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## Opportunities to monitor disparities in asthma and other respiratory diseases using public health data

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### Keywords

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In the United States, asthma and chronic obstructive pulmonary disease (COPD) affect approximately 8% and 6% of people, respectively.<sup>1,2</sup> Certain populations are disproportionately affected. For instance, asthma prevalence is higher among people who are non-Hispanic (NH) Black or have lower incomes;<sup>3</sup> COPD is more prevalent among individuals with less than a high school education.<sup>2</sup>

Early in the COVID-19 pandemic, National Syndromic Surveillance Program (NSSP) data showed reduced overall, asthma-, and COPD-related emergency department (ED) visits in 2020 compared to 2019.<sup>1</sup> Less is known about how declines in asthma- and COPD-related emergency healthcare use (e.g., ED visits, hospitalizations) varied across communities by demographics including race, ethnicity, and income.

In this issue of the *Annals of Allergy, Asthma & Immunology*, Gaffney et al.<sup>4</sup> address this question. They examined county-level trends and disparities in asthma- and COPD-related emergency healthcare use before and during the COVID-19 pandemic, using data from the Centers for Disease Control and Prevention's (CDC's) National Environmental Public Health Tracking Network (Tracking).<sup>4</sup> Tracking is a public health surveillance program that collects, integrates, and analyzes non-infectious disease and environmental data. Its mission is to “provide information from a nationwide network of integrated health and environmental data that drives actions to improve community health.”<sup>5</sup> Tracking data can be used to help

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implement public health programs, develop communication and outreach campaigns, and respond to public health emergencies.<sup>5</sup>

The study used administrative codes to identify health conditions and calculated percent change and 95% confidence intervals (CIs) for mean county-level 2019–2020 rates of asthma- and COPD-related emergency healthcare use.<sup>4</sup> Investigators used additional public CDC data (<https://wonder.cdc.gov/>) to assess chronic lower respiratory disease mortality.<sup>4</sup> They performed linear regression analyses adjusted for year and county-fixed effects; further analyses examined trends by quartiles of county-level demographic characteristics (e.g., income, education, Hispanic or NH Black population share).<sup>4</sup> Supplementary analyses calculated national ED visit rates (overall, asthma-related, COPD-related) using 2016–2020 National Hospital Ambulatory Care Survey (NHAMCS) data.<sup>4</sup>

County-level results included 685 counties from 13 states.<sup>5</sup> Compared to 2019, 2020 data showed decreases in asthma- and COPD-related emergency healthcare use and chronic lower respiratory disease mortality.<sup>4</sup> Some trends varied by county demographics.<sup>4</sup> For example, counties with higher Hispanic or NH Black population share experienced larger absolute reductions in asthma-related ED visits;<sup>4</sup> COPD-related ED visits and hospitalizations declined more in counties in lower income or education quartiles.<sup>4</sup> NHAMCS data revealed 2020 overall ED visits were 7% lower compared to 2016–2019; asthma- and COPD-related ED visits decreased 33% and 51%, respectively.<sup>4</sup>

Gaffney et al.'s findings suggest potential opportunities to reduce asthma- and COPD-related disparities — especially if causes of 2020 trends can be confirmed.<sup>1,4</sup> Decreases in circulating respiratory viruses likely contributed substantially to the 2020 reduction in chronic lung disease exacerbations.<sup>1,4</sup> CDC previously reported very low circulation of multiple respiratory viruses from March 2020, when multiple COVID-19 control measures began to be implemented, through early 2021.<sup>6</sup> However, by spring 2021 many common respiratory viruses were circulating again; some subsequently appeared to increase above recent pre-pandemic levels.<sup>6</sup> One large multi-site hospital-based respiratory syncytial virus (RSV) surveillance system reported peak RSV hospitalization rates in 2022 that were nearly double the peak hospitalization rates during any of the previous four years.<sup>7</sup> Influenza demonstrated a similar resurgence with the 2022–2023 influenza season resulting in the highest hospitalization rates since the 2017–2018 season (<https://gis.cdc.gov/GRASP/Fluview/FluHospRates.html>). Impacts of these resurgences likely vary across communities.

Before the COVID-19 pandemic, American Indian/Alaskan Native (AI/AN) children were noted to have much higher RSV hospitalization rates than the general population and Hispanic, NH Black, and AI/AN populations were all noted to have lower influenza vaccination coverage and higher influenza hospitalization rates than their NH White and Asian peers.<sup>7,8</sup> COVID-19 further resulted in increased morbidity and mortality among groups that have been economically or socially marginalized<sup>9</sup>, with an unknown number of COVID-19 survivors reporting ongoing, long-term respiratory symptoms following recovery from acute illness.<sup>10</sup> Ensuring equitable access to tools such as COVID-19, influenza, and RSV vaccination, and antiviral treatment that reduce risks associated with respiratory virus

infections, may be even more important in preventing further worsening of existing health disparities and inequities, as respiratory virus circulation continues to rebound.

Additional proposed reasons for 2020 emergency healthcare use trends include hospital avoidance because of patients' safety concerns (as described by Gaffney et al.) or tele-medicine use.<sup>1,4</sup> Also, outdoor air pollution changes in 2020 might have affected asthma- and COPD-related emergency healthcare use.<sup>1,4</sup> Decreased population movement during 2020 stay-at-home orders correlated with reduced outdoor air pollutants in some U.S. cities; community-level variation in 2020 air pollution trends is less well-described.<sup>1,4</sup> Because NH Black individuals, Hispanic individuals, and people with lower incomes are disproportionately exposed to outdoor air pollutant triggers of asthma and COPD exacerbations (e.g., ozone),<sup>3</sup> county-level investigations of demographics, air pollution, and emergency healthcare use trends in 2020 could further understanding of results from Gaffney et al.<sup>4</sup> Publicly available data sources like CDC's Tracking data can support such analyses.<sup>5</sup> Moreover, CDC's Tracking data on asthma- and COPD-related ED visits can continue to be used to monitor disease burden and to assess county-level geographic differences over time.

Limitations of county-level analyses include potential ecological fallacy, a possible bias when comparing aggregated data that could result in exposure misclassification.<sup>4</sup> Individual-level data (including demographics or clinicians' assessments of what triggered each asthma or COPD exacerbation) could confirm Gaffney et al.'s results.<sup>4</sup> Also, county-level data in this analysis are not nationally representative.<sup>4</sup>

While Gaffney et al. was not able to ascertain causes of county-level variation in 2020 trends, overall these data suggest the potential to reduce asthma- and COPD-related morbidity and disparities across communities.<sup>1,4</sup> Individuals with asthma or COPD are at increased risk for severe, acute respiratory illness. Tailored, community-level efforts to build trust in and increase use of tools such as vaccination and treatment that reduce the risk of severe respiratory virus disease can help decrease existing disparities, including in asthma and COPD. Addressing health disparities in exposure to air pollutants can further improve health among disproportionately affected populations, including communities with higher asthma or COPD burden.

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## Abbreviations/Acronyms:

<b>AI/AN</b>	American Indian/Alaskan Native
<b>CDC</b>	Centers for Disease Control and Prevention
<b>CI</b>	confidence interval

<b>COPD</b>	chronic obstructive pulmonary disease
<b>ED</b>	emergency department
<b>NH</b>	non-Hispanic
<b>NHAMCS</b>	National Hospital Ambulatory Care Survey
<b>NSSP</b>	National Syndromic Surveillance Program
<b>RSV</b>	respiratory syncytial virus.

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