

COVID-19 Mask Mandates in NY and Their Effect on the Incidence of Flu

Vishal Rana

Internal Medicine Residency, Mather Hospital Northwell Health, vrana@northwell.edu

Michael William

Internal Medicine Residency, Mather Hospital Northwell Health

Anjali Kewalramani

Internal Medicine Residency, Mather Hospital Northwell Health

Jordan Daloya

Internal Medicine Residency, Mather Hospital Northwell Health

Martin Barnes

Oncology Fellow, Mather Hospital Northwell Health

See next page for additional authors

Follow this and additional works at: <https://scholarlycommons.gbmc.org/jchimp>

Recommended Citation

Rana, Vishal; William, Michael; Kewalramani, Anjali; Daloya, Jordan; Barnes, Martin; Chang, Tylis; Miele, Andrew S.; Haggerty, Greg; and Ng, Joseph () "COVID-19 Mask Mandates in NY and Their Effect on the Incidence of Flu," *Journal of Community Hospital Internal Medicine Perspectives*: Vol. 13: Iss. 1, Article 1.

DOI: 10.55729/2000-9666.1140

Available at: <https://scholarlycommons.gbmc.org/jchimp/vol13/iss1/1>

This Research Article is brought to you for free and open access by the Journal at GBMC Healthcare Scholarly Commons. It has been accepted for inclusion in Journal of Community Hospital Internal Medicine Perspectives by an authorized editor of GBMC Healthcare Scholarly Commons. For more information, please contact GBMCcommons@gbmc.org.

COVID-19 Mask Mandates in NY and Their Effect on the Incidence of Flu

Authors

Vishal Rana, Michael William, Anjali Kewalramani, Jordan Daloya, Martin Barnes, Tylis Chang, Andrew S. Miele, Greg Haggerty, and Joseph Ng

COVID-19 Mask Mandates in NY and Their Effect on the Incidence of Flu

Vishal Rana ^{a,*}, Michael William ^a, Anjali Kewalramani ^a, Jordan Daloya ^a,
Martin Barnes ^a, Tylis Chang ^b, Andrew S. Miele ^c, Greg Haggerty ^d, Joseph Ng ^e

^a Department of Internal Medicine, Mather Hospital Northwell Health, USA

^b North Shore University Hospital Laboratories, Northwell Health Labs, USA

^c Psychology Department, St. John's University, USA

^d Graduate Medical Education, Mather Hospital Northwell Health, USA

^e Department of Critical Care, Mather Hospital Northwell Health, USA

Abstract

Objective: The goal of the study is to quantify the reduction in the cases of influenza and how this decrease in incidence correlates with the execution of masking requirements in public as well as social distancing.

Methods: Influenza statistics were collected from Northwell Health, a 23-hospital system located throughout New York State. Positive influenza results were collected representing the 2018–2019 Flu season, 2019–2020 Flu season, and compared to the 2020–2021 Flu season, which corresponded to the mask mandates and social distancing measures implemented in NYS.

Results: Our data showed a dramatic decrease in influenza rates during the 2020–2021 Flu season, which corresponded to NYS's strict social distancing and mask requirements during the pandemic. This shows a steep decline correlating with the implementation of public health mandates directed at decreasing the spread of aerosolized particles between members of the population.

Conclusion: Our data show a significant decrease in the number of positive influenza tests during the same period of time when COVID-19 social distancing and mask-wearing requirements were in effect.

Keywords: Influenza, COVID-19, Mask-wearing, Social distancing, SARS-CoV-2, Communicable disease

1. Introduction

In early 2020, the United States experienced a surge in hospitalizations due to the SARS-CoV-2 virus, more well known as the Coronavirus (COVID-19) Pandemic. In an effort to reduce the transmission of this global phenomenon, on April 17th, 2020, New York State (NYS) issued an Executive Order mandating all people in New York to wear a mask covering their face when in public, in addition to social distancing and limiting large group gatherings. Applying what was learned through previous SARS-related pandemics, guidelines and safety precautions were implemented by the Centers for Disease Control and Prevention (CDC) to protect the population at large.^{1,2} Months

after the implementation of the mask mandate went into effect, the CDC reported the cases of COVID-19 began to downtrend in NYS. It was also observed that the incidence rate of the influenza virus was significantly reduced. Influenza virus, similar to COVID-19, is predominantly transmitted by aerosol infection.³

Several studies have shown a decrease in transmission of viral respiratory diseases as a result of public health measures implemented for COVID-19, but few studies have evaluated the change in the incidence of influenza during mask mandates during the COVID-19 pandemic.^{4,5} The primary objective of this study is to investigate and quantify the reduced incidence of influenza cases correlated with the implication of mask mandates and social distancing.

Received 26 July 2022; revised 25 October 2022; accepted 2 November 2022.
Available online 10 January 2023

* Corresponding author at: Mather Hospital Northwell Health, 75 N. Country Rd., Port Jefferson, NY, 11777, USA.
E-mail address: vrana@northwell.edu (V. Rana).

<https://doi.org/10.55729/2000-9666.1140>

2000-9666/© 2023 Greater Baltimore Medical Center. This is an open access article under the CC BY-NC license (<http://creativecommons.org/licenses/by-nc/4.0/>).

2. Methods

Influenza statistics were collected from Northwell Health's Pathology lab. Northwell Health is a non-profit integrated healthcare network that is New York State's largest private healthcare provider and employer, with more than 74,000 employees. The positivity rates for the influenza virus were evaluated for the last 3 Flu seasons 2018-2019, 2019-2020, and 2020-2021. The *flu season* was defined as the fourth quarter and first quarter (October to March) of the subsequent year. Patients were tested for influenza virus using the Flu A and Flu B tests (provided by Cepheid®, a positive percent agreement of 100% (95% CI, 93.0%–100.0%) and 100% (95% CI, 92.3%–100.0%) respectively) or the respiratory viral panel (RVP) test (provided by GenMark®, a positive percent agreement of 95.5% (95% CI, 89.9%–98.1%) and 89.4% (79.7%–94.8%) respectively), which included additional viral pathogens in addition to FluA and FluB.^{6,7} The positivity rates were collected representing the 2018–2019 Flu season, 2019–2020 Flu season, and compared those to the 2020–2021 Flu season; the latter corresponded to the mask mandates and social distancing measures implemented in NYS during the COVID-19 pandemic.

3. Results

Our study showed a considerable decrease in the positivity rate of the influenza virus corresponding to the 2020–2021 Flu season. The overall positivity rate of the influenza virus (Flu A + Flu B) was 0.28% during the 2020–21 flu season compared to 12.77% and 12.82% during the 2018–2019 and 2019–2020 Flu seasons, respectively. We can correlate the decrease in the positivity rate of the influenza virus to NYS implementing the mask mandate and social distancing measures to help combat the transmission of the aerosolized particles of the SARS-CoV-2 virus.

Further breaking down the tests into individual components, we see the percent of positive influenza test results for the 2018–2019 Flu season was 20.72% for Flu A and 0.81% for Flu B, while the percent of positive on respiratory viral panels in the same flu season was 8.58% for Flu A, and 0.27% for

Flu B. During the 2019–2020 flu season percent positive for Flu A was 13.85%, and 6.29% for Flu B while RVP Flu A positive rate was 4.75%, and RVP Flu B was 2.07%. Compared to the 2020–2021 Flu season, when mask mandates and social distancing were in place, a dramatic drop in the positive rate can be seen. The positivity rate for Flu A was down to 0.79% and 0.82% for Flu B, while RVP Flu A positivity rate was down to 0.10% and 0.08% for RVP Flu B (Table 1). During the 2020–2021 Flu season, we noted a steep decrease in the positivity rate (Fig. 1) and number of positive tests (Fig. 2) despite a significant increase in the respiratory viral panels performed across the 23 hospitals in the Northwell Health system in New York state as compared to the previous two Flu seasons (Fig. 3). The increase in respiratory viral panels performed was due to the advent of testing that includes both COVID-19 and Flu A & B.

4. Discussion

The influenza virus is an enveloped negative single-strand RNA virus that can rapidly mutate and is predominantly transmitted by aerosol infection. During the 2018–2019 Flu season, the CDC reported 16.5 million primary care visits, 490,600 hospitalizations, and 34,200 deaths from influenza alone.⁸ An estimated 35.5 million people were found to be symptomatic with influenza.⁸ Our study aims to demonstrate the effect of population-wide use of face masks on the incidence of the influenza virus.

In 2020, the United States saw an uprising in hospitalizations due to the COVID-19 pandemic. The CDC reported approximately 375,000 deaths from the COVID-19 pandemic in the United States.⁹ COVID-19 became the third leading cause of mortality following heart disease and cancer-related deaths. In response, New York imposed a state-wide mask mandate and social distancing recommendations to reduce the transmission rate of COVID-19. As New York abided by the COVID-19 restrictions, we noted a significant reduction in hospitalizations due to the influenza virus. Although correlation does not equate to causation, the reduction in the influenza infection rate may be related to changes in personal behavior, including wearing masks and improved personal hygiene, which helped to reduce

Table 1. Number of positive influenza test results and percent positive of influenza tests by flu season.

	FluA	FluA%+	FluB	FluB%+	RVPFluA	RVPFluA%+	RVPFluB	RVPFluB%+tot
Flu 2018-2019	1925	20.72%	75	0.81%	1783	8.58%	57	0.27%
Flu 2019-2020	2890	13.85%	1313	6.29%	1184	4.75%	515	2.07%
Flu 2020-2021	24	0.79%	25	0.82%	38	0.10%	29	0.08%

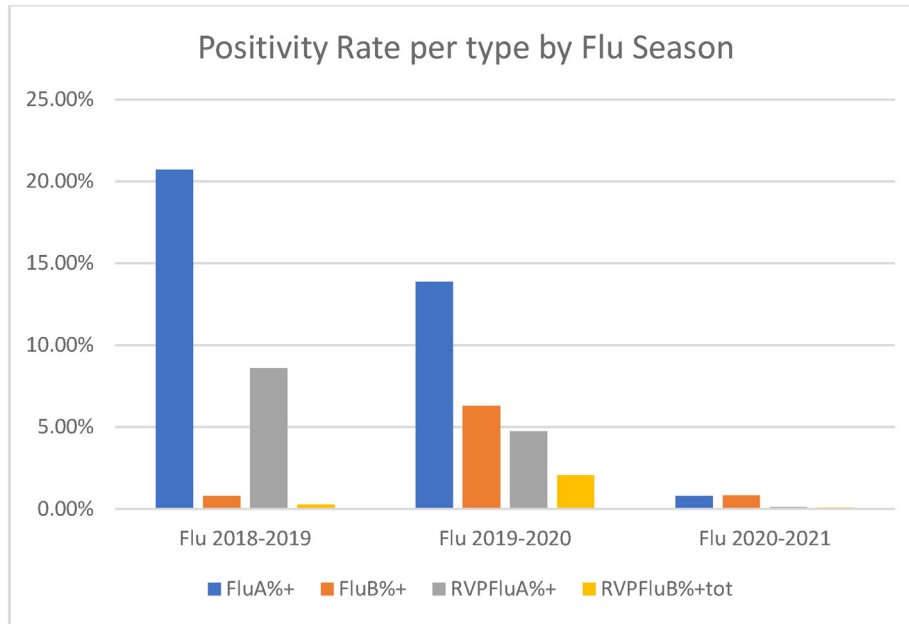


Fig. 1. Positivity rate of influenza tests by flu season.

the risk posed to public health, including severe infection, hospitalizations, and deaths.

When considering the efficacy of the seasonal flu vaccine, the CDC reports that the 2018–2019 and 2019–2020 flu seasons had a vaccine efficacy of 29% (95% CI, 21%–25%) and 39% (95% CI, 32%–44%).^{10,11} When comparing this to the 2020–2021 flu season, the CDC reports that the flu vaccine was not estimated due to the low flu virus circulating. Due to the relatively low efficacy of previous flu vaccines, it

can be correlated that the low circulating influenza virus, during the 2019–2020 flu season, was strongly impacted by the implantation of the mask mandate and social distancing measures.¹²

Studies previous to the COVID-19 pandemic, although correlational, have shown that masks have a direct effect on reducing the transmission rates of flu and other respiratory viruses.^{1,2,13,14} Our data demonstrate that a decrease in flu cases during a competing pandemic may result from the consistent

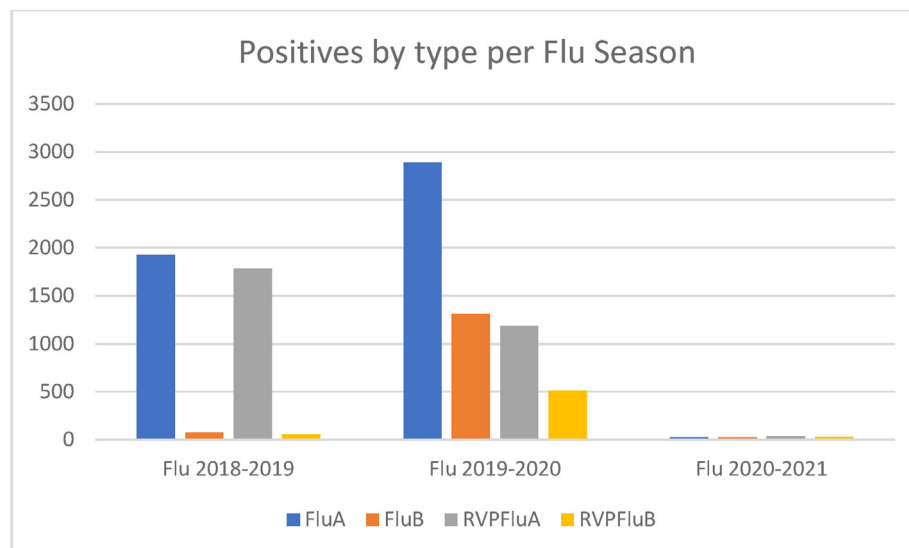


Fig. 2. Number of positive results by flu season.

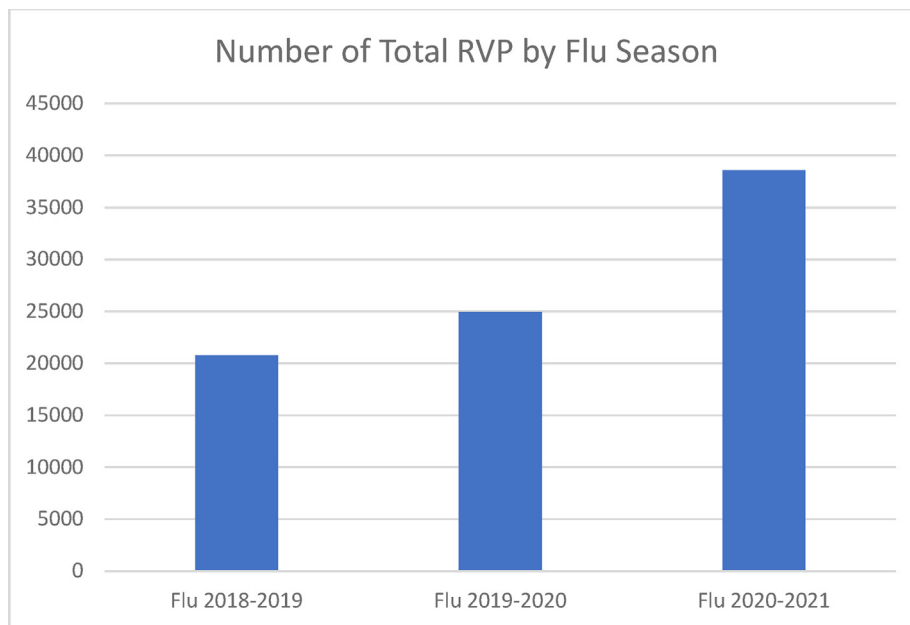


Fig. 3. Number of respiratory viral panels (RVP) performed by flu season.

use of masks and social distancing, which contribute to the reduction of the spread of communicable diseases.³

A study by Wong et al. found a significant reduction in influenza-like illness once hand hygiene and facemask use were implemented.¹⁵ An extrapolation can be made that as New York State only mandated masks, and not hand hygiene, that masks had a higher impact during the COVID-19 pandemic on influenza rates despite increased testing, as previously mentioned. Moving forward, as the pandemic recedes and life starts to return to normalcy, recommendations can be made to patients that in addition to receiving the influenza vaccine, wearing masks in public places during Flu season will help to decrease infection rates as well as decrease the number of hospitalizations related to influenza. This would be especially relevant to those patients who historically fit into the high-risk category for mortality due to the influenza virus, such as children, pregnant women, immunocompromised individuals, and the elderly.¹⁶

5. Conclusion

Our study reinforces the importance of practicing preventative measures to reduce infection rates of communicable diseases. By preventing the transmission of communicable diseases, we can reduce mortality and decrease hospital cost. When the COVID-19 pandemic resolves and masks and social

distancing are no longer required, we suspect an increase in influenza cases during the flu season.

Although very promising, our study does have limitations. New York State, and its diverse population, resemble the greater population of the United States as a whole. In addition, it was one of the first states to enact a state-wide mandate on face masks, and the strict enforcement of their use in public provides a level of assurance; there are limitations when attempting to track the actual compliance of the general population. Finally, because COVID-19 is still a new virus with many details undiscovered, we do not know the extent of any viral competition that may occur among the two viral organisms. However, there have been many reported cases of COVID-19 co-infection with other respiratory illnesses.

We believe that a follow-up study to look at the influenza rates as mask mandates are lifted would yield additional information that will possibly shed more light on the data in this study and that the infection rates will rise once again as people stop wearing masks, social distancing, and cease practicing hand hygiene.

Conflict of interest

The authors do not have any conflicts of interest and this project was not supported by grant funding.

References

- Lo JY, Tsang TH, Leung YH, Yeung EY, Wu T, Lim WW. Respiratory infections during SARS outbreak, Hong Kong. *Emerg Infect Dis*. 2003;11(11):1738–1741. <https://doi.org/10.3201/eid1111.050729>.
- Lu N, Cheng KW, Qamar N, Huang KC, Johnson JA. Weathering COVID-19 storm: successful control measures of five Asian countries. *Am J Infect Control*. 2020;48(7):851–852. <https://doi.org/10.1016/j.ajic.2020.04.021>.
- bin-Reza F, Lopez Chavarrias V, Nicoll A, Chamberland ME. The use of masks and respirators to prevent transmission of influenza: a systematic review of the scientific evidence. *Influa Other Respir Viruses*. 2012;6(4):257–267. <https://doi.org/10.1111/j.1750-2659.2011.00307.x>.
- Olsen SJ, Azziz-Baumgartner E, Budd AP, et al. Decreased influenza activity during the COVID-19 pandemic – United States, Australia, Chile, and South Africa, 2020. *Am J Transplant*. 2020;20(12):3681–3685. <https://doi.org/10.1111/ajt.16381>.
- Soo RJJ, Chiew CJ, Ma S, Pung R, Lee V. Decreased influenza incidence under COVID-19 control measures, Singapore. *Emerg Infect Dis*. 2020;26(8):1933–1935. <https://doi.org/10.3201/eid2608.201229>.
- Xpert® xpress CoV-2/Flu/RSV plus. Cepheid. <https://www.fda.gov/media/152163/download#:~:text=The%20Xpert%20Xpress%20CoV%2D2,nasal%20swab%20or%20nasal%20wash%2F>. Accessed October 21, 2022.
- ePlex® respiratory pathogen panel 2 package insert. GenMark. <https://www.fda.gov/media/142905/download>. Accessed October 21, 2022.
- Centers for Disease C, Prevention. Estimated influenza illnesses and hospitalizations averted by influenza vaccination – United States, 2012–13 influenza season. *MMWR Morb Mortal Wkly Rep*. 2013;62(49):997–1000.
- Ahmad FB, Cisewski JA, Miniño A, Anderson RN. Provisional mortality data – United States, 2020. *MMWR Morb Mortal Wkly Rep*. 2021;70:519–522. <https://doi.org/10.15585/mmwr.mm7014e1>.
- Flannery B, Garten Kondor RJ, Chung JR, et al. Spread of antigenically drifted influenza A(H3N2) viruses and vaccine effectiveness in the United States during the 2018–2019 season. *J Infect Dis*. 2019;221(1):8–15. <https://doi.org/10.1093/infdis/jiz543>.
- Tenforde MW, Garten Kondor RJ, Chung JR, et al. Effect of antigenic drift on influenza vaccine effectiveness in the United States–2019–2020. *Clin Infect Dis*. 2021;73(11):e4244–e42450. <https://doi.org/10.1093/cid/ciaa1884>.
- CDC seasonal flu vaccine effectiveness studies. Centers for Disease Control and Prevention; August 3, 2022. <https://www.cdc.gov/flu/vaccines-work/effectiveness-studies.htm#a-2021>. Accessed October 21, 2022.
- Cheng VC, Wong SC, Chuang VW, et al. The role of community-wide wearing of face mask for control of coronavirus disease 2019 (COVID-19) epidemic due to SARS-CoV-2. *J Infect*. 2020;81(1):107–114. <https://doi.org/10.1016/j.jinf.2020.04.024>.
- Worby CJ, Chang HH. Face mask use in the general population and optimal resource allocation during the COVID-19 pandemic. *Nat Commun*. 2020;11:4049. <https://doi.org/10.1038/s41467-020-17922-x>.
- Aiello AE, Murray GF, Perez V, et al. Mask use, hand hygiene, and seasonal influenza-like illness among young adults: a randomized intervention trial. *J Infect Dis*. 2010;201(4):491–498. <https://doi.org/10.1086/650396>.
- Whitley RJ, Monto AS. Prevention and treatment of influenza in high-risk groups: children, pregnant women, immunocompromised hosts, and nursing home residents. *J Infect Dis*. 2006;194(2):S133–S138. <https://doi.org/10.1086/507548>.