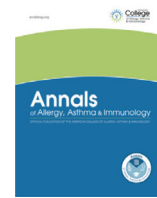




Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



Letters

The effect of coronavirus disease 2019 on asthma visits



Unscheduled emergency department (ED) and inpatient (IP) visits for pediatric asthma have been found to be decreased during coronavirus disease 2019 (COVID-19). Nevertheless, each of these reports has had their limitations. Arsenault et al¹ compared asthma ED visits for 2020 with 2019 only. It is difficult to make an inference from this single-year comparison because 2019 could have been an abnormal year. Kenyon et al² compared visits for the first 4 months of 2020 with those months from 4 previous years. This did not account for the overall reductions in all visits owing to COVID-19. Levene et al³ also compared the first 4 months of 2020 with the previous year. Like the case with the report of Arsenault, it is difficult to make inferences with a single-year comparison. Taquechel et al⁴ compared the first 60 days of 2020, from January 17 to March 17, with the second 60 days, from March 17 to May 17, and with the same periods for the years 2015 to 2019. This publication did correct for total visits, which is the only previously published article to do so. The report from Krivec et al⁵ was a letter with very limited information on admissions (only evaluated a 1-month period from March to April 2020, compared with the same period from the previous 3 years). There was a comparison with other factors (ie, pollen, nitrogen dioxide, particulate matter [PM] 10, and respiratory tract infections); however, the values were very limited. It is also unclear on how their respiratory tract infection admissions were monitored (clinically diagnosed vs polymerase chain reaction [PCR] proven).⁵ A recent report by Guijon et al⁶ compared asthma visits 90 days pre- and post-school closure in 2020 with the same time periods in the years 2017 to 2019. Other possible asthma triggers were evaluated; however, these only included 1 particular type of air pollution (PM 2.5) and the analysis of respiratory viral illnesses was limited to influenza only, leaving out a multitude of other respiratory viruses that are known to trigger asthma. Because asthma visits tend to occur seasonally with peaks in the spring and fall months, any observed reduction could be because of a combination of factors in addition to COVID-19, including a reduction in viral infections, changes in allergen exposure, and changes in exposure to air pollutants.⁷

The objective of this study was to evaluate the effect of COVID-19 on unscheduled asthma visits by comparing monthly 2020 visits with those from the previous 10 years (2010–2019). To do this, we queried the electronic medical records at a tertiary pediatric hospital to identify the total number of patients with asthma per month who were seen in an ED or urgent care clinic (ED), an inpatient unit (IP), or who visited an outpatient (OP) clinic between 2010 and 2020 for a primary diagnosis of asthma (International Classification of Diseases, Ninth Revision of 493 or International Classification of Diseases, Tenth Revision of J45). Total OP visits were used to control for the overall effect of COVID-19 on scheduled visits. Monthly pollen counts for 2010 to 2019 were obtained from samples obtained with a Burkard sampler located on the roof of

the hospital. Pollen counts for 2020 were obtained from an Allergenco sampler because the Burkard was not accessible during COVID-19.

Virus data were obtained from the Children's Mercy Hospital microbiology laboratory. This included all results from respiratory panel PCR testing done between 2010 and 2020. Monthly percent of positive virus isolates (rhinovirus, influenza, and total virus) was also evaluated to determine their contribution to these visits. Air pollutants including ozone and PM 2.5 data were obtained from the Environmental Protection Agency website. Time series analysis by the integer-valued generalized autoregressive conditional heteroscedasticity model for asthma visit counts and the autoregressive (ARIMA) model for percent of asthma visits were used to determine the significance of 2020 data vs the previous decade.

Total IP, ED, and OP asthma visits were statistically significantly reduced in 2020 vs the previous 10 years primarily in the spring and fall months but not during the summer or winter when visits were normally low (Fig 1A). In addition, there was a decrease in percent asthma visits for the ED and IP relative to total ED and IP visits but an increased percent of OP spring visits (Fig 1B and C) suggesting unscheduled visits were reduced, whereas scheduled OP visits were increased more than total visits to those same locations. These reductions were sustained when adjusted for air pollution and pollen counts; however, reduced percent of positive virus isolates correlated with reduced asthma visits. When each environmental variable was evaluated in an ARIMA model, the only statistically significant differences were a decrease in total virus in March 2020 and viral PCR percent-positive testing result during April to December, except for July. No other variables had statistically significant changes. When categorized by age, children under age 5 years had fewer visits for all the pandemic months, children aged 6 to 12 years had fewer visits except during June and July, and older children did not experience statistically significantly fewer asthma visits.

Until now, it has not been possible to separate the contribution of respiratory infections toward unscheduled asthma visits from that of the other triggers.⁸ COVID-19 has provided a unique opportunity by strongly reducing the contribution that respiratory infections have on exacerbations owing to social distancing and widespread use of facial coverings. Other asthma triggers including exposure to indoor and outdoor allergens,⁹ air pollution, environmental tobacco smoke, and changes in weather are unlikely to have been affected by interventions used to avoid COVID-19, which is supported by the lack of statistically significant changes in these variables during the pandemic. For that reason, the reduction found in asthma use seen during COVID-19 seems to be owing to a reduction of respiratory infections. These findings support those found earlier by Taquechel et al,⁴ in which rhinovirus positive testing result decreased during the pandemic and air pollution levels remained unchanged. They do, however, partially contradict the report of Guijon et al,⁶ which found air pollution to be statistically significantly affected by the pandemic,

Disclosures: The authors have no conflicts of interest to report.

Funding: The authors have no funding sources to report.

<https://doi.org/10.1016/j.anai.2022.01.027>

1081-1206/© 2022 American College of Allergy, Asthma & Immunology. Published by Elsevier Inc.

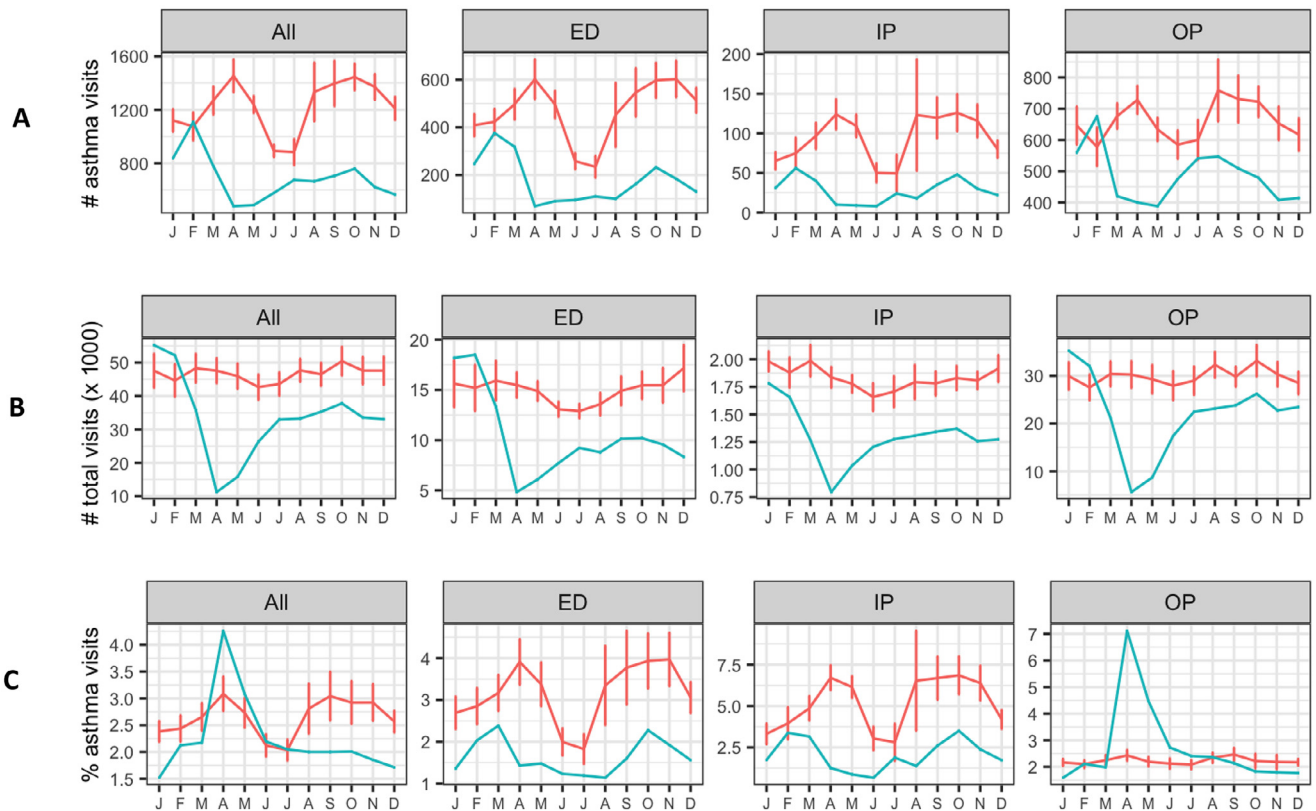


Figure 1. Unscheduled (ED and IP) and scheduled (OP) asthma (row A) and total visits (row B) to Children's Mercy Hospital during 2020 (green lines) compared with mean (95% CI) scheduled and unscheduled asthma and total visits (row C) from 2010 to 2019 (red lines). ALL, all visits; CI, confidence interval; ED, emergency department/urgent care; IP, inpatient; OP, outpatient.

suggesting the need for more research looking at this variable. Interestingly, the reduction in asthma visits at our facility was most pronounced in the youngest patients and tapers as age increases, suggesting a more predominant role for viruses as a trigger for asthma in patients aged less than 5 years old.

In conclusion, unscheduled asthma visits were statistically significantly reduced during COVID-19. This is most likely owing to reduced viral upper respiratory tract infections because other variables did not change during this same time.

Sean Stout, MD
Helen Murphy, RRT
Aarti Pandya, MD
Hung-Wen Yeh, PhD
Jay Portnoy, MD
Section of Allergy, Asthma & Immunology
Children's Mercy Hospital
Kansas City, Missouri
jportnoy@cmh.edu

References

- Arsenault S, Hoofman J, Poowuttikul P, Secord E. Sustained decrease in pediatric asthma emergency visits during the first year of the COVID-19 pandemic. *Allergy Asthma Proc.* 2021;42(5):400–402.
- Kenyon CC, Hill DA, Henrickson SE, Bryant-Stephens TC, Zorc JJ. Initial effects of the COVID-19 pandemic on pediatric asthma emergency department utilization. *J Allergy Clin Immunol Pract.* 2020;8(8):2774–2776.e1.
- Levene R, Fein DM, Silver EJ, Joels JR, Khine H. The ongoing impact of COVID-19 on asthma and pediatric emergency health-seeking behavior in the Bronx, an epicenter. *Am J Emerg Med.* 2021;43:109–114.
- Taquechel K, Diwadkar AR, Sayed S, Dudley JW, Grundmeier RW, Kenyon CC, et al. Pediatric asthma health care utilization, viral testing, and air pollution changes during the COVID-19 pandemic. *J Allergy Clin Immunol Pract.* 2020;8(10):3378–3387.e11.
- Krivec U, Kofol Seliger A, Tursic J. COVID-19 lockdown dropped the rate of paediatric asthma admissions. *Arch Dis Child.* 2020;105(8):809–810.
- Guijon OL, Morphew T, Ewherhemuepha L, Galant SP. Evaluating the impact of coronavirus disease 2019 on asthma morbidity: a comprehensive analysis of potential influencing factors. *Ann Allergy Asthma Immunol.* 2021;127(1):91–99.
- Murray CS, Jackson DJ, Teague WG. Prevention and outpatient treatment of asthma exacerbations in children. *J Allergy Clin Immunol Pract.* 2021;9(7):2567–2576.
- Busse WW. The role of the common cold in asthma. *J Clin Pharmacol.* 1999;39(3):241–245.
- Barnes C, Pacheco F, Landuyt J, Hu F, Portnoy J. Hourly variation of airborne ragweed pollen in Kansas City. *Ann Allergy Asthma Immunol.* 2001;86(2):166–171.

Ultrarush immunotherapy with polymerized extracts during the coronavirus disease 2019 pandemic Safety of restarting administrations without dose adjustments



Disclosures: The authors have no conflicts of interest to report.
Funding: The authors have no funding sources to report.

Allergen-specific immunotherapy (AIT) is the only therapy that can change the natural history of allergic diseases and it has been established as an effective treatment in immediate-type allergic reactions