

# MONTHLY COVID-19 IN CHILDREN SURVEILLANCE REPORT

SOUTH AFRICA

04 DECEMBER 2020

## EPIDEMIOLOGY AND CLINICAL CHARACTERISTICS OF LABORATORY-CONFIRMED COVID-19 AMONG CHILDREN AND ADOLESCENTS AGED $\leq 18$ YEARS, SOUTH AFRICA, 1 MARCH – 21 NOVEMBER 2020

NICD COVID-19 and DATCOV teams

### Summary

- As of 21 November 2020, children and adolescents  $\leq 19$  years made up 9.0% of laboratory-confirmed COVID-19 cases and 4.0% of all COVID-19-associated admissions at sentinel hospitals.
- The age group included in this report has been changed from children and adolescents  $\leq 18$  years to children and adolescents aged  $\leq 19$  years to allow standardisation with other reports.
- The cumulative incidence of laboratory-confirmed COVID-19 cases aged  $\leq 19$  years was 325.6 per 100 000 population, six times lower than that in adults (1832.4 per 100 000). The cumulative incidence was lowest in Limpopo province and highest in Free State province, was higher in females compared to males and increased with age among individuals aged  $\geq 1$  year.
- The weekly incidence of laboratory-confirmed COVID-19 cases aged  $\leq 19$  years increased in Eastern Cape and Western Cape from week 43 and 44 respectively, mirroring trends among adults aged  $>19$  years.
- There were 4042 reported COVID-19-associated admissions among individuals aged  $\leq 19$  years; of these, 2911 (72.0%) had data on underlying conditions and of these 510 (17.5%) had  $\geq 1$  underlying conditions. Asthma and other chronic pulmonary conditions, diabetes mellitus, HIV infection and tuberculosis were the commonest underlying conditions.
- The median length of hospital stay among COVID-19-associated admissions aged  $\leq 19$  years was 4 days (interquartile range 2–8 days) with 217 (5.4%) individuals admitted into intensive care units (ICU) at some point during admission and 87 (2.2%) having been ventilated.
- Data on in-hospital outcome were available for 3701 (91.6%) individuals aged  $\leq 19$  years. Among these, there were 100 in-hospital deaths giving an in-hospital case fatality risk of 2.7% (100/3701). Among all deaths, 47 (47.0%) were among adolescents aged 15–19 years and 23 (23.0%) were aged under one year.
- Among 75 (75.0%) in-hospital deaths who had available data on underlying conditions, 57 (76.0%) reported  $\geq 1$  underlying condition. Diabetes, HIV and malignancy were the commonest reported underlying conditions among older children who died ( $\geq 15$  years). Additional data are being sought on individuals not reporting an underlying illness and those without available data.

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## Background

In December 2019, a cluster of pneumonia cases of unknown aetiology was reported in Wuhan, Hubei Province China.<sup>(1)</sup> The cause of the outbreak has since been confirmed as severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) and the disease named coronavirus disease 2019 (COVID-19). Infections had been reported in 213 countries and territories with more than 57 million individuals infected and 1.3 million deaths reported to World Health Organization as of 22 November 2020. <sup>(1)</sup> The first case of COVID-19 in South Africa was reported on 5 March 2020 in KwaZulu- Natal Province.<sup>(2)</sup> On the 21 November 2020, the country reported 765 409 cases and 20 845 deaths. <sup>(2)</sup>

Published studies suggest that the clinical presentation of COVID-19 in children and adolescents differs from that of adults. Disease in children is more likely to be asymptomatic or mildly symptomatic and less likely to result in hospital admission compared to that in adults.<sup>(3)</sup> However, there are concerns of possible limited testing in children leading to cases among children being missed.<sup>(4)</sup> There are concerns regarding possible transmission within and outside schools and other congregate settings. Individuals aged  $\leq 19$  years, constitute just over a third of the population of South Africa (21 825 534; 36.6%) and includes the entire compulsory school-going age – considered 7- 15 years <sup>(5)</sup>.

In this report, the epidemiological characteristics of laboratory-confirmed COVID-19 cases aged  $\leq 19$  years notified through the laboratory based national notification system and COVID-19-associated admissions aged  $\leq 19$  years at sentinel hospitals in South Africa are presented to allow alignment with other reports produced by the National Institute for Communicable Diseases (NICD). Previous reports have presented characteristics of cases and admissions aged  $\leq 18$  years.

## Methods

### Data collection procedures.

Laboratory results from public and private laboratories were submitted to the NICD. Limited demographic and epidemiological data were collected at the time of specimen collection. Data extraction for the report was done on 25 November 2020. Data on children and adults admitted to sentinel hospitals were collected on the DATCOV platform – an online data collection system. <sup>(6)</sup> Health care workers at the sentinel hospitals capture demographic and clinical information on admitted COVID-19 cases at admission, during admission and at discharge. As of the 21 November 2020, there were 544 hospitals submitting admissions data into DATCOV. This included 100% of the private hospitals in the country and 96% of public hospitals – with 100% coverage in the Western Cape.

### Definition of outcomes

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. A COVID-19-associated admission was defined as any person who tested SARS-CoV-2 positive and was admitted to a sentinel hospital regardless of the reason for admission.

### Data analysis

Data from the national line list was exported into Stata14.2® for analysis of the national dataset. Descriptive statistics were used to describe the characteristics of cases aged  $\leq 19$  years. Incidence was determined as the number of cases in different age groups as a proportion of the population size as provided by the Statistics South Africa (Stats SA) mid-year population estimates for 2020 and presented as cases per 100 000 persons by age, gender, province and week of diagnosis. Descriptive statistics were used to describe demographic and clinical characteristics among admissions  $\leq 19$  year at sentinel hospitals stratified by age groups: <1 year, 1- 4 years, 5- 9 years, 10- 14 years and 15- 19 years.

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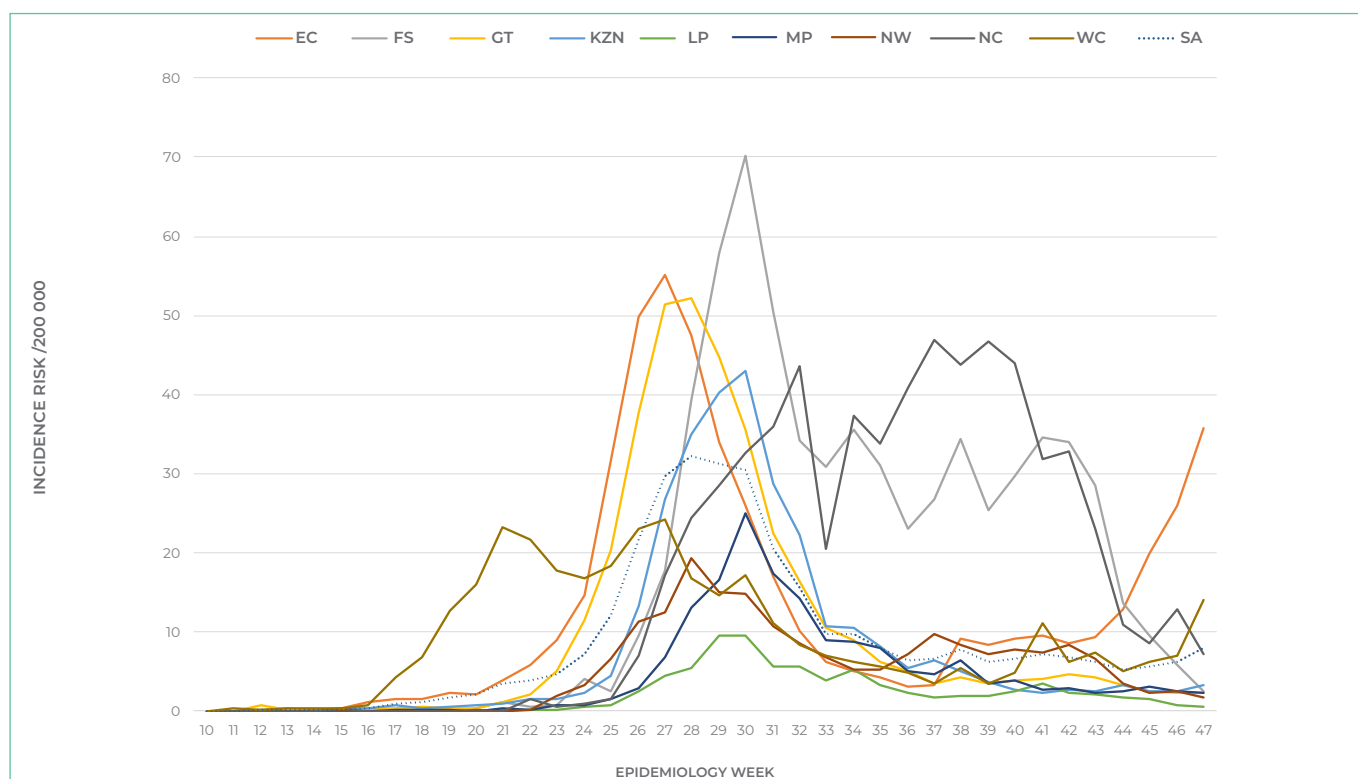
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## Results

### Incidence of COVID-19 among children and adolescents aged ≤18 years

There were 765 409 laboratory-confirmed cases of COVID-19 captured on the national linelist through 21 November 2020. Of these, 1 754 (0.2%) were missing age information. Of the 763 665 with known age, 71 074 (9.3%) were aged ≤19 years. Children and adolescents ≤18 years made up 90.0% of laboratory confirmed COVID-19 cases aged ≤19 years (N=63,976). This number of children and adolescents ≤18 years represented a 13.4% increase from the previous report, which only looked at those ≤18 years and was driven by a 30.6% increase in new cases in the EC.

The median age of the children was 14 years (interquartile range [IQR] 9 – 17 years) with 2456 (3.5%) aged <1 year, 31 700 (44.6%) aged ≥15 years. There were 31 076 (43.7%) males with 1343 (1.9%) children missing information on gender. The majority of cases 60 050/71 074 (84.5%) were in five provinces – Eastern Cape (19.2%), Free State (10.0%), Gauteng Province (24.2%), KwaZulu Natal (19.6%) and Western Cape (11.0%). The cumulative incidence of laboratory-confirmed COVID-19 among individuals aged ≤19 years was 325.6 per 100 000 population as compared to 1832 per 100 000 population in individuals aged >19 years. The cumulative incidence ranged from 80.3 per 100 000 in Limpopo province to 655.4 per 100 000 population in Free State province (Table 1). The national weekly incidence among individuals aged ≤19 years increased from <1 per 100 000 in week 10, peaking at 32 per 100 000 during week 28. Most provinces experienced peaks in incidence during the weeks 27-30 and thereafter showed declining weekly incidence – with the Eastern Cape and Western Cape, where incidence has been rising since week 43 and 44 respectively (Figure 1).



**Figure 1.** Weekly incidence of laboratory-confirmed COVID-19 among children aged ≤19 years by epidemiologic week, South Africa 1 March- 21 November 2020 (N=71 074)

EC= Eastern Cape, FS= Free State, GP= Gauteng Province, KZN= KwaZulu Natal, LP= Limpopo Province, MP = Mpumalanga province, NW= North West Province, NC= Northern Cape, WC= Western Cape.

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**Table 1.** Cumulative incidence of laboratory -confirmed COVID-19 and COVID-19 associated admissions among children and adolescents aged <=19 years

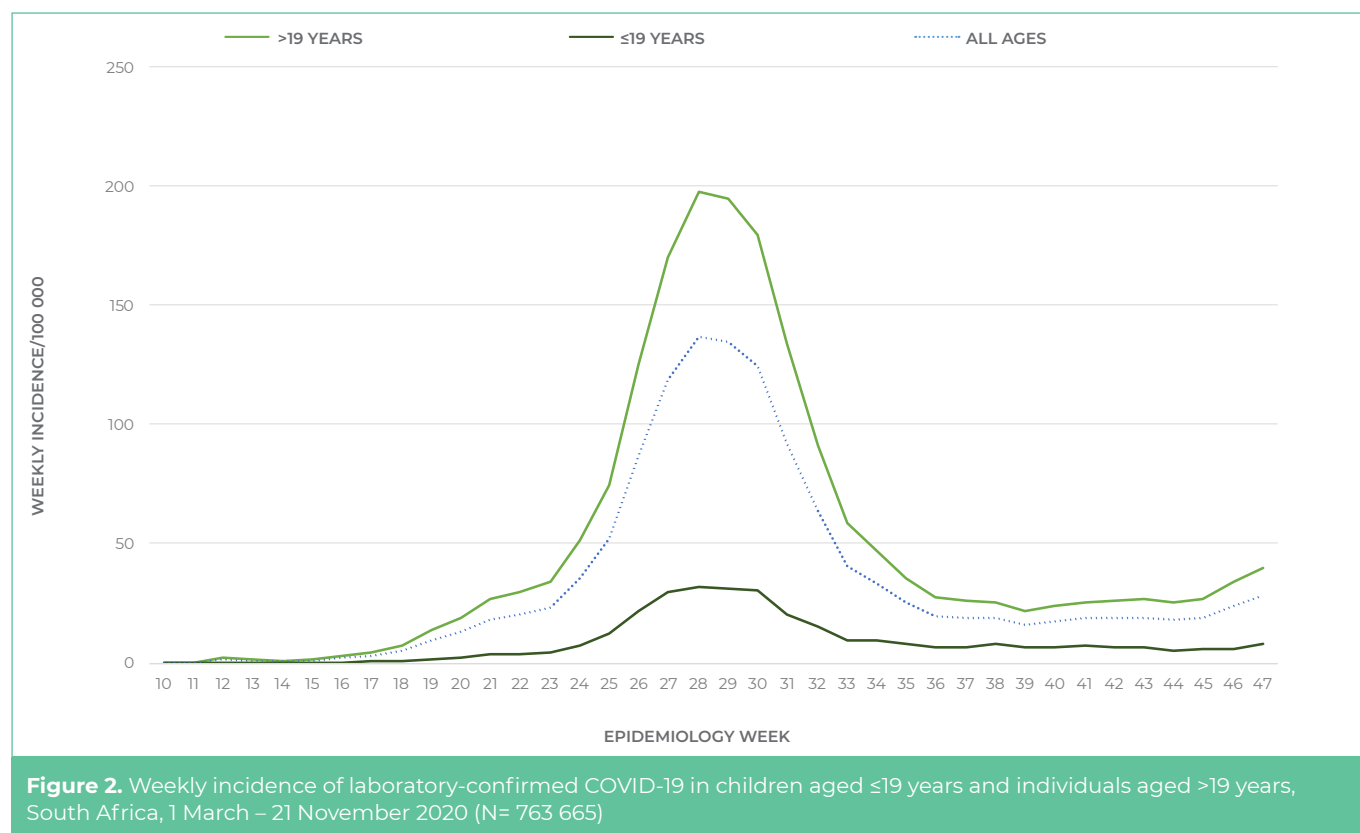
| Province             | Total population in province | Population of ≤ 19 years | % aged ≤19  | % children in the country | Eligible COVID-19 cases | Cases ≤19    | % of all cases | % of pediatric cases | Cumulative incidence per 100 000 | Total admissions | % admissions ≤19 years | % of paediatric admissions |
|----------------------|------------------------------|--------------------------|-------------|---------------------------|-------------------------|--------------|----------------|----------------------|----------------------------------|------------------|------------------------|----------------------------|
| Eastern Cape         | 6734001                      | 2818181                  | 41.9        | 12.9                      | 118498                  | 13650        | 11.5           | 19.2                 | 484.4                            | 15375            | 518 (3.4)              | 12.8                       |
| Free State           | 2928903                      | 1082712                  | 37.0        | 5.0                       | 58627                   | 7096         | 12.1           | 10.0                 | 655.4                            | 7526             | 267 (3.6)              | 6.6                        |
| Gauteng              | 15488137                     | 4710102                  | 30.4        | 21.6                      | 229368                  | 17581        | 7.7            | 24.7                 | 373.3                            | 28932            | 952 (3.3)              | 23.6                       |
| KwaZulu Natal        | 11531628                     | 4709686                  | 40.8        | 21.6                      | 125192                  | 13912        | 11.1           | 19.6                 | 295.4                            | 16186            | 678 (4.2)              | 16.8                       |
| Limpopo              | 5852553                      | 2510790                  | 42.9        | 11.5                      | 18341                   | 2017         | 11.0           | 2.8                  | 80.3                             | 1895             | 86 (4.5)               | 2.1                        |
| Mpumalanga           | 4679786                      | 1773075                  | 37.9        | 8.1                       | 30739                   | 2973         | 9.7            | 4.2                  | 167.7                            | 2674             | 112 (4.2)              | 2.8                        |
| North West           | 4108816                      | 1528001                  | 37.2        | 7.0                       | 34313                   | 2972         | 8.7            | 4.2                  | 194.5                            | 6099             | 491 (8.1)              | 12.2                       |
| Northern Cape        | 1292786                      | 481364                   | 37.2        | 2.2                       | 22769                   | 3062         | 13.4           | 4.3                  | 636.1                            | 2108             | 83 (3.9)               | 2.1                        |
| Western Cape         | 7005741                      | 2211623                  | 31.6        | 10.1                      | 125818                  | 7811         | 6.2            | 11.0                 | 353.2                            | 20712            | 855 (4.1)              | 21.2                       |
| <b>All provinces</b> | <b>59622350</b>              | <b>21825534</b>          | <b>36.6</b> | <b>100.0</b>              | <b>763665</b>           | <b>71074</b> | <b>9.3</b>     | <b>100</b>           | <b>325.6</b>                     | <b>101507</b>    | <b>4042 (4.0)</b>      | <b>100</b>                 |



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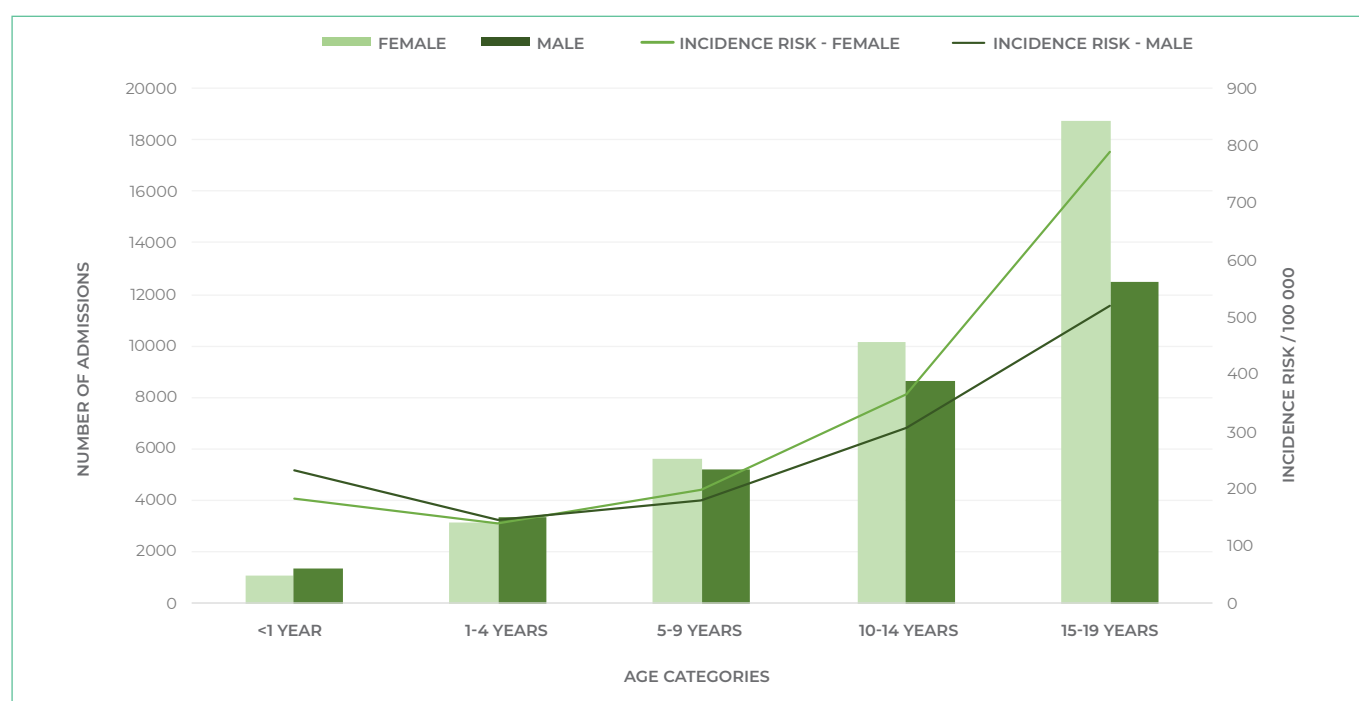


The overall weekly incidence trend for children aged ≤19 years was similar in shape to that of adults aged >19 years although the magnitude of the peak weekly incidence was much lower (Figure 2). Generally the cumulative incidence increased with age from 145.2 per 100 000 among children aged 1-4 years to 663.9 per 100 000 among adolescents aged 15-19 years (data not shown). Overall, the cumulative incidence was higher among females compared to male (358.0 per 100 000 vs 281.8 per 100 000), this trend was also observed among adult COVID-19 cases. Cumulative incidence was higher among males in the age groups <1 year and higher in females from age categories 5-9 years, 10- 14 years and 15- 19 years (Figure 3).

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**Figure 3.** Cumulative incidence of laboratory-confirmed COVID-19 among children and adolescents by age and birth sex, South Africa, 1 March- 21 November 2020 (N= 71 074)

## COVID-19-associated admissions in children and adolescents aged ≤19 years

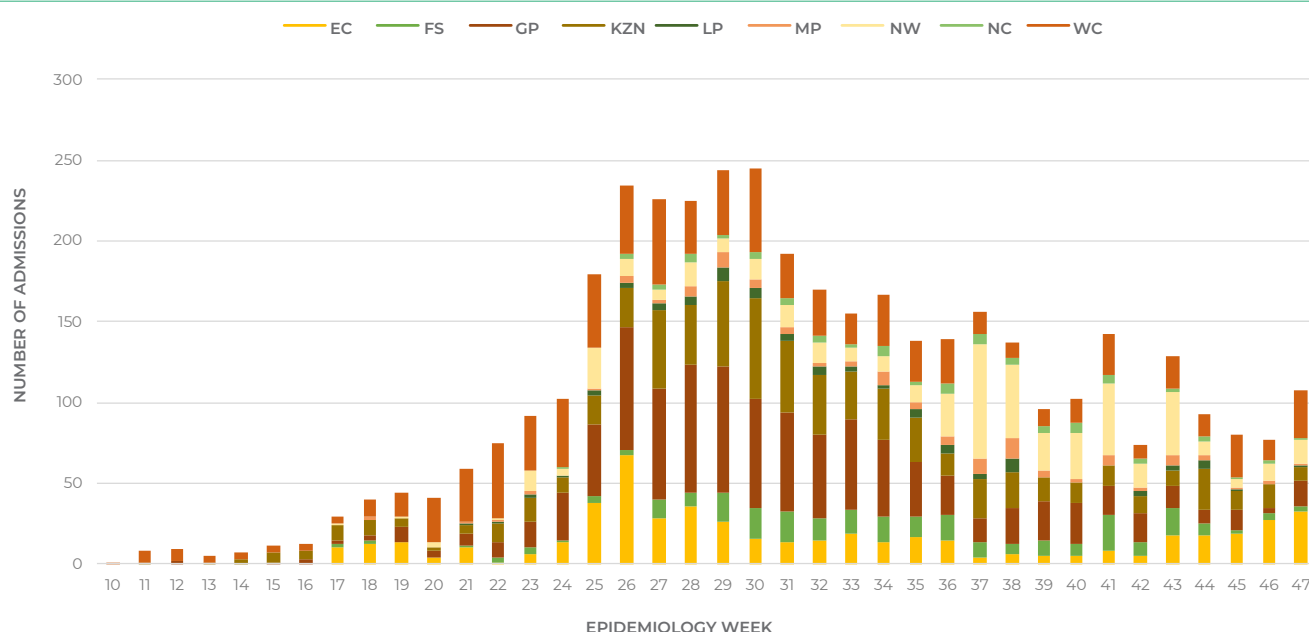
As of 21 November 2020, data on 103 109 COVID-19-associated admissions had been captured on DATCOV. Of these admissions, 1602 (1.6%) were missing age information. Among the remainder of admissions with available age information (N= 101,507), 4042 (4.0%) were among individuals aged ≤19 years. The proportions of all COVID-19-associated admissions which were among individuals aged ≤19 years varied across provinces from 3.3% in Gauteng to 8.1% in Northern Cape. Children and adolescents ≤18 years made up 89.9% of the COVID-19 associated admissions aged ≤19 years included in the report (N=3634). This represented a 20.5% increase from the previous report, driven by a 30.7% increase in admissions in Eastern Cape. There was also a 42% increase in admissions in North West because of retrospective capturing of admissions data into DATCOV.

The first admission among a COVID-19 positive child was during week 10 (Figure 4). The majority of the admissions were in five provinces; Gauteng (23.6 %), Western Cape (21.2 %), KwaZulu Natal (16.8 %), Eastern Cape (12.8 %) and North West (12.2 %) provinces together accounting for 86.4% of all admissions (N=3494). Overall, the number of admissions peaked during week 29-30 (Figure 4). Number of admissions were highest in children 15-19 years - 1631 (40.4%), < 1 year- 676 (16.7%), 10- 14 years – 662 (16.4 %), 1- 4 years- 645 (16.0 %) and least among children 5-9 years – 428 (10.6 %). Admissions in the 15- 19 year old group peaked in weeks 29 but have remained higher than the other age groups in the more recent weeks – weeks 35- 47 (Figure 5).

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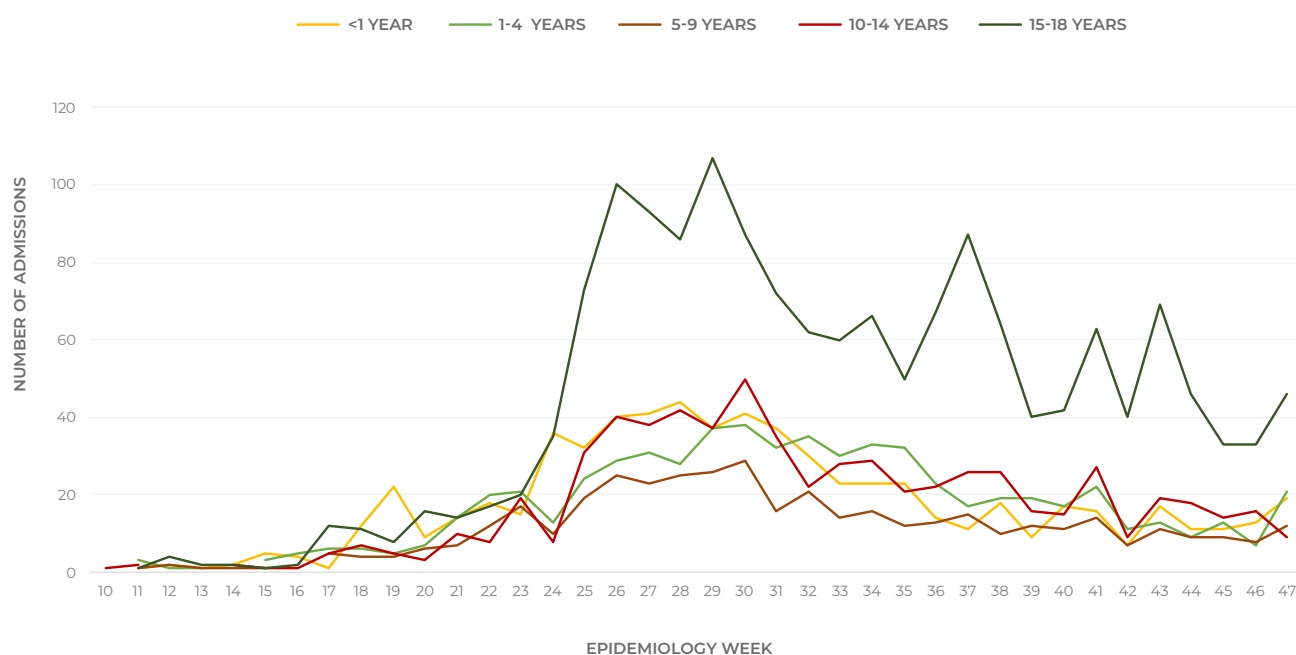
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**Figure 4.** Number of COVID-19-associated admissions aged  $\leq 19$  years by epidemiologic week and province, South Africa, DATCOV, 1 March – 21 November 2020 (N=4042)

EC= Eastern Cape, FS= Free State, GP= Gauteng Province, KZN= KwaZulu Natal, LP= Limpopo Province, MP = Mpumalanga province, NW= North West Province, NC= Northern Cape, WC= Western Cape.

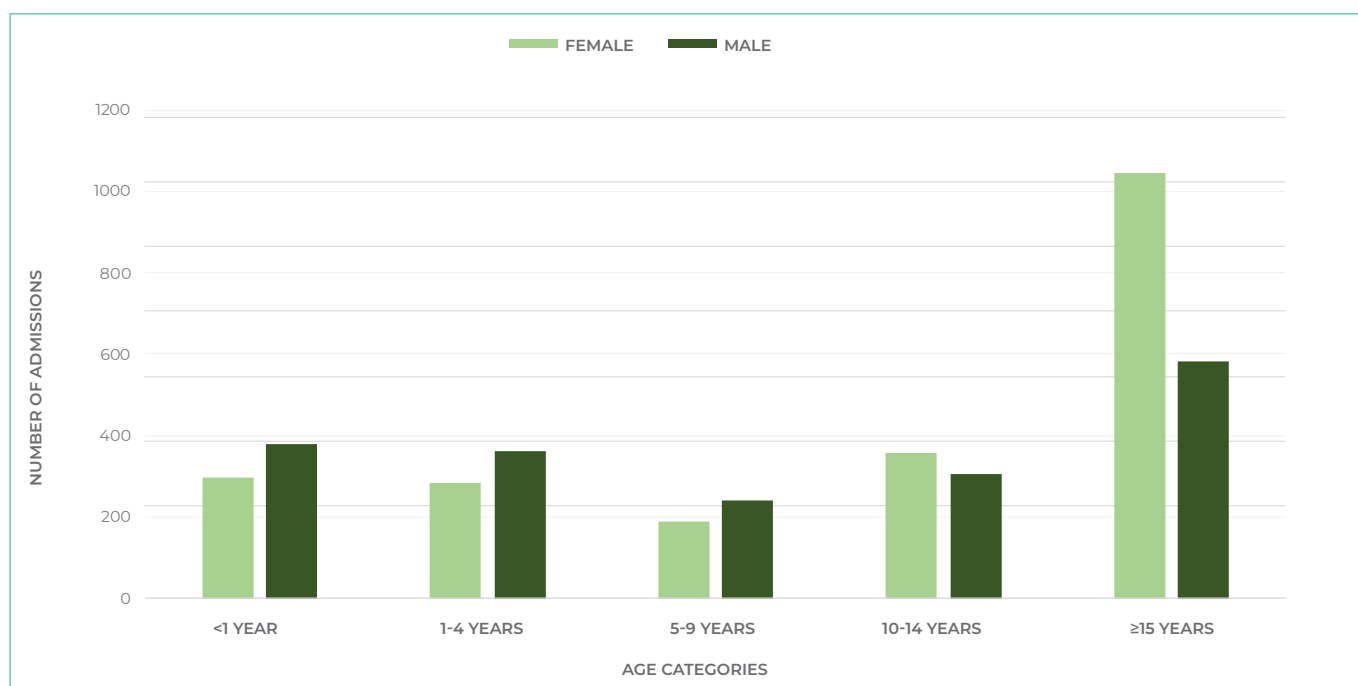


**Figure 5.** Number of COVID-19-associated admissions among individuals aged  $\leq 19$  years at sentinel hospitals by epidemiologic week and age group, South Africa, DATCOV, 1 March - 21 November 2020 (N=4042)

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Of the 4042 admitted individuals included in the analysis, the median age was 12.5 years (IQR 2.3 -17.4 years) and 1871 (46.3%) were male. Figure 6 shows the distribution of the admissions by age and sex. The majority of children were admitted at hospitals in the public sector (2413, 59.7%). Table 3 shows the demographic and clinical characteristics of COVID-19-associated admissions among children and adolescents aged  $\leq 19$  years at sentinel hospitals overall and stratified by age group. Overall 2911 (72.0%) had data on underlying conditions available. Of these 510 (17.5%) had one or more underlying conditions. Asthma or chronic pulmonary diseases were the most frequently reported underlying conditions followed by diabetes, HIV and tuberculosis - current or active (Figure 7).



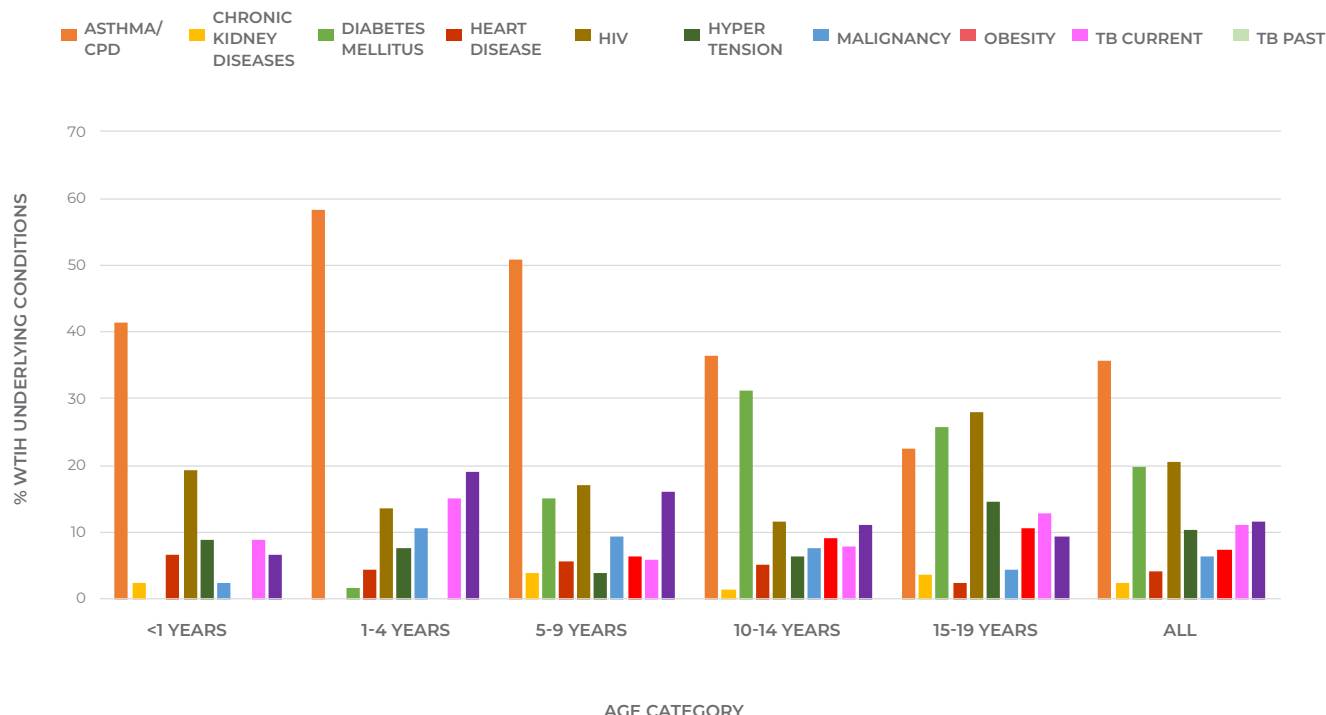
**Figure 6.** Number of COVID-19-associated admissions aged  $\leq 19$  years by age group and sex, South Africa, DATCOV, 1 March – 21 November 2020 (N=4042)



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**Figure 7.** Distribution of underlying conditions among COVID-19-associated admissions aged ≤19 years with ≥1 underlying conditions, South Africa, DATCOV, 1 March – 21 November 2020 (N=510)\*

CPD= chronic pulmonary disease; HIV= human immunodeficiency virus; TB= tuberculosis

## Outcomes of COVID-19-associated admissions among children aged ≤19 years

Of the 4042 COVID-19-associated admissions among children aged ≤19 years, 217 (5.4%) were admitted into ICU and 87 (2.2%) were ventilated at some point during admission. At analysis, 3601 (89.1%) had been discharged, 240 (5.9%) were still admitted, 101 (2.5%) had been transferred to other facilities and 100 (2.5%) had died during admission. Among individuals with outcome data available, the in-hospital case fatality risk was 2.7% (100/3701). The overall median length of hospital stay was 4 days (IQR 2- 8 days) and was 6 days (IQR 1- 12 days) for those who died. Of the 100 COVID-19 associated in-hospital deaths, 75 (75.0%) individuals had data on underlying conditions available. Of these 57 (76.0%) reported ≥1 underlying condition. Diabetes mellitus, HIV infection and malignancy were the most frequently reported among those who had underlying conditions and died in-hospital. Table 3 includes descriptions of these outcomes by age categories while Table 4 describes the 100 children or adolescents who died in hospital. Males, children aged <1 year and those aged 15-19 years were overrepresented among those who died compared to those who did not die, as were children with one or more underlying conditions. Males made up 56% of in-hospital deaths vs 46.3% of all admissions; children <1 made up 23.0% of deaths vs 16.7% of admissions while adolescents 15- 18 years made up 47.0% of deaths vs 40.4% of admissions (table 3 and 4).

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**Table 3.** Characteristics of COVID-19-associated admissions aged ≤18years, South Africa, DATCOV, 1 March–21 November 2020 (N=4042)

| Variable   | <1yr<br>(n=676)<br>(16.7%) | 1- 4 years<br>(n=645)<br>(16.0%) | 5- 9 years<br>(n=428)<br>(10.6%) | 10- 14 years<br>(n=662)<br>(16.4%) | 15- 19 years<br>(n=1631)<br>(40.4%) | Overall<br>(n=4042)<br>(100%) |
|--|----------------------------|----------------------------------|----------------------------------|------------------------------------|-------------------------------------|-------------------------------|
| Age (median, IQR)                                      | 3.0 mons<br>(1.1- 6.7mons) | 2.2 yrs.<br>(1.5- 3.3yrs)        | 7.8 yrs.<br>(6.4- 8.8yrs)        | 12.9 yrs.<br>(11.6- 14.0yrs)       | 17.9 yrs.<br>(16.7- 19.0yrs)        | 12.5 yrs.<br>(2.3-17.4 yrs.)  |
| Male (n, %)  | 379 (56.2)                 | 362 (56.1)                       | 41 (56.3)                        | 305 (46.1)                         | 584 (35.8)                          | 1871 (46.3)                   |
| <b>Province</b>  |                            |                                  |                                  |                                    |                                     |                               |
| Eastern Cape   | 51 (7.5)                   | 47 (7.3)                         | 43 (10.1)                        | 71 (10.7)                          | 306 (18.8)                          | 518 (12.8)                    |
| Free State   | 22 (3.3)                   | 42 (6.5)                         | 24 (5.6)                         | 46 (7.0)                           | 133 (8.2)                           | 267 (6.6)                     |
| Gauteng  | 176 (26.0)                 | 165 (25.6)                       | 135 (31.5)                       | 171 (25.8)                         | 305 (18.7)                          | 952 (23.5)                    |
| KwaZulu Natal  | 121 (17.9)                 | 112 (17.4)                       | 65 (15.2)                        | 126 (19.0)                         | 254 (15.6)                          | 678 (16.7)                    |
| Limpopo  | 17 (2.5)                   | 6 (0.9)                          | 14 (3.3)                         | 14 (2.1)                           | 35 (2.2)                            | 86 (2.1)                      |
| Mpumalanga   | 16 (2.4)                   | 17 (2.6)                         | 12(2.8)                          | 16 (2.4)                           | 51 (3.1)                            | 112 (2.8)                     |
| North West   | 23 (3.4)                   | 28 (4.3)                         | 29 (6.8)                         | 103(15.6)                          | 308 (18.9)                          | 491 (12.2)                    |
| Northern Cape  | 9 (1.3)                    | 18 (2.8)                         | 10 (2.3)                         | 17 (2.6)                           | 29 (1.8)                            | 83 (2.1)                      |
| Western Cape   | 241 (35.6)                 | 210 (32.6)                       | 96 (22.4)                        | 98 (14.8)                          | 210 (12.9)                          | 855 (21.2)                    |
| Admitted at a public hospital, (n, %)                  | 406 (60.1)                 | 296 (45.9)                       | 227 (53.0)                       | 412 (62.2)                         | 1072 (65.7)                         | 2413 (59.7)                   |
| <b>Data on underlying conditions available, (n, %)</b> | 469 (69.4)                 | 460(71.3)                        | 298 (69.3)                       | 453 (68.4)                         | 1231 (75.5)                         | 2911 (72.0)                   |
| Has ≥1 underlying conditions, (n/N, %)*                | 65/469 (13.9)              | 72/460 (15.7)                    | 64/298 (21.5)                    | 85/453 (18.8)                      | 224/1231 (18.2)                     | 510/2911 (17.5)               |
| Length of stay (median, IQR)**                         | 4 (2-10)                   | 3 (1-5)                          | 3 (1-9)                          | 5 (2-9)                            | 6 (2-9)                             | 4 (2-8)                       |
| ICU admission  | 69 (10.2)                  | 29 (4.5)                         | 29 (6.8)                         | 35 (5.3)                           | 55 (3.4)                            | 217 (5.4)                     |
| Ventilation  | 27 (4.0)                   | 9 (1.4)                          | 14 (3.3)                         | 16 (2.4)                           | 21(1.3)                             | 87 (2.2)                      |
| Died   | 23 (3.4)                   | 7 (1.1)                          | 10 (2.3)                         | 13 (2.0)                           | 47 (2.9)                            | 100 (2.5)                     |
| Discharged alive                                       | 590 (87.3)                 | 584 (90.5)                       | 389 (90.9)                       | 592 (89.4)                         | 1446 (88.7)                         | 3601 (89.1)                   |
| Transferred to another hospital                        | 17 (2.5)                   | 6 (0.9)                          | 6(1.4)                           | 19 (2.9)                           | 53 (3.3)                            | 101 (2.5)                     |
| Still admitted   | 46 (6.8)                   | 48 (7.4)                         | 23 (5.4)                         | 38 (5.7)                           | 85 (5.2)                            | 240 (5.9)                     |

Mons= months; Yrs. = years; IQR= interquartile range; ICU = intensive care unit; \*Individual can have more than one comorbidity and denominator is those with available data on underlying conditions;\*\* among those who died, transferred or discharged

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**Table 4.** Characteristics of COVID-19-associated hospitalised children and adolescents aged ≤19 years who died in hospital, South Africa, DATCOV, 1 March – 21 November 2020 (N=100)

| Characteristic  | n (%)                        |
|---|------------------------------|
| Age (median, IQR*)  | 14.3 years (1.3– 17.9 years) |
| Age < 1 year  | 23 (23.0)                    |
| Age ≥15   | 47 (47.0)                    |
| Male  | 56 (56.0)                    |
| <b>Province</b>   |                              |
| Eastern Cape  | 22 (22.0)                    |
| Free State  | 9 (9.0)                      |
| Gauteng   | 24 (24.0)                    |
| KwaZulu-Natal   | 16 (16.0)                    |
| Limpopo   | 2 (2.0)                      |
| Mpumalanga  | 4 (4.0)                      |
| North West  | 3 (3.0)                      |
| Northern Cape   | 0 (0.0)                      |
| Western Cape  | 20 (20.0)                    |
| Intensive care unit admission   | 37 (37.0)                    |
| Data on underlying conditions available   | 75 (75.0)                    |
| Underlying conditions<br>Yes  | 57/75 (76.0)                 |
| <b>Underlying conditions</b>  |                              |
| Asthma/ Chronic Pulmonary Disease**   | 2 (3.5)                      |
| Chronic Kidney Disease  | 5 (8.8)                      |
| Diabetes mellitus   | 10 (17.5)                    |
| HIV   | 10 (17.5)                    |
| Heart Disease   | 6 (10.5)                     |
| Hypertension  | 7 (12.3)                     |
| Malignancy  | 8 (14.0)                     |
| Obesity   | 4 (7.0)                      |
| Tuberculosis past   | 5 (8.8)                      |
| Tuberculosis current  | 9 (15.8)                     |
| Other ( <i>Acute appendicitis, Anaemia, Biliary atresia, Cerebral palsy, Epilepsy, Hypokalaemia, Hypocalcaemia, Prader Willi Syndrome, pneumonia, Prematurity, Ileus, HIV-exposure, substance abuse</i> ) | 15 (26.3)                    |

\*IQR= interquartile range; \*\*the two children who died with respiratory conditions also had other underlying conditions.

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## Discussion

This report presents data, on the epidemiology and clinical features of laboratory-confirmed COVID-19 among individuals aged  $\leq 19$  years using data from two surveillance systems established for monitoring the COVID-19 pandemic in South Africa. The data presented showed that children made up 9.0% of all laboratory-confirmed COVID-19 cases reported in South Africa and around 4.0% of COVID-19 associated admissions, despite comprising almost 37% of the population. The cumulative incidence among children was almost six times lower compared to that of adults (1832.4 per 100,000) during the same period. The data showed much higher cumulative incidence among older females aged 15- 19 years (788.8/100,000 population) compared to other age groups in children (146-520 per 100,000). The higher incidence among females compared to males from age 10-14 years is apparent until the age of 60 years, (7) and may be due to some unknown biological factor, differential exposures to COVID-19 through care work or other frontline roles or from better health seeking behaviour and subsequent testing in females.

The data also showed increasing trends in new laboratory confirmed COVID-19 cases and COVID-19-associated admissions among children and adolescents in Eastern Cape and Western Cape, more so in Eastern Cape, reflecting national trends and trends among older individuals (7). The median age of children admitted to hospital was lower than that among all diagnosed cases aged  $\leq 19$  years (12.5 years vs 14.0 years), which suggests that severe disease may be more common among younger children or that clinicians are more likely to admit younger children as a precaution.

The overall in-hospital case fatality risk was 2.7% among those with available data on in-hospital outcome, which is somewhat higher than has been reported in smaller hospital cohorts elsewhere – on average 0.2% in studies from Europe and China. (8-12) Among the hospitalised children with confirmed COVID-19 who died we were often not able to confirm whether COVID-19 was incidentally identified and whether it contributed to the mortality. Infants aged  $<1$  years were over-represented among deaths in our dataset. Although infants made up 16% of admissions, they made up 23% of deaths. This is consistent with what has been described in China, United States and Europe. (13-16) In China – 11% of infants  $<1$  year had severe or critical illness compared 4.8% among the rest of the children. (13) In the United States infants made up 15% of all childhood cases and 40% of hospitalizations in a cohort reported during February to April. (14) In a report on deaths among children and adolescents aged  $<21$  years in the United States, infants made up 10% of these deaths. (15) In a multicentre study of COVID-19 hospitalizations among children in Europe during April 2020, infants  $<1$  year were five times more likely to be admitted into intensive care units, although overall mortality was low at 0.7%. (16)

Respiratory underlying conditions – asthma and chronic pulmonary disease – were the most common underlying conditions documented among admitted children and adolescents but were by themselves not associated with any deaths. On the other hand, diabetes mellitus, HIV and malignancy appeared to be the most commonly documented underlying conditions among older children who died and had data on underlying conditions available. There is a need to ensure high compliance with respect to non-pharmaceutical interventions within families and schools of children and adolescents with underlying conditions in general and in particular among children with underlying conditions, their families and communities. Approximately 34% of children who died and had data on underlying medical conditions available did not have any reported underlying medical conditions. Additional data are being sought on individuals not reporting an underlying illness to further characterise the nature of the underlying condition and on those without available data.



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## Limitations

This analysis was subject to several limitations:

- Both surveillance systems included only SARS-CoV-2-confirmed or tested COVID-19 cases or admissions and 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.
- The national laboratory based reporting system lacks complete information on symptoms or contact history to determine source of infection.
- The DATCOV system started as a sentinel hospital-based system. As the platform is being rolled out to all provinces, the hospitalizations captured are increasingly more representative of all COVID-19 admissions in the country.
- Information on underlying medical conditions is incomplete in the two surveillance systems. Additional information on underlying conditions among admitted children is always being sought from reporting hospitals.
- The indications or reasons for admission are mostly not provided. These would allow determination of whether admission was due to COVID-19 disease, for isolation purposes or other diseases



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