Background

During its first three consecutive influenza seasons, 2012/13, 2013/14 and 2014/15 field researchers in participating GIHSN hospitals actively screened consecutive admissions possibly related to influenza using a common protocol. Depending on the season, participating hospitals were in Russia, China, the Czech Republic, France, Turkey and Spain.

Methods

After consent, we collected information on socio demographic and clinical characteristics and obtained nasal, pharyngeal or nasopharyngeal swabs and ascertainment influenza virus subtype or lineage with reverse transcription polymerase chain reaction (RT-PCR). The adjusted odds ratio (aOR) for admission with influenza related to strain and various patient characteristics was estimated with multilevel multivariate logistic regression taking into account calendar time and country clustering effect. Vaccine effectiveness was estimated as (1-aOR)*100.

Results

41,288 patients were screened, 35,547 were considered eligible, 21,872 met criteria for inclusion and had valid laboratory results. Finally, 4,698 (21%) were influenza positive.

Vaccination provided low to moderate protection against hospital admission with laboratory –confirmed influenza in adults targeted for influenza vaccination.

GIHSN can fill a relevant gap in our understanding of influenza, given the opportunity of collaboration among different teams, the geographic representative surveillance on admissions with influenza and vaccine performance.

We speculate that influenza circulation variability could be related to evolving immunity in the population and virus adaptability to this ecologic background. Whereas the level of vaccine effectiveness could be related to this background immunity and the drift of the virus that could possibly be related to its genetic characteristics.

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.
Waning protection of influenza vaccination. A test-negative study in four consecutive influenza seasons. Valencia Hospital Network for the Study of Influenza (VAHNSI), Spain.

Joan Puig-Barberà1,2, Aina Mira-Iglesias1, Miguel Tortajada-Girbés1, F. Xavier López-Labrador1,4, Ángel Belenguer-Varea6, Mario Carballido-Fernández5, Empar Carbonell-Franco7, Concha Carratalá-Munuera8,9 Ramón Limón-Ramírez10, Joan Mollar-Maseres11, María del Carmen Otero-Reigada11, Germán Schwarz-Chavarri12, José Tuells13, Vicente Gil-Guillén14, * for the Valencia Hospital Network for the Study of Influenza and other Respiratory Viruses (VAHNSI)

1. Fundación para el Fomento de la Investigación Sanitaria y Biomédica de la Comunitat Valenciana (FISABIO), Valencia, Spain; 2. Centro de Salud Pública de Castellón, Castellón, Spain; 3. Hospital Doctor Peset, Valencia, Spain; 4. Consorcio de Investigación Biomédica de Epidemiología y Salud Pública (CIBERESP), Instituto de Salud Carlos III, Madrid, Spain; 5. Hospital La Ribera, Alzira, Spain; 6. Hospital General de Castellón, Spain; 7. Hospital Arnau de Vilanova, Valencia, Spain; 8. Hospital San Juan, Alicante, Spain; 9. Catedra de Medicina de Familia. Departamento de Medicina Clínica, Universidad Miguel Hernández, San Juan, Alicante, Spain; 10. Hospital de la Plana, Vila-real, Spain; 11. Hospital Universitario y Politécnico La Fe, Valencia, Spain; 12. Hospital General de Alicante, Alicante, Spain; 13. Hospital Universitario del Vinalopó, Elche, Spain; 14. Hospital de Elda, Elda, Spain Disease Control and Prevention, Beijing, China; 6 School of Public Health, Li Ka Shing Faculty of Medicine, The University of Hong Kong, Hong Kong Special Administrative Region, China

Background

Annual influenza vaccination is recommended to prevent influenza related complications. There exists an ongoing debate regarding the waning of vaccine protection. We present our results on the relationship of date of vaccination (DOV) with admission with influenza in four consecutive influenza seasons.

Methods

Consenting consecutive admissions were included and swabbed. Influenza infection and subtyping was performed by real time reverse transcription polymerase chain reaction (RT-PCR). Only vaccinated patients were included.

The study was conducted in four consecutive seasons in the Valencia Region (Figure 1), located in the Eastern Mediterranean coast of Spain, Valencia Region population is 5 million inhabitants.

The Valencia network included nine, five, six and ten hospitals in the 2011/12, 2012/13, 2013/14 and 2014/15 seasons, in which we enrolled 1127, 520, 633 and 1599 18 years old and older subjects, belonging to target groups for vaccination, and registered as vaccinated with the seasonal influenza vaccine in Valencia’s Vaccination Information System.

We explored if DOV could be explained by age, sex, underlying chronic conditions, previous influenza vaccination, smoking habits, socioeconomic status, previous general practitioner (GP) consultations or hospital admissions. We used a test-negative approach to compare the adjusted odds ratio (aOR) of admissions with influenza and vaccination in the third DOV tertile, with the first DOV tertile as reference, overall, by predominant strain and restricting the analysis only to admissions in 65 years old and older.

OR were estimated by a multilevel logistic regression approach adjusted by age, gender, smoking habits, social class, number of chronic conditions, being hospitalized in the last year, GP consultations, days from onset of symptoms to swabbing, calendar time (weeks) in restricted cubic splines and hospital as a random effect.

A sensitivity analysis was performed in individuals vaccinated both in the past and current season.

Results

We ascertained 293, 68, 106 and 357 admissions with influenza in vaccinated patients in 2011/12, 2012/13, 2013/14 and 2014/15 seasons (Figure 2).

We observed a higher risk of admission with influenza in those individuals vaccinated at the beginning of the vaccination campaign in the 2011/12 season (aOR=0.68, 95%CI=0.47 to 0.99) of DOV third tertile compared to DOV first tertile and in the 2014/15 season (aOR=0.68, 95%CI=0.49 to 0.93). Nevertheless, we did not find differences on vaccine protection by season, age group, strain or in those vaccinated only in the current season.

Conclusion

Waning effect was observed in two mismatched A(H3N2) predominant seasons (11/12 and 14/15). Sparse numbers precluded other analysis by age group, strain or in those vaccinated only in the current season.
Admissions with influenza and other respiratory viruses, 2012 to 2015 seasons. Results from the Global Influenza Hospital Surveillance Network (GIHSN).

Joan Puig-Barberà1, Maria Pisareva2, Marilda Siqueira3, Selim Badur4, F. Xavier López-Labrador1,5, Fernanda Edna-Moura6, Ayse Tulay Bagci Bossi7, Ainaara Mira-Iglesias1, Veronica Afanasieva2, Sonia Raboni8, Sevim Mese4, Anna Sominina2, for the Global Influenza Hospital Surveillance Study Group (GIHSN).

1 Fundación para el Fomento de la Investigación Sanitaria y Biomédica de la Comunidad Valenciana (FISABIO), Valencia, Spain; 2 Research Institute of Influenza, Saint Petersburg, Russian Federation; 3 Oswaldo Cruz Foundation (FIOCRUZ), Rio de Janeiro, Brazil; 4 National Influenza Reference Laboratory, Istanbul Faculty of Medicine, Istanbul University, Istanbul, Turkey; 5 Concurso de Investigación Biomédica de Epidemiología y Salud Pública (CIBERESP), Instituto de Salud Carlos III, Madrid, Spain; 6. Universidad Federal de Ceará, Fortaleza, Brazil; 7. Hacettepe University, Faculty of Medicine, Department of Public Health, Ankara, Turkey; 8. Hospital de Clínicas/Universidade Federal do Paraná, Curitiba, Brazil.

Background
The Global influenza Hospital Surveillance Network (GIHSN) is a platform able to generate relevant data to understand and define the burden of disease related to influenza and other respiratory viruses (IORV).

Admissions with respiratory viral infection are however not well described although it is accepted that they generate every year a significant public health problem.

Methods
Consecutive consenting admissions with symptoms possibly related to an acute viral respiratory infection presenting within seven days of symptoms onset were enrolled and swabbed at GIHSN sites. The presence of IORV was assessed by real time reverse transcription polymerase chain reaction in Russia (St. Petersburg, three seasons), Turkey (two seasons), Spain (Valencia, three seasons) and Brazil (Fortaleza, one season). Overall, 16,584 admissions were tested for the presence of IORV.

Results
We ascertained 6,884 (41%) IORV positives. Predominant viruses were influenza (40%), RSV (21%) and rhinovirus/enterovirus (13%).

Respiratory syncytial virus (RSV) was dominant in those less than five years old (Figure 4), mostly in 0 to less than 6 months of age (data not shown). In subjects 65 years old and over A(H3N2) was dominant (Figure 4) with 30% or more positives, with its frequency increasing with age (data not shown). In the 65 years old and over, 10% of admissions were positive for RSV, with a decreasing trend by age (Figure 4). There was substantial seasonal variability in the predominance of IORV in included admissions (Figure 5).

Whereas, 50-52% of IORV positives were observed in those under 5 years old, 18-27% of IORV positives were among those 65 years old or older. The virus type distribution was age-dependent.

Conclusion
The results from this multicenter surveillance further confirm the relevance of IORV infection worldwide.

Keywords: Influenza, Influenza vaccine and Epidemiology

Abstract: AOIX00515

Figure 1: Map of the GIHSN network in the current season (2015/2016).

Figure 2: Admissions with laboratory result by site.

Figure 3: Respiratory viruses distribution. Seasons 2012/13 to 2014/15.

Figure 4: Virus distribution by age groups.

Figure 5: Seasonal distribution of the probability of admission with IORV in the GIHSN sites in three consecutive seasons.
The Global Influenza Hospital Surveillance Network as a growing platform to generate epidemiology evidence on the burden of severe influenza and other respiratory viruses

Sophia Drulieva1, Cristelle El Guarcha-Sébéon1,2, José Puig-Bochar1, Anna Somiando1, Elena Buntova3, Jan Kyncl4, Sehat Ullah5, Ben Cowling6, Yu Hongjie7, Odile Launay8, Porvaz Kouli9, Guillermo Ruiz-Palacios10, Maílida Siqueira11, Shelby McNiel12, Cádiz Mba13, Bruno Lino14, John Pegal15, N. Bertha Romeo, Global Epidemiology Department, Lyon, France; Foundation for Influenza Epidemiology, Lyon, France; Fundación para la Investigación de la Influenza en el El Salvador y Centro de Investigación de la Influenza en el Perú (Fluvac, Peru), Peru; Research Institute of Virology, Moscow, Russia; 6National Institute of Public Health (NIPH), Praha, Czech Republic; 7WHO Regional Office for the Americas (WHO-ROPA), Washington, DC, USA; 8Foundation for Influenza Epidemiology, Lyon, France; 9University of California, San Francisco (UCSF) and University of California (UC), USA; 10Centro de Investigación y Docencia Económica, Mexico; 11Sher-i-Kashmir Institute of Medical Sciences (SKIMS), Srinagar, India; 12Mexico National Institutes of Health and High Speciality Hospitals Surveillance Network, Mexico; 13Oswaldo Cruz Foundation, Brazil; 14Foundation for Virology, Sf. Petersburg, Russia; 15Ivanovsky Research Institute of virology, Moscow, Russia; 16National Institute of health and high Specialty Hospitals Surveillance Network, Mexico; 17Santé et Sécurité au travail, HCL & UCBL, Lyon, France; 18Netherlands Institute for Health Services Research (NIVEL), Utrecht, The Netherlands; 19Sanofi Pasteur, Global Epidemiology Department, Lyon, France; 20Foundation for Influenza Epidemiology, Lyon, France; 21WHO National Influenza Centre of Russia, Saint Petersburg, Russia; 22Foundation for Virology, Sf. Petersburg, Russia; 23WHO NIC, WOHN, Lyon, France; 24WHO European Centre for Health Information and Surveillance (ECDC), Stockholm, Sweden; 25WHO Regional Office for Europe (WHO-ROE), Copenhagen, Denmark

ABSTRACT

Very few hospital-based surveillance systems offer standardized core processes across a broad geographical area and there is a need to produce reliable influenza burden estimates. To fill this gap, the Global Influenza Hospital Surveillance Network (GIHSN) was initiated in 2011 and is now expanding.

Methods: The GIHSN is an international public-private partnership initiated by Sanofi Pasteur. It is coordinated by a regional public health foundation, FISABIO (Spain), and composed of several countries partners affiliated with national health Authorities. This is a multi-centre, prospective, active surveillance, hospital-based epidemiological study. A standardized protocol is shared between sites allowing comparision and pooling of results across sites. When vaccine coverage is efficient, vaccine effectiveness is assessed using a test negative design.

Results: The GIHSN studies were conducted in 4, then 5 and finally 6 countries during the 2012-2013, 2013-2014 and 2014-2015 influenza seasons. The network currently includes more than 40 hospitals in 10 countries and the number of samples has increased by 62% from 2012 to 2015.

CONCLUSIONS

The establishment of the GIHSN network is an opportunity to learn from the variations of epidemiological patterns and burden of respiratory viruses across regions and to collect more representative data over time. An increase in the number of GHIN partners will enable an increased sample size, thus amplifying the sensitivity and external validity of the results. Currently there is a need to expand the network to additional Southern Hemisphere countries, to enable more specific and sensitive comparisons across sites and seasons.

Evolution of the Global Influenza Hospital Network over the seasons

<table>
<thead>
<tr>
<th>Season</th>
<th>Number of countries</th>
<th>Number of participating sites</th>
<th>Number of people with ILI</th>
<th>Number of positive samples</th>
<th>Number of positive for other respiratory viruses</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-2013</td>
<td>4</td>
<td>5</td>
<td>5,095</td>
<td>1,565 (32.7%)</td>
<td>478 (9.1%)</td>
</tr>
<tr>
<td>2013-2014</td>
<td>5</td>
<td>24</td>
<td>5,963</td>
<td>1,198 (19.2%)</td>
<td>804 (13.5%)</td>
</tr>
<tr>
<td>2014-2015</td>
<td>6</td>
<td>27</td>
<td>5,980</td>
<td>2,176 (36.3%)</td>
<td>2,471 (42.3%)</td>
</tr>
</tbody>
</table>

Current partners and implementing sites for the 2015-2016 influenza season

France

Sanofi Pasteur

Global Epidemiology Department, Lyon, France

Gihsn.org

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