



Influenza A(H1N1) virus resistance to oseltamivir - 2008/2009 influenza season, northern hemisphere

18 March 2009

During weeks 1-4 (28 December 08 – 24 January 09), the level of overall influenza activity in the world increased. In Europe, most countries reported regional or widespread activity with influenza A (H3) viruses predominating. Widespread influenza A activity (H1 and H3) was reported in Japan. In Canada, Hong Kong SAR and the United States, influenza activity increased but remained relatively low. Sporadic influenza activity was observed in Brazil (A), Croatia (H1, H3, B), Greece (H1, H3, B), Iran (H1, H3), Mongolia (A), Portugal (H1, H3, B), Serbia (H1, H3, B), Singapore (H1, H3, B), Slovakia (H3) and Turkey (H3, B).

During this period, a total of 30 countries from all WHO regions reported oseltamivir resistance for 1291 of 1362 A(H1N1) viruses analysed. The prevalence of oseltamivir resistance was very high in the following countries/territory: Canada (52 of 52 tested), Hong Kong SAR (72 of 80), Japan (420 of 422), the Republic of Korea (268 of 269) and the United States of America (237 of 241). The resistance prevalence was relatively low in China (6 of 44 tested). In Europe, H1N1 circulation was low during this period while the resistance prevalence was high: France (12 of 12 tested), Germany (66 of 67), Ireland (9 of 10), Italy (16 of 16), Sweden (11 of 12) and the United Kingdom (61 of 62).

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.

A comprehensive table of influenza A(H1N1) virus resistance to oseltamivir (Fourth quarter 2008 - 31 January 2009) can be found on the following page.

**Table 1. Influenza A(H1N1) virus resistance to oseltamivir
(Fourth quarter 2008 - 31 January 2009) as of 18 Mar 2009**

Region	Country, area or territory	No. of H1N1 isolates tested	No.(%) of viruses tested positive for oseltamivir resistance†
AFRO	Ghana	1	1
	Madagascar	7	0
AFRO Total		8	1
AMRO	Argentina	1	0
	Canada	52	52 (100%)
	Costa Rica	1	0
	Mexico	5	4
	Puerto Rico	1	1
	United States of America	241	237 (98%)
AMRO Total		301	294 (98%)
EMRO	Marocco	10	10 (100%)
EMRO Total		10	10 (100%)
EURO	France	12	12 (100%)
	Germany	67	66 (99%)
	Greece	1	1
	Ireland	10	9 (90%)
	Israel	1	1
	Italy	16	16 (100%)
	Netherlands	4	4
	Norway	9	9
	Portugal	3	3
	Russian Federation	6	5
	Slovakia	1	1
	Spain	5	5
	Sweden	12	11 (92%)
	United Kingdom	62	61 (98%)
EURO Total		209	204 (98%)
SEARO	India	6	6
	Thailand	6	5
SEARO Total		12	11 (92%)
WPRO	China	44	6 (14%)
	China, Hong Kong SAR	80	72 (90%)
	Japan	422	420 (100%)
	Republic of Korea	269	268 (100%)
	Singapore	7	5
WPRO Total		822	771 (94%)
Grand Total		1362	1291 (95%)

† Percentage (%) is not shown if the number of viruses tested was less than 10.

**Table 2. Influenza A(H1N1) virus resistance to oseltamivir
(1 April 2008 - 30 September 2008) as of 15Jan 2009**

Region	Country, area or territory	No. of H1N1 isolates tested	No.(%) of viruses tested positive for oseltamivir resistance†
AFRO	Cameroon	2	2
	Ghana	22	13 (59%)
	Ivory Coast	5	2
	Kenya	9	1
	Madagascar	9	0
	Mauritius	1	1
	Nigeria	1	1
	Senegal	10	10 (100%)
	Seychelles	8	5
	South Africa	225	225 (100%)
AFRO Total		292	260 (89%)
AMRO	Argentina	36	18 (50%)
	Brazil	18	4 (22%)
	Canada	2	1
	Chile	90	12 (13%)
	Colombia	1	0
	Costa Rica	19	14 (74%)
	El Salvador	32	21 (66%)
	Guadeloupe	1	0
	Guatemala	5	4
	Honduras	8	5
	Mexico	3	1
	Nicaragua	13	0
	Panama	9	0
	Paraguay	1	0
	Peru	9	0
	United States of America	10	3 (30%)
Uruguay	17	14 (82%)	
Venezuela	1	1	
AMRO Total		275	98 (36%)
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%)
SEARO	India	1	0
	Thailand	12	0
SEARO Total		13	0
WPRO	Australia	76	71 (93%)
	China, Hong Kong SAR	583	97 (17%)
	Japan	7	1
	Malaysia	8	0
	New Caledonia	7	7
	New Zealand	2	2
	Philippines	11	10 (91%)
	Singapore	6	3

	Vietnam	31	21	(68%)
WPRO Total		731	212	(29%)
Grand Total		1344	588	(44%)

† Percentage (%) is not shown if the number of viruses tested was less than 10.