Estimates of 2014/15 vaccine effectiveness (VE) against influenza related hospitalizations from the Global Influenza Hospital Surveillance Network (GIHSN) using a test negative case-control design.

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Introduction

The Global Influenza Hospital Surveillance Network (GIHSN) is a public-private partnership between various Public Health institutions and Sanofi Pasteur. The main goal of the GIHSN is to promote a better knowledge of influenza epidemiology. From mid November 2014 to mid May 2015 influenza-like-illness (ILI) admissions were prospectively screened for influenza viruses by 24 hospitals across Russia Federation; Czech Republic, Turkey, China and Spain (Figure 1). A common, standardized operational protocol was used across sites to monitor influenza vaccine effectiveness (IVE).
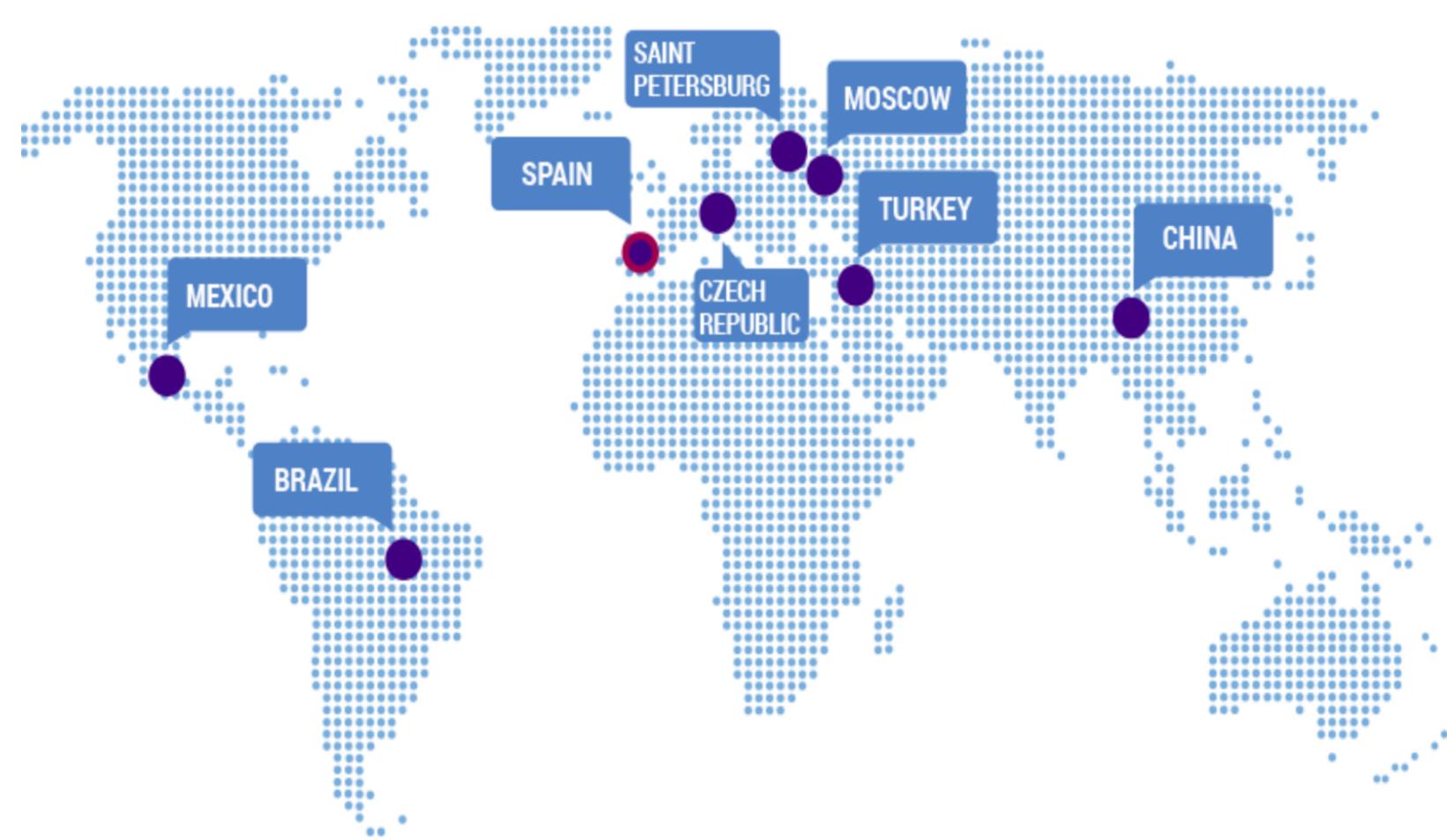

Figure 1. Global Influenza Hospital Surveillance Network (GIHSN)

Methods

Vaccination status was compared between individuals who tested positive (cases) and those who tested negative (controls) for influenza virus by RT-PCR. Patients who had received at least 1 dose of current season vaccine at least 15 days prior to illness onset were considered vaccinated.

Influenza vaccine effectiveness (IVE) was estimated as (1 – odds ratio) × 100%. Logistic regression with site modeled as random effect, was used to calculate a combined effect across sites.

Results

Over 20.000 patients were enrolled of whom 9.590 (47%) were eligible. 2.177 (23%) of those eligible were influenza positive.

Among positives, 1.233 (57%) were A(H3N2), 115 (5%) were A(H1N1)pdm09, 665 (31%) were flu B/Yamagata -lineage and only 11 (5‰) were B/Victoria lineage,
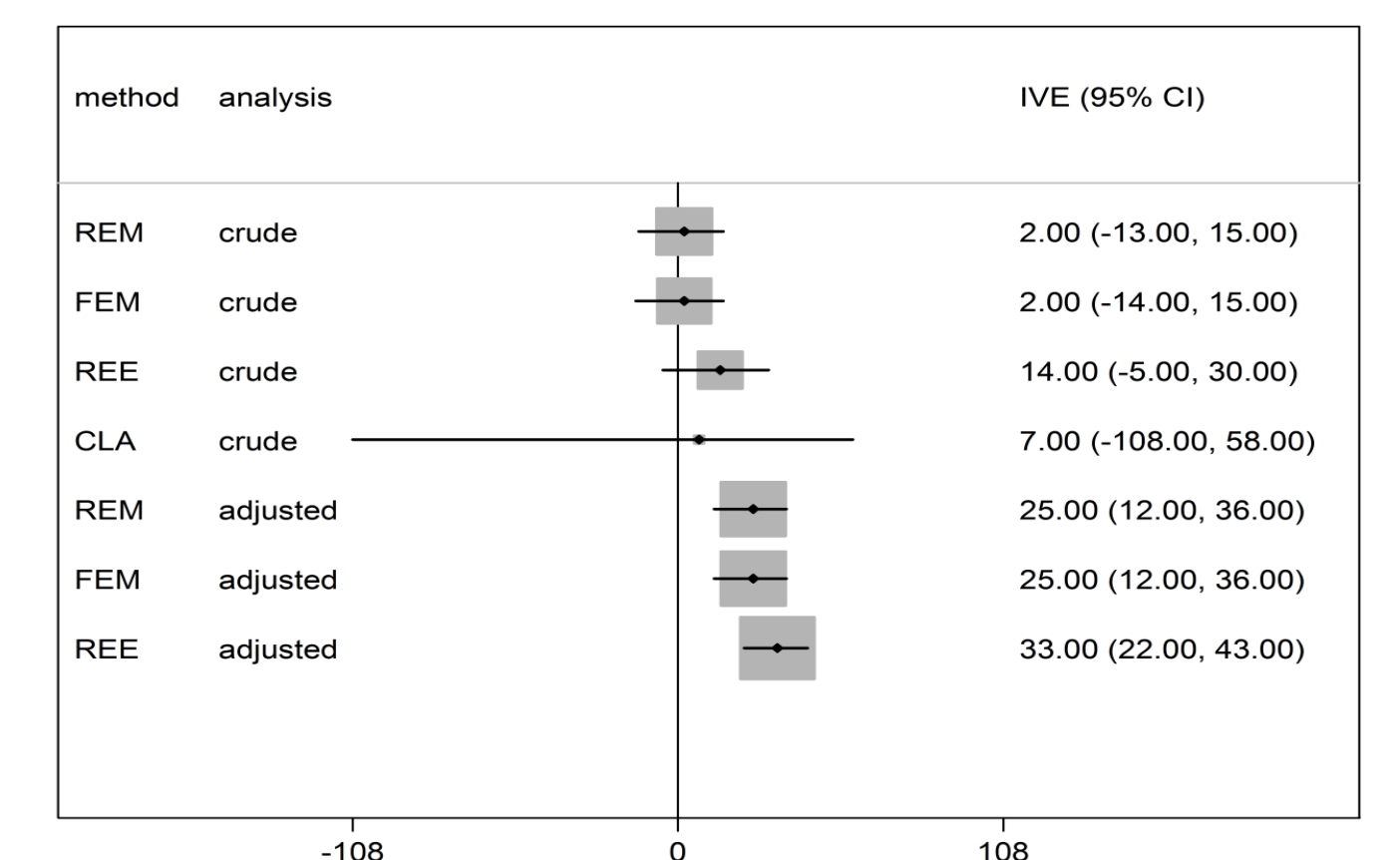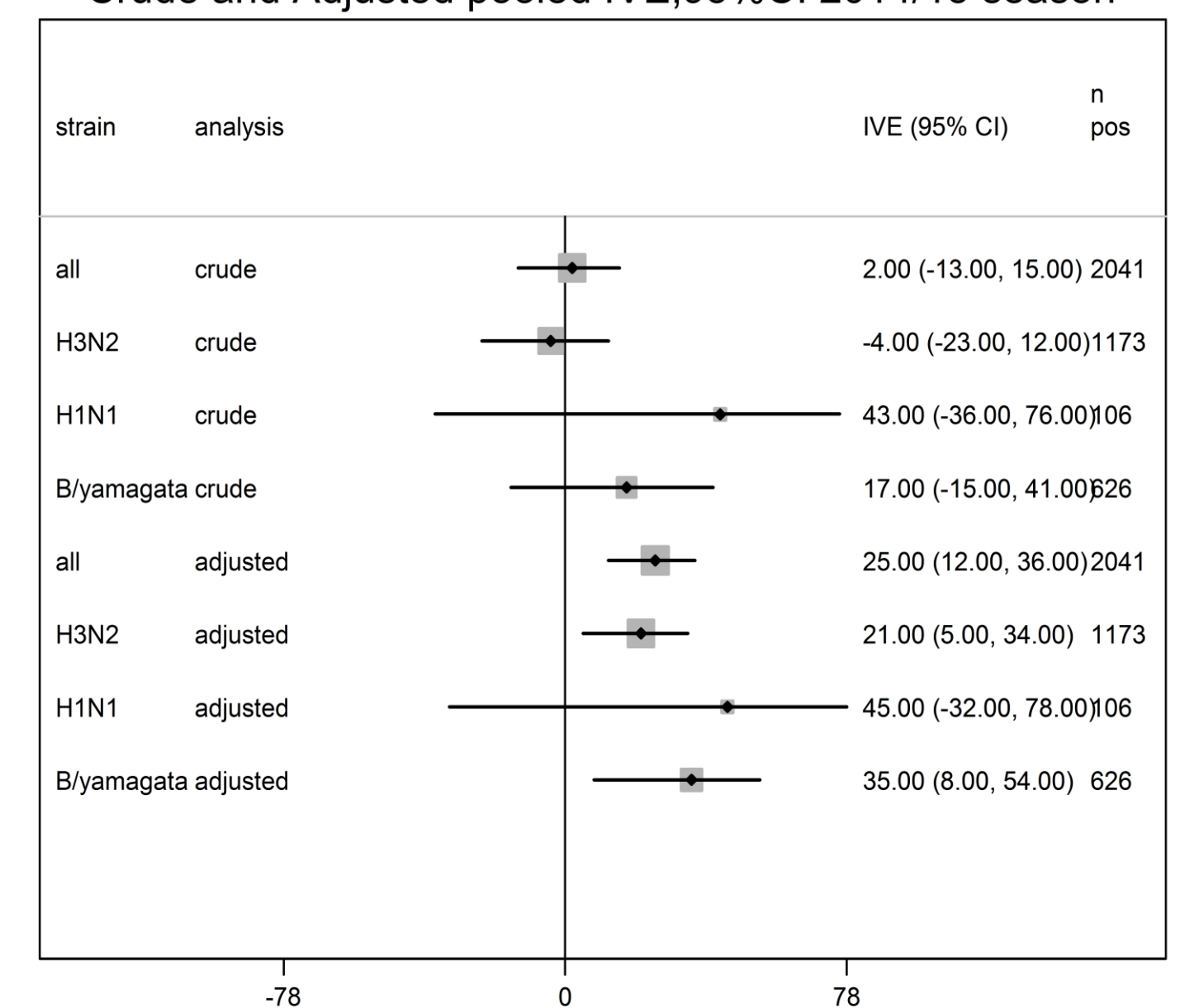
Overall 2.035 (24%) admissions had received the vaccine; 443 (22%) of influenza positive were vaccinated and 1.598 (25%) influenza negative were vaccinated.

Pooled adjusted IVE against any influenza was 25% (95%CI: 12%, 36%) (Figure 2).

Adjusted IVE was 21% (95%CI: 5%, 34%) against A(H3N2), 45% (95%CI:-32%, 78%) against A(H1N1)pdm09 and 35% (95%CI: 8%, 54%) against B/Yamagata.

VE against any influenza ranged from -1% (95%CI: -33%, 23%) in patients under 65 years of age to 27% (95%CI: 12%, 39%) among patients 65 years and older (P value for interaction=0.054).

Crude and Adjusted pooled IVE,95%CI 2014/15 season

strain	analysis	IVE (95% CI)	n pos
all	crude	2.00 (-13.00, 15.00)	2041
H3N2	crude	-4.00 (-23.00, 12.00)	1173
H1N1	crude	43.00 (-36.00, 76.00)	106
B/yamagata	crude	17.00 (-15.00, 41.00)	626
all	adjusted	25.00 (12.00, 36.00)	2041
H3N2	adjusted	21.00 (5.00, 34.00)	1173
H1N1	adjusted	45.00 (-32.00, 78.00)	106
B/yamagata	adjusted	35.00 (8.00, 54.00)	626

method	analysis	IVE (95% CI)
REM	crude	2.00 (-13.00, 15.00)
FEM	crude	2.00 (-14.00, 15.00)
REE	crude	14.00 (-5.00, 30.00)
CLA	crude	7.00 (-108.00, 58.00)
REM	adjusted	25.00 (12.00, 36.00)
FEM	adjusted	25.00 (12.00, 36.00)
REE	adjusted	33.00 (22.00, 43.00)

Sensitivity analysis

REM: random effects models for individual level analysis. FEM: fixed effects models for individual level analysis. REE: robust standard errors f or individual level analysis CLA: cluster -level summary measures

Figure 2. Crude and adjusted influenza vaccine effectiveness by strain. An methods sensitivity analysis.

Discussion

Our moderate IVE estimates against A(H3N2) were consistent with the predominance of antigenically drifted A(H3N2) viruses during 2014/15 season in the Northern-Hemisphere. VE against B/Yamagata viruses was higher than VE against A(H3N2). VE estimates were higher in elderly than in young subjects . Sparse data did not support estimation of VE against A(H1N1)pdm09 or among 0.5-65 years-old patients.