

Vaccine effectiveness in preventing hospitalizations with influenza. Preliminary results from the Global Influenza Hospital Surveillance Network for the northern hemisphere 2013/14 influenza season using a test-negative approach.

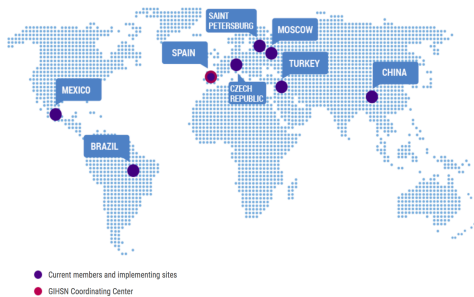
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Background

This was a multicentric study performed by the Global Influenza Hospital Surveillance Network (GIHNS). From December 2013 to June 2014 influenza-like-illness (ILI) admissions were prospectively screened for influenza viruses in 19 hospitals across Russia Federation; Turkey, China and Spain. Assessment of influenza vaccine effectiveness (IVE) evidence was facilitated by reducing the heterogeneity of evaluations across sites through the use of a common, standardized operational protocol.

Global Influenza Hospital Network (GIHNS)



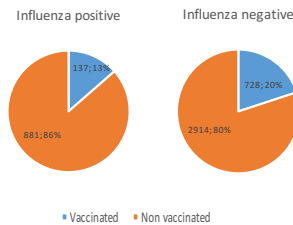
Methods

We followed the test negative-design to estimate IVE. A random effects logistic regression model was fitted with influenza RT-PCR results as the outcome and seasonal influenza vaccination status from registry records or recall data as the linear predictor. The I² test was used to assess heterogeneity between sites.

Results

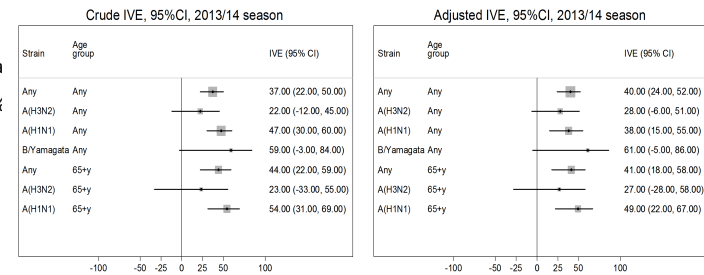
| | St. Petersburg 1,713 | | Moscow 1,743 | | Turkey 1,509 | | Beijing 655 | | Valencia 3,887 | | Total 9,507 | |
|--|-------------------------|-------------|-----------------|-------------|-----------------|-------------|----------------|-------------|-------------------|-------------|----------------|-------------|
| | n | % | n | % | n | % | n | % | n | % | n | % |
| Total eligible | | | | | | | | | | | | |
| Exclusion criteria | | | | | | | | | | | | |
| Non-resident | 11 | 0.6 | 63 | 3.61 | 127 | 8.4 | 1 | 0.2 | 49 | 1.3 | 251 | 2.6 |
| Institutionalized | 5 | 0.3 | 11 | 0.63 | 1 | 0.1 | 5 | 0.8 | 11 | 0.3 | 33 | 0.3 |
| Unable to communicate | 28 | 1.6 | 47 | 2.70 | 21 | 1.4 | 8 | 1.2 | 175 | 4.5 | 279 | 2.9 |
| Not giving consent | 74 | 4.3 | 59 | 3.38 | 39 | 2.6 | 69 | 10.5 | 71 | 1.8 | 312 | 3.3 |
| Previous discharge > 30 days | 13 | 0.8 | 44 | 2.52 | 152 | 10.1 | 8 | 1.2 | 27 | 0.7 | 244 | 2.6 |
| No ILI symptoms > 5 days of age | 4 | 0.2 | 39 | 2.24 | 558 | 37.0 | 40 | 6.1 | 1140 | 29.3 | 1781 | 18.7 |
| Swabbed > 7 days after onset of symptom (all ages) | 286 | 16.7 | 149 | 8.55 | 103 | 6.8 | 61 | 9.3 | 407 | 10.5 | 1006 | 10.6 |
| Sample inadequate | 0 | 0.0 | 0 | 0.00 | 0 | 0.0 | 0 | 0.0 | 5 | 0.1 | 5 | 0.1 |
| Previous influenza infection | 1 | 0.1 | 1 | 0.06 | 9 | 0.6 | 0 | 0.0 | 3 | 0.1 | 14 | 0.1 |
| Recruited in periods without influenza cases | 35 | 2.0 | 70 | 4.02 | 13 | 0.9 | 42 | 6.4 | 119 | 3.1 | 279 | 2.9 |
| Under 6 months of age | 238 | 14.0 | 46 | 2.6 | 47 | 3.1 | 5 | 0.8 | 221 | 5.7 | 557 | 5.9 |
| Vaccination contraindicated | 63 | 3.7 | 3 | 0.2 | 5 | 0.3 | 9 | 1.4 | 6 | 0.1 | 86 | 0.9 |
| Included in the IVE analysis | 955 | 55.7 | 1,211 | 69.5 | 434 | 28.8 | 407 | 62.1 | 1,653 | 42.5 | 4,660 | 49.0 |
| RT-PCR results* | | | | | | | | | | | | |
| Negative | 758 | 79.4 | 932 | 77.0 | 328 | 75.6 | 321 | 78.9 | 1,303 | 78.8 | 3642 | 78.0 |
| Influenza positive | 197* | 20.6 | 279 | 23.0 | 106 | 24.4 | 86 | 21.1 | 350 | 21.2 | 1018 | 21.8 |
| Influenza A(H3N2) | 143 | 15.0 | 184 | 15.2 | 85 | 19.6 | 32 | 7.9 | 63 | 3.8 | 507 | 10.9 |
| Influenza A(H1N1) | 17 | 1.8 | 27 | 2.2 | 0 | 0.0 | 15 | 3.7 | 278 | 16.8 | 337 | 7.2 |
| Influenza A/ not typed | 15 | 1.6 | 7 | 0.6 | 0 | 0.0 | 1 | 0.2 | 9 | 0.5 | 32 | 0.7 |
| Influenza B/Yamagata | 14 | 1.5 | 52 | 4.3 | 21 | 4.8 | 38 | 9.3 | 0 | 0.0 | 125 | 2.7 |
| Influenza B/Victoria | 0 | 0.0 | 3 | 0.2 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 3 | 0.1 |
| Influenza B/ not typed | 9 | 0.9 | 6 | 0.5 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 15 | 0.3 |

Of 4,660 included admissions, 1,018 (22%) were positive for influenza (13% vaccinated) and 3,642 (78%) were negative controls (20% vaccinated).



Adjusted TIV effectiveness in preventing laboratory-confirmed A(H3N2), A(H1N1)pdm09 and B/Yamagata-lineage hospitalizations was 28% (-6 to 51), 38% (15 to 55) and to 61% (-5 to 86) respectively.

By age, IVE estimates against A(H1N1) were significantly larger in the elderly 65+ years old, ME of 49% (22 to 77) than in younger patients (data not shown), IVE of 22% (-26 to 52) with a P-value for effect modification of age 0.020). Statistical tests for heterogeneity by site were not significant (I²=0%, P=0.904).



Too small numbers of run analysis for B/Yamagata 65+

Conclusion

Influenza vaccine effectiveness in preventing admissions with influenza was low to moderate. While influenza vaccination is to be recommended for preventing influenza related disease, improved vaccines that offer better protection are needed.

Influenza A(H3N2) virus comprised 50% of test positive specimens, A(H1N1)pdm09, 33% and B/Yamagata-lineage, 12%.

Moderate vaccine protection was observed overall, with adjusted effectiveness for the 2013/14 of 40% (95%CI 24 to 52).