Influenza Updates

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

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News and Events

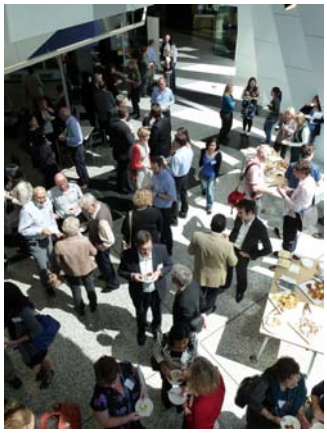
Recommendations for Southern Hemisphere 2013 vaccine announced

The WHO Consultation on the Composition of Influenza Vaccines for the Southern Hemisphere 2013 was held in Beijing on 17-19 September, hosted by the WHO Collaborating Centre for Reference and Research on Influenza at the China Center for Disease Control and Prevention. Following the Consultation, WHO made the following recommendation:

> *It is recommended that trivalent vaccines for use in the 2013 influenza season (southern hemisphere winter) contain the following:*
>
> *- an A/California/7/2009 (H1N1)-like virus;*
> *- an A/Victoria/361/2011 (H3N2)-like virus;*
> *- a B/Wisconsin/1/2010-like virus.*
>
> *It is recommended that quadrivalent vaccines containing two influenza B viruses contain the above three viruses and a B/Brisbane/60/2008-like virus.*

This is the same recommendation as the vaccine composition for the northern hemisphere 2012-2013. More details about the recommendations can be found at: http://www.who.int/influenza/vaccines/virus/recommendations/2013_south/en/index.html.

Australian Influenza Symposium



The 8th Australian Influenza Symposium was held 4-5 October 2012 at the John Curtin School of Medical Research, Australian National University, Canberra, and was attended by 107 delegates from Australia, New Zealand, Cambodia, USA and Canada. Highlights included:

- A diverse range of presentations given by invited guest speakers and selected presenters. Topics included influenza biology and clinical research, vaccine technologies, epidemiology and population modelling, zoonotic influenzas, surveillance and public health strategies.
- A roundtable discussion on ethical issues surrounding manipulation of influenza viruses in life science research.
- A historical account of the Centre presented by its former and current Directors in recognition of its 20th anniversary as a WHO Collaborating Centre.

Photos from the Symposium can be viewed on the Centre website at: http://www.influenzacentre.org/news_symposium.htm

Training at the Centre

Ms Vina Arguelles (*left*) and Ms Herma Base (*right*), from the Research Institute for Tropical Medicine in Muntinlupa City, Philippines, spent two weeks at the Centre during September. They undertook training in a range of influenza surveillance techniques, including virus isolation, haemagglutination inhibition assays, determination of viral types/subtypes by PCR, sequencing, phylogenetic analysis and neuraminidase inhibitor assays. On returning to the Philippines they were able to share their experiences with other staff at the Research Institute.

WHO Collaborating Centre for Reference and Research on Influenza
VIDRL

Surveillance update: Virus activity 1 Jan—30 Sept 2012

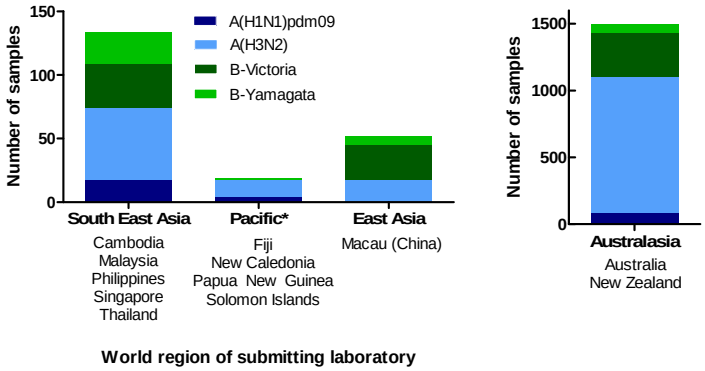
For viruses with collection dates in the period 1 January to 30 September 2012 that have been analysed at the Centre as of 17 October, 2012.

Virus types / subtypes†

The type and subtype/lineage of 1707 viruses have been determined. The majority of viruses were A(H3N2) [1112 viruses].

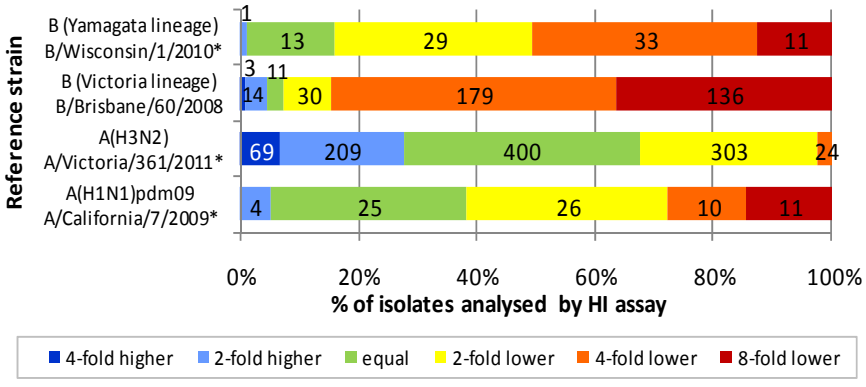
† *Subtypes and lineages are based on analysis of the HA and in some cases confirmed by genetic analysis of NA.*

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



Antigenic analysis

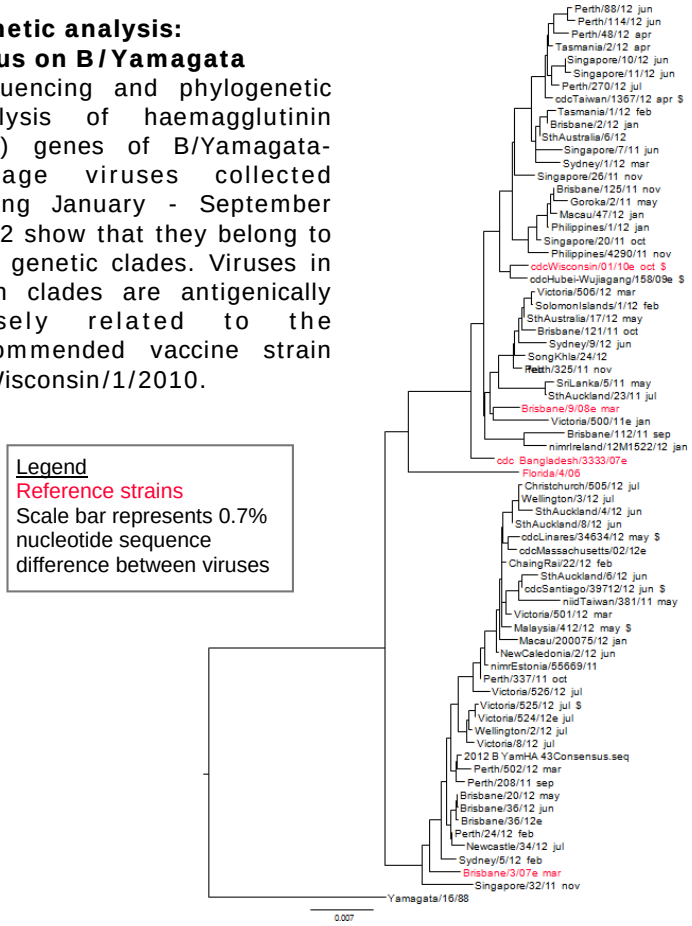
Haemagglutination inhibition (HI) assays indicate that most isolates are antigenically similar to current vaccine strains, with a minority of low reactors (8-fold lower HI titres compared to reference strains). Detection of low reactors with specific antisera may be due to several different factors, so further analyses are performed to determine whether antigenic drift has occurred.



** indicates strains included in the most recent WHO vaccine recommendation (2013 Southern Hemisphere)*

Genetic analysis: focus on B/Yamagata

Sequencing and phylogenetic analysis of haemagglutinin (HA) genes of B/Yamagata-lineage viruses collected during January - September 2012 show that they belong to two genetic clades. Viruses in both clades are antigenically closely related to the recommended vaccine strain B/Wisconsin/1/2010.



Neuraminidase inhibitor resistance

Viruses are routinely tested for their sensitivity to the antiviral drugs oseltamivir (Tamiflu) and zanamivir (Relenza) using the neuraminidase inhibitor (NAI) assay.

Of 1699 viruses tested, only one, a A(H1N1)pdm09 virus from Perth, was found to have highly reduced sensitivity to oseltamivir. This virus was confirmed to carry the H275Y mutation in the NA protein that confers resistance to oseltamivir. All viruses tested are sensitive to zanamivir (data not shown).

Viruses tested for resistance to oseltamivir		
	No. sensitive viruses	No. resistant viruses
A(H1N1) pdm09	79	1 (1.3%)
A(H3N2)	1089	0
B	530	0

Recent activity at the Centre (1 July—30 September 2012)

The number of viruses sent to the Centre peaked during the period 1 July—30 September. Below is a summary of our surveillance activities during this period.

Samples received

The Centre received a total of 2620 samples from the laboratories listed below:

AUSTRALIA

IMVS Pathology (Adelaide)
Sullivan Nicolaides Pathology (Brisbane)
Royal Darwin Hospital (Darwin)
St John of God Pathology (Geelong)
Melbourne Pathology (Melbourne)
Monash Medical Centre (Melbourne)
PathWest QEII Medical Centre (Perth)
John Hunter Hospital (Newcastle)
Westmead Hospital (Sydney)
Queensland Health Forensic and Scientific Services (Brisbane)
Canberra Hospital (Canberra)
Australian Rickettsial Reference Laboratory (Geelong)
Royal Hobart Hospital (Hobart)
Austin Health (Melbourne)
Victorian Infectious Diseases Reference Laboratory (Melbourne)
Princess Margaret Hospital for Children (Perth)
Prince of Wales Hospital (Sydney)
Gippsland Pathology (Traralgon)

OTHER COUNTRIES

Institut Pasteur du Cambodge (Phnom Penh, Cambodia)
Institut Pasteur (Noumea, New Caledonia)
Canterbury Health Services (Christchurch, New Zealand)
Research Institute for Tropical Medicine (Muntinlupa City, Philippines)
Institute of Environmental Science and Research (Wellington, New Zealand)
National Referral Hospital (Solomon Islands)
Thai National Influenza Center (Bangkok, Thailand)
Public Health Laboratory (Macau, China)
National Public Health Laboratory (Singapore)
Auckland Hospital (Auckland, New Zealand)
Medical Research Institute (Colombo,Sri Lanka)

Antigenic analysis

A total of 1153 influenza isolates submitted from 11 countries were analysed by HI assay (Table 1).

Genetic analysis

Sequencing was performed on 253 HA, 253 NA, 197 MP and 123 NS genes. A total of 824 gene sequences from 196 viruses were deposited with the GISAID EpiFlu™ database (http://www.gisaid.org) by the Centre (Table 2).

Neuraminidase inhibitor resistance

A total of 1216 influenza isolates were tested by neuraminidase inhibition (NAI) assay for susceptibility to the antiviral drugs oseltamivir and zanamivir (Table 3).

Country of submitting laboratories	Table 1: Number of viruses analysed by HI assay*				Table 2: Number of viruses with gene sequences deposited with GISAID			Table 3: Number of viruses tested by NAI assay		
	A(H1N1) pdm09	A(H3N2)	B Victoria	B Yamagata	A(H1N1) pdm09	A(H3N2)	B	A(H1N1) pdm09	A(H3N2)	B
Australia	13	624	190	26	8	64	45	25	654	225
Cambodia		26	1			3			26	1
Fiji	1	2			1	1		1	2	
Macau		10	8	2		1	3		10	10
Malaysia	1		1	2	1	1	7	1		
New Caledonia		1		1		1			1	1
New Zealand	19	109	10	11	6	15	6	28	112	24
Papua New Guinea		1		1	1	1	1	2	26	9
Philippines	2	26	1	8		2				
Singapore	12	13	8	11	3	4	6	12	13	19
Sri Lanka	2	5	5		1	1	2	4	5	5
Thailand					1	2	8			
Total	**50**	**817**	**224**	**62**	**22**	**96**	**78**	**73**	**849**	**294**

* *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 into eggs to obtain potential vaccine strains. From 1 July to 30 September, 2 A(H1N1)pdm09, 3 A(H3N2) viruses and 2 B viruses were successfully isolated in eggs at the Centre.

In profile: Dr Philippe Buchy

The Centre was delighted that Dr Philippe Buchy (*pictured right*), Head of the Virology Unit and the WHO National Influenza Centre (NIC) at Institut Pasteur du Cambodge in Phnom Penh, Cambodia, was able to accept our invitation to visit us in Melbourne and to participate in the Australian Influenza Symposium in Canberra in early October.

The Cambodian NIC and Influenza-Like Illness (ILI) surveillance network in Cambodia were established in 2006 in collaboration with Ministry of Health, the WHO Regional Office of the Western Pacific region and WHO Cambodia. Following a contribution from the French government in 2007 that enabled the construction of BSL3 laboratories and a BLS3+ animal facility, Dr Buchy established research projects on the genomics, evolution and drug sensitivity of avian A(H5N1) viruses in partnership with the Ministries of Health and Agriculture. In recent years his research interests have expanded to include the role of the environment (eg. soil, water, markets) in the natural cycle of avian influenza viruses.

Influenza research community

Recent publications of interest: Swine-related A(H3N2)v viruses

Lindstrom S, Garten R, Balish A, Shu B, Emery S, Berman L, Barnes N, Sleeman K, Gubareva L, Villanueva J, Klimov A. Human infections with novel reassortant influenza A(H3N2)v viruses, United States, 2011.Emerg Infect Dis. 2012 May;18(5):834-7. doi: 10.3201/eid1805.111922.
Genetic and antigenic characterisation of A(H3N2)v viruses in comparison with circulating human and current vaccine influenza A viruses.

Pearce MB, Jayaraman A, Pappas C, Belser JA, Zeng H, Gustin KM, Maines TR, Sun X, Raman R, Cox NJ, Sasisekharan R, Katz JM, Tumpey TM. Pathogenesis and transmission of swine origin A(H3N2)v influenza viruses in ferrets. Proc Natl Acad Sci U S A. 2012 Mar 6;109(10):3944-9.
Investigation of virulence, transmissibility, receptor binding and replication kinetics of A(H3N2)v influenza viruses in a ferret model.

Skowronski DM, Janjua NZ, De Serres G, Purych D, Gilca V, Scheifele DW, Dionne M, Sabaiduc S, Gardy JL, Li G, Bastien N, Petric M, Boivin G, Li Y. Cross-reactive and Vaccine-Induced Antibody to an Emerging Swine-Origin Variant of Influenza A Virus Subtype H3N2 (H3N2v). J Infect Dis. 2012 Sep 7.
Analysis of seroprotection against A(H3N2)v influenza provided by recent seasonal vaccines by measures of cross-reactive antibodies to A(H3N2)v in sera collected from the Canadian population.

Upcoming meetings and conferences

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

Severe Influenza: Burden, Pathogenesis and Management
29-31 October 2012; Hanoi, Vietnam
http://www.isirv.org/site/index.php/component/content/article/11-antiviral-group/167-second-avg-conference
Run by the Antiviral Group of isirv, this conference will focus on severe influenza, including epidemiology, mechanisms of pathogenesis, treatment and resistance to antiviral drugs.

2nd Antivirals Congress
11-13 November; Cambridge MA, USA
http://www.antivirals.elsevier.com/index.html
This interdisciplinary conference will focus on the development and application of antiviral drugs in a range of diseases.

Singapore International Conference on Dengue and Emerging Infections
21-23 November; Singapore
http://stopdengue.sg/conference2012/
This conference is co-organised by the STOP-Dengue Translational Clinical Research Program and the Duke-NUS Emerging Infectious Diseases Program and will focus on dengue, influenza and other infectious diseases.

42nd Annual Scientific Meeting of the Australasian Society for Immunology
2-6 December; Melbourne
http://www.asi2012.org/
This is a large conference with a broad focus on immunology, with special interest side meetings also being held.

WHO International Meeting on Influenza Vaccine Effectiveness
3-4 December 2012; Geneva, Switzerland
This WHO meeting will focus on methods and challenges of evaluating influenza vaccine effectiveness around the world, and how these measures can be optimized and/or improved.

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