

COVID-19 HOSPITAL SURVEILLANCE UPDATE



NATIONAL INSTITUTE FOR
COMMUNICABLE DISEASES

Division of the National Health Laboratory Service

SOUTH AFRICA WEEK 8 2022

OVERVIEW

This report summarises data of COVID-19 cases admitted to hospital in all provinces. The report is based on data collected from 5 March 2020 to 26 February 2022.

HIGHLIGHTS

- As of 26 February 2022, 458,475 COVID-19 admissions were reported from 666 facilities (407 public-sector and 259 private-sector) in all nine provinces of South Africa, representing 100% coverage of public and private hospitals that have had COVID-19 admissions. There were 205,310 (52.3%) and 187,643 (47.8%) admissions reported in public and private sector respectively. The majority of COVID-19 admissions were reported from four provinces, Gauteng 138,741 (30.3%), Western Cape 89,013 (19.4%), KwaZulu-Natal 78,448 (17.1%) and Eastern Cape 44,426 (10.0%).
- Of the 458,475 admissions, 2,844 (0.6%) patients were in hospital at the time of this report, 347,097 (75.7%) patients were discharged alive or transferred out and 100,820 (22.0%) patients died in hospital.
- Of the 447,917 COVID-19 patients who had recorded in-hospital outcome (died and discharged), the case fatality ratio (CFR) was 22.5%. On multivariable analysis, factors associated with in-hospital mortality were older age; male sex; black African, Coloured and Indian compared to white race; admission in the public sector; and having comorbid hypertension, diabetes, chronic cardiac disease, chronic renal disease, malignancy, HIV, current and past tuberculosis, and obesity.
- Compared to wave 1, there was increased risk of mortality in wave 2 (adjusted odds ratio [aOR] 1.5; 95% confidence interval [CI] 1.4-1.5) and wave 3 (aOR 1.3; 95% CI 1.3-1.4), and decreased risk of mortality in wave 4 (aOR 0.5; 95% CI 0.4-0.5). Compared to the Western Cape Province, individuals hospitalised in all other provinces were more likely to die in-hospital.

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METHODS

DATCOV hospital surveillance for COVID-19 admissions, was initiated on the 1 April 2020. Data are submitted by public and private hospitals that have agreed to report COVID-19 admissions through DATCOV surveillance in all nine provinces of South Africa. A COVID-19 case was defined as a person with a positive reverse transcriptase polymerase chain reaction (RT-PCR) assay for SARS-CoV-2 or a person who had a positive SARS-CoV-2 antigen test who was admitted to hospital. An individual was defined as having severe disease if treated in high care or intensive care unit (ICU), or ventilated or diagnosed with acute respiratory distress syndrome (ARDS) or if dead. Case fatality ratio (CFR) was calculated for all closed cases, i.e. COVID-19 deaths divided by COVID-19 deaths plus COVID-19 discharges, excluding individuals who are still admitted in hospital.

Data are submitted by public and private hospitals that have agreed to report COVID-19 admissions through DATCOV surveillance in all nine provinces of South Africa. On 15 July 2020, the National Health Council adopted DATCOV as the national COVID-19 hospital surveillance system. As of 26 February 2022, a total of 666 facilities submitted data on hospitalised COVID-19 cases, 407 from public sector and 259 from private sector (Table 1). This reflects 100% coverage of all public and private hospitals that have had COVID-19 admissions to date.

Table 1. Number of hospitals reporting data on COVID-19 admissions by province and sector, South Africa, 5 March 2020 to 26 February 2022

Facilities reporting	Public	Private
Eastern Cape	86	18
Free State	35	20
Gauteng	40	96
KwaZulu-Natal	69	47
Limpopo	41	7
Mpumalanga	31	9
North West	17	13
Northern Cape	29	6
Western Cape	59	43
South Africa	407	259

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RESULTS

Epidemiological and geographic trends in admissions

From 5 March 2020 to 26 February 2022, a total of 458,475 COVID-19 admissions were reported from 666 facilities in all nine provinces of South Africa. Of these admissions, 205,310 (52.3%) and 187,643 (47.8%) were reported in public and private sector, respectively. The fourth wave of the COVID-19 pandemic began in week 45 of 2021 in both public and private sectors and peaked in week 51 (Figure 1). The weekly admissions during the fourth wave were lower than the numbers of admissions at the peak of the second and third waves in both sectors.

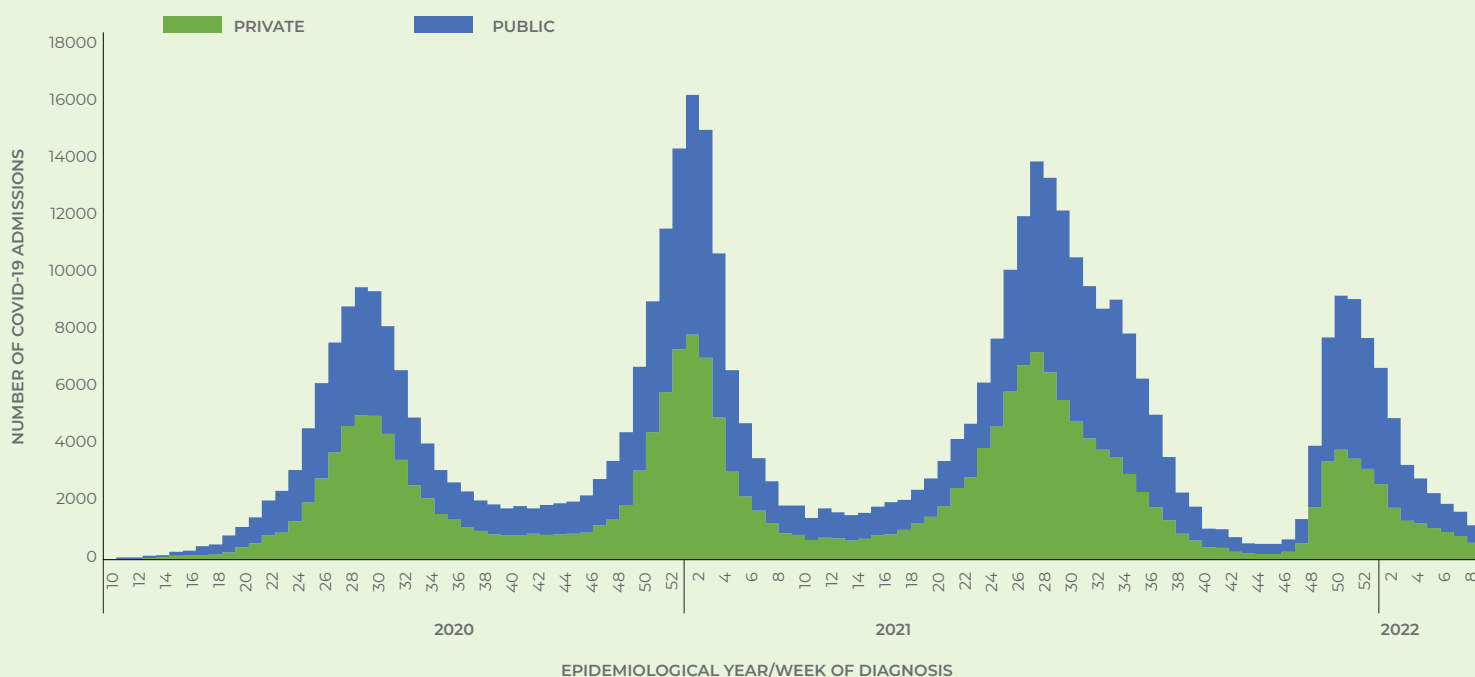


Figure 1. Number of reported COVID-19 admissions by health sector and epidemiological year and week of diagnosis, 5 March 2020-26 February 2022, n=458,475

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The majority of admissions 350,628/458,475 (76.5%) were recorded in four provinces, with the highest number reported in Gauteng 138,741 (30.3%), Western Cape 89,013 (19.4%), KwaZulu-Natal 78,448 (17.1%) and Eastern Cape 44,426 (10.0%) (Figure 2). There has been a decrease in admissions in all provinces since the fourth wave peak in week 50. All provinces have exited the fourth wave.

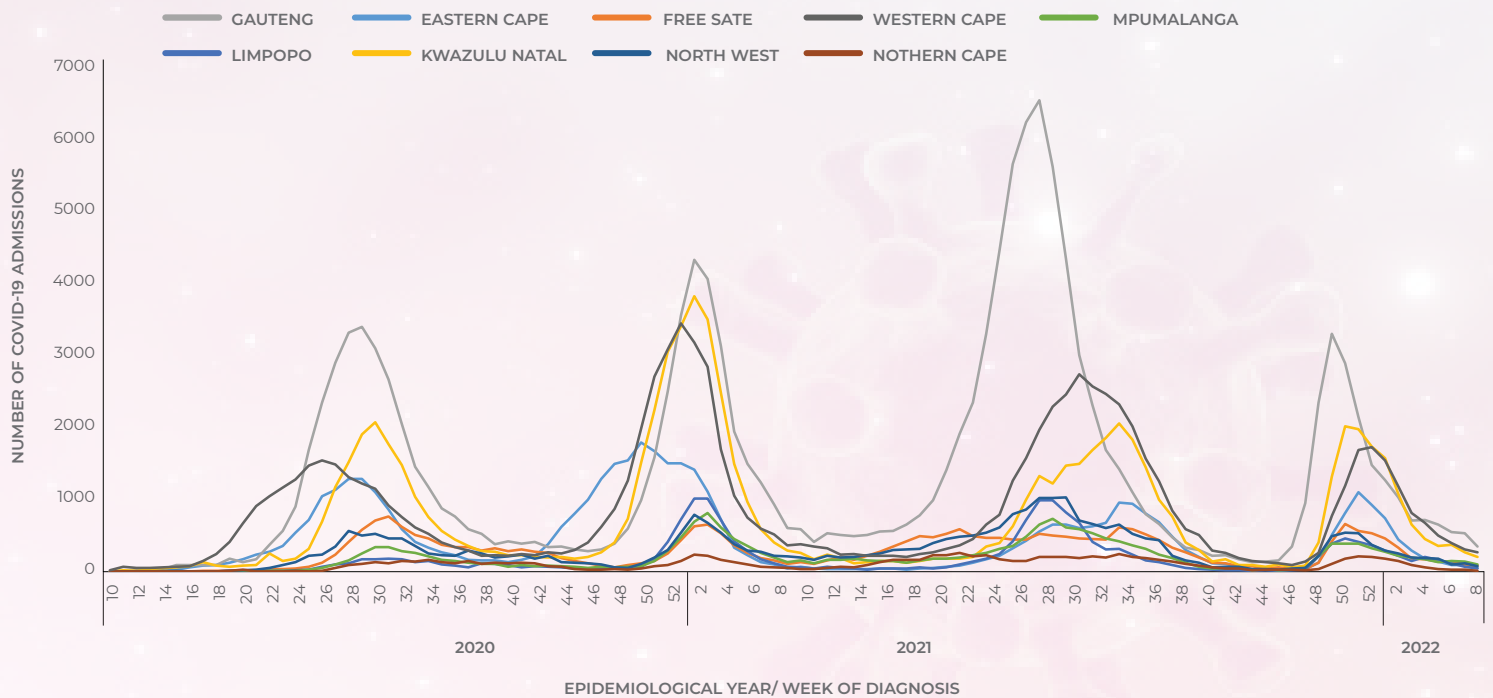


Figure 2. Number of reported COVID-19 admissions, by province and epidemiological year and week of diagnosis, South Africa, 5 March 2020-26 February 2022, n=458,475

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DEMOGRAPHIC AND CLINICAL CHARACTERISTICS OF ADMISSIONS

The median age of COVID-19 admissions was 52 years (interquartile range [IQR] 37 – 65). There were 29,508 (6.4%) admissions in patients 18 years and younger and 82,728 (18.0%) in patients older than or equal to 70 years. Among admitted individuals with COVID-19, 254,208 (55.4%) were female. Females were more common than males in all age groups except in individuals younger than 10 years (Figure 3).



Figure 3. Number of reported COVID-19 admissions by age, sex and percentage of males, South Africa, 5 March 2020-26 February 2022, n=458,475

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Of the 294,308 (64.2%) patients for whom race was known, 225,162 (76.5%) were black African, 20,233 (6.9%) were Coloured, 14,758 (5.0%) were Indian, 33,242 (11.3%) were white and 913 (0.3%) were classified as other race group. There were 10,878 (2.4%) health care workers (HCW) that were reported to be hospitalised. Among the 107,639 admissions in females of child-bearing age 15-50 years, there were 16,352 (15.2%) females admitted who were pregnant or within 6 weeks post-partum.

Among 352,140 (76.8%) patients for whom comorbid conditions were known, 169,699 (48.2%) had no comorbid condition reported, 103,261 (29.3%) had one comorbid condition reported, 59,089 (16.8%) had two comorbid conditions and 20,091 (5.7%) had three or more comorbid conditions reported. The most commonly reported comorbidities were hypertension (120,182, 26.2%) and diabetes (77,271, 16.9%); there were 28,487 (6.2%) patients who were HIV-infected, 6,050 (1.3%) patients with active tuberculosis (TB) and 9,901 (2.2%) patients with previous history of TB (Table 2). Obesity, defined by body mass index where available or by the subjective opinion of the attending HCW, while not consistently reported for all COVID-19 admissions, was recorded as a risk factor in 15,910 (3.6%) of all patients hospitalised.

Table 2. Reported comorbid conditions among COVID-19 admissions, South Africa, 5 March 2020 to 26 February 2022, n= 352,140 *

Comorbid disease**	n	%
Hypertension	120,182	26.2
Diabetes mellitus	77,271	16.9
Chronic cardiac disease	7,283	1.6
Chronic pulmonary disease/ Asthma	22,275	5.0
Chronic renal disease	7,588	1.7
Malignancy	1,934	0.4
HIV	28,487	6.2
Active tuberculosis	6,050	1.3
Previous history of tuberculosis	9,901	2.2

* Multiple comorbid conditions are counted more than once so the total number may be more than the total number of individuals reporting comorbid conditions.

** Presence of a comorbid condition includes only the conditions reported in the table; obesity is not included.

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OUTCOMES

Of the 458,475 admitted individuals, 2,844 (0.6%) were currently in hospital, 347,097 (75.7%) were discharged alive, 7,714 (1.7%) were transferred out to either higher-level care or step-down facilities and 100,820 (22.0%) died in hospital of COVID-19. Of the 447,917 COVID-19 patients who had recorded in-hospital outcome (died and discharged), the case fatality ratio (CFR) was 22.5%.

EPIDEMIOLOGICAL AND GEOGRAPHIC TRENDS IN MORTALITY

The peak numbers of weekly deaths were higher in the second wave than the first, third wave and fourth wave (Figure 4). The CFR was higher in the public health sector (26.2%) than in the private health sector (18.4%) ($p < 0.001$).

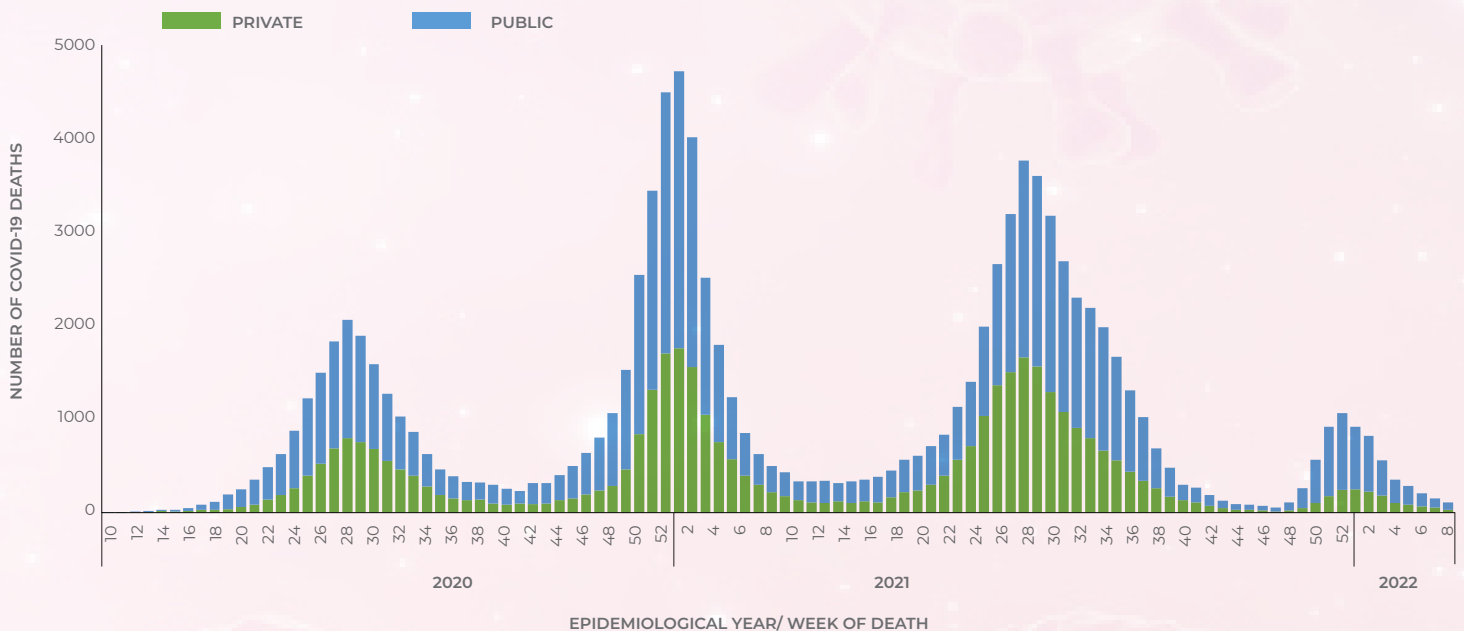


Figure 4: Number of COVID-19 deaths reported per week by health sector and epidemiologic year and week, South Africa, 5 March 2020-26 February 2022, n=100,820

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Most deaths were reported in Gauteng (29,306, 29.1%), Western Cape (18,300, 18.2%), KwaZulu-Natal (17,042, 16.9%) and Eastern Cape (13,068, 13.0%) (Figure 5). There was a decrease in deaths in all provinces since the fourth wave peak in week 1 (2022). The weekly deaths during the fourth wave were lower than the numbers of deaths at the peak of the prior three waves in all provinces.

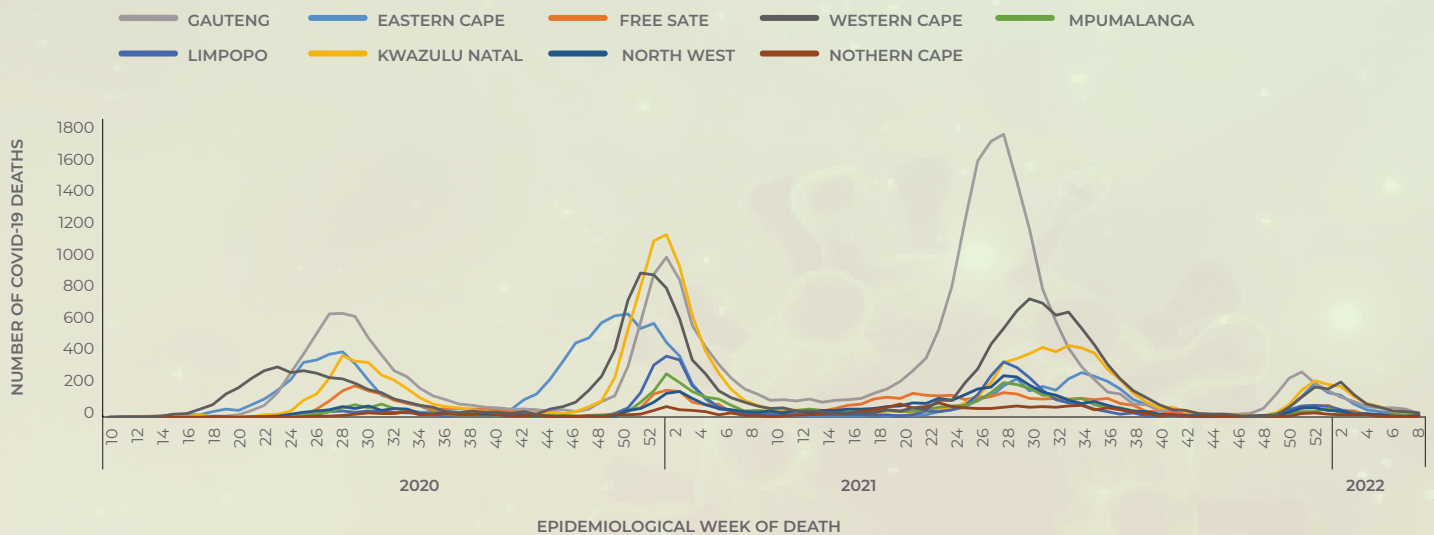


Figure 5: Number of reported COVID-19 deaths, by province and epidemiological years and week of death, South Africa, 5 March 2020-26 February 2022, n=100,820

DEMOGRAPHIC CHARACTERISTICS OF DEATHS

The median age of patients who died was 63 (IQR 53–73) years, and for those who were discharged alive was 49 (IQR 34 – 61) years. There were 825 (0.8%) deaths in children aged ≤ 18 years, many of these deaths were in children with serious underlying comorbid conditions. There were 7,532 (7.5%) deaths in patients younger than 40 years (Figure 6). The CFR was higher in males (24.6%) than females (20.9%) ($p < 0.001$).

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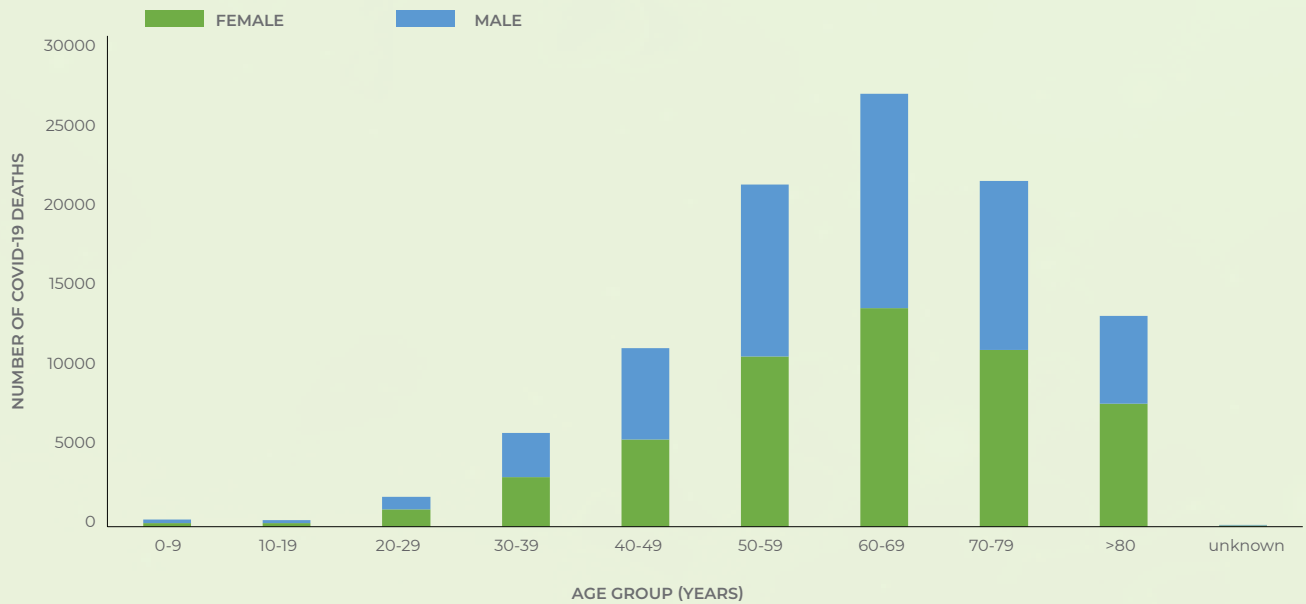


Figure 6: Number of reported COVID-19 deaths by age and gender, South Africa, 5 March 2020-26 February 2022, n=100,820

COMMON COMORBIDITIES REPORTED AMONG DEATHS

In all age groups older than 40 years, hypertension and diabetes were most commonly reported comorbidities among patients who died. In patients between 20 and 60 years, HIV, tuberculosis and obesity were commonly reported (Figure 7).

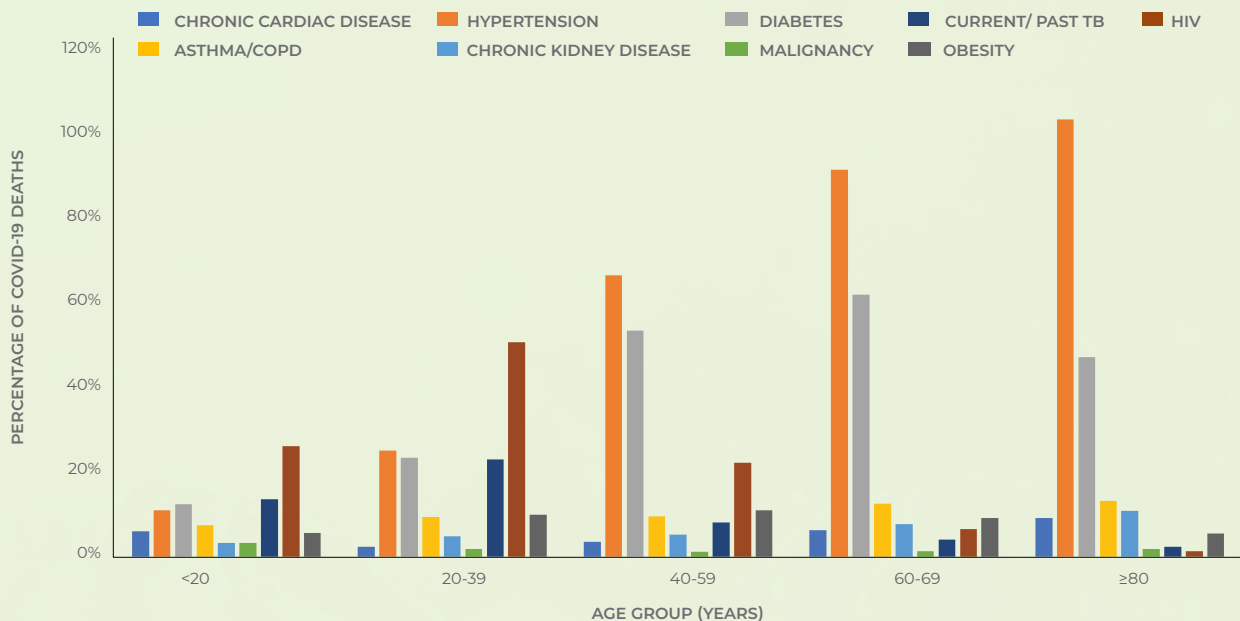


Figure 7: Frequency of comorbid conditions for reported COVID-19 deaths by age group, South Africa, 5 March 2020-26 February 2022, n=79,290

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FACTORS ASSOCIATED WITH IN-HOSPITAL MORTALITY

On multivariable analysis, factors associated with in-hospital mortality were older age; male sex; black African, Coloured and Indian compared to white race; admission in the public sector; and having comorbid hypertension, diabetes, chronic cardiac disease, chronic renal disease, malignancy, HIV, current tuberculosis alone or both current and past tuberculosis, and obesity. Compared to wave 1, there was increased risk of mortality in wave 2 and wave 3, and decreased risk of mortality in wave 4. Compared to the Western Cape Province, individuals hospitalised in Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, North West and Northern Cape provinces were more likely to die in-hospital (Table 3 and Figure 8).

Table 3: Univariate and multivariable analysis of factors associated with mortality among 447,917 individuals with in-hospital outcome (discharges and deaths), South Africa, 5 March 2020 to 26 February 2022

Characteristic	Case-fatality ratio n/N (%)	Unadjusted OR (95% CI)	p-value	Adjusted OR* (95% CI)	p-value
Age group					
<20 years	825/28,466 (2.9)	Reference		Reference	
20-39 years	7,532/97,636 (7.7)	2.8 (2.6-3.0)	<0.001	3.1 (2.7-3.6)	<0.001
40-59 years	31,837/161,536 (19.7)	8.2 (7.7-8.8)	<0.001	8.6 (7.5-9.8)	<0.001
60-79 years	47,629/130,294 (36.6)	19.3 (18.0-20.7)	<0.001	19.4 (16.9-21.2)	<0.001
≥80 years	12,902/28,442 (45.4)	27.8 (25.8-29.9)	<0.001	35.2 (30.7-40.4)	<0.001
Unknown age	95/1,543 (6.2)	2.2 (1.8-2.7)	<0.001	5.0 (1.7-14.7)	0.003
Sex					
Female	51,869/248,411 (20.9)	Reference		Reference	
Male	48,913/199,251 (24.5)	1.2 (1.2-1.3)	<0.001	1.3 (1.3-1.4)	<0.001
Race					
White	7,450/32,623 (22.8)	Reference		Reference	
Black	51,907/217,223 (23.9)	1.1 (1.0-1.1)		1.2 (1.2-1.4)	<0.001
Coloured	4,772/19,691 (24.2)	1.1 (1.0-1.1)	<0.001	1.2 (1.1-1.3)	<0.001
Indian	3,405/14,485 (23.5)	1.0 (0.9-1.1)	<0.001	1.2 (1.2-1.3)	<0.001
Other	174/860 (20.2)	0.9 (0.7-1.0)	0.111	0.7 (0.4-1.0)	0.081
Unknown	33,112/163,035 (20.3)	0.9 (0.8-0.9)	<0.001	1.4 (1.3-1.4)	<0.001
Healthcare worker					
No	99,398/437,161 (22.7)	Reference			
Yes	1,422/10,756 (13.2)	0.5 (0.4-0.5)	<0.001		
Peri-partum					
No	9,153/88,995 (10.3)	Reference			
Yes	374/16,071 (2.3)	0.2 (0.2-0.3)	<0.001		

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Comorbid condition						
No co-morbidity	27,088/166,779 (16.2)	Reference				
1 co-morbid condition	26,440/100,803 (26.2)	1.8 (1.8-1.9)	<0.001			
2 comorbid conditions	19,260/57,709 (33.4)	2.6 (2.5-2.6)	<0.001			
≥3 comorbid conditions	6,502/19,741 (32.9)	2.5 (2.5-2.6)	<0.001			
Unknown	21,530/102,885 (20.9)	1.4 (1.3-1.4)	<0.001			
Hypertension						
No	37,916/211,789 (17.9)	Reference		Reference		
Yes	37,201/118,562 (21.7)	2.1 (2.0-2.2)	<0.001	1.1 (1.0-1.1)		<0.001
Diabetes mellitus						
No	45,662/241,445 (18.9)	Reference		Reference		
Yes	25,472/75,835 (33.6)	2.2 (2.1-2.2)	<0.001	1.4 (1.3-1.4)		<0.001
Chronic cardiac disease						
No	62,940/296,204 (21.3)	Reference		Reference		
Yes	2,578/7,046 (36.6)	2.1 (2.0-2.2)	<0.001	1.2 (1.1-1.3)		0.001
Chronic pulmonary disease/Asthma						
No	59,797/280,628 (21.3)	Reference				
Yes	5,360/21,951 (24.4)	1.2 (1.1-1.2)	0.001			
Chronic renal disease						
No	61,729/293,986 (21.0)	Reference		Reference		
Yes	3,315/7,483 (44.3)	2.9 (2.8-3.1)	<0.001	1.5 (1.5-1.7)		<0.001
Malignancy						
No	63,963/299,004 (23.2)	Reference		Reference		
Yes	692/1,866 (37.1)	2.1 (1.9-2.3)	<0.001	1.6 (1.4-1.9)		<0.001
HIV						
No	59,568/280,577 (21.2)	Reference		Reference		
Yes	6,549/27,442 (23.9)	1.1 (1.1-1.2)	<0.001	1.3 (1.3-1.4)		<0.001
Tuberculosis						
No	59,759/281,335 (21.2)	Reference		Reference		
Previous	1,484/6,342 (23.4)	1.1 (1.1-1.2)	<0.001	1.0 (1.0-1.2)		0.045
Current	440/1,813 (24.3)	1.2 (1.1-1.3)	0.002	1.4 (1.2-1.6)		<0.001
Current and previous	600/2,820 (21.3)	1.0 (0.9-1.1)	0.964	1.4 (1.3-1.6)		<0.001
Obesity						
No	18,111/79,543 (22.8)	Reference		Reference		
Yes	4,396/15,307 (30.1)	1.4 (1.3-1.4)	<0.001	1.0 (0.9-1.1)		0.262
Unknown	76,116/341,674 (22.3)	1.0 (1.0-1.1)	0.003	0.9 (0.9-1.0)		0.081

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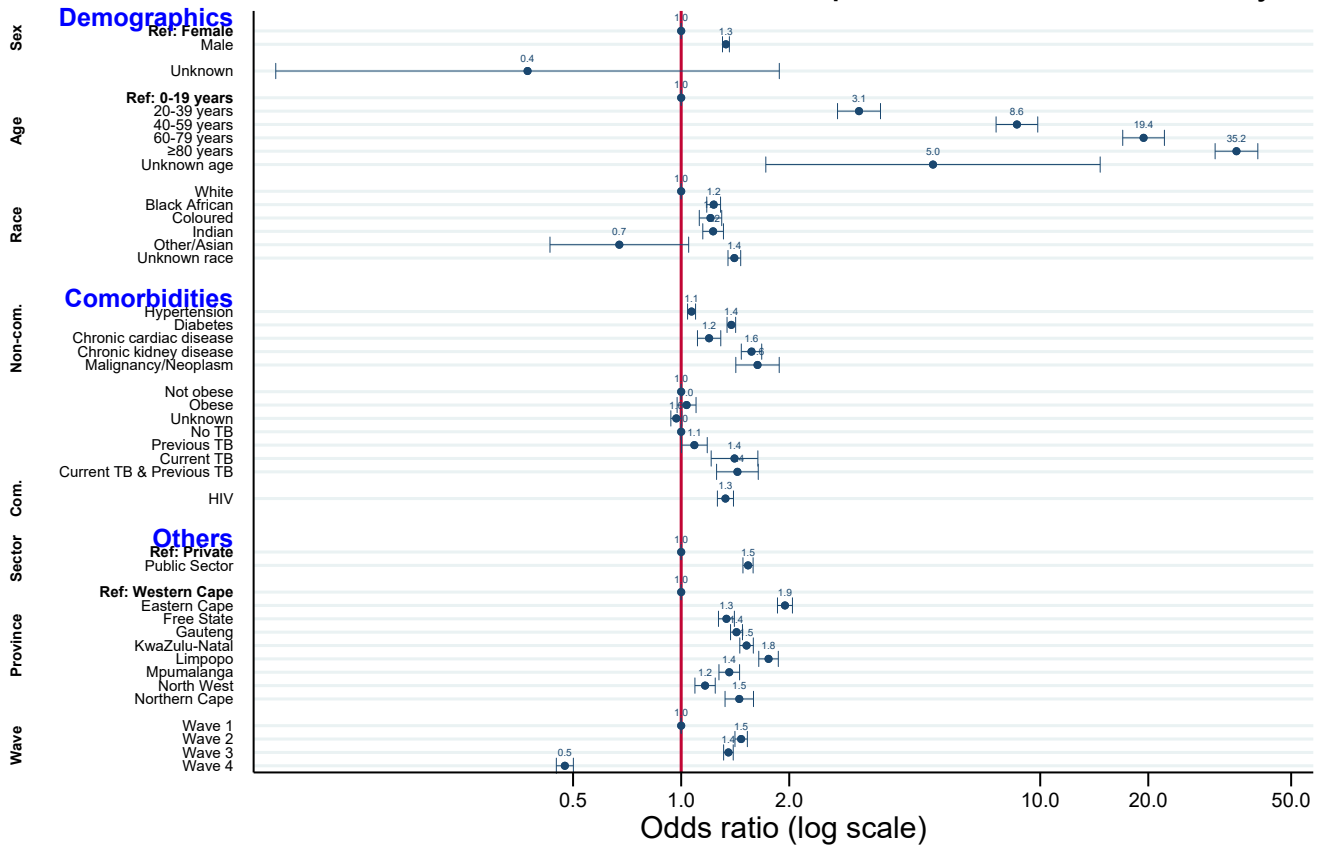
Health sector					
Private sector	39,107/212,264 (18.4)	Reference		Reference	
Public sector	61,713/235,653 (26.2)	1.6 (1.6-1.7)	<0.001	1.5 (1.5-1.6)	<0.001
Province					
Western Cape	18,300/88,356 (20.7)	Reference		Reference	
Eastern Cape	13,068/43,400 (30.1)	1.6 (1.5-1.6)	<0.001	1.9 (1.9-2.0)	<0.001
Free State	5,965/27,088 (22.0)	1.1 (1.1-1.2)	<0.001	1.3 (1.3-1.4)	<0.001
Gauteng	29,306/135,720 (21.6)	1.1 (1.1-1.1)	<0.001	1.4 (1.3-1.4)	<0.001
KwaZulu-Natal	17,042/76,011 (22.4)	1.1 (1.1-1.2)	<0.001	1.5 (1.4-1.6)	<0.001
Limpopo	5,233/18,765 (27.9)	1.5 (1.5-1.7)	<0.001	1.7 (1.6-1.9)	<0.001
Mpumalanga	4,775/19,855 (24.1)	1.2 (1.2-1.4)	<0.001	1.3 (1.2-1.4)	<0.001
North West	4,723/28,513 (16.6)	0.7 (0.6-0.7)	<0.001	1.2 (1.0-1.2)	<0.001
Northern Cape	2,408/10,209 (23.6)	1.2 (1.1-1.2)	<0.001	1.5 (1.3-1.6)	<0.001
Ever ICU					
No	71,011/389,143 (18.3)	Reference			
Yes	29,809/58,774 (50.7)	4.6 (4.5-4.7)	<0.001		
Ever High Care					
No	88,766/410,632 (21.6)	Reference			
Yes	12,054/37,285 (32.3)	1.7 (1.6-1.7)	<0.001		
Ever ventilated					
No	82,392/420,311 (19.6)	Reference			
Yes	18,428/27,606 (66.7)	8.2 (8.0-8.4)	<0.001		
Ever on oxygen					
No	45,944/265,623 (17.3)	Reference	<0.001		
Yes	54,876/182,294 (30.1)	2.0 (2.0-2.1)			
Wave					
Wave 1	15,134/70,261 (21.5)	Reference	<0.001	Reference	
Wave 2	11,580/40,996 (28.2)	1.4 (1.4-1.5)	<0.001	1.5 (1.4-1.5)	<0.001
Wave 3	55,053/209,290 (26.3)	1.3 (1.2-1.3)	<0.001	1.3 (1.3-1.4)	<0.001
Wave 4	4,720/43,230 (10.9)	0.4 (0.4-0.5)		0.5 (0.4-0.5)	<0.001

* Multivariable model excluded all individuals with unknown comorbid conditions

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Factors associated with in-hospital COVID-19 mortality



Data source: NICD-DATCOV19

Figure 8: Multivariable analysis of factors associated with mortality among 447,917 individuals with in-hospital outcome (discharges and deaths), South Africa, 5 March 2020 to 26 February 2022

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DISCUSSION

DATCOV currently includes 458,475 admissions from 666 public and private hospitals in all nine provinces in South Africa. It also includes 100,820 deaths that have been reported to date.

The findings confirm factors associated with in-hospital mortality were older age; male sex; Black, Indian and Coloured race; and having comorbid hypertension, diabetes, chronic cardiac disease, chronic renal disease, malignancy, HIV, current and previous tuberculosis, and obesity.

Increased risk of mortality in waves 2 and 3 were related to higher virulence Beta and Delta variants dominant during those waves, and decreased risk of mortality in wave 4 was related to possible lower virulence of the dominant Omicron variant as well as prior immunity.

Trends in CFR over time and provincial differences may be affected by many factors such as hospital admission criteria, timeousness of closing cases, testing criteria in different provinces, and the severity of illness in admitted cases.

The availability of reliable surveillance data is of critical importance to gain a better understanding of the epidemiology of COVID-19 in South Africa, to monitor the COVID-19 epidemic and to respond with adequate control measures. It has been suggested that when local transmission is widespread and testing strategies change, hospital admission or mortality surveillance systems provide a more reliable picture of the epidemic progression than overall confirmed case numbers.

DATCOV provides real-time data and summary analyses, which inform modelling and reporting at a national level. It also addresses a knowledge gap, in the lack of data from low and middle income countries (LMIC), allowing for analysis of COVID-19 epidemiology in a country with a younger population, unique disease profile with epidemics of both infectious (HIV and tuberculosis) and non-communicable diseases, and an overburdened public health system.

LIMITATIONS

DATCOV now includes reporting from all hospitals with COVID-19 admissions but there may be incomplete submission of historic data. Data quality in a surveillance system is dependent on the information submitted by healthcare institutions. It is not possible for the NICD to verify or check the quality of all these data, however, the NICD has built-in data quality checks. Delays in reporting of admissions and deaths may affect the numbers reported in the most recent week. The National Department of Health have recruited data capturers in eight provinces to support hospitals to improve data submission.

In patients with non-communicable diseases, the current data collection platform is not able to distinguish between those that had pre-existing disease and those that were newly-diagnosed; and between those with well- or poorly-controlled disease.

Data on socioeconomic status are not collected. Data on treatment and medical interventions have not been analysed because the data were incomplete. Efforts are ongoing to improve the quality and completeness of data on symptom of these data will be included in future reports.

As hospitals reached capacity, admission criteria may change and therefore influence trends and inferences about the progression of the epidemic. DATCOV only reports hospital-based admissions and deaths and therefore does not include deaths occurring outside hospitals. DATCOV now has a module to record out-of-hospital deaths.

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ACKNOWLEDGEMENTS

All public and private sector hospitals submitting data to DATCOV

Private hospital groups submitting data to DATCOV:

- Netcare
- Life Healthcare
- Mediclinic Southern Africa
- National Hospital Network (NHN)
- Clinix Health Group
- Lenmed
- Joint Medical Holdings (JMH)

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Table 4: Number of reported COVID-19 admissions and deaths by age and gender, South Africa, 5 March 2020 to 26 February 2022

ADMISSIONS					DEATHS			
Age (years)	Female	Male	Unknown	Total	Female	Male	Unknown	Total
0-4	5695	7159	37	12891	173	191	2	366
5-9	1626	2162	8	3796	28	29	0	57
10-14	2369	2369	9	4747	66	61	0	127
15-19	6681	3676	6	10363	147	130	0	277
20-24	10469	5195	9	15673	331	258	1	590
25-29	16537	7427	14	23978	724	497	1	1222
30-34	21208	11872	11	33091	1247	1056	1	2304
35-39	21978	15634	21	37633	1769	1672	4	3445
40-44	19587	17381	14	36982	2196	2263	0	4459
45-49	21639	21339	12	42990	3143	3333	1	6477
50-54	25202	23634	10	48846	4306	4442	2	8750
55-59	28100	25569	14	53683	6103	6123	5	12231
60-64	24903	22873	20	47796	6582	6781	6	13369
65-69	21513	19218	17	40748	6808	6367	6	13181
70-74	18310	16145	19	34474	6039	5888	4	11931
75-79	13736	11317	9	25062	4773	4474	3	9250
80-84	10474	7314	8	17796	3914	3038	3	6955
85-89	5661	3524	2	9187	2176	1598	0	3774
90-94	2486	1218	1	3705	1074	611	0	1685
>=95	774	365	3	1142	349	154	0	503
Unknown	924	714	45	1683	48	46	0	94
Total	279872	226105	289	506266	51996	49012	39	101047