





**Global Influenza Hospital Surveillance** Network

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# Pilot estimates of admission rates with confirmed influenza in the Global Influenza Hospital Surveillance Network (GIHSN) sites, 2014-2015 influenza season, in regions with known or unknown denominators

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## Background

The Global Influenza Hospital Surveillance Network (GIHSN) was established in 2012 to generate epidemiologic data on influenza admissions. A common protocol is currently being used in 32 hospitals in the Russian Federation, Czech Republic, France, Turkey, China, India, Valencia, Mexico and Brazil.



Cumulative incidence rates by age group are shown in the Table 1 and Figures 3 and 4. Admission rates by age group followed the expected age pattern with admission rates being higher at age extremes.

	Site	Admissions with influenza	Estimated denominator		Incidence rate per 100,000 (95% CI)
_	St. Pertersburg	602	1015665		59.27 (54.63, 64.20)
	Moscow	435	1269710	-	34.26 (31.12, 37.64)
	Turkey <sup>x</sup>	115	465464		24.71 (20.40, 29.66)

Figure 1: Map of the GIHSN contributing sites in 2015/16 season.

GIHSN goal to measure the incidence of severe disease related to influenza has proved difficult due to lack of denominators, because patients can go to any hospital, only specific wards in a participating hospital are involved or participating hospitals are reference centers for big regions.

The GIHSN has set-up in 2015/16 a pilot activity to evaluate the feasibility and reliability of estimating in the GIHSN sites the incidence of admissions with influenza following the recommendations recently issued by WHO.

## **Methods**

We requested all participating sites to define a "residence area". Only admissions in patients residing for the last six months in this area were considered for inclusion.

In Valencia, a well-defined denominator by hospital was available and cumulative incidence rates of admissions with influenza per 100,000 by age-group were estimated for the 2014/15 season. For sites as Moscow or St. Petersburg, with an unknown denominator, each city was defined as the residence area, whereas, in Ankara, it was decided to be all Turkey. We estimated a most plausible sitedenominator obtaining the population by age group for the residence area and multiplying the number of subjects in each age-group by the fraction of admissions due to ARI/ILI (in St. Petersburg) or pneumonia (in Moscow) in the participating hospitals over the total of ARI/ILI or pneumonia admissions in the residence area



Figure 2: Overall cumulative incidence rates of influenza-positive admissions GIHSN sites, 2014/15.



(\*\*) Age groups in Moscow: 0-0, 1-4, 5-17, 18-49, 50-64, 65-74, 75+ (\*\*\*) Season 2015-2016 for Turkey

Figure 3: Pilot estimates of influenza cumulative incidence rates in 2014/15 season in GIHSN sites.

Age group in years	Influenza-positiv admissions (n)	veEstimated denominator (n)		Incidence rate per 100,000 (95% CI)
St. Peterst	bura			
0-4 vrs	291	75840		383.70 (340.88, 430.42
5-14 vrs	97	57456	<b></b>	168.82 (136.91, 205.95
15-64 vrs	184	725616		25.36 (21.83, 29.30)
>=65 yrs	30	156753	<b>A</b>	19.14 (12.91, 27.32)
Moscow				
<1 yrs	16	18749	<b></b>	85.34 (48.78, 138.58)
1-4 yrs	78	108112	▲	72.15 (57.03, 90.04)
5-17 yrs	85	370383		22.95 (18.33, 28.38)
18-49 yrs	218	587706		37.09 (32.33, 42.36)
50-64 yrs	22	131543		16.72 (10.48, 25.32)
65-74 yrs	6	32030	<b>A</b>	18.73 (6.87, 40.77)
>=75 yrs	10	21186	<u>←</u>	47.20 (22.63, 86.80)
Turkey				
<1 yrs	17	6421	<b>_</b>	264.76 (154.23, 423.90
1-4 yrs	23	17608	<b></b>	130.63 (82.80, 196.00)
5-17 yrs	7	111053		6.30 (2.53, 12.99)
18-49 yrs	13	231921		5.61 (2.98, 9.59)
50-64 yrs	13	65647		19.80 (10.54, 33.86)
65-74 yrs	13	20354	- <u>+</u> -	63.87 (34.01, 109.22)
75-84 yrs	19	9592	<b></b>	198.09 (119.26, 309.33
>=85 yrs	10	2869	<b>_</b>	348.51 (167.14, 641.00
Valencia				
<1 yrs	28	18414	<b></b>	152.06 (101.04, 219.77
1-4 yrs	30	84138		35.66 (24.06, 50.90)
5-17 yrs	9	294610		3.05 (1.40, 5.80)
18-49 yrs	34	1088213		3.12 (2.16, 4.37)
50-64 yrs	71	451687		15.72 (12.28, 19.83)
65-74 yrs	149	214489		69.47 (58.76, 81.56)
75-84 yrs	238	141240	<b>▲</b>	168.51 (147.78, 191.33
>=85 yrs	178	58735	- <u>+</u>	303.06 (260.17, 350.99
			0 100 200 500	600
		Incidence	rate per 100 000	

#### Results

The information obtained from the sites is shown in Table 1 and the overall incidence rates are shown in Table 1 and Figure 2.

Site/parameter		Age group							Total	
		0 to <1 yrs	1 to <5 yrs	5 to <18 yrs	18 to <50 yrs	50 to <65 yrs	65 to <75 yrs	75 to <85 yrs	85 yrs or more	
St Petersburg	Population of the catchment area	289817		389153	3705656		807064			5191690
	ILI and ARI hosp	1781		304	608		74			2767
	ILI and ARI area	6806		2059	3105		381			12351
	% ILI and ARI	26.17%		14.76%	19.58%		19.42%			22.40%
	Numerators (flu cases)*	291		97	184		30			602
	Denominators	75,840		57,456	725,616		156,753			1,015,665
	Rates of influenza positive admissions	383.70		168.82	25.36		19.14			59.27
Moscow	Population of the catchment area	132306	443575	1239706	5888476	2543172	964063	832598		12043896
	Pneumonia hosp	53	292	267	412	129	51	73		1276
	Pneumonia area	374	1196	892	4128	2494	1525	2882		13491
	% pneumonia	14.17%	24.37%	29.88%	9.98%	5.17%	3.32%	2.54%		9.46%
	Numerators (flu cases)*	16	78	85	218	22	6	10		435
	Denominators	18,749	108,112	370,383	587,706	131,543	32,030	21,186		1,269,710
	Rates of influenza positive admissions	85.34	72.15	22.95	37.09	16.72	18.73	47.20		34.26
Turkey	Population of the catchment area	1,276,303	5,105,213	16,456,004	37,985,748	11,422,546	3,982,569	1,994,234	518,436	78,741,053
	Pneumonia hosp	83	159	149	212	275	284	310	147	1,619
	Pneumonia area	16,498	46,101	22,079	34,723	47,850	55,569	64,454	26,560	313,834
	% pneumonia	0.50%	0.34%	0.67%	0.61%	0.57%	0.51%	0.48%	0.55%	0.52%
	Numerators (flu cases)**	17	23	7	13	13	13	19	10	115
	Denominators	6,421	17,608	111,053	231,921	65,647	20,354	9,592	2,869	465,464
	Rates of influenza positive admissions	264.76	130.63	6.30	5.61	19.80	63.87	198.09	348.51	24.71
Valencia	Population of the catchment area	18414	84138	294610	1088213	451687	214489	141240	58735	2351526
	Numerators (flu cases)*	28	30	9	34	71	149	238	178	737
	Rates of influenza positive admissions	152.06	35.66	3.05	3.12	15.72	69.47	168.51	303.06	31.34

\* Cases ascertained during the 2014/15 season

\*\* Cases ascertained during the 2015/16 season, preliminary data after end of field work activities

Table 1: Source population and overall and by age-group cumulative incidence rates of admissions with influenzapositive admission per 100,000.

\* Data from Turkey, preliminary 2015/16 en of season data

Figure 4: Incidence rates of influenza-positive admissions GIHSN sites, 2014/15.

## Limitations

For the majority of GIHSN participating sites it was not possible to provide residence-area denominators, and when available by age-groups, the age group range was not homogenous.

## Conclusion

The application of the WHO approach standardizes for in-site differences in health care services involved in ascertaining admissions with influenza. Next step is to setup mechanisms to obtain the basic information needed to estimate weighted denominators and to explain the heterogeneity inside and across sites.

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