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Closing Finnish schools and day care centres had a greater impact on primary care than secondary care emergency department visits

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The Finnish Government declared a state of emergency on 16 March 2020, three days after the World Health Organization declared COVID-19 a pandemic. All schools were closed and day care was only provided if parents were key workers. They were reopened in May when it became clear that COVID-19 was less severe in children and they were less likely to spread the disease than adults.

We previously showed that lockdown restrictions effectively reduced the spread of other respiratory infections than COVID-19 and that the influenza and respiratory syncytial virus seasons were shorter in 2020 than the previous four years. (1) An American study also reported that social distancing measures reduced paediatric emergency room visits due to infectious diseases and even urinary tract and soft tissue infections (2).

Meanwhile, a Canadian study showed that paediatric emergency departments saw fewer acute trauma cases during social isolation in spring 2020 (3). Another American study highlighted that isolation could have delayed treatment and led to increased poisoning, domestic abuse and child and adolescent mental health disorders and decreased vaccinations (4).

This retrospective, observational, cross-sectional study examined the effects the school and day care closures had on paediatric hospital visits. It was based on the patient discharge records at Mikkeli Central Hospital, a secondary level hospital with a paediatric emergency room, which provides round-the-clock primary and secondary level care for a paediatric population of up to 19,000. These numbers were virtually unchanged from 2019 to 2020, so we compared visits rather than incidence rates.

The study period from 1 January 2020 to 30 September 2020 was compared with the corresponding dates in 2019. We collected the dates of primary care and secondary care emergency department visits, the patient's age and whether they were hospitalised. The data divided age groups: under one year of age, day care (1-6 years) and lower (7-12

years) and upper (13-15 years) elementary school. The chi-square test was used for categorised variables and the Mann-Whitney U test for continuous variables. The analyses were carried out with SPSS for Windows, version 27.0 (IBM Corp, New York, USA). The Hospital gave us permission to access the discharge register data and no further approval or permission was required as we studied retrospective, anonymised data.

The total number of visits clearly fell in 2020. The analyses comprised 9,931 visits: 4,490 (45.8%) in 2020 and 5,441 (54.2%) in 2019. Primary care emergency department visits were 3,579 (79.7%) in 2020 and 4,421 (81.3%) in 2019. Secondary care emergency department visits were 911 (20.3 %) in 2020 and 1,020 (18.7%) in 2019. The weekly median number of emergency department visits was 122 (IQR 45) in 2020 and 139 (interquartile range 30) in 2019 ($p < 0.001$) (Figure S1). The 2020 decrease was most prominent among patients aged 1-6 years and also seen, to a lesser extent, in those aged 7-12 years. The short re-opening of the schools and day care centres before the summer vacation did not increase emergency department visits. However, they did reach 2019 levels during the summer vacations and had remained at 2019 levels in September 2020 (Figure S1).

The fall in all hospital emergency department visits when the schools and day centres were closed was mostly due to decreased primary care visits, as the secondary level visits remained more stable (Figure S2). In 2020, 275 (6.1%) children were hospitalised, compared to 435 (8.0%) in 2019 ($p < 0.001$).

Closing schools and day centres immediately decreased emergency department visits by paediatric patients and, when they reopened in late spring, this did not have any immediate effect on visits. After that the rate increased slightly in children aged 1- 6 years, which may be because children in day care have a higher risk of infections (5). However, re-opening day care centres did not increase emergency visits as fast as lockdown reduced them. The impact of social distancing was immediate and the rates only started to recover a few weeks after the day care restrictions were eased.

The decrease in emergency department visits during lockdown was not as prominent in children aged 7-12 as in children attending day care and the summer vacation period and

the start of the new school term in August had no effect on this age group. As Figure S1 shows, there were little differences in children under the age of one and adolescents aged 13-15 years.

The strengths of this study were the fast reporting of precise real-life data from patient discharge registers. The study Hospital provides primary and secondary level care and should provide good estimates of Finnish hospital emergency department visits. The limitation was that we were only able to report total weekly visits from one Finnish hospital. The national visit rates for 2020 will not be available until late 2021.

Our study shows that closing school and day care centres decreased paediatric hospital visits and reopening them did not immediately increase these rates. However, they did increase to the 2019 levels during the summer. Most of the reductions were in primary care visits and it is unlikely that emergency cases went untreated during the COVID-19 lockdown. These results will inform future decision making on how school and day care closures impact hospital visits.

CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare

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