

Brief Report

Evaluation of Wearing Masks Would Reduce the Impact on Influenza and Pneumonia. – Learned Lessons From the COVID-19 Pandemic.

Hamza Mirza¹ and Dr. Mansoor Mirza MD. FACP²

¹Biology Department – New Jersey City University, Jersey City NJ; hamza.a.mirza@gmail.com

²Advocate Aurora Health Care – West Allis Memorial Hospital, West Allis, WI; Mansoor.mirza@aah.org; mansoor1947@gmail.com

*Corresponding author: Dr. Mansoor Mirza: Mansoor.mirza@aah.org; mansoor1947@gmail.com

Abstract:

Background: Our goal was to evaluate whether wearing personal protective equipment (PPE) such as an N95, or a surgical mask during the (COVID-19) pandemic had really reduced the cases of influenza in the state of Wisconsin.

Methods: Respiratory Virus Surveillance Reports from the Wisconsin Department of Health Services (DHS) and the Centers for Disease Control and Prevention (CDC) were used to compare the rates of Influenza during the seasons of 2018-2019 and 2020-2021.

Results: The number of cases, hospitalizations, and mortality rates with Influenza had significantly decreased in the 2020-2021 season compared to the Influenza season of 2018-2019.

Discussion: Reducing the burden of influenza illnesses, hospitalizations, and deaths on the health care system is imperative. Wearing masks should be addressed for the most vulnerable.

Keywords: COVID-19; Influenza; Morbidity; Mortality; Flu; Pneumonia; Virus Infections; Preventive Medicine; Hospitalization; Internal Medicine; Respiratory illness

1. Background:

In late December of 2019, mysterious cases of the respiratory illness pneumonia have been reported in China, and within a few weeks, the World Health Organization call this virus the coronavirus (COVID-19).^[1] This illness spread globally resulting in a global pandemic. According to Cascella et.al, the coronavirus is a highly contagious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which caused a disastrous effect on the world resulting in millions of deaths around the world.^[2] The coronavirus has spread through both direct contact and indirect contact. Coronavirus spreads through direct contact when one is close to an infected individual. This occurs when the infected person coughs, sneezes, or even talks less than 6-feet from the uninfected individual. It spreads through indirect contact when an individual touches a contaminated surface.^[3]

This global pandemic unfortunately has resulted in over 271 million cases with over 5 million deaths worldwide since the outbreak. The most common symptoms associated with COVID-19 are fever, cough, weakness, taste disorder, and myalgia. Other symptoms are anosmia, dyspnea, headache, and the presence of sputum.^[4-5] Influenza (Flu) is another acute viral infection that has been here for hundreds of years and causes significant illness and deaths yearly around the world. Three types of this cause the disease, but the major one is influenza A and B.^[6] The transmission of COVID-19 is very similar to the transmission of the influenza virus. The influenza virus is spread through direct and indirect contact such as coughing, talking, and touching contaminated objects. This viral infection spreads very fast during the autumn and winter months and infects children and adults yearly.^[7] In other words, this seasonal epidemic causes millions of infections and thousands of deaths yearly. The symptoms associated with COVID-19 are also similar to the symptoms of the flu such as fevers, cough, sore throat, runny nose, headaches, fatigue, myalgia, and more.^[8]

Most elders are vaccinated against flu but remain at high risk of contracting influenza pneumonia which leads to secondary bacterial pneumonia. These individuals are at high risk of dying. The quality of health is up to par in the state of Wisconsin and the quality of care and treatment options are great. Since the Covid-19 pandemic, Flu pneumonia admissions have become almost obsolete. The most vulnerable patients are the elderly and immunocompromised who are at a high risk of dying from the flu or Covid.

To eliminate or reduce the spread of influenza in Wisconsin, we evaluated whether wearing a (PPE) such as an N95 during the (COVID-19) pandemic had a substantial impact on the reduction of influenza cases. We evaluated the respiratory virus surveillance reports and data from the Wisconsin DHS and the CDC respectively. The surveillance reports are important because they provide us with the morbidity and mortality rates in the state of Wisconsin.

2. Methods:

Data collection was carried out since January 2021 and the process ran for several months. The study aimed at comparing the morbidity and hospitalization of Influenza in Wisconsin during the Influenza Season of 2018-2019 and 2020-2021 from the respiratory virus surveillance reports. Secondary data from various healthcare facilities were utilized in this cross-sectional study. We also collected the weekly mortality rates of the same influenza seasons from the CDC. We collected and combined the data for a few weeks/months and compared them. Our main focus was on the

months of November, December, and January since this is the mid-season of influenza. These are the months with holidays when a lot of people visit and spend time with each other increasing the chance of spreading influenza through direct contact. Reportedly, many cases are witnessed during these three months every single year.

Simple aggregation of data variables column-wise was utilized to get the sum totals of the data to aid in comparison. The weekly cases of influenza were calculated by adding up the positive results of Influenza A, and B, Parainfluenza, and the positive results of influenza from the rapid antigen test. The data in the Respiratory Virus Surveillance Report included hospitalization rates from September to the current week. Hospitalization rates were thus collected by subtracting the number of hospitalizations in the current week from the previous week. Finally, we calculated the mortality rates by selecting the week and year on the Pneumonia and Influenza Mortality Surveillance map from the CDC site. The retrospective data used in this study is from the Wisconsin DHS, and the CDC.

3. Results:

Coronavirus is a respiratory virus that infects humans, typically leading to an upper respiratory infection (URI). [1-3,9] By early 2020; coronavirus had spread globally since its outbreak in China in December 2019. [1,10] Several retrospective studies have shown that wearing a mask reduces the cases of the Novel Coronavirus since it protects an individual from inhaling contaminated surfaces such as fomites. In this study, it was observed that wearing a face mask also dramatically reduced the cases, hospitalization, and mortality rates of another respiratory illness (Influenza). This was evident from the comparative analysis of morbidity, hospitalization, and mortality rates of Influenza in Wisconsin during the Influenza Season of 2018-2019 and 2020-2021.

In establishing the difference, influenza cases in the months of November, December, and January in the 2018-2019 season were compared against the influenza cases reported in the 2020-2021 season. Comparison data showed that Influenza cases, hospitalizations, and mortality rates of infected people had significantly decreased in the 2020-2021 season compared to the 2018-2019 season. However, the mortality rate in the 2020-2021 season was high due to the novel coronavirus pandemic. [11-13] This data was tabulated down and presented graphically for comparative analysis as depicted in Table 1-3, and Figure 1 below.

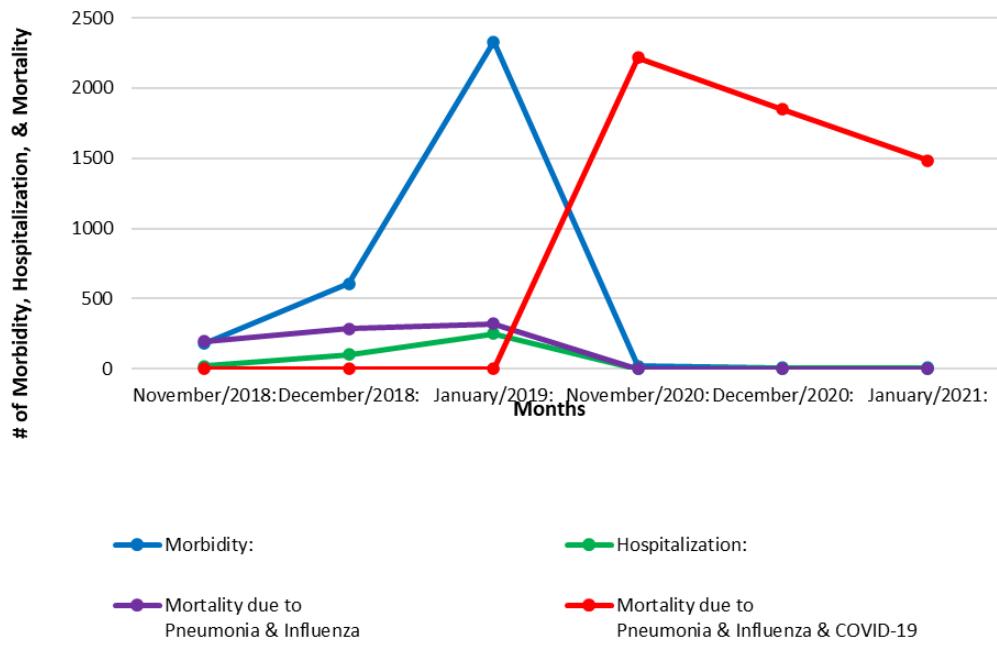
Table 1: Influenza Season 2018-2019 (Weekly)				
Month:	Week Ending Date:	Morbidity:	Hospitalization:	Mortality due to Pneumonia & Influenza
November	11/3/2018	39	5	57
November	11/10/2018	56	4	51
November	11/17/2018	29	7	41
November	11/24/2018	55	4	47
November Total:		179	20	196
December	12/1/2018	45	2	55
December	12/8/2018	67	9	48
December	12/15/2018	87	13	59
December	12/22/2018	177	26	59
December	12/29/2018	231	51	64
December Total:		607	101	285
January	1/5/2019	214	72	66
January	1/12/2019	-	-	71
January	1/19/2019	491	-	65
January	1/26/2019	784	72	65
February	2/2/2019	839	106	55
January Total:		2328	250	322
3 Month Total:		3114	371	803
Date on week ending in 1/12/2019 was not reported from Wisconsin Department of Health Services. Data Adapted from Wisconsin DHS.				

Table 2: Influenza Season 2020-2021 (Weekly)				
Month:	Week Ending Date:	Morbidity:	Hospitalization:	Mortality due to Pneumonia & Influenza & COVID-19
November	11/7/2020	3	0	478
November	11/14/2020	5	0	586
November	11/21/2020	5	0	608
November	11/28/2020	8	0	545
November Total:		21	0	2217
December	12/5/2020	0	0	544
December	12/12/2020	-	-	489
December	12/19/2020	4	4	428
December	12/26/2020	3	0	386
December Total:		7	4	1847
January	1/2/2021	3	1	359
January	1/9/2021	0	0	317
January	1/16/2021	-	-	293
January	1/23/2021	3	1	272
January	1/30/2021	1	1	244
January Total:		7	3	1485
3 Month Total:		35	7	5549
Data week ending in 12/12/2020 & 1/16/2021 was not reported from Wisconsin Department of Health Services. Data Adapted from Wisconsin DHS.				

Table 3: Influenza Season 2018-2019 vs Season 2020-2021 (Monthly)

Month:	Morbidity:	Hospitalization:	Mortality due to Pneumonia & Influenza	Mortality due to Pneumonia & Influenza & COVID-19
November/2018:	179	20	196	0
December/2018:	607	101	285	0
January/2019:	2328	250	322	0
November/2020:	21	0	0	2217
December/2020:	7	4	0	1847
January/2021:	7	3	0	1485

Data Adapted from Wisconsin DHS.

Figure 1: Influenza Season in 2018-2019 vs. 2020-2021

4. Discussion:

Influenza and the coronavirus are both acute viral infections that bear similar symptoms and cause significant illness and death in the state of Wisconsin. However, Influenza is a seasonal epidemic, while coronavirus was declared a pandemic by the World Health Organization in 2020 and its' status has not changed even as of today. Influenza season is a time when hospital admission peaks. It also results in preventable illnesses on an annual basis. The COVID-19 pandemic affected the entire globe, especially the elderly and populations who were initially suffering from other respiratory tract infections. However, the wearing of masks to reduce coronavirus prevalence was of sentimental value to the control of Influenza since it led to a reduction in hospitalization, and mortality cases related to influenza. The

wearing of masks to prevent Influenza and pneumonia was incidental to the attainment of the primary objective (control of Covid-19).

Adherent use of N95 masks during the peak of influenza season proved to reduce the incidences of Influenza and pneumonia infections which consequently reduced hospitalization. This is evident from the data in Table 3 which shows the variation in cases between the two seasons (before the use of the mask and after). According to the results from the findings, the use of N95 masks bore a positive impact in reducing the number of cases thus implying that more lives were saved, healthcare costs were cut down, and the risk of spread was curbed. Nevertheless, this also meant that incremental costs of acquiring masks would be incurred even though it is relatively cheaper than hospitalization costs. In my closing remarks, masks wearing should be embraced from the month of November till the end of February to reduce incidences of Influenza. In the long run, it will spare us a substantial deal of health dollars and reduce mortality rates.

5. Limitations:

Despite the study yielding results and attaining the intended purpose, the research was limited in some aspects. Primarily, it focused only on the Wisconsin state, and generalizations were made regarding the efficacy of masks in controlling viral infections in other states. The study could maybe yield different results if a larger geographical scope was covered. The United States has many states, and we cannot certainly conclude other states that the study was unable to cover. Besides, wearing masks only proved to be effective in the control of Influenza and Pneumonia but its efficacy in the control of other airborne and viral infections was not covered under this scope.

Looking Ahead: More data on influenza cases, mortality, and hospitalization should be collected and analyzed for the other months. Additionally, further studies should focus on a larger geographical region like the other states to prove the accuracy of the generalizations made regarding the efficacy of masks on Influenza and Pneumonia control. Similarly, further studies should consider setting a bigger budget estimate that will enable comprehensive data collection in several healthcare facilities and CDC centers to improve the accuracy of findings. Larger sample sizes reduce incidences of inherent errors and mistakes associated with small samples.

References:

1. Sun P, Lu X, Xu C, Sun W, Pan B. Understanding of COVID-19 based on current evidence. *J Med Virol.* 2020;92(6):548-551. doi:10.1002/jmv.25722
2. Cascella M, Rajnik M, Aleem A, et al. Features, Evaluation, and Treatment of Coronavirus (COVID-19) [Updated 2021 Sep 2]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK554776/>
3. Lotfi M, Hamblin MR, Rezaei N. COVID-19: Transmission, prevention, and potential therapeutic opportunities. *Clin Chim Acta.* 2020;508:254-266. doi:10.1016/j.cca.2020.05.044
4. Alimohamadi Y, Sepandi M, Taghdir M, Hosamirudsari H. Determine the most common clinical symptoms in COVID-19 patients: a systematic review and meta-analysis. *J Prev Med Hyg.* 2020;61(3):E304-E312. Published 2020 Oct 6. doi:10.15167/2421-4248/jpmh2020.61.3.1530
5. Çalıca Utku A, Budak G, Karabay O, Güçlü E, Okan HD, Vatan A. Main symptoms in patients presenting in the COVID-19 period. *Scott Med J.* 2020;65(4):127-132. doi:10.1177/0036933020949253
6. Gaitonde DY, Moore FC, Morgan MK. Influenza: Diagnosis and Treatment. *Am Fam Physician.* 2019;100(12):751-758.
7. Boktor SW, Hafner JW. Influenza. [Updated 2021 Jul 18]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK459363/>
8. Krammer F, Smith GJD, Fouchier RAM, et al. Influenza. *Nat Rev Dis Primers.* 2018;4(1):3. Published 2018 Jun 28. doi:10.1038/s41572-018-0002-y
9. Subbarao K, Mahanty S. Respiratory Virus Infections: Understanding COVID-19. *Immunity.* 2020;52(6):905-909. doi:10.1016/j.immuni.2020.05.004
10. Zhu H, Wei L, Niu P. The novel coronavirus outbreak in Wuhan, China. *Glob Health Res Policy.* 2020;5:6. Published 2020 Mar 2. doi:10.1186/s41256-020-00135-6

11. Respiratory Virus Surveillance Reports: 2018-2019 Flu Season. Wisconsin Department of Health Services. <https://www.dhs.wisconsin.gov/library/p-02346-2018-19.htm>. Published 2018. Accessed April 6, 2021.
12. Respiratory Virus Surveillance Reports: 2020-2021 Flu Season. Wisconsin Department of Health Services. https://www.dhs.wisconsin.gov/library/p-02346-2020-21.htm?order=title_field&sort=desc. Published 2020. Accessed April 6, 2021.
13. National Center for Health Statistics Mortality Surveillance System. Gis.cdc.gov. <https://gis.cdc.gov/grasp/fluvview/mortality.html>. Published 2020. Accessed April 10, 2021.
14. N95 Respirators, Surgical Masks, and Face Masks. U.S. Food and Drug Administration. <https://www.fda.gov/medical-devices/personal-protective-equipment-infection-control/n95-respirators-surgical-masks-and-face-masks>. Published 2021. Accessed April 6, 2021.