

COVID-19 SPECIAL PUBLIC HEALTH SURVEILLANCE BULLETIN



NATIONAL INSTITUTE FOR
COMMUNICABLE DISEASES

Division of the National Health Laboratory Service

VOLUME 18. SUPPLEMENTARY ISSUE 3

08 SEPTEMBER 2020

FOREWORD

Since the COVID-19 pandemic reached South Africa in March 2020, there has been considerable variation in its effects on the wide range of demographic groups in the country. This report details the epidemiology of COVID-19 in adolescents aged ≤ 18 years, who currently account for close to 8% of confirmed cases in South Africa. The NICD's DATCOV and COVID-19 teams compiled these data, and are to be congratulated on setting up such detailed surveillance systems in remarkably short time.

This is the third special issue of the our COVID-19 series, and we trust that you will find this information useful as we continue to grapple with SARS-CoV-2.

Prof Basil Brooke, Editor

COVID-19 SPECIAL PUBLIC HEALTH SURVEILLANCE BULLETIN

VOLUME 18. SUPPLEMENTARY ISSUE 3

08 SEPTEMBER 2020

EPIDEMIOLOGY AND CLINICAL CHARACTERISTICS OF LABORATORY-CONFIRMED COVID-19 AMONG CHILDREN AND ADOLESCENTS AGED ≤ 18 YEARS, SOUTH AFRICA, 3 MARCH - 17 AUGUST 2020

COVID-19 and DATCOV teams, National Institute for Communicable Diseases

Summary

- As of 17 August 2020, children and adolescents ≤ 18 years made up 7.6% of laboratory-confirmed COVID-19 cases and 2.9% of all COVID-19-associated admissions at sentinel hospitals.
- The cumulative incidence risk of laboratory-confirmed COVID-19 cases aged ≤ 18 years was 219 per 100 000 population. The incidence risk was lowest in Limpopo Province and highest in Gauteng Province, was higher in females than males, and increased with age among individuals aged ≥ 1 year.
- The weekly incidence risk of laboratory-confirmed COVID-19 cases aged ≤ 18 years, and cases admitted to sentinel hospitals, peaked during weeks 26-30 for most provinces and has declined since then.
- There were 1568 COVID-19-associated admissions among individuals aged ≤ 18 years reported. Of these, 1091 (69.6%) included data on underlying conditions of which 194 (17.8%) had ≥ 1 underlying conditions. Asthma and other chronic pulmonary conditions, and HIV were the commonest.
- The median length of hospital stay among COVID-19-associated admissions aged ≤ 18 years was 3 days (interquartile range 2- 6 days) with 122 (7.8%) individuals admitted into intensive care units at some point during admission of which 45 (3.1%) were ventilated.
- Data on in-hospital outcome were available for 1415 (90.2%) individuals aged ≤ 18 years. Among these, there were 42 deaths giving an in-hospital mortality of 3%. Among 27 (64.3%) individuals who died with available data on underlying conditions, 11 (40.7%) reported ≥ 1 condition. Additional data is being sought on individuals who did not report an underlying illness and those for whom there are no data currently.

COVID-19 SPECIAL PUBLIC HEALTH SURVEILLANCE BULLETIN

VOLUME 18. SUPPLEMENTARY ISSUE 3

08 SEPTEMBER 2020

Background

In December 2019, a cluster of pneumonia cases of unknown aetiology was reported in Wuhan, Hubei Province, China.¹ 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 188 countries and territories with 21.2 million individuals infected and 761 000 deaths reported to the World Health Organization as of 17 August 2020.¹ The first case of COVID-19 in South Africa was reported on 5 March 2020 (week 8) in KwaZulu-Natal Province.² By 17 August 2020, the country had reported 589 886 cases and 11 982 deaths.²

Published studies suggest that the clinical presentation of COVID-19 in children differs from that of adults. Compared to adults, COVID-19 in children is more likely to be asymptomatic or mildly symptomatic, and is less likely to result in hospital admission.³ There are, however, concerns of possible limited testing in children and cases among children being missed.⁴ There is also concern regarding increased transmission within and outside schools as they re-open after months of lockdown. Persons aged ≤ 18 years constitute just over a third of the population of South Africa (20 633 557; 35.1%) and make up the vast majority of school-goers.

This report details the epidemiological characteristics of laboratory-confirmed COVID-19 cases aged ≤ 18 years as notified through the laboratory-based national notification system, as well as COVID-19-associated admissions aged ≤ 18 years at sentinel hospitals in South Africa.

Methods

Data collection procedures. Laboratory results from public and private laboratories were submitted to the National Institute for Communicable Diseases (NICD). Limited demographic and epidemiological data were collected at the time of specimen collection. Data on children admitted to sentinel hospitals were collected on the DATCOV platform – an online data collection system. Health care workers at the sentinel hospitals captured demographic and clinical information on admitted COVID-19 cases at time of admission, during admission and at discharge. As of 17 August 2020, there were 397 hospitals submitting admissions data to DATCOV. This included private and some public hospitals – with 100% coverage in the Western Cape Province.

Definition of outcomes

A laboratory-confirmed case of COVID-19 was defined as any person who tested positive for SARS-CoV-2 by real-time reverse-transcription polymerase chain reaction (rRT-PCR) assay of 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 were exported into Stata14.2® for analysis, and descriptive statistics for cases aged ≤ 18 years were used. Incidence risk was determined as the number of cases aged ≤ 18 years as a proportion of the mid-year population estimates for 2019 provided by Statistics South Africa (Stats SA), and presented as cases per 100 000 by age, gender, province and week of diagnosis. Descriptive

COVID-19 SPECIAL PUBLIC HEALTH SURVEILLANCE BULLETIN

VOLUME 18. SUPPLEMENTARY ISSUE 3

08 SEPTEMBER 2020

statistics were used to describe demographic and clinical characteristics among admissions ≤ 18 years at sentinel hospitals. These were stratified by the following age groups: <7 days, 7- 28 days, 29 days – 1 year, 1- 4 years, 5- 9 years, 10- 14 years and 15- 18 years. Individuals for whom age data were missing were excluded from the analysis.

Results

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

As of 17 August 2020, 589 886 laboratory-confirmed cases of COVID-19 had been reported to the NICD. Of these, 44 956 (7.6%) were aged ≤ 18 years. The median age of the children and adolescents was 13 years (interquartile range [IQR] 8- 16 years) with 1891 (4.3%) aged <1 year, 17 016 (37.9%) aged ≥ 15 years and 19 943 (44.9%) female. The majority of cases [39,662 /44 956 (88.2%)] were in five provinces – Eastern Cape (18.0%), Free State (6.9%), Gauteng (29.9%), KwaZulu-Natal (22.1) and Western Cape (11.4%). The cumulative incidence of laboratory-confirmed COVID-19 among persons ≤ 18 years was 218 per 100 000 population. The cumulative incidence risk ranged from 45 per 100 000 in Limpopo Province to 303 per 100 000 population in Gauteng Province (Table 1). The national weekly incidence risk among persons aged ≤ 18 years increased from <1 per 100 000 in week 9 to a peak of 30 per 100 000 during weeks 25-27. Most provinces experienced peaks during the weeks 26-31 and all thereafter showed declining weekly incidence risks (Figure 1).

Table 1. Cumulative incidence risk of laboratory-confirmed COVID-19 among children and adolescents aged ≤ 18 years by province, South Africa, 1 March- 17 August 2020 (N=44 956).

| Province | Total cases (n, %) | Population (≤ 18 years) | Incidence risk per 100 000 |
|----------------------|--------------------|-------------------------------|----------------------------|
| Eastern Cape | 8069 (18.0) | 2 714 308 | 297.3 |
| Free State | 3088 (6.9) | 1 031 291 | 299.4 |
| Gauteng | 13438 (29.9) | 4 434 404 | 303.0 |
| KwaZulu Natal | 9952 (22.1) | 4 350 890 | 228.7 |
| Limpopo | 1098 (2.5) | 2 417 100 | 45.4 |
| Mpumalanga | 1726 (3.9) | 1 692 768 | 102.0 |
| North West | 1539 (3.4) | 1 451 987 | 106.0 |
| Northern Cape | 913 (2.0) | 450 096 | 202.8 |
| Western Cape | 5103 (11.4) | 2 090 713 | 244.1 |
| All provinces | 44956 (100) | 20 633 557 | 217.9 |

COVID-19 SPECIAL PUBLIC HEALTH SURVEILLANCE BULLETIN

VOLUME 18. SUPPLEMENTARY ISSUE 3

08 SEPTEMBER 2020

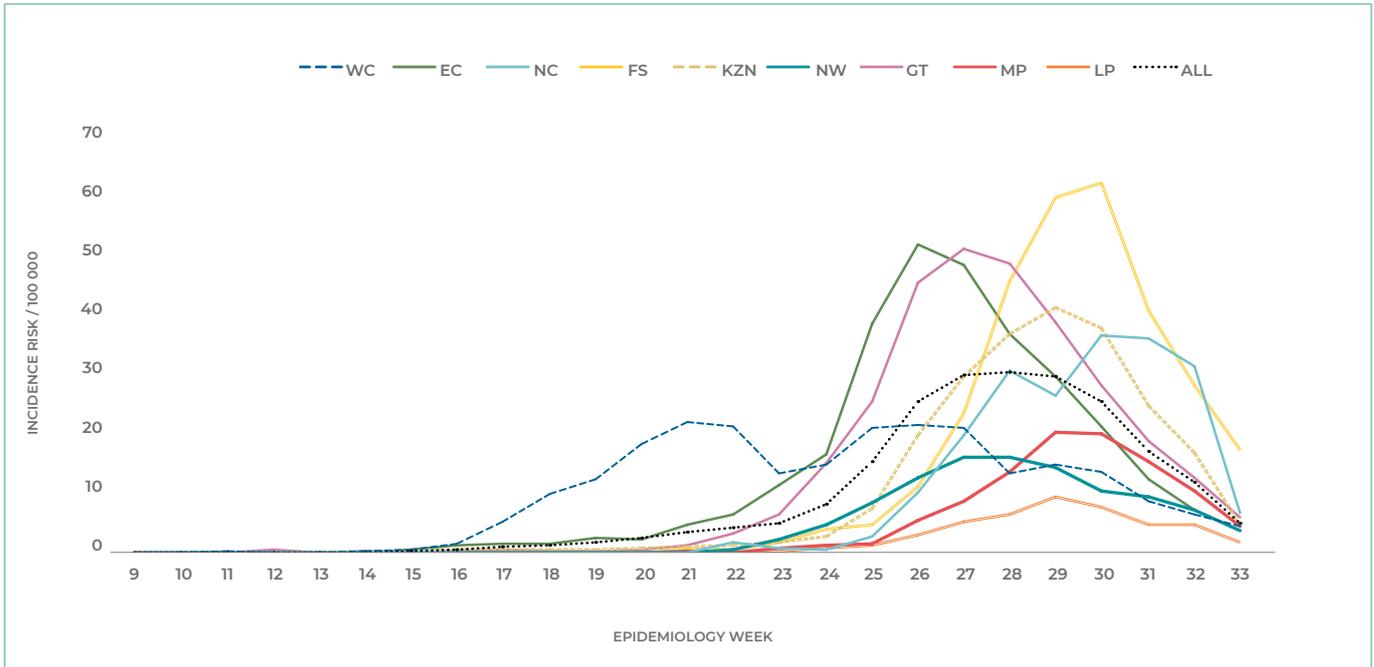


Figure 1. Weekly incidence risk of laboratory-confirmed COVID-19 among children and adolescents ≤ 18 years by province by epidemiologic week, South Africa, 1 March-17 August 2020 (N=44 956).

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

The cumulative incidence risk generally increased with age from 106 per 100 000 among children aged 1-4 years to 456 per 100 000 among adolescents aged 15-18 years. The cumulative incidence risk was higher among females than males (237 per 100 000 vs 191 per 100 000) (Figure 2).

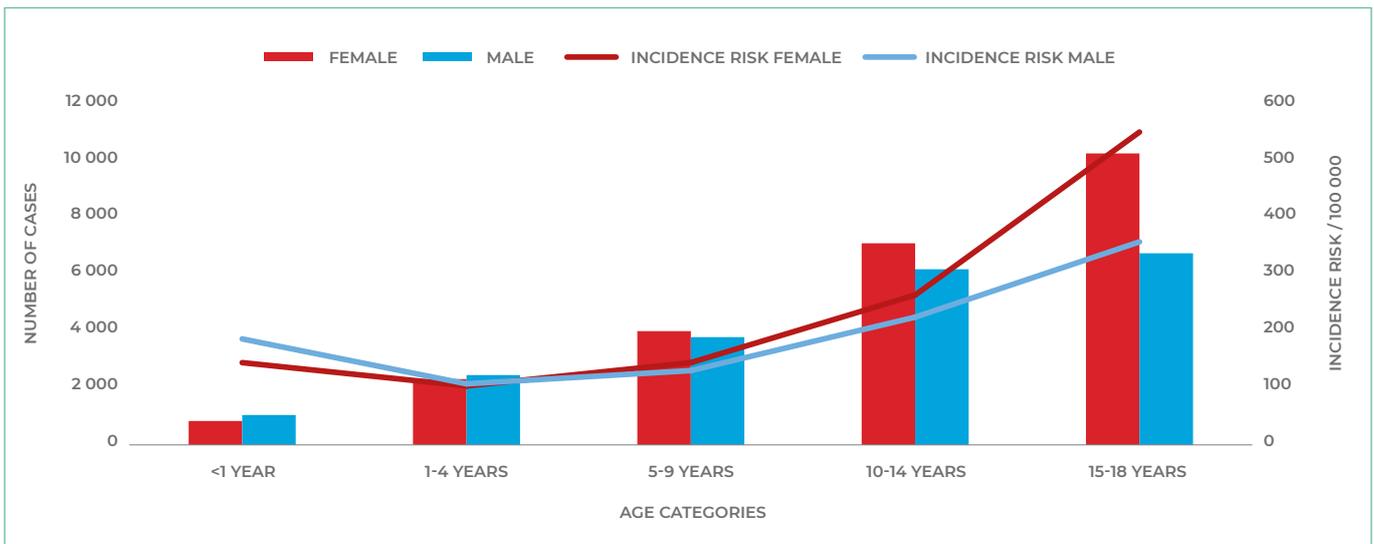


Figure 2. Cumulative incidence risk of laboratory-confirmed COVID-19 among children and adolescents by age and gender, South Africa, 1 March-17 August 2020 (N=44 956).

COVID-19 SPECIAL PUBLIC HEALTH SURVEILLANCE BULLETIN

VOLUME 18. SUPPLEMENTARY ISSUE 3

08 SEPTEMBER 2020

COVID-19-associated admissions in children and adolescents aged ≤ 18 years

As of 17 August 2020, data on 54 112 COVID-19-associated hospital admissions had been captured on DATCOV. Of these, 1568 (2.9%) were individuals aged ≤ 18 years. The proportions of COVID-19-associated admissions in individuals aged ≤ 18 years varied across provinces, from 1.3% in Limpopo to 23.3% in Gauteng. The first admission of a COVID-19-positive child was during week 9 (Figure 3). The majority of the admissions were in five provinces; Western Cape (35.5%), Gauteng (23.3%), KwaZulu-Natal (17.9%), Eastern Cape (8.3%) and Free State (6.2%), which accounted for 91.1% of all admissions. From week 25, the number of admissions increased before coming down during weeks 29-30 (Figure 4).

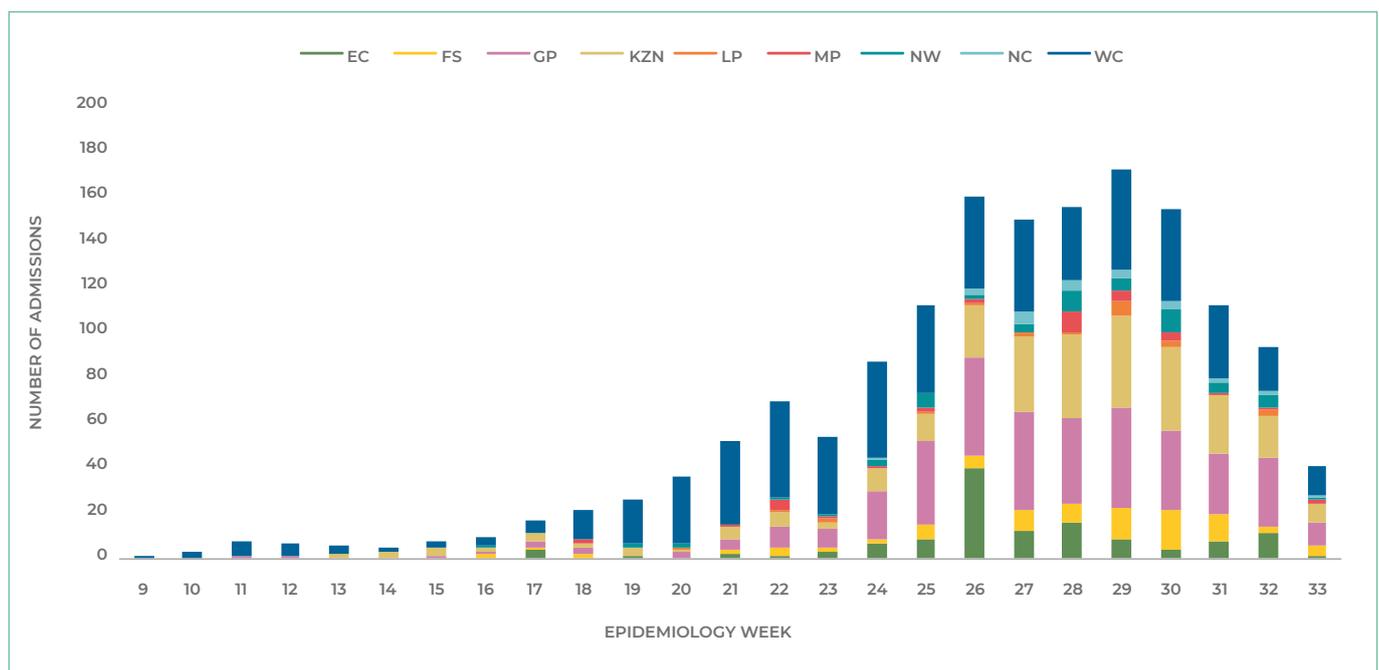


Figure 3. Number of COVID-19-associated admissions aged ≤ 18 years by epidemiologic week and province, South Africa, DATCOV, 1 March – 17 August 2020 (N=1568).

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

COVID-19 SPECIAL PUBLIC HEALTH SURVEILLANCE BULLETIN

VOLUME 18. SUPPLEMENTARY ISSUE 3

08 SEPTEMBER 2020

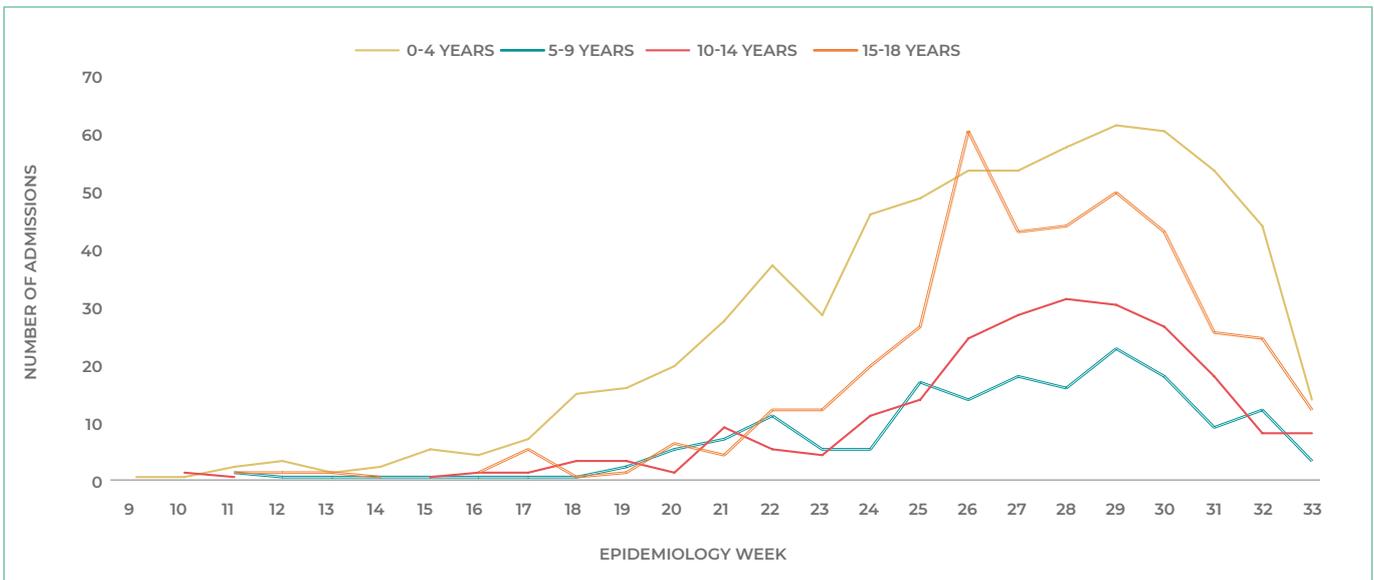


Figure 4. Number of COVID-19-associated admissions among individuals aged ≤18 years at sentinel hospitals by epidemiologic week and age group, South Africa, DATCOV, 1 March - 17 August 2020 (N=1568).

Of the 1568 admitted individuals included in the analysis, the median age was 7.4 years (IQR 1.1 -15.6 years) with 377 (24.0%) aged <1 year, 424 (27.0%) aged ≥15 years and 784 (50.0%) were male. Figure 5 shows the distribution of the admissions by age and sex. Just over 40% of the children were admitted at hospitals in the public sector (645, 41.1%). Table 2 shows the demographic and clinical characteristics of COVID-19-associated admissions among children and adolescents aged ≤18 years at sentinel hospitals overall and stratified by age group. A total of 1091 (69.6%) cases had data on underlying conditions. Of these 194 (17.8%) had one or more underlying conditions with 14 (16.0%) showing ≥2 underlying conditions. Asthma and chronic pulmonary disease were the most frequently reported underlying conditions followed by HIV and diabetes (Figure 6).

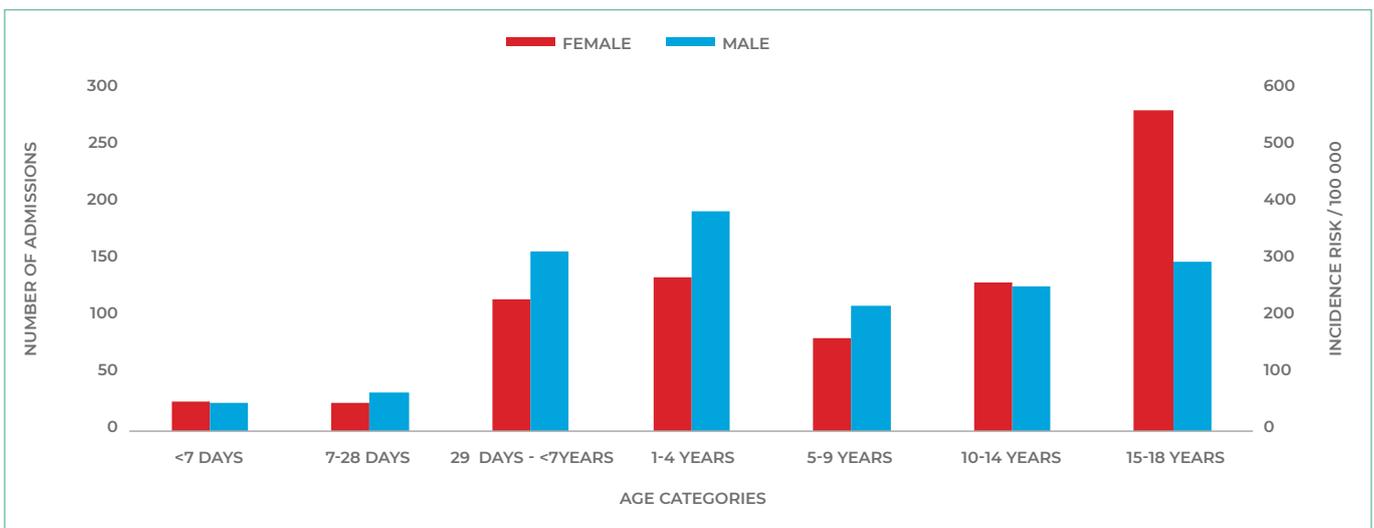


Figure 5. Number of COVID-19-associated admissions aged ≤18 years by age group and sex, South Africa, DATCOV, 1 March - 17 August 2020 (N=1568).

COVID-19 SPECIAL PUBLIC HEALTH SURVEILLANCE BULLETIN

VOLUME 18. SUPPLEMENTARY ISSUE 3

08 SEPTEMBER 2020

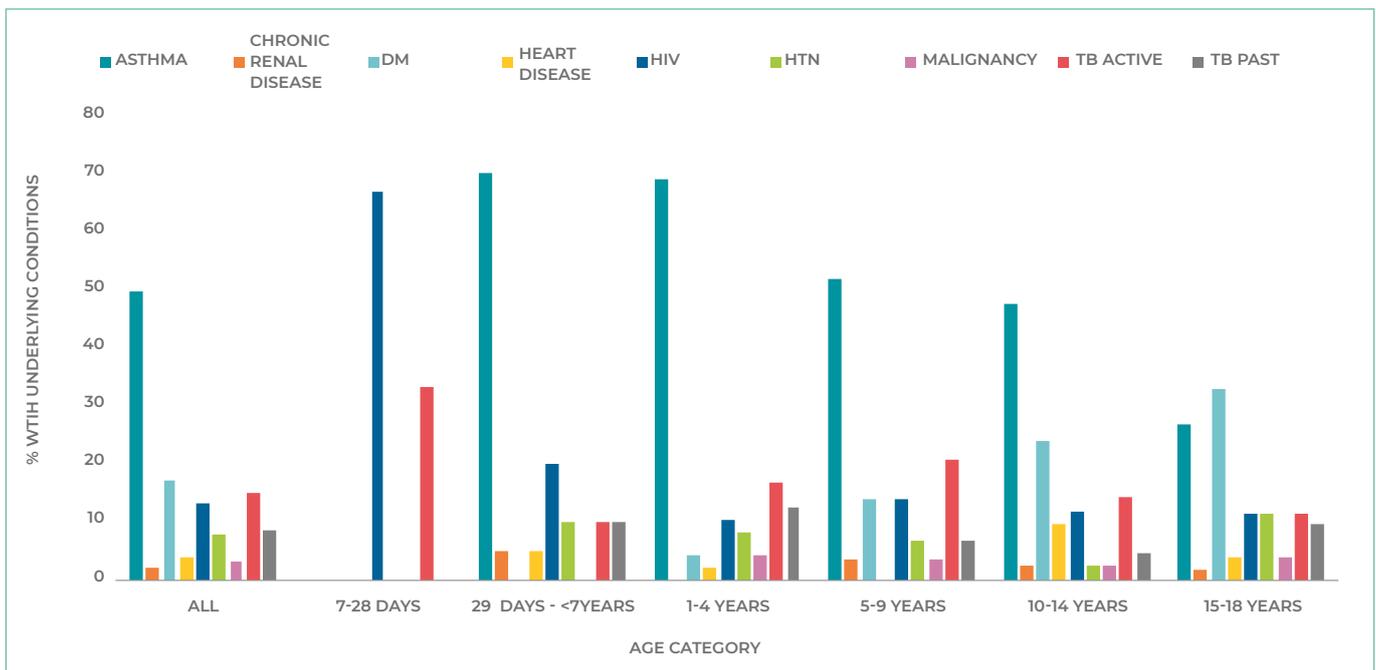


Figure 6. Distribution of underlying conditions among COVID-19-associated admissions aged ≤18 years with ≥1 underlying condition/s, South Africa, DATCOV, 1 March – 17 August 2020 (N=194).

CPD=chronic pulmonary disease, DM=diabetes mellitus, HTN=hypertension, TB=tuberculosis

Outcomes of COVID-19-associated admissions among children aged ≤18 years

Of the 1568 COVID-19-associated admissions among children ≤18 years, 122 (7.8%) were admitted to ICU and 48 (3.1%) were ventilated at some point during admission. At analysis, 1371 (87.4%) had been discharged, 140 (8.9%) were still admitted, 13 (0.8%) had been transferred to other facilities and 44 (2.8%) had died during admission. Two of the 44 deaths were considered unrelated to COVID-19. Among individuals with in-hospital outcome data available, the case fatality ratio was 3% (42/1415). The overall median length of hospital stay was 3 days (IQR 2- 6 days) and 9 days (IQR 2-16 days) for those who died. Of the 42 COVID-19-associated in-hospital deaths, 27 (64.3%) had data on underlying conditions. Of these, 11 (40.7%) reported ≥1 underlying condition/s (Table 3). Diabetes mellitus and heart disease were the most frequently reported among those who had underlying conditions and died in hospital.

COVID-19 SPECIAL PUBLIC HEALTH SURVEILLANCE BULLETIN

VOLUME 18. SUPPLEMENTARY ISSUE 3

08 SEPTEMBER 2020

Table 2. Cumulative incidence risk of laboratory-confirmed COVID-19 among children and adolescents aged ≤18 years by province, South Africa, 1 March-17 August 2020 (N=44 956).

| Variable | <7days (n=50) | 7- 28 days (n=57) | 29days- <1yr (n=270) | 1- 4 years (n=323) | 5- 9 years (n=190) | 10- 14 years (n=254) | 15- 18 years (n=424) | Overall (in years) |
|--|--------------------|------------------------|------------------------|------------------------|------------------------|---------------------------|---------------------------|--------------------------|
| Age (median, IQR) | 0 days (0- 1 days) | 14.0 days (12- 20days) | 3.9mons (2.1- 7.1mons) | 2.2 yrs. (1.4- 3.1yrs) | 7.8 yrs. (6.6- 8.9yrs) | 12.9 yrs. (11.6- 14.0yrs) | 17.6 yrs. (16.6- 18.1yrs) | 7.4 yrs. (1.1-15.6 yrs.) |
| Male (n, %) | 24 (48.0) | 33 (57.9) | 156 (57.8) | 190 (58.8) | 109 (57.4) | 125 (49.2) | 147 (34.5) | 784 (50.0) |
| Province | | | | | | | | |
| Eastern Cape | 2 (4.0) | 2 (3.5) | 9 (3.3) | 17 (5.3) | 12 (6.3) | 17 (6.7) | 70 (16.5) | 129 (8.2) |
| Free State | 0 | 1 (1.8) | 9 (3.3) | 20 (6.2) | 7 (3.7) | 18 (7.1) | 42 (9.9) | 97 (6.2) |
| Gauteng | 13 (26.0) | 12 (21.1) | 59 (21.9) | 68 (21.1) | 50 (26.3) | 73 (28.7) | 91 (21.5) | 366 (23.3) |
| KwaZulu Natal | 13 (26.0) | 7 (12.3) | 41 (15.2) | 52 (16.1) | 29 (15.3) | 60 (23.6) | 79 (18.3) | 281 (17.9) |
| Limpopo | 2 (4.0) | 2 (3.5) | 3 (1.1) | 1 (0.3) | 5 (2.6) | 0 | 7 (1.7) | 20 (1.3) |
| Mpumalanga | 4 (8.0) | 1 (1.8) | 1 (0.4) | 5 (1.6) | 3 (1.6) | 6 (2.4) | 15 (3.5) | 35 (2.2) |
| North West | 1 (2.0) | 1 (1.8) | 5 (1.9) | 12 (3.7) | 8 (4.2) | 8 (3.2) | 23 (5.4) | 58 (3.7) |
| Northern Cape | 1 (2.0) | 0 | 1 (0.4) | 5 (1.6) | 7 (3.7) | 8 (3.2) | 4 (0.9) | 26 (1.7) |
| Western Cape | 14 (28.0) | 31 (54.4) | 142 (52.6) | 143 (44.3) | 69 (36.3) | 64 (25.2) | 93 (21.9) | 556 (35.5) |
| Admitted at a public hospital, (n, %) | 12 (24.0) | 38 (66.7) | 141 (52.2) | 127 (39.2) | 64 (33.7) | 91 (35.8) | 172 (40.6) | 645 (41.1) |
| Data on underlying conditions available, (n, %) | | | | | | | | |
| No | 22 (44.0) | 37 (64.9) | 129 (47.8) | 103 (31.9) | 52 (27.4) | 57 (22.4) | 77 (18.2) | 477 (30.4) |
| Yes | 28 (56.0) | 20 (35.1) | 141 (52.2) | 220 (68.1) | 138 (72.6) | 197 (77.6) | 347 (81.8) | 1091 (69.6) |
| Has ≥1 underlying conditions, (n/N, %)* | 0/28 (0) | 3/20 (15.0) | 20/141 (14.2) | 48/220 (21.8) | 29/138 (21.0) | 42/197 (21.3) | 52/347 (15.0) | 194/1091 (17.8) |
| Length of stay (median, IQR)** | 11 (4-36) | 5 (3-10) | 4 (2-7) | 2 (1-4) | 2 (1-5) | 3 (2-7) | 4 (2-7) | 3 (2-6) |
| ICU admission | 18 (50.0) | 11 (19.3) | 22 (8.2) | 19 (5.9) | 11 (5.8) | 11 (8.3) | 20 (4.7) | 122 (7.8) |
| Ventilation | 12 (24.0) | 3 (5.3) | 7 (2.6) | 5 (1.6) | 5 (2.6) | 11 (4.3) | 5 (1.2) | 48 (3.1) |
| Died*** | 1 (2.0) | 3 (5.3) | 8 (3.0) | 3 (0.9) | 3 (1.6) | 9 (3.5) | 15 (3.5) | 42 (2.7) |
| Discharged alive | 38 (76.0) | 47 (82.5) | 239 (88.5) | 290 (89.8) | 173 (91.1) | 219 (86.2) | 365 (86.1) | 1371 (87.4) |
| Transferred to another hospital | 0 | 0 | 2 (0.7) | 2 (0.6) | 1 (0.5) | 4 (1.6) | 4 (0.9) | 13 (0.8) |
| Still admitted | 9 (18.0) | 7 (12.3) | 21 (7.8) | 28 (8.7) | 13 (6.8) | 22 (8.7) | 40 (9.4) | 140 (8.9) |

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 *** excludes 2 deaths which were deemed unrelated to COVID-19

COVID-19 SPECIAL PUBLIC HEALTH SURVEILLANCE BULLETIN

VOLUME 18. SUPPLEMENTARY ISSUE 3

08 SEPTEMBER 2020

Table 3. Characteristics of in-hospital deaths among COVID-19-associated admissions aged ≤ 18 years, South Africa, DATCOV, 1 March – 17 August 2020 (N=42).

| Characteristic | n (%) |
|---|--------------------------------|
| Age (median, IQR) | 13.5 (2.9 months – 16.0 years) |
| Age < 1 year | 12 (28.6) |
| Males | 27 (64.3) |
| Province | |
| Eastern Cape | 5 (11.9) |
| Free State | 5 (11.9) |
| Gauteng | 12 (28.6) |
| KwaZulu Natal | 6 (14.5) |
| Western Cape | 13 (31.0) |
| Others | 1 (2.4) |
| Data on underlying conditions available | 27 (64.3) |
| Underlying conditions | |
| No | 16/27 (59.3) |
| Yes | 11/27 (40.7) |
| Diabetes mellitus | 3/11 (27.3) |
| Heart Disease | 3/11 (27.3) |
| Hypertension | 1/11 (9.1) |
| Malignancy | 2/11 (18.2) |
| Chronic kidney disease | 2/11 (18.2) |
| Tuberculosis past | 1/11 (9.1) |
| Tuberculosis current | 1/11 (9.1) |
| Asthma / chronic pulmonary disease | 0/11 (0) |
| HIV | 0/11 (0) |

IQR=interquartile range

Discussion

Children made up 7.6% of all laboratory-confirmed COVID-19 cases and 2.9% of COVID-19 associated hospital admissions in South Africa during the surveillance period. Females of school-going age showed a higher cumulative incidence risk and proportion admitted to hospital. The data also showed declining incidence of new laboratory confirmed COVID-19 cases and COVID-19 associated admissions among children and adolescents in all provinces in recent weeks, reflecting national trends. The median age at admission was lower than that of diagnosed cases in general (7.4 years vs 13.0 years), suggesting that severe disease may be more common among younger children or that clinicians are more likely to admit younger children as a precaution. Some of the COVID-19 associated admissions <1 year were newborns and may have been admitted for birth-related complications rather than the COVID-19-related illness. The overall in-hospital mortality was 2.7%, which is somewhat higher than has been reported in smaller hospital cohorts elsewhere – on average 0.2% in studies from Europe and China.⁵⁻⁹ Almost 60%

COVID-19 SPECIAL PUBLIC HEALTH SURVEILLANCE BULLETIN

VOLUME 18. SUPPLEMENTARY ISSUE 3

08 SEPTEMBER 2020

of the children that died and for whom there were data on underlying medical conditions, did not have any underlying medical conditions. Additional data is being sought on individuals not reporting an underlying illness and those without available data.

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 and those individuals who were symptomatic but not tested would have been missed. Testing approaches in South Africa have changed as the epidemic has 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 is a sentinel hospital-based system. It therefore does not include all admissions at all hospitals in South Africa. As a result, hospitalisation rates by province, epidemiology week, age or gender cannot be determined.
- Information on underlying medical conditions is incomplete in the two surveillance systems.
- The indications or reasons for admission are not provided. These would allow determination of whether admission was due to COVID-19 disease, isolation purposes or other diseases.

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COVID-19 SPECIAL PUBLIC HEALTH SURVEILLANCE BULLETIN

VOLUME 18. SUPPLEMENTARY ISSUE 3

08 SEPTEMBER 2020

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COVID-19 SPECIAL PUBLIC HEALTH SURVEILLANCE BULLETIN



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