates

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

Volume 5, Issue 1, April 2016

Preparation for the Southern Hemisphere influenza season

As winter and the influenza season approach in many countries in the southern hemisphere, we expect that the number of samples submitted to the Centre will increase in the coming months in the lead up to the next WHO Consultation on the Composition of Influenza Vaccines for the Southern Hemisphere on 27–29 September 2016.

Please send us your samples on a regular basis 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.

The WHO Shipping Fund Project covers the cost of shipping samples by National Influenza Laboratories to WHO Collaborating Centres for up to a maximum of 3 shipments per laboratory per year. 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*.

Timing for sending samples to a WHO Collaborating Centre

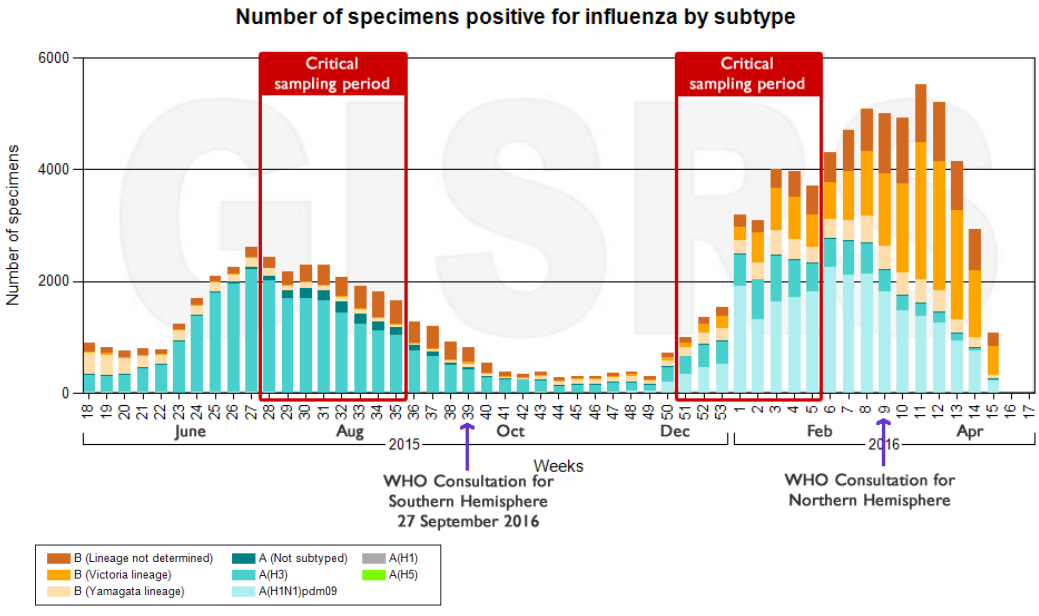


Figure adapted from FluNet: http://www.who.int/influenza/gisrs_laboratory/flunet/en/; circulation of influenza viruses, Western Pacific Region of WHO

WHO Collaborating Centre for Reference and Research on Influenza
VIDRL

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

Upcoming meetings and conferences

Look out for staff from our Centre who will be attending and presenting posters and talks at the following meetings during 2016. Please contact us if you would like to meet us there.

15th National Immunisation Conference
7–9 June 2016; Brisbane, Australia
https://www.phaa.net.au/events/event/15th-national-immunisation-conference
Organised by the Public Health Association of Australia, this year's conference will have the theme "Immunisation: the jigsaw – fitting the pieces two decades on", with broad discussion of current and future immunisation practices in Australia and the region, and in comparison to the United Kingdom.

Australian Society for Microbiology Annual Scientific Meeting
3–6 July 2016; Perth, Australia
http://asmmeeting.theasm.org.au/
This meeting will cover a wide variety of topics, including infectious diseases microbial infections and resistance, the microbiome, viruses, zoonotic infections, vaccines and emerging treatment options.

Options IX for the Control of Influenza
24–28 August 2016; Chicago IL, USA
http://2016.isirv.org/
This is the largest international conference that focuses exclusively on influenza. The meeting is aimed for people working across all facets of influenza, including basic and applied researchers and scientists, clinicians, epidemiologists, policy makers, vaccine experts, public health workers, medical and scientific media, and government officials.

16th International Congress of Immunology
21–26 August 2016; Melbourne, Australia
http://ici2016.org/
This triennial conference is the largest international meeting in the field of immunology, and in 2016 will be held in our Centre's hometown of Melbourne. Dr Ian Barr, Acting Director of the Centre, is part of the organising committee. The main theme of this year's meeting is "Immunotherapy: Harnessing the Power of the Immune System", while other topics to be discussed include advances in the development of vaccines for infectious diseases, microbiome-host interactions, new innate cell subsets and immunoregulatory pathways. The program will include over 800 oral presentations, of which over 100 will be from invited speakers.

Australian Influenza Symposium

Due to the similar timing of two major international meetings in this August of this year - Options IX for the Control of Influenza (Chicago IL, USA) and the 16th International Congress of Immunology (Melbourne) - it has been decided not to hold an Australian Influenza Symposium during 2016. The next Symposium is scheduled for October 2017 and potential locations are in Brisbane or Sydney. Please contact us at *symposium@influenzacentre.org* if you would like to stay informed about the Australian Influenza Symposium in future years.

PhD students at the Centre

We are pleased to welcome Ms Rubaiyea Farrukee (*left*) and Ms Annika Suttie (*right*), who have recently commenced their PhD candidatures at the Centre. Rubaiyea's project will investigate the replication, transmission and fitness of antiviral-resistant viruses. In a collaboration between the Centre, Institut Pasteur du Cambodge, and Federation University, Annika will undertake a project characterising the molecular epidemiology of influenza viruses in Cambodia.

Recent activity at the Centre (1 January — 31 March 2016)

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 557 influenza samples from the laboratories and institutions listed below during the period 1 January—31 March, 2016.

AUSTRALIA: Canberra Hospital, Royal Darwin Hospital, Westmead Hospital, Queensland Health Forensic and Scientific Services, SA Pathology, Royal Hobart Hospital, Austin Health, Royal Children's Hospital (Molecular Microbiology Dept.)

CAMBODIA: Institut Pasteur du Cambodge

FIJI: Fiji Centre for Communicable Disease Control

MALAYSIA: Insitute for Medical Research

NEW CALEDONIA: Institut Pasteur

PHILIPPINES: Research Institute for Tropical Medicine

SINGAPORE: National Public Health Laboratory

SOLOMON ISLANDS: National Referral Hospital

SRI LANKA: Medical Research Institute

THAILAND: Thai National Influenza Center

	Antigenic analysis: A total of 602 influenza isolates were analysed by HI assay.							**Neuraminidase inhibitor susceptibility:** A total of 892 influenza isolates were tested by neuraminidase inhibition (NAI) assay for susceptibility to oseltamivir, zanamivir, peramivir and laninamivr.			
Country of submitting laboratory	**No. of viruses analysed by HI assay***							**No. of viruses tested by NAI assay***			
	A(H1N1)pdm09	A(H3N2)	A (unsubtyped)	B/Victoria	B/Yamagata	B lineage undetermined	Untyped	A(H1N1)pdm09	A(H3N2)	B/Victoria	B/Yamagata
Australia	71	35	15	26	15	14	1	115	152	159	56
Cambodia	6	16		2	22			5	20	2	22
Fiji	4	5		22	55	7		4	5	22	55
Malaysia	16	5	2	1	3			16	5	1	3
New Caledonia	1	1		55	9	11		1	2	55	9
New Zealand									4	3	1
Papua New Guinea						1			3		
Philippines	7	8	2			1		4	4		
Singapore	31	33		16	18			31	41	16	18
Solomon Islands								17			
Sri Lanka	9	18	2	1	2	13		5	15	1	2
Thailand	1	9		1	9				8	1	9
Total	**146**	**130**	**21**	**124**	**133**	**47**	**1**	**198**	**259**	**260**	**175**

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

Recent activity at the Centre (1 Jan — 31 Mar 2016, continued)

	Genetic analysis: Sequencing was performed on 90 HA, 47 NA, 92 MP and 26 NS genes from 91 viruses by Sanger sequencing. Next Generation Sequencing (NGS) techniques were used to sequenced the HA, NA and MP genes of an additional 89 A(H3N2) viruses, as well as the full genomes of 64 viruses. In total, 242 sequences from 45 human viruses received for surveillance purposes were deposited with the GISAID EpiFlu™ database (http://www.gisaid.org).							
Country of submitting laboratory	**No. of viruses with individual genes (HA/ NA/MP/NS) analysed by Sanger sequencing or NGS**				**No. of viruses analysed by full genome sequencing using NGS techniques**			
	A(H1N1) pdm09	A(H3N2)	B/Vic	B/Yam	A(H1N1) pdm09	A(H3N2)	B/Vic	B/Yam
Australia	20	100	11	8	8	6	6	7
Cambodia	1	3	1	4	2	1	1	2
Fiji	1	1	2	3		1	1	1
Macau SAR						1		1
Malaysia	2	2	1	1	1	1	1	2
New Caledonia			3	1			1	1
New Zealand	1					2	3	3
Papua New Guinea						1		
Philippines	1	1			1			
Solomon Islands	3							
South Africa						1		1
Sri Lanka		3	1			1	1	
Thailand		2	1	2	1	1	2	1
Total	**29**	**112**	**20**	**19**	**13**	**16**	**16**	**19**

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 2016, 8 A(H1N1)pdm09 and one A(H3N2) virus were successfully isolated in eggs at the Centre.

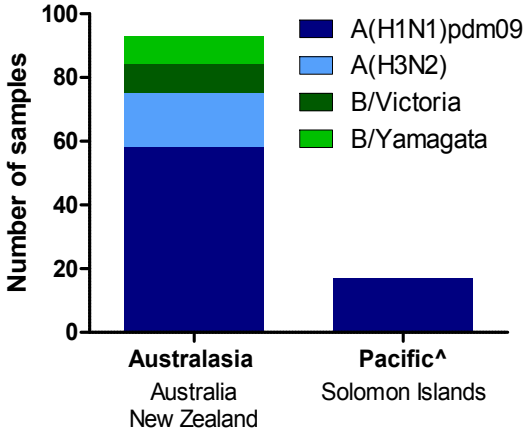
Surveillance update: Virus activity 1 January—31 March 2016

The data below are results for viruses collected between 1 January and 31 March 2016 that have been analysed at the Centre as of 20 April 2016.

Virus types/subtypes[†]
The type and subtype/lineage of 110 viruses have been determined. The predominant type/subtype amongst viruses analysed to date was A(H1N1)pdm09 (68.2%).

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

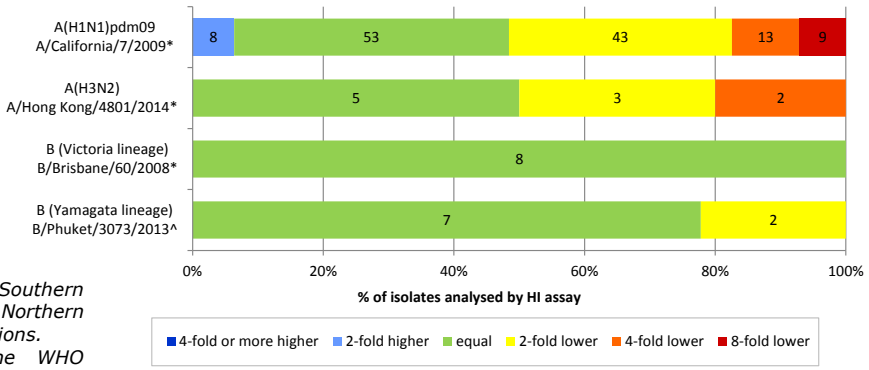
^ *The Pacific region comprises countries in Polynesia, Melanesia and Micronesia.*



Surveillance update: Virus activity 1 Jan — 31 Mar 2016 (continued)

Antigenic analysis

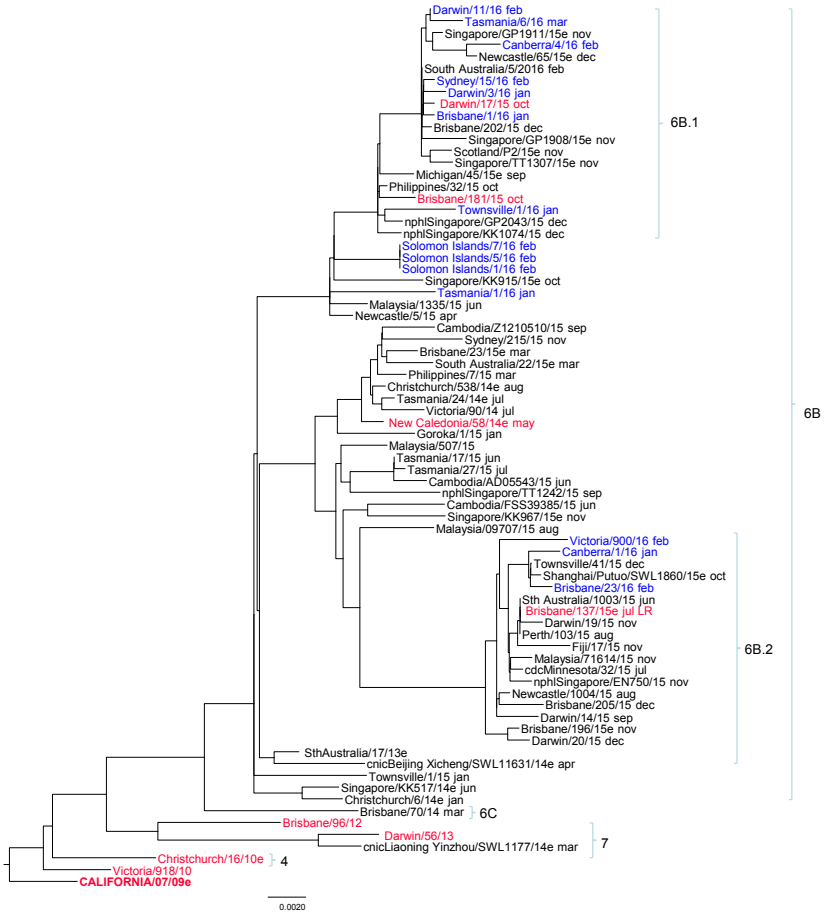
Haemagglutination inhibition (HI) assays indicate that with the exception of a small number of A(H1N1)pdm09 viruses, all isolates were antigenically similar to the 2016 Southern Hemisphere and 2016-2017 Northern Hemisphere vaccine strains.



** indicates strains included in the 2016 Southern Hemisphere and 2016-2017 Northern Northern Hemisphere WHO vaccine recommendations.*
^ Indicates strains included in the WHO quadrivalent vaccine recommendations

Genetic analysis: focus on A(H1N1)pdm09

Sequencing and phylogenetic analysis of haemagglutinin (HA) genes indicate that viruses circulating during January–March 2016 contained some genetic changes compared to the vaccine reference strain A/California/7/2009, although these changes do not affect the antigenic behaviour of the viruses.



Legend
Reference strains
CURRENT VACCINE STRAIN
Viruses collected in 2016
} Brackets indicate clades
Scale bar represents 0.2% nucleotide sequence difference between viruses

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 112 viruses tested, none showed highly reduced inhibition to any of the neuraminidase inhibitors.

Viruses that demonstrate reduced inhibition by antiviral drugs in the NAI assay undergo genetic analysis of the neuraminidase gene to detect known or novel 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.

Type/ subtype	A(H1N1)pdm9	A(H3N2)	B/Victoria	B/Yamagata
No. viruses tested	78	17	8	9
Number of viruses with highly reduced inhibition				
Oseltamivir	0	0	0	0
Peramivir	0	0	0	0
Zanamivir	0	0	0	0
Laninamivir	0	0	0	0

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