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Influenza season 2018/2019 in the Czech Republic – interim report.

(reporting period: weeks 40/2018 - 06/2019)

Epidemiological and virological surveillance:

The surveillance of influenza and other ARI is based mainly on clinical and virological surveillance from the community and hospitals. The system includes approximately 2230 general practitioners (GP) and 1240 paediatricians and covers approximately 5 million inhabitants (half of the Czech population) in all 86 districts of the Czech Republic. As of January 2009, ILI is defined as “Sudden onset of symptoms AND at least one of the four systemic symptoms (fever or feverishness / malaise / headache /myalgia) AND at least one of the three respiratory symptoms (cough / sore throat / shortness of breath)”, in accordance with the EU case definition for influenza (Commission Decision of 28 April 2008 amending Decision 2002/253/EC). ARI for reporting purposes is defined as every GP's clinical diagnosis of acute upper respiratory tract infection (as defined by the International Classification of Diseases, Tenth Revision (ICD-10), codes J00, J02, J04, J05, and J06) and influenza (ICD-10 codes J10.1, J10.8, J11.1, and J11.8). In addition, based on the national sampling strategy coordinated by the Ministry of Health of the Czech Republic, a subset of sentinel physicians (28 – 30 in the whole country, i.e. 2-3 per region) are collecting swabs from their ILI/ARI patients each influenza season (week 40 of each year to week 20 of the next year). The number of samples tested also varies within the epidemic situation. Because of out-seasonal ARI/ILI cases, the NRL is opened for the same testing for the whole year.

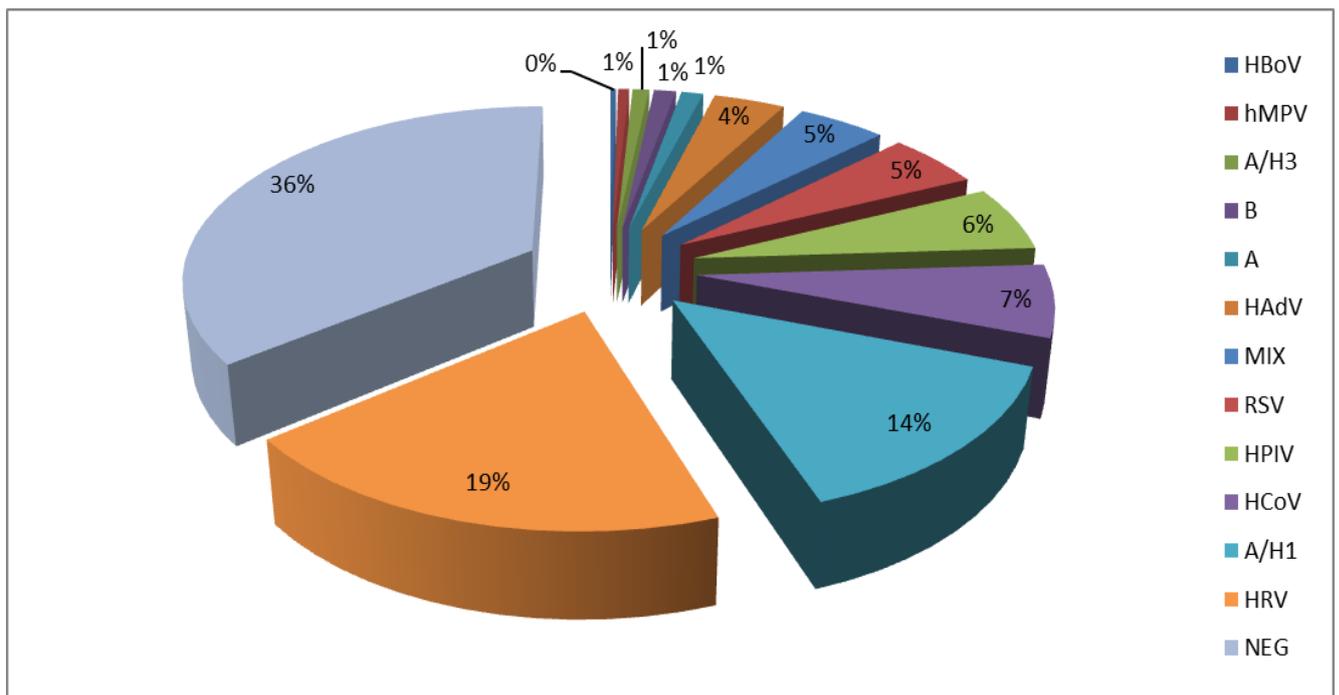
Non-sentinel samples have been routinely collected from ILI/ARI hospitalized individuals in the Czech Republic according to the investigator's opinion or from those with severe ILI/ARI according to the WHO case definition.

Sentinel samples have been routinely tested by q-PCR for influenza and the basic spectrum of respiratory viruses. Non-sentinel samples have been tested for influenza and according to the needs of the treatment for other respiratory viruses, atypical bacteria, and/or *Pneumocystis jirovecii*. The National Reference Laboratory (NRL) for Influenza also receives test results from other collaborating virological laboratories in the Czech Republic (CZ). These data are not divided into sentinel and non-sentinel. SARI cases and some of the results from other laboratories have been confirmed or characterised in NRL.

Results:

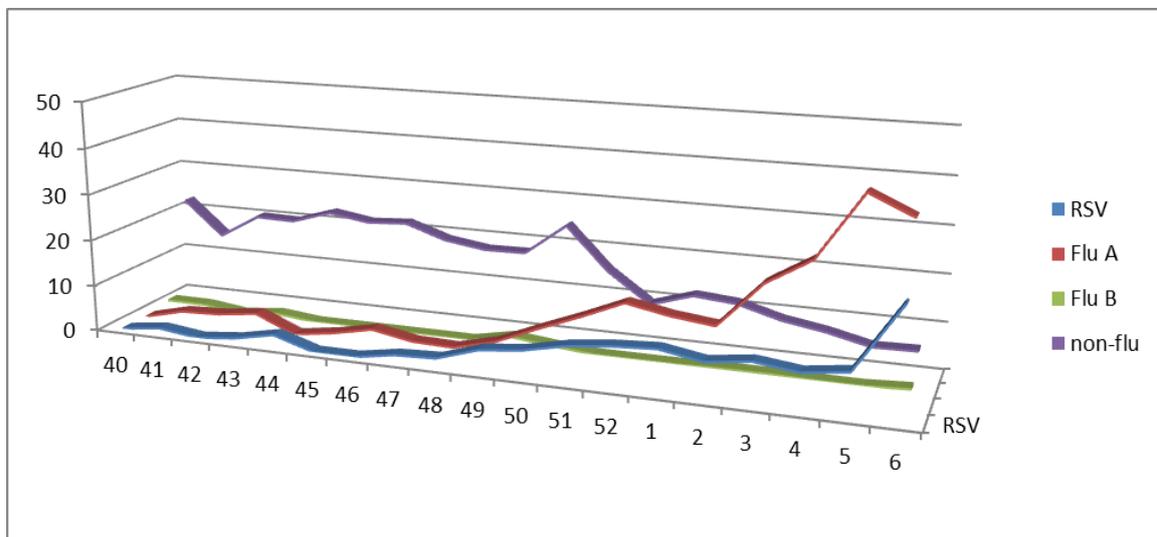
From week 40/2018 to week 6/2019, total amount of 333 nasopharyngeal swabs from sentinel outpatients were tested. To date, the most common pathogen has been HRV (with the highest incidence recorded in weeks 40-52), followed by influenza A/H1 virus. Influenza virus as the causative agent has been the least common in the age group 0-5 years (6/61 – 9.8 %) and the most common in school children aged 6-14 years (25/105 – 23.8 %). In the age groups 15-24 years and 25-59 years, influenza virus was detected at similar rates (6/37 and 16/93 – 16.2 % and 17.2 %), while the lowest rate has been found in the age group 60+ (5/37 – 13.5 %). In the 2018/2019 season, the cause of ARI/ILI are often non-influenza respiratory viruses and RSV in particular, and these pathogens are showing 10 % increase compared to the same period of the last season.

Fig. 1 : The proportion of influenza and non-influenza viruses of ARI etiology from week 40/2018 to week 6/2019, Czech Republic. Analysis of 333 nasopharyngeal swabs from the sentinel system.



From week 40 to week 52, non-influenza viruses prevailed and influenza virus was sporadic. Nevertheless, since week 51, the etiological role of influenza A/H1N1 in ARI has been rising with a clear upward trend since week 2, in accordance with the development of morbidity. The higher detection of RSV has been recorded from the 5th week. The results presented in Fig. 2 are based on the sentinel and non-sentinel data collected by the NRL and on data reported by the collaborating laboratories, so this graph illustrates the trend in influenza A/B, non-influenza and RSV infection.

Fig. 2 : Percentage of influenza A and B, RSV and non-influenza viruses on the etiology of ARI in the Czech Republic, from week 40/2018 to week 6/2019. Whole-country data.



The morbidity expressed by the ARI curve shows an autumn dynamic increase (caused mainly by non-influenza viruses), a traditional Christmas drop, and a sharp rise due to the onset of the epidemic in the first weeks of 2019. It is probable that the 2018/2019 influenza epidemic will be less widespread as compared to the seasons 2017/18 and 2016/17.

Fig 3: Incidence of ARI per 100,000 population in the Czech Republic during current and during three previous influenza seasons

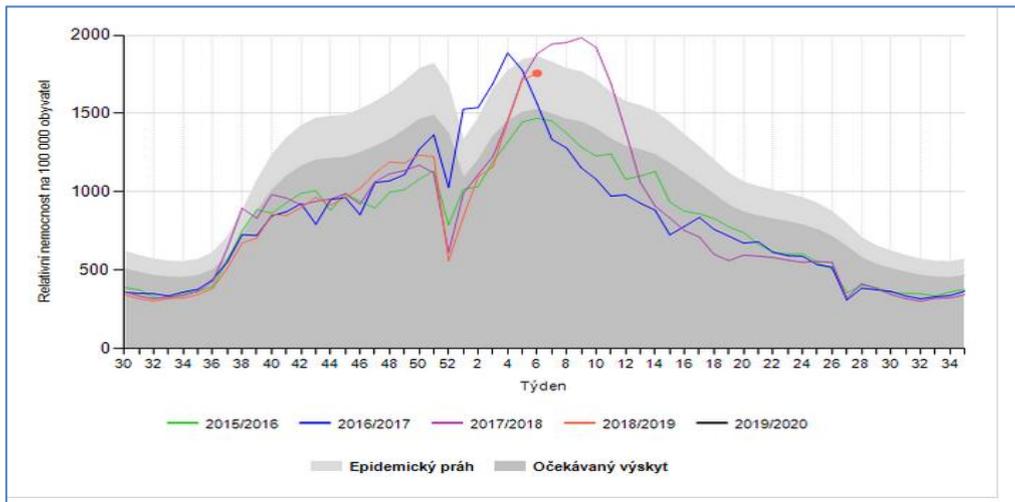
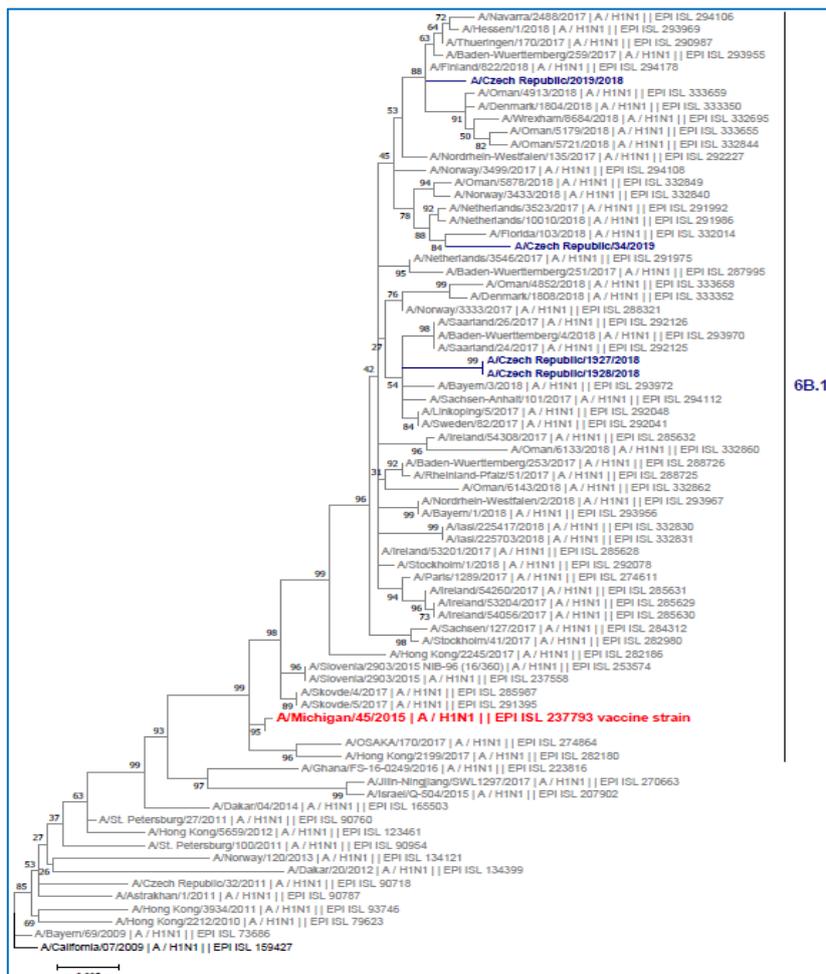


Fig. 4: Phylogenetic analysis of the hemagglutinin molecule.



6B.1

Based on sequencing analysis of HA, recent isolates of influenza virus A/H1N1 are assigned to clade 6B.1 similarly to most European strains. The tree was generated using the maximum likelihood method on the basis of representative H1 sequences obtained from the GISAID database and rooted to A/California/7/2009(H1N1) strain. Bootstrap values (100 replicates) in percentages were indicated at key nodes. The Czech 2018/2019 H1 sequences are highlighted in blue and the vaccine strain A/Michigan/45/2015 in red, respectively.

Within the monitoring of severe cases of influenza according to the ECDC definition, 264 admissions to ICU were reported. Of these patients, 60 died. Most of them were elderly unvaccinated patients with chronic underlying conditions (data as of 15 February 2019).

Conclusion:

The predominant strain in the 2018/2019 influenza epidemic in the CZ is A/H1N1. RSV is also on the rise, along with the influenza wave, which is not typical. The numbers of severe cases and deaths are within the expected trend.