



SOUTH AFRICAN ACADEMY OF  
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**25th National Congress**  
**Integrating Primary Care – creating a more connected  
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# Welcome to the



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# **FAMILY PHYSICIANS**

# **25<sup>th</sup> Annual Practitioners Conference**

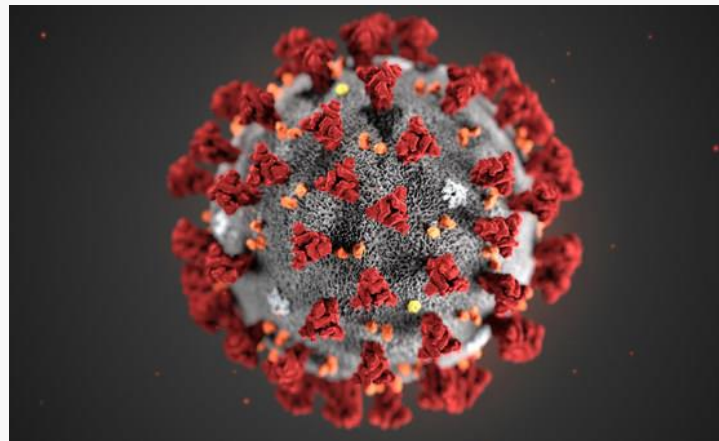


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# **Mortality trends during the first three waves of the COVID-19 pandemic at an urban district hospital in South Africa: A retrospective comparative analysis**

**O Hirachund, M Naidoo, C Pennefather**



# Introduction



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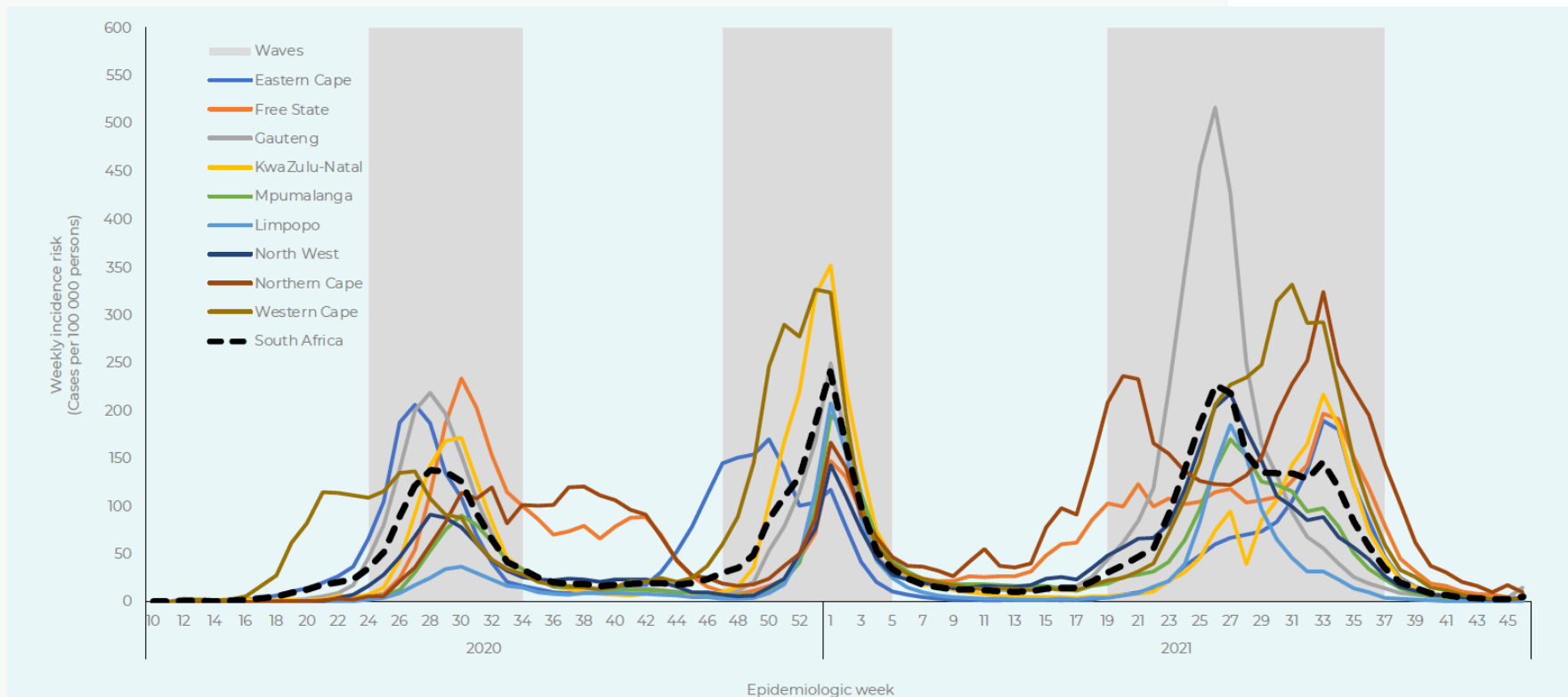
- SARS COV 2 was responsible for the COVID-19 pandemic.
- State-run and private healthcare facilities - overwhelmed by the impact of COVID-19
- Periods of increased transmission = waves (NICD- 30/100K)
- First wave = ancestral strain, 2nd wave = beta variant (B.1.351), 3rd wave = delta variant (B.1.617.2)
- The study aimed to identify the mortality trends during the first three waves at Wentworth Hospital.



# COVID-19 Waves in RSA



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**Figure 2.** Weekly incidence risk of laboratory-confirmed cases of COVID-19 by province and epidemiologic week, South Africa, 2 March 2020 – 20 November 2021 (n=2 929 862)

National Institute for Communicable Diseases. Proposed definition of COVID-19 wave in South Africa. Communicable Diseases Communiqué. 2021 Nov;20(11).



# What is known about this topic

- Knowledge of mortality from LMICs district hospitals limited
- High mortality in multi-morbid ventilated patients with C19
- Multiple independent risk factors contributors to severe disease and mortality
- Male sex, obesity, HT, T2DM, CV Dx, malignancies, COPD, PTB, and HIV
- Differential patterns of C19 deaths by sex, age, and comorbidities per province
- NICD DATCOV database was a national surveillance system for COVID-19 hospitalisations
- No other system for individual institutions to audit themselves.
- Outside of the WC, little has been published from DHs in other provinces

# Background



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- RSA ICFR = was 21.5%, 28.8%, 26.4% respectively
- WC: better IFS, HS response, and support for resource-constrained DHs.
- During each wave, RH, TH and CHs overwhelmed,
- ICU/ HCUs reached capacity = poor acceptance rates from DHs
- KZN – ICU beds minimal - waiting lists for ICU beds.
- Severely ill patients with complex presentations were managed at DHs.
- DH: HCW shortages due to illness and lack of NI ventilation systems HFNO/CPAP



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# Methods

- **Aim:** To compare mortality trends of patients demised from C19 at an urban DH in KZN during the first three waves.
- **Main outcome measures:** Case- and crude fatality rates, demographic and clinical characteristics, and management.
- **Design:** Retrospective analytical study using clinical records at WWH
- **Included:** All patients with C19 (based on clinical or lab-confirmed diagnosis)- who demised in-hospital during the defined waves were included in the study.
- **Excluded:** those transferred out that died at the RH/TH.



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# Results

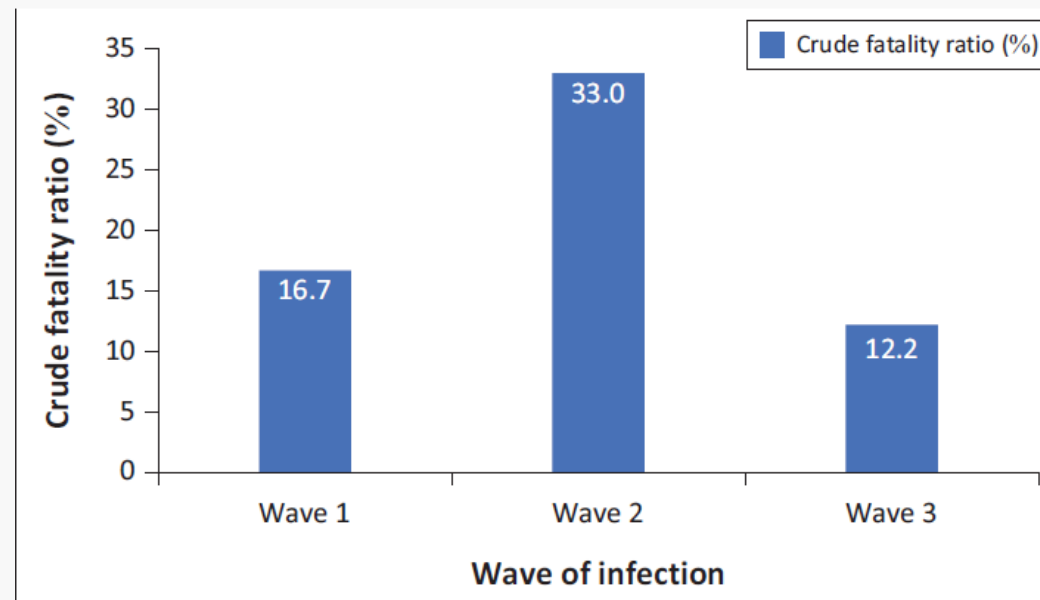
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- **Total:** 311 demised
- **Across waves:** 59 (19.0%), 189 (60.8%), and 63 (20.3%)
- **Admissions:** 354, 573 and 517
- **I Crude FR**



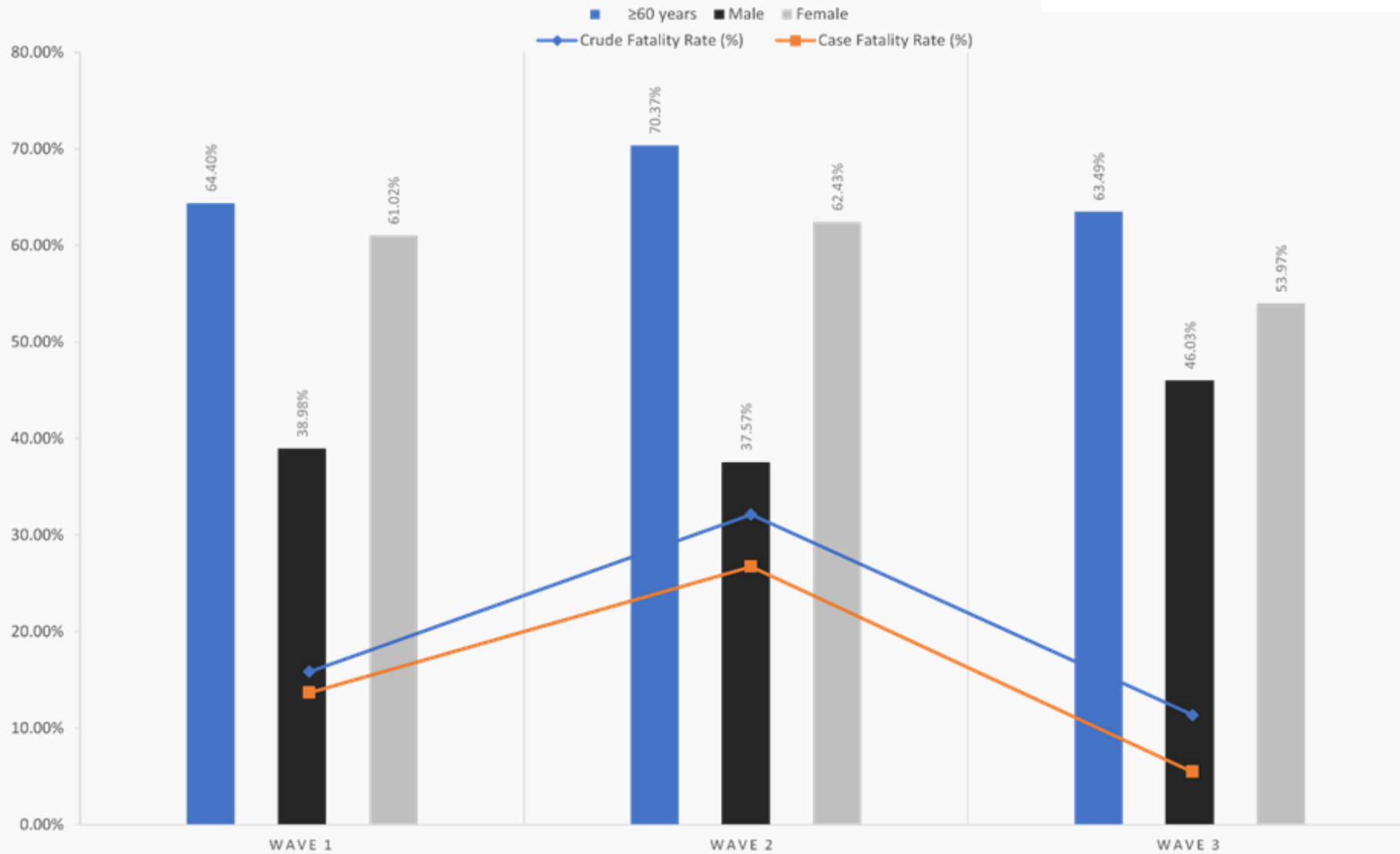
- **Confirmed C19 infection:** 408, 684, and 994.
- **I Case FR:** 14.5%; 27.6% and 6.3%



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# Mortality trends



# Background characteristics



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Characteristics, n (%) except where specified	Wave 1		Wave 2		Wave 3	
	n = 59	OR (95% CI); p-value	n = 189	OR (95% CI); p-value	n = 63	OR (95% CI); p-value
<b>Background</b>						
Female	36 (61.0%)	1.03 (0.58-1.84); 0.921	118 (62.4%)	1.23 (0.78-1.96); 0.373	34 (54.0%)	0.72 (0.41-1.25); 0.239
Age (years), mean (SD)	64.6 (14.4)		64.1 (13.1)		64.4 (13.2)	
≥60 years	38 (64.4%)	0.83 (0.46-1.50); 0.530	133 (70.4%)	1.34 (0.83-2.17); 0.235	40 (63.5%)	0.78 (0.44-1.40); 0.407
<60 years	21 (35.6%)	1.21 (0.67-2.20); 0.530	56 (29.6%)	0.75 (0.46-1.21); 0.235	23 (36.5%)	1.28 (0.72-2.28); 0.407
Ethnic classification						
Black	42 (71.2%)	<b>1.85 (1.00-3.43); 0.048</b>	114 (60.3%)	1.06 (0.66-1.68); 0.819	30 (47.6%)	<b>0.54 (0.31-0.94); 0.027</b>
White	4 (6.8%)	0.35 (0.12-1.03); 0.067	29 (15.3%)	1.05 (0.55-1.98); 0.887	14 (22.2%)	1.86 (0.93-3.74); 0.078
Asian	10 (16.9%)	1.31 (0.61-2.83); 0.493	21 (11.1%)	0.54 (0.28-1.02); 0.056	13 (20.6%)	1.82 (0.89-3.73); 0.098
Coloured/Mixed race	3 (5.1%)	0.38 (0.11-1.29); 0.110	25 (13.2%)	1.91 (0.96-4.25); 0.106	6 (9.5%)	0.83 (0.33-2.09); 0.688
Clinical frailty score						
<5	18 (31.6%)	<b>0.44 (0.24-0.81); 0.007</b>	104 (57.1%)	<b>2.51 (1.56-4.03); &lt;0.001</b>	22 (36.1%)	<b>0.55 (0.31-0.98); 0.042</b>
≥5	39 (68.4%)	<b>2.25 (1.24-4.07); 0.007</b>	78 (42.9%)	<b>0.40 (0.25-0.63); &lt;0.001</b>	39 (63.9%)	<b>1.82 (1.03-3.21); 0.037</b>
Unspecified	2		7		2	
<b>Comorbidities</b>						
Hypertension	38 (64.4%)	1.11 (0.62-2.01); 0.721	111 (61.7%)	1.07 (0.67-1.70); 0.791	37 (58.7%)	0.82 (0.47-1.45); 0.503
Diabetes mellitus	31 (52.5%)	1.30 (0.74-2.29); 0.367	86 (45.5%)	0.83 (0.53-1.32); 0.438	30 (47.6%)	1.02 (0.59-1.77); 0.950
HbA1c < 7%	2 (3.4%)	1.73 (0.33-9.16); 0.512	2 (1.1%)	0.25 (0.05-1.31); 0.078	3 (4.8%)	3.05 (0.66-13.99); 0.132
HbA1c 7-8	4 (6.8%)	0.72 (0.24-2.18); 0.564	19 (10.1%)	1.59 (0.67-3.76); 0.285	4 (6.3%)	0.66 (0.22-1.99); 0.462
HbA1c > 8%	25 (42.4%)	1.44 (0.81-2.58); 0.211	62 (32.8%)	0.75 (0.47-1.21); 0.239	23 (36.5%)	1.06 (0.6-1.89); 0.832
Unknown	0 (0.0%)		3 (1.6%)		0 (0%)	
Body mass index > 30	8 (13.6%)	0.59 (0.26-1.32); 0.193	44 (23.3%)	<b>1.87 (1.01-3.46); 0.043</b>	9 (14.3%)	0.63 (0.29-1.36); 0.233
Dyslipidaemia	5 (8.5%)	0.39 (0.15-1.04); 0.052	28 (14.8%)	0.67 (0.37-1.22); 0.194	20 (31.7%)	<b>3.03 (1.59-5.77); 0.001</b>
Ischaemic Heart Disease	4 (6.8%)	0.66 (0.22-1.98); 0.455	12 (6.3%)	<b>0.42 (0.19-0.91); 0.025</b>	13 (20.6%)	<b>3.77 (1.71-8.33); 0.001</b>
HIV-positive	11 (18.6%)		1 (0.5%)		5 (7.9%)	
With viral suppression	1 (1.7%)	0.85 (0.10-7.43); 0.884	3 (1.6%)	0.64 (0.13-3.22); 0.585	2 (3.2%)	2.00 (0.36-11.17); 0.421
Virally unsuppressed/ unknown	10 (16.9%)	2.13 (0.95-4.79); 0.061	19 (10.1%)	0.94 (0.44-1.97); 0.864	3 (4.8%)	0.38 (0.11-1.28); 0.106

# Background characteristics



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<b>Habits</b>						
Sober habits	42 (71.2%)	0.93 (0.50-1.75); 0.825	137 (72.5%)	1.02 (0.61-1.69); 0.945	46 (73.0%)	1.04 (0.56-1.94); 0.894
Current smoking	8 (13.6%)	1.16 (0.50-2.68); 0.727	24 (12.7%)	1.12 (0.56-2.26); 0.748	6 (9.5%)	0.71 (0.28-1.78); 0.465
Ex-smoking	1 (1.7%)	0.29 (0.04-2.27); 0.213	9 (4.8%)	0.97 (0.34-2.79); 0.950	5 (7.9%)	2.05 (0.68-6.23); 0.197
Current alcohol use	2 (3.4%)	0.65 (0.14-2.94); 0.568	9 (4.8%)	0.97 (0.34-2.79); 0.950	4 (6.3%)	1.46 (0.45-4.75); 0.527
Illicit drug use	0 (0.0%)	-	2 (1.1%)	1.65 (1.51-1.81); 0.254	0 (0.0%)	-
<b>COVID-19 data</b>						
Positive antigen	2 (3.4%)	<b>0.02 (0.00-0.08); &lt;0.001</b>	116 (61.4%)	<b>2.29 (1.44-3.64); &lt;0.001</b>	48 (76.2%)	<b>3.53 (1.88-6.63); &lt;0.001</b>
Negative antigen	0 (0.0%)	-	36 (19.0%)	1.68 (0.88-3.22); 0.116	15 (23.8%)	1.84 (0.93-3.63); 0.075
Antigen not done	57 (96.6%)	<b>165.61 (38.75-707.79); &lt;0.001</b>	37 (19.6%)	<b>0.28 (0.17-0.46); &lt;0.001</b>	0 (0.0%)	-
Positive PCR	59 (100.0%)	-	178 (94.2%)	0.69 (0.23-2.04); 0.502	58 (92.1%)	0.54 (0.18-1.61); 0.333
Negative PCR	0 (0%)	-	11 (5.8%)	1.45 (0.49-4.27); 0.502	5 (7.9%)	1.86 (0.62-5.55); 0.333
Vaccination history						
Partial (one dose)	0 (0.0%)	1.24 (1.17-1.30); 0.492	0 (0.0%)	0 (0-0); 0.052	2 (3.2%)	<b>1.21 (1.29-1.53); 0.005</b>
Unvaccinated	58 (98.3%)	1.90 (0.23-15.51); 0.542	184 (97.4%)	1.25 (0.33-4.74); 0.745	60 (95.2%)	0.5 (0.12-2.04); 0.322
Unknown	1		5		1	

# Clinical characteristics



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Clinical presentation on admission	Wave 1		Wave 2		Wave 3	
	n = 59	OR (95% CI); p-value	n = 189	OR (95% CI); p-value	n = 63	OR (95% CI); p-value
<b>Symptoms</b>						
Headache	0 (0.0%)	-	6 (3.2%)	1.29 (0.72-2.31); 0.441	6 (9.5%)	<b>0.62 (0.35-1.09); 0.019</b>
Fever	23 (39.0%)	1.73 (0.96-3.13); 0.068	56 (29.6%)	1.05 (0.63-1.73); 0.859	12 (19.0%)	<b>0.50 (0.25-1.00); 0.046</b>
Shortness of breath	45 (76.3%)	0.57 (0.29-1.14); 0.109	165 (87.3%)	<b>2.05 (1.12-3.74); 0.018</b>	49 (77.8%)	0.63 (0.32-1.26); 0.190
Sore throat	14 (23.7%)	1.51 (0.76-3.00); 0.234	36 (19.0%)	1.13 (0.62-2.05); 0.683	7 (11.1%)	0.50 (0.21-1.15); 0.097
Confusion	6 (10.2%)	0.45 (0.18-1.10); 0.072	37 (19.6%)	1.24 (0.68-2.26); 0.479	14 (22.2%)	1.36 (0.69-2.69); 0.371
Chest pain	4 (6.8%)	0.89 (0.29-2.73); 0.841	11 (5.8%)	0.57 (0.24-1.33); 0.186	8 (12.7%)	2.26 (0.91-5.60); 0.072
Diarrhoea	7 (11.9%)	0.96 (0.40-2.30); 0.926	20 (10.6%)	0.68 (0.35-1.35); 0.273	11 (17.5%)	1.73 (0.81-3.71); 0.155
Cough	44 (74.6%)	1.20 (0.63-2.28); 0.586	131 (69.3%)	0.74 (0.44-1.23); 0.244	48 (76.2%)	1.33 (0.70-2.53); 0.376
Anosmia/ageusia	9 (15.3%)	1.19 (0.54-2.65); 0.662	26 (13.8%)	1.06 (0.54-2.06); 0.872	7 (11.1%)	0.76 (0.32-1.80); 0.534
Myalgia	22 (37.3%)	0.95 (0.53-1.71); 0.864	74 (39.2%)	1.10 (0.69-1.76); 0.688	23 (36.5%)	0.91 (0.51-1.61); 0.748
<b>Respiratory rate, mean (SD)</b>	25.7 (7.3)		28.6 (8.8)		27.0 (7.9)	
≥25 breaths per minute	25 (42.4%)	<b>0.48 (0.27-0.85); 0.010</b>	115 (60.8%)	1.46 (0.92-2.30); 0.109	38 (60.3%)	1.17 (0.67-2.06); 0.580
<25 breaths per minute	33 (55.9%)	<b>2.17 (1.22-3.85); 0.007</b>	69 (36.5%)	0.66 (0.41-1.04); 0.073	24 (38.1%)	0.88 (0.50-1.55); 0.661
Unspecified	1		5		1	
<b>Heart rate, mean (SD)</b>	100.5 (21.4)		103.3 (20.0)		98.9 (25.0)	
≥100 beats per minute	32 (54.2%)	0.96 (0.55-1.70); 0.898	106 (56.1%)	1.12 (0.71-1.77); 0.627	33 (52.4%)	0.88 (0.50-1.53); 0.642
<100 beats per minute	26 (44.1%)	1.09 (0.61-1.92); 0.779	78 (41.3%)	0.88 (0.56-1.4); 0.602	28 (44.4%)	1.11 (0.63-1.93); 0.719
<b>Systolic BP, mean (SD)</b>	137.9 (29.4)		124.5 (25.3)		130.0 (28.7)	
Systolic BP <139	31 (52.5%)	<b>0.43 (0.24-0.78); 0.004</b>	138 (73.0%)	<b>1.76 (1.08-2.85); 0.022</b>	43 (68.3%)	1.01 (0.55-1.82); 0.987
Systolic BP ≥ 140	27 (45.8%)	<b>2.48 (1.38-4.45); 0.002</b>	46 (24.3%)	<b>0.55 (0.34-0.90); 0.018</b>	18 (28.6%)	0.96 (0.52-1.77); 0.893
Unknown	1		5		2	
<b>Diastolic BP, mean (SD)</b>	78.5 (23.3)		71.5 (15.6)		75.4 (21.3)	
Diastolic BP < 90	40 (67.8%)	<b>0.48 (0.26-0.91); 0.022</b>	161 (85.2%)	<b>2.60 (1.49-4.53); 0.001</b>	44 (69.8%)	0.54 (0.29-1.01); 0.052
Diastolic BP >90	18 (30.5%)	<b>2.40 (1.25-4.60); 0.007</b>	23 (12.2%)	<b>0.36 (0.20-0.65); &lt;0.001</b>	16 (25.4%)	1.72 (0.89-3.32); 0.104
Unspecified	1		5		3	

# Clinical characteristics



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GCS on admission, median (IQR)	15 (15-15)		15 (14-15)		15 (14-15)
3-9	1 (1.7%)	0.29 (0.04-2.27); 0.213	8 (4.2%)	0.73 (0.26-2.06); 0.545	6 (9.5%)
10-14	10 (16.9%)	0.71 (0.34-1.50); 0.373	45 (23.8%)	1.50 (0.84-2.68); 0.165	11 (17.5%)
15	47 (79.7%)	1.72 (0.87-3.43); 0.118	131 (69.3%)	0.77 (0.46-1.28); 0.315	44 (69.8%)
Unspecified	1		5		2
Finger-prick glucose, median (IQR)	10.1 (6.6-18)		8.3 (6.4-14.3)		10.3 (6.9-18.2)
<11mmol/l	33 (55.9%)	0.76 (0.43-1.34); 0.337	124 (65.6%)	1.57 (0.98-2.50); 0.059	34 (54.0%)
≥11mmol/l	25 (42.4%)	1.37 (0.77-2.44); 0.284	60 (31.7%)	<b>0.61 (0.38-0.97); 0.036</b>	28 (44.4%)
Unspecified	1		5		1
SP02 on room air on admission, median (IQR)	87.0 (76.0-94.3)		83.5 (61.3-92.0)		78.0 (55.5-89.0)
<95%	44 (74.6%)	0.60 (0.31-1.18); 0.138	155 (82.0%)	1.12 (0.62-2.00); 0.710	54 (85.7%)
≥95%	14 (23.7%)	1.87 (0.93-3.74); 0.075	29 (15.3%)	0.87 (0.47-1.61); 0.661	7 (11.1%)
Unspecified	1		5		2
Triage colour on admission					
Red	9 (15.3%)	0.85 (0.39-1.86); 0.685	31 (16.4%)	0.89 (0.49-1.63); 0.709	13 (20.6%)
Orange	36 (61.0%)	0.66 (0.37-1.19); 0.170	139 (73.5%)	<b>1.80 (1.11-2.93); 0.017</b>	38 (60.3%)
Yellow	12 (20.3%)	<b>2.54 (1.18-5.46); 0.014</b>	15 (7.9%)	<b>0.44 (0.22-0.90); 0.021</b>	8 (12.7%)
Green	1 (1.7%)	0.53 (0.06-4.29); 0.542	4 (2.1%)	0.51 (0.13-1.92); 0.309	4 (6.3%)
Missing	1		0		0
Dead on Arrival	1 (1.7%)		7 (3.7%)		3 (4.8%)
Demised within a few hours of being seen (in casualty)	2 (3.4%)		26 (13.8%)		0
Demised between 16:00-8:00	38 (64.4%)	0.87 (0.48-1.58); 0.654	131 (69.3%)	1.32 (0.82-2.13); 0.257	39 (61.9%)

Abbreviations: SD: Standard deviation; OR: Odd's ratio; CI: confidence interval; IQR: inter-quartile range; BP: Blood pressure

# Investigations



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Variables, n (%) except where specified	Wave 1		Wave 2		Wave 3	
	n = 59	OR (95% CI); p-value	n = 189	OR (95% CI); p-value	n = 63	OR (95% CI); p-value
<b>Investigations</b>						
Chest X-ray findings						
Mild infiltrates	8 (13.8%)	1.56 (0.66-3.69); 0.306	12 (6.8%)	<b>0.37 (0.17-0.79); 0.008</b>	11 (19.0%)	<b>2.41 (1.09-5.34); 0.026</b>
Ground glass/moderate	31 (53.4%)	<b>3.12 (1.74-5.59); &lt;0.001</b>	49 (27.7%)	<b>0.54 (0.33-0.88); 0.013</b>	17 (29.3%)	0.78 (0.42-1.44); 0.420
Ground glass/severe	19 (32.8%)	<b>0.34 (0.19-0.63); &lt;0.001</b>	116 (65.5%)	<b>2.37 (1.49-3.77); &lt;0.001</b>	30 (51.7%)	0.76 (0.44-1.32); 0.333
Unspecified	1		12		5	
PF ratio on admission						
≤100	18 (36.7%)	0.91 (0.49-1.68); 0.764	59 (31.2%)	0.90 (0.55-1.46); 0.660	23 (36.5%)	1.28 (0.72-2.28); 0.407
101 - 200	12 (20.3%)	1.06 (0.52-2.14); 0.876	31 (16.4%)	0.60 (0.34-1.06); 0.076	18 (28.6%)	<b>1.91 (1.01-3.61); 0.045</b>
>200	19 (32.2%)	1.46 (0.79-2.70); 0.231	49 (25.9%)	0.98 (0.59-1.65); 0.953	13 (20.6%)	0.69 (0.35-1.35); 0.273
Unspecified	10		50		9	
Urine dipstick						
Normal	1 (1.7%)	1.07 (0.12-9.74); 0.953	2 (1.1%)	0.42 (0.07-2.58); 0.338	2 (3.2%)	2.68 (0.44-16.38); 0.268
Glucose	15 (25.4%)	1.75 (0.89-3.44); 0.100	32 (16.9%)	0.83 (0.46-1.50); 0.539	9 (14.3%)	0.71 (0.33-1.55); 0.389
Protein	12 (20.3%)	1.21 (0.59-2.46); 0.604	30 (15.9%)	0.70 (0.39-1.25); 0.223	14 (22.2%)	1.40 (0.71-2.77); 0.329
Ketones	4 (6.8%)	0.76 (0.25-2.3); 0.626	16 (8.5%)	1.04 (0.45-2.36); 0.933	6 (9.5%)	1.2 (0.46-3.13); 0.709
Blood	5 (8.5%)	1.57 (0.54-4.56); 0.399	9 (4.8%)	0.56 (0.22-1.42); 0.217	5 (7.9%)	1.44 (0.5-4.16); 0.498
Leukocytes	2 (3.4%)	1.23 (0.25-6.07); 0.801	5 (2.6%)	0.80 (0.21-3.05); 0.745	2 (3.2%)	1.13 (0.23-5.57); 0.882
Not done/unspecified	37 (62.7%)	0.81 (0.45-1.46); 0.486	130 (68.8%)	1.29 (0.80-2.08); 0.301	40 (63.5%)	0.84 (0.47-1.50); 0.563



# Investigations

Blood results	Wave 1		Wave 2		Wave 3		p-value
	n	Mean, SD	n	Mean, SD	n	Mean, SD	
Haemoglobin	57	12 (2.62)	179	12.6 (2.28)	59	12.9 (2.61)	0.079
White cell count	57	11.3 (5.41)	179	11 (5.86)	59	11.4 (5.00)	0.525
Platelets	57	298.3 (134.87)	178	288.9 (129.43)	59	265.8 (101.97)	0.339
Urea	58	17 (14.23)	181	12.6 (10.62)	59	14.1 (11.37)	0.114
Creatinine	58	265.6 (287.13)	181	173 (195.78)	58	188.8 (181.16)	0.130
GFR	56	44.1 (33.39)	181	55.4 (33.37)	58	52.6 (33.72)	0.088
Bilirubin	49	14.4 (6.79)	170	16 (12.65)	57	19.9 (21.9)	0.838
ALT	47	45.2 (57.46)	171	42.9 (43.27)	56	70.8 (182.65)	0.997
GGT	47	85.3 (100.85)	170	73.2 (83.48)	56	74.2 (134.44)	0.084
CRP	57	159.8 (61.96)	179	151.4 (66.13)	58	144.5 (66.16)	0.234
D-dimer	44	0.8 (0.59)	168	1.2 (2.26)	52	0.9 (1.49)	0.235
LDH	2	1242 (371.94)	28	1465.6 (593.85)	7	1628.1 (628.82)	0.684



# Management



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<b>Complications present on admission</b>						
Renal impairment	49 (83.1%)	<b>3.28 (1.59-6.77); 0.001</b>	113 (59.8%)	<b>0.60 (0.37-0.97); 0.038</b>	38 (60.8%)	0.81 (0.46-1.42); 0.459
Depressed LOC	10 (16.9%)	0.67 (0.32-1.4); 0.282	42 (22.2%)	1.01 (0.58-1.74); 0.985	17 (27.0%)	1.39 (0.74-2.63); 0.305
Haemodynamic	17 (28.8%)	1.77 (0.92-3.37); 0.082	35 (18.5%)	0.73 (0.42-1.27); 0.263	12 (19.0%)	0.89 (0.44-1.78); 0.736
LFT abnormality	9 (15.3%)	0.75 (0.34-1.62); 0.457	38 (20.1%)	1.28 (0.71-2.33); 0.412	11 (17.5%)	0.90 (0.44-1.87); 0.786
Thrombo-embolic	9 (15.3%)	1.98 (0.86-4.58); 0.105	20 (10.6%)	1.33 (0.60-2.94); 0.487	1 (1.6%)	<b>0.12 (0.02-0.91); 0.015</b>
DKA	7 (11.9%)	1.48 (0.60-3.67); 0.394	14 (7.4%)	0.62 (0.28-1.34); 0.221	7 (11.1%)	1.35 (0.55-3.34); 0.513
Myocarditis	5 (8.5%)	1.70 (0.58-4.98); 0.326	12 (6.3%)	1.31 (0.48-3.59); 0.598	1 (1.6%)	0.22 (0.03-1.68); 0.110
Other	2 (3.4%)	0.85 (0.18-3.98); 0.836	4 (2.1%)	<b>0.31 (0.09-1.05); 0.047</b>	6 (9.5%)	<b>4.25 (1.32-13.65); 0.009</b>
Nil specified	6 (10.2%)	<b>0.31 (0.13-0.75); 0.006</b>	52 (27.5%)	1.73 (0.98-3.02); 0.055	16 (25.4%)	1.12 (0.59-2.11); 0.738
<b>Oxygenation needs on admission:</b>						
Room air	17 (28.8%)	1.56 (0.82-2.95); 0.174	43 (22.8%)	1.09 (0.63-1.89); 0.765	9 (14.3%)	0.52 (0.24-1.12); 0.091
Nasal prongs	1 (1.7%)	0.71 (0.08-5.99); 0.749	3 (1.6%)	0.48 (0.1-2.16); 0.326	3 (4.8%)	3.05 (0.66-13.99); 0.132
40% venturi mask	12 (20.3%)	1.06 (0.52-2.14); 0.876	36 (19%)	0.91 (0.52-1.61); 0.754	13 (20.6%)	1.08 (0.55-2.15); 0.819
100% non-rebreather	20 (33.9%)	0.92 (0.51-1.68); 0.793	73 (38.6%)	1.45 (0.89-2.35); 0.135	17 (27.0%)	0.62 (0.33-1.14); 0.119
Dual oxygen	6 (10.2%)	1.08 (0.42-2.76); 0.880	19 (10.1%)	1.13 (0.52-2.46); 0.762	5 (7.9%)	0.77 (0.28-2.10); 0.607
High-flow nasal oxygen	1 (1.7%)	0.20 (0.03-1.52); 0.085	8 (4.2%)	<b>0.37 (0.15-0.92); 0.028</b>	12 (19.0%)	<b>6.25 (2.5-15.61); &lt;.001</b>
CPAP	2 (3.4%)	0.85 (0.18-3.98); 0.836	7 (3.7%)	0.90 (0.28-2.90); 0.86	3 (4.8%)	1.33 (0.35-5.06); 0.677
Intubation + ventilation	0 (0.0%)		0 (0%)		1 (1.6%)	
<b>Number of days admitted, median (IQR)</b>	4 (2-7)		4 (1-7)		3 (1-8)	
<5	40 (69.0%)	1.27 (0.69-2.34); 0.448	113 (61.4%)	0.69 (0.42-1.13); 0.138	43 (70.5%)	1.39 (0.76-2.56); 0.288
6-10	11 (19.0%)	0.77 (0.38-1.59); 0.480	45 (24.5%)	1.35 (0.77-2.38); 0.296	12 (19.7%)	0.81 (0.40-1.64); 0.562
>10	7 (12.1%)	0.91 (0.38-2.19); 0.839	26 (14.1%)	1.34 (0.66-2.73); 0.416	6 (9.8%)	0.69 (0.28-1.73); 0.428
Missing	1		5		2	



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# Discussion

- The second wave had a devastating impact in KZN, affecting more functional individuals
- CXR/Clin findings: Second wave: More severe dx
- Overwhelmed healthcare system, shortage of HCWs, poor health literacy and misinformation surrounding the pandemic circulating on social media.
- ABG and hence PF ratio less used in 2<sup>nd</sup> wave: Illness of HCWs –failure to appreciate how sick some of these patients were.



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# Discussion

- Across the three waves, older age, females and comorbidities featured prominently.
- First wave ↑ AKI/CKD ? Related to ↑ DM
- Elevated d-dimer feature across all three waves – prothrombotic condition associated with C19
- The hospital acquired more HFNO and CPAP devices in the second and third waves

# Limitations of the study



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- Paper-based clinical record with sections not filled in.
- Weight not often measured due to ill, immobile patients ?? obesity
- Study only reviewed patients who demised as compared to all admissions



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# Conclusions

- Beta variant - devastating impact on mortality at this DH in KZN affecting  $f(x)$  individuals
- Older age, females and those with comorbidities
- DHs functioned at their peak capacity due to staff shortages and an increased service load
- High patient numbers, and a lack of HCWs, esp nurses and docs, contributed to the high mortality
- Health system - ill-prepared to deal with the waves of infection.
- Vaccination mainly occurred after the 3rd wave, so its impact on the first three waves was minimal

# Recommendations



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- The RH and TH need to be more involved in the pandemic response and be adapted to the context, thereby reducing risk at the DH.
- FPs and other senior, permanent staff working at a DH need to have expertise in managing critically ill patients
- Simple clinical algorithms and structured clinical notes help improve assessment and management.
- Mortality trends are essential for future planning/risk stratification of patients
- Helps guide decision-making in resource-constrained environments with limited ability to expand critical care capacity
- Ethical allocation of resources with early effective patient triaging depends on local data to ensure equitable and appropriate admission to critical care services.

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