



Influenza Activity in Hospitalized Patients in Mexico During the 2017-2018 Season

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Site presentation

The Global Influenza Hospital Surveillance Network (GIHSN) is an international public-private collaboration created in 2012 to improve understanding of influenza epidemiology with the goal of informing public health policy decisions. To establish the Mexico branch of the GIHSN 11 Hospitals have been included since September 2015, 5 in the Mexico City area and 6 in 3 Mexico States: Durango, Oaxaca and Chiapas. Geographic location, catchment area and population are indicated in the map. Potential study patients are assessed throughout the whole calendar year. Influenza season is defined as the first two weeks in which influenza is being identified and there is a continuous increase thereafter. The end of the season occurs with the decline of influenza positive cases followed by two-influenza-free weeks. All hospitalized patients 1 month of age and beyond are eligible for the study.



Site	Screened	Included in the study
Instituto Nacional de Ciencias Médicas y Nutrición Salvador Zubirán	1728	421 (24%)
Instituto Nacional de Enfermedades Respiratorias	1545	614 (40%)
Hospital Infantil de México	513	364 (71%)
Instituto Nacional de Pediatría	685	276 (40%)
Hospital General Dr. Manuel Gea González	748	517 (69%)
Hospital General Dr. A Valdivieso Oaxaca	171	115 (64%)
Hospital Regional de Alta Especialidad Oaxaca	60	37 (60%)
Hospital General de Durango	327	108 (32%)
Hospital General de Durango 450	294	32 (12%)
Hospital Regional de Alta Especialidad Ciudad Salud	23	3 (17%)
Hospital General de Tapachula	51	38 (78%)
Total	6145	2525 (41%)

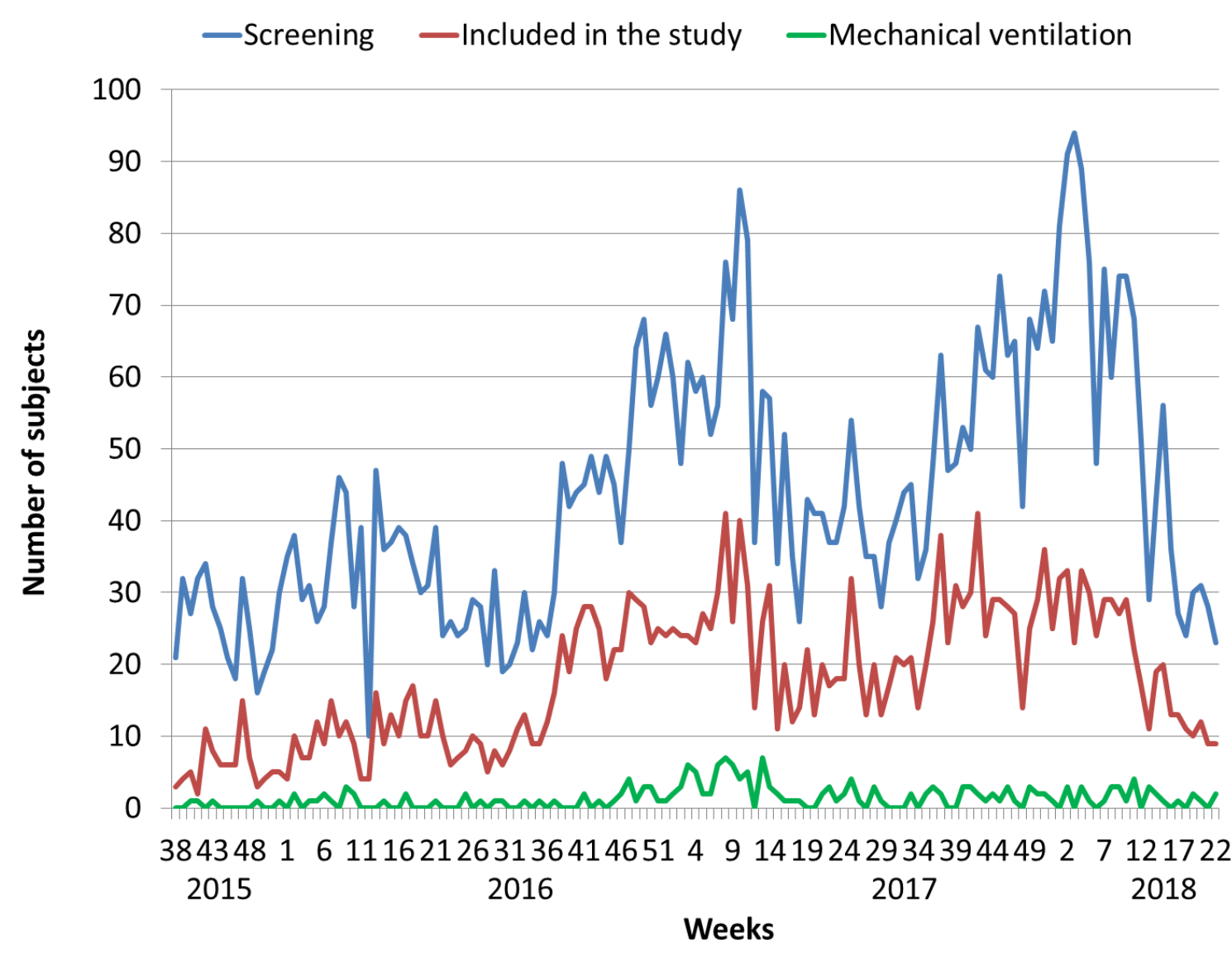
Methods

Hospitalized, non-institutionalized patients residing in a pre-defined hospital catchment area, reporting symptoms of a predefined set of conditions described as possibly associated with a recent influenza infection within 7 days prior to admission and not having been discharged from a Hospital in the previous 30 days have been included in the study. Trained doctors and nurses collect relevant information by a combination of face-to-face interview of patients and attending physicians, and by reviewing clinical records. Nasopharyngeal swabs are collected from all patients meeting the inclusion criteria and tested by reverse transcription-polymerase chain reaction (RT-PCR) for influenza and a multiplex PCR (Respifinder®) for other viruses and bacteria. Influenza-positive samples are sub-typed. Patients are considered vaccinated if they had received the current season's influenza vaccine at least 14 days before symptom onset.

Ethical considerations: The study was approved by a Central Research Ethics Committee. Informed written consent is required for enrolment. Good Clinical and Epidemiological Practice procedures are implemented in all study processes.

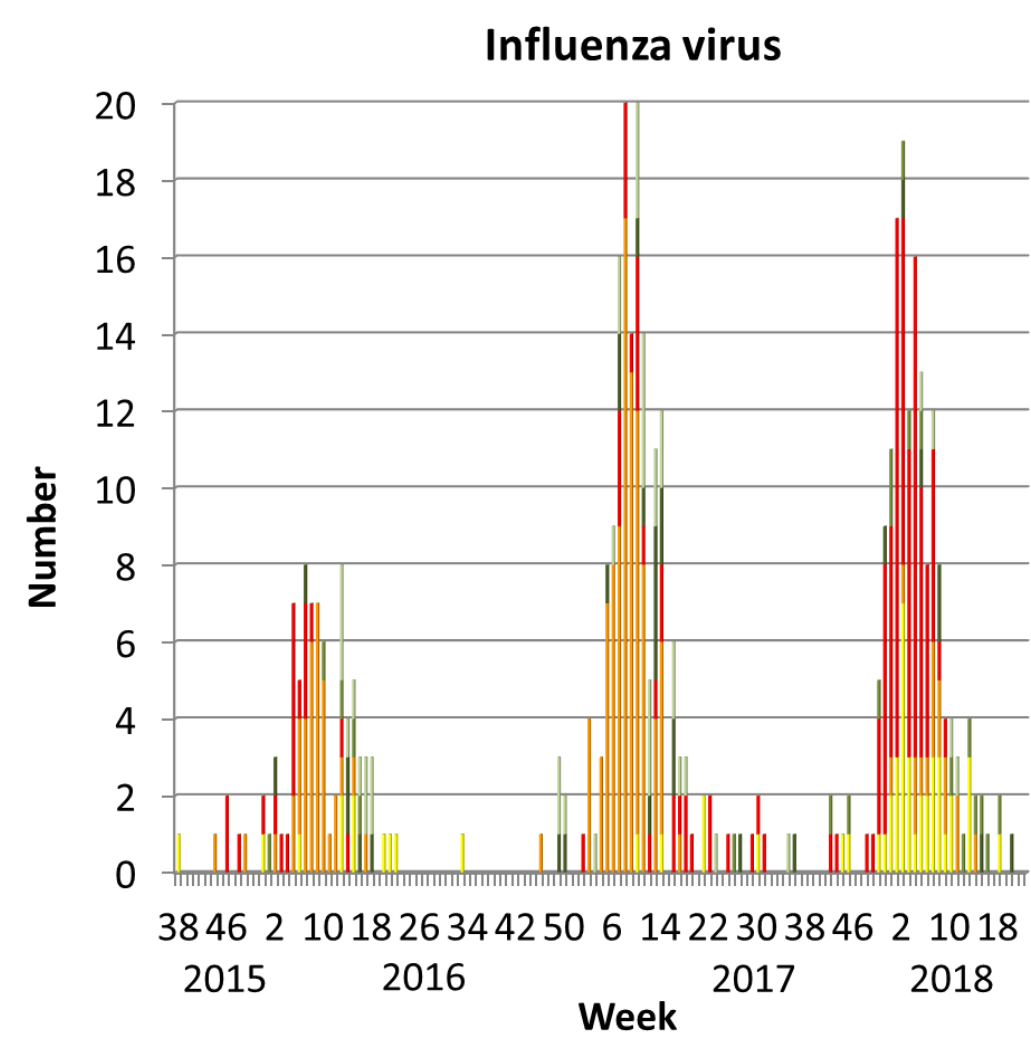
Results

Number of patients screened, included in the study and those admitted to the ICU or requiring mechanical ventilation



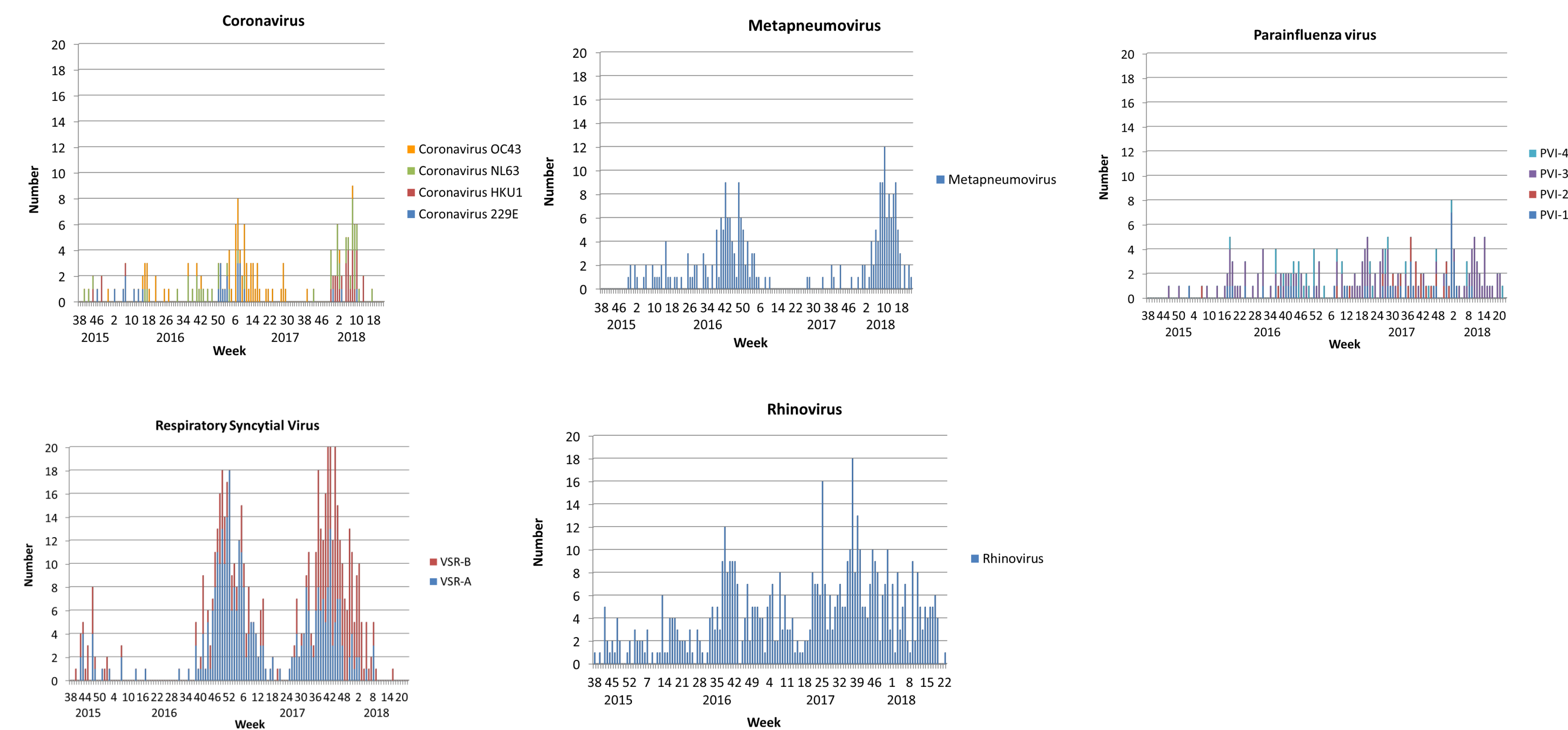
Influenza type	Number of influenza positives	Number (%) of deaths by influenza type
Non-typeable Influenza A	38	3 (7.8)
Influenza A(H1N1)pdm09	16	3 (18.7)
Influenza A(H3N2)	83	1 (1.1)
Non-typeable Influenza B	7	0
Influenza B Victoria	15	1 (6.6)
Influenza B Yamagata	4	1 (25)

Vaccination against influenza during the current 2017-2018 season	
Yes	124
No	586
Data not available	111

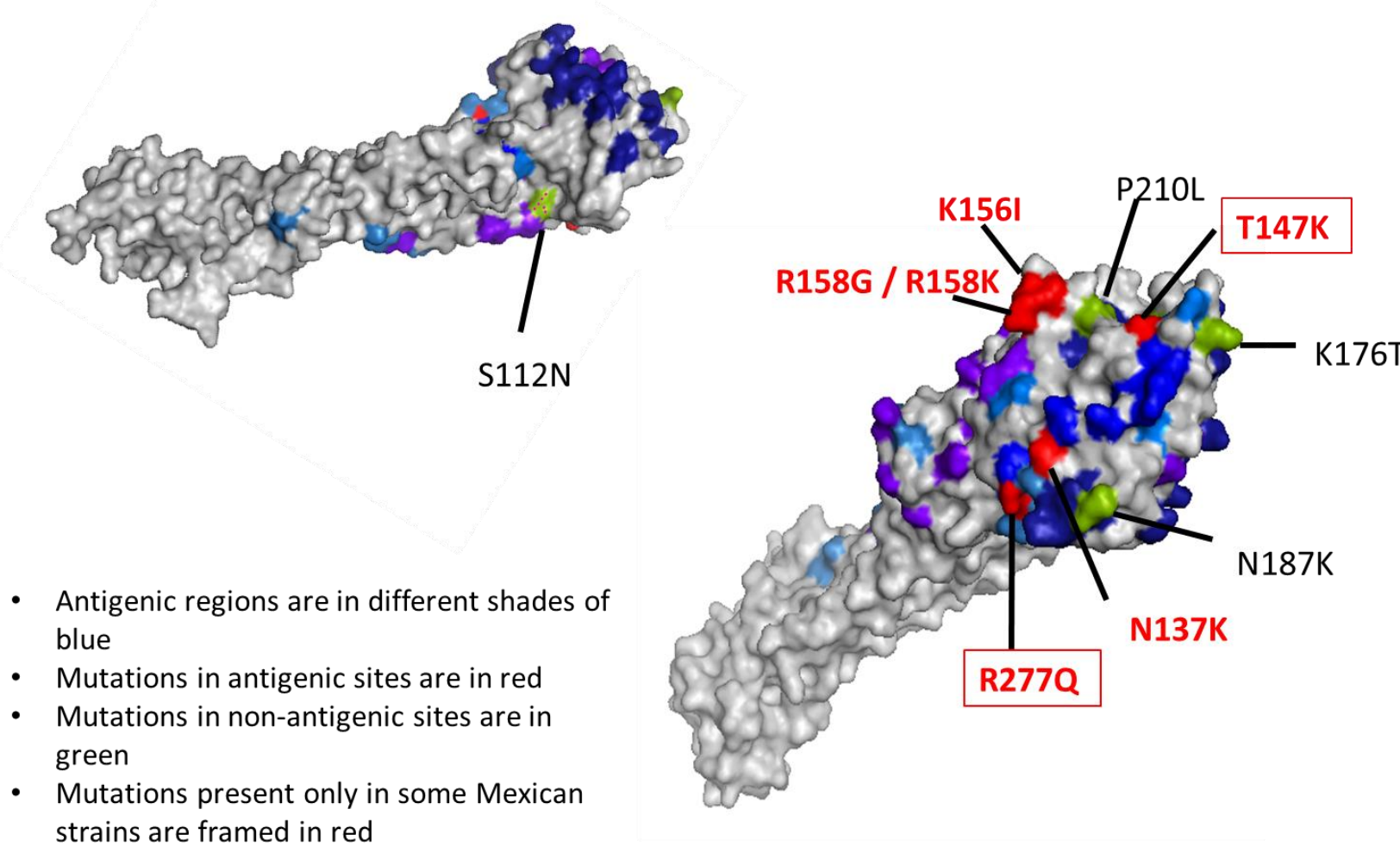


Influenza type	Number (%)
Non-typeable Influenza A	38 (23.3)
Influenza A(H1N1)pdm09	16 (9.8)
Influenza A(H3N2)	83 (50.9)
Non-typeable Influenza B	7 (4.2)
Influenza B Victoria	15 (9.2)
Influenza B Yamagata	4 (2.4)

Frequency distribution of other viral pathogens detected during the study period, including the 2017-2018 season.

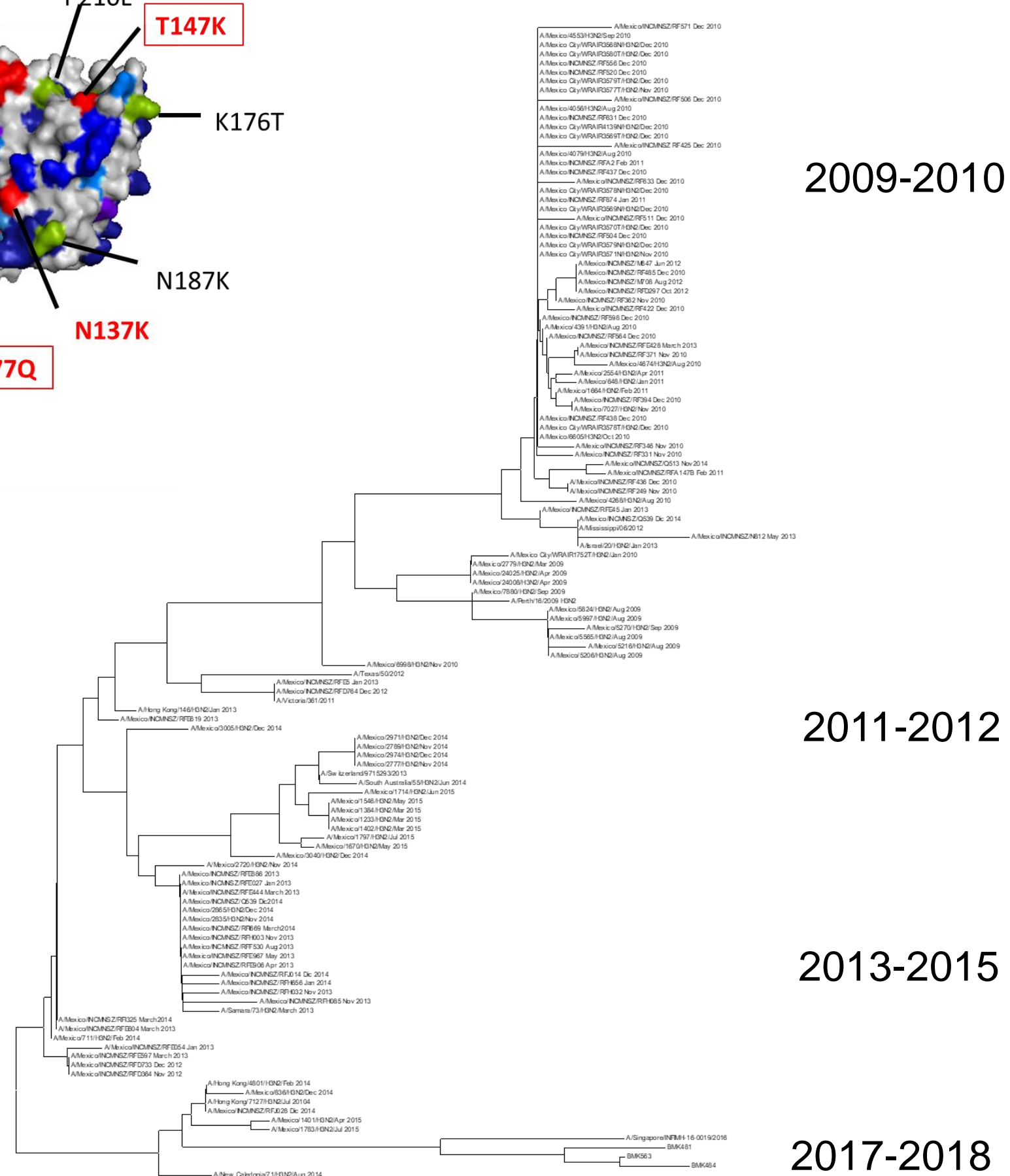


Spatial location of aminoacid residues of A/Mexico/INCMNSZ/BMK365 Feb2018 with respect to A/H3A/HongKong/4801/2014



- Antigenic regions are in different shades of blue
- Mutations in antigenic sites are in red
- Mutations in non-antigenic sites are in green
- Mutations present only in some Mexican strains are framed in red

Dendrogram of H3N2 strains during the study period, including the 2017-2018 season



Key aspects & challenges

The implementation of the GIHSN in Mexico, has enable us to create and maintain a real-time surveillance system to accurately inform health professionals and public policy makers about the burden of respiratory viruses to our population. It also has informed the medical community about the risk imposed by the different respiratory viruses, with special attention to the circulating influenza strains associated with severe diseases and death. Furthermore, the study of the molecular aspects of the different influenza types has informed vaccine developers about the match of the vaccine with circulating strains.

Our challenges remain in the sustainability of the surveillance system already established and sharing the lessons learned to the rest of the States in our country.

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