

Norovirus Infections Drop 49% in the United States with Strict COVID-19 Public Health Interventions

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Abstract

Norovirus is a substantial burden on the U.S. We compared norovirus outbreaks before and during COVID-19. There were fewer norovirus outbreaks during COVID-19 compared to a similar time period in 2019 (326 versus 638, $P < 0.001$). **Conclusion.** COVID-19 public health interventions may be considered to decrease the burden of norovirus. This demonstrates the ability of more restrictive interventions to decrease other outbreaks of known or emerging viruses.

Key Words: Coronavirus ■ Norovirus ■ Public Health.

Introduction

Norovirus places a substantial burden on the U.S., with 19-21 million illnesses and 109,000 hospitalizations per year and an estimated annual cost of \$6.2 billion (inflation adjusted for 2020) (1, 2). Norovirus, like coronaviruses, can spread through person-to-person contact. Interventions to prevent COVID-19 infection should also decrease norovirus infection. Stay-at-home (“lockdown”) orders to decrease the spread of COVID-19 were implemented in 32 states by 31 March, 2020 (3). There is evidence suggesting that COVID-19-related restrictions decreased influenza rates in the United States (R.P. Lennon, E.L. Miller, H. Dong, D. Rabago, A.E. Zgierska, unpublished data, August 2020). To our knowledge, the impact of COVID-19-related restrictions on norovirus infection rates has not been evaluated.

Our objective was to compare norovirus infection rates in the U.S. before and after COVID-19 lockdown.

Materials and Methods

Data from the Centers for Disease Control and Prevention (CDC), which collects norovirus outbreak data reported by health departments through the National Outbreak Reporting System (NORS), were used to compare weekly norovirus outbreak rates during the pre-COVID-19 2018-19 and 2019-20 seasons (August 1 through January 30) (4). In addition, weekly outbreaks rates after the COVID-19 lockdown (February 6 through June 6, 2020) were compared to the pre-COVID-19 rates (February 6 through June 6, 2019). This research is exempt per 45 CFR 46.101(b) (4). The differences in outbreak rates were assessed with a Wilcoxon signed rank test, with significance level established at two-tailed $P < .05$, using R statistical software, Version 3.6.2.

Results

There were no significant differences ($P = 0.384$) in pre-COVID-19 norovirus weekly outbreak rates

between 2018-19 and 2019-2020 seasons through January 30, 2020 (Table 1). There were fewer norovirus weekly outbreaks post-COVID-19 lockdown in 2020, compared to a similar time period in 2019 (326 versus 638, $P < 0.001$) (Table 1)

Table 1. Comparison of Norovirus Outbreaks Pre- and Post -COVID-19

Weeks	Norovirus outbreaks*	Norovirus outbreaks†	Key events	Wilcoxon rank test, 2-tailed to 95% confidence
Pre-COVID-19 lockdowns in the United States				
1-Aug	8	5	-	
8-Aug	4	4	-	
15-Aug	5	2	-	
22-Aug	7	6	-	
29-Aug	7	11	-	
5-Sep	4	9	-	
12-Sep	11	11	-	
19-Sep	8	11	-	
26-Sep	6	12	-	
3-Oct	5	6	-	
10-Oct	13	10	-	
17-Oct	10	15	-	
24-Oct	11	12	-	
31-Oct	13	23	-	Comparing outbreaks per week from August 1, 2019 through January 30, 2020
7-Nov	12	25	-	$P=0.384$
14-Nov	21	24	-	
21-Nov	40	17	-	
28-Nov	54	52	-	
5-Dec	62	48	-	
12-Dec	79	43	-	
19-Dec	36	48	-	
26-Dec	67	46	-	
2-Jan	81	59	-	
9-Jan	65	41	-	
16-Jan	56	46	First U.S. case (5)	
23-Jan	61	49	-	
30-Jan	48	57	-	
Post-COVID-19 lockdowns in the United States				
6-Feb	53	55	U.S. declares public health emergency (5)	
13-Feb	50	48	-	
20-Feb	49	57	-	
27-Feb	68	61	-	
6-Mar	53	33	-	
13-Mar	49	34	Lockdowns start (3)	
20-Mar	51	13	-	
27-Mar	47	10	32 States in lockdown (3)	
3-Apr	53	7	-	Comparing outbreaks per week from February 6, 2020 through June 5, 2020
10-Apr	32	1	-	$P < 0.001$
17-Apr	21	2	-	
24-Apr	18	1	-	
1-May	22	1	-	
8-May	27	0	-	
15-May	10	1	-	
22-May	16	2	-	
29-May	11	0	-	
5-Jun	8	0	-	

*2018-2019; †2019-2020.

Discussion

During the COVID-19-related lockdown period, the norovirus outbreak rates were lower than the year prior. Limitations of this comparison include potential changes in public care-seeking behaviors or physician testing patterns during the COVID-19 pandemic, and the NORS system approach to data collection, which relies on voluntary reports by health departments. Further, the 2020 norovirus data will not be finalized until 12-18 months after the end of the current season and, therefore, these estimates may still change.

Conclusion

The reductions in norovirus burden associated with COVID-19 restrictions suggest the power of restrictive public health measures to impact infectious disease burden more generally. Such measures may be considered for other high-burden outbreaks of known and emerging viruses now and in the future.

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critically for important intellectual content: RL, CG, EM, HD, DR and AZ; Approved final version of the manuscript: RL, CG, EM, HD, DR and AZ.

Conflict of Interest: The authors declare that they have no conflict of interest.

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