

## COVID-19 lockdown dropped the rate of paediatric asthma admissions

During the first 5 weeks of the state's lockdown for coronavirus disease 2019 (COVID-19), from 16 March to 20 April 2020, we observed a 71% to 78% decrease in paediatric asthma admissions compared with the same time periods in the last 3 years. Regarding common asthma attack triggers, there was a 51% to 68% decrease in admissions for acute respiratory tract infections. Airborne pollen concentrations were within seasonally expected limits. A 48% to 58% reduction in the air nitrogen dioxide (NO<sub>2</sub>) level was detected, but concentrations of particulate matter with a diameter of less than 10 µm (PM<sub>10</sub>) did not change substantially (table 1).

Data on admissions represent official hospital statistics. Data on pollen and air pollutants' concentrations were provided by the Institute of Public Health of the Republic of Slovenia and the Slovenian Environment Agency, respectively.

We systematically monitor paediatric asthma hospitalisation rates as a

**Table 1** Descriptive data of asthma and respiratory tract infection admissions at Ljubljana Children's Hospital, mean daily pollen count, and the concentrations of nitrogen dioxide and particulate matter with a diameter of less than 10 µm for the city of Ljubljana, Slovenia, for the observed period, 16 March to 20 April 2017–2020

	2020	2019	2018	2017
Asthma admissions	2	9	9	7
Respiratory tract infection admissions	20	41	49	63
Birch pollen (grains/m <sup>3</sup> ), mean SD	148 (200)	146 (188)	241 (299)	145 (198)
Grass pollen (grains/m <sup>3</sup> ), mean SD	5 (4)	4 (1)	2 (1)	4 (2)
NO <sub>2</sub> (µg/m <sup>3</sup> ), mean SD	13 (7)*	28 (11)	25 (9)	31 (13)
PM <sub>10</sub> (µg/m <sup>3</sup> ), mean SD	33 (39) 23 (7)†	24 (8)	21 (9)	25 (12)

European Union (EU) and WHO air quality annual mean limit values for NO<sub>2</sub> (40 µg/m<sup>3</sup>) and PM<sub>10</sub> (40 µg/m<sup>3</sup>, WHO 20 µg/m<sup>3</sup>).

\*p<0.001 for difference between means 2020 vs 2019, 2018, 2017.

†Average PM<sub>10</sub> concentration without 3 days, 26–29 March 2020, episode of desert dust.

NO<sub>2</sub>, nitrogen dioxide; PM<sub>10</sub>, particulate matter less than 10 µm in diameter.

quality-of-care indicator. Longitudinal trends predict a spring admission peak. The absence of an expected increase could indicate parents' fear of attending healthcare facilities during the COVID-19 pandemic.<sup>1</sup> During lockdown, both hospitalised asthma cases received timely medical attention and improved after first-line treatments were administered. None was admitted to the intensive care unit.

Early reports on severe COVID-19 in people with chronic lung disease have caused considerable concern in parents of children with asthma. Guidance to regularly administer prescribed preventative drugs was provided to the public in a timely manner. Almost no routine outpatient visits occurred during the lockdown. Instead, 422 out of 491 scheduled patients with asthma were reached by phone. A large majority reported taking preventative medicines. A total of 176 drug prescriptions were issued.

Viral respiratory infections are frequent triggers of asthma attacks in children. The implemented shutdown measures aimed to limit viral disease transmissions. Consequently, hospitalisations due to respiratory infections progressively dropped, reaching two instead of the expected 12 per week in lockdown week 5. Importantly, none of the hospitalised patients with asthma were SARS-CoV-2 positive.

High pollen counts and air pollutant exposure have been linked to increased asthma exacerbation and admission rates.<sup>2,3</sup> Over the observed period, seasonally expected levels of airborne birch and grass pollens were counted. Enforced 'stay-at-home' measures limited outdoor activities by patients. Nevertheless, both hospitalised patients were allergic to grass pollen.

Substantial air quality improvement during the lockdown has been reported.<sup>4</sup> Similarly, we observed a significant decrease in urban background NO<sub>2</sub> levels. Of note, 3 days of extremely high daily PM<sub>10</sub> values were detected due to a large desert dust outbreak. This event did not significantly alter the cumulative daily mean PM<sub>10</sub> concentration nor did it affect asthma admission events after a lag period.

Citizens' adherence to strict lockdown measures effectively limited COVID-19 spread throughout the community and saved many human lives. Moreover, these unprecedented social circumstances also dropped the occurrence of common childhood illnesses that require hospital care, such as asthma.

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**Contributors** UK: provided and analysed the data, drafted, revised and approved the manuscript. AKS: provided and analysed the data, revised and approved the manuscript. JT: provided and analysed the data, revised and approved the manuscript.

**Funding** The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

**Competing interests** None declared.

**Patient consent for publication** Not required.

**Provenance and peer review** Not commissioned; internally peer reviewed.

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**To cite** Krivec U, Kofol Seliger A, Tursic J. *Arch Dis Child* 2020;**105**:809–810.

Accepted 16 May 2020

Published Online First 22 May 2020

*Arch Dis Child* 2020;**105**:809–810.

doi:10.1136/archdischild-2020-319522

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