Recommended composition of influenza virus vaccines for use in the 2011-2012 northern hemisphere influenza season

February 2011

The World Health Organization (WHO) convenes technical consultations[1] in February and September each year to recommend viruses for inclusion in influenza vaccines[2] for the northern and southern hemispheres, respectively. This recommendation relates to the influenza vaccines for the forthcoming influenza season in the northern hemisphere (2011-2012). A recommendation will be made in September 2011 relating to vaccines that will be used for the influenza season in the southern hemisphere (2012). For countries in equatorial regions, epidemiological considerations influence which recommendation (February or September) individual national and regional authorities consider more appropriate.

Influenza activity, September 2010 – January 2011

Between September 2010 and January 2011, influenza activity was reported in Africa, the Americas, Asia, Europe and Oceania. Pandemic 2009 influenza A(H1N1) [A(H1N1)pdm09][3] viruses predominated in Asia and Europe while influenza A(H3N2) viruses predominated in the Americas. Influenza B viruses co-circulated in many countries in the northern hemisphere and was the predominant virus in some countries. The former seasonal influenza A(H1N1) viruses were detected sporadically in very few countries.

In the northern hemisphere, widespread outbreaks of A(H1N1)pdm09 were reported in most European countries and the United States of America as well as some countries in Asia and north Africa. In Europe, A(H1N1)pdm09 activity occurred early in the United Kingdom of Great Britain and Northern Ireland (United Kingdom) and western Europe where it reached peaks or declined by January, whereas A(H1N1)pdm09 activity continues to increase in some countries in central and south eastern Europe. In Asia, regional and widespread A(H1N1)pdm09 influenza activity was reported during this period. In Canada and the United States of America activity due to A(H1N1)pdm09 was low but increased in January.

Influenza A(H3N2) activity resulted in regional outbreaks in the Americas. Activity increased in Canada and the United States of America in December and became widespread in January. In Cambodia and China Hong Kong Special Administrative Region (Hong Kong SAR) regional influenza A(H3N2) activity was reported during September and October while localized and sporadic activity was reported in some countries in north Africa and Europe.

Influenza B activity increased in Canada, the United States of America and many European countries in December and January. Influenza B was the predominant virus in Norway, the Russian Federation and Ukraine. Regional or widespread outbreaks were reported by Algeria

[1] http://www.who.int/csr/disease/influenza/vaccinerecommendations/en/index.html
[2] Description of the process of influenza vaccine virus selection and development available at: http://www.who.int/gb/pip/pdf_files/Fluvaccvirusselection.pdf
[3] The designation "pdm" is being used to differentiate the H1N1 viruses originating from the 2009-2010 pandemic from seasonal human influenza A (H1N1) viruses that pre-dated the pandemic.

and Israel in December and January. Localized and sporadic activity was also reported by several African countries.

The former seasonal influenza A(H1N1) virus was very rarely detected (reported by China, Malaysia, the Russian Federation, Tunisia and the United States of America).

In the southern hemisphere, influenza activity in general was low during this period with the exception of some South American countries where widespread activity was reported. A(H1N1)pdm09 was reported at low levels in a few countries in southern Africa, South America and Oceania. Influenza A(H3N2) was the predominant virus in many countries in South America with widespread outbreaks occurring in September in Chile. Localized and sporadic activity was also reported in southern Africa, South America and Oceania.

In tropical areas, many countries experienced outbreaks of varying intensity of influenza A(H1N1)pdm09, A(H3N2) and B viruses.

Sporadic human cases of avian influenza A(H5N1) were reported from Cambodia, China Hong Kong SAR, Egypt and Indonesia. No human cases of influenza A(H9N2) were reported during the period of September 2010 to January 2011.

The extent and type of influenza activity worldwide are summarized in Table 1.

Zoonotic influenza infections caused by A(H5N1), A(H9N2), and swine A(H1N1) and swine A(H3N2) viruses

From 27 September 2010 to 9 February 2011, 14 confirmed human cases of A(H5N1), 6 of which were fatal, were reported from Cambodia, China Hong Kong SAR, Egypt and Indonesia, where highly pathogenic avian influenza A(H5N1) is present in poultry or wild birds. Since December 2003, a total of 520 cases with 307 deaths have been confirmed in 15 countries[4]. To date there has been no evidence of sustained human-to-human transmission.

No human cases of influenza A(H9N2) were reported during the period September 2010 to January 2011.

Since September 2010, a total of 8 zoonotic infections caused by swine A(H1N1) and swine A(H3N2) viruses were detected in China (1), Switzerland (1) and the United States of America (6).

Antigenic and genetic characteristics of recent virus isolates

Influenza A(H1N1) viruses

Between September 2010 and January 2011, the vast majority of A(H1N1) viruses detected worldwide were A(H1N1)pdm09. Haemagglutination inhibition (HI) tests using postinfection ferret antisera indicated that A(H1N1)pdm09 viruses remained antigenically homogeneous and closely related to the vaccine virus A/California/7/2009. Sequence analysis of the HA genes of A(H1N1)pdm09 viruses indicated that the viruses fell into three genetic subgroups which were antigenically indistinguishable. A small number of viruses showed reductions in reactivity with some ferret antisera in HI assays.

[4] http://www.who.int/csr/disease/avian_influenza/country/cases_table_2011_02_09/en/index.html

Only six former seasonal A(H1N1) viruses were detected: in China, Malaysia, the Russian Federation, Tunisia and the United States of America. Of those tested, most were antigenically and genetically closely related to A/Brisbane/59/2007 and belonged to clade 2B.

Influenza A(H3N2) viruses

The majority of A(H3N2) viruses collected from September 2010 to January 2011 were antigenically closely related to A/Perth/16/2009, the vaccine virus for the 2010-2011 northern hemisphere and 2011 southern hemisphere seasons. Antigenic characteristics were assessed with panels of postinfection ferret antisera in HI and virus neutralization assays. The HA genes of recent viruses fell into two phylogenetic clades represented by A/Perth/16/2009 and A/Victoria/208/2009, with the majority falling within the A/Victoria/208/2009 clade. Phylogenetic subgroups within both clades have emerged but viruses within these subgroups were antigenically similar to A/Perth/16/2009.

Influenza B viruses

Influenza B viruses of both the B/Victoria/2/87 and the B/Yamagata/16/88 lineages circulated with B/Victoria/2/87 lineage viruses continuing to predominate globally. However, in China, B/Yamagata/16/88 lineage viruses predominated from September 2010 to January 2011 and have continued to co-circulate with B/Victoria/2/87 lineage viruses at a low level.

In HI tests with postinfection ferret antisera, the majority of the B/Victoria/2/87 lineage viruses were antigenically closely related to the vaccine virus B/Brisbane/60/2008. A small number of viruses from several countries were antigenically and genetically distinguishable from B/Brisbane/60/2008-like viruses; most of them belonged to the subgroup represented by B/Singapore/616/2008 and B/Philippines/1617/2010. Most recent B/Yamagata/16/88 lineage viruses were antigenically and genetically distinguishable from the previous vaccine virus B/Florida/4/2006 and were more closely related to B/Bangladesh/3333/2007, B/Hubei-Wujiagang/158/2009 and B/Wisconsin/1/2010.

Resistance to influenza antiviral drugs

Neuraminidase inhibitors

The vast majority of A(H1N1)pdm09 viruses were sensitive to oseltamivir. Of the small number of oseltamivir-resistant A(H1N1)pdm09 viruses detected, most were linked to the use of this drug for prophylaxis or treatment. However, in some countries e.g. Japan and United Kingdom, there were a few cases with no known exposure to oseltamivir. In all cases, resistance was due to a histidine to tyrosine substitution at amino acid 275 (H275Y) in the neuraminidase. There were no reports of oseltamivir-resistant A(H3N2) or B viruses. No zanamivir-resistant viruses were detected. Updates are available on the WHO website[5].

M2 inhibitors

All A(H1N1)pdm09 and A(H3N2) viruses tested were resistant to the M2 inhibitors, amantadine and rimantadine. Resistance to these antiviral drugs was associated with a serine to asparagine substitution at amino acid 31 (S31N) of the M2 protein.

[5] http://www.who.int/csr/disease/influenza/2011_02_11_weekly_web_update_oseltamivir_resistance.pdf

Studies with inactivated influenza virus vaccines

HI assays were used to measure the presence of antibodies to the HA of recent virus isolates in 12 panels of sera from children, adults and elderly adults who had received seasonal trivalent inactivated vaccines. The trivalent vaccines contained the antigens of A/California/7/2009 (H1N1)-like, A/Perth/16/2009 (H3N2)-like and B/Brisbane/60/2008 viruses.

Vaccines containing A/California/7/2009-like antigens stimulated anti-HA antibodies of similar geometric mean HI titres to the vaccine virus and recent A(H1N1)pdm09 viruses.

Vaccines containing influenza A/Perth/16/2009-like antigens stimulated anti-HA antibodies of similar geometric mean HI titres to the vaccine virus and the majority of representative recent A(H3N2) viruses. Similar results were obtained in micro-neutralization tests using a subset of sera.

Vaccines containing influenza B/Brisbane/60/2008 antigens stimulated anti-HA antibodies of similar geometric mean HI titres to the vaccine virus and recent B/Victoria/2/87 lineage viruses. Geometric mean HI titres were lower to recent B/Yamagata/16/88 lineage viruses than to the most recent B/Victoria/2/87 lineage vaccine virus (average reductions: adults, 44%; elderly adults, 45%; children, 75%).

Recommended composition of influenza virus vaccines for use in the 2011-2012 influenza season

A(H1N1)pdm09 viruses co-circulated in varying proportions with A(H3N2) and B viruses during the period of September 2010 to January 2011. A(H1N1)pdm09 viruses were antigenically and genetically similar to A/California/7/2009. Vaccines containing A/California/7/2009 antigens stimulated anti-HA antibodies of similar titres against the vaccine virus and recent A(H1N1)pdm09 viruses.

Very few former seasonal influenza A(H1N1) viruses were reported. Most of those analysed were antigenically and genetically similar to the previous vaccine virus A/Brisbane/59/2007.

Influenza A(H3N2) viruses were detected in many parts of the world with widespread activity reported in several countries. The majority of recent viruses were antigenically and genetically similar to the vaccine virus A/Perth/16/2009. Vaccines containing A/Perth/16/2009-like antigens stimulated anti-HA antibodies of similar titres against the vaccine virus and recently circulating A(H3N2) viruses.

Influenza B activity was reported in many countries. B/Victoria/2/87 lineage viruses predominated in many parts of the world but B/Yamagata/16/88 lineage viruses predominated in China. The majority of recent B/Victoria/2/87 lineage viruses were antigenically and genetically closely related to B/Brisbane/60/2008. Most recently isolated B/Yamagata/16/88 lineage viruses were antigenically distinguishable from the previous vaccine virus B/Florida/4/2006 and were more closely related to B/Bangladesh/3333/2007, B/Hubei-Wujiagang/158/2009 and B/Wisconsin/1/2010 viruses. Current vaccines containing B/Brisbane/60/2008 antigens stimulated anti-HA antibodies that had similar titres against the vaccine viruses and recent viruses of the B/Victoria/2/87 lineage; however, titres were lower to recent viruses of the B/Yamagata/16/88 lineage.

It is expected that A(H1N1)pdm09, A(H3N2) and B viruses will co-circulate in the 2011-2012 northern hemisphere season.

It is recommended that the following viruses be used for influenza vaccines in the 2011-2012 influenza season (northern hemisphere):

– an A/California/7/2009 (H1N1)-like virus;
– an A/Perth/16/2009 (H3N2)-like virus;
– a B/Brisbane/60/2008-like virus.

Candidate influenza vaccine viruses that are available or under development and reagents for vaccine standardization can be found on WHO website[6]. The website includes information of candidate vaccine viruses for the above recommendation. In addition, candidate vaccine viruses for the B/Yamagata/16/88 lineage and A(H5N1) viruses are also listed on the same website.

As in previous years, national or regional control authorities approve the composition and formulation of vaccines used in each country. National public health authorities are responsible for making recommendations regarding the use of the vaccine. WHO has published recommendations on the prevention of influenza[7].

Candidate vaccine viruses (including reassortants) and reagents for use in the laboratory standardization of inactivated vaccine may be obtained from: Immunobiology, Office of Laboratory and Scientific Services, Monitoring and Compliance Group, Therapeutic Goods Administration, P.O. Box 100, Woden ACT, 2606 Australia (fax: +61 2 6232 8564, email: influenza.standards@tga.gov.au; web site: http://www.tga.gov.au); Division of Virology, National Institute for Biological Standards and Control, Health Protection Agency, Blanche Lane, South Mimms, Potters Bar, Hertfordshire, EN6 3QG UK (fax: +44 1707 641050, e-mail: enquiries@nibsc.hpa.org.uk, web site: http://www.nibsc.ac.uk/spotlight/influenza_resource_centre/reagents.aspx); or Division of Product Quality, Center for Biologics Evaluation and Research, Food and Drug Administration, 1401 Rockville Pike, Rockville, MD 20892, United States (fax: +1 301 480 9748). Center for Influenza Virus Research, National Institute of Infectious Diseases, Gakuen 4-7-1, Musashi-Murayama, Tokyo 208-0011, Japan (fax: +81 42 561 6156).

Requests for reference viruses for antigenic analysis should be addressed to the WHO Collaborating Centre for Reference and Research on Influenza, VIDRL, 10 Wreckyn Street, North Melbourne, Victoria 3051, Australia (fax: +61 3 9342 3939, web site: http://www.influenzacentre.org); the WHO Collaborating Centre for Reference and Research on Influenza, National Institute of Infectious Diseases, Gakuen 4-7-1, Musashi-Murayama, Tokyo 208-0011, Japan (fax: +81 42 561 6149 or +81 42 565 2498, web site: http://www.nih.go.jp/niid/index.html); the WHO Collaborating Center for Surveillance, Epidemiology and Control of Influenza, Centers for Disease Control and Prevention, 1600 Clifton Road, Mail Stop G16, Atlanta, GA 30333, United States (fax: +1 404 639 0080, web site: http://www.cdc.gov/flu/); the WHO Collaborating Centre for Reference and Research on Influenza, MRC National Institute for Medical Research, The Ridgeway, Mill Hill, London NW7 1AA, UK (fax: +44 208 906 4477, web site: http://www.nimr.mrc.ac.uk/wic/) or the WHO Collaborating Center for Reference and Research on Influenza, National Institute for Viral Disease Control and Prevention, China CDC, 155 Changbai Road, Changping District, 102206, Beijing, P.R. China. (tel: +8610 58900851, fax: +8610 58900851, email: whocc-china@cnic.org, website: http://www.cnic.org.cn/eng/)

Influenza surveillance information is updated on the WHO web site[8].

[6] http://www.who.int/csr/disease/influenza/vaccinerecommendations2/en/index.html
[7] http://www.who.int/docstore/wer/pdf/2002/wer7728.pdf
[8] http://www.who.int/influenza

Table 1. Extent and type of influenza activity worldwide, September 2010 – January 2011

Country, area or territory	September	October	November	December	January
Africa					
Algeria		*B	*H3, **B, *H1(pdm09)	*H3, ***B, *H1(pdm09)	*H3, ***B, **H1(pdm09)
Cameroon	*H3, *B, *H1(pdm09)	*H3, *B, **H1(pdm09)	*H3, *B, **H1(pdm09)	*H3, *B, **H1(pdm09)	*B, *H1(pdm09)
Central African Republic	*H1(pdm09)	*B, *H1(pdm09)	*B	*B	*A
Côte d'Ivoire	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)		*H1(pdm09)
Democratic Republic of the Congo				*H1(pdm09)	
Egypt	*B	*B, *H1(pdm09)	*B, *H1(pdm09)	*H1(pdm09)	**H1(pdm09)
Ethiopia	*H3	*H1(pdm09)	*H1(pdm09)	*H1(pdm09)	
France, Réunion	*H1(pdm09)				
Ghana	*H3, *H1(pdm09)	*H3, *H1(pdm09)	*H3, *H1(pdm09)	*H3, *B, *H1(pdm09)	*H3, *B
Kenya	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	*B, *H1(pdm09)
Madagascar	*H3, *B, *H1(pdm09)	*H3	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)
Mali	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	*H1(pdm09)		
Mauritius	*B				*H1(pdm09)
Morocco	*H3		*H1(pdm09)	*H3, *B, *H1(pdm09)	*H3, **B, **H1(pdm09)
Nigeria	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)			
Rwanda	*B	*H3			
Senegal	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	*H1(pdm09)	
South Africa	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	*B, *H1(pdm09)	*H3, *B, *H1(pdm09)
Togo		*H3, *B, *H1(pdm09)	*H1(pdm09)		*H1(pdm09)
Tunisia			*H1, *H3	*H3, **B, **H1(pdm09)	**B, ****H1(pdm09)
Uganda	*H3	*H3, *B		*H3, *B	
United Republic of Tanzania	*H3, *B		*H3		
America					
Argentina	*H3, **B	***A, **H3, *B	**A, *H3, *B	*A, *B, *H1(pdm09)	*H1(pdm09)
Bolivia (Plurinational State of)	*H3, *B, *H1(pdm09)	**H3, **B, *H1(pdm09)	**H3	*H3	*H3, *H1(pdm09)
Brazil	*B	*H3*B*H1(pdm09)	*H3*B*H1(pdm09)	*H3*B*H1(pdm09)	*H3*B*H1(pdm09)
Canada	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	**H3, *B, *H1(pdm09)	****H3, **B, **H1(pdm09)
Chile	****H3, **B,**H1(pdm09)	**H3, *B, *H1(pdm09)	*H3, *B	*H3, *B	*H3, *H1(pdm09)
Colombia	*H3, *B, **H1(pdm09)	*B, *H1(pdm09)	*H3, *H1(pdm09)	*H3, *H1(pdm09)	*H3, *B, *H1pdm
Costa Rica	**H3, *H1(pdm09)	*H3, *B	*H3, *B	*B	*H3, *B
Cuba	***H3, *B, *H1(pdm09)	**H3, *B	**H3, *B, *H1pdm	*H3, *B	*H3, *H1(pdm09)
Dominican Republic	**H3			*B	*B

Country, area or territory	September	October	November	December	January
Ecuador	*B				
El Salvador	*H3, *B, *H1(pdm09)	**B	*B		*B
France, French Guiana	*H3, *B	*H3, *B	*H3	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)
France, Guadeloupe		**H3	*H3, *B	*H3, *B	*H3, *B, *H1(pdm09)
France, Martinique	**H3	**H3	*H3	**H3, *B	*H3, *B, *H1(pdm09)
Honduras	*H3, *B, *H1(pdm09)	*H3, *B	*B	*H3, *B	*H3, *B
Jamaica	***H3	*H3, *B			*H1(pdm09)
Mexico	***H3, *B, *H1(pdm09)	**H3, *B	**H3, *B, *H1(pdm09)	***H3, *B, *H1(pdm09)	**H3, **B, *H1(pdm09)
Nicaragua	**B	*B	*B		
Panama	*B	*B	*B		
Paraguay	*H3, **B, **H1(pdm09)	**H3, **B, **H1(pdm09)	***H3, *B, *H1(pdm09)	***H3, *B	***H3, *B
Peru	*B, *H1(pdm09)	**A, *B, *H1(pdm09)	**A, *B, *H1(pdm09)	*A, *B	
United States of America	*H1, *H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	*H3, **B, *H1(pdm09)	**H3, **B, *H1(pdm09)	****H3, **B, ***H1(pdm09)
Uruguay	**H3, ***B	**H3, **B	**H3, *B		
Venezuela (Bolivarian Republic of)	*H3, *B				
Asia					
Bangladesh	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	*H3, *B		
Cambodia	***H3, *B, **H1(pdm09)	***H3, *B, *H1(pdm09)	**H3, ***B, *H1(pdm09)	*H3, ***B, *H1(pdm09)	**B
China	**H3, *B, *H1(pdm09)	**H3, *B, *H1(pdm09)	*H1, **H3, *B, *H1(pdm09)	*H1, **H3, *B, *H1(pdm09)	**H3, *B, **H1(pdm09)
China, Hong Kong SAR	***H3, *B, *H1(pdm09)	**H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	**H3, **B,****H1(pdm09)
Taiwan, China	***H3, *B, *H1(pdm09)				
Indonesia	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)
India	*H3, *B, ****H1(pdm09)	*B, **H1(pdm09)	*B, *H1(pdm09)	*B	*H3, *B
Iran (Islamic Republic of)	*B	*B, *H1(pdm09)	*H3, *B	*H3, **B, **H1(pdm09)	**B, **H1(pdm09)
Iraq			*H1(pdm09)	*H1(pdm09)	
Israel		*A, *B	*A, *B	*H3, **B, ***H1(pdm09)	*H3, **B, ***H1(pdm09)
Japan	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	**H3, *B, *H1(pdm09)	**H3, *B, ***H1(pdm09)	**H3, *B, ****H1(pdm09)
Kazakhstan				*B, *H1(pdm09)	*B, **H1(pdm09)
Kuwait				*H3	
Kyrgyzstan			*B	*B	**B
Lao People's Democratic Republic	**H3, **B		*H3, *B, *H1(pdm09)	*B, *H1(pdm09)	*H3, *B, *H1(pdm09)
Mongolia	*A	*H3, *B	*H3	*H3	*H3, *H1(pdm09)
Nepal	*H3, **B, **H1(pdm09)	*H3, *B, *H1(pdm09)	*B		

Country, area or territory	September	October	November	December	January
Oman	*H1(pdm09)	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	*B, *H1(pdm09)	*B, *H1(pdm09)
Pakistan	*H3, *B	*H3, *B	*H1(pdm09)	*B, ****H1(pdm09)	***H1(pdm09)
Philippines	*H3, *B, *H1(pdm09)	*H3, *B	*H3, *B, *H1(pdm09)	*B, *H1(pdm09)	*A, *B
Republic of Korea	*H3, *H1(pdm09)	*H3, *H1(pdm09)	*H3, *H1(pdm09)	*H3, **H1(pdm09)	*H3, ***H1(pdm09)
Singapore	**H3, **B, **H1(pdm09)	**H3, **B, **H1(pdm09)			*H3, **B, **H1(pdm09)
Sri Lanka	*H3, *H1(pdm09)	*B, **H1(pdm09)	*B, **H1(pdm09)	*B, **H1(pdm09)	*B, **H1(pdm09)
Tajikistan					*H1(pdm09)
Thailand	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)
Viet Nam	*H3	*H3			
Europe					
Albania				*H3, *B, *H1(pdm09)	*H3, *B, **H1(pdm09)
Armenia		**B	**B	**B	*A, **B
Austria				*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)
Belarus		*B		*B	*B, *H1(pdm09)
Belgium		*H3, *B	*B, *H1(pdm09)	*H3, ***B,****H1(pdm09)	****B, ****H1(pdm09)
Bosnia and Herzegovina					*B, ***H1(pdm09)
Bulgaria				*H1(pdm09)	**B, ****H1(pdm09)
Croatia		*H3		**H1(pdm09)	****H1(pdm09)
Czech Republic			*H1(pdm09)	*H1(pdm09)	*H1(pdm09)
Denmark			*H3, *H1(pdm09)	*H3, ***B,****H1(pdm09)	*H3, ***B,****H1(pdm09)
Estonia				*H1(pdm09)	*H3, **B, ****H1(pdm09)
Finland			*H1(pdm09)	*B, ***H1(pdm09)	**B, ****H1(pdm09)
France	*H3, *H1(pdm09)	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)	*H3, ***B,****H1(pdm09)	*H3, ***B,****H1(pdm09)
Georgia			*B, *H1(pdm09)	*B, *H1(pdm09)	**B, ****H1(pdm09)
Germany	*H3, *H1(pdm09)	*H3, *B, *H1(pdm09)	*B, *H1(pdm09)	*H3, *B, **H1(pdm09)	*H3, **B, ***H1(pdm09)
Greece		*H3			*H3, *B, ****H1(pdm09)
Hungary				*H1(pdm09)	*B, ****H1(pdm09)
Iceland				**H1(pdm09)	*H3, **B, **H1(pdm09)
Ireland				*B, ****H1(pdm09)	**B, ****H1(pdm09)
Italy			*B, *H1(pdm09)	*H3, *B, *H1(pdm09)	*H3, **B, **H1(pdm09)
Latvia				*H3, *B, **H1(pdm09)	***B, ****H1(pdm09)
Lithuania	*H1(pdm09)			*B, *H1(pdm09)	*B, ***H1(pdm09)
Luxembourg			*B	**B, ****H1(pdm09)	****B, ****H1(pdm09)
Malta				*B, **H1(pdm09)	*B, **H1(pdm09)
Netherlands	*B	*B	*B, *H1(pdm09)	*B, ***H1(pdm09)	****B, ****H1(pdm09)
Norway	*H1(pdm09)	*H3, *B, *H1(pdm09)	*B, *H1(pdm09)	*H3, ****B, **H1(pdm09)	*H3, ****B,***H1(pdm09)
Poland	*H1(pdm09)		*B	*B, *H1(pdm09)	*H3, **B, ***H1(pdm09)

Country, area or territory	September	October	November	December	January
Portugal			*H3, *B	*H3, ****B,***H1(pdm09)	****B, ****H1(pdm09)
Republic of Moldova					*B, **H1(pdm09)
Romania			*H1(pdm09)	*H3, *H1(pdm09)	*H3, *B, **H1(pdm09)
Russian Federation	*H1, *H3	*H1	*H3, *B, *H1(pdm09)	*H3, **B, *H1(pdm09)	*H3, ***B, ****H1(pdm09)
Serbia				*H3	*H3, *B, *H1(pdm09)
Slovakia		*A		*B, *H1(pdm09)	**B, **H1(pdm09)
Slovenia			*H3, *B	*B, *H1(pdm09)	*H3, ****B, ***H1(pdm09)
Spain		*H3, *B, *H1(pdm09)	*H3, **B, **H1(pdm09)	*H3, *B, ***H1(pdm09)	*H3, ***B, ****H1(pdm09)
Sweden			*H3, **B, **H1(pdm09)	*H3, **B, **H1(pdm09)	*H3, **B, ****H1(pdm09)
Switzerland	*H1(pdm09)	*B, *H1(pdm09)	*B	*B, **H1(pdm09)	***B, ****H1(pdm09)
Turkey			*H3, *B	*H3, **B, *H1(pdm09)	**H3, ***B, ***H1(pdm09)
Ukraine		*B	*H3, *B	*H3, ***B, *H1(pdm09)	*H3, **B, **H1(pdm09)
United Kingdom of Great Britain and Northern Ireland	*H3, *B	*H3, *B, *H1(pdm09)	*H3, **B, **H1(pdm09)	*H3, ****B, ****H1(pdm09)	*H3, ****B, ****H1(pdm09)
Oceania					
Australia	*H3, **B, **H1(pdm09)	*H3, **B, **H1(pdm09)	**H3, **B, *H1(pdm09)	*H3, *B, *H1(pdm09)	*H3, *B, *H1(pdm09)
Fiji	***H1(pdm09)	***H3, *H1(pdm09)			
France, New Caledonia	**B	*B, *H1(pdm09)			
New Zealand	*H3, **H1(pdm09)				
Micronesia (Federated States of)	*B	*B			

Data in table 1 were provided by the Global Influenza Surveillance Network and other partners.

* = Sporadic activity	A = Influenza A (not subtyped)
** = Local activity	B = Influenza B
*** = Regional outbreaks	H1(pdm09) = Pandemic 2009 influenza A(H1N1)
****= Widespread outbreaks	H1 = Influenza A(H1N1)
	H3 = Influenza A(H3N2)

Annex

Declarations of interest

The WHO recommendation on composition of influenza vaccines for the northern hemisphere 2011-2012 was made through a technical consultation with relevant WHO Collaborating Centres on Influenza (CCs) and Essential Regulatory Laboratories (ERLs).

In accordance with WHO policy, Directors of the relevant WHO CCs and ERLs, in their capacity as representatives of their respective institutions ("Advisers") completed the WHO form for Declaration of Interests for WHO experts before being invited to the consultation. At the start of the consultation, the interests declared by the Advisers were disclosed to all consultation participants.

The Advisers declared the following personal current or recent (past 4 years) financial or other interests relevant to the subject of work:

Institution	Representative	Personal interest
WHO CC Atlanta	Dr Nancy Cox	None
WHO CC Beijing	Dr Yuelong Shu	None
WHO CC London	Dr John McCauley	None
WHO CC Melbourne	Dr Anne Kelso	Shareholdings in a vaccine manufacturer
WHO CC Memphis	Dr Richard Webby	None
WHO CC Tokyo and ERL NIID	Dr Masato Tashiro	None
ERL CBER	Dr Zhiping Ye	None
ERL NIBSC	Dr Othmar Engelhardt	Travel cost to a conference paid by a vaccine manufacturer
ERL TGA	Dr Gary Grohmann	None

The interest declared by Dr Kelso and Dr Engelhardt was reviewed by the WHO Secretariat and determined not to present a conflict of interest with the objectives of the technical consultation. Furthermore, the interest was disclosed to all consultation participants. In view of the foregoing, Dr Kelso and Dr Engelhardt participated in the consultation as Advisers.