Influenza Surveillance: Comparative Analysis of Influenza Cases Data in Nebraska

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Influenza Surveillance: Comparative Analysis of Influenza Cases Data in Nebraska

Anna Marie Carpenter

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ABSTRACT

Influenza is an infectious, viral disease caused by the influenza virus. There are four strains of influenza: Type A, Type B, Type C, Type D. Symptoms can be as mild as a fever, runny nose, sore throat, headache and cough. These symptoms are very similar to our current pandemic symptoms of coronavirus SARS-CoV-2, or COVID-19. However, influenza symptoms can also manifest as severe viral pneumonia, bacterial pneumonia and heart failure.

Influenza surveillance provides present data on the prevalence of influenza within Nebraska which then allows health professionals to remind the population to get vaccinated and the importance of social distancing when feeling ill and how to get treated. It is also vital in providing information regarding the current virulent strain, the target population, and the effectiveness of the vaccine.

My role in assisting the Department of Health and Human Services (DHHS) prior to the start of this year’s influenza surveillance season and throughout the beginning was to compile and analyze previous seasons’ surveillance data and compare to the sentinel providers and laboratories reporting data, evaluate and enhance current recruiting materials and send to all health departments within the state, pinpoint areas of surveillance need in the state and recruit additional sentinel providers, and send out the influenza testing supplies to all sentinel providers and laboratories. Throughout the beginning and peak influenza season, I evaluated previous seasons’ influenza reporting and resulting data compared to the 2020-2021 season’s data while analyzing that data according to patient age and strain type to identify any trends in the positive results.
A. Specific Aims

The aim of this project was to maintain or increase the current sentinel sites efficiency in reporting the patient visits and influenza like illness (ILI) data and to increase the amount of sentinel providers within the state to allow for more precise influenza data tracking during this COVID-19 pandemic. This project also compared the previous two seasons’ (2018-2019 and 2019-2020) data with the current 2020-2021 season’s data to identify any trends or differences between the influenza surveillance seasons. This may indicate interesting variables that can cause a difference in positive cases; mask wearing, social distancing, and increased hand hygiene.

B. Significance

In late 2019, SARS-CoV-2 emerged and made headlines. In early 2020, it made its appearance in the United States. The symptoms of COVID-19 are very similar to influenza symptoms; fever, cough, fatigue, sore throat, and many others. Influenza is spread in the same manner as COVID-19 through droplet transmission; droplets spread when one coughs, sneezes or talks. Now, acquiring influenza data has become more difficult since the country is focusing on COVID-19 positive patients who could also be influenza positive patients. Providers and laboratories across the state are more hesitant during this pandemic to be recruited to become an influenza surveillance sentinel location due to the slight increase in work as the data must be reported weekly.
Efficient surveillance systems around the world are vital to better understand influenza epidemiology, disease incidence and severity and to develop prevention strategies. Influenza is a vaccine-preventable disease.

Knowing where influenza is most prevalent and which strain or lineage is infecting the population through this surveillance data allows recommendations to which area of the state the vaccines should be administered the most aggressively. In addition, not all strains of influenza require the same medical treatment. By tracking which strain is most active during the influenza season, medical professionals can be more aware and educated on which treatment will be most successful. Influenza infects populations differently. The population data obtained shows health officials the most affected communities and where an increase in vaccination education and administration is needed.
A. Epidemiologic Description of the Health Problem

Influenza is a contagious respiratory virus that infects the nose, throat, and sometimes the lungs (Centers for Disease Control and Prevention 2019). As mentioned previously, there are four strains: Influenza A, B, C and D. Influenza types A and B are the viruses that cause seasonal epidemics known as flu season. Influenza A is the only influenza virus known to cause global pandemics. Influenza A is further broken down into subtypes based on proteins on the surface of the virus (Centers for Disease Control and Prevention 2019); influenza A subtype H3 and influenza A subtype H1N1 are also known as seasonal flu. Influenza B is broken down into lineages based on the differentiation of hemagglutination; Victoria and Yamagata lineages (Biere et al. 2010). Subtypes of influenza A and lineages of influenza B are included each year in the season’s influenza vaccines. Influenza C virus infections cause very mild illnesses and are not known to infect people globally. Influenza D affects cattle and are not known to infect or cause illness in people.

Sentinel surveillance began in the late 1990s. But the emergence of the 2009 influenza A (H1N1) strain highlighted the need for more efficient influenza surveillance worldwide. Thus, the World Health Organization concluded that the world was unprepared to respond to an influenza pandemic (Ortiz et al. 2009). Researchers began to develop a sentinel surveillance system that could enhance the epidemiological and laboratory data and increase our preparedness and prevention.

B. Program Description
Nebraska’s influenza surveillance system currently consists of 17 sentinel providers and 18 sentinel laboratories within the state of Nebraska. The purpose of these sentinel providers is to report the number of influenza like illness patient visits and total number of patient visits by age group every week into the online CDC database (Influenza Like Illness Network, ILINet). This database consists of more than 3,000 healthcare providers in all 50 states and reports over 25 million patient visits each year. The sentinel locations also are to submit nasopharyngeal specimens during each part of the season to the Nebraska Public Health Laboratory for confirmation. If the specimen is confirmed positive, it will then be sent to the Centers for Disease Control and Prevention (CDC) for antiviral susceptibility and strain classification. Because of this partnership with the sentinel providers and laboratories, the Department of Health and Human Services is able to track where influenza is most prevalent, which virulent strain is most active, and what population of the state is most affected.

The more data that is obtained throughout the influenza season, the more efficient the surveillance program. By increasing the amount of sentinel providers and sentinel laboratories, DHHS is able to track which strain is the most prevalent and provide the CDC with that information. If influenza activity is confirmed within a community through this tracking, health professionals are able to treat patients with influenza like illness symptoms within 48 hours of symptom onset to reduce the severity of their illness.

C. Evaluation Framework

Without the cooperation from the sentinel providers and laboratories, influenza data could not be obtained. It is vital to the influenza surveillance program that these sentinel locations submit the data weekly and submit nasopharyngeal specimens to the Nebraska Public Health
Laboratory for confirmation testing. The data reported weekly into the online database allows DHHS to evaluate that sentinel location’s reporting data and efficiency. The data can be pulled for each season and sorted by sentinel location, number of total patient visits each week, number of those patients with influenza symptoms and the age of the patients.

All the data obtained each season allows health professionals to accurately track influenza occurrence and prevalence and which strain is the most virulent for that season. Because influenza viruses undergo constant antigenic change, surveillance is necessary to identify influenza new virus variants, monitor their health impact in populations, and to provide data necessary for selection of influenza vaccine components each year. Influenza surveillance allows public health professionals to identify high-risk patients, determine the effectiveness of current prevention programs, and refine vaccine recommendations each year (Centers for Disease Control and Prevention 2017).

D. Hypothesis

I hypothesized that the current 2020-2021 season’s positive results numbers would be lower than the previous two seasons (2018-2019 and 2019-2020) due to the mask mandate, social distancing, and increased hand hygiene that has been established around the state all due to the COVID-19 pandemic.
CHAPTER 3 – METHODS

A. Evaluation Methods

The process for reporting influence-like-illness (ILI) data is simple for the sentinel providers and laboratories. All sentinel laboratories and providers from the previous season were identified and grafted onto a map (See Appendices 1) which allows DHHS a visual aid of the sentinel provider locations so they could be notified in September via email and asked to participate this 2020-2021 season. If they choose to opt out, the Department of Health and Human Services and the health departments used this map to identify areas of need and were then tasked with recruiting additional sentinel providers or laboratories. Recruitment packets and a letter of involvement that I enhanced were sent to the health departments across the state to aid in recruitment (See Appendices 2). Each packet contained information regarding the importance of influenza surveillance, specimen collection and transport, specimen test ordering in the Nebraska Public Health NULirt system (test ordering and result reporting), and instructions for ILINet reporting. Sentinel providers of any specialty in any type of practice are eligible to be ILINet providers. However, school health centers and any type of institutional setting such as nursing homes or prisons are not eligible. Two additional sentinel providers were recruited toward the peak/end of the season.

Those sentinel locations that chose to report again, were notified and sent 10 influenza testing kits, free of charge, to utilize for surveillance purposes throughout the season. Each kit contains one nasopharyngeal swab, one viral transport media container, one biohazard specimen transport bag, and a recruitment packet.
These sentinel providers and laboratories are to report once per week the total number of patients seen for all reasons and the total number of patient visits for ILI (fever ≥ 100°F and cough and/or sore throat) by age group (0-4 years, 5-24 years, 25-49 years, 50-64 years, ≥ 65 years). They log onto ILINet online or by fax to a central repository at the CDC (See Appendices 3). The process to report takes less than 30 minutes to complete to compile and report their data.

Also, these sentinel laboratories and providers are to submit the provided influenza kits throughout the season to the Nebraska Public Health Laboratory for confirmation testing, along with ordering the test in the NULirt system. During the beginning of the influenza season (October – December), they are to obtain two or three nasopharyngeal specimens on patients who exhibit signs and symptoms of ILI regardless of the rapid diagnostic test result performed at their clinic location. During the peak or middle of the season (January – February), sites should obtain two or three nasopharyngeal specimens on patients who have tested positive for influenza by rapid diagnostic testing. Lastly, at the end of the influenza season (March – May), sites need to obtain two or three nasopharyngeal specimens on patients who exhibit signs and symptoms of ILI regardless of the rapid diagnostic test. All of the patient specimens must be ordered in the state reporting system, NULirt, prior to sending to NPHL. Patient demographics must be entered as well as the order for the influenza PCR panel, FLUPCR. Such demographic information includes patient name, date of birth, gender, ethnicity, address, phone number and any symptoms present. Additional epidemiological questions are included which are sent to the CDC; recent travel, agriculture exposure and vaccine status.
The Nebraska Public Health Laboratory will then perform a PCR panel on the submitted specimens that includes the detections of Influenza, A, B, A-H3, and A-2009 H1. These tests results are submitted electronically through the state resulting system, NULirt.

B. Standards and Criteria

The influenza surveillance program is conducted by health professionals who agreed to enroll in the program. By reporting their data each week and submitting specimens throughout the season, their program credibility is maintained. This surveillance program is designed to reach all age groups and all ethnicities and are subject to the patient’s symptoms and rapid influenza test result.

Based on the needs of the program and data from the previous season, additional sentinel providers are recruited each season to allow for more precise surveillance throughout the state. Additional nasopharyngeal kits for surveillance will be sent out if an area of the state is in need. Health departments are notified prior to and throughout the season regarding the surveillance in their area.

C. Data Sources and Measurement

Sources of data that were used to track patient visits were conducted internally by the sentinel providers and laboratories. They reported, by age group, the total patient visits and total ILI patients every week into the CDC database, ILINet. That data is then downloaded from ILINet and analyzed by DHHS and myself using Excel. I analyzed the data by age group and by sentinel location.

The specimens that are submitted to the Nebraska Public Health Laboratory are tracked and reported using NULirt. The data is then downloaded from NULirt into an Excel spreadsheet and
analyzed by myself. I analyzed the data by age group, time of season, sentinel location and strain identified by running multiple pivot tables to decipher the data.
CHAPTER 4 – RESULTS

A. Evaluation Findings

The patient visits reporting data pulled from the ILINet reporting system (See Table 1) showed that there were 572 ILI patients out of a total of 85,904 patients seen during the current 2020-2021 season. That number of total patients seen was lower than in previous years reporting. I compared this data to the data from previous years to be able to see if there was a trend between patient visits in regards to the COVID-19 pandemic. A total of 93,456 patients were seen with 1,929 seen with ILI during 2019-2020 season. Age 5-24 group had more patients present than any other age group that season.

There was significantly more patients seen during the 2018-2019 season than any other season compared. A total of 133,519 patients were seen with 2,529 ILI. Age 5-24 group again had more patients present than any other age group.
Table 1. ILINet Data: Patients Seen per Season

<table>
<thead>
<tr>
<th>Season</th>
<th># Total Patients Seen</th>
<th># Total ILI Patient Seen</th>
<th>Age 0-4</th>
<th>Age 5-24</th>
<th>Age 25-49</th>
<th>Age 50-64</th>
<th>Age 65 and Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018-2019</td>
<td>133519</td>
<td>2529</td>
<td>546</td>
<td>957</td>
<td>432</td>
<td>326</td>
<td>268</td>
</tr>
<tr>
<td>2019-2020</td>
<td>93456</td>
<td>1929</td>
<td>308</td>
<td>743</td>
<td>444</td>
<td>251</td>
<td>183</td>
</tr>
<tr>
<td>2020-2021</td>
<td>85904</td>
<td>572</td>
<td>50</td>
<td>122</td>
<td>205</td>
<td>117</td>
<td>78</td>
</tr>
</tbody>
</table>

Data was obtained from NULirt to analyze the specimens that were sent from the sentinel laboratories and providers to the Nebraska Public Health Lab for confirmation FLUPCR testing (See Table 2). Only four specimens have been sent to the Nebraska Public Health Laboratory and none of them were positive FLUPCR specimens reported as of March 18, 2021 during the current 2020-2021 season. For the 2019-2020 season, there were a total of 56 specimens submitted and 36 were confirmed positive by FLUPCR. Of the 36 positive specimens, 25 of them were of the influenza strain A/H1N1 during the 2019-2020 season. For the 2018-2019 season, there were a total of 36 specimens submitted and of those, 20 were confirmed positive by FLUPCR. Of the 20 positive specimens, 14 of them were of the influenza strain A, subtype H3 during the 2018-2019 season.
Table 2. NULirt Data: FLUPCR Specimen Results by Season

<table>
<thead>
<tr>
<th>Season</th>
<th># Specimens</th>
<th>Result</th>
<th>A, Subtype H3</th>
<th>A/H1N1</th>
<th>B, Victoria Lineage</th>
<th>B, Yamagata Lineage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018-2019</td>
<td>16</td>
<td>Negative</td>
<td>14</td>
<td>4</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>Positive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019-2020</td>
<td>20</td>
<td>Negative</td>
<td>1</td>
<td>25</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>36</td>
<td>Positive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020-2021</td>
<td>4</td>
<td>Negative</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>Positive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data was analyzed from NULirt to compare the sentinel locations submitting data by time of each season. Table 3 shows the specimens sent by time of season; Beginning, Peak and End. The data showed that during the peak of season 2018-2019, influenza A, subtype H3 was the most prevalent strain with 13 confirmed positive specimens. During the beginning of season 2019-2020, influenza A/H1N1 was the most prevalent strain with 13 confirmed. Influenza A/H1N1 is the most prevalent strain in Nebraska with 29 confirmed positive specimens in the last three seasons.
Table 3. NUlirt Data: FLUPCR Specimen Results by Season

<table>
<thead>
<tr>
<th>Season</th>
<th>Strain</th>
<th>A, Subtype H3</th>
<th>A/H1N1</th>
<th>B, Victoria Lineage</th>
<th>B, Yamagata Lineage</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018-2019</td>
<td>Beginning</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Peak</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>End</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Off Season</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2019-2020</td>
<td>Beginning</td>
<td>1</td>
<td>13</td>
<td>3</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Peak</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>End</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Off Season</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2020-2021</td>
<td>Beginning</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Peak</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>End</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Off Season</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>19</td>
<td>29</td>
<td>5</td>
<td>7</td>
<td>40</td>
</tr>
</tbody>
</table>

Table 4 shows the NUlirt confirmed positive specimen submitted data analyzed by age of patient at time of season. Data showed that there are a higher number of confirmed positive specimens submitted in the 5-24 age group in all three season with a total of 21 specimens. Age 50-64 group had the least number of overall specimens with 5 submitted.
Table 4. NuIirt Data: FLUPCR Positive Specimens Submitted by Age by Season

<table>
<thead>
<tr>
<th>Age</th>
<th>2018-2019</th>
<th>2019-2020</th>
<th>2020-2021</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4 Years</td>
<td>3</td>
<td>10</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>5-24 Years</td>
<td>10</td>
<td>11</td>
<td>0</td>
<td>21</td>
</tr>
<tr>
<td>25-49 Years</td>
<td>1</td>
<td>9</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>50-64 Years</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>&gt;65 Years</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>36</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

As I had hypothesized, the 2020-2021 season showed a decrease in submitted positive specimen confirmation numbers than previous seasons with only four specimens received for confirmation testing (See Figure 1). In the 2018-2019 season, 1.4% of the total ILI patients seen had specimens submitted for confirmation testing with 0.8% of those positive and the 2019-2020 season had 2.9% submission with 1.8% of those positive. This 2020-2021 season, only 0.6% of ILI patients seen had specimens submitted for confirmation testing and 0% positive. Possible reasons for the decrease in positive influenza submission cases are the mask mandate that has been in place since August 2020, social distancing of six feet, more employees and students are working/schooling from home, increased hand hygiene, and fewer patient visits due to telehealth availability that has been established around the state all due to the COVID-19 pandemic.
Figure 1. NULirt Data: FLUPCR Specimens Submitted 2018-2021

![FLUPCR Specimens Graph](image)

- **2018-2019**: 2500 specimens submitted, 1.4% confirmed positive
- **2019-2020**: 2000 specimens submitted, 2.9% confirmed positive
- **2020-2021**: 1500 specimens submitted, 1.8% confirmed positive

Legend:
- # ILI Patients Seen
- # Specimens Submitted
- # Confirmed Positive
CHAPTER 5 – DISCUSSION

A. Summary

The Department of Health and Human Services influenza surveillance program provides present data on the prevalence of influenza within Nebraska which also provides information regarding the current virulent strain, the target population, and the effectiveness of the current season’s vaccine.

The Nebraska influenza surveillance system currently consists of 17 sentinel providers and 18 sentinel laboratories within the state of Nebraska who submit weekly data regarding the total number of patient visits and the total number of those patient visits with influenza like illness (ILI) by age group. The sentinel locations then submit nasopharyngeal specimens throughout the season to the Nebraska Public Health Laboratory for confirmation testing. This 2020-2021 influenza season, the sentinel locations reported that only 85,904 total patients were seen and of those 572 were seen for ILI. In contrast, the 2019-2020 influenza season reported 93,456 total patients seen with 1,929 seen for ILI and the 2018-2019 season reported 133,519 total patients seen with 2,529 of those with ILI.

This 2020-2021 influenza seasons’ data showed that there was a decrease in the number of total patients seen and total ILI patients seen by our sentinel locations and there have been zero confirmed positive influenza specimens from the sentinel locations in Nebraska. During the 2019-2020 influenza season, a total of 36 specimens were confirmed positive; 0-4 years of age group had ten, 5-24 years of age had eleven, 25-49 years of age had nine, 50-64 years of age had four and age 65 and older had 2. During the 2018-2019 influenza season, a total of 20 specimens
were confirmed positive; 0-4 years of age group had three, 5-24 years of age had ten, 25-49 and 50-64 years of age both had one, and age 65 and older had five.

In the 2018-2019 season, 1.4% of the total ILI patients seen had specimens submitted for confirmation testing with 0.8% of those positive and the 2019-2020 season had 2.9% submission with 1.8% of those positive. This 2020-2021 season, only 0.6% of ILI patients seen had specimens submitted for confirmation testing and 0% positive.

Due to the COVID-19 pandemic, certain restrictions have been in place since last March; remote learning for all students, mask mandate, six feet social distancing, remote working for employees, food and drink establishments were closed or had capacity restrictions, and increased hand washing practices across the state. All of these criteria appear to have a significant impact on the amount of positive influenza specimens that the Nebraska Public Health Laboratory received during this 2020-2021 season as they have only received four specimens for confirmation testing and none of them were positive.

B. Strengths and Limitations

A strength of this surveillance program is the ease and speediness of reporting the data into the CDC online database. Health professionals can access this system from anywhere and at any time to report their patient visits data and it takes less than 30 minutes to complete each week. Another strength of this program is that the data from the sentinel locations reporting system and the data from the specimen resulting system can be easily and readily downloaded into a measurement-ready spreadsheet. This allows DHHS to access the information at any time to track the progress and efficiency of the season’s surveillance.
A limitation of this surveillance program is that surveillance is only feasible if the sentinel locations report their data each week and submit positive specimens for confirmation to the Nebraska Public Health Laboratory throughout the season. Without their cooperation, proper surveillance could not be achieved. Another limitation is the access to care for patients. During the COVID-19 pandemic, many physician offices were not seeing patients. This led to a decrease in patient visits for ILI symptoms. Some patients were offered a telehealth visit, but many chose to stay at home and self-quarantine due to the symptom similarity to COVID-19. These limitations could affect my hypothesis due to the limited amount of data that has been obtained during the 2020-2021 season. With only four specimens submitted and zero positives so far, the data cannot be properly analyzed.

C. Recommendations

The influenza surveillance program could be improved by recruiting additional sentinel locations throughout the state. Engaging the health departments for help can aid in this recruitment. In September 2020, we did reach out to the health departments and the little feedback we received showed that most health departments and clinics did not have time to initiate this program due to the COVID-19 pandemic. Perhaps in future seasons, with the newly enhanced recruitment packet and the increased need for surveillance during COVID-19, more sentinel locations will agree to participate in the surveillance program.
APPLICATION OF PUBLIC HEALTH COMPETENCIES

Foundational Competency #7: Assess population needs, assets and capabilities that affect communities’ health. Through influenza surveillance, populations’ health are assessed through the ILI data to track influenza epidemiology.

Environmental and Occupational Health Competency EOHMPH1: Analyze sources of exposure in the workplace or environment that can cause health risks to humans or degradation of ecosystems. Influenza surveillance allows public health officials to assess which influenza strain is infecting the state’s population and to provide better prevention strategies to reduce exposure.

Environmental and Occupational Health Competency EOHMPH4: Apply genetic and physiological factors that affect susceptibility to adverse health outcomes following exposure to environmental and occupational hazards. ILI data that is reported through the sentinel sites is reported by age group to allow for age-specific tracking. Also, when the sites are ordering the influenza PCR test in NULirt for the confirmation specimen, they must provide ethnicity for each patient. This allows public health officials to track and monitor the effects of influenza on different minority population.
BIBLIOGRAPHY


APPENDICES

Appendices 1. Sentinel Provider Map

Appendices 2. Recruitment Packet
How You Can Help With...

Influenza Surveillance for the 2020-2021 Season

...In Only a Few Minutes a Week!

Department of Health and Human Services (DHHS)
Influenza Surveillance 2020-2021 Recruitment Packet
Local Health Department Recruiting
Sentinel Providers Check List

- Review reporting record(s) of your influenza sentinel provider. Did they meet the criteria for a regularly reporting provider (a provider who reports ≥26 of the 33 weeks from the beginning of October to the end of May)? If they didn’t you may need to discuss this further with the provider to see if they want to continue in the program or you may decide you need to find a different provider.

- Identify point of contact (POC) in the sentinel provider’s office and possibly opt to make an appointment for a personal recruiting visit.

- Explain influenza surveillance using the recruitment materials:
  - Sentinel provider fact sheet
  - Influenza surveillance report from DHHS (on our website)
  - Enrollment form (e-mail address required)
  - Review roles and responsibilities of a sentinel provider

- Email the completed enrollment form to Influenza Coordinator at robin.m.williams@nebraska.gov

- Sentinel provider work folder from the CDC will be sent directly to providers in September, or if requested, directly to LHD.

- Encourage provider to submit respiratory specimens monthly to NPHL.

- Keep the lines of communication open (make sure they understand what they need to do and follow up with them throughout the season).

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302 Denteneer Mall S, PO Box 99254 Lincoln, NE 68509-9254
Phone: 402-471-3977 Fax: 402-471-3901
http://www.dhis.ne.gov/
How You Can Help With...

**Influenza Surveillance for the 2020-2021 Season**

...In Only a Few Minutes a Week!

What is an influenza ILINet provider?  
An influenza ILINet provider conducts surveillance for influenza-like illness (ILI) in collaboration with the state and local health department and the Centers for Disease Control and Prevention. Data reported by ILINet providers, in combination with other influenza surveillance data, provide a national picture of influenza virus and ILI activity in the U.S. ILINet consists of more than 3,000 healthcare providers in all 50 states, the District of Columbia and the U.S. Virgin Islands reporting over 25 million patient visits each year.

What data do ILINet providers collect? How and to whom are data reported?  
ILI providers report each week the total number of patient visits for any reason and the number of patient visits for influenza-like illness (ILI) by age group (0-4 years, 5-24 years, 25-49 years, 50-64 years, ≥65 years).

[Influenza-like Illness (ILI) Case Definition]
Fever (≥ 100°F (37.8°C), oral or equivalent)
AND
Cough and/or sore throat

These data are transmitted once a week via the Internet or fax to a central data repository at CDC. Most providers report that it takes them less than 30 minutes a week to compile & report their data. In addition, each year, sentinel providers are needed to submit nasopharyngeal swabs from patients with influenza-like illness to the Nebraska Public Health Laboratory (NPHL) for testing and strain identification. This invaluable aspect of influenza surveillance in Nebraska takes providers or their staff less than 30 minutes to complete each week as well.

The purpose of this program and your participation allows the state to:  
- Monitor the impact of influenza in Nebraska;  
- Recognize new and emerging strains of influenza;  
- Help to guide prevention and control policies;  
- Facilitate in vaccine strain selection, and recommendations for patient care.

Who can be an ILINet Provider?  
Providers of any specialty in any type of practice are eligible to be ILINet providers:

- Emergency Medicine
- Family Practice
- Infectious Disease
- Internal Medicine
- OB/GYN
- Pediatrics
- Student Health
- Urgent Care

[NEBRASKA]
[CDC]
Responsibilities of Sentinel Providers:

Access the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet) by 12pm each Tuesday to report your data using the work folder mailed to you. Access the ILINet reporting system at: http://dhbs.ne.gov/Flu%20Documents/Report.pdf [dhbs.ne.gov]

- Utilize the supply of the 10 influenza kits sent to you from the Nebraska Public Health Lab for testing. Submit nasopharyngeal swabs as directed in letter in collection kits materials.

- Contact your local health department point of contact if there are changes to your contact information or if you are having problems reporting.

- As a sentinel provider you may be called upon to help assist the local health department with testing if an outbreak has occurred at a school or other closed setting.
Date

NAME
ORGANIZATION
ADDRESS
CITY, STATE ZIPCODE

Dear XXXXXXX,

The Office of Epidemiology of the Division of Public Health needs your help and is currently recruiting providers to participate as an influenza sentinel provider. By sending respiratory specimens to the state laboratory for testing, sentinel providers play a critical role in the state and national influenza surveillance.

The purpose of this program and your participation allows the state to:

- Monitor the impact of influenza in Nebraska;
- Recognize new and emerging strains of influenza;
- Help to guide prevention and control policies;
- Facilitate in vaccine strain selection, and recommendations for patient care.

Each year sentinel providers are needed to submit nasopharyngeal swabs from patients with influenza-like illness to the Nebraska Public Health Laboratory (NPHL) for testing and strain identification. This invaluable aspect of influenza surveillance in Nebraska takes providers or their staff less than 90 minutes to complete each week.

Providers participating in this program will receive weekly e-mail updates about influenza in the state and free influenza confirmatory testing through NPHL, and the insight to what the current influenza conditions are in the community they serve.

If you are interested in this program, please fill out the accompanying form and mail or fax it to this office, or you can call us and give us the information. Your participation is very important to us and vital for the success of this program.

Sincerely,

XXXXXXX
# ILINET Workfolder 2020-2021

U.S. Outpatient Influenza-like Illness Surveillance Network

September 27, 2020 – October 2, 2021

**Provider ID:**

**Password:**

**INFLUENZA-LIKE ILLNESS (ILI) is defined as:**

- Fever (oral temperature of 100.4°F [38.0°C] or higher), or a history of fever or cough and/or sore throat (without a known cause other than influenza).

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<th>Patients with ILI</th>
<th>Total Patients Seen*</th>
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*Total Patients seen for any reason = (non ILI + ILI)

Thank you for participating in the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet).
To Influenza Sentinel Provider Surveillance Sites
From: Nebraska Public Health Laboratory/Nebraska DHSS
Date: September 23, 2020

RE: 2020-21 Influenza Surveillance Project

In coordination with the Nebraska DHSS Division of Public Health Office of Epidemiology, the NPHL has been asked to supply your facility with specimen collection materials for influenza surveillance. Influenza testing provides data in public health and clinical practices and both sources provide valuable information to monitor influenza activity. While clinical practices primarily test respiratory specimens for diagnostic purposes, the role of the public health laboratory is to test specimens for surveillance purposes to understand what influenza viruses are circulating throughout the season and the population groups affected. Thus, a subset of specimens from outpatient clinics such as yours can provide useful information on the timing and intensity of influenza activity in our area. Specimens that are sent to the NPHL for testing provide samples that can further be characterized for antigenic and genetic characterization that can be useful for vaccine efficacy and development. Submitting specimens for public health surveillance is an important part of being an Influenza-like Illness (ILI) sentinel provider along with reporting your data to CDC every week. Also, if an outbreak were to occur in your jurisdiction, the local public health staff may need to utilize these kits for confirmatory testing purposes. Therefore, it is important to keep these separate from your regular supply of specimen collection kits. In addition, the NPHL will replenish the kit(s) used, so that you have an adequate supply of vials available to maintain your surveillance.

Patients with ILI should be tested by a differentiated rapid antigen or test that can detect influenza A or B. The sensitivity of these rapid tests (i.e., false negative rate) can range from 10% to 70% and it is therefore important that the test operator have the appropriate training to be competent to run the test and that the specimen collected is of a high-quality oropharyngeal swab. A video demonstrating the collection of a oropharyngeal swab for both influenza and COVID-19 is available on the NPHL website (https://nphl.ne.gov) at NPHLPharmacists/SampleSpecimenCollectionGuides. To use for surveillance purposes, the specimen must meet strict guidelines, highlighting that the proper collection and transport are vitally important.

Laboratory Surveillance Testing Recommendations:
During the beginning of the influenza season (Oct-Dec), please obtain 5 or 3 specimens on patients who exhibit signs and symptoms of ILI regardless of the result of the rapid diagnostic test. During the peak (middle) of the influenza season (Jan-Feb), please obtain 5 or 3 specimens on patients who have tested positive for influenza by rapid diagnostic testing. Lastly, at the end of the influenza season (Mar-May), please obtain 2 or 5 specimens on patients who exhibit signs and symptoms of ILI regardless of the result of the rapid diagnostic test. Please submit specimens using the 10 collection kits that you have received. Please note that the expiration date on the kits when received, no additional testing after this time will require a new kit from the NPHL.

At this time, NPHL staff will perform an “Influenza PCR Panel (CDC)” that includes the detection of Influenza A (universal type), Influenza B (along with lineage), Influenza A-H3, and Influenza A/2009 H1. Test results will be transmitted electronically through NULab to the submitting site. Enclosed please find the materials to submit patient specimens for the influenza surveillance project.

These materials include:
- Ten Influenza Collection Kits
- Influenza Surveillance Specimen Requirements and Collection and Reporting Procedures

Thank you for your assistance with influenza surveillance and please do not hesitate to reach out with questions to NPHL (402-559-9444), client services (855.250.1400) or Robin Williams (402-471-0915).

Revised 9/20
BIOGRAPHY & CV

Anna Marie Carpenter is a Master of Public Health student at the University of Nebraska Medical Center. Her studies have focused on environmental and occupational health. In the fall of 2020, she worked with the Department of Health and Human Services to assist and analyze the influenza surveillance program in Nebraska. In addition to her studies, Anna is the Assistant Manager of Ancillary Services at Regional Pathology Services, University of Nebraska Medical Center. In this role, she assists the Manager with pre-analytical and post-analytical process for the Department of Pathology & Microbiology and the Nebraska Public Health Laboratory, including specimen collection, transport, processing, distribution and storage, as well as report dissemination. She also aids in administrative and technical activities of the lab which include organization of work, employee supervision, quality management, process improvement and problem solving. She is the direct supervisor of 13 employees within Lincoln and Omaha.

Anna obtained her Bachelor’s of Science in Biology from University of Nebraska at Omaha in 2006. She was the instructor of the MEDT1100 Procedure in Phlebotomy course at Southeast Community College from 2007-2010. She was a graduate of Foundations for Success in 2017 and obtained her Phlebotomy Technician Certification from the American Society for Clinical Pathology in 2020.
ANNA CARPENTER

Assistant Manager of Ancillary Services with over 15 years of pre-analytical and post-analytical laboratory experience and patient and client customer service. Motivated and dedicated employee for Regional Pathology Services eager to apply academic and professional background towards launching a successful career in laboratory personnel management.

CONTACT
PHONE:
402-360-4233
402-559-6420

EMAIL:
anna.carpenter@unmc.edu

EDUCATION

University of Nebraska Medical Center – College of Public Health
August 2017 – Present
I am currently enrolled part-time and have a 4.0 GPA. I was awarded the Hengstler – Odineal Scholarship in June 2018 based on employment hours, GPA and courses taken. I will graduate with my Master’s in Public Health, Environmental & Occupational Health in May 2021.

University of Nebraska at Omaha
August 2002 – May 2006
Bachelor’s of Science in Biology

PROFESSIONAL EXPERIENCE

Regional Pathology Services  Assistant Manager, Ancillary Services
November 2019 – Present
Assists the Manager with pre-analytical and post-analytical process for the Department of Pathology & Microbiology and the Nebraska Public Health Laboratory, including specimen collection, transport, processing, distribution and storage, as well as report dissemination; aids in administrative and technical activities of the lab which include organization of work, employee supervision, quality management, process improvement and problem solving; direct supervisor of 13 employees within Lincoln and Omaha.

Regional Pathology Services  Client Services Liaison
December 2016 – November 2019
Provide and maintain excellent customer service for Regional Pathology Services (RPS), Nebraska Public Health Laboratory (NPHL) and Department of Pathology & Microbiology; manage the resolution of client and specimen problems; ensure daily quality assurance check for accuracy on tests ordered and client information on requisitions; place client supply orders; schedule paternity appointments; rotate after hours and holiday on-call duties; assists management in development and maintenance of policies and procedures; assist with public health questions and specimens; assisted management in annual appraisals; responsible for overseeing 29 employees.

Regional Pathology Services  Lead Client Service Representative
October 2016 - December 2016
Processed and reported results of outreach laboratory specimens directly impacting patient care; specimen handling and storage of human and environmental samples; test ordering and availability; distribution of laboratory specimens; placed client supply orders; provided precise technical and clerical assistance that required independent judgement; provided extensive client service communication with internal and external customers of RPS, NPHL and Department of Pathology & Microbiology; responsible for oversite of 9 employees.

Regional Pathology Services  Client Service Representative
May 2015 - October 20
Received and processed human and environmental specimens; ordered tests as requested for anatomical pathology and clinical pathology; provided customer service via phone from internal and external customers of RPS, NPHL and Department of Pathology & Microbiology.

Nebraska Medicine  Lab Assistant 3rd Shift
February 2013 – May 2015
Performed phlebotomy on patients, including pediatrics and neonates; processed human specimens for Nebraska Medicine and Department of Pathology & Microbiology; performed patient and quality control testing on point of care
instrumentation (ISTAT, ACT); assisted on code blue patient blood collection; specimen delivery to laboratory departments.

**Nebraska Medicine Lead Lab Assistant 1st Shift**
August 2010 – December 2012

Performed phlebotomy on patients when needed; processed human specimens for Nebraska Medicine and Department of Pathology & Microbiology; trained new employees in phlebotomy and specimen processing; specimen delivery to laboratory departments; provided support to support services management; overseeing of all 1st shift support services employees.

**SKILLS/AFFILIATIONS**

- Fluent in computer programs such as Word, Excel, Outlook, PowerPoint, Office, EPIC, ArchivePlus, Microsoft Dynamics, Ipassport, Sunquest, ESHOP, CoPath and Atlas.
- Assists marketing team in training new client with ordering in Atlas and submitting anatomic and clinical pathology specimens to Regional Pathology Services.
- Initiated an improved process for tracking of specimens within our department.
- Oversee Materials Management and Courier Network.
- Reorganized and improved Materials Management warehouse storage through proper supply storage and tracking.
- Streamlined supply ordering to decrease cost to the department.
- Trained in Category A and Category B specimen handling and processing.
- Trained in MedTox specimen processing and shipping of drug screen testing.
- DOT shipping trained yearly.
- CAP, CLIA, OSHA and JACHO compliant.
- Certified Phlebotomy Technician, American Society for Clinical Pathology, 2020.

**RESEARCH EXPERIENCE**

**Department of Health and Human Services**

August 2020-Present

Compile and analyze previous seasons’ surveillance data and compare to the sentinel providers and laboratories reporting data; evaluate and enhance current recruiting materials and send to all health departments within the state; pinpoint areas of surveillance need in the state and recruit additional sentinel providers; sent out the influenza testing supplies to all sentinel providers and laboratories; evaluated previous seasons’ influenza reporting and resulting data compared to current 2020-2021 season’s data while analyzing that data according to patient age and strain type to identify any trends in the positive results.