

Influenza seroprotection correlates with predominant circulating viruses during 2014/15 and 2015/16 seasons in Portugal

Portuguese Laboratory Network for the Diagnosis of Influenza Infection

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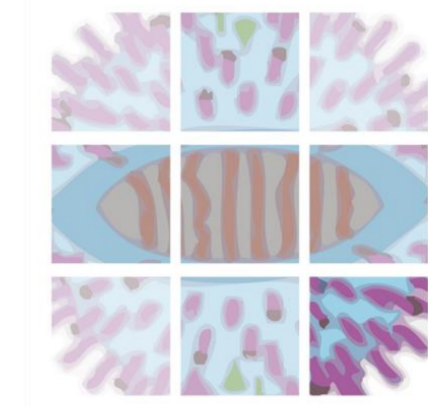
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Background:

Population immune profile for influenza is highly affected by circulating influenza viruses, thus changing the risk of infection for influenza. This study aim was to assess influenza immunity in the Portuguese population by age groups, during 2014 and 2015 and establish a relationship between seroprotection and circulating influenza viruses in 2014/15 and 2015/16 seasons.

Methods:

Two cross-sectional studies were developed based on a convenience serum sample collected in June 2014 (n=626) and July 2015 (n=675) in hospitals from Portugal mainland, Azores and Madeira. Serums equally represent all age groups. Antibody titers were evaluated by HI assay for strains recommended for seasonal influenza vaccine northern hemisphere, 2014/15 and 2015/2016. Seroprevalences were estimated for each strain by age group and the association with seasonal cumulative influenza-like illness (ILI) rates for influenza virus during both seasons was analyzed.

Table I – Seroprevalence (HI titre ≥ 40) for influenza A(H1)pdm09, A(H3), B/Yamagata and B/Victoria viruses during 2014 and 2015. (2014 n=626; 2015 n=675).

Antigens used in 2014^a and 2015^b study:

^a A/California/7/2009; A/Texas/50/2012; B/Massachusetts/2/2012 (Yamagata lineage); B/Brisbane/60/2008 (Victoria lineage).

^b A/California/7/2009; A/Switzerland/9715293/2013; B/Phuket/3073/2013 (Yamagata lineage); B/Brisbane/60/2008 (Victoria lineage).

Influenza	Seroprevalence (HI ≥ 40)					
	2014 ^a			2015 ^b		
	n	%	95%CI	n	%	95%CI
A(H1)pdm09	186	30	26-33	209	31	26-34
A(H3)	250	40	26-44	262	39	35-43
B Yamagata	144	23	20-26	372	55	51-59
B Victoria	57	9	7-12	147	22	19-25

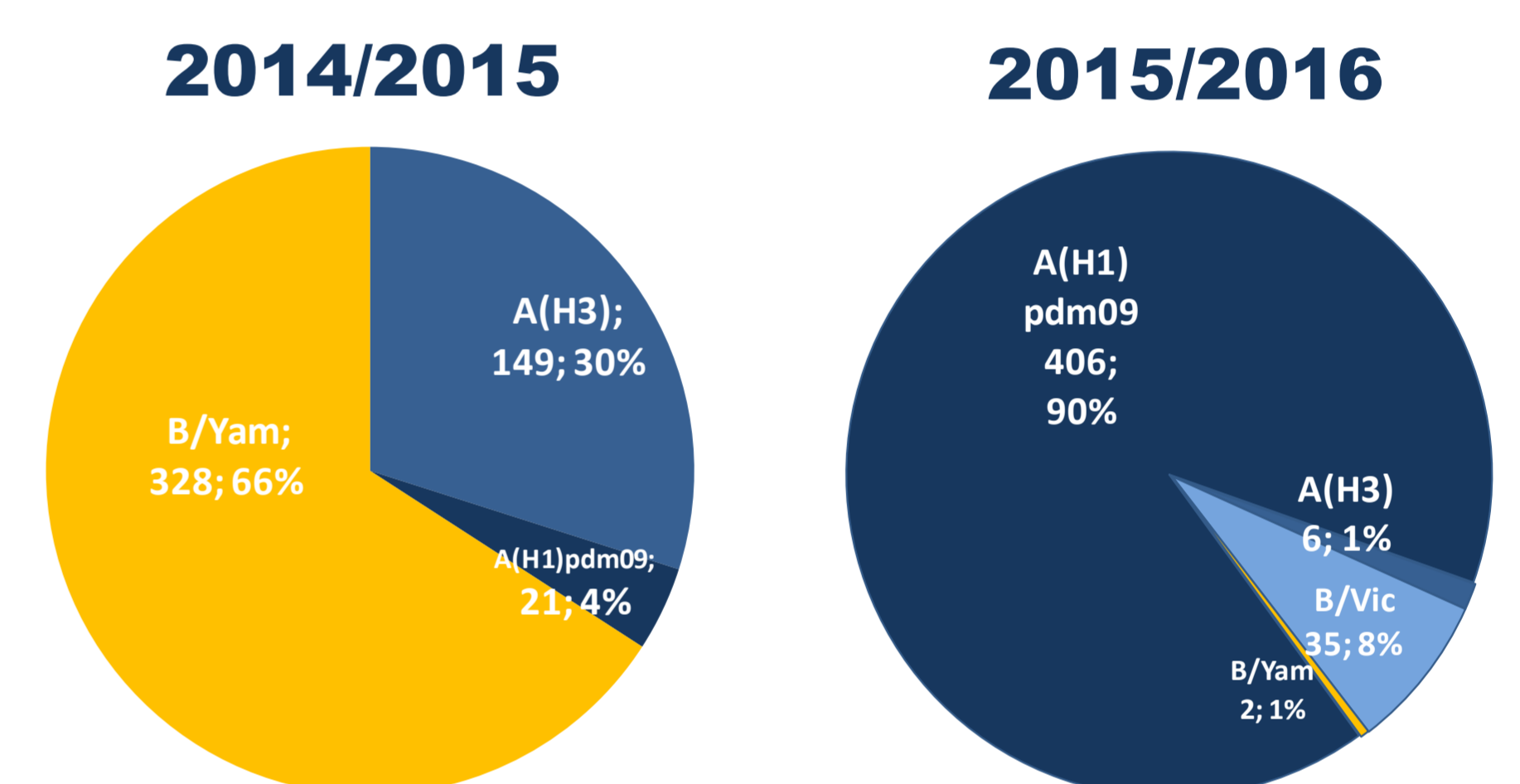


Figure 1 – Influenza virus type/subtype detected in circulation during 2014/2015 and 2015/2016 seasons in Portugal.

Results:

2014

- The highest seroprotection was observed for influenza A(H3) (40%) and A(H1)pdm09 (30%), with higher levels in children 5-14 years old (Table I, Figure 2);

- During 2014/2015 influenza B/Yamagata was dominant with high incidence rates in individuals under 65 years old, the ones that had lower seroprotection in 2014 (Figure 1 and 2);

- Although high protection for A(H3), the circulation of the new drift A(H3) strains had gained an immunological advantage, with A(H3) elevated incidence rates observed during 2014/15 (Figure 2).

2015

- The highest seroprotection was observed for influenza B/ Yamagata (55%), 2.4 times the estimated in 2014. Being in younger's (≤ 4 years old), 6.3 times higher in 2015, in agreement with high ILI incidence rate in children during 2014/2015 epidemic (Table I, Figure 2);

- Seroprotection levels for influenza A(H1)pdm09 and A(H3) were not significantly different from 2014 (Table I, Figure 2);

- The lowest level of seroprotection was observed for B/Victoria lineage (22%) in the general population before the start of 2015/2016 season (Table I);

-Influenza A(H1N1)pdm09 was predominant, with high incidence rate in < 65 year old (Figure 2).

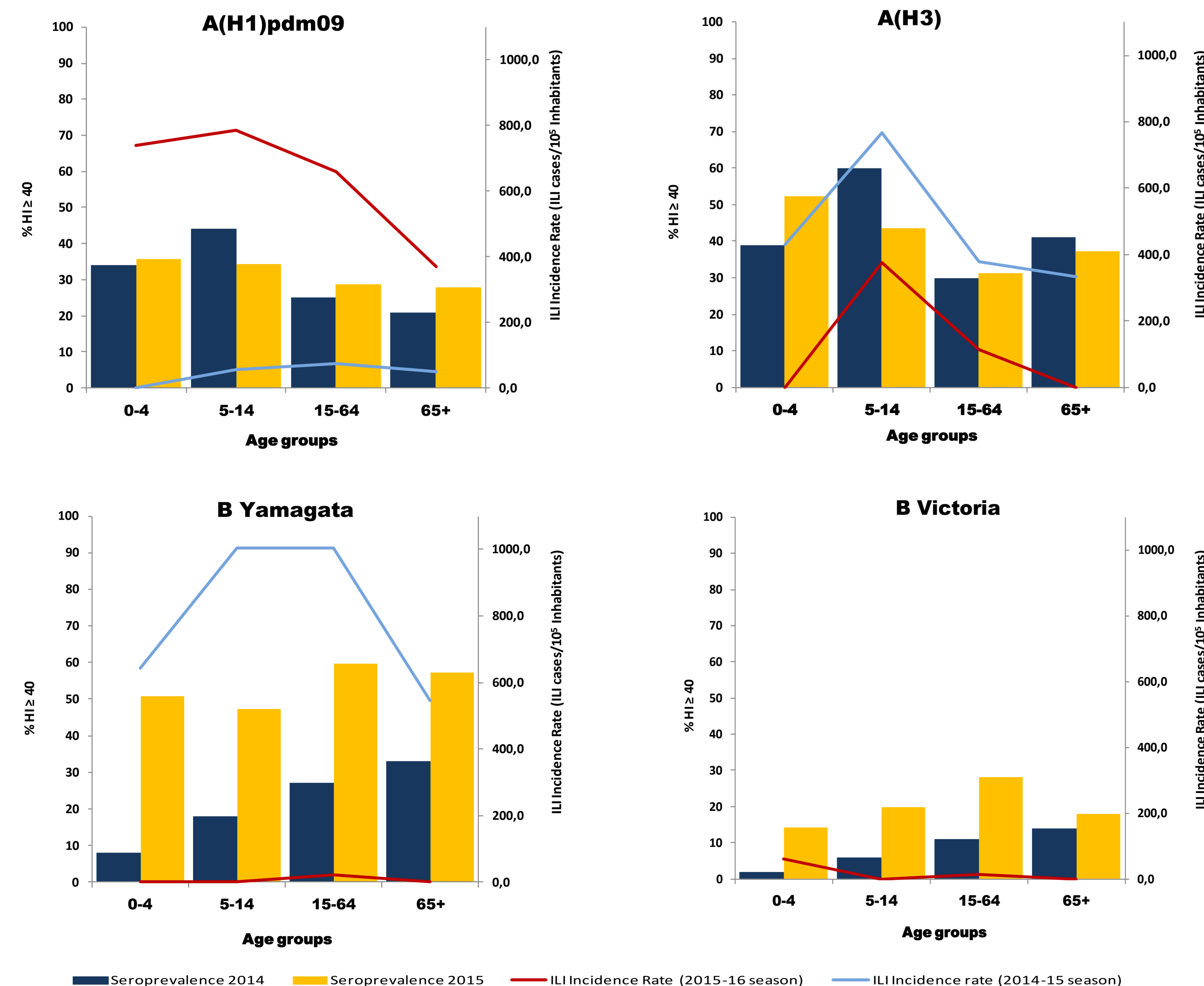


Figure 2 – Seroprevalence for influenza A(H1)pdm09, A(H3), B/Yamagata and B/Victoria viruses by age group during 2014 and 2015.

Conclusions:

There was a correlation between virus circulation, incidence rates for each age group and the previous seroprotection for seasonal influenza viruses. Our study highlights the value of measuring the serological profile for influenza to establish risk groups for infection for which an increase preventive measures, including vaccination, should be fostered.