



30 JUNE 2020

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Background

In December 2019, a cluster of pneumonia cases of unknown aetiology was reported in Wuhan, Hubei Province China. The cause of the outbreak has since been confirmed as severe acute respiratory coronavirus-2 (SARS-CoV-2) and the disease named coronavirus disease 2019 (COVID-19).^[1] Cases have since spread worldwide, with 8 061 550 million individuals infected and 387 155 deaths reported to World Health Organization.^[2] The first case of COVID-19 in South Africa was reported on 5 March 2020 (week 8) in KwaZulu- Natal Province.^[3] By 9 June 2020, the country had reported 52 991 cases with 66% of cases reported in the Western Cape.^[3]

There are limited data from South Africa on the epidemiology and clinical presentation of COVID-19 in children. Data from other countries suggest that the clinical presentation of COVID-19 may differ in children and that they have a lower risk of severe disease as compared to adults. ^[4-6] Individuals aged ≤18 years, constitute just over one third (20 633 557; 35.1%) of the population of South Africa. Describing the epidemiology of COVID-19 in children in South Africa is important to inform prevention strategies of COVID-19 and to assist policy-makers in making informed decisions about enforcing or relaxing some of the COVID-19 prevention regulations currently in place or being planned, such as reopening of schools. In this report, we described the epidemiological characteristic of individuals aged ≤18 years with laboratory-confirmed COVID-19 who were notified through the national notification system in South Africa. In addition, we described the characteristics of individuals aged ≤ 18 years hospitalised for COVID-19- related illnesses at sentinel hospitals in South Africa.

Methods

In the first part of the report we present data from a national laboratory-based surveillance system.^[3] Laboratory results from public and private laboratories were submitted to the National Institute for Communicable Diseases (NICD). Limited demographic and epidemiological data was collected at the time of collecting a specimen. Data on clinical presentation was collected through the Notifiable Medical Conditions (NMC) platform, a national reporting system of all laboratory-confirmed COVID-19 cases in South Africa. For cases notified at the beginning of the outbreak (until 1 May 2020), additional information on presentation and underlying conditions was collected through a standardised person under investigation questionnaire.

The second part of the report, presents data from the DATCOV platform – an electronic data collection system used by sentinel hospitals to report data on individuals admitted with COVID-19 disease.^[7] The DATCOV system collects demographic and clinical information on admitted COVID-19 cases at admission, during admission and at discharge from sentinel private and public hospitals across all nine provinces in the country. As of 7 June, there were 242 facilities (64 from public sector and 178 from private sector) submitting admissions data into DATCOV.

A laboratory-confirmed case of COVID-19 was defined as any person who tested positive for SARS-CoV-2 on real-time reverse-transcription polymerase chain reaction (rRT-PCR) on a respiratory sample obtained from a nasopharyngeal and/or oropharyngeal swab. We included data from 3 March to 7 June 2020. For the first part of the report, we included all laboratory-confirmed cases in South Africa and for the second part we included laboratory-confirmed cases hospitalised at DATCOV sentinel sites.

Data analysis

Data from the national line list and from NMC was exported and merged in Stata version 14.2 for analysis of the national dataset. Descriptive statistics were used to describe the characteristics of individuals aged ≤ 18 years with laboratory-confirmed COVID-19 in South Africa from the two datasets separately.

Results

As of 7 June 2020, a total of 52 991 laboratory-confirmed cases of COVID-19 were notified through the national laboratory-based surveillance in South Africa, among whom 3 025 (6%) were aged ≤ 18 years. Among individuals aged ≤ 18 years, 51% (1 536/2 975) were female and the majority (8 833/30 025; 29%) were aged ≥ 15 years. The median age of the cases, was 11.4 years, interquartile range (IQR 5.7-15.6) (Table 1).

Cases were reported from all nine provinces. The majority of cases were from Western Cape Province (60%, 1821/3025), followed by the Eastern Cape (14.8, 447/3025) and Gauteng (12.4%, 375/3025) provinces (Table 1). The number of cases increased as the outbreak progressed (Figure 1).

The cumulative incidence risk of laboratory-confirmed cases aged ≤ 18 years was 14.7 cases per 100 000 persons, with the highest cumulative incidence risk reported among individuals aged 15-18 years (23.6 cases per 100 000 persons) and the lowest cumulative incidence risk reported among cases aged 5-9 years (10.8 cases per 100 000 persons). The cumulative incidence risk was similar among females (15.0 cases/100 000 persons) and males (13.8 cases per 100 000). For both females and males, the highest cumulative incidence risk was reported among individuals aged 15-18 years, however, this was higher for females, 26.5 cases per 100 000 persons versus 20.2 cases per 100 000 persons in males (Figure 3 and table 2).

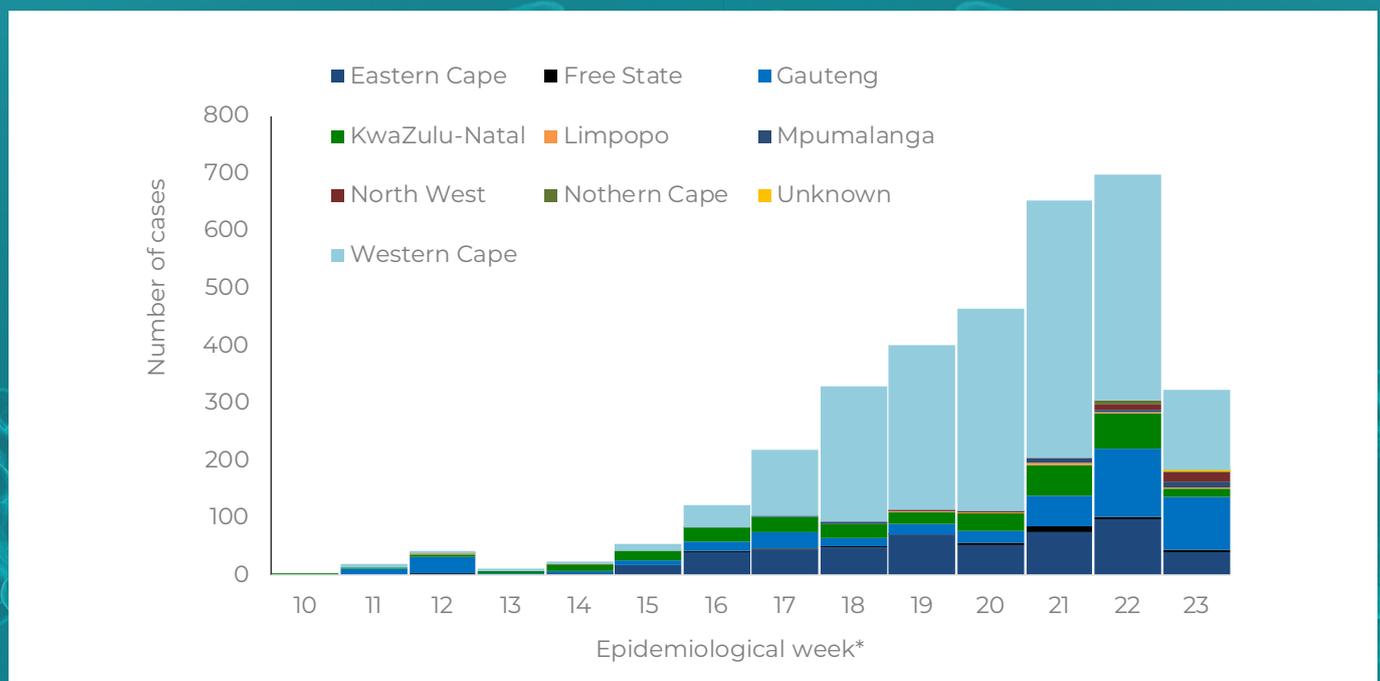


Figure 1. Number of laboratory-confirmed COVID-19 cases aged ≤ 18 years by province and epidemiological week, South Africa, 3 March 2020-7 June 2020 (week 23 not complete)

*Based on date of sample collection/receipt

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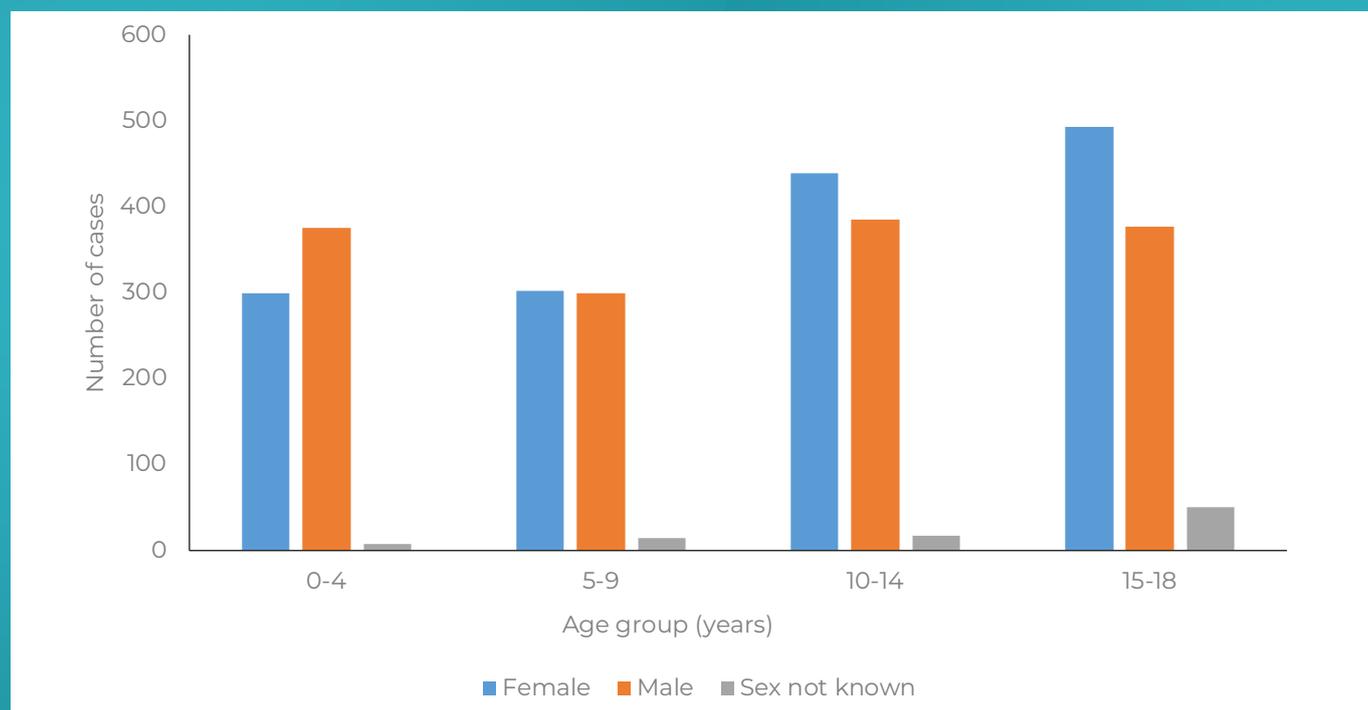


Figure 2. Number of laboratory-confirmed COVID-19 cases aged ≤ 18 years by age group and sex, South Africa, 3 March 2020-7 June 2020

Table 1. Number and characteristics of laboratory-confirmed COVID-19 cases aged ≤ 18 years, South Africa, 3 March 2020-7 June 2020, N=3 025

Characteristics	Number	Percent
Age (years), median (interquartile range)	11.4 (5.7-15.6)	
Age group (years), n (%)		
0-4	682	22.6
5-9	617	20.4
10-14	843	27.9
15-18	883	29.2
Sex, n (%)		
Male	1 439	48.3
Female	1 536	51.6
Province, n (%)		
Eastern Cape	447	14.8
Gauteng	375	12.4
KwaZulu Natal	266	8.9
Limpopo	12	0.4

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Mpumalanga	28	0.9
Northwest	32	1.6
Northern Cape	10	0.3
Western Cape	1 821	60.2
Free State	33	1.1
Not allocated	1	0.03

Table 2. Number and incidence risk of laboratory confirmed cases of COVID-19 cases aged ≤18 years by age group, South Africa 3 March 2020-7 June 2020

Age group in years	All cases, n (%)	Population mid-2019*,n	Incidence risk in individuals ≤18 year old (cases per 100 000 persons)
0-4	682 (22.5)	5 733 946	11.9 (11.0-12.8)
5-9	617 (20.4)	5 737 439	10.8 (9.9-11.6)
10-14	843 (20.4)	5 427 902	15.5 (15.5-16.6)
15-18	883 (29.2)	3 734 270	23.6 (22.1-25.3)
0-18	3 025 (100.0)	20 633 557	14.7 (14.1-15.2)

* Statistics South Africa 2019 mid-year population estimates

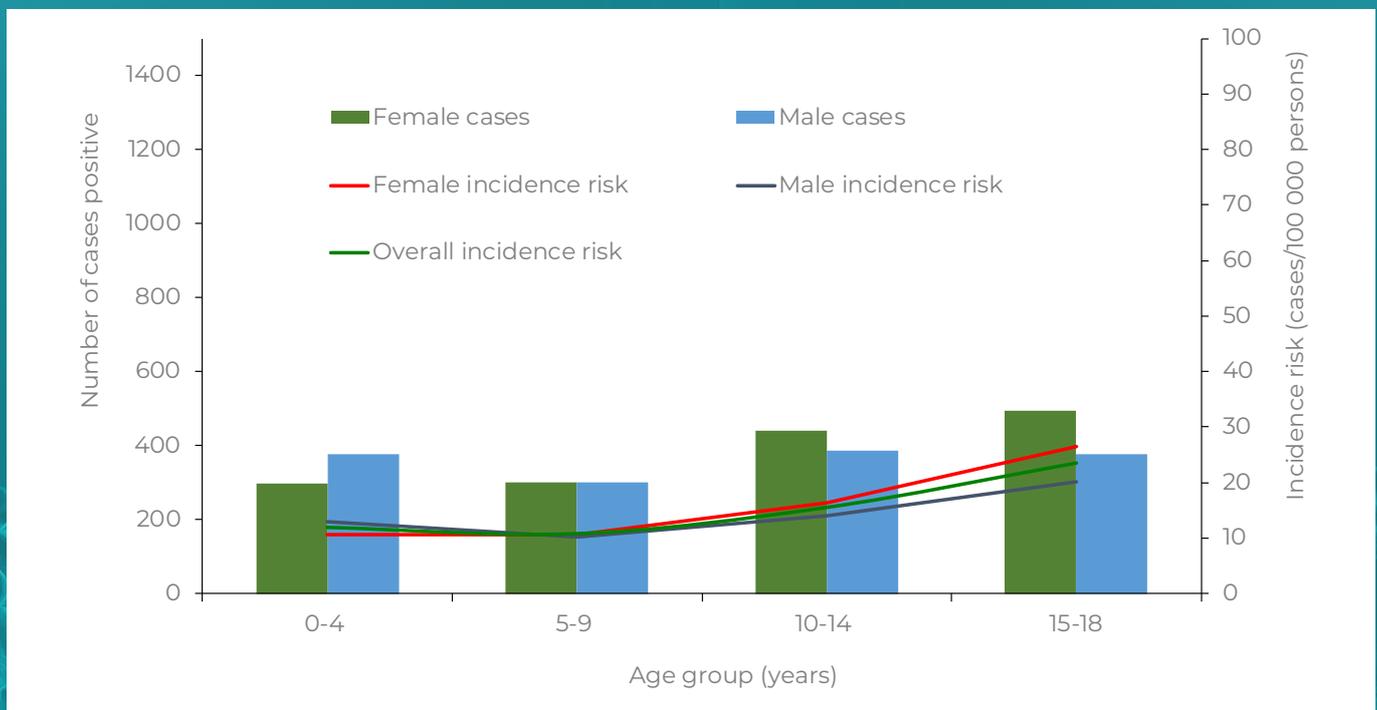


Figure 3. Number and incidence risk of laboratory confirmed COVID-19 cases aged ≤18 years by age group and sex, South African 3 March 2020-7 June 2020

Results from DATCOV hospital surveillance

As of 7 June 2020, data on 6353 admissions had been captured on DATCOV. Of these admissions, 230 (3.3%) were among individuals aged ≤ 18 years. The proportions of admissions ≤ 18 years varied across provinces from 0 in the Northern Cape to 28.8% in Mpumalanga. The first admission among COVID-19 positive children occurred during week 9 (Figure 4). The majority of admissions up to week 23 were in the Western Cape Province, representing 63.0% of all admissions in children reported on DATCOV (n=145).

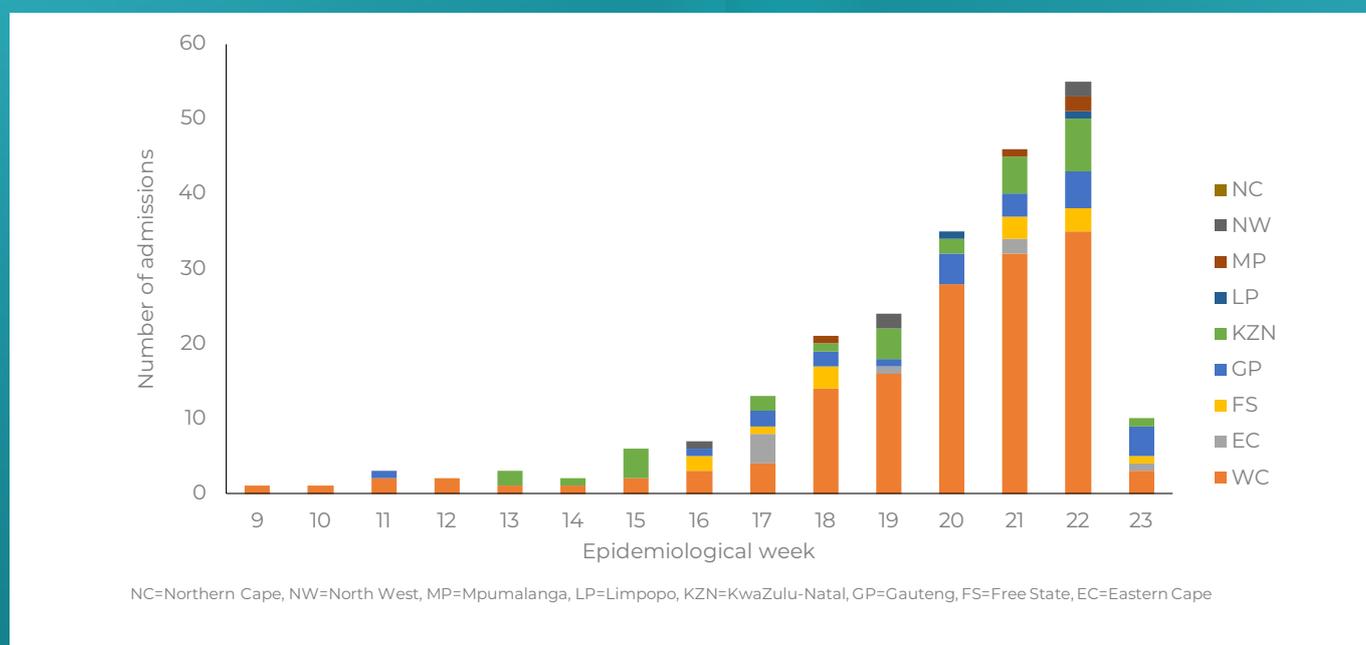


Figure 4. Number of admissions and deaths among laboratory-confirmed cases of COVID-19 aged ≤ 18 years by epidemiologic week and province, South Africa, DATCOV, 3 March 2020-7 June 2020 (N=230)

Of the 230 admitted individuals, the median age was 3 years (IQR 154 days-11 years) with 77 (33.5%) aged <1 year while 133 (57%) were male. Figure 5 shows the distribution of the admissions by age and sex. The majority (64.8%) were admitted at public hospitals and 63.0% admitted in the Western Cape. Overall 45 (19.6%) had one or more comorbidities while these data was missing for 93 (40.4%). Among the 45 who had comorbidities reported, the median number of comorbidities was 1 IQR (1-1) with a maximum of 4. Respiratory comorbidities were most frequently reported with asthma being the most frequent followed by current and past tuberculosis. Table 3 shows the demographic and clinical characteristics of children admitted with COVID-19 stratified by age categories.

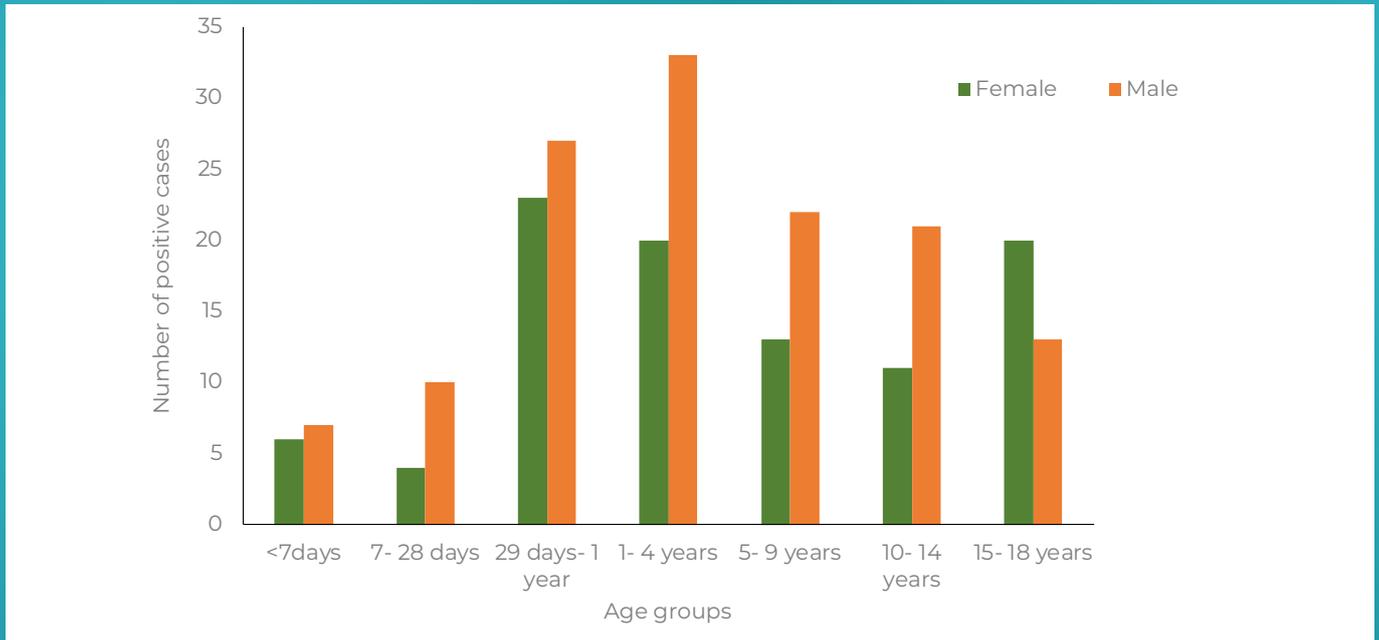


Figure 5. Number of laboratory-confirmed COVID-19 admissions aged ≤ 18 years by age group and sex in South Africa, DATCOV, 3 March 2020-7 June 2020, (N=230)

Outcomes of children admitted with COVID-19

Of the 230 children admitted with COVID-19, 16 (6.7%) were admitted into ICU and 6 (2.6%) were ventilated at some point during admission. At analysis, 167 (72.6%) had been discharged, 56 (24.4%) were still admitted, 4 (1.7%) had been transferred to other facilities and 3 (1.3%) had died during admission. The overall median length of hospital stay was 3 days (IQR 1- 7 days) and was 3 days (IQR 0- 5 days) for those who died. Table 3 includes descriptions of these outcomes by age categories. The majority of the children (5/8, 62.5%) were under the age of 10 years with 4/8 (50%) under the age of one. The three cases who died were aged, 1 year, 15 years and 16 years. They all had severe underlying medical conditions including dilated cardiomyopathy, leukaemia, hypertension and diabetes mellitus.

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Table 3. Characteristics of admitted individuals aged ≤ 18 years testing SARS-COV-2 positive in South Africa, DATCOV, 3 March 2020-7 June 2020 (N=230)

Variable	All ≤18 years (n=230)	<7days (n=13)	7- 28 days (n=14)	29 days-1 year (n=50)	1-4 years (n=53)	5-9 years (n=35)	10-14 years (n=32)	15-18 years (n=33)
Age (years) (mean, S.D)	6.0 (6.3)	1.7 (1.8)	17.3 (5.4)	128.7 (96.2)	2.5 (1.1)	7.5 (1.4)	12.7 (1.4)	17.1 (1.1)
Male (n, %)	133 (57.8)	7 (53.9)	10 (71.4)	27 (54)	33 (62.3)	22 (62.9)	21 (65.6)	13 (39.4)
Admitted at a public hospital, (n, %)	149 (64.8)	7 (53.9)	12 (85.7)	42 (84.0)	27 (50.8)	18 (57.4)	21 (65.6)	22 (66.7)
Admitted in Western Cape, (n, %)	145 (63.0)	6 (46.2)	11 (78.6)	43 (86.0)	36 (67.9)	18 (57.4)	14 (43.8)	17 (51.5)
Co-morbidities, (n, %)								
No	92 (40.0)	4 (30.8)	2 (14.3)	12 (24.0)	21 (39.6)	17 (48.6)	17 (53.1)	19 (57.6)
Yes	45 (19.6)	1 (7.7)	0 (0)	6 (12.0)	12 (22.6)	8 (28.6)	8 (25.0)	8 (24.2)
Unknown	93 (40.4)	8 (61.5)	12 (85.7)	32 (64.0)	20 (37.7)	10 (22.9)	7 (21.9)	6 (18.2)
Type and number with comorbidities*								
Hypertension	4	0	0	1	2	0	0	1
Diabetes mellitus	4	0	0	0	0	0	0	4
HIV	5	0	0	2	1	2	0	0
Tuberculosis past	8	0	0	2	1	2	2	1
Tuberculosis current	4	0	0	2	1	0	1	0
Asthma	30	1	0	3	10	7	7	2
Chronic kidney disease	0	0	0	0	0	0	0	0
Malignancy	2	0	0	0	1	0	0	1
Length of stay (median, IQR)	3 (1-7)	3 (1-7)	3 (2-6)	3 (1-7)	2 (0-7)	2 (0-7)	6 (3-11)	5 (2-8)
ICU admission	16 (7.0)	1 (7.7)	0	4 (8.0)	3 (5.7)	2 (5.7)	1 (3.1)	5 (15.2)
Ventilation	6 (2.6)	1 (7.7)	0	3 (6.0)	1 (1.9)	0	0	1 (3.0)
Died	3 (1.3)	0	0	0	1 (1.9)	0	0	2 (6.1)
Discharged alive	167 (72.6)	8 (61.5)	11 (78.6)	34 (68.0)	41 (77.4)	27 (77.1)	25 (78.1)	21 (63.6)
Transferred to another hospital	4 (1.7)	0	0	1 (2.0)	1 (1.9)	0	1 (3.1)	1 (3.0)
Still admitted	56 (24.4)	5 (31.5)	3 (21.4)	15 (30.0)	10 (18.9)	8 (22.9)	6 (18.8)	9 (27.3)

*An individual can have more than one comorbidity; S.D= standard deviation; IQR= interquartile range; ICU = intensive care unit

Discussion

This report presents data on individuals aged ≤ 18 years with COVID-19, from two surveillance systems conducted for monitoring the COVID-19 pandemic in South Africa. From both programmes, children made up $< 7\%$ of all reported cases in South Africa, despite constituting approximately one third of the South African population. From the laboratory-based surveillance which has limited data on clinical presentation, the majority of cases were in the older age group (≥ 15 years), which also had the highest incidence risk. These data suggests that, similar to data from other countries, the burden of COVID-19 disease is lower in young children compared to adults.^[4,5] The majority of reported cases were from the Western Cape, reflecting the current epidemiology in South Africa, with Western Cape reporting more than 60% of total cases.^[3] The highest incidence risk was among females, similar to data among older individuals, which may reflect health-seeking practices or differential exposure to COVID-19 within community settings. The DATCOV hospital surveillance presented demographic and clinical characteristics of children admitted with COVID-19 at sentinel hospital sites. Among the COVID-19 admissions in children, the median age at admission was lower than that among all diagnosed cases ≤ 18 years, which may suggest that severe disease may be more common among younger children or that clinicians are more likely to admit younger children as a precaution. In addition, some of the younger cases were newborns who may have been admitted for birth-related complications or precautionary reasons rather than COVID-19-related illness. Of the children aged ≤ 18 years admitted, only 7% were admitted into ICU, 2% ventilated and 1% died. Given that the corresponding figures for adults are 13%, 6% and 14% for ICU admission, ventilation and death respectively^[7], this suggests that the children may have been admitted with milder forms of disease. In most countries dealing with the COVID-19 pandemic for longer and with larger number of cases than South Africa, small numbers of deaths among children with COVID-19 have been reported.^[6,8] In our analysis, the children who died had other severe comorbidities and the role of COVID-19 in disease progression was unclear. This highlights the need for better determination of causes of death so that final death classifications can be possible.

Limitations

The laboratory based-surveillance, provided large numbers of cases, but important epidemiological data including clinical presentation, underlying conditions and outcome were not collected systematically, especially as the numbers of cases in the country increased. It was not possible to describe these factors and to assess factors associated with severe disease. However, there are other surveillance platforms, such as surveillance for severe respiratory illness and surveillance for influenza like illness, in South Africa which are better placed to answer these questions in the future as case numbers increase.^[9]

For the DATCOV hospital surveillance, data on indications for admissions were not provided and it was not possible to determine if children were admitted because of COVID-19 disease or that SARS-CoV2 infection was a coincidental finding at admission. Also it was not possible to determine if some children were admitted for isolation purposes only. This surveillance system also had missing or incomplete data on comorbidities, with 42% of children admitted not having comorbidity data recorded. The DATCOV platform is sentinel site based so does not include COVID-19 admissions at all the hospitals in the country. Because DATCOV surveillance is hospital-based, cases and deaths occurring outside hospitals would be missed and therefore reported cases and mortality will be an underestimate even for areas which fall under the catchment of a participating sentinel hospital. Both surveillance systems included SARS-CoV-2 - confirmed or tested COVID-19 cases or admissions, therefore asymptomatic cases would have been missed as well as individuals who were not tested. Testing approaches in South Africa have changed as the epidemic progressed, potentially biasing characteristics of detected cases.^[10]

Conclusion

COVID-19 is uncommon in South African children including among the school-going children aged five to 18 years and when it occurs it is milder than in adults. This is encouraging given the re-opening of schools in South Africa and is consistent with data from other counties.^[4, 5] The implementation of non-pharmaceutical interventions such as using masks, physical distancing and hand washing or sanitising within schools need to be strengthened to prevent children acquiring SARS-CoV2 infections. The number of deaths in this population was small but any severe illness in children in this age group is concerning nonetheless and steps to minimise COVID-19 transmission such as physical distancing and use of masks should be consistently applied where possible, even among children.

Acknowledgements

We would like to acknowledge Professor Shabir Madhi and Professor and Professor Haroon Saloojee for useful comments on an earlier version of this report.

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