Severe acute respiratory infections in the 2012/2013 season studied by the Portuguese Laboratory Network for Influenza

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Background:
During the 2009/10 influenza pandemic, a network of 14 laboratories located in the main reference hospitals from Portugal mainland, Madeira and Azores was established for the diagnosis of the new influenza A(H1N1)pdm09 pandemic strain. Since then, the network performs laboratory diagnosis of influenza as well as other respiratory pathogens, thus contributing to the laboratory diagnosis of respiratory disease in Portugal. This network is a valuable complement of the National Influenza Surveillance Programme (mainly based on primary healthcare units), enabling a more accurate knowledge of the aetiology of the severe respiratory infections especially in hospitalized cases. The present study describes the severe acute respiratory infections, in the 2012/2013 season, diagnosed by the laboratory network.

Material and Methods:
From the 14 laboratories, 11 reported cases of respiratory disease during 2012/2013 season. The laboratory network performs diagnosis of influenza A and B viruses and other respiratory agents by PCR based methods, enabling the detection of mixed infections. All 14 laboratories perform the detection of influenza A(H1)pdm09, 4 perform the influenza A(H1) seasonal and A(H3) subtyping, and 10 participants also detect influenza B. Eight laboratories implemented methodologies for the detection of other infectious agents associated with respiratory disease. The antigenic characterization of 16 isolated viruses [9 B/Yamagata, 6 A(H1)pdm09 and 1 A(H3)] was performed at the National Influenza Reference Laboratory. The genetic analysis of the HA1 subunit of the hemagglutinin gene was performed in 22 vaccines, 4 B/Yamagata and 2 A/Portugal. Twenty nine A/H1pdm09 and 5 B/Yamagata were tested for antiviral susceptibility [PR/CR(NA)-H75Y and/or MUNANA phenotypic assays for oseltamivir and zanamivir].

Results:
The 11 laboratories reported a total of 1511 respiratory disease cases, from week 39/2012 to 24/2013 [peak of 208 (13.8%) cases during week 10/2013]. Influenza A was identified in 512 cases, Influenza B was detected in 352 (68.8%) cases: 297 (58.0%) cases were A/H1pdm09, 48 (9.4%) cases were not subtyped, and 7 (1.3%) cases were A(H3). Influenza B was identified in 157 (30.7%) of the influenza cases (Figure 1). There were also identified 2 cases (0.4%) of flu A + flu B mixed infections as well as one case of infection by influenza C (0.2%). From the 1511 reported cases, were notified 312 ICU cases. The causal agent was identified in 148 (47.4%) ICU cases. Influenza was identified in 121 (38.6%) patients.

Among ICU influenza cases, the most detected virus was A(H1)pdm09 (76, 62.8%). However, cases of A(H3) (2; 1.7%), A unsubtyped (5; 4.1%) and B (26; 21.5%) were also detected (Figure 2). As expected, the highest number of ICU influenza positive cases was detected in week 8 and 10/2013 (18; 14.9% each), almost coincident with the highest number of influenza cases during all season (Figure 1). The majority of the characterized influenza viruses were similar to the vaccine strains and reduction in susceptibility to neuraminidase inhibitors was not detected.

Conclusions:
The Portuguese Laboratory Network for Influenza Diagnosis plays a major role in the diagnosis of acute respiratory infections in Portugal, providing a more accurate knowledge of the respiratory agents involved. During the 2012/2013 season, the influenza A(H1)pdm09 virus co-circulated with influenza B virus. The A(H1)pdm09 virus was the responsible for the majority of the flu cases admitted in the ICU and may have been the cause of death in two cases. Bacterial and other viral agents have been identified in some of the severe cases reported.