

## PERSPECTIVE

# Restrictions for COVID-19 prevented other respiratory infections and reduced emergency visits in children

## 1 | INTRODUCTION

The World Health Organisation (WHO) declared COVID-19 a pandemic on 11 March 2020, which globally induced restrictive measures ranging from recommendations for social distancing to full societal lockdowns. The restrictions for children varied between the countries, depending on differences in the phase of the pandemic and day care and school systems. Three researcher groups in Finland have reported influences of these restrictions on respiratory infections in children and on prescriptions of antibiotics. This perspective article aims to summarise these influences, including a discussion on what we can learn about these observations for future post-pandemic times.

## 2 | RESTRICTIONS IN FINLAND

Finland went into lockdown in March 2020, which for example consisted of closing of schools, and day care centres for young children if their parents were not key workers. Face masks were not required. Restrictions were reduced in May 2020 when the numbers of COVID-19 cases decreased. In September 2020, the COVID-19 rates raised again, and the second wave of the pandemic began. Restrictions were in most part returned but, however, day care centres and schools were not closed, and the hobbies of the children were allowed. Face mask recommendation at public places and transports came into force for people aged >15 years. These second wave restrictions in 2020 were targeted to adults and to the indoor hobbies of children, but outdoor hobbies such as physical education and sport activities were allowed. The subsequent waves were milder due to large-scale adult vaccinations, and from 2021, restrictions were based on regional infection rates.

## 3 | EARLY EUROPEAN EXPERIENCES

Several studies have shown that the restrictive measures during the first wave of the COVID-19 pandemic in spring 2020 reduced the rates of other infections in children, such as respiratory tract and

intestinal infections.<sup>1</sup> The first observations on paediatric health care came from Italy, where after the lockdown, numbers of emergency visits, hospitalisations for respiratory infections, and prescriptions and reimbursements of antibiotics decreased in children.

## 4 | EXPERIENCES FROM FINLAND

In 2019, over 12000 children visited for lower respiratory tract infection (LRTI) the primary care clinics of the largest private health-care company of the country, and in 2020, the number of visits was about 5000.<sup>2</sup> The decrease was 61% for bronchitis and 49% for community-acquired pneumonia. Prescriptions of antibiotics decreased by more than 20% for children younger than 5 and older than 10 years of age, and this reduction came mainly from less prescribing of macrolides for children with bronchitis.<sup>2</sup> Instead, the proportion of amoxicillin used for community-acquired pneumonia increased.<sup>2</sup> Overall, the costs for antibiotics decreased in line with less prescriptions. These observations suggest that children who visited primary care presented with more severe respiratory infections during the pandemic than before it. The numbers of respiratory infections decreased due to less viral circulation in child population, but in addition, the numbers of visits which the parents did not consider essential reduced.

In two hospitals, which together covered one-fifth of the Finnish child population, visits at emergency departments decreased by 63% to 72%, when 4 weeks before and 4 weeks during the lockdown were compared.<sup>1</sup> Based on the nationwide infection register data, the influenza and respiratory syncytial virus (RSV) epidemics which were ongoing at the time of lockdown, subsided significantly more quickly in spring 2020 than the corresponding epidemics in previous years.<sup>1</sup> The social restrictions after the lockdown reduced the burdens of RSV and influenza infections in children but failed to prevent the circulation of rhinoviruses.<sup>3</sup> When the national register-based virus data were compared in relation to closing and re-opening of schools and day care centres, closures immediately decreased paediatric emergency room and department visits, but re-opening increased these rates with a delay. In addition, different viruses seem to have different influences, as seen for influenza, RSV, and rhinoviruses.

**Abbreviations:** RSV, respiratory syncytial virus; LRTI, lower respiratory tract infection; WHO, World Health Organisation.

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A prospective study, which started at 27 December 2019 when first influenza cases were identified in the area, was aimed to evaluate the role of influenza virus in viral infections of infants.<sup>4</sup> RSV epidemic was already going on in the area. The inclusion criteria of the study were cough, fever, and age < 12 months, and 117 infants admitted to the emergency department of an academic hospital were recruited before 6 May 2020. RSV and influenza infections stopped rapidly by 15 March, followed by gradual ceasing of other respiratory infections during the spring.<sup>4</sup> Finally, the epidemic of RSV infections was mild and short in 2020 obviously because of lockdown measures and closures of schools and most day care centres due to the COVID-19 pandemic. The results raise a question whether some restrictions targeted to families with infants, such as avoiding of crowded places and mass events, and even use of face masks by adults and siblings aged >15 years when distancing is not possible, could be useful during coming RSV epidemics.

A retrospective register study exploited the data on purchased antibiotics obtained from the Finnish national prescription register maintained by the Social Insurance Institution.<sup>5</sup> The data included over 330,000 prescriptions for antibiotics dispensed to children aged 0–12 years in 2019 (69%) and in 2020 (31%). Overall, prescriptions of antibiotics to these children decreased by 55%, and the decrease was most prominent (60%) for macrolides in children aged 0–5 years.<sup>5</sup> The costs decreased accordingly. Thus, restrictions due to the COVID-19 pandemic led to reductions of doctor visits for children's respiratory infections, and further to halving of antibiotic consumption and costs related to antibiotics. The results are important from different perspectives, including the perspective of emergence of bacterial antibiotic resistance and of the stewardship of available antibiotics.

## 5 | DISCUSSION

The restrictions aimed to prevent the uncontrollable spread of COVID-19 pandemics included lockdown of the society and closing of schools and day care centres, and after them, limitations of travelling, and based on local decisions, limitations of children's indoor hobbies continued. No doubt, these restrictions caused substantial harmful effects on children's social well-being and even on their mental health, as well as on prevention, early diagnosis, and appropriate treatment of chronic diseases. Instead, the effects on occurrence of common infections and on antibiotic consumption were mainly positive.

Respiratory syncytial virus and influenza epidemics were milder and shorter than usual, or even did not at all start in some areas. Influenza viruses cause epidemics annually and can be prevented with vaccinations and treated with antiviral drugs in severe cases. In Finland, RSV causes nationwide epidemics every other year and minor outbreaks between the large epidemics. RSV infections may be severe in infants, and the only prevention, use of monoclonal antibodies, is justified only for young infants who are at a special risk, such as preterm infants and infants with underlying heart or lung diseases.

Avoiding of crowded places, providing smaller day care groups during infection seasons, enhancement of hygiene at home and in

day care, and even discontinuing of day care during the peaks of major RSV epidemics are potential measures. The parents and older children of the families can reduce the risk of bringing the virus to home by avoiding crowded places and mass events and using face masks for example when using public transport.

## 6 | CONCLUSION

Social distancing and other restrictions due to the COVID-19 pandemic, such as closure of schools and day care centres, reduced the circulation of common viruses in child population and even halved the occurrence of respiratory infections and prescriptions for antibiotics in children. These observations raise the question whether some of these restrictions, of course in more targeted form, could be applied for the prevention of RSV epidemics and reduction of complications of RSV infections in young children.

## CONFLICT OF INTEREST

None.

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