

Lessons Learned From the COVID-19 Pandemic: Factors Affecting Decreased Incidence of Influenza

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ABSTRACT

Introduction: Our goal was to identify if the cases of influenza declined in the state of Wisconsin during the COVID-19 pandemic and, if so, what factors may have been responsible for this decline.

Methods: Influenza rates during the 2018-2019 and 2020-2021 seasons were compared using data from Respiratory Virus Surveillance Reports from the Wisconsin Department of Health Services and the Centers for Disease Control and Prevention.

Results: The number of cases and hospitalizations due to influenza decreased significantly during the 2020-2021 influenza season compared to the 2018-2019 season, although mortality rates increased during 2020-2021.

Discussion: Reducing the burden of illnesses, hospitalizations, and deaths due to influenza on the health care system is imperative. Taking the same preventive measures used during the COVID-19 pandemic, such as wearing masks, physical distancing, and frequent handwashing, should be advised, especially for the most vulnerable patient populations.

INTRODUCTION

In late December 2019, mysterious cases of respiratory illness pneumonia were reported in China. Within a few weeks, the World Health Organization (WHO) had named this illness coronavirus disease (COVID-19).¹ COVID-19 is a highly contagious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Following the initial outbreak, COVID-19 continued to spread rapidly, resulting in a global

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pandemic that has since led to more than 271 million cases and over 5 million deaths worldwide.²

COVID-19 spreads through both direct and indirect contact. Direct contact may occur when one is close to an infected individual who coughs, sneezes, or even talks less than 6 feet from the uninfected individual. Indirect contact may occur when an individual touches a contaminated surface.³ The most common symptoms associated with COVID-19 are fever, cough, weakness, taste disorder, and myalgia. Other symptoms include anosmia, dyspnea, headache, and the presence of sputum.⁴⁻⁵

Another acute viral infection—influenza—causes significant morbidity and mortality. It spreads quickly during the autumn and winter months, infecting both children and adults and resulting in millions of cases and thousands of deaths annually.⁶ Although many elderly patients receive influenza vaccinations, they remain at a high risk of contracting and dying from influenza due to changes in the immune system as they age and other underlying medical conditions.⁷

There are 3 different types of influenza, the most common being influenza A and B,⁸ and its transmission is very similar to that of COVID-19, including coughing, talking, and touching contaminated objects. Symptoms associated with influenza—fevers, cough, sore throat, runny nose, headaches, fatigue, and myalgia—are similar to COVID-19 symptoms as well.⁹

To identify if the incidence of influenza in Wisconsin declined during the pandemic, we evaluated the respiratory virus surveillance reports and data from the Wisconsin Department of Health Services (DHS) and the Centers for Disease Control and

Table 1. Wisconsin Influenza Data, 2018-2019

Month	Week Ending Date	No. of Cases	Hospitalizations	Mortality Due to Pneumonia and 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
January/February	2/2/2019	839	106	55
January Total		2328	250	322
3 Month Total		3114	371	803

Data for week ending Jan 12, 2019 was not reported from the Wisconsin Department of Health Services.

Table 2. Wisconsin Influenza Data, 2020-2021

Month	Week Ending Date	No. of Cases	Hospitalizations	Mortality Due to Pneumonia and Influenza
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 for week ending Dec 12, 2020 and Jan 16, 2021 was not reported from the Wisconsin Department of Health Services.

Prevention (CDC). We hypothesized a reduction of influenza cases, hospitalizations, and mortality rates throughout the state and sought to determine contributing factors.

METHODS

To compare morbidity, hospitalization, and mortality rates for influenza in Wisconsin during the 2018-2019 and 2020-2021 seasons, we conducted a cross-sectional study using retrospective data from the Wisconsin Department of Health Services and the Centers for Disease Control and Prevention respiratory virus surveillance reports, as well as secondary data from various health care facilities.

We combined and analyzed data for the months of November, December, and January 2018-2019 and 2020-2021. We focused on these months—the middle of influenza season—because many cases are reported each year during this timeframe, which includes holidays when lots of people spend time together, thereby increasing the chance of spreading influenza through direct contact.

To aid comparison, simple aggregation of data variables column-wise was utilized to determine the sum totals. The weekly cases of influenza were calculated by adding the positive cases of influenza A and B and parainfluenza and the positive results of influenza from rapid antigen tests. Data in the respiratory virus surveillance report included hospitalization rates from September to the current week. Hospitalization rates were determined by subtracting the number of hospitalizations in the current week from

Table 3. Wisconsin Influenza Data by Month, 2018-2019 vs 2020-2021

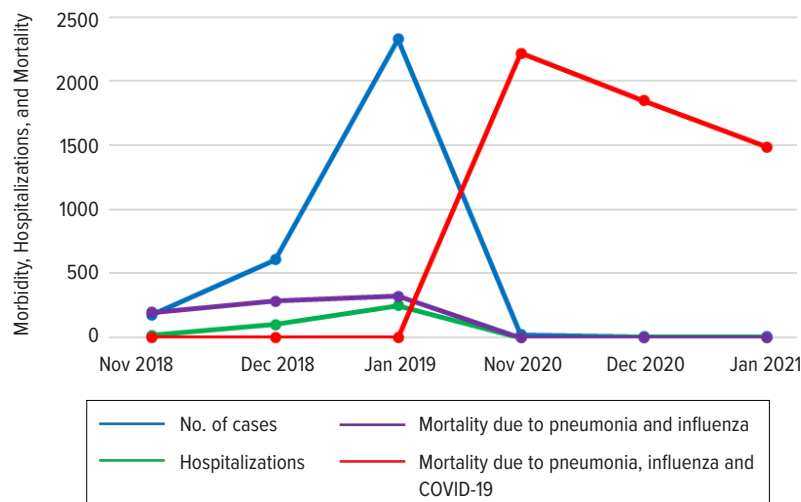
Month	Week Ending Date	No. of Cases	Hospitalizations	Mortality Due to Pneumonia and Influenza	
November 2018		179	20	196	0
December 2018		607	101	285	0
January 2019		2328	250	322	0
November 2020		21	0	0	2217
December 2020		7	4	0	1847
January 2021		7	3	0	1485

the previous week. Finally, we calculated mortality rates by selecting the week and year on the CDC’s Pneumonia and Influenza Mortality Surveillance map.

RESULTS

Comparison data show that the number of influenza cases and hospitalizations decreased significantly during 2020-2021 compared to 2018-2019. During the 2018-2019 influenza season, there were a total of 3114 reported cases of influenza and 371 hospitalizations. In comparison, during the 2020-2021 season, there were 35 reported cases of influenza and 7 hospitalizations. However, the mortality rate during the 2020-2021 season was significantly higher than the 2018-2019 season due to the COVID-19 pandemic: 5549 deaths vs 803, respectively.¹⁰⁻¹² (See Tables 1-3 and Figure 1 for detailed comparisons.)

Figure. Influenza Season Data, 2018-2019 vs 2020-2021



DISCUSSION

Both influenza and COVID-19 are acute viral infections that bear similar symptoms and cause considerable illness and death. However, influenza is a seasonal epidemic that results in substantial preventable illness each year, while in 2020, the World Health Organization declared coronavirus a global pandemic that has resulted in over 271 million cases and 5 million deaths worldwide.^{4,5}

To curb the spread of COVID-19, preventive measures such as mask mandates and physical distancing were implemented, and individuals were urged to stay home, get vaccinated, practice frequent handwashing, and clean high-touch surfaces. Several retrospective studies have shown that these measures were incidental to reducing the occurrence of COVID-19.^{13,14}

Our findings show that during the 2018-2019 influenza season, there were a total of 3,114 cases of influenza and 371 hospitalizations. In contrast, during the 2020-2021 influenza season (during the pandemic), there were 35 cases of influenza reported and 7 hospitalizations. Mortality totals due to pneumonia and influenza rose from 803 pre-COVID to 5549, respectively, during the pandemic.

Adherent use of masks, physical distancing, staying home, handwashing, and frequent cleaning of high-touch surfaces during the peak of influenza season are factors that likely contributed to the reduction of influenza infections and subsequent hospitalizations. Table 3 shows the variation in cases between the two seasons. The same preventive measures used to curb the spread of COVID-19 in 2020-2021 appear to have contributed to the reduction in influenza cases and hospitalizations, thus inferring that more lives were saved, health care costs related to influenza were reduced, and the risk of spread was curbed. We suggest

that these preventive measures should be embraced from November through February to reduce the impact of influenza. In the long run, it will spare health care dollars and reduce mortality rates.

Limitations

This study is limited in that it focused primarily on the state of Wisconsin, and generalizations were drawn regarding possible factors that contributed to the decline in influenza. The study may yield different results if a larger geographic region was covered. Further, the preventive measures mentioned proved to be effective only in the control of influenza and pneumonia, but their efficacy in controlling other airborne and viral infections was beyond the scope of this study.

Looking Ahead

More data on influenza cases, hospitalizations, and mortality should be collected and analyzed for the 9-month periods not included in this study. Additionally, further studies should focus on a larger geographic region (ie, other states) to affirm the accuracy of the generalizations made regarding the efficacy of the preventive measures mentioned for influenza control. Similarly, future studies could include more comprehensive data to improve the accuracy of findings. Larger sample sizes reduce incidences of inherent errors and mistakes associated with small samples.

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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). In: *StatPearls*. StatPearls Publishing; 2021. Accessed April 10, 2021. <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. doi:10.15167/2421-4248/jpmh2020.61.3.1530
5. Çalica 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. Boktor SW, Hafner JW. Influenza. In: *StatPearls*. StatPearls Publishing; 2021. Accessed April 10, 2021. <https://www.ncbi.nlm.nih.gov/books/NBK459363/>
7. Smetana J, Chlibek R, Shaw J, Splino M, Prymula R. Influenza vaccination in the elderly. *Hum Vaccin Immunother*. 2018;14(3):540-549. doi:10.1080/21645515.2017.1343226

- 8.** Gaitonde DY, Moore FC, Morgan MK. Influenza: diagnosis and treatment. *Am Fam Physician*. 2019;100(12):751-758.
- 9.** Krammer F, Smith GJD, Fouchier RAM, et al. Influenza. *Nat Rev Dis Primers*. 2018;4(1):3. doi:10.1038/s41572-018-0002-y
- 10.** Respiratory Virus Surveillance Reports: 2018-2019 flu season. Wisconsin Department of Health Services. Published 2018. Accessed April 6, 2021. <https://www.dhs.wisconsin.gov/library/p-02346-2018-19.htm>
- 11.** Respiratory Virus Surveillance Reports: 2020-2021 flu season. Wisconsin Department of Health Services. Published 2020. Accessed April 6, 2021. <https://www.dhs.wisconsin.gov/library/p-02346-2020-21.htm>
- 12.** Pneumonia and influenza mortality surveillance from the National Center for Health Statistics Mortality Surveillance System. Centers for Disease Control and Prevention. Published 2020. Accessed April 10, 2021. <https://gis.cdc.gov/grasp/fluview/mortality.html>
- 13.** Talic S, Shah S, Wild H, et al. Effectiveness of public health measures in reducing the incidence of covid-19, SARS-CoV-2 transmission, and covid-19 mortality: systematic review and meta-analysis. *BMJ*. 2021;375:e068302. doi:10.1136/bmj-2021-068302
- 14.** Krishnamachari B, Morris A, Zastrow D, Dsida A, Harper B, Santella AJ. The role of mask mandates, stay at home orders and school closure in curbing the COVID-19 pandemic prior to vaccination. *Am J Infect Control*. 2021;49(8):1036-1042. doi:10.1016/j.ajic.2021.02.002

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