

Influenza Updates

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

Volume 3, Issue 2, August 2014

News and Events

Thank you for your influenza samples

Thank you to all of the laboratories who have sent us influenza samples in recent weeks. We are extremely grateful to have these samples in time for the WHO Consultation on the Composition of Influenza Vaccines for the Southern Hemisphere 2015 which will be held in Geneva next month.

Australian Influenza Symposium

Registrations for the 10th Australian Influenza Symposium are now open. The Symposium will held on Wednesday 12 November and Thursday 13 November 2014 at The Peter Doherty Institute for Infection and Immunity, Melbourne. We are pleased to confirm an exciting and diverse line-up of international speakers, including:

Dr Benjamin Cowling, The University of Hong Kong, Hong Kong SAR, China
Dr Vijaykrishna Dhanasekaran, Duke NUS, Graduate Medical School, Singapore
Dr Paul Horwood, Institut Pasteur du Cambodge, Phnom Penh, Cambodia
A/Prof Lance Jennings, Canterbury District Health, Christchurch, New Zealand
Dr Martha Nelson, Fogarty International Center, NIH, Bethesda MD, USA
Dr Stacey Schultz-Cherry, St Jude Children's Research Hospital, Memphis TN, USA
Dr Gavin Smith, Duke NUS, Graduate Medical School, Singapore
Dr Paul Thomas, St Jude Children's Research Hospital, Memphis TN, USA
Dr Cecile Viboud, Fogarty International Center, NIH, Bethesda MD, USA

More information about the Symposium and submitting abstracts for talks can be found at http://www.influenzacentre.org/news_symposium.org. You can register for the Symposium by completing the online form linked from our website.

Please contact us by email at symposium@influenzacentre.org if you have any questions about the 2014 Symposium.

National Influenza Centres meeting in Jakarta

Several staff members from the Centre recently attended the 8th Bi-regional Meeting of National Influenza Centres and Influenza Surveillance in the Western Pacific and South-East Asia Regions, held in Jakarta, Indonesia. Topics discussed included global and regional updates on circulating influenza strains, strengthening national influenza surveillance systems, implementation of the PIP Framework, and processes for influenza vaccine selection and application. We were pleased to catch up with many of you there, and thank SEARO for organizing an excellent meeting.



Meeting delegates touring the National Institute of Health Research and Development (NIHRD) in Jakarta. Photo courtesy of SEARO.



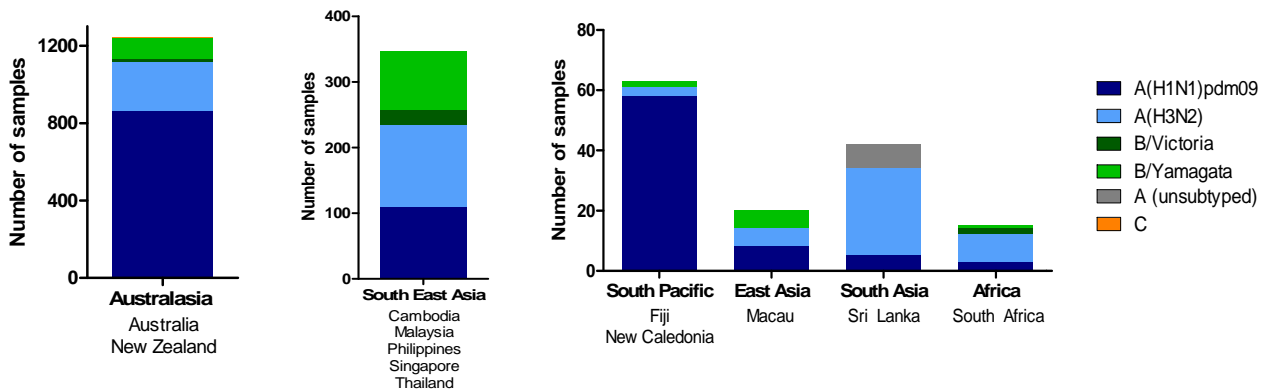
Surveillance Update: Virus activity 1 January–31 July 2014

The data below are results for viruses collected between 1 January and 31 July 2014 that have been analysed at the Centre as of 26 August 2014.

Virus types/subtypes[†]

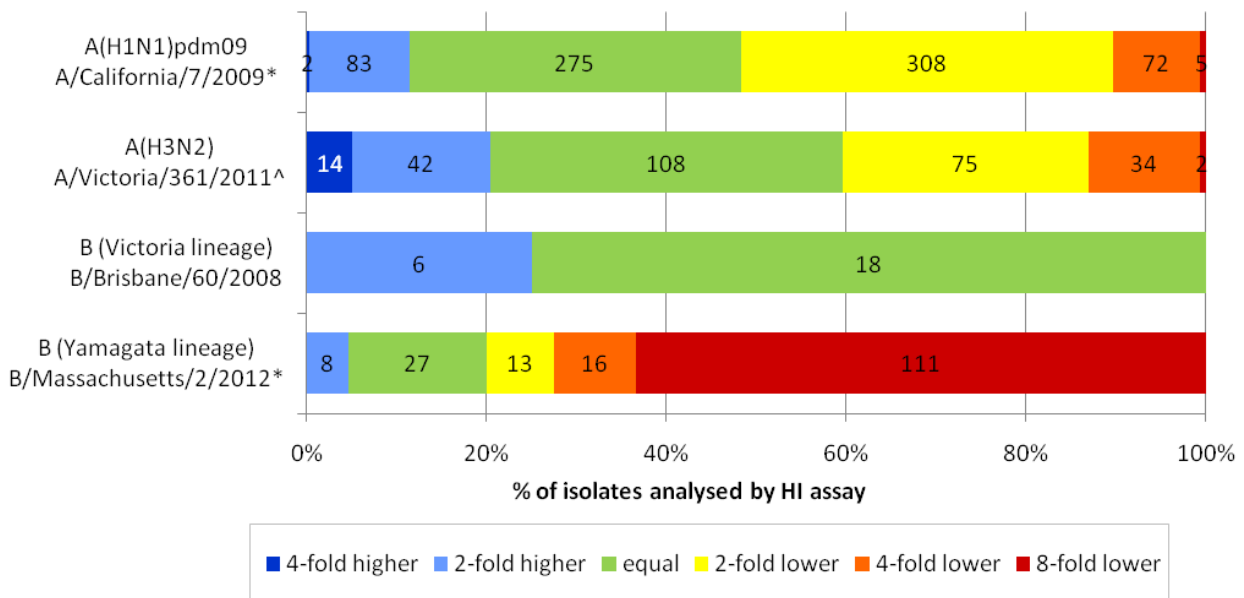
The type and subtype/lineage of 1731 viruses have been determined. The predominant type/subtype amongst viruses analysed to date is A(H1N1)pdm09 (60.4%), although A(H3N2) is also prominent in some countries.

[†] 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 most A(H1N1)pdm09, A(H3N2) and B/Victoria isolates are antigenically similar to current vaccine strains. A large proportion of B/Yamagata isolates have been found to be low reactors to the current vaccine strain B/Massachusetts/2/2012 and more similar to B/Wisconsin/1/2010. 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 (2014-2015 Northern Hemisphere).

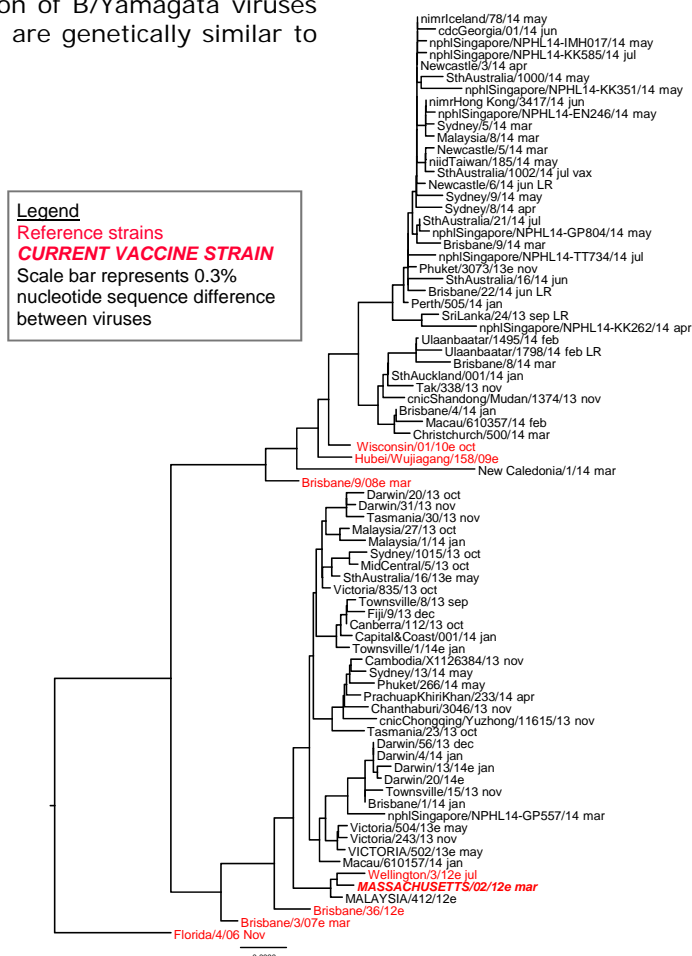
^ A/Texas/50/2012, which is included in the most recent WHO vaccine recommendation, is an A/Victoria/361/2011-like virus.



Surveillance Update continued: 1 January–31 July 2014

Genetic analysis: focus on B/Yamagata

Sequencing and phylogenetic analysis of haemagglutinin (HA) genes indicate that a large proportion of B/Yamagata viruses circulating during January-July 2014 are genetically similar to B/Wisconsin/1/2010.



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 1337 viruses tested, only a small number showed highly reduced inhibition to the neuraminidase inhibitors.

| Viruses tested for susceptibility to neuraminidase inhibitors | | | | | |
|---|--------------------|--|-----------|-----------|-------------|
| Type/subtype | No. viruses tested | No. viruses with highly reduced inhibition | | | |
| | | Oseltamivir | Peramivir | Zanamivir | Laninamivir |
| A(H1N1)pdm09 | 839 | 4 (0.5%) | 3 (0.4%) | 0 | 0 |
| A(H3N2) | 275 | 0 | 0 | 0 | 0 |
| B/Victoria | 35 | 1 (2.9%) | 2 (5.7%) | 1 (2.9%) | 1 (2.9%) |
| B/Yamagata | 188 | 0 | 2 (1.1%) | 0 | 0 |

Viruses demonstrating reduced susceptibility to antiviral drugs in the NAI assay undergo sequencing or pyrosequencing of the neuraminidase gene for 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.



Recent activity at the Centre (1 May–31 July 2014)

Below is a summary of surveillance activities at the Centre from 1 May to 31 July. As usual, we have been particularly busy in recent months with the onset of the Southern Hemisphere winter.

Samples received

The Centre received 1335 influenza samples from the laboratories listed below.

Submitting laboratories 1 May to 31 July, 2014

| | |
|---|--|
| AUSTRALIA: Austin Health Canberra Hospital Healthscope Pathology IMVS Pathology John Hunter Hospital Monash Medical Centre Pathwest QEII Medical Centre Prince of Wales Hospital Queensland Health Forensic and Scientific Services Royal Children's Hospital Royal Children's Hospital, Molecular Microbiology Department Royal Darwin Hospital Royal Hobart Hospital Victorian Infectious Diseases Reference Laboratory Westmead Hospital | CAMBODIA: Institut Pasteur du Cambodge FIJI: Fiji Centre for Communicable Disease Control MACAU: Public Health Laboratory MONGOLIA: National Center for Communicable Diseases NEW CALEDONIA: Institut Pasteur NEW ZEALAND: Canterbury Health Services SINGAPORE: National Public Health Laboratory SOUTH AFRICA: National Institute for Communicable Disease SRI LANKA: Medical Research Institute THAILAND: Thai National Influenza Center |
|---|--|

Antigenic analysis

A total of 752 influenza isolates were analysed by HI assay (Table 1).

Genetic analysis

Sequencing was performed on 165 HA, 162 NA, 115 MP and 38 NS genes from 181 viruses. A total of 418 gene sequences from 141 human viruses were deposited with the GISAID EpiFlu™ database (<http://www.gisaid.org>) by the Centre (Table 2).

Neuraminidase inhibitor susceptibility

A total of 723 influenza isolates were tested by neuraminidase inhibition (NAI) assay for susceptibility to the antiviral drugs oseltamivir, zanamivir, peramivir and laninamivir (Table 3).

| Country of submitting laboratory | 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/Vic | B/Yam | A(H1N1) pdm09 | A(H3N2) | B/Vic | B/Yam | A(H1N1) pdm09 | A(H3N2) | B/Vic | B/Yam |
| Australia | 402 | 88 | 6 | 65 | 38 | 28 | 1 | 23 | 383 | 80 | 7 | 76 |
| Cambodia | | | | | 2 | | | 2 | | | | |
| Fiji | | 2 | | 1 | 1 | 1 | | 1 | | 2 | | 1 |
| Macau SAR | 8 | 4 | 10 | 10 | | | | | 8 | 4 | | 6 |
| Malaysia | 18 | 10 | 2 | 10 | 1 | | 1 | 1 | 18 | 11 | 2 | 10 |
| Mongolia | 3 | 2 | 6 | 7 | | | | | 3 | 2 | 6 | 7 |
| New Caledonia | 42 | | | 1 | 3 | | | | 42 | | | 1 |
| New Zealand | 13 | 1 | | 1 | 6 | 9 | 1 | 7 | 13 | 1 | | 1 |
| Singapore | | | | | | 2 | | | | | | |
| South Africa | | | | | | | 1 | | | | | |
| Sri Lanka | 2 | 11 | | | 1 | 1 | | 1 | 2 | 10 | | |
| Thailand | 11 | 5 | 1 | 10 | 1 | 5 | | 3 | 11 | 5 | 1 | 10 |
| Total | 499 | 123 | 25 | 105 | 53 | 46 | 4 | 38 | 480 | 115 | 16 | 112 |

* 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 May to 31 July 2014, 3 A(H1N1)pdm09 and 11 A(H3N2) viruses have been successfully isolated in eggs at the Centre.