

Pediatric COVID-19 Cases Prelockdown and Postlockdown in Italy

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In Italy, 15.8% of the residents are children <18 years old: specifically, 1.4% from 0 to 1 years of age, 4.1% from 2 to 6 years of age, 5.6% from 7 to 12 years of age, and 4.8% from 13 to 17 years of age. Fewer cases of coronavirus disease 2019 (COVID-19) have been reported in children <18 years of age than in adults.¹ However, recent data indicate that the number and rate of pediatric cases are steadily increasing. During the lockdown phase, the incidence of COVID-19 was underestimated in children because of a lack of widespread testing and the priority of testing given to adults and patients with severe illness, whereas, now, the testing of mild and asymptomatic cases is leading to an increase in confirmed cases. The objective of the current study is to evaluate, before school starts, the impact of the transition phase (the progressive reopening of all activities starting from May 4 to September 13) of the epidemic on pediatric cases.

METHODS

The study population included children <18 years of age with laboratory-confirmed COVID-19 (by reverse transcription polymerase chain reaction–based commercial diagnostic tests for severe acute respiratory syndrome coronavirus 2) reported to the Italian surveillance system until September 13, 2020,¹ as per the case definition by the European Centre for Disease Prevention and Control.² To

identify the risk factors associated with the postlockdown phase, a multivariable logistic regression model was used, including sex, age groups (0–1, 2–6, 7–12, and 13–18 years), presence of pre-existing underlying medical conditions, severity of COVID-19 (considering the highest severity between baseline and follow-up), and geographic area of residency in Italy (Northwest, Northeast, Central, and South and Islands) as defined by the National Bureau of Census. The severity of the clinical state was defined as previously described.¹ The transition from restrictive policies during the lockdown phase (February 23 to May 3) to a lockdown easing with a progressive reopening of all activities (May 4 to September 13) was decided at the national level and began in all parts of Italy simultaneously.

RESULTS

As of September 13, 2020, 9868 pediatric COVID-19 cases have been reported in Italy, which represents 3.4% of all Italian cases. However, the rate of cases in children and adolescents has sharply increased since the beginning of the transition phase (May 4), from 1.8% during the lockdown to 8.5% (6197 of 73 206) during the postlockdown phase. Considering all case patients <18 years of age, a first peak of the outbreak at the end of March was followed by a second peak starting from the last week of August to the middle of September (Fig 1). Most asymptomatic

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Dr Bellino shared the initial idea of the study and performed the statistical analyses and drafted the manuscript; Drs Rota and Villani shared the initial idea of the study; Dr Riccardo contributed to the coordination of the Italian coronavirus disease 2019 (COVID-19) national surveillance; Dr Bella contributed to the coordination of the Italian COVID-19 national surveillance and supervised the surveillance data collection; Drs Andrianou, Mateo Urdiales, and Del Manso participated in the management, routine data analysis, data collection, and data quality of the Italian COVID-19 national surveillance; Dr Punzo participated in the revision of medical records and death certificates; Dr Pezzotti shared the initial idea of the study and is the head of the Italian COVID-19 surveillance system; and all authors revised and approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

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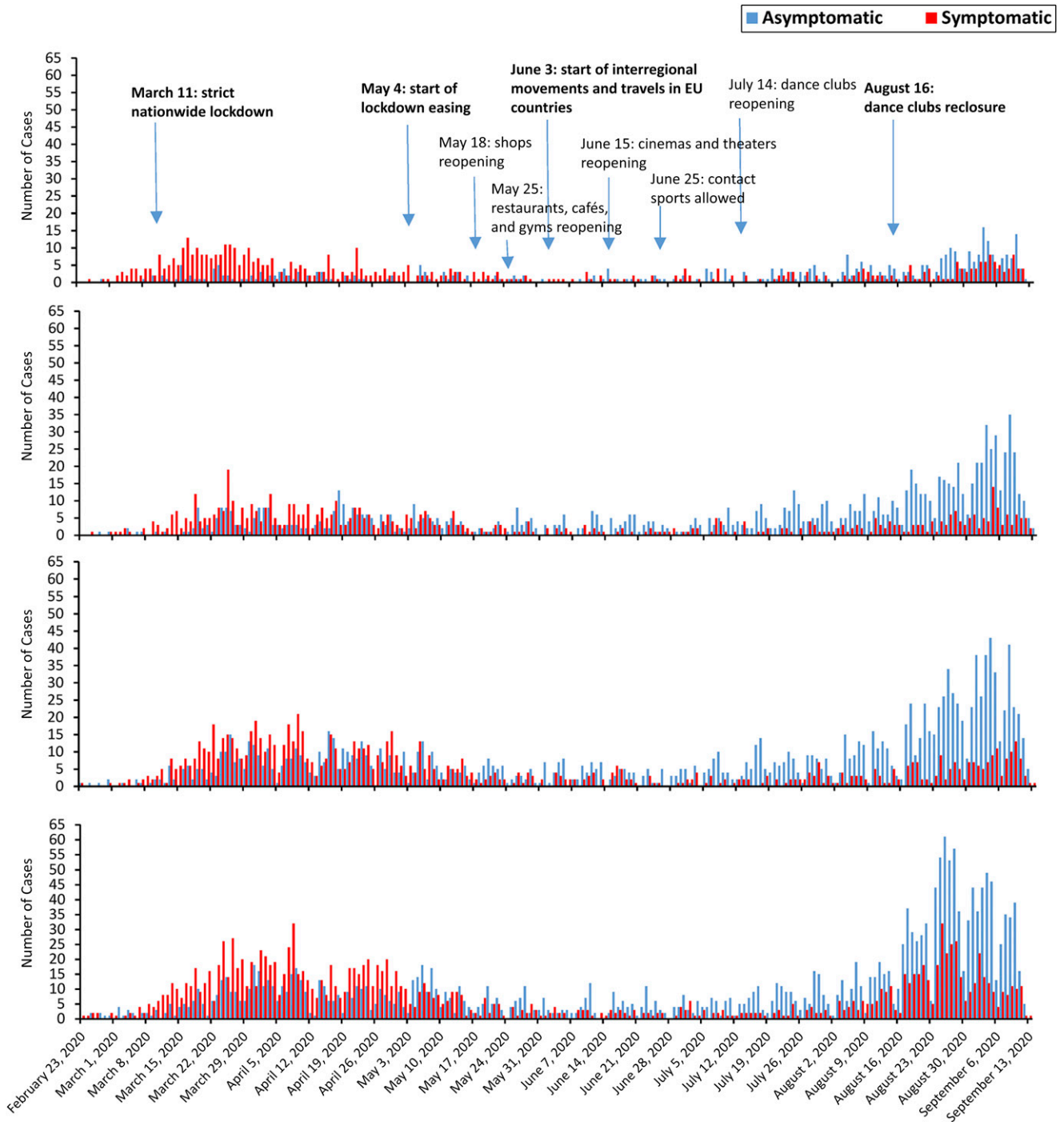


FIGURE 1

Epidemic curve by date of positive test result and disease severity (asymptomatic or symptomatic) of COVID-19 cases patients <18 years of age in Italy, from February 23 to September 13, 2020. A, 0–1 year. B, 2–6 years. C, 7–12 years. D, 13–17 years. Asymptomatic is shown in light blue, and symptomatic is shown in red.

cases were detected in the second phase of the epidemic for all age groups. Starting from lockdown easing (May 4, 2020), most cases occurred in adolescents from the ages

of 13 to 17 (2558; 41.3%), followed by those in children from the ages of 7 to 12 (1736; 28.0%), 2 to 6 (1303; 21.0%), and 0 to 1 (600; 9.7%). The hospitalization rate was 4.8%, and

the highest percentage of hospital admission occurred in infants aged ≤ 1 year (16.2%), followed by children of older ages (~3.5%); among hospitalized patients, the

admission rate to the ICU was 4.3%. Underlying medical conditions were found in 2.8% of all cases and 5.3% of hospitalized patients. Asymptomatic and paucisymptomatic patients accounted for 71.2% and 8.4% of COVID-19 cases, respectively, whereas children with mild infections represented 18.5% of the pediatric population; subjects with a severe or critical infection were 2%. In this last group infants ≤ 1 year of age showed the highest proportion (7.2%), whereas the other age groups were just above 1%. Since June 3, when interregional movements and travels in the European Union area were allowed, $\sim 19\%$ of cases (1001 of 5312) have been imported. Italian Northwest regions (Piemonte, Valle d'Aosta, Liguria, and Lombardia) reported 33.4% of total pediatric cases, followed by Northeast regions (30.8%), Central (16.6%), and South and Islands (19.3%). After adjusting for sex, age groups, underlying medical conditions, disease severity, and geographic area, children from the ages of 2 to 6 had a slightly higher risk of acquiring COVID-19 in the transition phase of the epidemic than infants ≤ 1 year of age, whereas a lower risk was associated with the presence of underlying medical conditions and symptoms (paucisymptomatic state, mild disease, severe or critical disease). Moreover, Italian Northeast, Central, and South and Island areas presented a lower risk, compared with the Northwest regions (Table 1).

DISCUSSION

An increase of COVID-19 cases is being observed worldwide after the lifting of lockdowns as well as the relaxation of physical distancing and other preventive measures.³

In Italy, increased testing has contributed to a better detection of ongoing transmission, and, to date, >2000 local outbreaks are ongoing throughout the country. Cases of

TABLE 1 Risk Factors for Study Period (May 4 to September 13 versus February 23 to May 3, 2020) in Individuals <18 Years of Age in Italy; Multivariable Logistic Regression Model

Risk Factors	February 23 to May 3, %	May 4 to September 13, %	Study Period		
			OR	95% CI	P
Sex					
Boys	48.5	48.8	Reference	—	—
Girls	51.5	51.2	1.04	0.95–1.15	.44
Class of age, y					
0–1	13.2	9.7	Reference	—	—
2–6	17.0	21.0	1.21	1.01–1.45	.038
7–12	29.7	28.0	0.93	0.78–1.09	.36
13–17	40.1	41.3	1.12	0.95–1.31	.16
Underlying medical conditions					
No	94.8	97.2	Reference	—	—
Yes	5.2	2.8	0.58	0.46–0.74	$<.001$
Disease severity					
Asymptomatic	35.5	71.2	Reference	—	—
Paucisymptomatic	18.2	8.4	0.22	0.19–0.25	$<.001$
Mild	40.3	18.5	0.20	0.18–0.22	$<.001$
Severe or critical	6.0	1.9	0.11	0.09–0.15	$<.001$
Geographic area					
Northwest	27.1	33.4	Reference	—	—
Northeast	34.0	30.8	0.60	0.53–0.68	$<.001$
Center	18.3	16.6	0.76	0.66–0.89	$<.001$
South and Islands	20.5	19.3	0.42	0.36–0.49	$<.001$

February 23 to May 3: $N = 3650$; May 4 to September 13: $N = 6197$. CI, confidence interval; OR, odds ratio; —, not applicable.

COVID-19 in those <18 years of age started to increase just after the lockdown easing, as observed in the United States.⁴

In the second phase of the epidemic, compared with the first one, the pediatric case distribution among age groups was similar; both hospitalizations and preexisting underlying medical conditions declined and asymptomatic patients increased, with fewer severe cases.¹ Because children are more likely to have an asymptomatic or paucisymptomatic infection, compared with adults, pediatric cases may have been undetected or underestimated, altering the true proportion on the overall population, particularly during the peak of the epidemic,⁵ when only subjects with clear signs and symptoms of the disease were tested. However, with lockdown easing, the systematic contact tracing, including novel digital tracing approaches as well as widespread testing, allowed to detect more cases and identify groups at the

highest risk of disease.⁶ Physical distancing, hand hygiene, facemasks, reducing contacts, and staying home when ill are essential measures for infection control, particularly with the reopening of schools, which are likely to have an impact on community transmission.

The national surveillance system will continue to monitor the school reopening impact on the epidemiological trend, both locally and nationally, to inform and guide policymakers in different evaluation strategies, weighing the risk of exposing students and staff to COVID-19 with the benefits of in-person school.

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ABBREVIATION

COVID-19: coronavirus disease 2019

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