

Waiting for the next winter. Outpatient pediatric visits for respiratory infections before, during and after the COVID-19 pandemic in the city of Buenos Aires

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Introduction

Acute lower respiratory infections (ALRIs) are the main cause of illness and hospitalization in children, and their most frequent etiology is viral (1). During the COVID-19 pandemic, a decrease in pediatric visits for respiratory causes was observed (2,3), probably because the nonpharmacological mitigation measures used to face the pandemic altered the circulation of the most common respiratory viruses.

However, many of the reports refer to a specific disease (bronchiolitis) or to a particular virus (respiratory syncytial virus (RSV) and influenza), include data from one or a few centers, or refer to hospitalized patients (4,5,6). In contrast, there is little information on the magnitude of this phenomenon in larger populations, especially in relation to less seriously affected patients, who tend to be the majority in the case of ALRIs. Unfortunately, recording the reasons for health facility visit due to ALRIs can be confusing (7). Despite the different coding systems used, there is still difficulty in identifying ALRI-related visits (8). We recently developed an algorithm that showed acceptable precision in the identification of ALRI-related visits in electronic health records, based not only on the reasons for consultation or identified diseases but also on terms used by professionals in the text of the registry (9). The public health system of the City of Buenos Aires has electronic health records for ambulatory care areas before the pandemic, allowing a precise evaluation of the impact of the pandemic on outpatient visits for different causes in a large urban population.

Our objective was to evaluate the impact of the COVID-19 pandemic on outpatient visits for acute lower respiratory infections in the city of Buenos Aires.

Methods

This was an observational study that included all visits at health facilities of the public health system of the City of Buenos Aires (Gobierno de la Ciudad de Buenos Aires - GCABA) for children under 2 years of age, registered in the GCABA electronic health records, between January 1, 2018, and December 31, 2022. The visits occurred at one of the hospitals or primary care centers of the system (10).

To identify the visits in the GCABA health database, a validated algorithm was (9).

The total number of visits and ALRIs-related visits and their distribution throughout the study period, by year and by season (cold months - autumn/winter: April, May, June, July, August and September -,

and warm months - spring/summer: October, November, December, January, February and March) were evaluated.

The proportion of ALRIs-related visits was calculated (percentage with 95% CI). The proportion of ALRIs-related visits was compared between different years (chi square for trend) and seasons (chi square). The analysis was carried out using IBM-SSPS Statistics 22.0. Data were conveniently anonymized. Approval by the Institutional Ethics Committee was requested and obtained (GCABA public research registry number 7141/2022).

Results

In the period under study, 704,426 outpatient visits were registered for children under 2 years of age in hospitals and primary care centers of the GCABA. The average age of the patients was 0.8 ± 0.5 months, and 48% were male. Of the total number of visits, 51,975 (7.38%; 95% CI 7.32-7.44) were ALRIs-related. The total number of visits, particularly those ALRIs-related, decreased significantly during 2020 (Table 1). In general, the proportion of ALRIs-related visits was significantly higher in cold months than in warm months (9.8% vs. 5.5%; OR: 1.76 95% CI: 1.73-1.79; $p < 0.001$). This distribution was clearly observed before (2018, 2019) and after the pandemic (2022); during 2020, it was reversed (more ALRI in warm months), and in 2021, no difference was observed (Table 2). A peak of ALRI-related visits occurred in the cold-month period in the pre-pandemic years (2018-2019); there was no peak in 2020; and the peak was delayed in 2021, with a recovery of pre-pandemic seasonality in 2022 (Figure 1). Visits for ALRIs decreased after the institution of mobility restrictions (March 2020) and increased again when the restrictions decreased, in particular with the return to full school attendance (July 2021) (Figure 1).

Discussion

In countries with a temperate climate, ALRIs usually have a seasonal pattern with an increase in cold months, following the circulation of the main viruses responsible for such infections (RSV and influenza virus); this pattern is observed both in the Northern Hemisphere and in the Southern Hemisphere (11,12). In our study, in 2018 and 2019, we verified this pattern in the city of Buenos Aires, with cases of ALRI appearing in the cold months and peaking in June, the beginning of the southern winter. During the first year of the COVID-19 pandemic, a drastic decrease was observed in health visits in general, and in visits for respiratory infections in particular, for the pediatric population around the world (13,14). This decrease was fundamentally attributed to the nonpharmacological mitigation measures that adopted to reduce the risk of SARS-CoV-2 infection: the use of face masks, frequent hand washing and social distancing measures, including school closings and public circulation limitations (15). In this study, in 2020, the number of cases of ALRIs decreased after the establishment of a national-wide lockdown at the end of the summer (16), remaining very low during the rest of the year, without showing a characteristic winter peak. This phenomenon is similar to that reported in other countries in the Southern Hemisphere, such as Brazil (17) and Australia (18), where there was a decrease in cases of bronchiolitis and hospitalizations for respiratory causes among the pediatric population in that period. In the Northern Hemisphere, during the first pandemic winter (2020-2021) and with mitigation measures still in force, similar findings were described: in cities in northern Italy (19) and in England (20), a decrease was observed in the number of pediatric hospitalizations and, particularly, in the incidence of RSV bronchiolitis between October 2020 and March 2021. During 2021, mitigation measures gradually decreased, and the circulation of common respiratory viruses reappeared (21). In this study, the cases of ALRIs increased in winter 2021 but later and with a somewhat lower intensity than in the pre-pandemic years (2018-2019). This phenomenon was also reported in relation to cases of RSV infection in pediatric hospitals in Buenos Aires (22,23). A similar delay in the onset of respiratory infections was observed in the Northern Hemisphere in the winter of 2021-2022 (24,25). In 2022, the winter increase in ALRIs cases occurred earlier and with greater intensity than in 2021, approaching pre-pandemic values. Something similar was observed in the Northern Hemisphere (2022-2023), with the seasonal cycle of RSV circulation moving toward pre-pandemic patterns (25). As mentioned above, most of the studies on the impact of the pandemic

on pediatric respiratory infections include hospitalized patients and/or those affected by RSV or influenza. As the spectrum of viruses responsible for ALRIs in outpatients may be different (including rhinoviruses and parainfluenza viruses) (26), the impact could have been different in these patients. However, our study, which included only outpatient visits, showed similar results, indicating that the impact of the pandemic was similar for all viruses responsible for ALRIs. During the pandemic, the circulation of respiratory viruses was greatly altered, and there were questions regarding whether the usual pattern would re-emerge (27). This study provides evidence that a return to the usual seasonal patterns of viral circulation is occurring. The pandemic highlighted, on several occasions, the need to be prudent in forecasting. In particular, children were affected by the pandemic in an indirect way (not related to the SARS-Cov2 virus) but to a much greater extent (domestic violence, eating disorders, anxiety, etc.) (28). Although there is a return of the circulation of common respiratory viruses to prepandemic patterns, it is unknown whether the immunological debt (29) of children has been fully settled or if a different pattern will emerge next winter.

Conclusion

Outpatient visits for ALRIs decreased significantly in the city of Buenos Aires during the COVID-19 pandemic and currently seem to have recovered their magnitude and seasonality.

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Table 1. Distribution of visits according to cause, by year

Year	ALRIs n (%)	Other n (%)	Total
2018	14683 (11,3%)	115434 (88,7%)	130117
2019	18327 (9,7%)	170575 (90,3%)	188902
2020	2441 (2,1%)	118944 (98,1%)	121385
2021	5998 (4,5%)	127175 (95,5%)	133173
2022	10526 (8,1%)	120323 (92,1%)	130849
Total	51975 (7,4%)	652451 (92,6%)	704426

ALRIs: Acute lower respiratory infections

Table 2. Distribution of ALRIs-related visits according to season, by year

Year (total n)

Cold months n (%)

Warm months n (%)

OR (IC 95%)

p

2018 (n = 130117)

8742 (15,3)

5491 (8,2)

1,86 (1,81-1,91)

<0,001

2019 (n = 188902)

11349 (13,6)

6978 (6,6)

2,1 (2,01-2,12)

<0,001

2020 (n = 121649)

475 (1,1)

1966 (2,5)

0,4 (0,38-0,47)

<0,001

2021 (n = 133173)

2713 (4,6)

3285 (4,4)

1,04 (0,99-1,09)

0,09

2022 (n = 130849)

6645 (10,6)

3881 (5,7)

1,8 (1,78-1,92)

<0,001

Total (n = 704426)

29924 (9,8%)

22051 (5,5)

1,76 (1,73-1,79)

<0,001

ALRIs: Acute lower respiratory infections

Figure 1. Monthly distribution of ALRIs-related visits during the study period

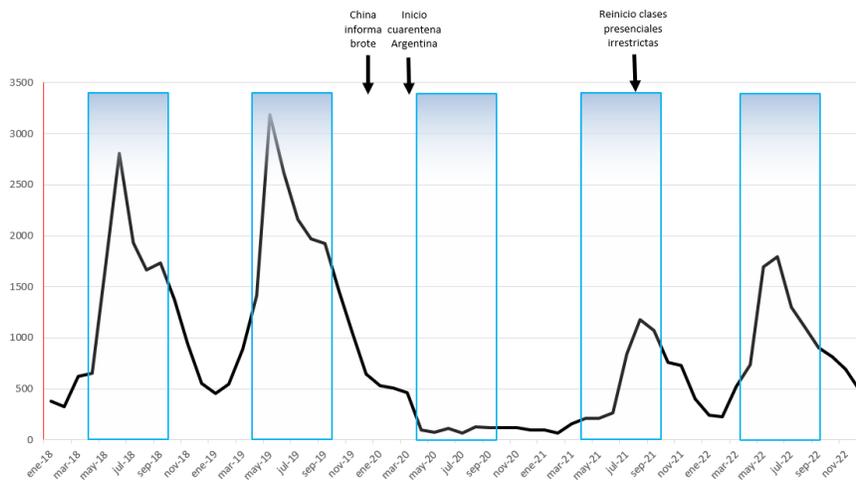


Figure 1:

(The shaded boxes indicate the "cold months" period -autumn/winter-)