OPTIONS IX for THE CONTROL OF INFLUENZA
24–28 AUGUST 2016

Abstract : AOIX00541

Keywords: Influenza, Influenza vaccine and Epidemiology

Global Influenza Surveillance Network, epidemiology and influenza vaccine effectiveness, in three influenza seasons, 2012-2015

Joan Puig-Barberà[1], Anna Sominina[2], Elena Burtseva[3], Hongjie Yu[4], Meral A. Ciblak[5], Odile Launay[6], Jan Kyncl[7], Angels Natividad-Sancho[1], Maria Pisareva[2], Svetlana Trushakova[3], Benjamin J. Cowling[8], Selim Badur[5], Philippe Vanhems[9], Helena Jirincova[7], Ainara Mira-Iglesias[1], Elizaveta Smorodintseva[2], Lyudmila Kolobukhina[3], Feng Luzhao[4], Kubra Yurctu[5], Nezha Lenzi[6], Zdenka Mandakova[7], 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 D.I. Ivanovsky Institute of Virology FGBC "N.F. Gamaleya FRCEM "Ministry of Health of Russian Federation, Moscow, Russian Federation; 4 Division of Infectious Disease, Key Laboratory of Surveillance and Early-Warning on Infectious Disease, Chinese Center for Disease Control and Prevention, Beijing, China; 5 National Influenza Reference Laboratory, Istanbul Faculty of Medicine, Istanbul University, Istanbul, Turkey; 6 Université Paris Descartes, Sorbonne Paris Cité, Inserm, CIC 1417 and the French Vaccine Research Network (REIVAC), Paris, France.; 7 Centre for Epidemiology and Microbiology, National Institute of Public Health, Prague, Czech Republic; 8 School of Public Health, Li Ka Shing Faculty of Medicine, The University of Hong Kong, Hong Kong Special Administrative Region, China; 9 Edouard Herriot Hospital, Lyon University Hospital (Hospices Civils de Lyon), Lyon, FranceLenzi[6], Zdenka Mandakova[7], for the Global Influenza Hospital Surveillance Study Group (GIHSN)

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 ascertained 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.

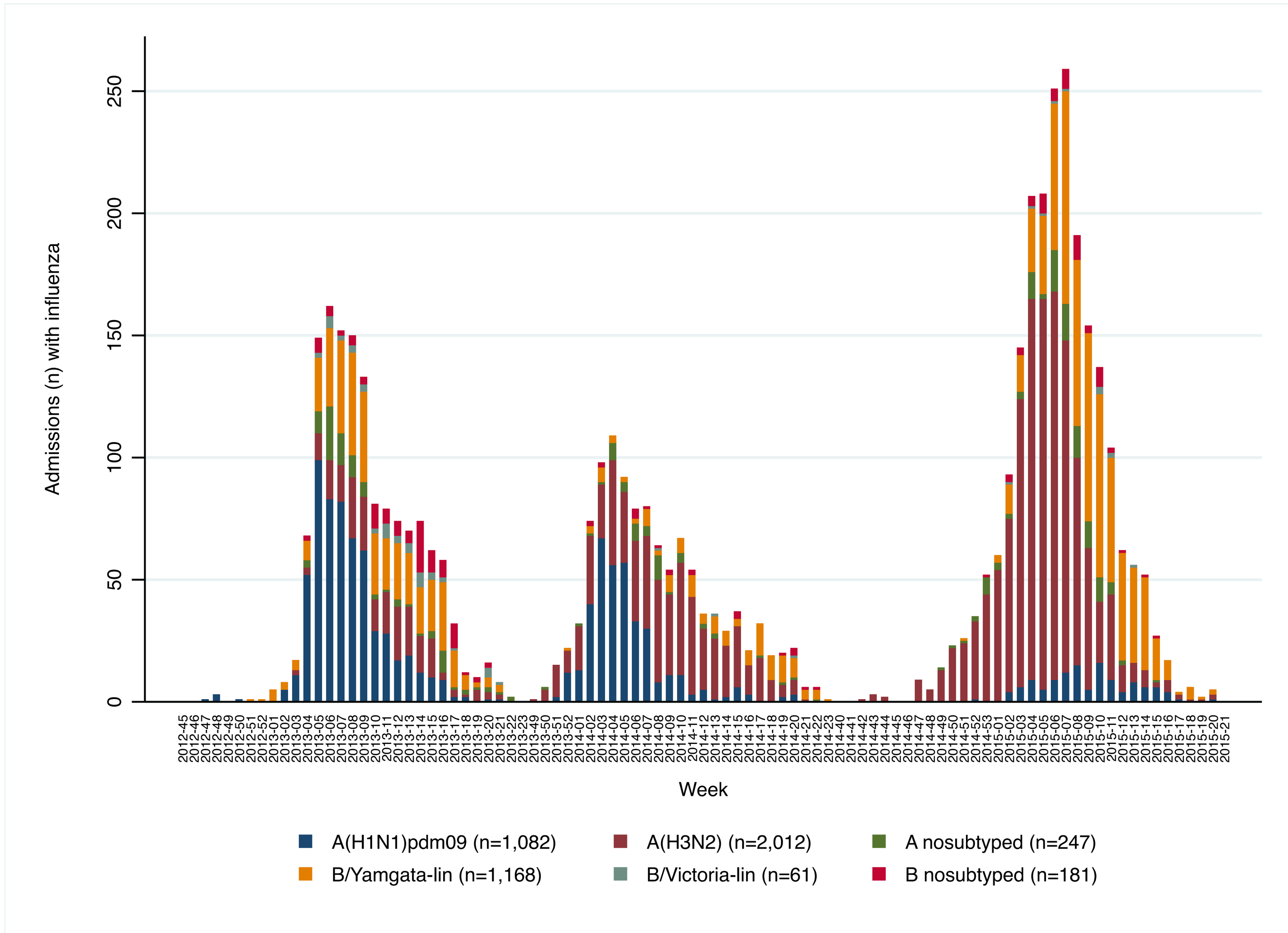


Figure 1. Admissions with influenza by season and week.

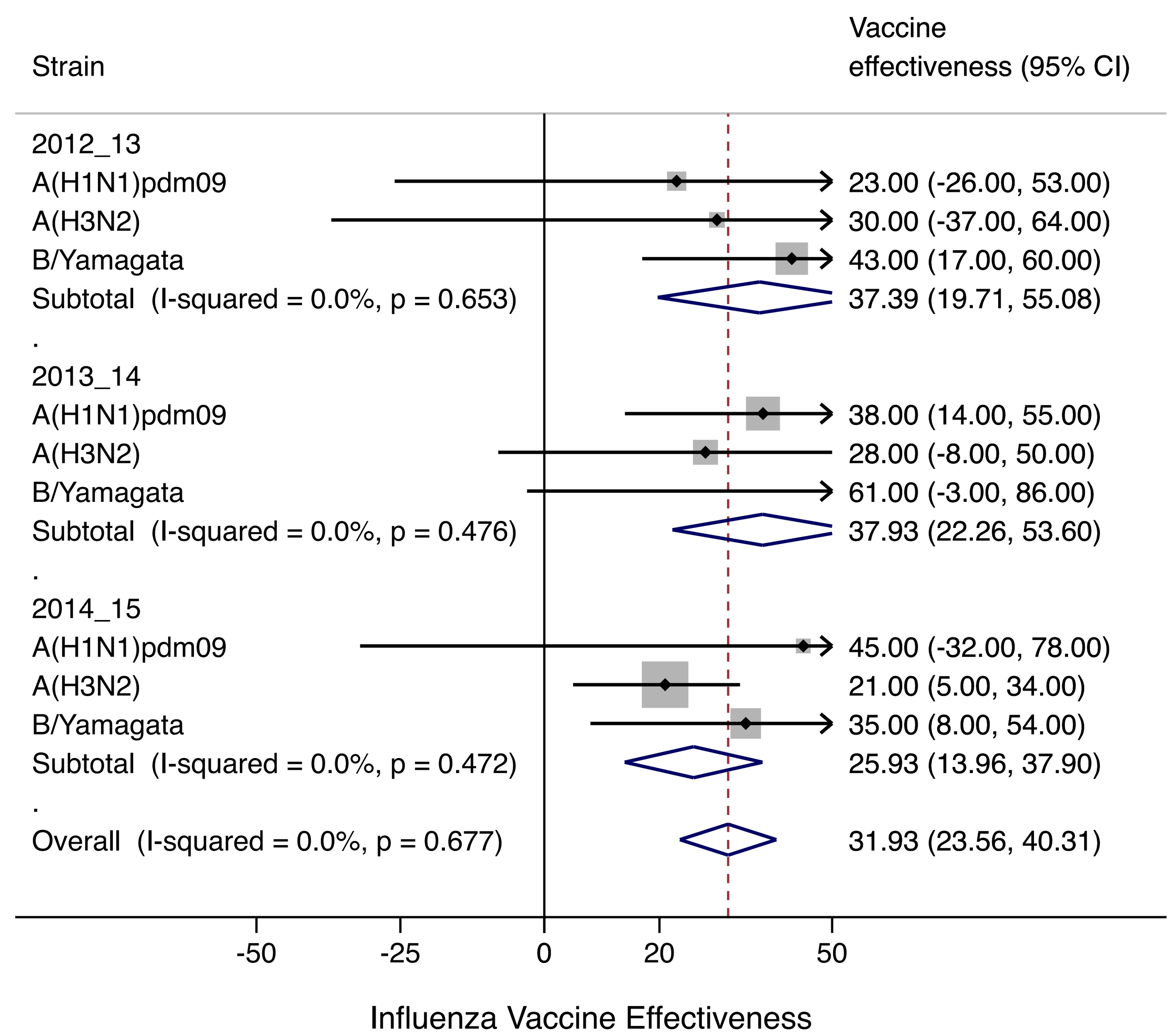


Figure 2. Influenza vaccine effectiveness

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.

Fundación para el Fomento de la Investigación Biomédica y Sanitaria (FISABIO), Valencia, Spain
Phone: +34 961 925 968; e-mail: puig_joa@gva.es
http://gihsn.org/

The study was funded by Sanofi Pasteur

OPTIONS IX for THE CONTROL OF INFLUENZA

24–28 AUGUST 2016

Global Influenza Hospital Surveillance Network

Abstract : AOIX00065

Keywords: Influenza vaccine, waning effect and Epidemiology

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-Barberà[1,2], Ainara Mira-Iglesias[1], Miguel Tortajada-Girbés[3], F. Xavier López-Labrador[1,4], Ángel Belenguer-Varea[5], Mario Carballido-Fernández[6], Empar Carbonell-Franco[7], Concha Carratalá-Munuera[8,9] Ramón Limón-Ramírez[10], Joan Mollar-Maseres[11], Maria del Carmen Otero-Reigada[11], Germán Schwarz-Chavarri[12], José Tuells[13], Vicente Gil-Guillén[9,14], * 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 de La Ribera, Alzira, Spain; 6. Hospital General de Castellón, Spain; 7. Hospital Arnau de Vilanova, Valencia, Spain; 8. Hospital San Juan, Alicante, Spain; 9. Cátedra 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

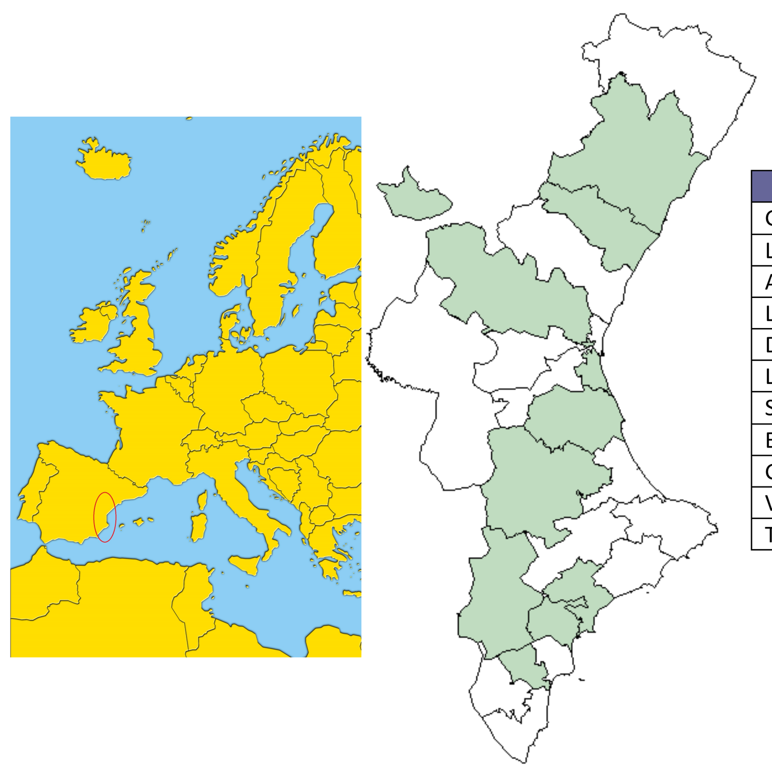
Annual influenza vaccination is recommended to prevent influenza related complications. There exists an ongoing debate regarding the waning of vaccine protection. We present our results on the relationship of date of vaccination (DOV) with admission with influenza in four consecutive influenza seasons.

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.



Health department	Population	Seasons
General Castellón	277672	11/12, 12/13, 13/14, 14/15
La Plana	185686	11/12, 12/13, 13/14, 14/15
Arnau de Vilanova	255648	11/12, 14/15
La Fe	192572	11/12, 13/14, 14/15
Doctor Peset	359893	11/12, 12/13, 13/14, 14/15
La Ribera	259125	14/15
San Juan	212894	11/12, 12/13, 13/14, 14/15
Elda	190389	11/12, 12/13, 13/14, 14/15
General Alicante	264490	11/12, 14/15
Vinalopó	153157	14/15
TOTAL	2351526	

Figure 1: Participating Health Districts (hospitals) and population.

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).

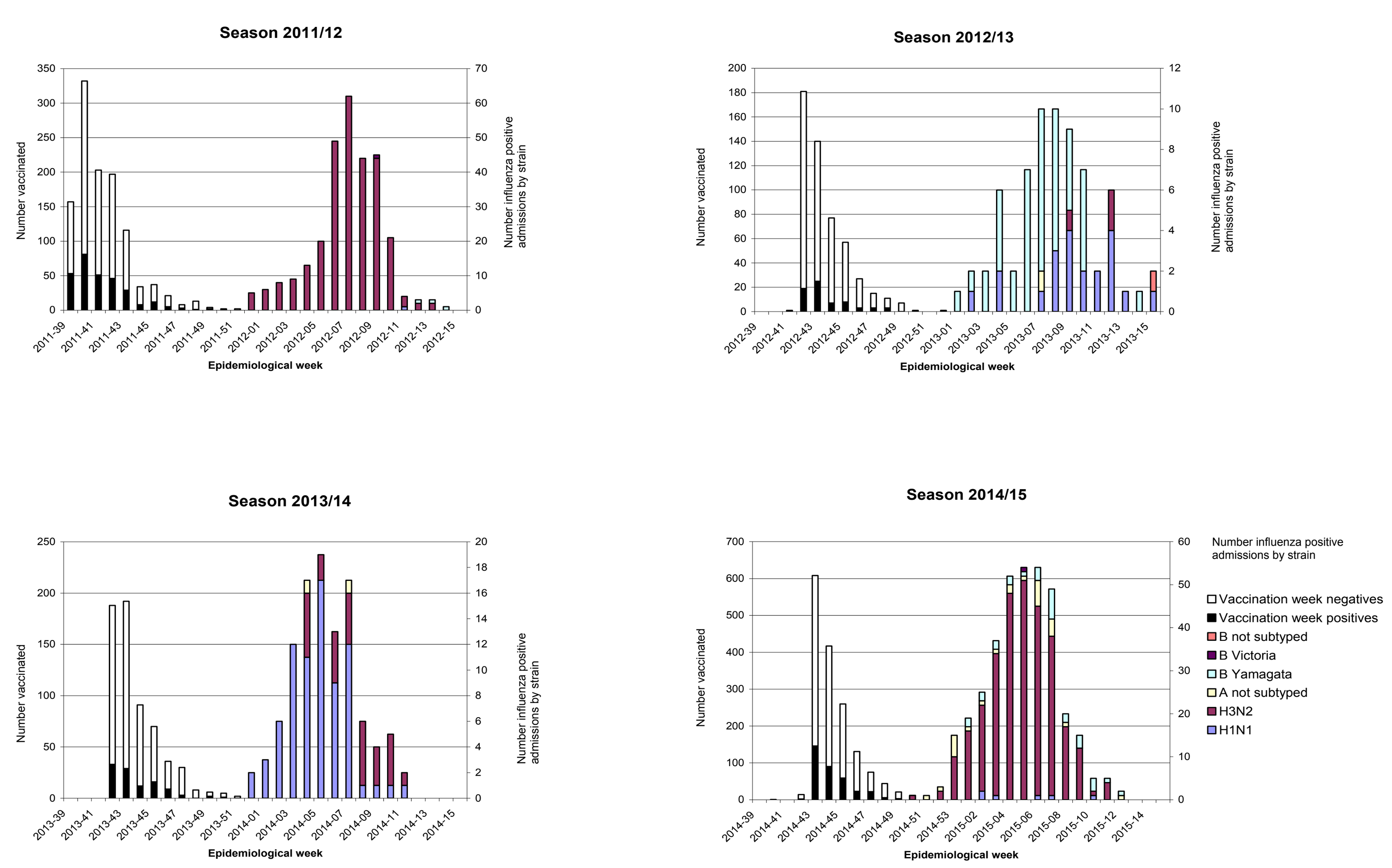


Figure 2: Distribution of vaccination date with RT-PCR result and distribution of influenza strains by season.

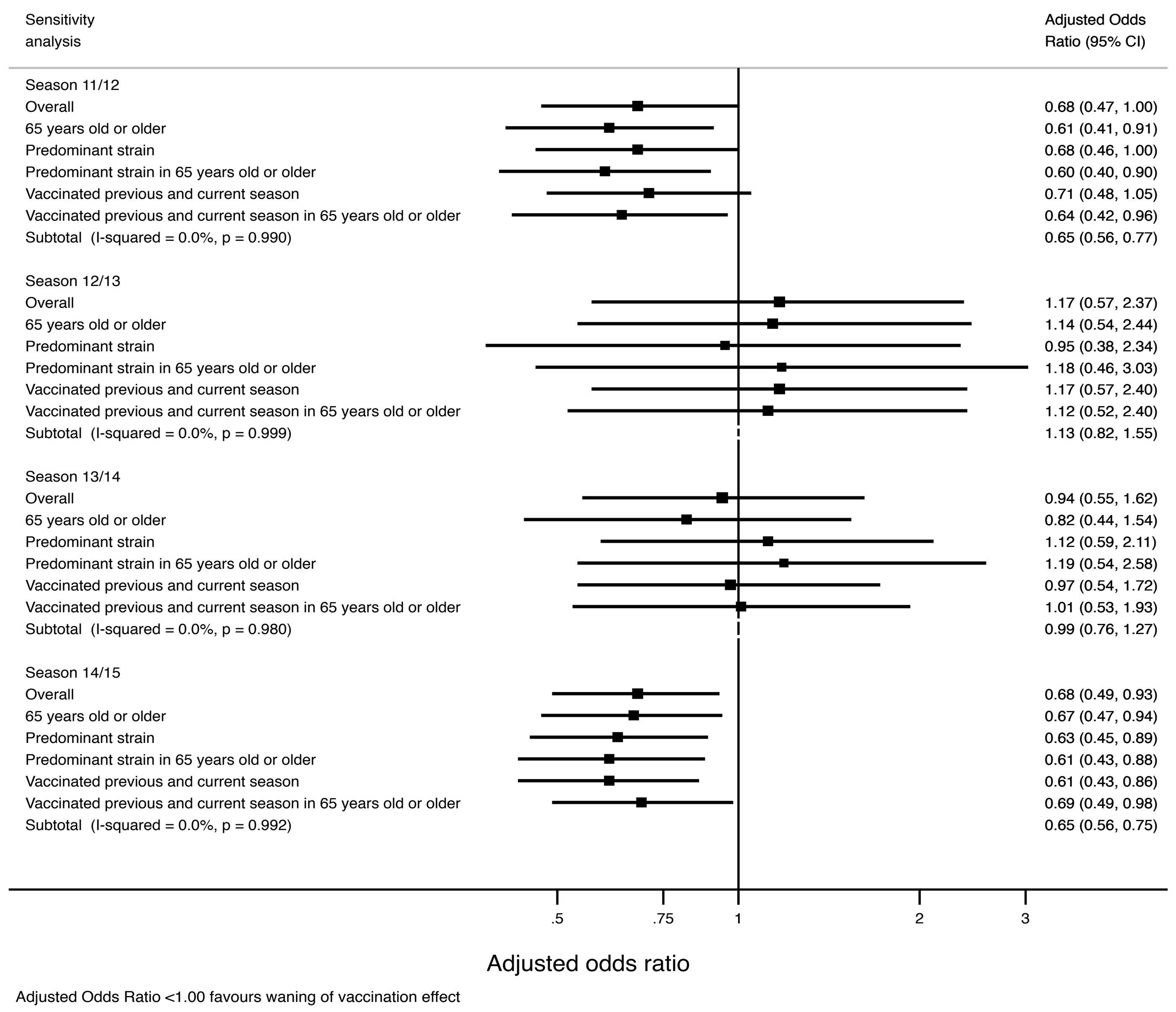


Figure 3. Adjusted odds ratio of admission with laboratory confirmed influenza (RT-PCR) in patients with later date of vaccination (third tertile) compared to those with and earlier date of vaccination (first tertile).

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 DOV tertile in the 2012/13 season (aOR=1.17, 95%CI=0.57 to 2.37) and in the 2013/14 season (aOR=0.94, 95%CI=0.55 to 1.62). Similar estimates were obtained in the sensitivity analysis including only those vaccinated both in the current and previous seasons (Figure 3).

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.

Fundación para el Fomento de la Investigación Biomédica y Sanitaria (FISABIO), Valencia, Spain
Phone: +34 961 925 968; e-mail: puig_joa@gva.es
http://gihsn.org/

VAHNSI activity is partly funded by Sanofi Pasteur

OPTIONS IX for THE CONTROL OF INFLUENZA
24–28 AUGUST 2016

Abstract : AOIX00515

Keywords: Influenza, Influenza vaccine and Epidemiology

Admissions with influenza and other respiratory viruses, 2012 to 2015 seasons. Results from the Global Influenza Hospital Surveillance Network (GIHSN).

Joan Puig-Barberà[1], Maria Pisareva[2], Marilda Siqueira[3], Selim Badur[4], F. Xavier López-Labrador[1,5], Fernanda Edna-Moura[6], Ayse Tulay Bagci Bossi[7], Ainara Mira-Iglesias[1], Veronica Afanasieva[2], Sonia Raboni[8], Sevim Mese[4], Anna Sominina[2], 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 Consorcio de Investigación Biomédica de Epidemiología y Salud Pública (CIBERESP), Instituto de Salud Carlos III, Madrid, Spain; 6. Universidade Federal de Cearà, Fortaleza, Brazil; 7. Hacettepe University, Faculty of Medicine, Department of Public Health, Ankara, Turkey; 8. Hospital de Clinicas/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.

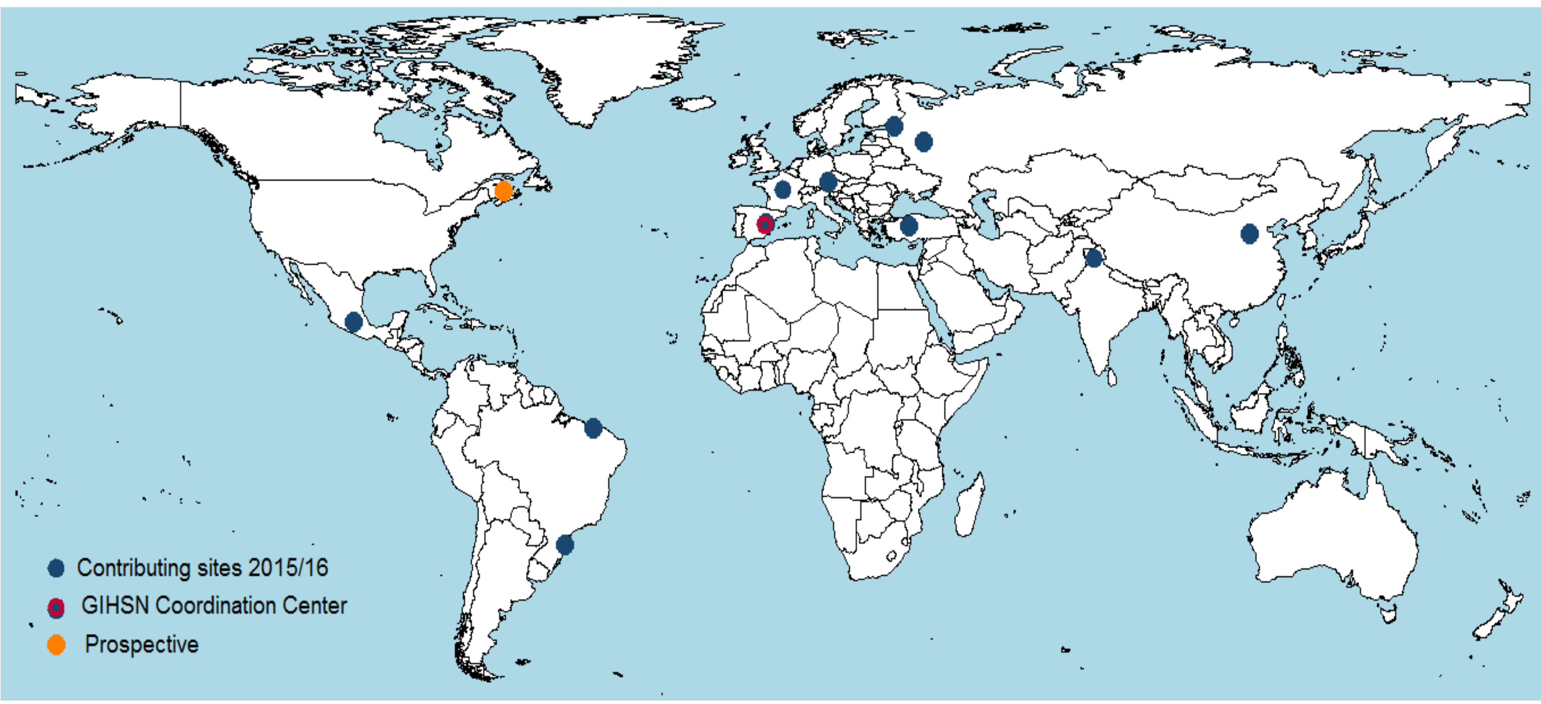


Figure 1: Map of the GIHSN network in the current season (2015/2016).

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.

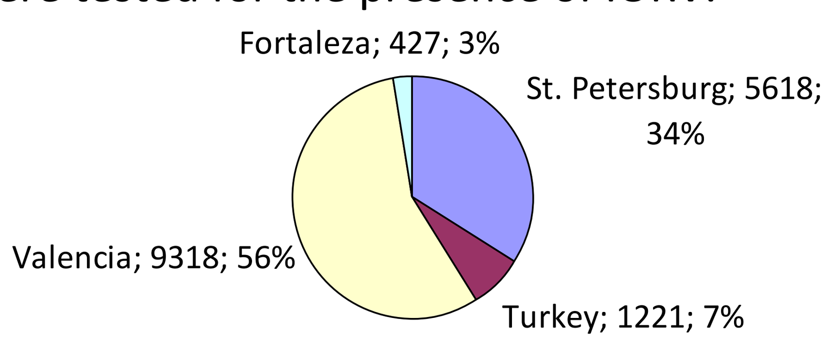


Figure 2: Admissions with laboratory result by site.

Results

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

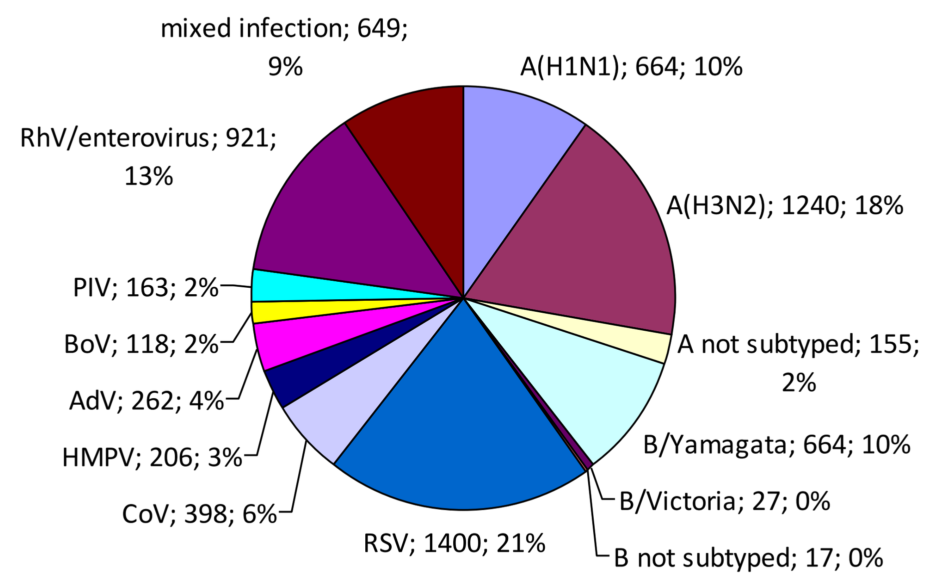


Figure 3: Respiratory viruses distribution. Seasons 2012/13 to 2014/15.

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.

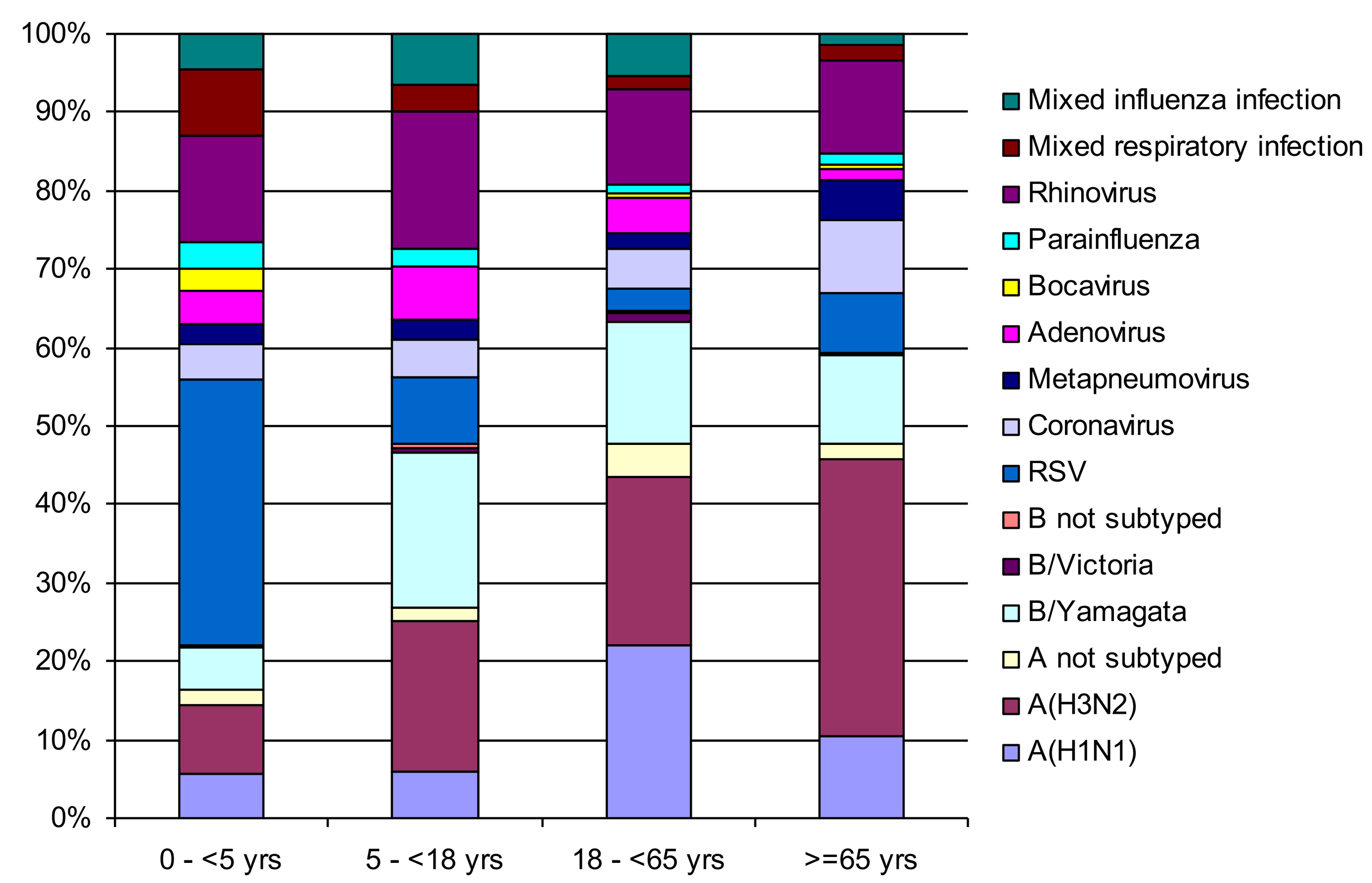


Figure 4: Virus distribution by age groups.

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).

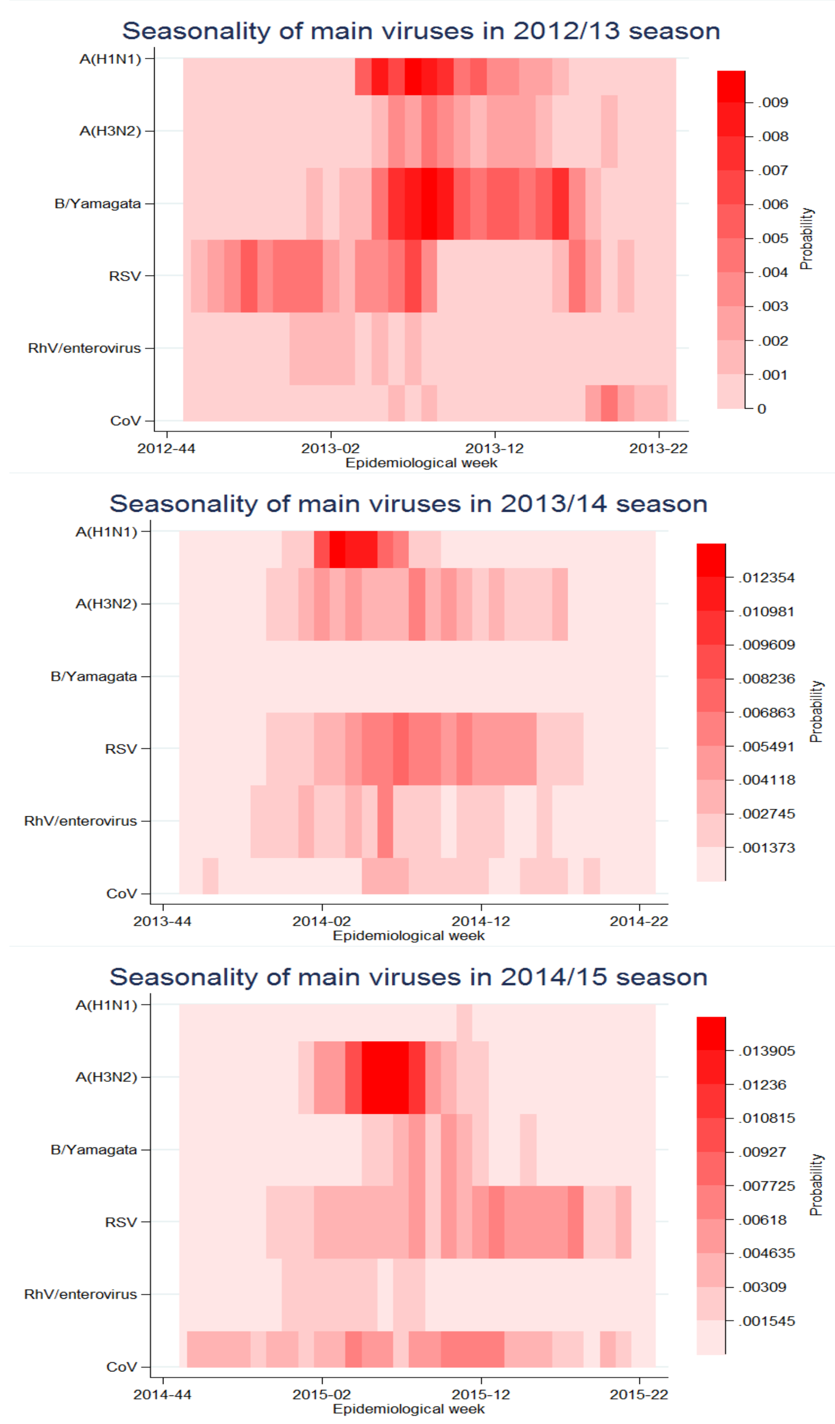


Figure 5: Seasonal distribution of the probability of admission with IORV in the GIHSN sites in three consecutive seasons.

Conclusion

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

Fundación para el Fomento de la Investigación Biomédica y Sanitaria (FISABIO), Valencia, Spain
Phone: +34 961 925 968; e-mail: puig_joa@gva.es
http://gihsn.org/

This network activity is partly funded by Sanofi Pasteur

The Global Influenza Hospital Surveillance Network as a growing platform to generate epidemiology evidence on the burden of severe influenza and other respiratory viruses

Sophie Druelles[1], Clotilde El Guerche-Séblain[1,2], Joan Puig-Barberá[3], Anna Sominina[4], Elena Burtseva[5], Jan Kyncl[6], Serhat Unal[7], Ben Cowling[8], Yu Hongjie[9], Odile Launay[10], Parvaiz Koul[11], Guillermo Ruiz-Palacios[12], Marilda Siqueira[13], Shelly McNeil[14], Cédric Mahé[1,2], Bruno Lina[15], John Paget[16]

[1]Sanofi Pasteur, Global Epidemiology Department, Lyon, France; [2]Foundation for Influenza Epidemiology, Lyon, France; [3]Fundación para el Fomento de la Investigación Sanitaria y Biomédica de la Comunidad Valenciana (FISABIO), Valencia, Spain; [4]Research Institute of Influenza of the Ministry of Healthcare of the Russian Federation, WHO National Influenza Centre of Russia, Saint Petersburg, Russia ; [5]Ivanovsky Research Institute of Virology, Moscow, Russia ; [6]National Institute of Public Health (NIPH), Praha, Czech Republic; [7]Turkish Society of Internal Medicine, Ankara, Turkey; [8]University of Hong Kong, Hong Kong; [9]Chinese Centre for Disease Control and Prevention, Beijing, China; [10]i-REIVAC (Innovative Clinical Research Network in Vaccinology), Paris, France; [11]Sher-i-Kashmir Institute of Medical Sciences (SKIMS), Srinagar, India; [12]Mexico National Institutes of Health and High Speciality Hospitals Surveillance Network, Mexico; [13]Oswaldo Cruz Foundation (FIOCRUZ), Rio de Janeiro, Brazil; [14]Canadian Center for Vaccinology, Halifax, Canada; [15]Centre National de Référence de la Grippe, HCL & UCBL, Lyon, France; [16]Netherlands Institute for Health Services Research (NIVEL), Utrecht, The Netherlands

ABSTRACT

Background: Very few hospital-based surveillance systems offer standardized common core protocols over 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 country partners affiliated with National Health Authorities. Results of each season and pooled analyses are presented at the GIHSN Global Annual Meeting each year in the presence of influenza experts and representatives from international institutions involved in epidemiology surveillance.

The sustainability of the network has recently been reinforced by the creation of the Foundation for Influenza Epidemiology in September 2015, governed by an Executive Committee that meets once a year to evaluate new proposals that are eligible for funding. The Foundation is an opportunity to facilitate additional funding from external donors (private and public) and it supports not-for-profit organizations able to coordinate a pool of hospitals with epidemiological research projects aligned with the GIHSN mission. As well as supporting the GIHSN influenza studies, it represents a new and growing platform to develop research on the epidemiology of other respiratory viruses. Notwithstanding the funding mechanisms of the Foundation, each study site retains full ownership of the data.

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 tested has increased by 62% from 2012 to 2015. Results are regularly published in scientific journals and available on www.gihsn.org.

Conclusions: The enlargement 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 GIHSN 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 GIHSN network to additional Southern Hemisphere countries, to enable more specific and sensitive comparisons across sites and seasons.

BACKGROUND

Very few hospital-based surveillance systems offer standardized common core protocols over 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 country partners affiliated with National Health Authorities.

This is a multi-centre, prospective, active surveillance, hospital-based epidemiological study. A **standard protocol** is shared between sites allowing comparison and pooling of results between sites. When vaccine coverage is sufficient, vaccine effectiveness is assessed using a test negative design.

The sustainability of the GIHSN has recently been reinforced by the creation of the Foundation for Influenza Epidemiology in September 2015, governed by an Executive Committee that meets once a year to evaluate new proposals that are eligible for funding.

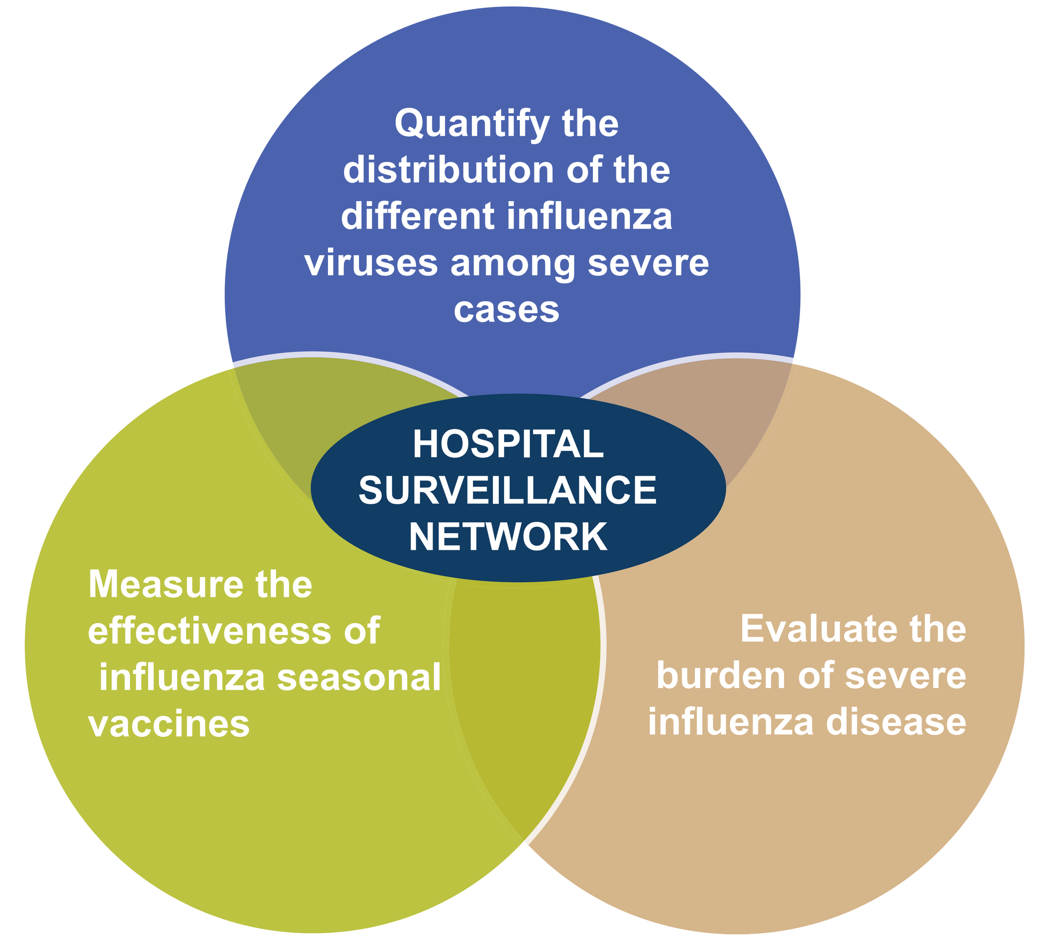
Notwithstanding the funding mechanisms of the Foundation, each study site retains full ownership of the data.

The GIHSN and the Foundation for Influenza Epidemiology: development of a collaborative framework

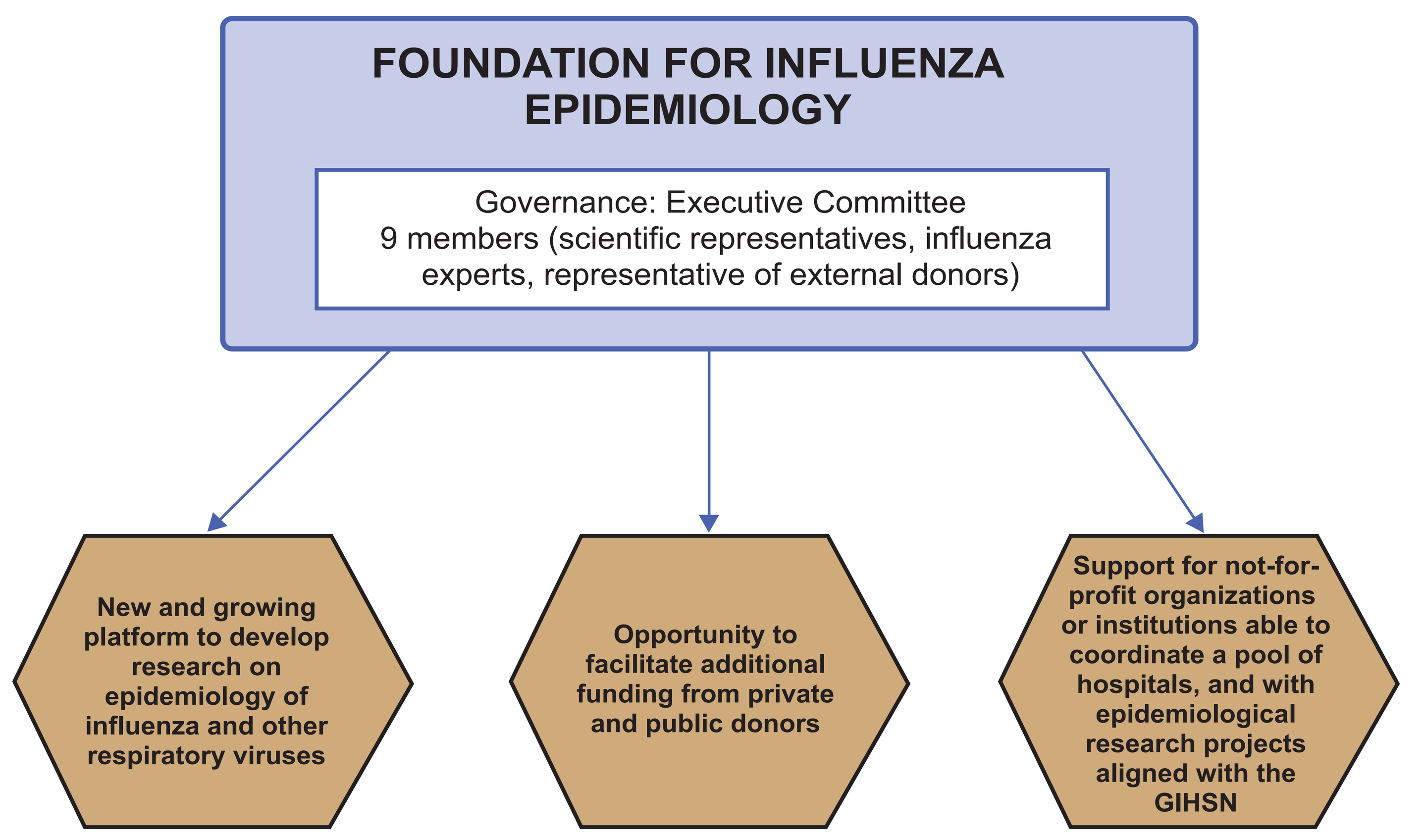
- All studies are funded through grants from the Foundation for Influenza Epidemiology
- Coordination activities and technical support is provided by FISABIO, an independent health institute based in Spain
- GIHSN sites funded by the Foundation are invited to share data generated during the season with FISABIO to produce the pooled analysis presented at the annual meeting
- This platform is an opportunity to plug additional research components such as other respiratory viruses

Every year, the Foundation for Influenza Epidemiology supports projects aligned with the GIHSN mission. Non-profit organizations that could coordinate a pool of hospitals in joining the GIHSN are eligible to respond to a call for proposal for funding, launched in May.

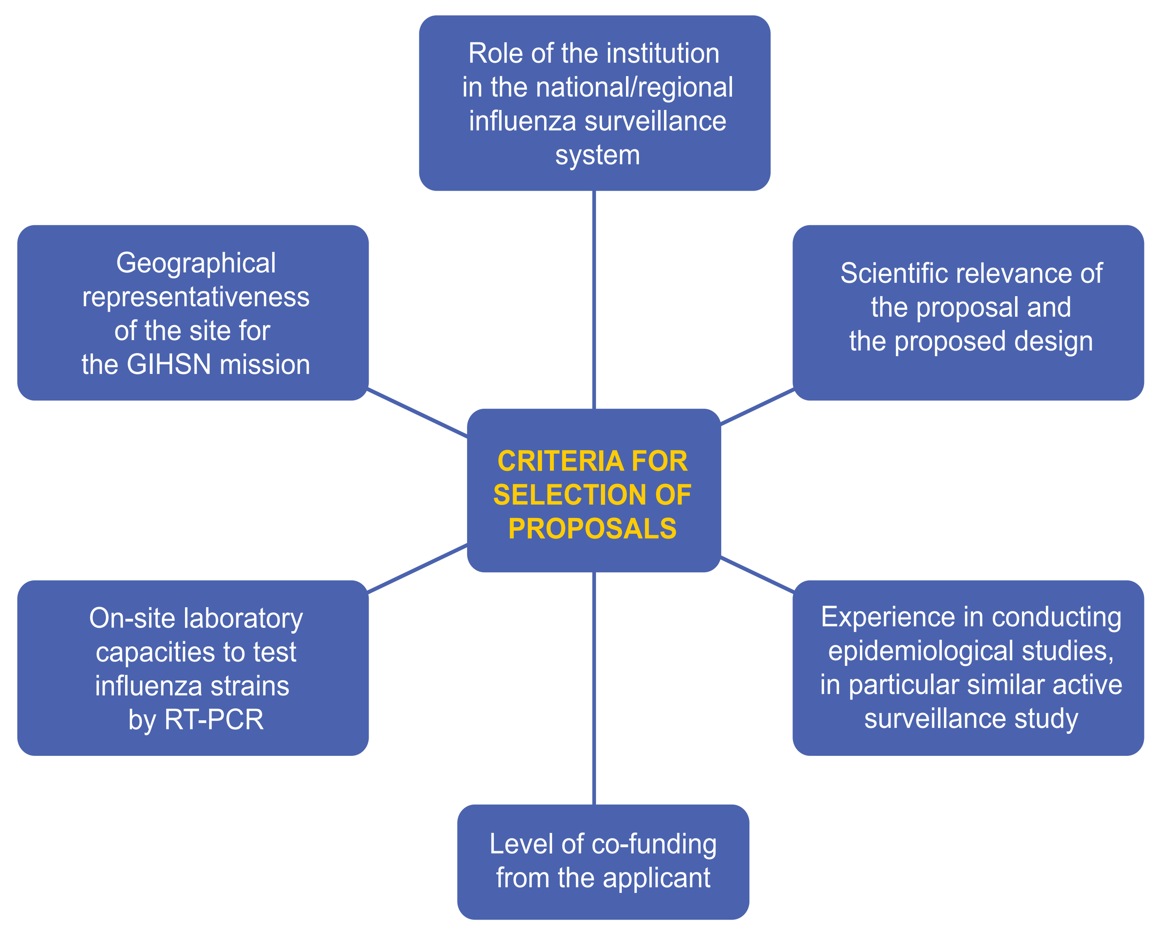
The three main scientific objectives of the network



Main features of the Foundation for Influenza Epidemiology



Criteria for the selection of proposals



RESULTS

Results of each season and pooled analyses are presented at the GIHSN Global Annual Meeting each year in the presence of influenza experts and representatives from international institutions involved in epidemiology surveillance.

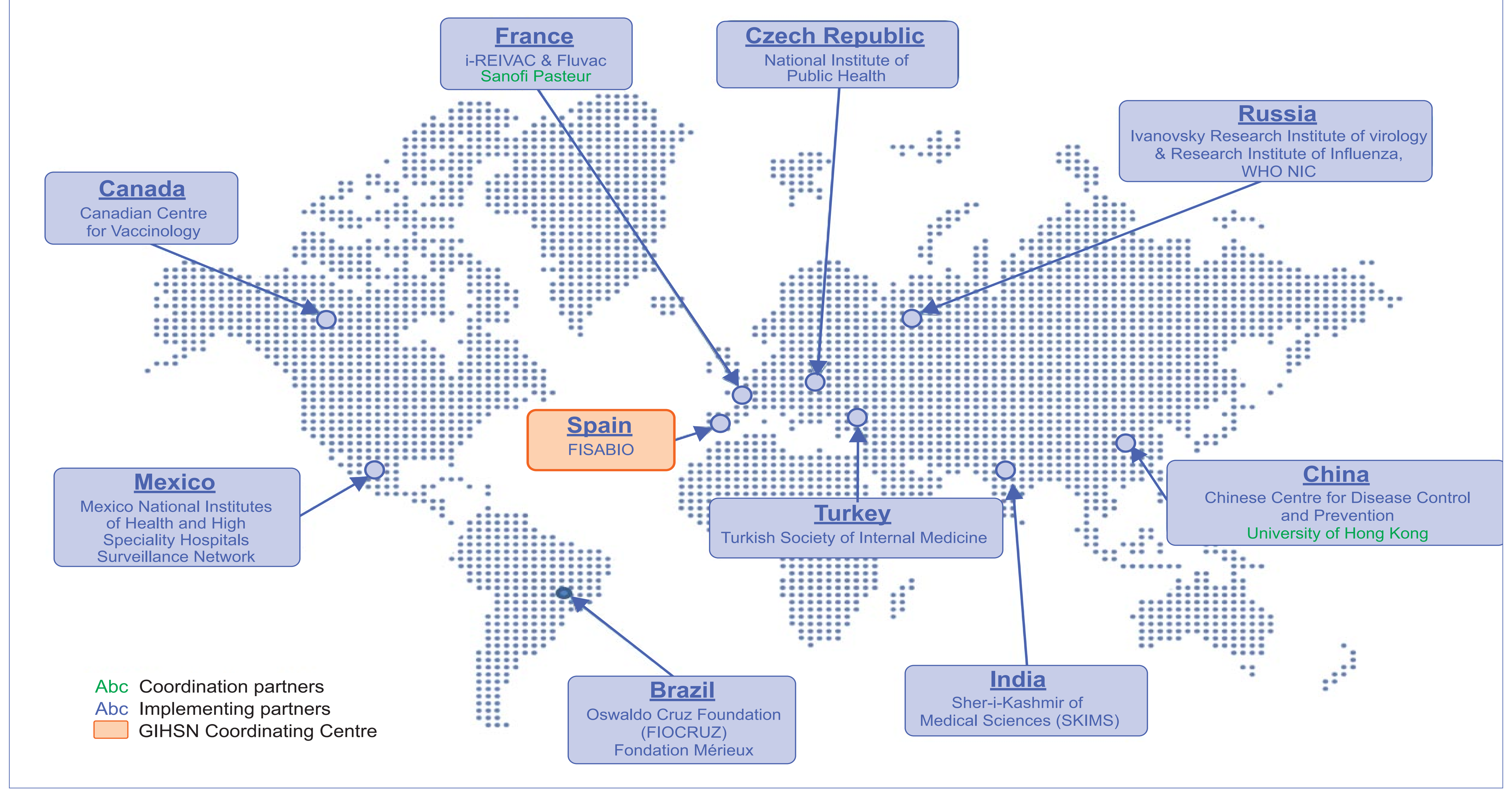
Results are regularly published in scientific journals and available on www.gihsn.org.

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.

Evolution of the Global Influenza Hospital Network over the seasons

Season	Number of countries	Number of implementing hospitals	Number of people included for ILI	Number of positive influenza cases	Number of positives for other respiratory viruses
2012-2013	4	21	5,906	1,545 (30.7%)	478 (8.1%)
2013-2014	5	24	5,963	1,139 (19.2%)	884 (15.3%)
2014-2015	6	27	9,589	2,176 (22.7%)	2,475 (22.2%)

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



CONCLUSIONS

The enlargement 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 GIHSN 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 GIHSN network to additional Southern Hemisphere countries, to enable more specific and sensitive comparisons across sites and seasons.

Further information

More information about the network and description of the implementing partners can be found on the Global Influenza Hospital Surveillance Network website: www.gihsn.org

Option IX for the control of influenza - 24-28 August 2016, Chicago, USA

Corresponding author: Sophie Druelles, sophie.druelles@sanofipasteur.com

SANOFI PASTEUR