Article Type: Research Brief

Striking Absence of “Usual Suspects” during the Winter of COVID-19 Pandemic 2020-2021

Authors: Siri S. Sarvepalli¹, Angela Beatriz V. Cruz MD², Teena Chopra MD², Hossein Salimnia PhD³, Pranatharthi Chandrasekar MD²

¹Wayne State University School of Medicine, Detroit, USA

²Infectious Diseases, Wayne State University, Detroit Medical Center, Detroit, USA

³Wayne State University, Detroit Medical Center, Detroit, USA

Correspondence to: Siri S. Sarvepalli, 3990 John R St., 5 Hudson, Detroit, MI 48201, USA.
(313)-745-8599. Fax: (313)-993-0302. Email: siri.sarvepalli@med.wayne.edu

Alternate Correspondence: Angela Beatriz V. Cruz MD, 3990 John R St., 5 Hudson, Detroit, MI 48201, USA. (313)-745-8599. Fax: (313)-993-0302. Email: gw8547@wayne.edu

Financial support. None reported.

Potential conflicts of interest. All authors report no conflicts of interest relevant to this article.
Each year, in October, the United States enters the “flu season”. During this time, influenza virus infections occur in all age groups with 9 – 45 million cases each year; besides, other respiratory infections due to pathogens such as respiratory syncytial (RSV) and rhinovirus are very common as well.\textsuperscript{1,2} Respiratory viral activity typically peaks in December and January, but the “flu season” can last until May.\textsuperscript{1} Many individuals receive the influenza vaccine from their primary care provider in the beginning of the fall season, and this is particularly effective in reducing the number of influenza infections.\textsuperscript{3} In 2020, however, the SARS-CoV-2 virus emerged and dramatically changed the landscape of medicine. In order to stop the spread of SARS-CoV-2, community mitigating factors such as social distancing, frequent hand washing, mask mandates, and school closures were implemented widely.\textsuperscript{4}

When the COVID-19 pandemic started in March 2020, many reported that seasonal flu cases disappeared earlier than expected.\textsuperscript{5} Additionally, an overall reduction in the incidence of respiratory viral infections during the “flu season” was noted on both national and international levels. Of note, in the Southern Hemisphere, the “flu season” falls in the summer season - earlier in the year than the Northern Hemisphere, and in the summer of 2020, Australia, Chile, and South Africa reported only 51 total cases of the flu.\textsuperscript{6} In the 2020-2021 winter season, as others, we also noted a significant reduction in respiratory infections compared to prior years. The purpose of this study is to evaluate the incidence of all other non-SARS-CoV-2 viral infections typically seen during the “flu season”. Additionally, we evaluate the incidence of Group A streptococcal culture positivity of throat specimens in children and adults during the same period.
We conducted a retrospective study that included PCR test results of nasopharyngeal swabs for Influenza A and B, respiratory syncytial virus (RSV), and SARS-CoV-2 and throat swab results for Group A Streptococcus (GAS) at the Detroit Medical Center (DMC) and Children’s Hospital of Michigan (CHM) from September 2019–February 2020 and September 2020-February 2021. Incidence of infections was calculated for each period and compared. Available data on other respiratory viruses including Parainfluenza virus 1 and 2, other Coronaviruses, and Human metapneumovirus during the 2020-2021 season was also reviewed.

During the period of study in 2020-2021, there were 0 documented adult cases of Influenza A, B, and RSV compared to 12%, 13%, and 9% in the 2019-2020 season respectively. Similarly, in children, there were 0 Influenza A & B infections and 1 RSV infection compared to 12%, 20%, and 24% respectively (Table 1). Remarkably, there were also 0 positive tests due to Parainfluenza (1 and 2), Coronaviruses, and Human Metapneumovirus in the 2020-2021 season, a significant decline when compared to the 2019-2020 season. Additionally, the number of throat swabs submitted for GAS in both adults and children decreased considerably between the 2 periods.

Overall, the incidence of Influenza A and B and RSV in the 2020-2021 season affected by the COVID-19 pandemic decreased significantly compared to the 2019-2020 season in both the pediatric and adult populations. Additionally, the incidence of other respiratory viral infections such as Parainfluenza 1 and 2, other Coronaviruses, and Human Metapneumovirus was drastically reduced.

Additionally, data from 42 medical centers in the Midwest region of the United States that utilize the Biofire system respiratory viral panel was obtained and analyzed. In the same study period of September 2020-February 2021, it was found that there were far fewer positive tests of Influenza A and B, RSV, Parainfluenza, Coronaviruses, and Human Metapneumovirus compared to the prior flu season. In the 2020-2021 season, 0% of Influenza A, 0.13% of
Influenza B, and 0.05% of RSV tests returned positive compared to 0.09%, 2.98%, and 9.38% respectively in the prior season. Human Metapneumovirus had decreased to 0.05% positivity compared to 3.41% positive tests in the prior season. This data reflected a dramatic decrease in non-SARS-CoV-2 respiratory infections in the entire region.

Speculating as to why the decrease in incidence of respiratory viral infections occurred, it is likely that community mitigating measures implemented at the beginning of the pandemic contributed to the decrease in the spread of viral pathogens in the general population. The reduction in GAS tests ordered – and overall reduction in secondary GAS infections – may have been a result of the decrease in number of respiratory viral infections as clinical suspicion for secondary infections would have been low. Additionally, viral interference, with COVID-19 being the dominant respiratory pathogen, might have contributed to the decrease in rates of other respiratory viral illnesses. This idea is not unfounded. During the H1N1 pandemic in 2009, while the number of H1N1 influenza cases increased, the incidence of seasonal influenza and RSV decreased significantly compared to prior years; this trend lasted until the H1N1 strain transitioned from a pandemic to a seasonal virus the following year.9

In conclusion, SARS-CoV-2 was the dominant pathogen while other community respiratory viral and Group A Streptococcal throat infections markedly declined in frequency in both adults and children during the 2020-2021 season as compared to 2019-2020. The reason for the decline may be attributed to the mitigating measures widely employed in the community. While it is difficult to predict the incidence of respiratory viral infections after the resolution of the COVID-19 pandemic, it is likely that the number of non-SARS-CoV-2 respiratory infections will rise back to normal in the coming years as SARS-CoV-2 becomes a seasonal virus.
<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Adults</th>
<th></th>
<th>Children</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SARS-CoV 2</td>
<td>0/0 (0%)</td>
<td>1198/18708 (6%)</td>
<td>0/0 (0%)</td>
<td>172/4308 (4%)</td>
</tr>
<tr>
<td>Influenza A</td>
<td>780/6795 (12%)</td>
<td>0/6830 (0%)</td>
<td>1300/10475 (12%)</td>
<td>0/1441 (0%)</td>
</tr>
<tr>
<td>Influenza B</td>
<td>892/6795 (13%)</td>
<td>0/6830 (0%)</td>
<td>2117/10475 (20%)</td>
<td>0/1441 (0%)</td>
</tr>
<tr>
<td>Respiratory Syncytial Virus</td>
<td>240/2673 (9%)</td>
<td>0/6822 (0%)</td>
<td>1653/6985 (24%)</td>
<td>1/1404</td>
</tr>
<tr>
<td>Group A Streptococcus</td>
<td>212/933 (23%)</td>
<td>49/212 (23%)</td>
<td>1050/3894 (27%)</td>
<td>163/777 (21%)</td>
</tr>
</tbody>
</table>

Table 1: Proportion of positive PCR tests for SARS-CoV 2, Influenza A, Influenza B, RSV and GAS
References

   https://www.cdc.gov/flu/about/season/flu-season.htm


   https://www.nature.com/articles/d41586-020-01538-8


8. Personal Correspondence with BioFire Syndromic Trends.

   doi:https://doi.org/10.1111/irv.12249