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Influenza Surveillance in New Mexico 2018-2019 Season Summary

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The New Mexico Department of Health (NMDOH) has participated in influenza sentinel surveillance for nearly 20 years. Currently, New Mexico's influenza surveillance systems include outpatient surveillance for influenza-like illness (ILI) through sentinel providers (ILINet), population-based surveillance for laboratory-confirmed influenza-associated hospitalizations in seven counties (FluSurv-NET), and mortality surveillance using data from the Epidemiology and Response Division's Bureau of Vital Records and Health Statistics (BVRHS). Other components include virologic surveillance using specimens submitted from ILINet and FluSurv-NET, which are tested at the state public health laboratory using polymerase chain reaction (PCR) and/or viral culture, and rapid influenza test data collected from our state-wide network of clinics and providers in ILINet. Data from these surveillance systems are shared with the Centers for Disease Control and Prevention (CDC) and compiled into a weekly national report on influenza activity among the 50 states and US territories.

Outpatient Influenza-like Illness (ILI) Surveillance
During the 2018-19 season, 50 health care provider sites participated in the voluntary ILI surveillance system in New Mexico. Through this participation, NMDOH determined the impact of influenza throughout the state and monitored the start, peak and end of the season. These data also help determine if one of New Mexico's five health regions is disproportionately affected by influenza so that resources and attention can be directed to prevention and control measures there.

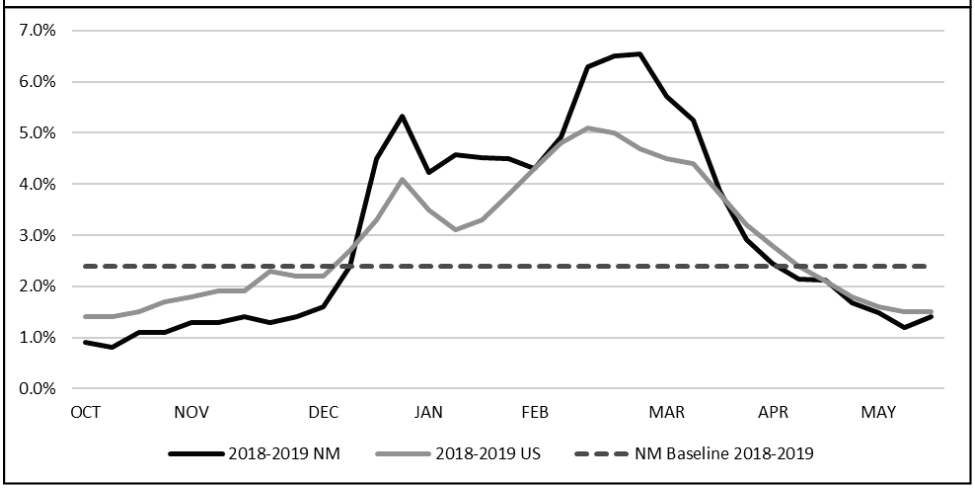
Provider sites report the total number of patients seen for all-cause visits and of those visits, the total number of patients seen with ILI on a weekly basis (ILI visits/ all-cause visits = %ILI). Influenza-like illness is defined as having a fever of greater than or equal to 100° F and cough and/or sore throat, in absence of another known cause. Sites also submit viral specimens for subtyping to the Scientific Laboratory Division (SLD). A portion of these specimens are also submitted to the CDC for further antigenic characterization and testing for antiviral resistance. The national ILI system is a collaborative effort between the CDC, state and local health departments, public health and clinical laboratories, vital statistics offices, physicians, clinics and emergency departments.

Nationally, the 2018-19 influenza season was the longest season in 10 years, with ILI activity above baseline for 21 weeks. In NM, peak activity occurred in mid-February; however, two distinct waves of activity were observed. From October 2018 to mid-February 2019, influenza A(H1N1) predominated, with a peak activity of 5.3% in the last week of 2018. During the second wave from February to May 2019, with activity peaking at 6.6% in the week ending 3/2/19, influenza A(H3N2) predominated (Figure 1).

Within New Mexico, there were large differences in ILI activity among the five health regions. This geographic variation in influenza activity is common and highlights the need to collect and analyze data in real time, on a local level, in order to focus outreach and prevention efforts of acutely affected regions of the state. The Northeast region peaked at 10.2% in the week ending 12/29/18, while the Southeast region saw a large surge in ILI activity starting in the week ending 2/9/19. Activity in this region peaked at 17.7% in the week ending 2/23/2019 (Figure 2).

Rapid Influenza Test Surveillance
During the 2018-19 season, 18 sentinel laboratories and clinics within New Mexico's ILI Network performed 19,825 rapid influenza tests. Typing results of these tests indicated that 3560 (18.0%) were positive for influenza A, 279 (1.4%) were positive for influenza B and 23 (0.1%) were positive for influenza but unable to be typed. The percentage of positive rapid influenza tests first peaked at 20.7% in the last week

Figure 1. ILI activity as reported by ILINet sentinel sites, NM and U.S., 2018-2019 influenza season



of 2018, which coincided with the first ILI peak of 5.3%. The second peak of the percentage of positive rapid influenza tests reached 37.2% in the week ending 2/2/19, four weeks before New Mexico's second ILI peak of 6.6% . In the previous 2017-18 influenza season, the percentage of positive rapid influenza tests also peaked during the same week at 22.0%, when ILI was at a peak of 9.9%.

FluSurv-Net

FluSurv-NET is a collaboration between CDC, the Emerging Infections Program (EIP), and select health departments in 13 geographical areas of the United States. As part of this network, NM conducts population-based surveillance for laboratory-confirmed influenza associated hospitalizations in seven counties, representing 60% of the state population. This surveillance includes a medical chart review to obtain information on course of illness, clinical management, vaccination history, and underlying risk factors for severe complications of influenza.

During the 2018-19 season, the overall influenza hospitalization rate in New Mexico was 86 per 100,000 population. This is compared to 83 per 100,000 in 2017-18, and 31 per 100,000 in 2016-17. Hospitalization rates were highest in cases 65 years and older (200 per 100,000), closely followed by cases 4 years and younger (196 per 100,000). The hospitalization rate of the 0-4 year age group in New Mexico was higher than any other FluSurv-NET site. Weekly rates were highest in the 0-4 year age group in December 2018 and January 2019, while rates were highest in the 65+ year age group in February and March 2019 (Figure 3). This suggests that the 0-4 year age group was more affected by the A(H1N1) subtype, while the 65+ year age group was more affected by the A (H3N2) subtype. Similar patterns were observed at the national level as well, with the assumption that different birth cohorts have different levels of susceptibility to various subtypes of influenza A.

Virologic Surveillance

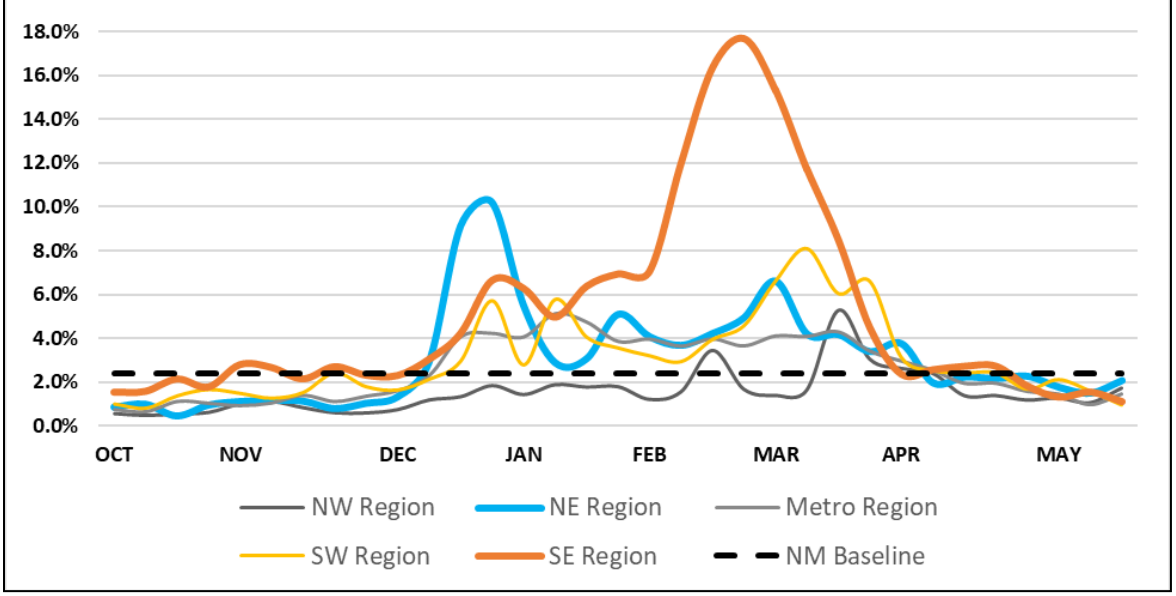
The Scientific Laboratory Division (SLD) performs influenza PCR testing and/or viral isolation on specimens submitted from the ILINet, FluSurv-NET, the Office of the Medical Investigator (OMI) and various other providers in the state throughout the influenza season. From mid-September 2018 to mid-May 2019, SLD received 1,555 specimens. Of those specimens, 920 (59.2%) were positive for influenza by PCR or viral culture. This is a higher percent positive than in past seasons, and may suggest that specimens that already tested positive by rapid test or another method are being submitted for confirmatory testing at a higher proportion than in the past. DOH is working with ILINet providers to increase the proportion of unscreened influenza specimens submitted to ensure a more random representation of respiratory illness.

In the 2018-19 season (Figure 4), there were two waves of influenza, which correspond to the two peaks in ILI activity, as seen in Figure 1. The first wave was caused by influenza A(H1N1)pmd09, the activity of which peaked in late December 2018 and early January 2019. The second wave was caused by influenza A(H3N2), the activity of which peaked in March 2019. There was very little activity caused by influenza B viruses in New Mexico in the 2018-19 season. The sharp spike in positive influenza tests seen in mid-December was due to a larger than normal shipment of specimens to the state laboratory for testing and does not correspond with an increase in ILI activity or influenza cases.

Mortality Surveillance – Pneumonia and Influenza

Surveillance for pneumonia and influenza (P&I) deaths is conducted through death certificate reporting. P&I deaths serve as an indirect measurement of the severity of influenza during a season and are used as a DOH health status indicator. There were 237 P&I deaths reported in the 2018-19 influenza season. The crude death rate for P&I was 11 per 100,000 for New Mexico residents, lower than the death rate of 14 per 100,000 observed during the previous 2017-18 season. One hundred and seventy-nine (or 75.5%) of those

Figure 2. ILI activity by region as reported by ILINet sentinel sites, New Mexico, 2018-2019 influenza season



deaths were observed among persons 65 years and older. By gender, males nearly equaled females (50.2% to 49.8%). There were two pediatric deaths that occurred in New Mexican children during the 2018-19 season as compared to three pediatric deaths during the 2017-18 season.

Conclusions

The geographic variation in influenza activity across New Mexico regions highlights the importance of having adequate data reporting and specimen submission from the various regions in the state. DOH is working to fill gaps and ensure adequate coverage within the ILINet, in order to improve representation and reduce variation in reported ILI rates in this diverse state.

The 2018-19 influenza season was outstanding for a number of reasons. It was the longest season in 10 years, and experienced two peaks with a roughly equal amount of activity contributed by influenza A(H1N1) pdm09 and influenza A (H3N2). This is unusual as typically, only one subtype of influenza A predominates per season with one distinct peak of activity. Additionally, the subclade of influenza A(H3N2) that emerged did not match the subclade that was included in the 2018-19 influenza vaccine. Although this emerging subclade diminished vaccine effectiveness in the 2018-2019 season, annual flu vaccination and early treatment with antivirals are still the best methods of preventing serious illness, hospitalization, and death from influenza, a disease which disproportionately impacts children under 4 and adults over 65 years old in New Mexico.

Acknowledgements

Influenza surveillance is not possible without the participation of many contributors including the dedicated staff of hospitals, laboratories, clinics, and other sentinel sites that contribute data and laboratory specimens to the NMDOH through ILINet and FluSurv-Net.

Figure 3. Weekly influenza hospitalization rates (per 100,000 population) by age group, New Mexico, 2018-2019 influenza season

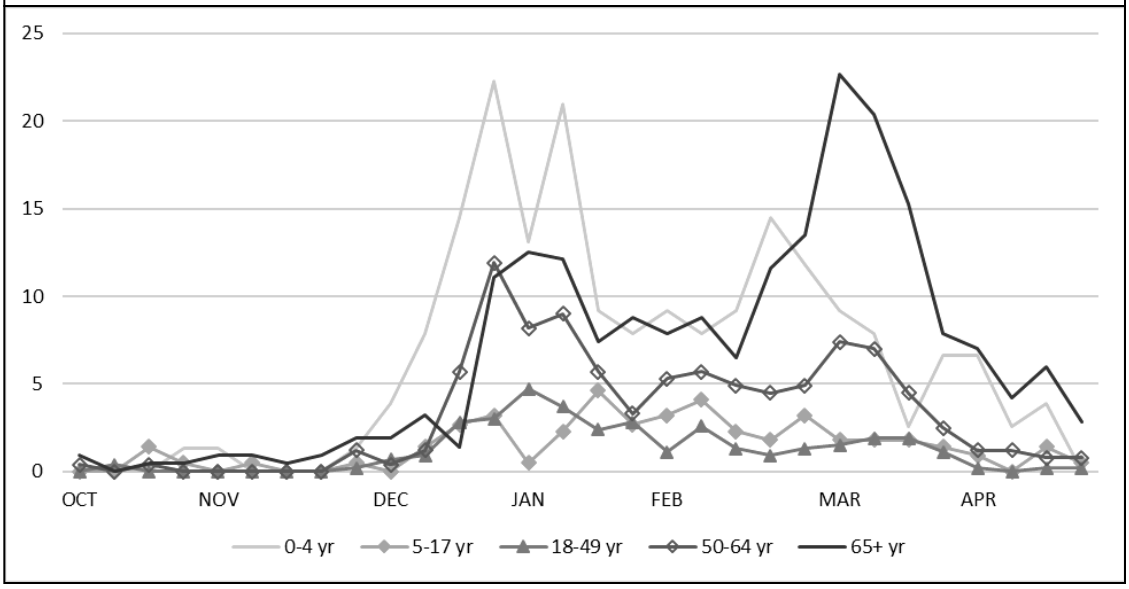


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Figure 4. PCR Positive Results among Hospital/Clinical Sites and Scientific Laboratory Division, New Mexico, 2018-2019 influenza season