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A pediatric asthma camp experience during the coronavirus disease 2019 pandemic



Every year, Camp Wheez is offered as a free summer day camp for children with asthma. Because of the ongoing coronavirus disease 2019 (COVID-19) pandemic, Camp Wheez 2020 was canceled. For 2021, we adapted Camp Wheez to the guidelines for summer camps put forth by the Centers for Disease Control and Prevention.¹

The primary aim of this study was to describe our experience with having a 4-day educational asthma program for children during the COVID-19 pandemic. Secondary aims were to investigate the effect of our educational program on airway inflammation and expiratory air flow from the lungs as measured by fractional exhaled nitric oxide (FENO) and peak flow (PF), respectively.

Since 1978, Camp Wheez has been a free annual day camp every August for children with asthma. Camp Wheez 2021 was open to all children with asthma aged 6 to 10 years of age, a reduced age range as compared with previous years to decrease gathering size. Camp Wheez 2021 reduced its capacity by half and decreased duration from 5 to 4 days to further decrease exposure and infection risk for campers. Written informed consent was obtained for each camper. All counselors and staff were required to be vaccinated for COVID-19 before the camp. Camp Wheez 2021 was conducted in accordance with the guidance of the Centers for Disease Control and Prevention for day camps: all activities were conducted outdoors, all campers and staff masked and maintained a physical distance of at least 6 feet, campers were cohorted into groups of 3 to 4 children to avoid mixing, campers were curbside-dropped off by parents to reduce the possible number of contacts, hand-sanitizing was enforced at the beginning and end of each rotation activity, point persons were designated to respond to any COVID-19 concerns, and all participants were counseled by health care staff to stay home for any COVID-19 symptoms.¹ Follow-up screening questionnaires for COVID-19 symptoms were done 1 week after camp completion. The NIOX Vero was used to measure FENO on day 1 (pre-camp), day 4 (post-camp), and approximately 1 week after the camp (follow-up). PFs were measured daily at the camp.

Wilcoxon signed rank test was used to compare mean FENOs pre-camp and post-camp. A one-way analysis of variance was used to compare mean peak flows between days 1 and 4 of the camp. We took $P < 0.05$ to indicate statistical significance.

A total of 20 children aged 6 to 10 years old were enrolled in Camp Wheez 2021, and the average age of the campers was 8.5 ± 1.3 years.

None of the children developed COVID-19 symptoms for the entire duration of the camp. All follow-up screening

questionnaires, done approximately 1 week after camp completion, were negative for COVID-19 symptoms. There were no statistically significant differences in mean FENO between pre- and post-camp ($P = 0.984$, Table 1). There was no statistically significant difference in mean peak flows among the days at the camp ($P = 0.744$, Table 1). Campers were not informed of their baseline FENO nor PF and none of the campers received targeted instruction.

The COVID-19 pandemic has required flexibility to adapt to the ever-changing environment. Social gatherings, including children's day camps, have been affected and require the development of safe procedures and protocols. Although a virtual platform was considered, the concern for screen fatigue was raised.² None of the campers developed COVID-19 symptoms throughout the camp duration nor at the 1 week follow-up questionnaire, though the community prevalence of COVID-19 during early August 2021 was a daily case rate of 18.6 per 100,000 people in Santa Barbara County, which may be lower as compared with other points during the ongoing pandemic.³ Although we did not see a statistically significant difference in FENO nor PF before and after the camp, the feedback and gratitude we received from both parents and campers make continuing Camp Wheez a worthy annual effort.

This is one of the first studies looking at the feasibility of a pediatric asthma camp during the COVID-19 pandemic, with objective measures to evaluate the camp's effect on campers' airway status. FENO has been found to decrease in children who attend summer asthma camps.⁴ The low mean baseline FENO could represent potentially improved asthma control, reduced triggers, and medication adherence during the COVID-19 pandemic.⁵

Table 1

Camper Demographics with Pre-Camp and Post-Camp FENO and Daily PF Measurements

Camper (n)	20
Mean age, y +/- SEM	8.5 +/- 1.3
Mean pre-camp FENO, ppb +/- SEM	22.1 +/- 4.8
Mean post-camp FENO, ppb +/- SEM	22.2 +/- 5.3
Mean Day 1 mean PF, L/min +/- SEM	254 +/- 15
Mean Day 2 mean PF, L/min +/- SEM	249 +/- 16
Mean Day 3 mean PF, L/min +/- SEM	273 +/- 18
Mean Day 4 mean PF, L/min +/- SEM	267 +/- 18

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

Funding: This study was funded by the Circassia grant and Sansum Clinic Foundation.

Our study should be interpreted in the context of several potential limitations. The small sample size and short duration of the camp may not have been sufficiently powered to detect a statistically significant difference in FENO and PF or to prove an asthma camp does not increase the risk of COVID-19 infection for our campers. Although all counselors and staff were vaccinated against COVID-19, testing was not required, so asymptomatic infection may have gone undetected. Rapid testing for COVID-19 was not readily available at the time of Camp Wheez 2021. Dependence on reported symptoms and questionnaires reflects subjective rather than objective measures for COVID-19 incidence.

We share our experience of having an educational asthma program for children during the COVID-19 pandemic, though no differences in FENO or peak flow were noted between groups. We strive to provide a balance of providing resources for our children with asthma while ensuring safety by following public health guidance. We wanted to be able to offer a much-loved experience for our children with asthma but, understandably, the COVID-19 pandemic will make certain experiences impossible to replicate as compared with before. The risks and benefits must always be weighed on an ongoing basis during the ever-changing climate of the COVID-19 pandemic.

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Effects of coronavirus disease 2019 pandemic on children, adolescents, and young adults with asthma in Rhode Island: Patterns in emergency department utilization with geospatial mapping



Despite early concerns for increased asthma exacerbations owing to the respiratory involvement of coronavirus disease 2019 (COVID-19), trends indicate *decreases* in the frequency of emergency department (ED) visits and asthma-related hospitalizations for children, adolescents, and young adults with asthma during spring 2020 when the first COVID-19 cases emerged and were rising in the United States.^{1,2} Less is known as to whether these patterns were maintained throughout summer and fall months of 2020 as the COVID-19 rates continued to increase. To the best of our knowledge, there are no published reports on asthma-related ED utilization by *geographical area*, to identify high-risk communities before and during the COVID-19 era. This would help identify high-risk communities to target for continued intervention, to enhance education on COVID-19–related safe practices, and optimal asthma management strategies.

Lifespan is Rhode Island's (RI) largest health system with several hospitals and partners spanning the state, including Rhode Island Hospital (RIH). The pediatric division of RIH, Hasbro Children's Hospital (HCH), located in urban Providence, RI, is home to the vast majority of inpatient pediatric care in the state. The ED at HCH serves more than 50,000 pediatric patients/y³ representing a wide diversity of racial, ethnic, and socioeconomic groups. Pre–COVID-19, the HCH ED served approximately 3327 patients with asthma-related difficulties annually; an average of 324 pediatric patients were hospitalized for asthma-related difficulties at HCH annually pre–COVID-19.

We aimed to examine current trends in ED utilization and hospitalizations for youth and young adults (aged 0–21 years)

with asthma in RI during the early COVID-19 era (January 1, 2020–October 31, 2020) compared with pre–COVID-19. Furthermore, we utilized geospatial mapping to identify ED utilization and specific community “hot spots” before and during the early COVID-19 era; findings will help to better understand changes in ED utilization over time within specific high-risk neighborhoods to target interventions where they are needed geographically. Lastly, we provide maps of RI indicating geographic distribution of COVID-19 rates to provide additional context and further inform how the spread of the virus in specific communities may have concurrently influenced ED utilization.

Data were collected from electronic health records from the Lifespan health system which includes 5 hospitals with EDs across RI, including HCH. ED visits and hospital encounters with asthma-related International Classification of Diseases, Tenth Revision, codes (eg, J45.2: mild intermittent asthma, J45.3: mild persistent asthma) for children, adolescents, and young adults (aged 0–21 years) were compiled. Data were collected from the same 10-month period (January–October) to compare frequencies pre–COVID-19 (2018, 2019) and during the early COVID-19 era (2020). Longitudinal time series plots (X statistical process control charts) were used to depict trends in ED visits and hospitalizations during the pre–COVID-19 and COVID-19 era periods. Paired *t* tests were utilized to compare (1) average frequency of asthma-related ED visits and (2) the number of ED visits that resulted in a hospitalization, both during pre–COVID-19 vs COVID-19 era periods. Geospatial mapping was also utilized to compare utilization rates across the same time periods by geographical area using patient ZIP codes. Data from the RI Department of Health (DOH) were utilized to map the median COVID-19 cases/mo from March to October 2020 by ZIP code to supplement the ED utilization maps and provide additional context.

Disclosures: All authors declare that they have no relevant or material financial interests that relate to the research described in this article.

Funding: This work is funded by the Hassenfeld Child Health Innovation Institute of Brown University.