

## TECHNICAL DOCUMENT

Community Network of Reference Laboratories (CNRL) for Human Influenza in Europe

# Influenza virus characterisation

Summary Europe, March 2010

## Influenza virus characterisation

### March 2010.

2009 pandemic influenza A(H1N1) viruses have continued to predominate but at a lower level than earlier in the season. Circulation of H3N2 viruses and influenza B viruses has remained low. There remains very little seasonal H1N1 virus activity.

Most of the viruses characterised by the London-based WHO Collaborating Centre (WHO CC) for Reference and Research on Influenza have been 2009 pandemic influenza A(H1N1) virus.

Table 1 shows the number of pandemic influenza A(H1N1) clinical samples and virus isolates from Europe received at the WHO CC from September 1 2009 to 28 February 2010. **Note:** for clinical samples, only representative samples were taken for virus recovery in tissue culture; the choice being based in part on qRT-PCR Ct values.

**Table 1: Summary of H1N1 pandemic analyses conducted on samples collected September 2009 to February 2010.**

MONTH Continent	Number of Countries	Clinical samples received		Isolates received	
		Number received	Number propagated	Number received	Number propagated
<b>SEPTEMBER</b> Europe	20	21	9	61	57
<b>OCTOBER</b> Europe	21	105	31	98	83
<b>NOVEMBER</b> Europe	28	655	122	200	193
<b>DECEMBER</b> Europe	20	260	73	69	69
<b>JANUARY</b> Europe	7	38	6	7	7
<b>FEBRUARY</b> Europe	3	34	7	5	5
<b>UNKNOWN</b> Europe	4	187		21	21
<b>TOTAL</b>		<b>1300</b>	<b>248</b>	<b>461</b>	<b>435</b>

*All propagated viruses have been antigenically characterised by HI assay.*

Antigenic analysis of a representative set of European viruses, including viruses recovered from specimens collected in January and February 2010, is shown in Table 2. The table shows haemagglutination inhibition (HI) results using a panel of reference post-infection ferret antisera. As described in the previous ECDC virus characterisation reports ([January](#), [February](#)), the viruses continue to react well with ferret antisera raised against the reference 2009 pandemic influenza viruses; notably all the viruses react well with the antiserum raised against the vaccine virus A/California/7/2009. A similar pattern continues to be observed with viruses from countries outside of Europe that have been assayed at the WHO CC in London.

**Table 2: Antigenic analyses of pandemic A(H1N1) influenza viruses conducted at WHO CC.**

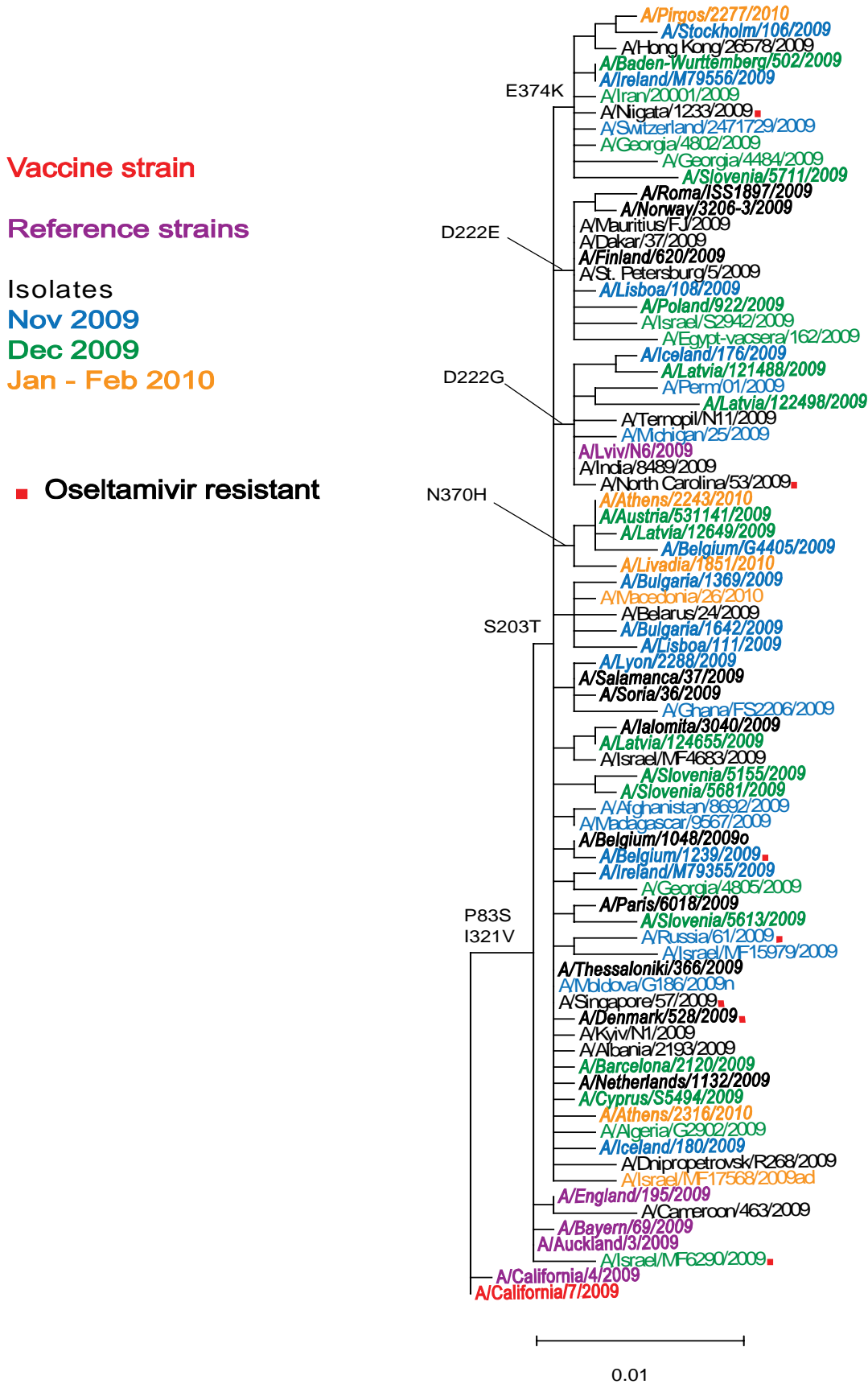
Viruses	Collection date	Passage History	Haemagglutination inhibition titre <sup>1</sup>					
			Post infection ferret sera					
			A/Cal 4/09 C4/F14/09	A/Cal 7/09 C4/31/09 IBSC	A/Eng 195/09 F17/09	A/Auck 3/09 C4/17/09	A/Bayern 69/09 C4/33/09	A/Lviv N6/2009 C4/34/09
<b>REFERENCE VIRUSES</b>								
A/California/4/2009		C1,E2	2560	2560	2560	5120	2560	5120
A/California/7/2009		E6	5120	2560	2560	5120	1280	5120
A/England/195/2009		MDCK3/SIAT1	1280	1280	1280	2560	640	1280
A/Auckland/3/2009		Ex+3	5120	5120	2560	5120	2560	5120
A/Bayern/69/2009		MDCK4/SIAT1	80	320	40	80	640	320
A/Lviv/N6/2009		MDCK4/SIAT1	640	1280	160	320	2560	2560
<b>TEST VIRUSES</b>								
A/Lithuania/1938/2009	unknown	SIAT3	1280	1280	1280	2560	1280	1280
A/Lithuania/1942/2009	unknown	SIAT3	640	640	640	1280	640	1280
A/La Reunion/3473/2009	unknown	MDCK2, SIAT1	1280	640	640	1280	640	640
A/Iceland117/2009	05/10/2009	MDCK1, SIAT1	1280	1280	640	1280	640	1280
A/Soria/36/2009	22/10/2009	MDCK1 / SIAT2	2560	2560	1280	5120	1280	2560
A/Bulgaria/1369/2009	03/11/2009	SIAT3	2560	2560	1280	2560	1280	2560
A/Tajikstan/411/2009	13/11/2009	SIAT3	2560	2560	1280	2560	1280	1280
A/Prague 214/09	26/11/2009	E1	2560	2560	1280	2560	1280	1280
A/Jihlava 203/09	29/11/2009	E3	1280	2560	1280	2560	1280	1280
A/Slovenia/5681/2009	Dec-09	M / SIAT1	1280	1280	1280	2560	1280	1280
A/Slovenia/5711/2009	Dec-09	M / SIAT1	1280	2560	1280	2560	1280	2560
A/Denmark/1900/2009	01/12/2009	3. MDCK / SIAT1	640	640	320	640	640	1280
A/Tajikstan/429/2009	03/12/2009	SIAT3	2560	1280	640	640	640	1280
A/Iceland/191/2009	06/12/2009	MDCK3 / SIAT1	2560	1280	1280	2560	1280	1280
A/Cyprus/5207/2009	07/12/2009	SIAT3	1280	1280	640	2560	640	1280
A/Turkey/TR-01/2009	14/12/2009	SIAT1, SIAT1	1280	1280	640	2560	640	1280
A/Macedonia/3302/2009	17/12/2009	SIAT3	1280	640	320	1280	640	640
A/Turkey/TR-04/2009	21/12/2009	SIAT1, SIAT1	1280	1280	640	1280	640	1280
A/Belgium/G4751/2009	21/12/2009	SIAT2	1280	2560	1280	2560	1280	1280
A/Macedonia/3369/2009	23/12/2009	SIAT4	640	2560	320	1280	2560	2560
A/Belgium/G4750/2009	28/12/2009	SIAT2	1280	1280	640	2560	640	1280
A/Iceland/192/2009	28/12/2009	MDCK2 / SIAT1	2560	1280	1280	2560	1280	1280
A/Lisboa/118/2009	28/12/2009	MDCK3	1280	1280	640	1280	640	1280
A/Lisboa/136/2009	29/12/2009	MDCK3	640	1280	640	1280	640	1280
A/Luxembourg/24/2010	05/01/2010	MDCKx / SIAT1	2560	2560	1280	2560	1280	2560
A/Georgia/54/2010	05/01/2010	SIAT2	1280	1280	640	2560	640	1280
A/Cyprus/5870/2010	20/01/2010	SIAT2	1280	2560	1280	2560	1280	1280
A/Ostrava 221/10	25/01/2010	E1	2560	2560	1280	2560	1280	2560
A/Latvia/1-1346/2010	27/01/2010	MDCKx / SIAT1	1280	2560	1280	2560	1280	1280
A/Latvia/2-37/2010	29/01/2010	MDCKx / SIAT1	2560	1280	1280	2560	1280	2560
A/Luxembourg/251/2010	02/02/2010	MDCKx	2560	2560	2560	5120	1280	2560
A/Athens/2243/2010	04/02/2010	SIAT2	2560	2560	1280	2560	1280	2560
A/Georgia/670/2010	04/02/2010	SIAT3	320	640	160	320	640	1280
A/Thessaloniki/790/2010	16/02/2010	E3	2560	2560	1280	5120	2560	2560
A/Thessaloniki/791/2010	17/02/2010	E3	1280	2560	1280	2560	1280	2560

Vaccine strain

Gene sequence analysis of a subset of recent viruses and clinical specimens shows that circulating viruses continue to remain genetically similar to the prototype and vaccine viruses. Figure 1 shows a phylogenetic tree of the HA1 coding region of the haemagglutinin (HA) gene; viruses from Europe (highlighted in bold-type italic script) are shown compared with viruses from other parts of the world. As described in the previous reports, most viruses carry the amino acid substitution S203T in the HA glycoprotein, with a subset carrying substitutions at amino acid 222 as well. These substitutions do not affect the antigenicity of the viruses. Viruses resistant to oseltamivir, associated with the H275Y amino acid substitution in the neuraminidase (NA), remain unclustered in the HA1 phylogenetic tree and have only been detected infrequently in Europe and the rest of the world.

No seasonal influenza viruses (H1N1, H3N2, influenza B) of European origin have been received at the WHO CC in London since the last report in [February](#).

**Figure 1: Phylogenetic comparison of pandemic A(H1N1) genes**



The phylogenetic tree was constructed using maximum parsimony in PAUP (Sinauer Associates). The bar indicates the proportion of nucleotide changes in the sequence. Reference strains are viruses to which post-infection antisera have been developed. The colours indicate the date of sample collection. Isolates from Europe are in italics.