

# Epidemiological characteristics of pediatric patients with COVID-19 in General Cabrera, Córdoba, Argentina, across 3 periods of the pandemic

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## ABSTRACT

**Introduction.** The onset of the SARS-CoV-2 pandemic raised questions about its behavior in different scenarios.

**Objective.** To describe the clinical and epidemiological behavior of COVID-19 in pediatric patients living in an agricultural-industrial city across 3 periods (2020 to 2022).

**Population and methods.** Observational, analytical study of children under 18 years diagnosed with COVID-19 in General Cabrera. Sex, age, symptoms, comorbidities, hospitalization, and death were analyzed. The  $\chi^2$  test was used to analyze the association between symptoms and period and the Kruskal-Wallis test, to analyze differences in symptom duration per period. Confidence level: 95%.

**Results.** In the study period, 194 cases in children under 18 years were confirmed. Only 1% required hospitalization; no deaths were recorded. Children's median age was 14 years; 51% were boys; 68% were asymptomatic; 2% had associated comorbidities.

**Conclusion.** SARS-CoV-2 infection was low in pediatrics and showed a distinct behavior by period.

**Keywords:** COVID-19; child; adolescent; comorbidity; epidemiology.

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## INTRODUCTION

Since the declaration of the pandemic on March 11<sup>th</sup>, 2020, the disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), known as COVID-19, has disseminated and generated a huge impact worldwide, not only in the healthcare setting but also in the financial and sociocultural context in an unprecedented manner.<sup>1–9</sup>

The first case of COVID-19 in General Cabrera was diagnosed on August 8<sup>th</sup>, 2020. The city is located in the south-central area of the province of Córdoba, Argentina, in the department of Juárez Celman. It is 188 km from the city of Córdoba, the provincial capital city, on national route 158, which keeps it connected to Villa María and Río Cuarto. It is an agricultural-industrial city with a projected population of 14 486 inhabitants in 2022.<sup>10</sup> According to data from the city's Office of Vital Records, 3705 inhabitants were under 18 years of age.

The bibliography reports a low incidence of COVID-19 in pediatric patients at the beginning of the pandemic, a trend that subsequently changed, with a predominantly asymptomatic clinical presentation in this age group;<sup>11</sup> however, the characteristics of COVID-19 may have been different in a more rural population. The objective of this study was to describe the clinical and epidemiological behavior of COVID-19 in pediatric patients living in an agricultural-industrial city across 3 periods between 2020 and 2022.

## POPULATION AND METHODS

This was an observational, longitudinal, retrospective, and analytical study in children under 18 years diagnosed with COVID-19 in the city of General Cabrera reported to the National Health Surveillance System (Sistema Nacional de Vigilancia de la Salud de Argentina, SNVS) in the period between epidemiological week (EW) 32 of 2020 and EW 22 of 2022. Subsequently, the reporting modality was changed from universal nominal to nominal for risk groups (people over 50 years and/or with comorbidities).

The variables analyzed were sex; age; presence, type, and duration of symptoms; comorbidities; hospitalization; death; and year of disease occurrence.

### Inclusion criteria

Any patient younger than 18 years with a positive result for SARS-Cov-2 by RT-PCR, loop mediated isothermal amplification (LAMP)

method, or rapid viral antigen test, who lived in the city of General Cabrera during the study period.

### Exclusion criteria

Any patient considered positive due to an "epidemiological link" or whose medical history did not contain the necessary data for analysis.

### Statistical analysis

Categorical and ordinal variables were described using absolute and relative frequencies, while median and interquartile range values were used for continuous variables. The Kruskal-Wallis test and  $\chi^2$  test were used to analyze association between the symptoms and the period during which they developed COVID-19. The level of significance was set at 95%. Data processing and analysis were done using the InfoStat/L (v.2020) Stata v17, Excel, and Microsoft Power BI statistical software programs.

### Ethical considerations

This project was assessed and approved by the Institutional Ethics and Health Research Committee of Instituto Médico Río Cuarto.

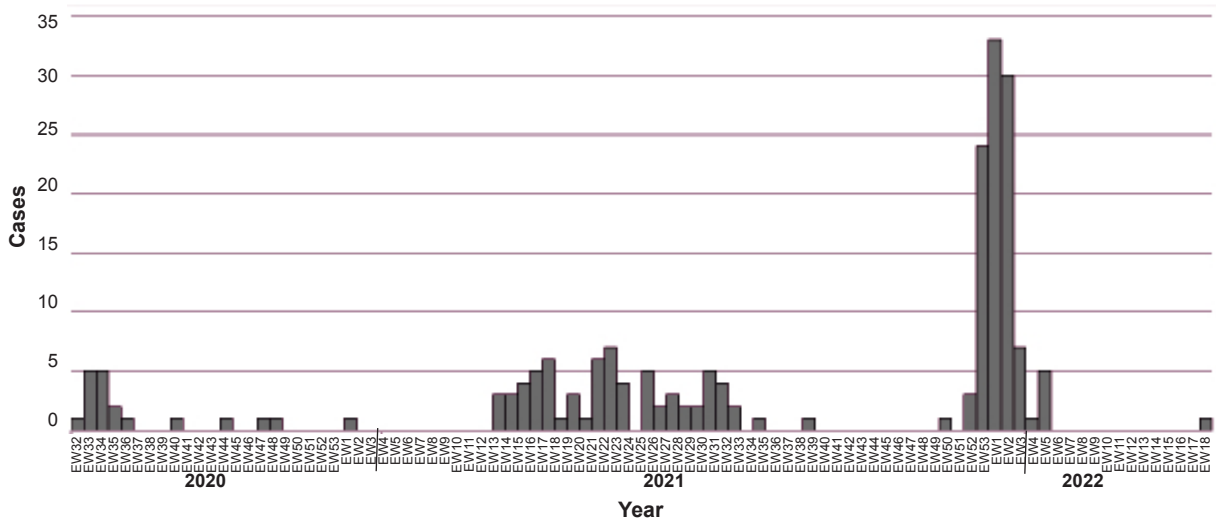
## RESULTS

A total of 3219 COVID-19 cases were confirmed between EW 32 of 2020 and EW 22 of 2022; 6% were children ( $n = 194$ ). Most cases, including pediatric cases, occurred in 2021; anyway, in 2022, cases took place mostly in the first 4 EWs (*Figure 1*).

Among confirmed pediatric cases, 51% ( $n = 99$ ) were boys; the median age for all children in the study was 14 years. The analysis of age by year shows that, in 2020, their median age was 12 years (interquartile range [IQR] = 4–14), whereas in the following 2 years, it was 14 years (IQR = 10–16).

In 68% ( $n = 132$ ) of pediatric cases, COVID-19 was asymptomatic, with a significantly higher proportion of asymptomatic patients in 2022 (79%,  $n = 64$ ) compared to 2020 (25%,  $n = 4$ ) and 2021 (66%,  $n = 64$ ) ( $p < 0.01$ ). Symptoms were fever, headache, anosmia in decreasing order in 2020; fever and non-specific symptoms in 2021 and 2022, except for a child with acute lower respiratory tract infection in 2022. In addition, the median duration of symptoms in days was significantly shorter in 2022 (6 days) compared to 2020 and 2021 (8.5 and 9 days,  $p < 0.01$ ).

Associated comorbidities were observed in 2% ( $n = 4$ ) of patients: 3 children had obesity and

**FIGURE 1. Epidemic curve of pediatric patients (n = 194) diagnosed with COVID-19 in the city of General Cabrera, 2020–2022**

Source: National Health Surveillance System.

1 had hypertension. No patient developed multisystemic inflammatory syndrome associated with COVID-19 (MIS-C) and no patient died. No significant differences were observed between the presence of symptoms and their duration or the presence of comorbidities by sex.

In addition, 1% (n = 2) of patients required

hospitalization; 1 in 2020 and another in 2022, who had obesity as an associated comorbidity; both patients were boys (Table 1).

## DISCUSSION

This article studied the clinical and epidemiological characteristics of pediatric

**TABLE 1. General characteristics of the pediatric population with COVID-19 by period in the city of General Cabrera**

	Period			Total (n = 194)	p value
Sex	2020 (n = 16)	2021 (n = 97)	2022 (n = 81)		
Female	6	44	45	95	0.252
Male	10	53	36	99	
Age (years)					
Median	12	14	14	14	0.18
IQR	4.5–14.5	11–16	11–16	10–16	
Symptoms					
No	4	64	64	132	< 0.01
Yes	12	33	17	62	
Symptom duration (days)					
Median	8.5	9	6	9	< 0.01
IQR	6–12	9–10	6–6	6–10	
Comorbidity					
No	15	95	80	190	0.38
HTN	0	1	0	1	
Obesity	1	1	1	3	
Hospitalization					
No	15	97	79	191	
Yes	1	0	1	2	

Source: National Health Surveillance System.

n: number; IQR: interquartile range; HTN: hypertension.

patients with a confirmed diagnosis of COVID-19, in the city of General Cabrera, province of Córdoba, Argentina, reported to the National Health Surveillance System between 2020 to 2022. There were differences in the behavior of COVID-19 in each of the study periods. The epidemic curve shows that, depending on the evolution of the pandemic, cases took place mostly in different weeks. In this regard, in 2021, 70% of the cases occurred between EW 13 and EW 32, while in 2022, 92% of cases were reported in the first 4 weeks. Likewise, the lowest proportion of pediatric cases was observed in 2020 (2% versus 7% in 2021 and 2022). This behavior is similar to that reported at a national level.<sup>4</sup>

The distribution of cases by sex was similar along the study timeline. The analysis of patient age at the time of COVID-19 diagnosis showed that patients who were infected in the first period were younger, which is in line with the data for the country. In our study, 1.5% (n = 3) of the patients were under 1 year old; at a national level, this value increased to 3.4% (n = 24 874).<sup>4</sup>

Once the total population is analyzed, it is observed that the pattern of spread and transmission in this group of patients followed the same pattern as in adults; in EW 2 of the third study period, the highest number of active cases in both age groups was observed, comparing the 3 years.<sup>11</sup>

Regarding symptoms, in 2020, 3 out of 10 children were asymptomatic, rising to 8 out of 10 children during the circulation of the omicron variant in the first weeks of 2022. Fever was the main symptom among those who developed symptoms. This is consistent with reviewed publications from Argentina that refer to fever as the main symptom in their cohort of patients.<sup>6</sup> No differences were found in the presentation of symptoms according to sex.

The median duration of symptoms in days shortened with each study period, reaching 6 days in 2022, which is consistent with the behavior of the new virus variants, which, over time, became more contagious, but less severe.<sup>12</sup>

At the time this article was written, the percentage of patients diagnosed with MIS-C<sup>13</sup> in Argentina was 3.1% (n = 226);<sup>4</sup> however, in General Cabrera, no case of MIS-C was reported in the study period.

In our study, 1% of patients required hospitalization. In contrast to our results, a multicenter study conducted in Argentina

reported that up to 59.4% of patients required hospitalization,<sup>6</sup> but the report refers to the beginning of the pandemic, when hospitalization criteria for children were different and included even mild cases. However, the European Centre for Disease Prevention and Control reported that the rates of hospitalization associated with COVID-19 until the end of 2022 were significantly lower compared to the rates for older people.<sup>14</sup>

The case fatality rate was 0% in children and adolescents in General Cabrera, while in our country, for the same indicator, the case fatality rate was 0.05% (n = 342).<sup>6</sup>

In conclusion, and consistent with other studies, SARS-CoV-2 infection had a low incidence in pediatrics, with mild or asymptomatic disease in most cases. ■

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