



Influenza A(H1N1) virus resistance to oseltamivir - 2008 influenza season, southern hemisphere

14 October 2008

During the weeks 37–40 (7 September – 4 October), influenza activity in the southern hemisphere continued to decline. In New Zealand, influenza activity declined from widespread to local, with influenza B virus circulating. Activity was also low in the rest of the world – declining influenza activity (H1, H3) was reported from Hong Kong SAR, China, sporadic influenza activity was detected in Argentina (A,B), Cameroon (B), Canada (A, B), Chile (A, B), Poland (A), South Africa (B), the United Kingdom (A) and the United States of America (A,B).

WHO has received several reports from National Influenza Centres (NIC) in the southern hemisphere regarding influenza A(H1N1) virus resistance to oseltamivir. In South Africa, a total of 306 A(H1N1) viruses have been isolated during the 2008 influenza season as of 6 October. Of those, 225 isolates have been tested for oseltamivir resistance by the National Institute of Communicable Diseases (NICD) and 100% were found to be resistant to oseltamivir by genotypic analysis. Only one of these 225 patients was receiving oseltamivir at the time of sampling, and no unusual clinical features or underlying conditions were found. In Australia, 47 of 59, Argentina, 15 of 33, Chile, 10 of 79, Kenya, 1 of 4, New Caledonia, 7 of 7, New Zealand, 2 of 2, and Uruguay 13 of 16 A(H1N1) viruses analysed showed the specific neuraminidase mutation (H274Y) associated with oseltamivir resistance, respectively. WHO has also received reports from NICs in other parts of the world; in Algeria, 4 of 13, Canada, 1 of 2, Ghana 5 of 13, Guatemala, 4 of 5, Honduras, 5 of 8, Ivory Coast, 2 of 5, the Netherlands, 1 of 2, Nigeria, 1 of 1, Senegal 10 of 10 and the United States of America, 3 of 7 A(H1N1) viruses tested were found to be resistant, respectively.

WHO is collecting global data about this phenomenon from multiple laboratories participating in [Global Influenza Surveillance Network](#). Data from European countries participating in EISS were provided by the [EISS](#) and [VirGil](#) project. This summary table will be updated regularly (every four weeks).

Oseltamivir resistance results were based on phenotypic and/or genotypic analyses.

For background and summary until week 24, 2008, see *Influenza A(H1N1) virus resistance to oseltamivir, Last quarter 2007 to first quarter 2008, Preliminary summary and future plans* http://www.who.int/csr/disease/influenza/oseltamivir_summary/en/index.html

Table 1. Influenza A(H1N1) virus resistance to oseltamivir (Second quarter 2008 - 13 October 2008)

WHO region	Country, area or territory	No. of H1N1 isolates tested	No.(%) of isolates resistant to oseltamivir
AFRO	Algeria	13	4 (31%)
	Cameroon	2	2

	Ghana	13	5	(38%)
	Ivory Coast	5	2	
	Kenya	4	1	
	Madagascar	9	0	
	Nigeria	1	1	
	Senegal	10	10	(100%)
	Seychelles	8	5	
	South Africa	225	225	(100%)
AFRO Total		290	255	(88%)
AMRO	Argentina	33	15	(45%)
	Brazil	12	0	
	Canada	2	1	
	Chile	79	10	(13%)
	Colombia	1	0	
	El Salvador	8	7	
	Guadeloupe	1	0	
	Guatemala	5	4	
	Honduras	8	5	
	Nicaragua	9	0	
	Panama	9	0	
	Paraguay	1	0	
	Peru	9	0	
	United States of America	7	3	
	Uruguay	16	13	(81%)
AMRO Total		200	58	(29%)
EMRO	Jordan	2	1	
EMRO Total		2	1	
EURO	Netherlands	2	1	
	Norway	8	6	
	Russian Federation	20	9	(45%)
	United Kingdom	1	1	
EURO Total		31	17	(55%)
WPRO	Australia	59	47	(80%)
	China, Hong Kong SAR	583	97	(17%)
	Japan	61	0	
	Malaysia	8	0	
	New Caledonia	7	7	
	New Zealand	2	2	
	Philippines	11	10	(91%)
	Singapore	6	3	
WPRO Total		737	166	(23%)
SEARO	Thailand	12	0	
SEARO Total		12	0	
Grand Total		1272	497	(39%)

*If the number of isolates tested was below 10, percentage is not shown.

Table 2. Influenza A(H1N1)virus resistance to oseltamivir (Last quarter 2007 - 31 March 2008)

WHO region	Country, area or territory	No. of H1N1 isolates tested	No.(%) of isolates resistant to oseltamivir	
AFRO	Algeria	2	0	
	Cameroon	5	3	
	Kenya	11	0	
	Madagascar	59	0	
	Senegal	16	0	
AFRO Total		93	3	(3%)
AMRO	Brazil	16	0	
	Canada	508	134	(26%)
	Chile	5	0	
	Ecuador	3	0	
	El Salvador	1	0	
	Honduras	2	0	
	Mexico	20	0	
	Montserrat	3	3	
	United States of America	1026	126	(12%)
	AMRO Total		1584	263
EMRO	Egypt	6	0	
	Iraq	1	0	
	Marocco	1	0	
	Qatar	4	0	
EMRO Total		12	0	
EURO	Austria	164	12	(7%)
	Belarus	7	2	
	Belgium	32	17	(53%)
	Bulgaria	9	0	
	Croatia	6	0	
	Czech Republic	24	0	
	Denmark	45	2	(4%)
	Estonia	7	3	
	Finland	13	3	(23%)
	France	496	231	(47%)
	Germany	505	66	(13%)
	Greece	65	7	(11%)
	Hungary	11	0	
	Iceland	10	2	(20%)
	Ireland	63	7	(11%)
	Italy	106	1	(1%)
	Kazakhstan	1	1	
	Latvia	15	0	
	Luxembourg	227	59	(26%)
	Netherlands	170	46	(27%)
Norway	265	178	(67%)	
Poland	10	1		
Portugal	29	6	(21%)	

	Romania	49	4	(8%)
	Russian Federation	128	58	(45%)
	Serbia	18	0	
	Slovakia	14	0	
	Slovenia	28	1	(4%)
	Spain	106	2	(2%)
	Sweden	36	4	(11%)
	Switzerland	53	10	(19%)
	Turkey	33	6	(18%)
	Ukraine	67	23	(34%)
	United Kingdom	346	37	(11%)
EURO Total		3158	789	(25%)
WPRO	Australia	84	3	(4%)
	China	4	0	
	China, Hong Kong SAR	666	79	(12%)
	Guam	15	0	
	Japan	1652	44	(3%)
	Malaysia	13	0	
	Mongolia	5	0	
	New Zealand	88	0	
	Philippines	37	0	
	Republic of Korea	99	0	
	Singapore	7	0	
WPRO Total		2670	126	(5%)
SEARO	Thailand	13	1	(8%)
SEARO Total		13	1	(8%)
Grand Total		7530	1182	(16%)

*If the number of isolates tested was below 10, percentage is not shown.