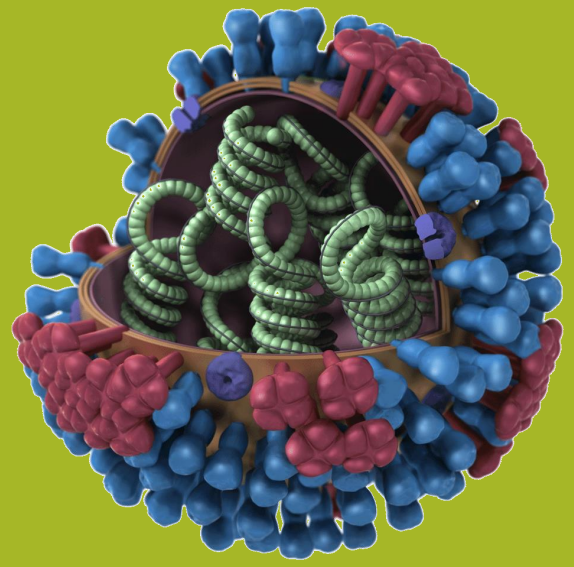
# INFLUENZA B IN LATIN AMERICA



Cynthia Vázquez,
Departamento de Virología.
Laboratorio Central de Salud Pública Paraguay

DOI:10.1111/irv.12317
www.influenzajournal.com
Original Article

# Burden of influenza-associated deaths in the Americas, 2002–2008

**Po-Yung Cheng,[a] Rakhee Palekar,[a,b] Eduardo Azziz-Baumgartner,[a] Danielle Iuliano,[a] Airlane P. Alencar,[c] Joseph Bresee,[a] Otavio Oliva,[b] Maria de Fatima Marinho de Souza,[b] Marc-Alain Widdowson[a]**

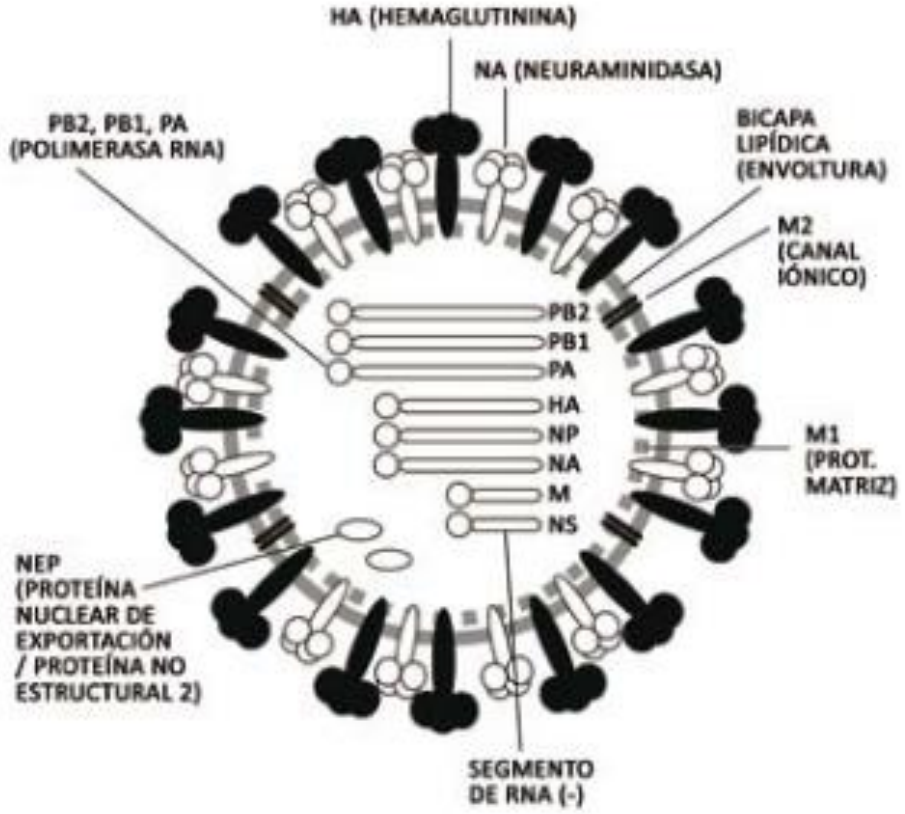
[a]Influenza Division, US Centers for Disease Control and Prevention, Atlanta, GA, USA. [b]Pan American Health Organization, Washington, DC, USA. [c]Institute of Mathematics and Statistics, University of São Paulo, São Paulo, Brazil.
*Correspondence:* Po-Yung Cheng, 1600 Clifton Road, MS A32, Atlanta, GA 30329-4018, USA. E-mail: pcheng@cdc.gov

- **mean: 85.100 deaths/year**
- **40.880 – 160.270 deaths/year**


Cheng P-Y, Palekar R, Azziz-Baumgartner E, et al.
*Influenza and Other Respiratory Viruses*.
2015;9(Suppl 1):13-21. doi:10.1111/irv.12317.

# Influenza Virus

- Family: Orthomyxoviridae
- Genera: Influenzavirus
- Types: A, B, C
- Genome: sRNA (-), 8 segments encoding 9-10 proteins
  - M1 and NP:  type specific
  - HA and NA: subtipe specific



# Influenza features

- **Influenza infections in humans are mainly caused by type A and type B viruses.**
- **Influenza A is responsible for the pandemics and the majority of seasonal infections**
- **Influenza B incidence can vary between seasons**
- **In contrast to influenza A, influenza B viruses mutate more slowly and have no animal reservoir**
- **Two antigenically distinct lineages of influenza B viruses have been cocirculating in the past 30 years.**

# Influenza B

- **Influenza B can be classified into two antigenically distinct lineage, Victoria and Yamagata, based on differences in the viral haemagglutinin gene**
- **This difference is responsible for the lack of antigenic cross reactivity between lineages.**
- **These two lineages currently circulate among humans since the mid-1980s**
- **Influenza B evolution is characterised by a continuous turnover of lineages and the match between circulating and vaccine strain vary annually**

# Vaccine Composition

- The trivalent influenza vaccine (TIV) recommended by WHO annually, contains two A strains, and one B lineage.
- Differences between the circulating lineage and the vaccine strain, could lead to limited protection in the vaccinated population, since immunity to a lineage does not confer protection against another.
- The quadrivalent influenza vaccine (QIV) contains an additional B lineage

World Health Organization

**Recommended composition of influenza virus vaccines for use in the 2015-2016 northern hemisphere influenza season**

- t is recommended that trivalent vaccines for use in the 2015-2016 influenza season (northern hemisphere winter) contain the following:
  - an A/California/7/2009 (H1N1)pdm09-like virus;
  - an A/Switzerland/9715293/2013 (H3N2)-like virus;
  - a B/Phuket/3073/2013-like virus.
- It is recommended that quadrivalent vaccines containing two influenza B viruses contain the above three viruses and
  - a B/Brisbane/60/2008-like virus;

World Health Organization

**Recommended composition of influenza virus vaccines for use in the 2016 southern hemisphere influenza season**

- It is recommended that trivalent vaccines for use in the 2016 southern hemisphere influenza season contain the following:
  - an A/California/7/2009 (H1N1)pdm09-like virus
  - an A/Hong Kong/4801/2014 (H3N2)-like virus
  - a B/Brisbane/60/2008-like virus.
- It is recommended that quadrivalent vaccines containing two influenza B viruses contain the above three viruses and
  - a B/Phuket/3073/2013-like virus.

World Health Organization

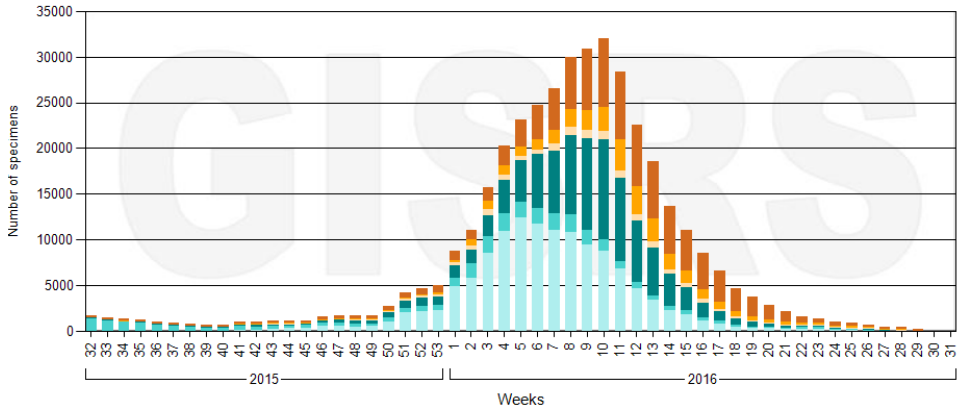
## Influenza Laboratory Surveillance Information

### by the Global Influenza Surveillance and Response System (GISRS)

Generated on 03/08/2016

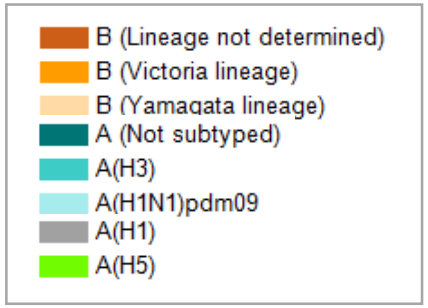
**Northern hemishere**

**Number of specimens positive for influenza by subtype**



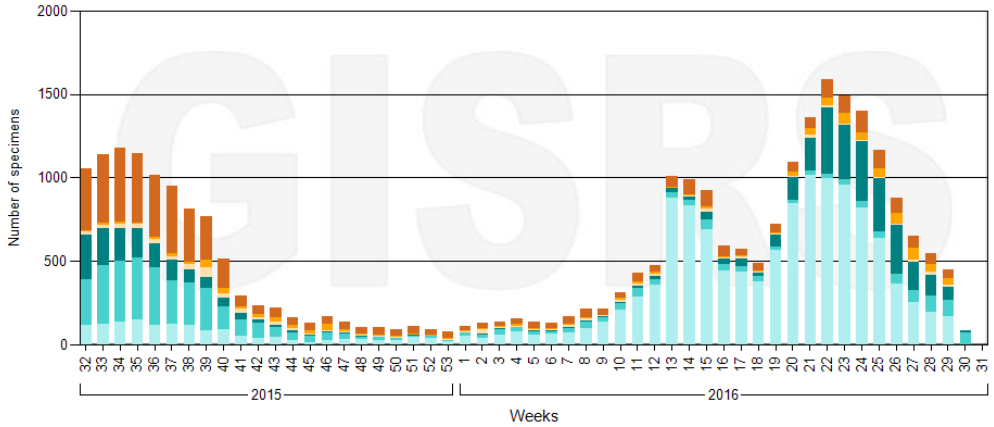

Most of the data from NH(maximum 30.000 samples per week) vs SH (maximum1500 per week)

Co-circulation
Yamagata & Victoria

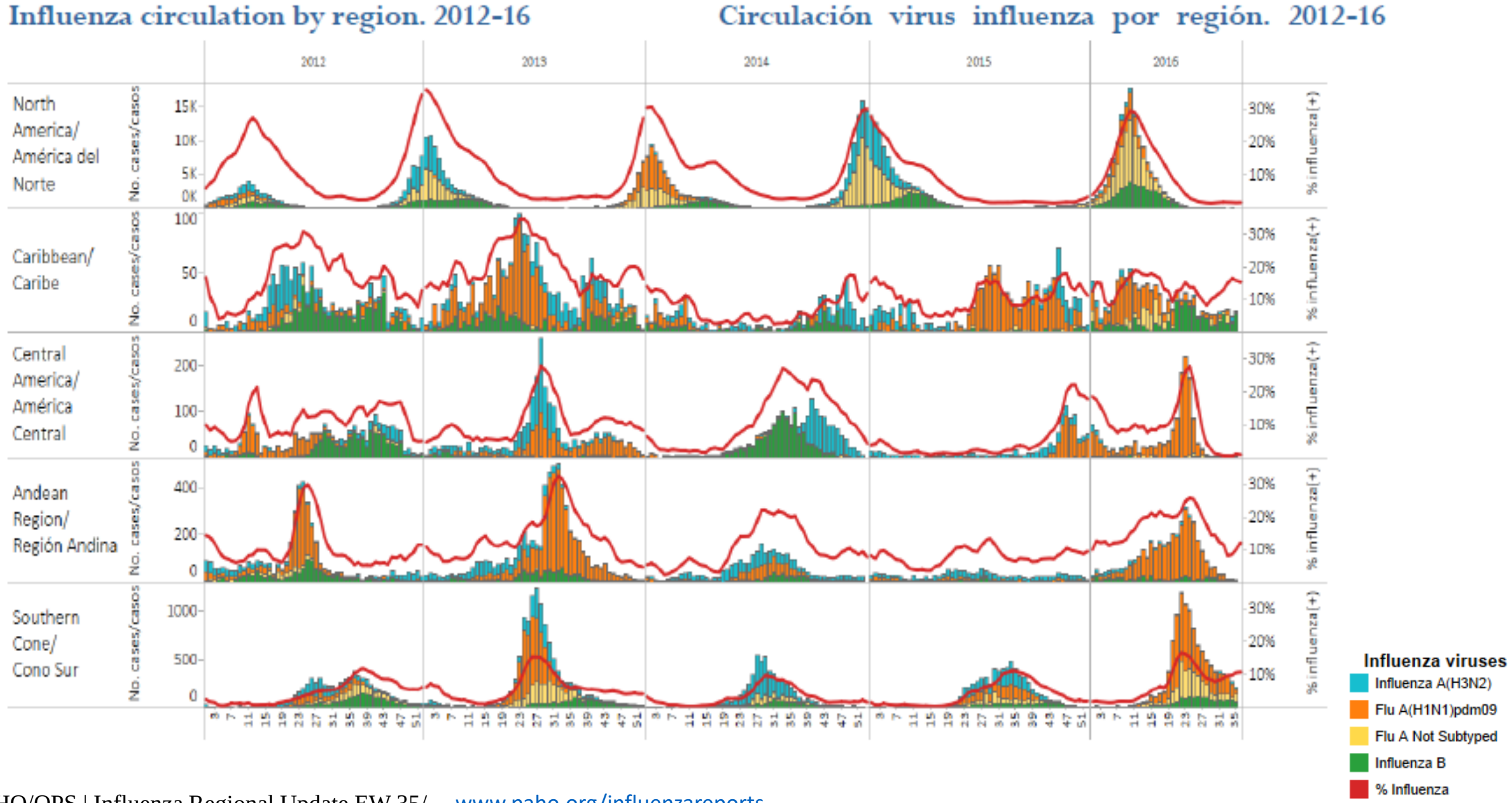



**Southern hemisphere**

**Number of specimens positive for influenza by subtype**



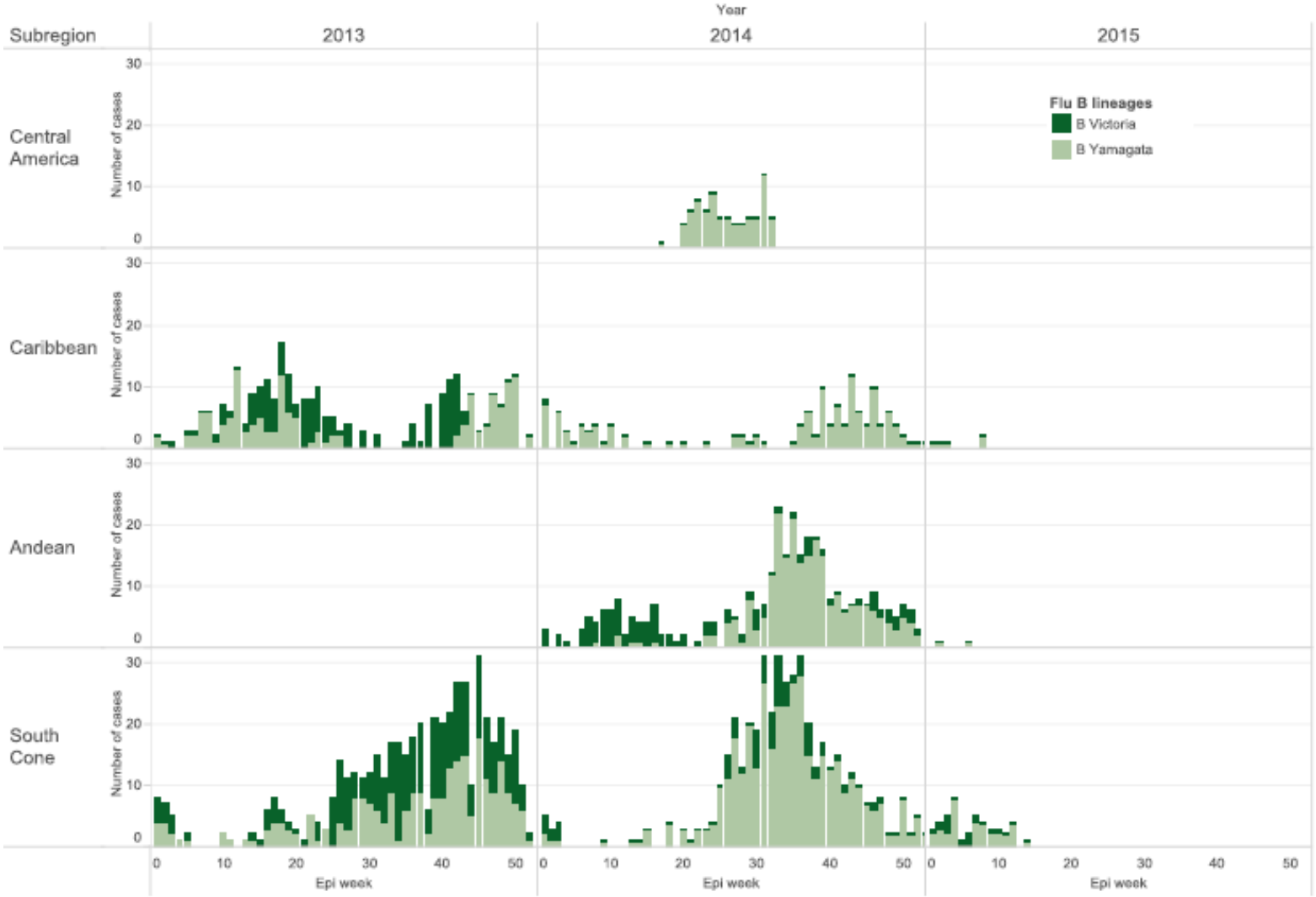

WHO. Number of specimens positive for influenza by subtype [Internet]. 2016 [updated 2016
Available from: http://gamapserver.who.int/gareports/Default.aspx?ReportNo=5&Hemispher
http://gamapserver.who.int/gareports/Default.aspx?ReportNo=5&Hemisphere=Southern


Influenza circulation by region. 2012-16
Circulación virus influenza por región. 2012-16
2012
2013
2014
2015
2016
North America/ América del Norte
Caribbean/ Caribe
Central America/ América Central
Andean Region/ Región Andina
Southern Cone/ Cono Sur
No. cases/casos
% influenza(+)
Influenza viruses
Influenza A(H3N2)
Flu A(H1N1)pdm09
Flu A Not Subtyped
Influenza B
% Influenza

# Lineages B co-circulation

## Influenza B cases by identified lineage by Subregion and EW (2013 to EW14 of 2015)

### Argentina, Bolivia-INLASA, CARPHA, Chile, Colombia, Cuba, Ecuador, El Salvador, French Guiana, Jamaica, Martinique, Nicaragua, Panama, Paraguay, Peru*




*Countries that provide influenza B lineage data. Only data from countries listed is shown.

Data source: Ministries of Health and National Influenza Centers of Member States reporting to the Global Information Platform **FluNet.**

Red de Infecciones Respiratorias Agudas Graves. SARInet [Internet]. 2015 [actualizado 2015 Abr 28; citado 2016 Feb 02]. Disponible en: http://sarinet.org/sites/default/files/sarinet_lineas_de_accion_y_proximos_pasos.pdf

DOI:10.1111/irv.12319
www.influenzajournal.com

Original Article

# Epidemiological and virological characteristics of influenza B: results of the Global Influenza B Study

**Saverio Caini,[a] Q. Sue Huang,[b] Meral A. Ciblak,[c] Gabriela Kusznierz,[d] Rhonda Owen,[e] Sonam Wangchuk,[f] Cláudio M. P. Henriques,[g] Richard Njouom,[h] Rodrigo A. Fasce,[i] Hongjie Yu,[j] Luzhao Feng,[j] Maria Zambon,[k] Alexey W. Clara,[l] Herman Kosasih,[m] Simona Puzelli,[n] Herve A. Kadjo,[o] Gideon Emukule,[p] Jean-Michel Heraud,[q] Li Wei Ang,[r] Marietjie Venter,[s,t] Alla Mironenko,[u] Lynnette Brammer,[v] Le Thi Quynh Mai,[w] François Schellevis,[a] Stanley Plotkin,[x] John Paget,[a] on behalf of the Global Influenza B Study***

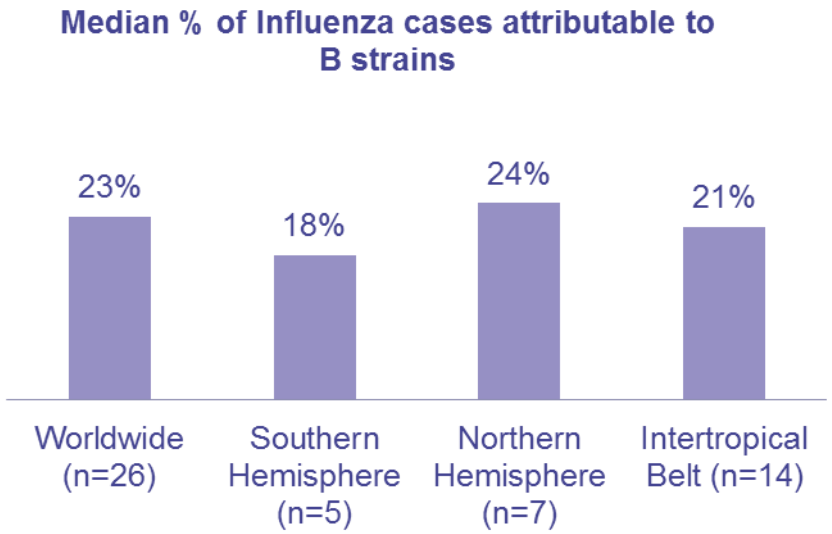
[a]Netherlands Institute for Health Services Research (NIVEL), Utrecht, The Netherlands. [b]Institute of Environmental Science and Research, Wellington, New Zealand. [c]Istanbul University, Istanbul, Turkey. [d]Instituto Nacional de Enfermedades Respiratorias Dr. Emilio Coni, Santa Fe, Argentina. [e]Department of Health and Ageing, Influenza Surveillance Section, Surveillance Branch, Office of Health Protection, Woden, ACT, Australia. [f]Public Health Laboratory, Department of Public Health, Ministry of Health, Thimphu, Bhutan. [g]Ministry of Health, Brasília, DF, Brazil. [h]Service de Virologie, Centre Pasteur du Cameroun, Yaounde, Cameroon. [i]Sección de Virus Respiratorios y Exantemáticos, Instituto de Salud Pública de Chile, Santiago de Chile, Chile. [j]Division of Infectious Disease, Key Laboratory of Surveillance and Early-warning on Infectious Disease, Chinese Center for Disease Control and Prevention, Beijing, China. [k]Respiratory Virus Unit, Public Health England, Colindale, UK. [l]US Centers for Disease Control, Central American Region, Guatemala City, Guatemala. [m]US Naval Medical Research Unit No. 2, Jakarta, Indonesia. [n]National Influenza Center, Istituto Superiore Sanità, Rome, Italy. [o]Respiratory Viruses Unit, Pasteur Institute of Côte d'Ivoire, Abidjan, Côte d'Ivoire. [p]US Centers for Disease Control and Prevention, Nairobi, Kenya. [q]National Influenza Center, Virology Unit, Institut Pasteur of Madagascar, Antananarivo, Madagascar. [r]Epidemiology and Disease Control Division, Ministry of Health, Singapore, Singapore. [s]Global Disease Detection, US-CDC, Pretoria, South Africa. [t]Zoonoses Research Unit, Department of Medical Virology, University of Pretoria, Pretoria, South Africa. [u]L.V.Gromashevsky Institute of Epidemiology and Infectious Diseases National Academy of Medical Science of Ukraine, Kiev, Ukraine. [v]Epidemiology and Prevention Branch, Influenza Division, Centers for Disease Control and Prevention, Atlanta, GA, USA. [w]National Institute of Hygiene and Epidemiology, Hanoi, Vietnam. [x]University of Pennsylvania, Philadelphia, PA, USA.

*Correspondence:* John Paget, PhD, Netherlands Institute for Health Services Research (NIVEL), Otterstraat 118-124, 3513 CR Utrecht, The Netherlands. E-mail: j.paget@nivel.nl

*Global Influenza B Study members are in Appendix 1.

# Global Influenza B study 2000-2013

- 26 countries - 935 673 influenza cases
- Overall median proportion of influenza B: **22.6%**
- During seasons where influenza B was dominant or co-circulated (>20%), Victoria predominated 64% of seasons and Yamagata 36%
- vaccine mismatch was observed in 25% of seasons.




Caini S, et al. Influenza Other Respir Viruses. 2015; 9(Suppl 1): 3-12.

PLOS ONE

RESEARCH ARTICLE

# Temporal Patterns of Influenza A and B in Tropical and Temperate Countries: What Are the Lessons for Influenza Vaccination?

**Saverio Caini[1]*, Winston Andrade[2], Selim Badur[3], Angel Balmaseda[4], Amal Barakat[5], Antonino Bella[6], Abderrahman Bimohuen[5], Lynnette Brammer[7], Joseph Bresee[7], Alfredo Bruno[8], Leticia Castillo[9], Meral A. Ciblak[3], Alexey W. Clara[10], Cheryl Cohen[11,12], Jeffery Cutter[13], Coulibaly Daouda[14], Celina de Lozano[15], Domenica De Mora[8], Kunzang Dorji[16], Gideon O. Emukule[17], Rodrigo A. Fasce[2], Luzhao Feng[18], Walquiria Aparecida Ferreira de Almeida[19], Raquel Guiomar[20], Jean-Michel Heraud[21], Olha Holubka[22], Q. Sue Huang[23], Herve A. Kadjo[14], Lyazzat Kiyanbekova[24], Herman Kosasih[25], Gabriela Kusznierz[26], Jenny Lara[27], Ming Li[18], Liza Lopez[23], Phuong Vu Mai Hoang[28], Cláudio Maierovitch Pessanha Henriques[19], Maria Luisa Matute[29], Alla Mironenko[22], Brechla Moreno[30], Joshua A. Mott[17], Richard Njouom[31], Nurhayati[25], Akerke Ospanova[24], Rhonda Owen[32], Richard Pebody[33], Kate Pennington[32], Simona Puzelli[34], Mai thi Quynh Le[28], Norosoa Harline Razanajatovo[21], Ana Rodrigues[35], Juan Manuel Rudi[26], Raymond Tzer Pin Lin[13], Marietjie Venter[36,37], Marie-Astrid Vernet[31], Sonam Wangchuk[16], Juan Yang[18], Hongjie Yu[18], Maria Zambon[38], François Schellevis[1], John Paget[1], Global Influenza B Study[¶]**

CrossMark
click for updates

OPEN ACCESS

**Citation:** Caini S, Andrade W, Badur S, Balmaseda

Influenza cases reported to the national influenza surveillance system by each participating and percentages of influenza B virus.

| Country | Latitude | Population (million) | No. seasons [1] | No. influenza cases | % influenza B |
|---|---|---|---|---|---|
| *Southern hemisphere* | | | ***45 (2000–2013)*** | ***143,102*** | ***23.3*** |
| New Zealand | 41.8 S | 4.5 | 12 (2000–2012) | 12,729 | 23.2 |
| Chile | 35.8 S | 16.6 | 4 (2008–2012) | 7,039 | 16.0 |
| Argentina (Santa Fe) | 31.4 S | 3.2 | 3 (2010–2012) | 664 | 18.7 |
| South Africa | 29.0 S | 53.0 | 4 (2010–2013) | 1,253 | 45.1 |
| Australia | 25.8 S | 23.4 | 11 (2001–2012) | 120,193 | 23.5 |
| Brazil South | 25.2 S | 27.4 | 7 (2004–2012) [2] | 861 | 30.1 |
| Brazil Southeast | 23.3 S | 80.4 | 4 (2008–2012) | 363 | 33.3 |
| *Inter-tropical belt* | | | ***87 (2002–2014)*** | ***42,908*** | ***38.1*** |
| Madagascar | 19.4 S | 21.3 | 11 (2002–2013) | 2,638 | 40.2 |
| Brazil West Central | 15.5 S | 13.3 | 2 (2006–2012) [2] | 152 | 12.5 |
| Brazil Northeast | 12.6 S | 53.1 | 5 (2004–2012) [2] | 512 | 31.1 |
| Brazil North | 3.1 S | 15.0 | 3 (2010–2012) | 205 | 27.3 |
| Ecuador | 2.0 S | 15.4 | 4 (2011–2014) | 1,872 | 17.6 |
| Indonesia | 1.7 S | 237.4 | 5 (2003–2007) | 4,231 | 35.1 |
| Kenya | 0.4 S | 44.4 | 5 (2007–2012) | 4,700 | 25.0 |
| Singapore | 1.2 N | 5.4 | 5 (2007–2012) | 6,859 | 31.5 |
| Cameroon | 5.7 N | 22.5 | 4 (2010–2013) | 606 | 37.6 |
| Ivory Coast | 7.6 N | 23.2 | 5 (2007–2012) | 1,260 | 39.3 |
| Panama | 8.6 N | 3.7 | 5 (2008–2013) | 921 | 26.3 |
| Costa Rica | 10.0 N | 4.6 | 3 (2010–2012) | 2,185 | 19.9 |
| Nicaragua | 12.9 N | 6.1 | 6 (2007–2013) | 3,273 | 23.0 |
| El Salvador | 13.8 N | 6.1 | 7 (2006–2013) | 1,375 | 35.6 |
| Honduras | 14.8 N | 8.2 | 3 (2010–2012) | 797 | 19.6 |
| Guatemala | 15.7 N | 15.4 | 7 (2006–2013) | 2,093 | 18.9 |
| Viet Nam | 16.7 N | 89.7 | 7 (2006–2013) | 9,229 | 72.4 |
| *Northern hemisphere* | | | ***80 (2000–2014)*** | ***385,897*** | ***27.9*** |
| Bhutan | 27.4 N | 0.7 | 3 (2010–2012) | 690 | 33.6 |
| China South | 31.1 N | 969.4 | 5 (2006–2011) | 46,835 | 44.1 |
| Morocco | 32.0 N | 33.2 | 7 (2003–2013) [2] | 1,130 | 21.4 |
| Turkey | 39.0 N | 76.7 | 4 (2006–2010) | 834 | 48.9 |
| Portugal | 39.3 N | 10.4 | 12 (2000–2013) | 3,684 | 25.5 |
| China North | 39.5 N | 370.9 | 6 (2005–2011) | 27,726 | 43.2 |
| Italy | 42.9 N | 59.9 | 9 (2002–2011) | 8,202 | 19.1 |
| USA | 45.6 N | 317.6 | 11 (2000–2011) | 289,413 | 23.9 |
| Kazakhstan | 48.0 N | 17.9 | 4 (2010–2014) | 1,195 | 23.8 |
| Ukraine | 49.1 N | 44.6 | 10 (2000–2012) [2] | 1,335 | 23.3 |
| England | 52.3 N | 53.0 | 9 (2003–2012) | 4,853 | 32.0 |

**Influenza B burden with high variability (12,5-72,4%)**

**Same country, different regions**
**Ej: Brazil**

[1] The 2009 influenza season (2009–2010 in Northern hemisphere) was not included in the analysis

[2] We did not include the following twelve seasons because <50 influenza cases were reported: 2005 in Brazil South; 2007, 2008, 2010, and 2011 in Brazil West Central; 2005, 2007, and 2008 in Brazil Northeast; 2005–2006 and 2007–2008 in Morocco; and 2001–2002 and 2003–2004 in Ukraine.

Caini S, et al. PLoS One. 2016 Mar 31;11(3):e0152310.

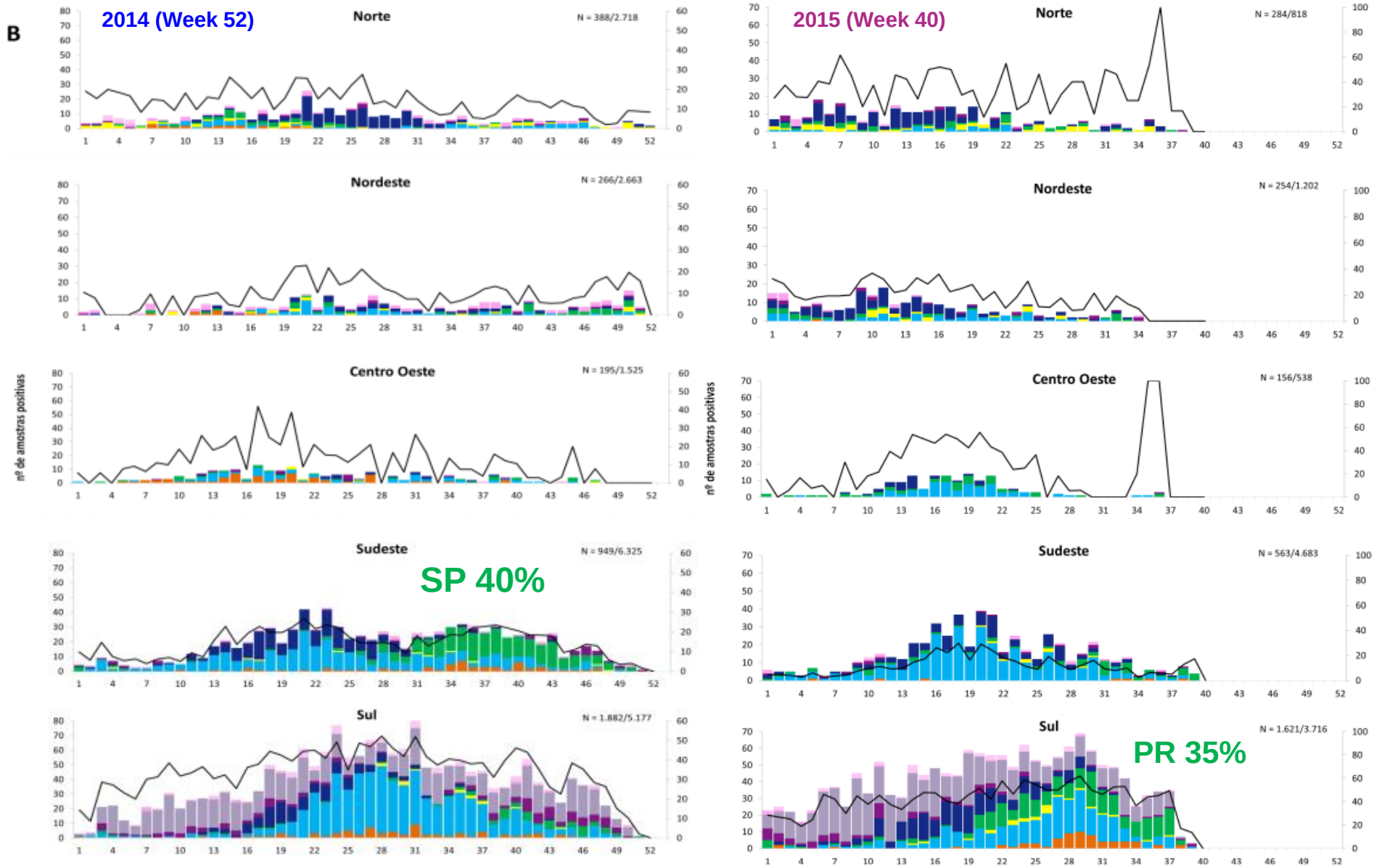
# Influenza Virus types and subtypes in 21 LAC, 2010-2015 [1]

| Countries | A(H1N1) | % | A(H3N2) | % | B | % | A? | % | TOTAL |
|---|---|---|---|---|---|---|---|---|---|
| Argentina | 3,891 | 22.12 | 3,810 | 22.0 | 3,163 | 18.0 | 6,724 | 38.23 | 17,588 |
| Brasil * | 4,773 | 45.11 | 3,349 | 32.0 | 2,322 | 22.0 | 135 | 1.27 | 10,579 |
| Chile | 3,329 | 28.51 | 5,537 | 47.42 | 2,147 | 18.38 | 662 | 6.0 | 11,675 |
| Colombia | 2,021 | 51.00 | 1,295 | 33.0 | 344 | 9.0 | 322 | 8.08 | 3,982 |
| Costa Rica | 1,519 | 45.28 | 1,186 | 35.36 | 605 | 18.03 | 44 | 1.31 | 3,354 |
| Cuba | 1,837 | 50.28 | 1,147 | 31.39 | 621 | 17.0 | 48 | 1.31 | 3,653 |
| Ecuador | 2,365 | 50.0 | 1,480 | 31.01 | 746 | 16.0 | 181 | 4.0 | 4,772 |
| El Salvador * | 343 | 26.0 | 476 | 36.0 | 475 | 36.0 | 42 | 3.14 | 1,336 |
| Guatemala | 8,444 | 35.38 | 509 | 2.13 | 908 | 4.0 | 14,000 | 59.0 | 23,861 |
| Jamaica * | 68 | 19.0 | 141 | 39.0 | 145 | 40.0 | 9 | 2.47 | 363 |
| Honduras * | 453 | 36.38 | 435 | 35.0 | 342 | 27.46 | 15 | 1.20 | 1,245 |
| Martinica * | 38 | 24.0 | 73 | 46.0 | 43 | 27.04 | 5 | 3.14 | 159 |
| Mexico | 13,242 | 50.0 | 8,032 | 30.30 | 3,374 | 13.0 | 1,857 | 7.00 | 26,505 |
| Nicaragua * | 1,075 | 28.0 | 1,579 | 41.0 | 1,219 | 31.45 | 2 | 0.05 | 3,875 |
| Panama * | 181 | 20.0 | 422 | 46.0 | 303 | 33.0 | 12 | 1.30 | 918 |
| Paraguay * | 1,333 | 22.0 | 3,221 | 52.29 | 1,383 | 22.45 | 222 | 4.0 | 6,159 |
| Peru | 2,233 | 45.47 | 1,434 | 29.20 | 882 | 18.0 | 361 | 7.35 | 4,910 |
| Dominicana | 348 | 52.0 | 193 | 29.0 | 130 | 19.31 | 2 | 0.29 | 673 |
| Uruguay * | 320 | 33.05 | 393 | 41.0 | 247 | 26.0 | 8 | 0.82 | 968 |
| Venezuela | 2,384 | 72.0 | 97 | 3.0 | 40 | 1.20 | 805 | 24.20 | 3,326 |
| Bolivia * | 4,630 | 56.26 | 1,671 | 20.30 | 1,774 | 22.0 | 154 | 2.0 | 8,229 |

*** Global Influenza Surveillance - 19% [2]**


1. PAHO. Influenza viruses by type/subtype, 2010-2015 (updated 2015 Set 14);. Available: http://ais.paho.org/phip/viz/ed_flu.asp
2. Caini S, et al. Influenza Other Respir Viruses. 2015 Aug;9 Suppl 1:3-12.

# Respiratory viruses identified in Sentinel Units, per EW - Brazil

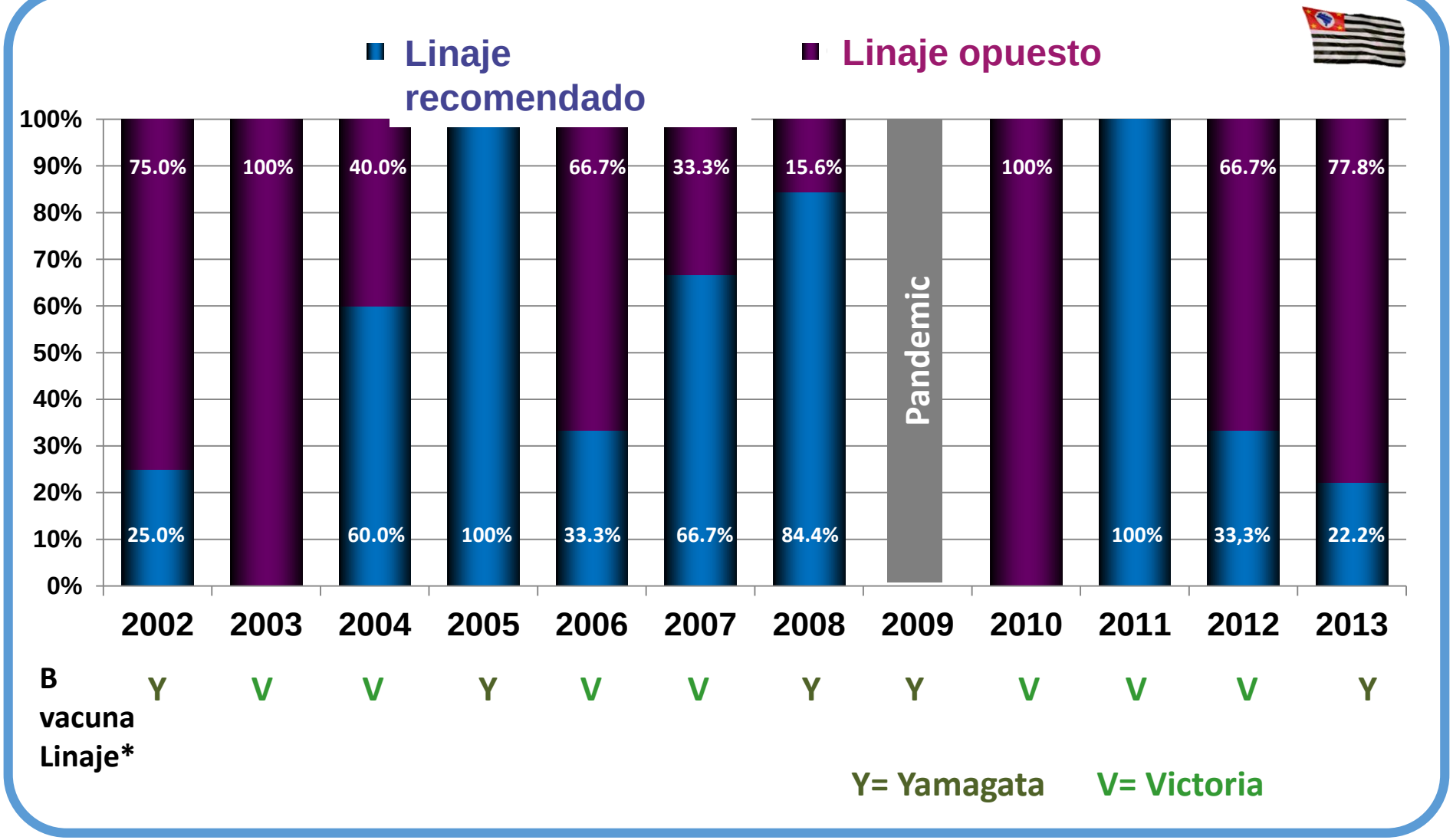



- Influenza A(H1N1)pdm09
- Parainfluenza
- Influenza A(H3N2)
- Rinovírus
- Influenza A (not subtyped)
- Adenovírus
- **Influenza B**
- Metapneumovírus
- VRS
- % of specimens positive


Brasil. Ministério da Saúde. Secretaria de Vigilância de Saúde. Disponível em: http://portalsaude.saude.gov.br/images/pdf/2015/janeiro/23/Boletim-Epidemiol--gico-Influenza-SE52-2014.pdf

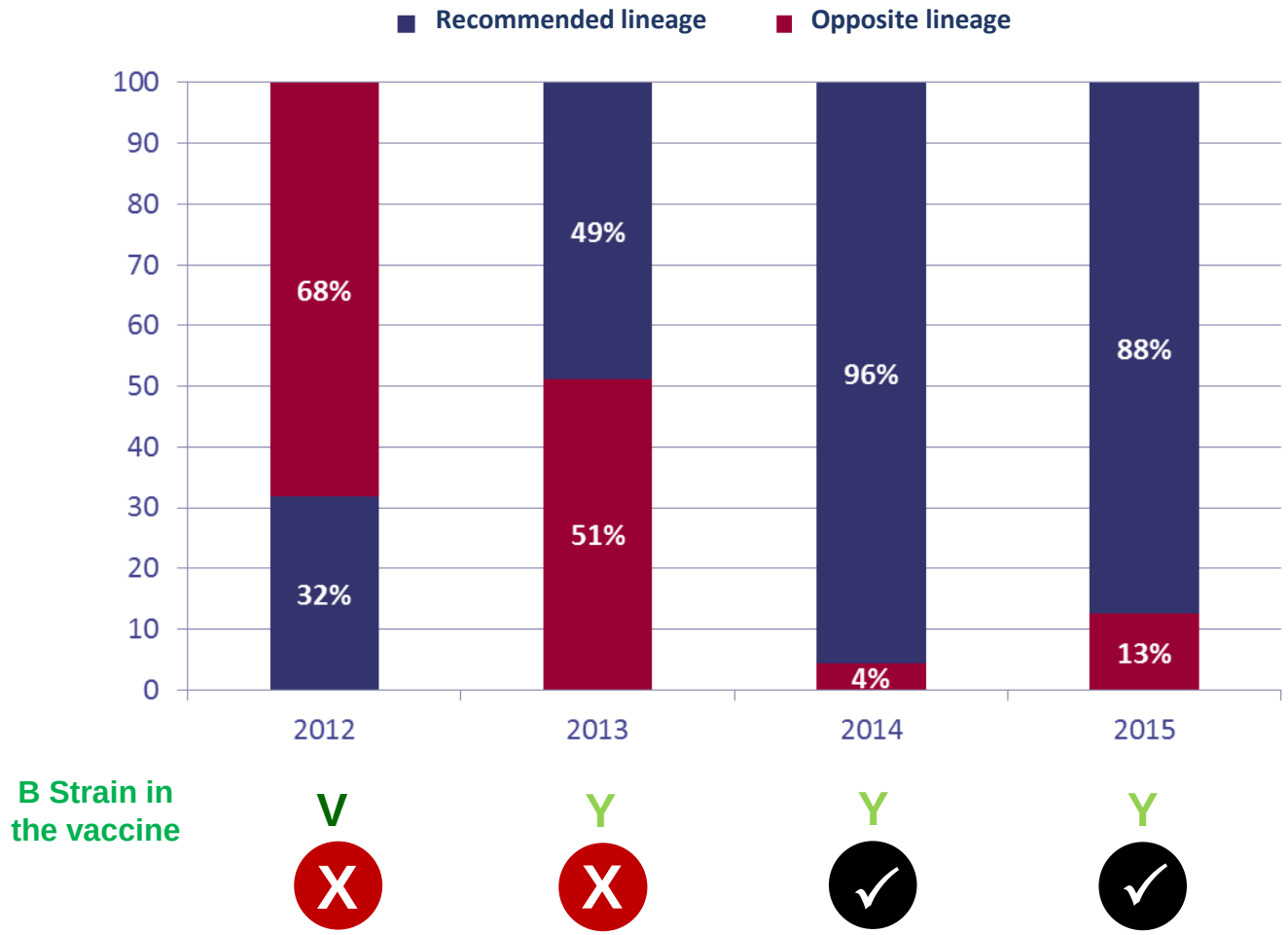
Brasil. Ministério da Saúde. Portal da Saúde. Boletim Epidemiológico – Influenza: monitoramento até a semana epidemiológica 40 de 2015. Disponível em: http://portalsaude.saude.gov.br/images/pdf/2015/outubro/16/boletim-epidemiologico-influenza-se40-2015.pdf

# Mismatch between circulating Influenza B strains and Vaccine strain for South Hemisphere São Paulo (Brasil), 2002-2013




Carvalhanas TRMP, et al. Influenza B circulation in Brazil and characterization of 75 B strains isolated from patients from São Paulo State, Brazil (2002-2013) [poster on the Internet]. In: 32nd ESPID; 2014 May 6-10; Dublin, Ireland [cited 2014 May 12]. Available from: http://espid.meetingxpert.net/ESPID_945/poster_94755/program.aspx Source: DVRESP/Adolfo Lutz Institute and WHO.
*Lineages included in influenza vaccines for southern hemisphere according to WHO (http://www.who.int/en/).

# Circulation of strains Influenza B is heterogeneous and unpredictable - Chile, 2012-2015




**Total 46.5% mismatch with TIV !**

(681 of 1464 strains B)

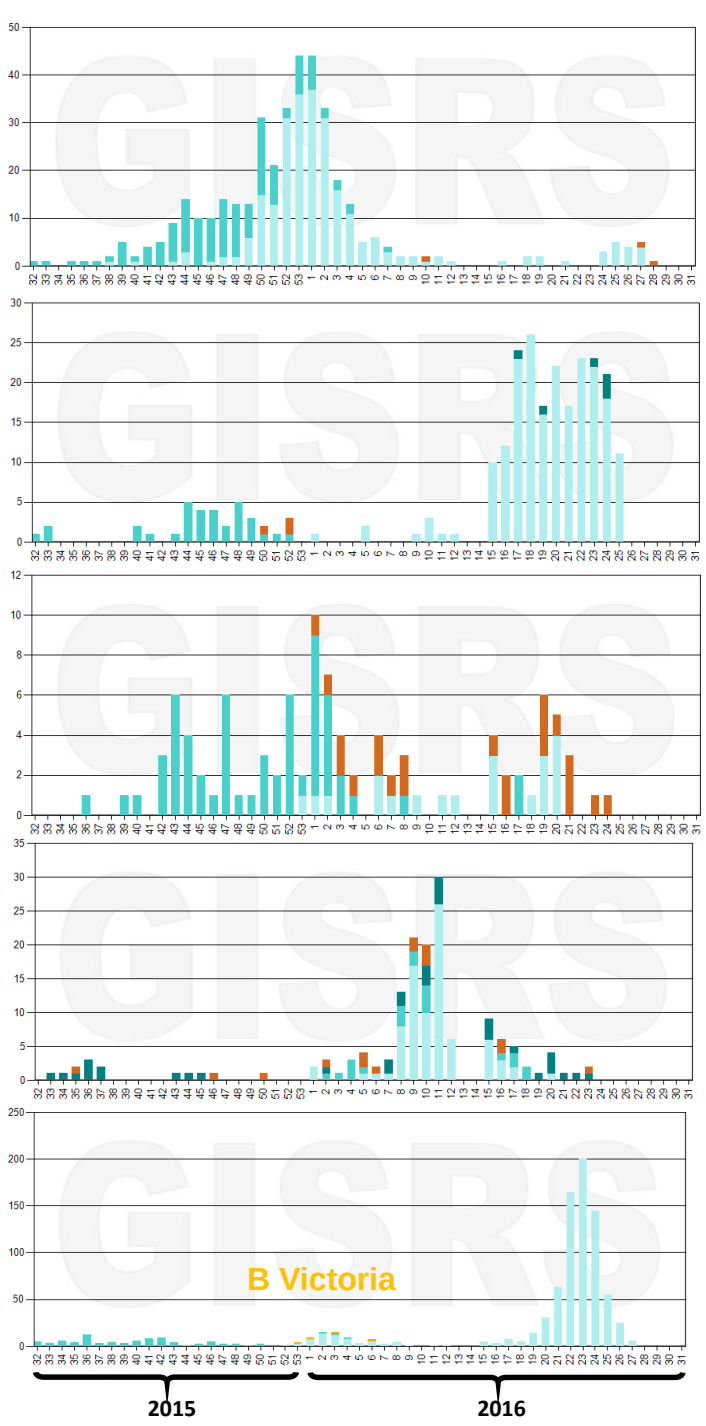
Torres JP, Rabello M, De la Maza V, Conca N. Influenza A and B strains circulation in Chile: review of 4 seasons (2012-2015) [abstract]. In: 34th Annual Meeting of the European Society for Paediatric Infectious Diseases; 2016 May 10-14. Brighton, United Kingdom.

World Health Organization

Data generated on 03/08/2016


B (Lineage not determined) | A (Not subtyped) | A(H1)
B (Victoria lineage) | A(H3) | A(H5)
B (Yamagata lineage) | A(H1N1)pdm09

WHO. Number of specimens positive for influenza by subtype [Internet]. 2016 [updated 2016 Aug 03; cited 2016 Aug 03]. Available from: http://www.who.int/influenza/gisrs_laboratory/flunet/charts/en/




Costa Rica

El Salvador

Honduras

Guatemala

Panama

2016
- circulation A/H1N1pdm09

Honduras:
B lineage?

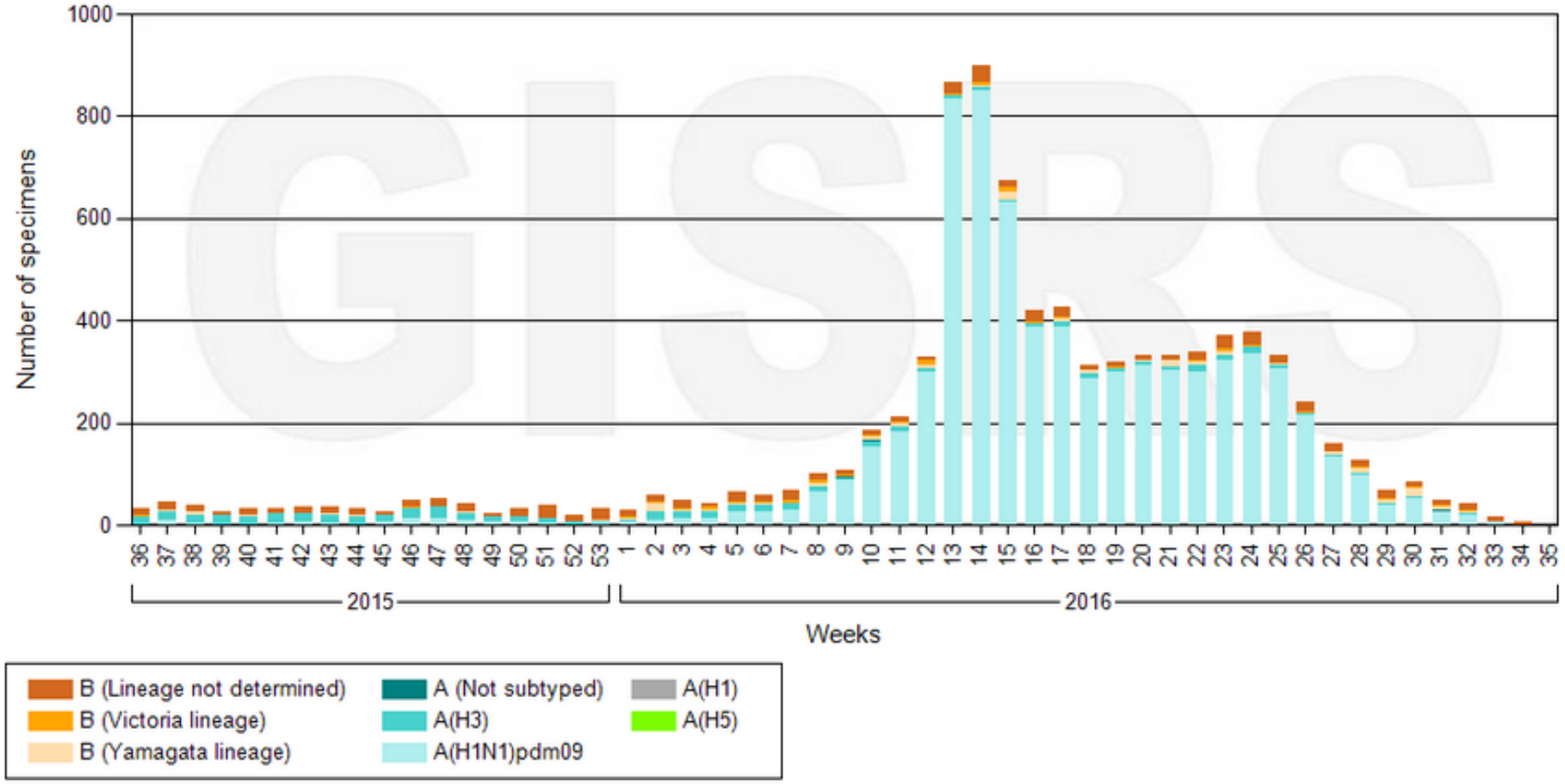
## Influenza Laboratory Surveillance Information

by the Global Influenza Surveillance and Response System (GISRS)

generated on 01/09/2016 20:40:22 UTC

### Influenza transmission zone: Tropical South America

**Number of specimens positive for influenza by subtype**

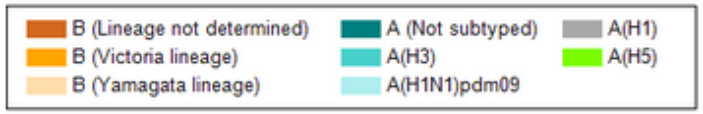


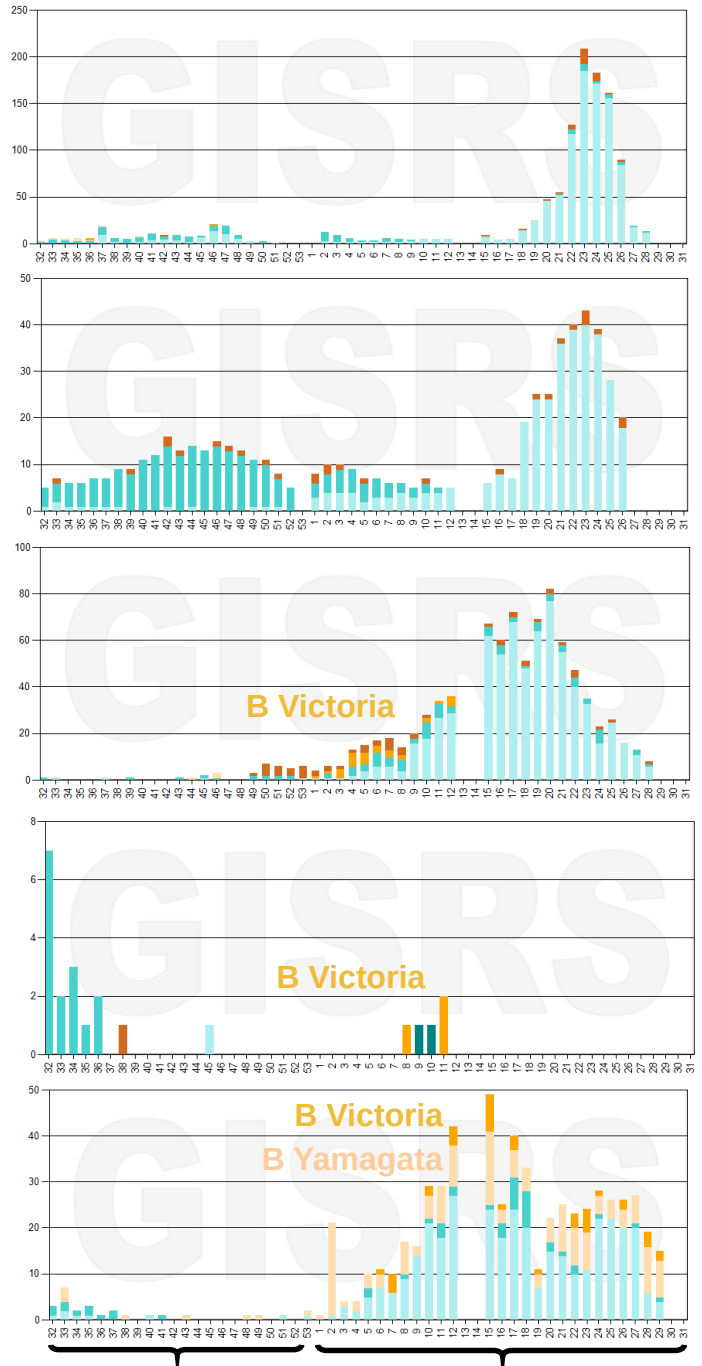

Data source: FluNet ( www.who.int/flunet ), GISRS

© World Health Organization 2016

World Health Organization

Data generated on 03/08/2016


High circulation A/H1N1pdm09

Perú: B lineages co-circulation with predominance of Yamagata (missmatch with TIV)

WHO. Number of specimens positive for influenza by subtype [Internet]. 2016 [updated 2016 Aug 03; cited 2016 Aug 03]. Available from: http://www.who.int/influenza/gisrs_laboratory/flunet/charts/en/

World Health Organization

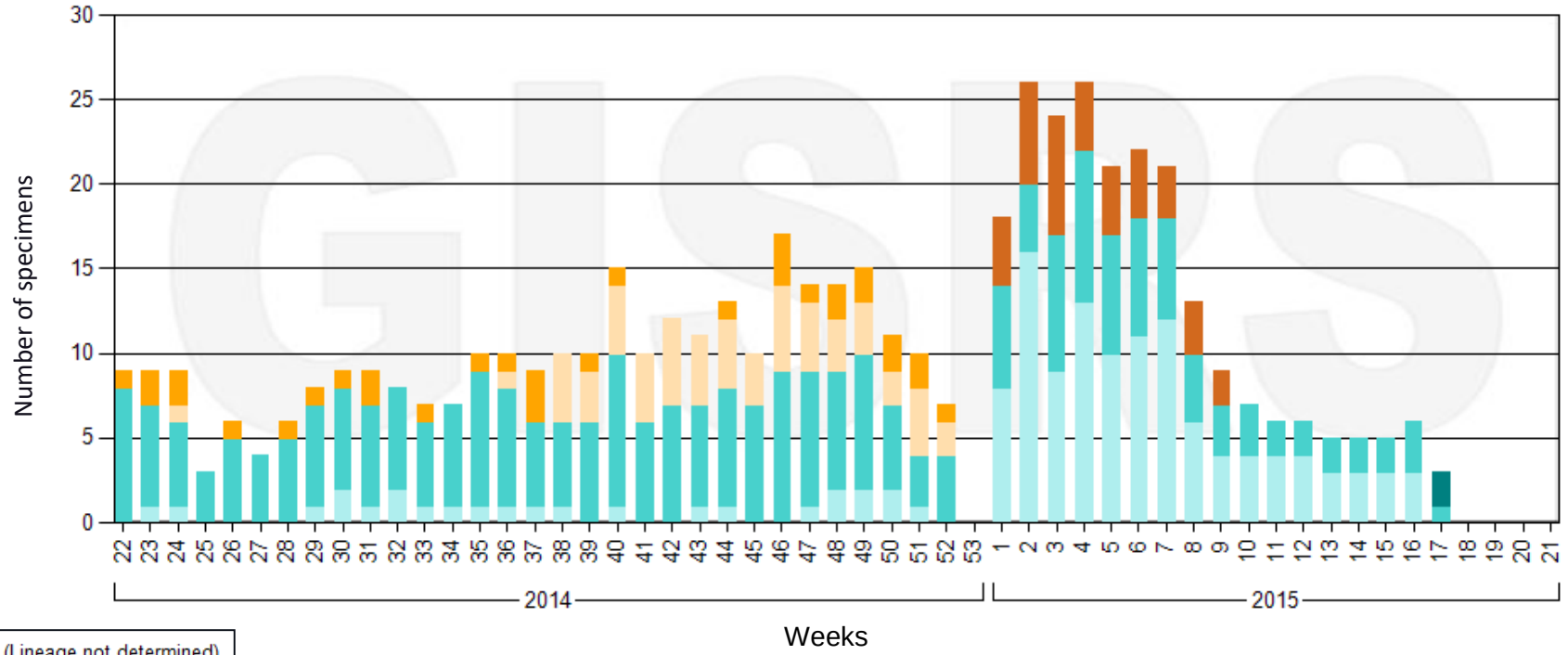
Influenza Laboratory Surveillance Information
by the Global Influenza Surveillance and Response System (GISRS)

Data generated on 26/05/2015

# Colombia

2014: 63% Victoria and 37% Yamagata

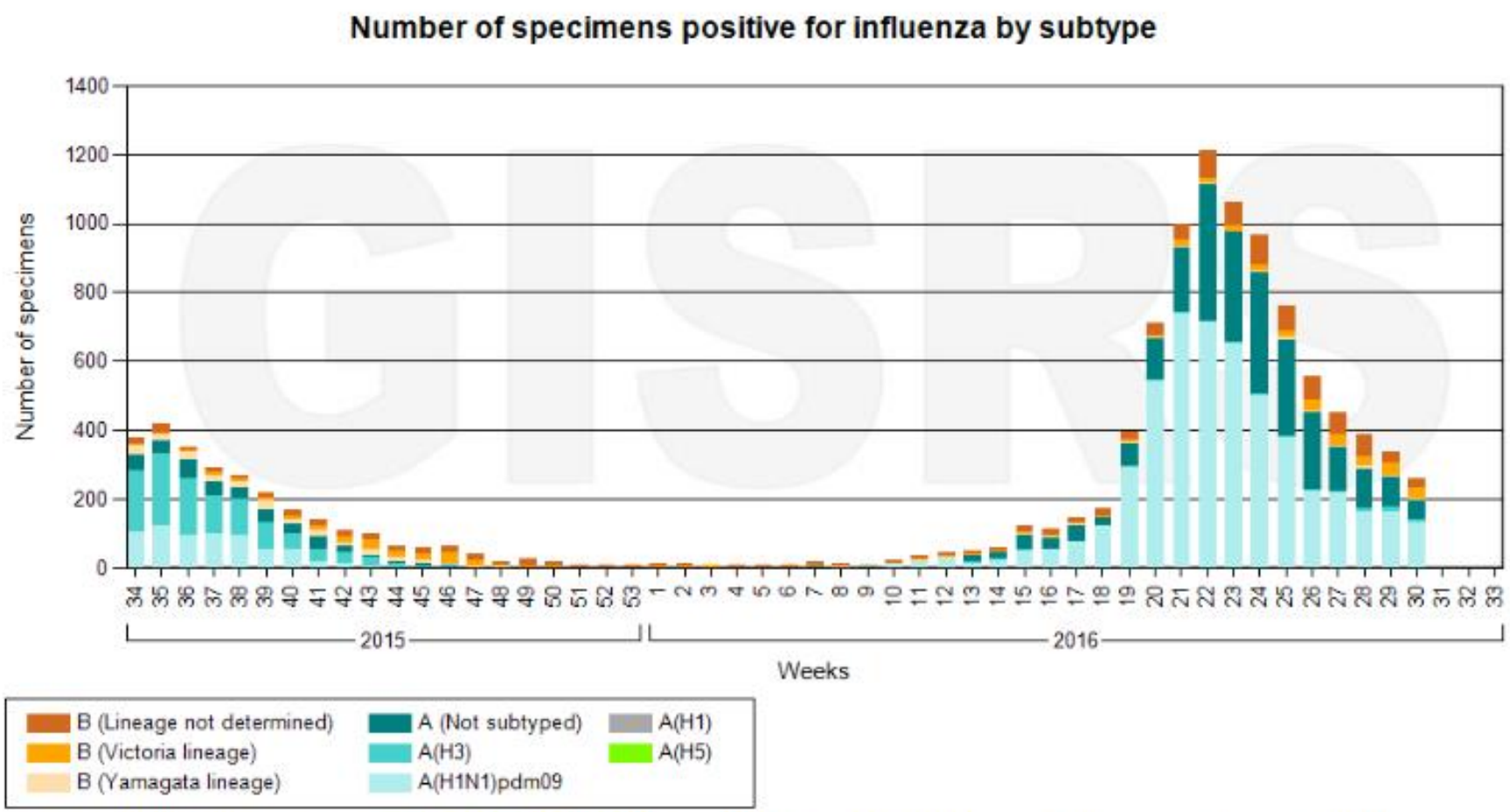
## Number of specimens positive for influenza by subtype




WHO. Number of specimens positive for influenza by subtype [Internet]. 2015 [updated 2015 May 26; cited 2015 May 26]. Available from: http://gamapserver.who.int/gareports/Default.aspx?ReportNo=1

World Health Organization

## Number of specimens positive for influenza by subtype in Temperate South America



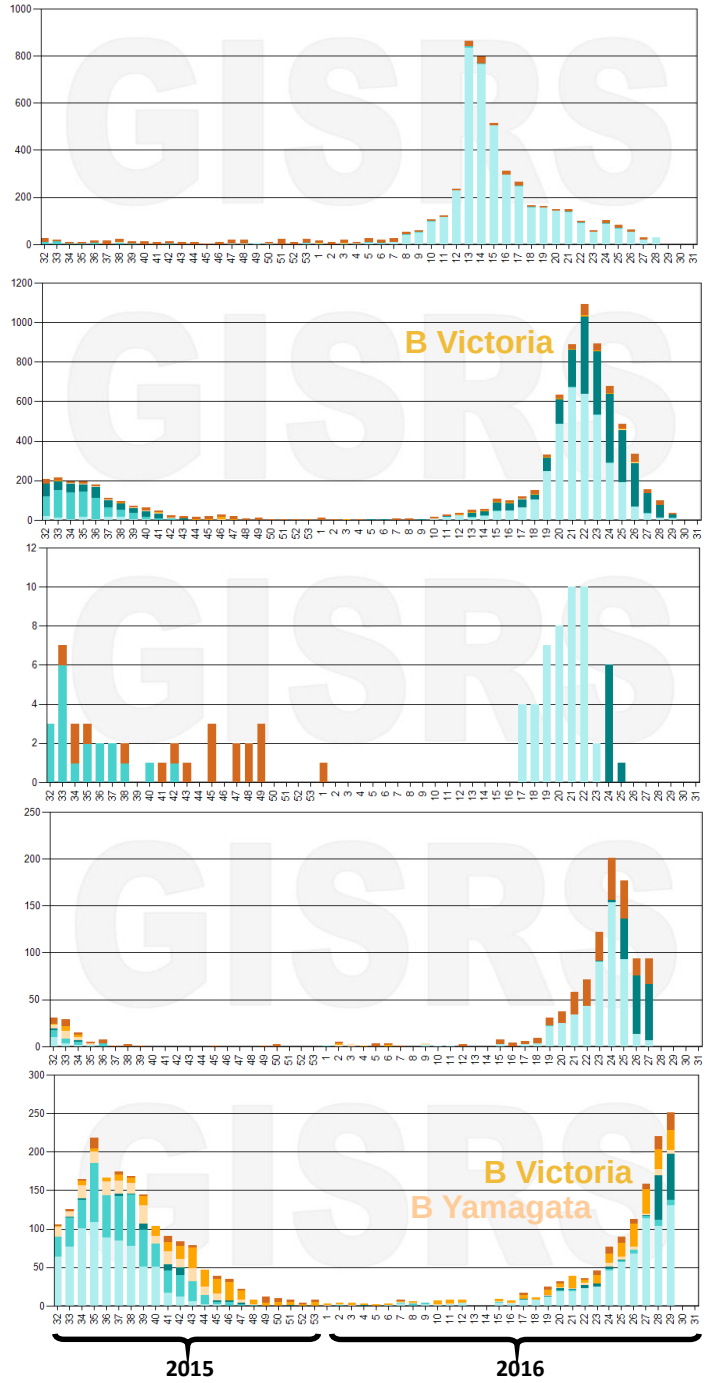

**Data source:** FluNet (www.who.int/flunet). Global Influenza Surveillance and Response System (GISRS)

World Health Organization

Data generated on 03/08/2016


B (Lineage not determined) | A (Not subtyped) | A(H1)
B (Victoria lineage) | A(H3) | A(H5)
B (Yamagata lineage) | A(H1N1)pdm09

WHO. Number of specimens positive for influenza by subtype [Internet]. 2016 [updated 2016 Aug 03; cited 2016 Aug 03]. Available from: http://www.who.int/influenza/gisrs_laboratory/flunet/charts/en/




Brazil

Argentina

Uruguay

Paraguay

Chile

Argentina *
EW1-28/2016
13% V; 87% Y
(missmatch with TIV)

Argentina. Boletín Integrado de Vigilancia nº 319, SE 29. Disponível em: http://www.msal.gob.ar/images/stories/boletines/Boletin-Integrado-De-Vigilancia-N319-SE29.pdf

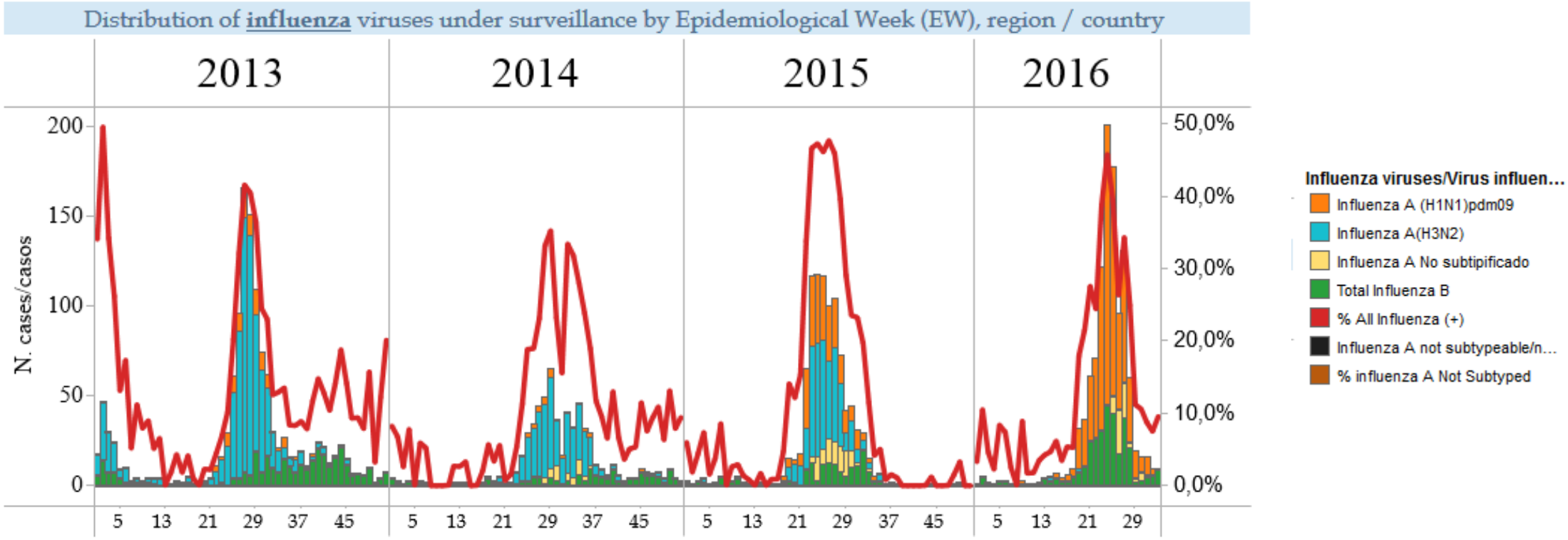
co-circulation V /Y

Pan American Health Organization
Regional Office of the World Health Organization

# Influenza and other Respiratory Viruses under Surveillance, 2010-2015

*Regional Influenza Surveillance, PAHO-WHO*

## PARAGUAY




Source: http://www.sarinet.org/?q=es

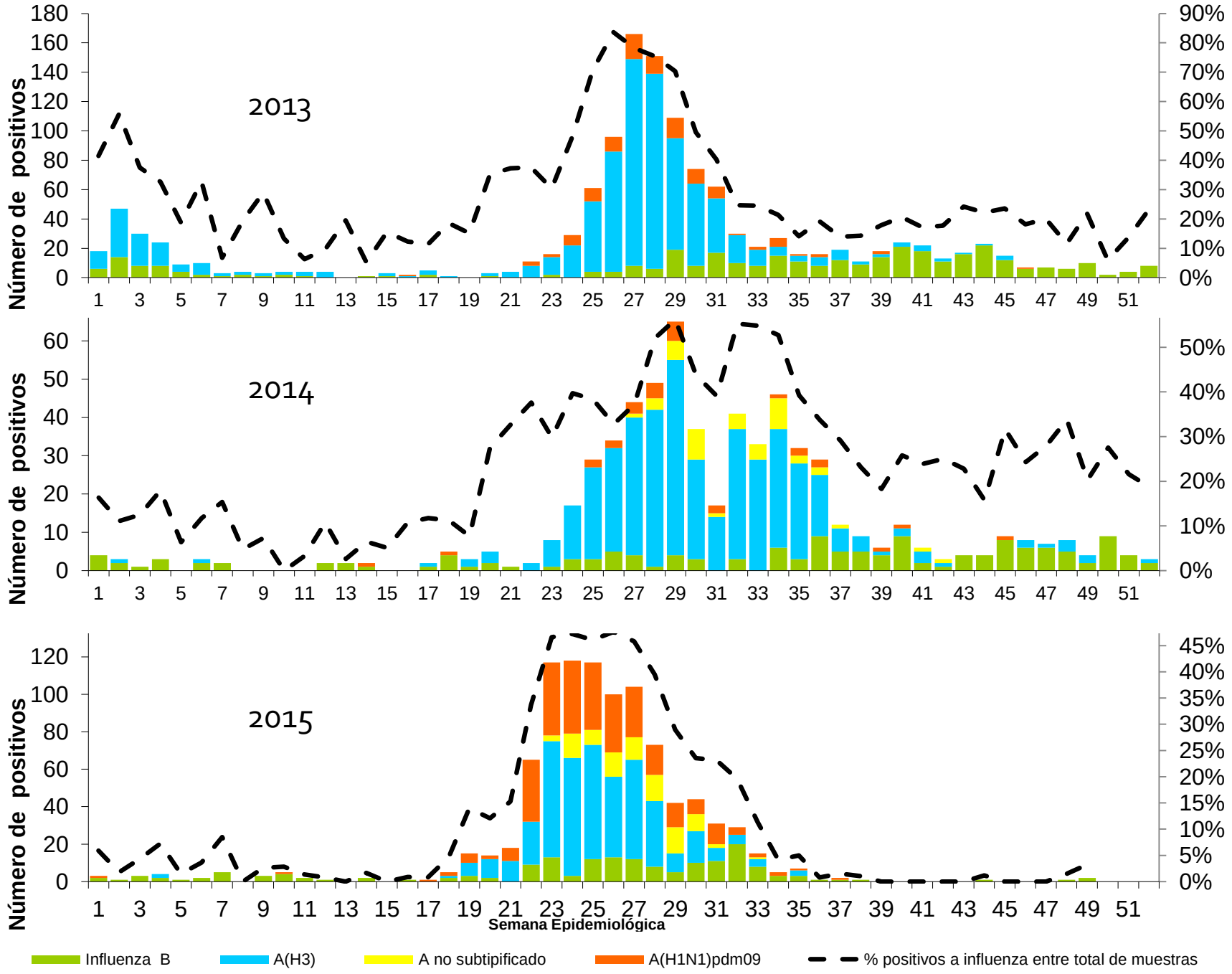
# Influenza Types and Subtypes by EW Paraguay 2013 - 2015

18250 samples analized

15,8% Influenza

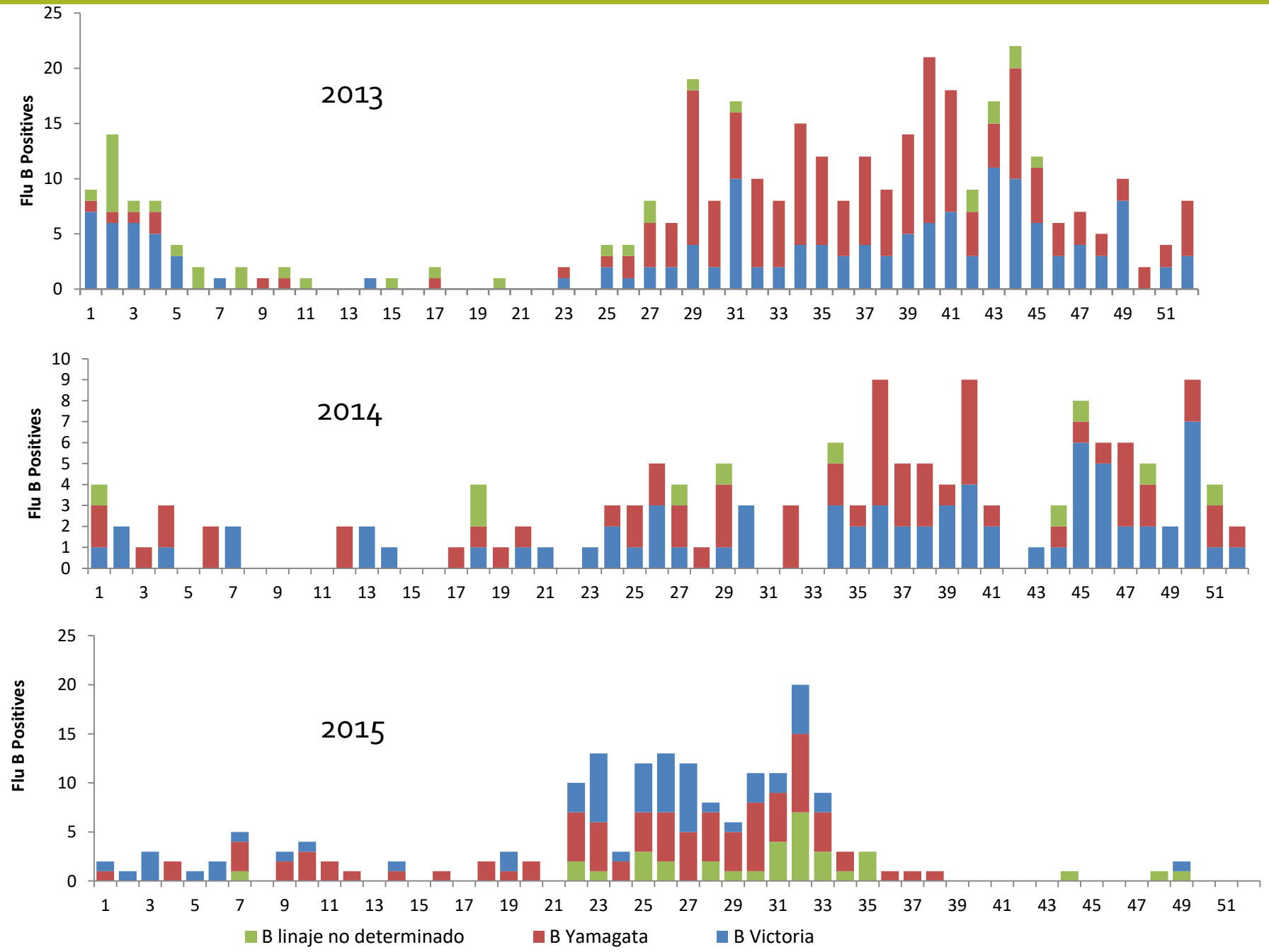
76,4% Influenza A

23,6% Influenza B



# INFLUENZA B LINEAGE BY EW PARAGUAY

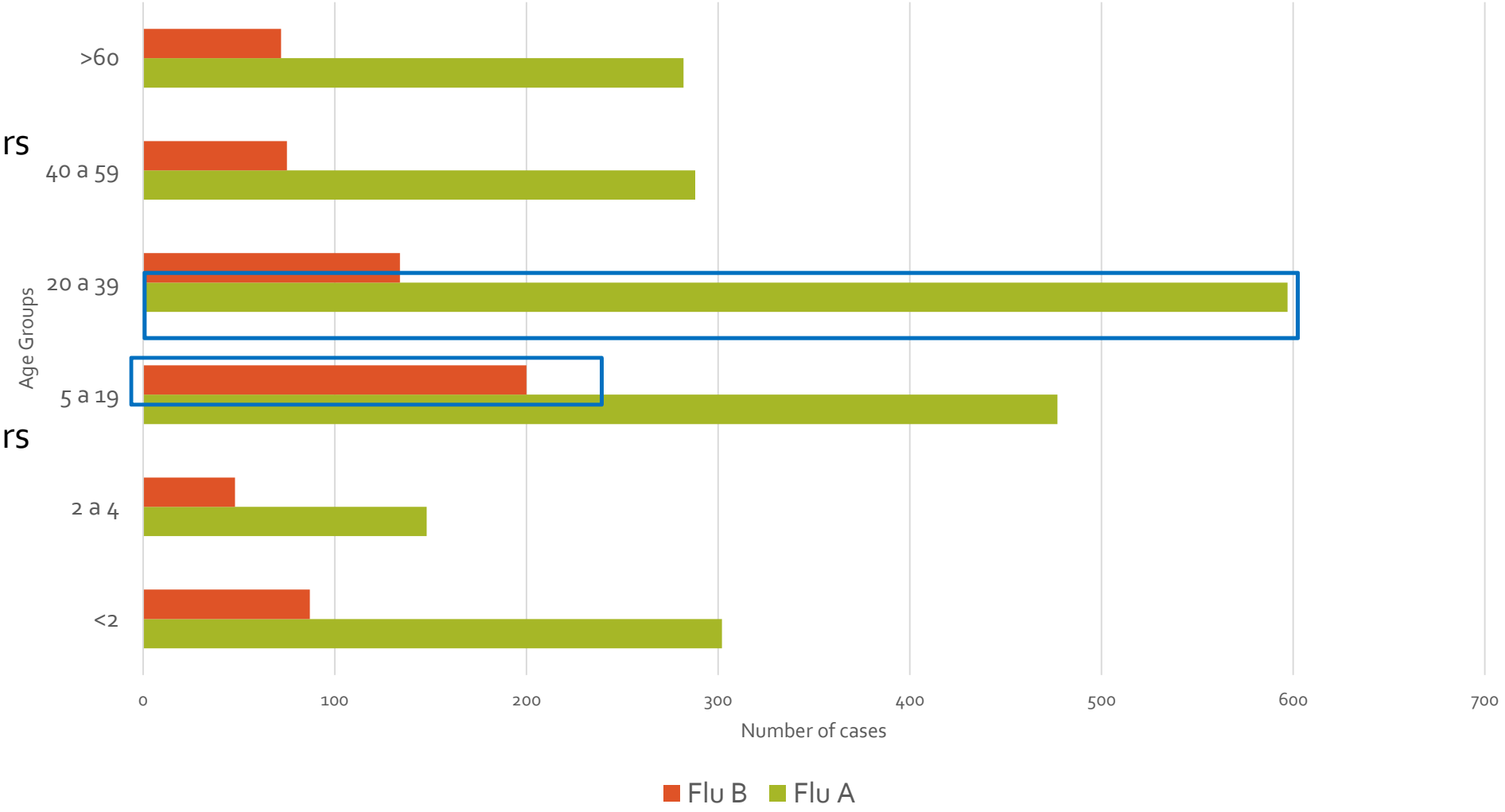
Victoria: 46%
Yamagata: 54%



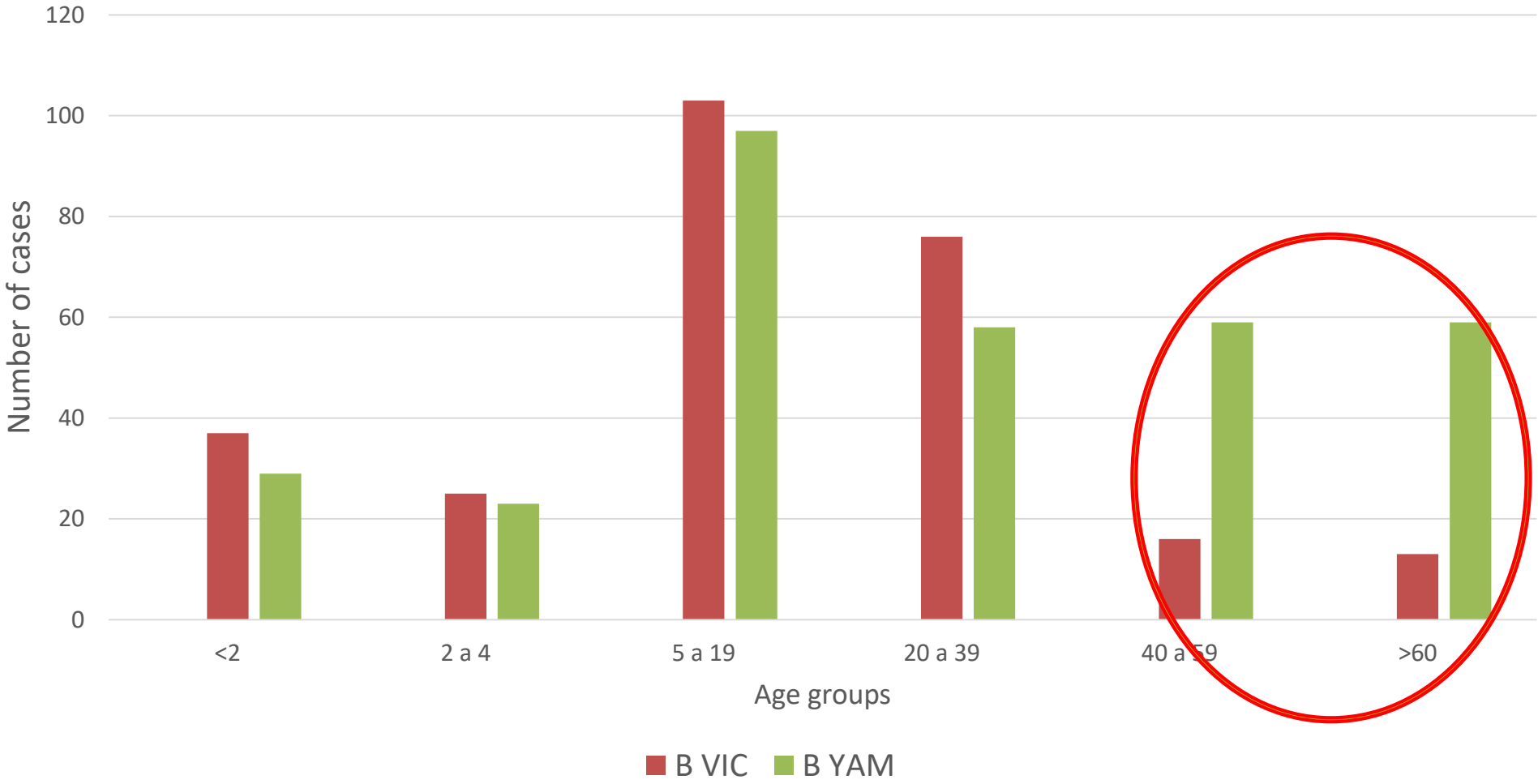
# Influenza types by age group. Paraguay 2013 -2015

Median age Flu A: 23 years
(14 days to 97 years)

Median age Flu B: 16 years
(2 days to 99 years)



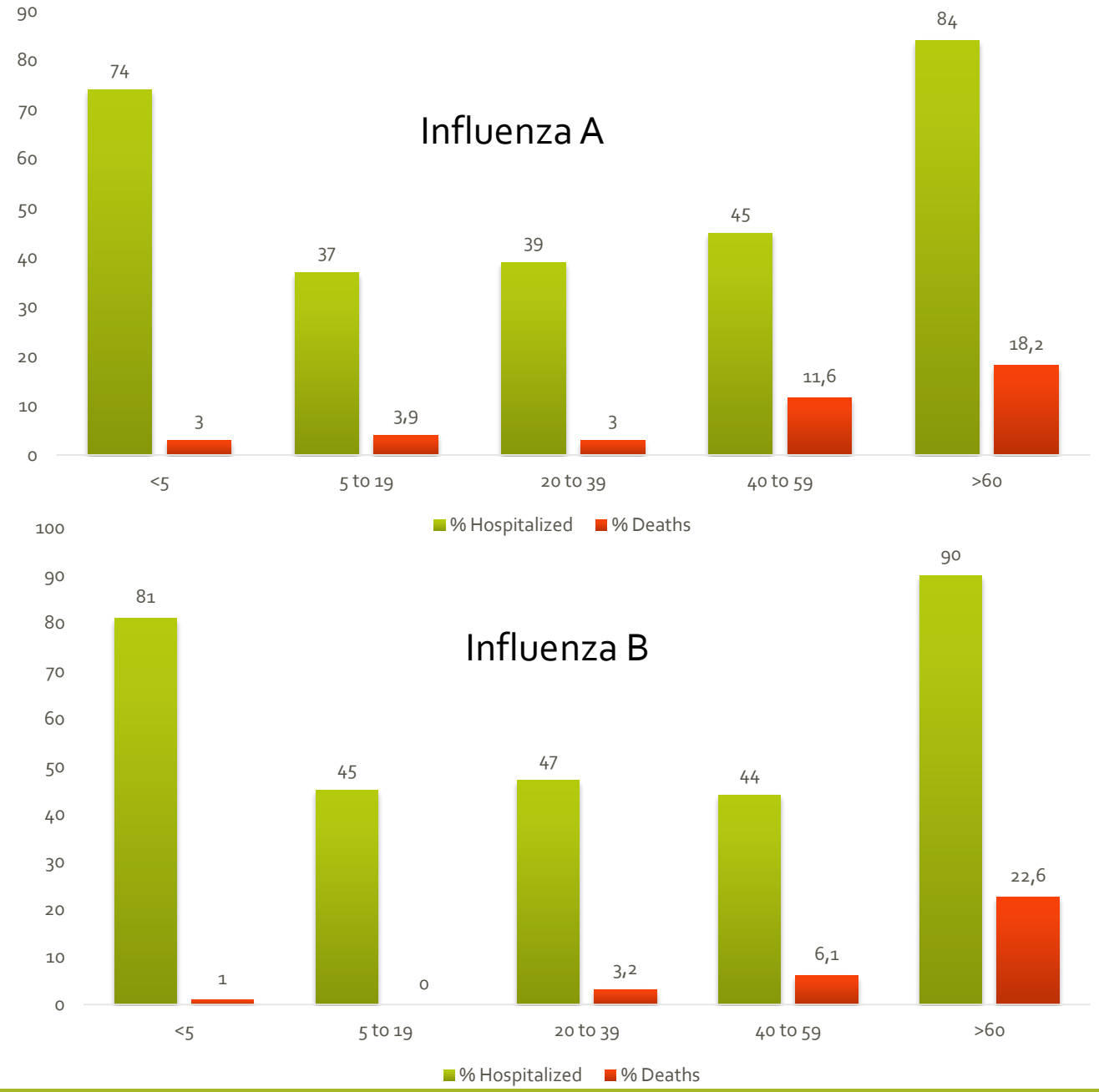
# Influenza B lineage by age group. Paraguay 2013 -2015



# Hospitalized and death patients by type and subtype of Influenza. Paraguay 2013 - 2015

| Types/Subtypes | Positives | Hospitalized | ICU | Deaths |
|---|---|---|---|---|
| Flu A/H1 pdm2009 | 474 | 278 (59%) | 36 (7,6%) | 25 (5,3%) |
| Flu A/H3 | 1737 | 833 (48%) | 81 (4,7%) | 58 (3,3%) |
| Flu B<br>Not characterized | 79 | 44 | 8 | 5 |
| Flu B Vic | 277 (45,9%) | 155 (56%) | 16 (5,8%) | 4 (1,4%) |
| Flu B Yam | 327 (54,1%) | 172 (53%) | 15 (4,6%) | 13 (4%) |
| **Total A** | 2211 (76,4%) | 1111 (50%) | 117 (5,3%) | 83 (3,7%) |
| **Total B** | 683 (23,6%) | 371 (54%) | 39 (5,7%) | 22 (3,2%) |

# Hospitalized and death patients by age group. Paraguay 2013 - 2015



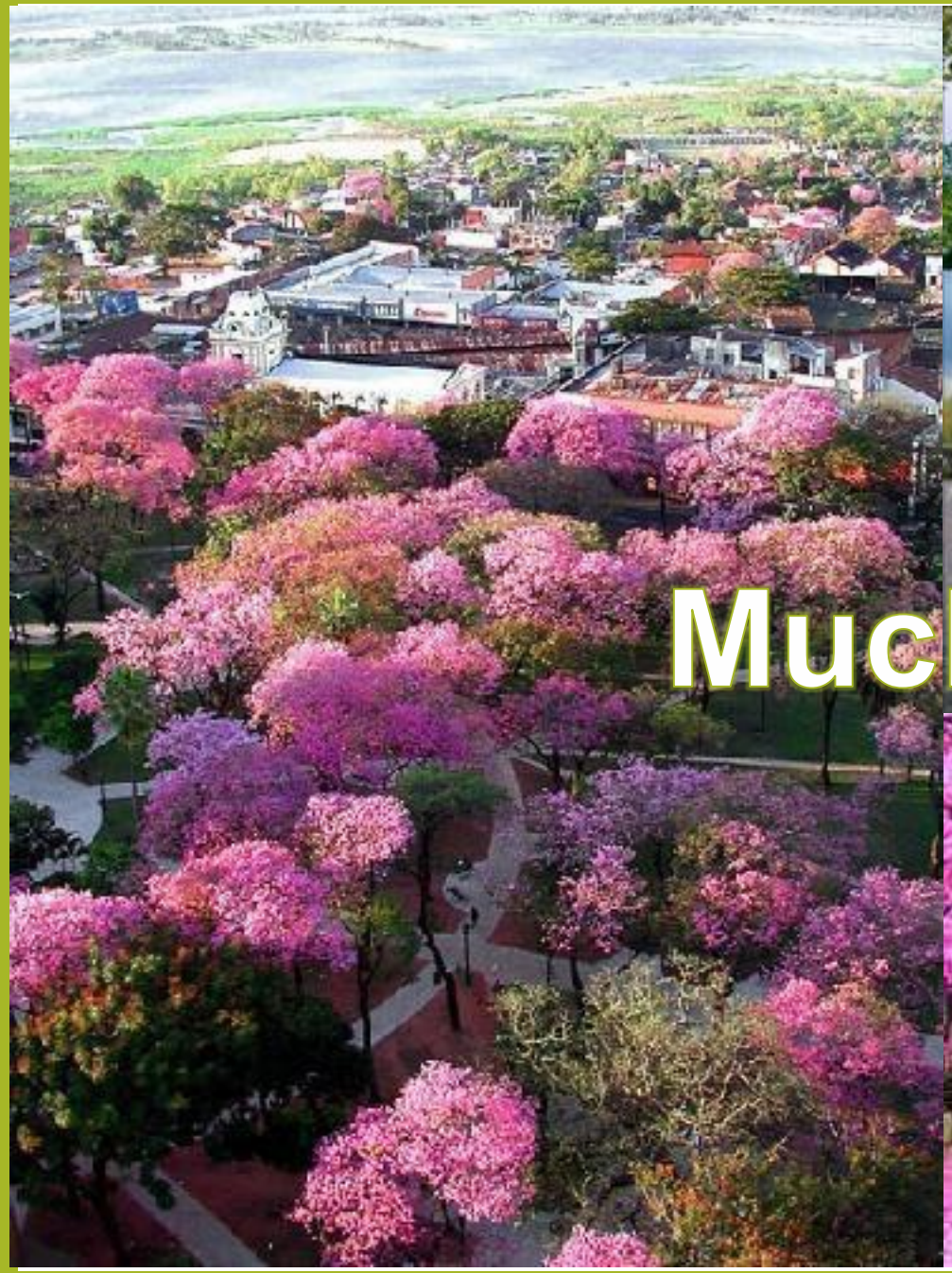
# Influenza B in Paraguay

- In Paraguay since 2013 to 2015 we found that overall Influenza A Virus (IAV) was more commonly detected. Influenza B Virus (IBV) 23,6%
- No significant differences were observed between the proportion of hospitalizations and deaths due to both types of virus
- The IBV was more frequent in school-age children and adolescents, while IAV was more prevalent in adults
- No major differences were observed in ages affected by the different lineage of influenza B
- Both lineages of IBV co-circulated in similar proportions over the whole year, and 46% of the circulating IBV belonged to the lineage not included in the TIV

# Influenza B in LAC

- The frequency and seasonality of influenza B is variable [1,2,3,4]
  - from one country to another
  - from one year to another
  - from one region to another
  - in different regions of the same country
- IBV affects people of all ages[1, 5]
- IBV cause severe illness and death[1]
- Continuous turnover of IBV lineages and the match with vaccine strain vary annually. Mismatch with vaccine strain can reach as much as 87% [6]
- Strengthen surveillance is necessary to better understanding the disease burden, but data indicate that the impact of the strains B in Latin America is similar to that reported in US and Europe [7]
- It is expected that the introduction of the QIV in Latin America can better protect the population [7]

1. Savy V, et al. Influenza Other Respi Viruses. 2012 Dec 5. - 2. PAHO. Influenza viruses by type/subtype, 2010-2014 [Internet]. 2014 [cited 2014 Sep 19]. Available from: http://ais.paho.org/phip/viz/ed_flu.asp 3. OPS. Actualización Regional, Influenza [Internet]. 2013 [citado: 6 dic. 2013]. Disponible en: http://www.paho.org/hq/ - 4. WHO. Influenza Laboratory Surveillance Information by the Global Influenza Surveillance and Response System (GISRS)[Internet]. 2013 [citado: 3 dic. 2013]. Disponible en: http://gamapserver.who.int/ - 5. Paiva TM, et al. J Med Virol. 2013 Nov;85(11):1983-9. - 6. Oliveira MLA, et al. Mismatch between vaccine strains and circulating influenza b viruses in different regions of Brazil: 2001-2013. [Internet]. XIII Options for the Control of Influenza Conference, Cape Town, South Africa, 2013. Abs. P2-524. p. 382-3. Disponible en: http://optionsviii.controlinfluenza.com/ 7 . Arlant LHF & Bricks LF Rev Chil Infectolo l 2015; 32(2) 198-204.



# Muchas Gracias