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Global Influenza Hospital Surveillance Network

Characteristics of hospitalizations associated with circulating seasonal influenza strains: Epidemiological analysis from the "Global Influenza Hospital Surveillance Network" (GIHSN)

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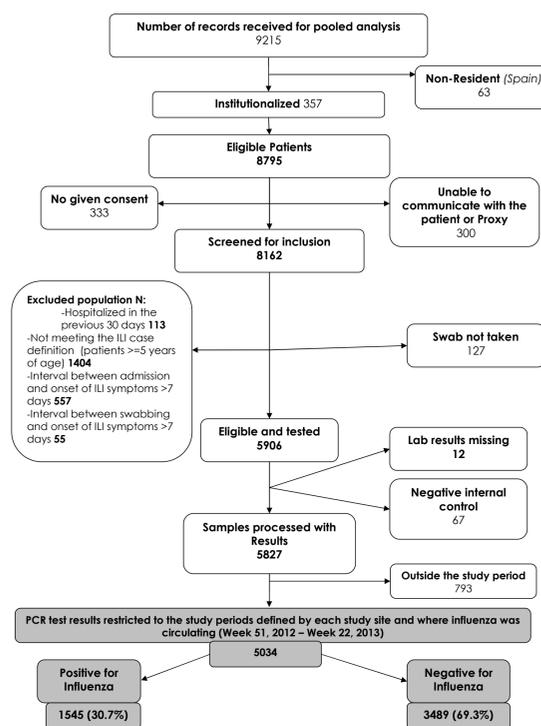
Started in 2011, the GIHSN is a network of country sites, each one coordinating a pool of hospitals. During the 2012-2013 influenza season, the GIHSN network was composed of 21 hospitals in the world. The GIHSN has for main objective to evaluate the burden of severe influenza disease; defined as hospitalization related to community acquired influenza; and quantify the distribution of different influenza strains among severe cases and different population groups.

Methods

A multi-centre prospective epidemiological surveillance study in:
• Spain (5 hospitals),
• France (5 hospitals),
• Turkey (7 hospitals),
• Moscow (1 hospital) and St. Petersburg (3 hospitals) regions in the Russian Federation; was conducted.

5 hospitals in Spain, 1 in Valencia, 2 in Castellón, 2 in Alicante

5 hospitals in France, 2 in Paris, 1 in Montpellier, 1 in Limoges, 1 in Lyon

7 hospitals in Turkey, 3 in Istanbul, 2 in Ankara, 1 in Edirne, 1 in Bursa

4 hospitals from the Russian Federation, 3 in St. Petersburg, 1 in Moscow

Hospitalized patients of all ages presenting influenza like-illness (ILI) within 7 days between the onset of symptoms and admission were swabbed. Positives for influenza were real time reverse transcription polymerase chain reaction (RT-PCR) positive for influenza A (H3N2), or A (H1N1)pdm09, or B.
All data management and analysis was performed with STATA version 12.

Results

Of the 9,215 patients screened, 5,034 patients were included in the analysis. Of these1,545 (31%) were positive for influenza. Influenza A (H1N1)pdm09 was dominant (n=615), following with influenza B/Yamagata (n=436) and influenza A (H3N2) (n=262).

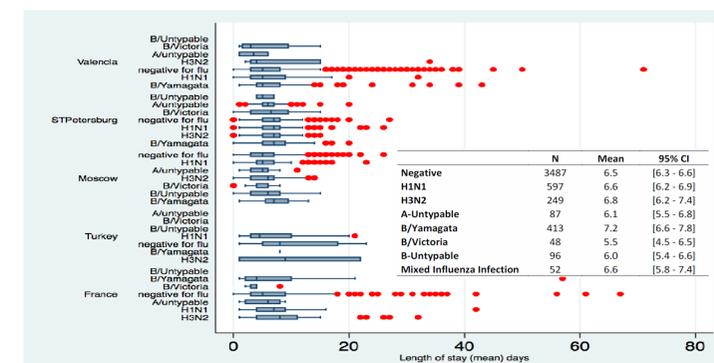**Fig. 1** Flowchart of subjects included in the GIHSN study 2012-2013 season

The flu season started globally at the end of December with a peak from week 5 to week 8 and ending week 22, 2013.

Fig. 2 Number of influenza positives by epidemiological week, by site and globally

Fig. 2A Spain Fig. 2B St. Petersburg
Fig. 2C Moscow Fig. 2D Turkey
Fig. 2E France Fig. 2F Global
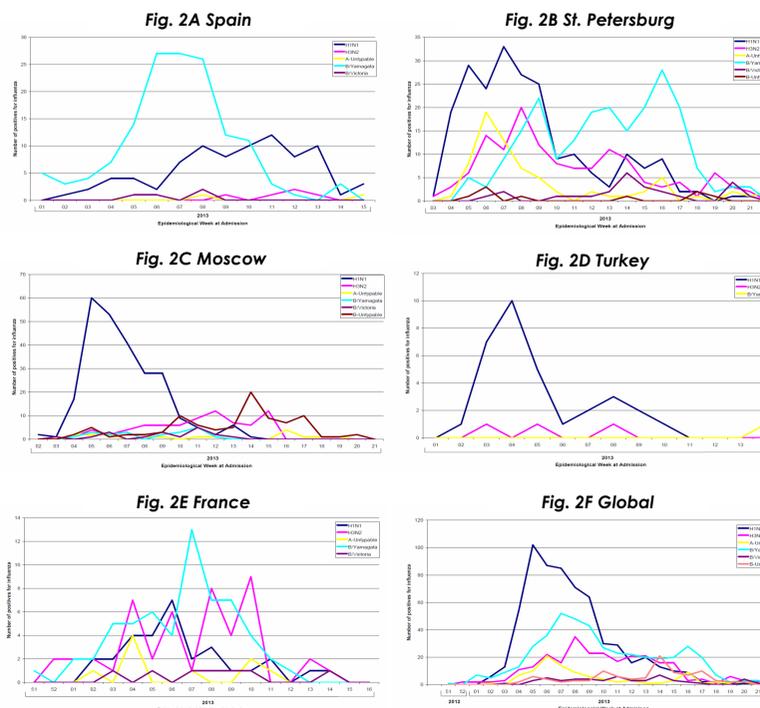
As presented in Figure 2, differences between countries were observed in terms of duration of the Influenza season and pattern of strain circulation.

Fig. 3 Mean length of stay in hospital of patients with an influenza strain virus

	N	Mean	95% CI
Negative	3487	6.5	[6.3 - 6.6]
H1N1	597	6.6	[6.2 - 6.9]
H3N2	249	6.8	[6.2 - 7.4]
A-Untypable	87	6.1	[5.5 - 6.8]
B/Yamagata	413	7.2	[6.6 - 7.8]
B/Victoria	48	5.5	[4.5 - 6.5]
B-Untypable	96	6.0	[5.4 - 6.6]
Mixed Influenza Infection	52	6.6	[5.8 - 7.4]

Influenza B/Yamagata was most common in Spain, St. Petersburg and France in the older than 65, and caused a mean length of stay at the hospital of 7.2 days [95% CI: 6.6 – 7.8].

Table 1 Number of patients admitted to ICU or have deceased

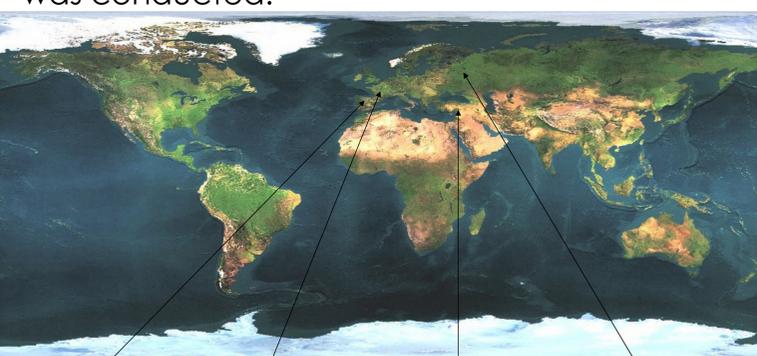|	Positives for Influenza N = 1545		Negatives for Influenza N = 3489	
	N	(%)	N	(%)
ICU Admission	20	(1.3)	29	(0.8)
Death	16	(1.0)	78	(2.2)

We did not observe differences on ICU admissions (P=0.107) in patients positive for influenza compared to those negative for influenza. Death at hospital was more frequent (P=0.004) in patients negative for influenza compared to those positive for influenza.

Conclusions

Influenza H1N1pdm09 was highly circulating this season in the younger in Eastern Europe and Central Asia, and Influenza B was present mostly in the elderly in northern and south west Europe. There was peak at a later appearance for Influenza B compared to Influenza H1N1pdm09.
More investigation is needed in order to further assess the risks of being hospitalized due to influenza. However the data represented from this network provides robust comparisons between positives and negatives for influenza, and epidemiological data giving a global overview of the influenza season 2012-2013.
Increased sample size within this network will allow for more accurate and representative data. Nevertheless, this study has shown that a multi-centre hospital based study is feasible and by maintaining a homogenous practice across sites through strong coordination and support ensures quality of pooling of data.