Seasonal and pandemic patterns of Influenza in Portugal

Paulo Gonçalves[1], Baltazar Nunes[2], Eleonora Paixão[2], Rita Cordeiro[1], Pedro Pechirra[1], Patrícia Conde[1], Ana Arraiolos[1], Cristina Furtado[3*], Raquel Guiomar[1]

[1]National Influenza Reference Laboratory; [2]Department of Epidemiology; [3]Reference and Epidemiological Surveillance Unit;
National Institute of Health Dr. Ricardo Jorge, Lisbon, Portugal
*on behalf of the Laboratory Network for Diagnosis of Influenza A(H1N1)2009 Infection

Background

The National Influenza Reference Laboratory has been collecting data on influenza activity in Portugal since 1957 through the National Influenza Surveillance Programme, including information on clinical and virological characteristics of the disease, allowing the estimation of weekly incidence rates for influenza-like illness. This information has not only been used by the National Health Authorities for the management of the disease, in its several aspects, but has also been contributing to the study of influenza by the World Health Organisation. Particularly during the past decade, the world had been preparing for a long awaited influenza pandemic, which characteristics could not been foreseen but was feared to have potentially devastating consequences. In April 2009 a new strain of Influenza A(H1N1) virus of swine origin disseminated throughout the world, resulting in the first pandemic of the XXI century. To face the increasing number of diagnosis being requested, a Network of Laboratories dedicated to the diagnosis of the new Influenza A(H1N1) pandemic virus was activated in our country. Data on Influenza collected over the past two Influenza seasons, through the National Influenza Surveillance Programme and the Laboratory Network for Diagnosis of Influenza A(H1N1)2009 infection , is presented and compared.

Materials and Methods

Components of the Influenza Surveillance System

The Influenza surveillance system in Portugal is fed by two independent notification structures: the National Influenza Surveillance Programme and the Laboratory Network for Diagnosis of influenza A(H1N1)2009 infection:

1. The National Influenza Surveillance Programme (NISP)
The NISP integrates two sentinel structures, the Network of Sentinel Medical Practitioners and the Network of Emergency Units.
Combined, they allow: the estimation of morbidity associated with the disease through the weekly determination of Influenza-like Illness (ILI) incidence rates; to readily identify outbreaks in the population under observation; to identify and characterise the Influenza strains in circulation and quantify their presence in the population during the period of Influenza activity; with the information generated, to contribute to the intervention of the Health Services on prevention measures and therapeutic guidelines.

2. The Laboratory Network for Diagnosis of Influenza A(H1N1)2009 infection (LND)
Established in 2006 and reactivated and updated in June 2009 in the context of the 2009 Influenza pandemic, this network is currently composed of 13 Laboratories from Reference Hospitals within mainland Portugal and the Islands. The main objective is to carry out the laboratory diagnosis of Influenza A(H1N1)2009 infection on specimens collected through the National Health Service, thus contributing to the evaluation of the Influenza activity and characterisation of Influenza strains in circulation.

Surveillance Period

This study describes the Influenza activity during the 2008/2009 and 2009/2010 Influenza seasons.
Usually, the surveillance programme is reactivated on September of one year (week 40) and follows through May of the following year (week 20). However, during the period of this study and facing a situation where two influenza seasons of different characteristics occurred, one seasonal and another pandemic, it was decided to consider the 2008/2009 Influenza winter season from week 40/2008 to week 16/2009, and the 2009/2010 pandemic season from week 17/2009 to week 27/2010. This particular division was decided considering that the first Influenza case attributed to Influenza A(H1N1)2009 infection was observed on week 17/2009.

Cases and variables studied

ILI cases were reported to the National Influenza Reference Laboratory and to the Department of Epidemiology of the National Institute of Health, in the context of the National Influenza Surveillance Programme, from week 40/2008 through week 27/2010. ILI cases were also analysed by the Laboratory Network from week 15/2009 to week 27/2010. The intensity and duration of the epidemic periods were described based on the weekly incidence rates for ILI. Nasopharyngeal swabs were collected for virological characterisation of influenza viruses circulating during this period.

Incidence of Influenza-like illness

Weekly incidence rates for ILI were calculated based on the cases notified through the Network of Sentinel Medical Practitioners. The intensity and duration of the epidemic periods were similar in both seasons (Fig 1).
The 2008/2009 winter season was characterised by a high Influenza activity. The epidemic period lasted for 8 consecutive weeks, from week 49/2008 through 4/2009, with a maximum of 165.8 cases per 100 000 inhabitants in week 52/2008. The influenza activity during 2009/2010 was also described as high. The epidemic period was one week shorter than that of the previous winter but occurred much earlier, from week 44/2009 through week 50/2009, with a maximum of 136.4 cases per 100 000 inhabitants in week 46/2009.

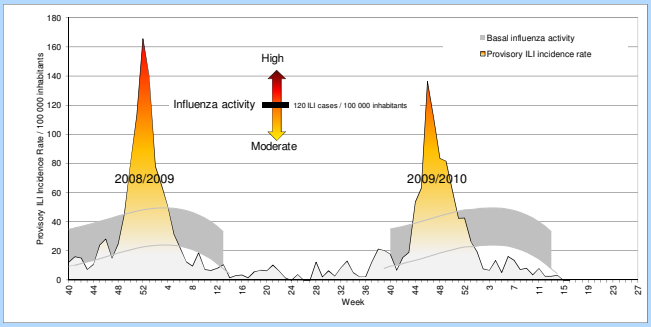

Fig 1. Provisory weekly incidence rates for ILI calculated from the data collected by the Sentinel Medical Practitioners.

ILI incidence rates per age group (Fig 2) show that in 2008/2009 the adult (15-64 years) and the elderly (65 years and above) were the most affected population, while in 2009/2010 the highest incidence rates were observed in infants (0-4 years) and children (5-14 years).

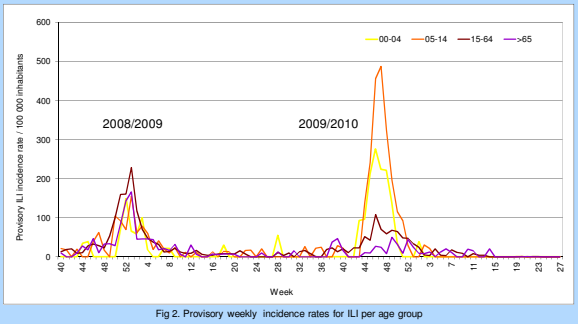

Fig 2. Provisory weekly incidence rates for ILI per age group

Results

A total of 65314 ILI cases were reported during the period of this study, 1432 during 2008/2009 and 63882 during 2009/2010 (Table I).
The highest number of notifications during 2008/2009 occurred in the winter months, from December through February (weeks 46/2008 to 6/2009), with a peak in week 1/2009 with 201 cases reported (Fig 3). The number of cases reported during 2009/2010 was much higher, a 45-fold increase compared with the previous season, with 2 peaks one occurring towards the end of the Summer'09 and another during November-December.
Nasopharyngeal specimens were collected for virological analysis from 63906 ILI cases (Table II), 748 during 2008/2009 (collected from 52.2% of ILI cases reported that season) and 63158 during 2009/2010 (from 98.9% of 2009/2010 ILI cases).

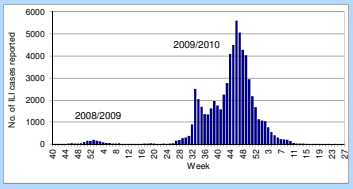

Fig 3. Number of ILI cases reported during 2008/2009 and 2009/2010

Table I. Number of ILI cases reported during 2008/2009 and 2009/2010 per origin of notification

Origin of report		2008/2009		2009/2010		TOTAL	
		Nº of cases	%	Nº of cases	%	Nº of cases	%
NISP	Sentinel	936	65.4%	1145	1.8%	2081	3.2%
	Emergency	495	34.6%	649	1.0%	1144	1.8%
Laboratory Network		1	0.1%	62088	97.2	62089	95.1%
Total		1432	100%	63882	100%	65314	100%

Table II. No. of swabs collected and analysed during 2008/2009 and 2009/2010

Season	Network	Total no. of ILI cases reported	No. of cases with swab	% of cases with swab
2008/2009	NISP	1431	747	52.2%
	Lab. Network	1	1	100%
2009/2010	NISP	1794	1070	59.6%
	Lab. Network	62088	62088	100%
Total		65314	63906	97.8%

Influenza – Results of the National Influenza Surveillance Programme

The presence of Influenza viruses was determined in 411 (55%) of 747 ILI cases analysed during 2008/2009 (Fig 4), the majority of which of the A(H3) subtype (61.1%). AH1, AH3 and B influenza viruses circulating in Portugal during the 2008/2009 season were replaced by the new Influenza A(H1N1)2009 virus during the pandemic season (Fig 5). 430 (40.2%) out of 1070 specimens tested positive for Influenza, 92.8% of which of the new A(H1N1)2009 subtype.

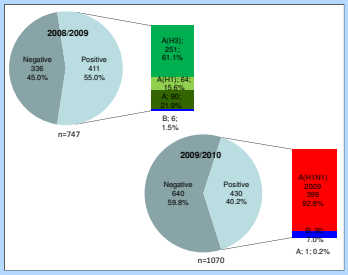

Fig 4. Virological results reported through the NISP

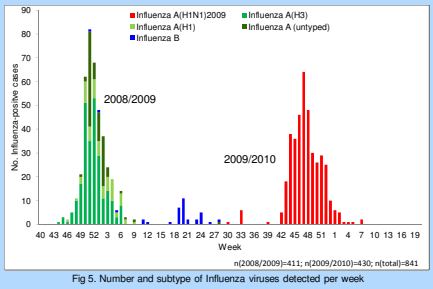

Fig 5. Number and subtype of Influenza viruses detected per week

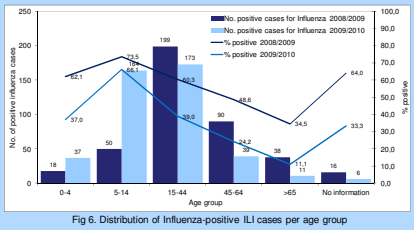

Fig 6. Distribution of Influenza-positive ILI cases per age group

The percentage of influenza-positive cases was higher during the 2008/2009 season for all the age groups considered (Fig 6). However, in terms of distribution per age group, both seasons follow an identical pattern, with a higher proportion of positive cases observed in the younger population (below 14 years of age).

For further details on signs/symptoms reported and antigenic and genetic characterisation of isolates based on the haemagglutinin and on the neuraminidase, please visit posters nos. P-333, P-709 and P-187, respectively.

Influenza - Results of the Laboratory Network for Diagnosis of Influenza A(H1N1)2009

Information collected through this Network shows identical results to those obtained from the National Influenza Surveillance Programme. Seasonal Influenza viruses were detected at the beginning of the season, being replaced by the new Influenza A(H1N1)2009 pandemic virus. A positive outcome of the integration of this data onto the surveillance system was that it was possible to detect Influenza viruses subtype A(H1) and A(H3) circulating, which were not detected by the NISP (Fig 7).

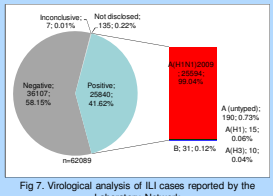

Fig 7. Virological analysis of ILI cases reported by the Laboratory Network

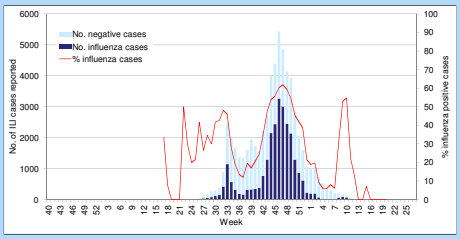

Fig 8. Weekly distribution of ILI and Influenza cases on the Laboratory Network

Fig 8 shows two waves of cases reported and positive results. The first wave occurred from week 26 to week 37/2009, with a peak in week 33/2009. During this period, ILI cases were mainly reported through this Network in the context of the emergence of the new Influenza A(H1N1)2009 pandemic virus. During the following period, in which the global dissemination of the new virus subtype occurred , ILI cases were reported in parallel by the two networks.

Comments

Facing the circulation of a new virus and the threat that this could impose to the population and to the health care system, the total number of ILI cases reported and analysed in our country during the 2009/2010 winter boosted to numbers not seen in previous influenza seasons. It is a fact that the 2009/2010 pandemic has had a significant impact in Portugal in many areas, such as the adoption of health-care regulations, availability of health-care facilities, vaccination strategies, and public action/awareness. However, in terms of pattern of disease, the data collected through the National Influenza Surveillance Programme and the Laboratory Network suggests that the 2009/2010 pandemic was similar to the previous influenza season in terms of intensity and geographic distribution. In terms of temporal distribution, the pandemic season was characterised by two waves of ILI cases reported, one towards the end of the summer and another during the winter. Seasonal viruses were replaced by the new Influenza A(H1N1)2009 strain, which caused disease particularly in young children.
Using the data generated from the Laboratory Network made it was possible to better characterise the beginning of the pandemic season, as the early cases were mainly reported to the Reference Hospitals that were dedicated to the isolation of patients in an attempt to contain the virus and contribute to the management of the infection.

For further information on this poster please contact: Raquel Guiomar, Laboratório Nacional de Referência para o Vírus da Gripe, raquel.guiomar@insa.min-saude.pt

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Options for the Control of Influenza VII, Hong Kong, 3-7 September 2010