

BRIEF REPORT

Social distancing during the COVID-19 pandemic resulted in a marked decrease in hospitalisations for bronchiolitis

Bronchiolitis is the most common acute viral infection of the lower airways in infants and the main cause of hospitalisation and death from viral infections in western countries. The worldwide COVID-19 pandemic has led to most countries adopting social distancing measures and population movement restrictions to reduce transmission of the severe acute respiratory syndrome coronavirus 2 infection. During the 2020–2021 winter season, social distancing and mask use altered the spread of common viral respiratory infections, reducing the incidence of winter epidemics.¹ The aim of this study was to investigate what impact social distancing measures had on the hospitalisations for bronchiolitis in two paediatric children's hospitals in Italy.

This was a multicentre retrospective study performed at the children's hospital Institute for Maternal and Child Health IRCCS Burlo Garofolo of Trieste, Italy, and the Bambino Gesù Children's Hospital IRCCS, Rome, Italy. We collected the medical records of all children admitted with a final diagnosis of bronchiolitis from 1 September to 28 February in 2018–2019, 2019–2020 and 2020–2021. They were included if they were less than one year of age and had a clinical diagnosis of bronchiolitis that required hospitalisation. The following data were compared: age, sex, weight at admission, weight at birth, gestational age at birth, virology results, need for oxygen therapy, need for non-invasive or invasive ventilatory support, length of hospital stay and admission to paediatric or neonatal intensive care units. The primary study outcome was the number of hospital admissions for bronchiolitis between the 2020 and 2021 winter season and the two previous ones.

We reported categorical variables as numbers and percentages and continuous variables as means and standard deviations.

Only eight patients were hospitalised for bronchiolitis in 2020–2021, compared to 148 in 2019–2020 and 140 in 2018–2019. None of the neonates or infants needed intensive care in 2020–2021 (Table 1). The cumulative number of days spent by those eight patients on paediatric wards for bronchiolitis in 2020–2021 was 32 days, which was significantly lower than the cumulative stays for the admissions in the previous two years: 891 days in 2019–2020 and 754 days in 2018–2019. In addition, 17 (11%) of the patients in 2019–2020 and 15 (11%) in 2018–2019 were admitted to intensive care, where they spent a total of 132 days and 81 days respectively. We found that seven of the eight patients admitted during winter 2020–2021 had positive nasal swab tests for rhinoviruses and one was positive for the respiratory syncytial virus.

This study shows that the number of hospitalisations for bronchiolitis fell by a dramatic 95% in 2020–2021, and this resulted in a mean of 16 spared admissions to intensive care units compared to the previous two years.

Previous studies have already shown that social distancing measures had a profound impact on the seasonality of winter paediatric respiratory infections in children. This led to marked limitation of the spread of respiratory syncytial virus and influenza infections.^{1–3}

COVID-19 has spread globally since the coronavirus that causes it was first detected in China. The Italian government established a national lockdown from 9 March to 4 May 2020. All commercial activities, factories, offices and schools were closed, and people were asked to stay at home. Healthcare services were only open for emergencies or undelayable needs. In September 2020, the need to wear face masks in public was reinstated, and from November 2020, different levels of social distancing were established, which resulted in regional variations in epidemiological data. Schools for younger students reopened from September 2020. However, we did not observe a recurrence of respiratory syncytial virus bronchiolitis during the 2020–2021 winter season, despite the reduction in social restrictions, in contrast to other reports.⁴

Rhinovirus was the main pathogen isolated in our series. Similar findings had already been reported for the first pandemic wave.⁵ The explanation for this phenomenon is not clear. However, we can speculate that non-enveloped organisms may be more resistant to products containing ethanol and stay longer on environmental surfaces, reducing the efficacy of social distancing measures.

This study had several limitations as it was retrospective and only performed in two children's hospitals in Italy. We cannot exclude that some cases were missed due to misclassification. In addition, we focussed our research on hospitalised patients and this limits the generalisation of our results.

In conclusion, this study shows a marked decrease in hospitalisations and intensive care admissions for bronchiolitis in winter 2020–2021, and respiratory syncytial virus infections were almost totally absent. Such reductions were principally related to the social distancing measures established to decrease the spread of the COVID-19 pandemic.

Continuous surveillance is mandatory in order to detect a delayed onset of bronchiolitis in spring and summer, as reported in the southern hemisphere.⁴

	2018–2019	2019–2020	2020–2021
Number	140	148	8
Age at admission (days)	66 ± 65	70 ± 62	75 ± 87
Weight at admission (kg)	5.0 ± 1.5	5.1 ± 1.6	5.9 ± 3.6
Gestational age (weeks)	39 ± 1.8	38 ± 2.0	39 ± 1.4
Birth weight (kg)	3.2 ± 0.6	3.1 ± 0.5	3.5 ± 0.3
Respiratory syncytial virus cases	91 (65%)	113 (76%)	1 (12%)
Rhinovirus cases	29 (21%)	28 (19%)	7 (87%)
Patients who needed oxygen therapy	67 (48%)	90 (61%)	0
Respiratory support rather than just oxygen: n (%)	53 (38%)	63 (42%)	3 (37%)
HFNC	46 (32%)	49 (33%)	3 (37%)
CPAP/NIV	20 (14%)	34 (23%)	0
Mechanical ventilation	1 (1%)	6 (4%)	0
Intensive care admissions n (%)	15 (11%)	17 (11%)	0

TABLE 1 Children admitted to two Italian hospital with bronchiolitis during three winter seasons from 1 September to 28 February

Note: Data are expressed as means and standard deviations or numbers and percentages. Statistical analysis: *p* values calculated using the analysis of variance test to compare discrete variables and Kruskal-Wallis test for categorical variables.

Abbreviations: CPAP, continuous positive air pressure; HFNC, high flow nasal cannula; NIV, non-invasive ventilation.

CONFLICT OF INTERESTS

The authors have no conflict of interests to declare.

Francesco Maria Risso¹
 Giorgio Cozzi² 
 Mariangela Volonnino³
 Francesca Cossovel³ 
 Nicola Ullmann⁴ 
 Marta Luisa Ciofi degli Atti^{5,6}
 Alessandro Amaddeo² 
 Sergio Ghirardo^{4,5} 
 Renato Cutrera⁴ 
 Massimiliano Raponi^{5,6}

innovation research unit, Academic Department of Pediatrics.
 Clinical, management and technology innovation research unit,
 Medical Direction, Bambino Gesù Children's Hospital IRCCS,
 Rome, Italy.

Email: ghirardo.sergio@gmail.com

ORCID

Giorgio Cozzi  <https://orcid.org/0000-0002-6427-1366>
 Francesca Cossovel  <https://orcid.org/0000-0002-0382-3825>
 Nicola Ullmann  <https://orcid.org/0000-0003-1111-5690>
 Alessandro Amaddeo  <https://orcid.org/0000-0003-2117-0781>
 Sergio Ghirardo  <https://orcid.org/0000-0002-6329-4208>
 Renato Cutrera  <https://orcid.org/0000-0001-7711-5672>

REFERENCES

- Amaddeo A, Cason C, Cozzi G, Ronfani L, Comar M. Social distancing measures for COVID-19 are changing winter season. *Arch Dis Child*. 2021. <https://doi.org/10.1136/archdischild-2021-322004>. Online ahead of print.
- Kuitunen I. Influenza season 2020–2021 did not begin in Finland despite the looser social restrictions during the second wave of COVID-19: A nationwide register study. *J Med Virol*. 2021;93(9):5626–5629. <https://doi.org/10.1002/jmv.27048>
- Kuitunen I, Renko M. Lessons to learn from the current pandemic for future non-pharmaceutical interventions against the respiratory syncytial virus - nationwide register-study in Finland. *Infect Dis (Lond)*. 2021;53:476–478.
- Foley DA, Yeoh DK, Minney-Smith CA, et al. The interseasonal resurgence of respiratory syncytial virus in Australian children following the reduction of coronavirus disease 2019-related public health measures. *Clin Infect Dis*. 2021. <https://doi.org/10.1093/cid/ciaa1906>. Online ahead of print.
- Takashita E, Kawakami C, Momoki T, et al. Increased risk of rhinovirus infection in children during the coronavirus disease-19 pandemic. *Influenza Other Respir Viruses*. 2021;15:488–494.

¹Neonatology and Neonatal Intensive Care Unit, Institute for Maternal and Child Health - IRCCS Burlo Garofolo, Trieste, Italy
²Emergency department, Institute for Maternal and Child Health - IRCCS Burlo Garofolo, Trieste, Italy
³University of Trieste, Trieste, Italy
⁴Pediatric Pulmonology & Respiratory Intermediate Care Unit, Academic Department of Pediatric, Bambino Gesù Children's Hospital IRCCS, Rome, Italy
⁵Clinical, management and technology innovation research unit, Medical Direction, Bambino Gesù Children's Hospital IRCCS, Rome, Italy
⁶Medical Direction, Bambino Gesù Children's Hospital, IRCCS, Rome, Italy

Correspondence

Sergio Ghirardo, Pediatric Pulmonology & Respiratory Intermediate Care Unit, Clinical, management and technology