Supplemental Digital Content

Additional analysis outputs for:

COVID-19 among adults living with HIV: Correlates of mortality among public sector healthcare users in Western Cape, South Africa

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Supplemental Digital Content A: Additional descriptions of SARS-CoV-2 infections

Table A1: Admission pressure, timing and location for SARS-CoV-2 infections among adults with HIV in the Western Cape, stratified by age group (percentages and counts)

	Cases until end of Wave 3			All cases (including Wave 4)
Characteristic	**Ages 15-39 years n = 9,321**	**Ages ≥40 years n = 8,799**	**All ages n = 18,120**	**All ages n = 22,057**
Admission pressure[1] (%)				
<25	28.7 (2,674)	23.5 (2,070)	26.2 (4,744)	29.2 (6,432)
≥25 and <50	34.1 (3,181)	36.5 (3,208)	35.3 (6,389)	37.8 (8,346)
≥50	37.2 (3,466)	40.0 (3,521)	38.6 (6,987)	33.0 (7,279)
Wave				
Wave 1	32.7 (3,052)	31.0 (2,731)	31.9 (5,783)	26.2 (5,783)
Wave 2	26.5 (2,469)	28.8 (2,532)	27.6 (5,001)	22.7 (5,001)
Wave 3	29.3 (2,731)	31.2 (2,747)	30.2 (5,478)	24.8 (5,478)
Wave 4	-	-	-	15.6 (3,430)
Inter-waves	11.5 (1,069)	9.0 (789)	10.3 (1,858)	10.7 (2,365)
District				
Cape Winelands	9.8 (915)	10.8 (950)	10.3 (1,865)	10.2 (2,253)
Central Karoo	1.1 (106)	1.4 (124)	1.3 (230)	1.3 (277)
City of Cape Town	61.1 (5,698)	62.7 (5,518)	61.9 (11,216)	62.1 (13,707)
Garden Route	18.0 (1,677)	16.1 (1,416)	17.1 (3,093)	17.2 (3,792)
Overberg	5.2 (489)	4.3 (379)	4.8 (868)	4.6 (1,009)
West Coast	4.7 (436)	4.7 (412)	4.7 (848)	4.6 (1,019)

[1] The week's total number of COVID-19 admissions relative to the maximum weekly COVID-19 admissions for that district (as a percent).

Table A2: Alternative CD4 cell count measures for SARS-CoV-2 infections among adults with HIV in the Western Cape, stratified by age group (percentages and counts)

	Cases until end of Wave 3			All cases (including Wave 4)
CD4 count (cells/µl) measure	**Ages 15-39 years n = 9,321**	**Ages ≥40 years n = 8,799**	**All ages n = 18,120**	**All ages n = 22,057**
Recent				
≥ 500	14.0 (1,304)	11.3 (991)	12.7 (2,295)	12.6 (2,775)
200-499	15.7 (1,465)	11.5 (1,014)	13.7 (2,479)	13.5 (2,986)
50-199	7.0 (648)	5.8 (511)	6.4 (1,159)	7.1 (1,576)
0-49	3.6 (333)	2.2 (191)	2.9 (524)	3.5 (773)
Unknown	59.8 (5,571)	69.2 (6,092)	64.4 (11,663)	63.2 (13,947)
Nadir				
≥ 500	15.3 (1,424)	12.1 (1,067)	13.7 (2,491)	13.4 (2,965)
200-499	44.1 (4,109)	39.2 (3,446)	41.7 (7,555)	40.7 (8,986)
50-199	21.3 (1,987)	28.7 (2,526)	24.9 (4,513)	25.1 (5,535)
0-49	8.0 (743)	10.1 (886)	9.0 (1,629)	9.6 (2,112)
Unknown	11.4 (1,058)	9.9 (874)	10.7 (1,932)	11.1 (2,459)
At ART initiation				
≥ 500	11.9 (1,105)	7.2 (631)	9.6 (1,736)	9.6 (2,111)
200-499	34.0 (3,166)	25.5 (2,245)	29.9 (5,411)	29.8 (6,572)
50-199	14.9 (1,387)	19.9 (1,752)	17.3 (3,139)	17.3 (3,813)
0-49	3.8 (358)	5.4 (477)	4.6 (835)	4.7 (1,027)
Unknown	35.5 (3,305)	42.0 (3,694)	38.6 (6,999)	38.7 (8,534)

Supplemental Digital Content B: Unadjusted and adjusted odds ratios for all model terms

Table B1: Mortality rates, unadjusted and adjusted odds ratios (and 95% CIs) describing the association of mortality with a person's demographic characteristics, co-existing conditions, vaccination status, HIV characteristics and time/location covariates, for 15–39-year-old adults with HIV and SARS-CoV-2 infections in the Western Cape

Variable	Category	n	Mortality risk (95% CI)	Univariable analysis: Unadjusted odds ratio (uOR)		Multivariable analysis: Adjusted odds ratio (aOR)	
				Estimate (95% CI)	p-value	Estimate (95% CI)	p-value
Sex	**Female (Ref)**	7114	2.52 (2.16,2.91)	-	<0.001		0.656
	Male	2032	4.13 (3.31,5.09)	1.67 (1.28,2.17)		1.07 (0.80,1.42)	
Age group (years)	**15-24 (Ref)**	884	2.26 (1.39,3.47)	-	0.001		0.003
	25-29	1973	2.13 (1.54,2.87)	0.94 (0.56,1.64)		1.21 (0.70,2.17)	
	30-34	3008	2.56 (2.03,3.19)	1.13 (0.70,1.92)		1.37 (0.83,2.38)	
	35-39	3281	3.78 (3.15,4.49)	1.70 (1.08,2.82)		2.05 (1.25,3.51)	
Hypertension	**Absent (Ref)**	8360	2.75 (2.41,3.12)	-	0.029		0.019
	Present	786	4.20 (2.91,5.85)	1.55 (1.05,2.22)		1.68 (1.07,2.55)	
Diabetes	**Absent (Ref)**	8789	2.74 (2.41,3.11)	-	0.001		<0.001
	Present	357	6.16 (3.90,9.18)	2.33 (1.45,3.57)		2.64 (1.54,4.33)	
Chronic obstructive pulmonary disease	**Absent (Ref)**	8776	2.83 (2.49,3.19)	-	0.19		0.643
	Present	370	4.05 (2.29,6.60)	1.45 (0.82,2.39)		1.15 (0.62,1.98)	
Chronic kidney disease	**Absent (Ref)**	9062	2.74 (2.41,3.09)	-	<0.001		<0.001
	Present	84	17.86 (10.35,27.74)	7.73 (4.20,13.32)		5.85 (2.93,11.06)	
Tuberculosis[1] (years since)	**Absent (Ref)**	6708	1.46 (1.19,1.78)	-	<0.001		<0.001
	≥ 1	1644	2.98 (2.21,3.92)	2.07 (1.45,2.92)		1.73 (1.19,2.49)	
	< 1	319	13.17 (9.66,17.38)	10.23 (6.93,14.87)		5.40 (3.43,8.41)	
	Ongoing	475	15.58 (12.44,19.16)	12.45 (9.03,17.09)		7.40 (5.12,10.67)	
Number of conditions[2]	**0-2 (Ref)**	9076	2.81 (2.48,3.17)	-	0.001		0.334
	>2	70	11.43 (5.07,21.28)	4.46 (1.96,8.88)		0.62 (0.22,1.60)	
Pregnancy	**Absent (Ref)**	8381	2.97 (2.62,3.36)	-	0.054		0.842
	Present	765	1.83 (1.00,3.05)	0.61 (0.34,1.01)		0.94 (0.51,1.63)	

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Table B1 continued

Variable	Category	n	Mortality risk (95% CI)	Univariable analysis: Unadjusted odds ratio (uOR)		Multivariable analysis: Adjusted odds ratio (aOR)	
				Estimate (95% CI)	p-value	Estimate (95% CI)	p-value
Vaccination status[3]	**None (Ref)**	8967	2.90 (2.56,3.27)		0.032		0.081
	Early	69	4.35 (0.91,12.18)	1.52 (0.37,4.13)		1.31 (0.31,3.80)	
	1/2 vaccines	110	0.00 (0.00,3.30)	0.00 (no deaths)		0.00 (0.00,0.29)	
CD4 count (cells/µl)	**≥ 500 (Ref)**	1280	1.48 (0.90,2.31)	-	<0.001		<0.001
	200-499	1441	2.50 (1.76,3.44)	1.70 (0.98,3.04)		1.19 (0.67,2.17)	
	50-199	631	7.77 (5.80,10.14)	5.59 (3.32,9.80)		2.20 (1.23,4.04)	
	0-49	318	14.78 (11.07,19.17)	11.51 (6.76,20.38)		3.39 (1.83,6.47)	
	Unknown	5476	2.05 (1.69,2.46)	1.39 (0.87,2.33)		1.05 (0.64,1.80)	
Viral load[4] (copies/ml)	**0-999 (Ref)**	5546	1.77 (1.44,2.15)	-	<0.001		0.092
	≥ 1000	892	7.06 (5.47,8.95)	4.22 (3.04,5.83)		1.53 (1.03,2.24)	
	Unknown	1896	3.01 (2.28,3.88)	1.72 (1.23,2.39)		1.26 (0.88,1.81)	
ART collection	**Yes**	8334	2.62 (2.28,2.98)	-	<0.001		<0.001
	No ART	812	5.54 (4.07,7.35)	2.18 (1.55,3.01)		2.30 (1.47,3.54)	
HIV (years since first evidence)	**≥ 1 (Ref)**	8322	2.66 (2.32,3.02)	-	<0.001		0.126
	< 1	824	5.10 (3.70,6.83)	1.97 (1.39,2.73)		1.37 (0.91,2.05)	
Admission pressure[5] (%)	**<25 (Ref)**	2630	2.78 (2.18,3.48)	-	0.3		0.036
	≥25 and <50	3147	3.24 (2.65,3.92)	1.17 (0.87,1.60)		1.65 (1.11,2.49)	
	≥50	3369	2.61 (2.10,3.21)	0.94 (0.69,1.29)		1.24 (0.79,2.00)	
Wave	**Wave 1 (Ref)**	3052	2.23 (1.73,2.82)	-	0.008		0.022
	Wave 2	2415	2.61 (2.01,3.33)	1.18 (0.83,1.66)		1.29 (0.82,2.01)	
	Wave 3	2636	3.57 (2.89,4.35)	1.62 (1.18,2.23)		1.68 (1.13,2.50)	
	Inter-waves	1043	3.64 (2.59,4.97)	1.66 (1.10,2.47)		1.83 (1.08,3.11)	
District	**City of Cape Town (Ref)**	5599	2.82 (2.40,3.29)	-	0.209		0.136
	Cape Winelands	907	4.08 (2.89,5.58)	1.46 (1.00,2.09)		1.70 (1.12,2.52)	
	Central Karoo	104	1.92 (0.23,6.77)	0.68 (0.11,2.16)		0.50 (0.08,1.75)	
	Garden Route	1623	2.40 (1.71,3.27)	0.85 (0.59,1.20)		0.95 (0.64,1.37)	
	Overberg	483	3.52 (2.06,5.58)	1.26 (0.73,2.03)		1.37 (0.76,2.32)	
	West Coast	430	2.33 (1.12,4.24)	0.82 (0.40,1.49)		0.94 (0.45,1.75)	

[1] Time since the most recent evidence of a start of an episode; with episodes beginning after 2 months before the SARS-CoV-2 diagnosis considered as ongoing. [2] Hypertension, diabetes, chronic obstructive pulmonary disease, chronic kidney disease, tuberculosis (at any time). [3] The highest level of protection from among: No vaccine received ('None'); <28 days since a first vaccine dose ('Early'); ≥28 days since (at least) a first dose of a vaccine (1 or 2 Pfizer or Janssen vaccines not distinguished due to small samples). [4] Among those with evidence of ART at any time. [5] The week's total number of COVID-19 admissions relative to the maximum weekly COVID-19 admissions for that district (as a percent).
ART: Antiretroviral therapy. CI: Confidence interval.

Table B2: Mortality rates, unadjusted and adjusted odds ratios (and 95% CIs) describing the association of mortality with a person's demographic characteristics, co-existing conditions, vaccination status, HIV characteristics and time/location covariates, for adults with HIV and SARS-CoV-2 infections ≥ 40 years old in the Western Cape

Variable	Category	n	Mortality risk (95% CI)	Univariable analysis: Unadjusted odds ratio (uOR)		Multivariable analysis: Adjusted odds ratio (aOR)	
				Estimate (95% CI)	p-value	Estimate (95% CI)	p-value
Sex	**Female (Ref)**	5529	7.23 (6.57,7.95)	-	<0.001		0.002
	Male	3146	11.09 (10.02,12.24)	1.60 (1.38,1.86)		1.31 (1.11,1.54)	
Age group (years)	**40-49 (Ref)**	5207	5.36 (4.76,6.00)	-	<0.001		<0.001
	50-59	2560	10.35 (9.20,11.60)	2.04 (1.71,2.43)		1.73 (1.43,2.09)	
	60-69	711	20.68 (17.75,23.84)	4.60 (3.70,5.72)		3.34 (2.61,4.26)	
	≥ 70	197	29.44 (23.18,36.34)	7.37 (5.27,10.20)		4.89 (3.35,7.07)	
Hypertension	**Absent (Ref)**	5796	6.82 (6.18,7.49)	-	<0.001		0.039
	Present	2879	12.30 (11.12,13.55)	1.92 (1.65,2.23)		1.22 (1.01,1.48)	
Diabetes	**Absent (Ref)**	7298	6.48 (5.93,7.07)	-	<0.001		<0.001
	Present	1377	20.04 (17.96,22.26)	3.62 (3.08,4.25)		3.12 (2.54,3.83)	
Chronic obstructive pulmonary disease	**Absent (Ref)**	7782	8.30 (7.70,8.94)	-	0.002		0.744
	Present	893	11.53 (9.51,13.81)	1.44 (1.15,1.79)		1.04 (0.80,1.35)	
Chronic kidney disease	**Absent (Ref)**	8098	7.42 (6.86,8.01)	-	<0.001		<0.001
	Present	577	25.65 (22.13,29.42)	4.30 (3.50,5.27)		2.47 (1.89,3.21)	
Tuberculosis[1] (years since)	**Absent (Ref)**	5799	7.23 (6.57,7.92)	-	<0.001		<0.001
	≥ 1	2284	8.89 (7.75,10.13)	1.25 (1.05,1.49)		1.26 (1.02,1.54)	
	< 1	228	18.86 (14.00,24.55)	2.98 (2.09,4.18)		2.31 (1.54,3.42)	
	Ongoing	364	23.08 (18.85,27.75)	3.85 (2.95,4.99)		3.37 (2.46,4.59)	
Number of conditions[2]	**0-2 (Ref)**	7994	7.36 (6.79,7.95)	-	<0.001		0.074
	>2	681	23.64 (20.50,27.02)	3.90 (3.20,4.73)		0.74 (0.53,1.03)	
Pregnancy	**Absent (Ref)**	8625	8.66 (8.08,9.27)	-	0.195		0.937
	Present	50	4.00 (0.49,13.71)	0.44 (0.07,1.42)		1.06 (0.17,3.51)	

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Table B2 continued

Variable	Category	n	Mortality risk (95% CI)	Univariable analysis: Unadjusted odds ratio (uOR)		Multivariable analysis: Adjusted odds ratio (aOR)	
				Estimate (95% CI)	p-value	Estimate (95% CI)	p-value
Vaccination status[3]	**None (Ref)**	8275	8.82 (8.22,9.45)	-	0.001		<0.001
	Early	217	5.07 (2.56,8.89)	0.55 (0.28,0.97)		0.50 (0.25,0.92)	
	Pfizer - 1 vaccine	79	8.86 (3.64,17.41)	1.00 (0.42,2.04)		0.40 (0.16,0.89)	
	Primary	104	0.96 (0.02,5.24)	0.10 (0.01,0.45)		0.10 (0.01,0.47)	
CD4 count (cells/µl)	**≥ 500 (Ref)**	974	7.80 (6.20,9.67)	-	<0.001		<0.001
	200-499	998	10.12 (8.32,12.16)	1.33 (0.98,1.82)		1.20 (0.86,1.68)	
	50-199	502	14.74 (11.76,18.15)	2.04 (1.45,2.87)		1.82 (1.25,2.66)	
	0-49	184	24.46 (18.43,31.32)	3.83 (2.53,5.74)		3.30 (2.04,5.31)	
	Unknown	6017	7.53 (6.87,8.22)	0.96 (0.75,1.25)		0.94 (0.72,1.24)	
Viral load[4] (copies/ml)	**0-999 (Ref)**	6112	7.66 (7.00,8.35)	-	<0.001		0.546
	≥ 1000	570	12.63 (10.02,15.64)	1.74 (1.33,2.26)		1.08 (0.78,1.47)	
	Unknown	1183	7.27 (5.86,8.90)	0.95 (0.74,1.19)		0.89 (0.68,1.15)	
ART collection	**Yes**	7865	7.96 (7.37,8.58)	-	<0.001		0.006
	No ART	810	15.19 (12.78,17.84)	2.07 (1.67,2.54)		1.48 (1.12,1.94)	
HIV (years since first evidence)	**≥ 1 (Ref)**	8164	8.06 (7.48,8.67)	-	<0.001		0.012
	< 1	511	17.81 (14.59,21.41)	2.47 (1.93,3.13)		1.48 (1.08,2.01)	
Admission pressure[5] (%)	**<25 (Ref)**	2036	8.25 (7.09,9.53)	-	0.137		0.932
	≥25 and <50	3183	9.43 (8.43,10.49)	1.16 (0.95,1.41)		0.99 (0.78,1.27)	
	≥50	3456	8.13 (7.24,9.09)	0.98 (0.81,1.20)		0.95 (0.72,1.26)	
Wave	**Wave 1 (Ref)**	2731	9.34 (8.27,10.49)	-	0.286		0.104
	Wave 2	2505	8.58 (7.51,9.75)	0.91 (0.75,1.10)		0.96 (0.74,1.25)	
	Wave 3	2672	8.35 (7.32,9.46)	0.88 (0.73,1.07)		1.14 (0.89,1.46)	
	Inter-waves	767	7.30 (5.56,9.38)	0.76 (0.56,1.03)		0.74 (0.51,1.06)	
District	**City of Cape Town (Ref)**	5447	9.42 (8.66,10.22)	-	0.002		0.231
	Cape Winelands	941	9.03 (7.28,11.05)	0.96 (0.75,1.21)		0.97 (0.74,1.26)	
	Central Karoo	121	8.26 (4.03,14.67)	0.87 (0.42,1.58)		0.75 (0.35,1.47)	
	Garden Route	1388	6.56 (5.31,7.99)	0.67 (0.53,0.85)		0.82 (0.64,1.05)	
	Overberg	368	5.71 (3.57,8.59)	0.58 (0.36,0.89)		0.65 (0.39,1.03)	
	West Coast	410	7.07 (4.79,10.00)	0.73 (0.49,1.06)		0.77 (0.50,1.14)	

[1] Time since the most recent evidence of a start of an episode; with episodes beginning after 2 months before the SARS-CoV-2 diagnosis considered as ongoing. [2] Hypertension, diabetes, chronic obstructive pulmonary disease, chronic kidney disease, tuberculosis (at any time). [3] The highest level of protection from among: No vaccine received ('None'); <28 days since a first vaccine dose ('Early'); ≥28 days since 1 dose of a Pfizer vaccine ('1 vaccine (P)'); ≥28 days since 1 Janssen vaccine, possibly with a 2nd vaccine too, or ≥14 days since a 2nd Pfizer vaccine |(combined into the 'primary' series due to the small sample). [4] Among those with evidence of ART at any time. [5] The week's total number of COVID-19 admissions relative to the maximum weekly COVID-19 admissions for that district (as a percent).
ART: Antiretroviral therapy. CI: Confidence interval.

Supplemental Digital Content C: Adjusted odds ratios using alternative CD4 cell counts measures

Table C1: Adjusted odds ratios (and 95% CIs) describing the association of mortality with a person's demographic characteristics, co-existing conditions, vaccination status, HIV characteristics and time/location covariates, using alternative CD4 cell count measures for 15–39-year-old adults with HIV and SARS-CoV-2 infections in the Western Cape

Variable	Category	Adjusted odds ratio (aOR)		
		Model 1: Recent CD4 (AIC[6]: 2051)	Model 2: CD4 nadir (AIC: 2043)	Model 3: CD4 at ART start (AIC: 2062)
Sex	**Female (Ref)**			
	Male	1.07 (0.80,1.42)	1.04 (0.78,1.39)	1.09 (0.81,1.45)
Age group (years)	**15-24 (Ref)**			
	25-29	1.21 (0.70,2.17)	1.15 (0.66,2.06)	1.14 (0.66,2.03)
	30-34	1.37 (0.83,2.38)	1.30 (0.78,2.24)	1.28 (0.78,2.22)
	35-39	2.05 (1.25,3.51)	1.88 (1.15,3.21)	1.91 (1.17,3.27)
Hypertension	**Absent (Ref)**			
	Present	1.68 (1.07,2.55)	1.70 (1.08,2.59)	1.67 (1.06,2.53)
Diabetes	**Absent (Ref)**			
	Present	2.64 (1.54,4.33)	2.56 (1.49,4.20)	2.46 (1.44,4.01)
Chronic obstructive pulmonary disease	**Absent (Ref)**			
	Present	1.15 (0.62,1.98)	1.14 (0.62,1.97)	1.18 (0.64,2.03)
Chronic kidney disease	**Absent (Ref)**			
	Present	5.85 (2.93,11.06)	5.99 (3.01,11.31)	5.79 (2.90,10.95)
Tuberculosis[1] (years since)	**Absent (Ref)**			
	≥ 1	1.73 (1.19,2.49)	1.50 (1.01,2.20)	1.67 (1.14,2.42)
	< 1	5.40 (3.43,8.41)	5.81 (3.71,8.99)	7.48 (4.88,11.30)
	Ongoing	7.40 (5.12,10.67)	7.58 (5.24,10.96)	8.66 (6.06,12.36)
Number of conditions[2]	**0-2 (Ref)**			
	>2	0.62 (0.22,1.60)	0.61 (0.22,1.58)	0.64 (0.23,1.65)
Pregnancy	**Absent (Ref)**			
	Present	0.94 (0.51,1.63)	0.95 (0.51,1.64)	0.98 (0.53,1.68)
Vaccination status[3]	**None (Ref)**			
	Early	1.31 (0.31,3.80)	1.29 (0.30,3.71)	1.18 (0.28,3.46)
	1/2 vaccines	0.00 (0.00,0.29)	0.00 (0.00,0.00)	0.00 (0.00,0.00)
CD4 count (cells/µl)	**≥ 500 (Ref)**			
	200-499	1.19 (0.67,2.17)	1.08 (0.67,1.84)	0.90 (0.55,1.52)
	50-199	2.20 (1.23,4.04)	1.29 (0.76,2.25)	1.41 (0.84,2.43)
	0-49	3.39 (1.83,6.47)	3.36 (1.95,5.98)	1.60 (0.84,3.05)
	Unknown	1.05 (0.64,1.80)	1.16 (0.63,2.17)	0.63 (0.37,1.11)
Viral load[4] (copies/ml)	**0-999 (Ref)**			
	≥ 1000	1.53 (1.03,2.24)	1.68 (1.15,2.43)	2.11 (1.46,3.02)
	Unknown	1.26 (0.88,1.81)	1.35 (0.94,1.93)	1.43 (1.00,2.04)
ART collection	**Yes**			
	No ART	2.30 (1.47,3.54)	2.33 (1.45,3.66)	3.32 (1.97,5.62)
HIV (years since first evidence)	**≥ 1 (Ref)**			
	< 1	1.37 (0.91,2.05)	1.48 (0.96,2.24)	1.33 (0.88,1.99)

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Table C1 continued

Variable	Category	Adjusted odds ratio (aOR)		
		Model 1: Recent CD4 (AIC[6]: 2051)	Model 2: CD4 nadir (AIC: 2043)	Model 3: CD4 at ART start (AIC: 2062)
Admission pressure[5] (%)	**<25 (Ref)**			
	≥25 and <50	1.65 (1.11,2.49)	1.68 (1.13,2.53)	1.66 (1.12,2.51)
	≥50	1.24 (0.79,2.00)	1.30 (0.82,2.09)	1.25 (0.80,2.01)
Wave	**Wave 1 (Ref)**			
	Wave 2	1.29 (0.82,2.01)	1.27 (0.81,1.99)	1.31 (0.83,2.04)
	Wave 3	1.68 (1.13,2.50)	1.71 (1.15,2.54)	1.66 (1.11,2.47)
	Inter-waves	1.83 (1.08,3.11)	1.81 (1.07,3.07)	1.88 (1.11,3.19)
District	**City of Cape Town (Ref)**			
	Cape Winelands	1.70 (1.12,2.52)	1.70 (1.12,2.54)	1.71 (1.12,2.54)
	Central Karoo	0.50 (0.08,1.75)	0.55 (0.09,1.88)	0.51 (0.08,1.77)
	Garden Route	0.95 (0.64,1.37)	0.94 (0.64,1.37)	0.96 (0.65,1.39)
	Overberg	1.37 (0.76,2.32)	1.38 (0.77,2.34)	1.31 (0.73,2.21)
	West Coast	0.94 (0.45,1.75)	0.93 (0.45,1.73)	0.96 (0.46,1.80)

[1] Time since the most recent evidence of a start of an episode; with episodes beginning after 2 months before the SARS-CoV-2 diagnosis considered as ongoing. [2] Hypertension, diabetes, chronic obstructive pulmonary disease, chronic kidney disease, tuberculosis (at any time). [3] The highest level of protection from among: No vaccine received ('None'); <28 days since a first vaccine dose ('Early'); ≥28 days since (at least) a first dose of a vaccine (1 or 2 Pfizer or Janssen vaccines not distinguished due to small samples). [4] Among those with evidence of ART at any time. [5] The week's total number of COVID-19 admissions relative to the maximum weekly COVID-19 admissions for that district (as a percent). [6] Akaike Information Criterion (AIC) provides relative measure of models' predictive powers; lower AIC values are more favourable.
ART: Antiretroviral therapy. CI: Confidence interval.

Table C2: Adjusted odds ratios (and 95% CIs) describing the association of mortality with a person's demographic characteristics, co-existing conditions, vaccination status, HIV characteristics and time/location covariates, using alternative CD4 cell count measures, for adults with HIV and SARS-CoV-2 infections ≥ 40 years old in the Western Cape

Variable	Category	Adjusted odds ratio (aOR)		
		Model 1: Recent CD4 (AIC[6]: 4465)	Model 2: CD4 nadir (AIC: 4470)	Model 3: CD4 at ART start (AIC: 4489)
Sex	**Female (Ref)**			
	Male	1.31 (1.11,1.54)	1.30 (1.10,1.53)	1.33 (1.13,1.57)
Age group (years)	**40-49 (Ref)**			
	50-59	1.73 (1.43,2.09)	1.71 (1.42,2.06)	1.67 (1.39,2.02)
	60-69	3.34 (2.61,4.26)	3.44 (2.68,4.39)	3.27 (2.56,4.17)
	70+	4.89 (3.35,7.07)	4.99 (3.41,7.24)	4.62 (3.16,6.68)
Hypertension	**Absent (Ref)**			
	Present	1.22 (1.01,1.48)	1.23 (1.02,1.49)	1.22 (1.01,1.48)
Diabetes	**Absent (Ref)**			
	Present	3.12 (2.54,3.83)	3.14 (2.56,3.86)	3.04 (2.48,3.73)
Chronic obstructive pulmonary disease	**Absent (Ref)**			
	Present	1.04 (0.80,1.35)	1.09 (0.84,1.41)	1.09 (0.84,1.41)
Chronic kidney disease	**Absent (Ref)**			
	Present	2.47 (1.89,3.21)	2.49 (1.91,3.23)	2.52 (1.93,3.27)
Tuberculosis[1] (years since)	**Absent (Ref)**			
	12m+	1.26 (1.02,1.54)	1.18 (0.96,1.45)	1.24 (1.01,1.52)
	<12m	2.31 (1.54,3.42)	2.68 (1.80,3.93)	2.93 (1.96,4.28)
	Ongoing	3.37 (2.46,4.59)	3.66 (2.69,4.96)	4.07 (2.99,5.49)
Number of conditions[2]	**0-2 (Ref)**			
	>2	0.74 (0.53,1.03)	0.75 (0.54,1.04)	0.75 (0.54,1.04)
Pregnancy	**Absent (Ref)**			
	Present	1.06 (0.17,3.51)	1.14 (0.18,3.74)	1.11 (0.18,3.65)
Vaccination status[3]	**None (Ref)**			
	Early	0.50 (0.25,0.92)	0.49 (0.24,0.90)	0.49 (0.24,0.90)
	Pfizer - 1 vaccine	0.40 (0.16,0.89)	0.41 (0.16,0.89)	0.41 (0.16,0.90)
	Primary	0.10 (0.01,0.47)	0.10 (0.01,0.48)	0.09 (0.01,0.44)
CD4 count (cells/µl)	**≥ 500 (Ref)**			
	200-499	1.20 (0.86,1.68)	1.37 (1.02,1.86)	1.07 (0.74,1.57)
	50-199	1.82 (1.25,2.66)	1.50 (1.11,2.07)	1.37 (0.95,2.01)
	0-49	3.30 (2.04,5.31)	2.36 (1.65,3.38)	2.11 (1.36,3.32)
	Unknown	0.94 (0.72,1.24)	0.79 (0.53,1.19)	1.21 (0.85,1.76)
Viral load[4] (copies/ml)	**0-999 (Ref)**			
	≥ 1000	1.08 (0.78,1.47)	1.34 (0.99,1.79)	1.45 (1.08,1.93)
	Unknown	0.89 (0.68,1.15)	1.03 (0.79,1.34)	0.94 (0.73,1.21)
ART collection	**Yes**			
	No ART	1.48 (1.12,1.94)	1.80 (1.32,2.43)	1.40 (1.03,1.88)
HIV (years since first evidence)	**≥ 1 (Ref)**			
	< 1	1.48 (1.08,2.01)	1.87 (1.35,2.57)	1.57 (1.15,2.14)

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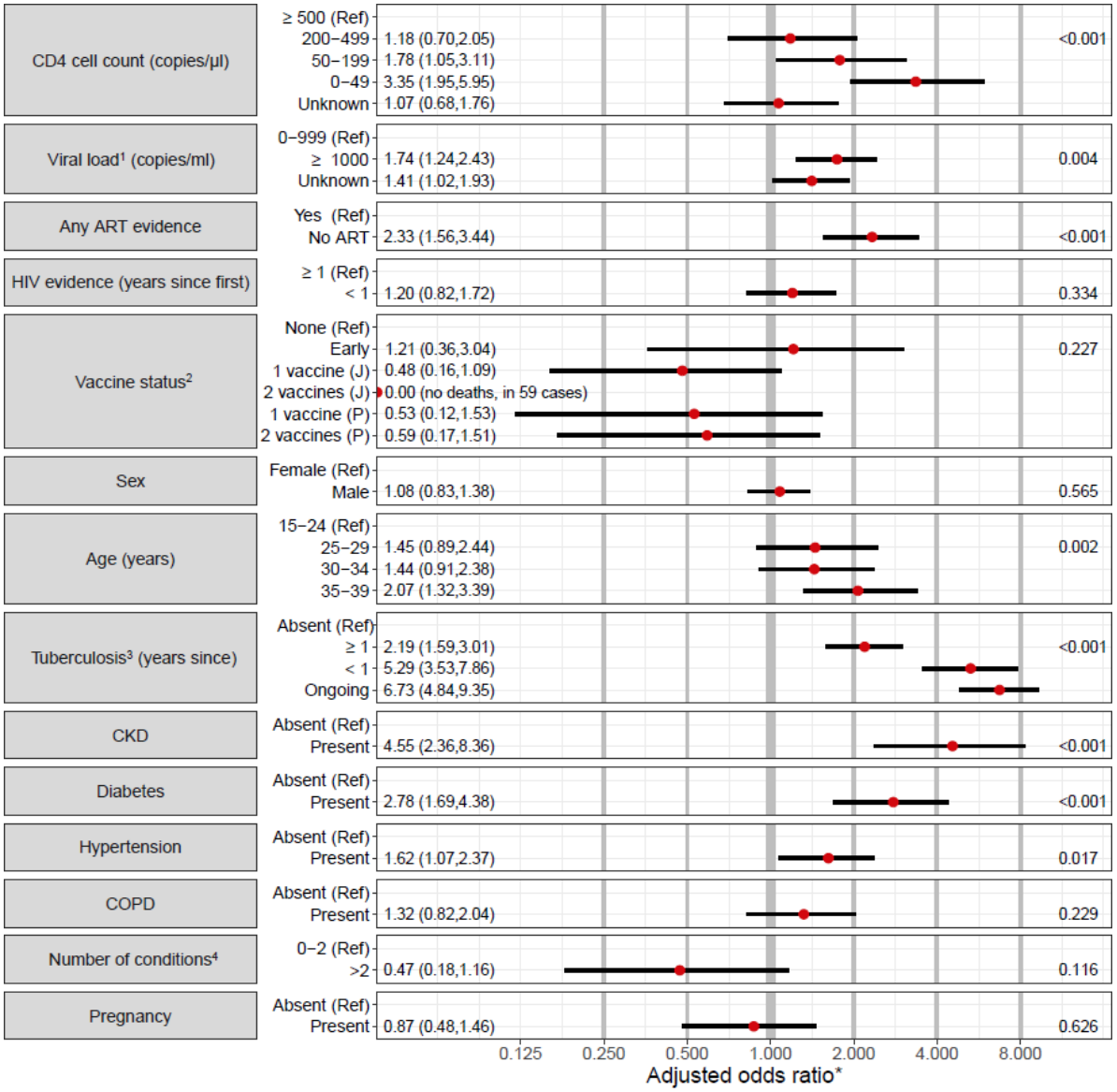
Table C2 continued

Variable	Category	Adjusted odds ratio (aOR)		
		Model 1: Recent CD4 (AIC[6]: 4465)	Model 2: CD4 nadir (AIC: 4470)	Model 3: CD4 at ART start (AIC: 4489)
Admission pressure[5] (%)	**<25 (Ref)**			
	≥25 and <50	0.99 (0.78,1.27)	0.98 (0.77,1.26)	1.00 (0.78,1.28)
	≥50	0.95 (0.72,1.26)	0.95 (0.72,1.26)	0.95 (0.72,1.26)
Wave	**Wave 1 (Ref)**			
	Wave 2	0.96 (0.74,1.25)	0.97 (0.74,1.26)	0.98 (0.75,1.27)
	Wave 3	1.14 (0.89,1.46)	1.15 (0.90,1.48)	1.18 (0.91,1.51)
	Inter-waves	0.74 (0.51,1.06)	0.72 (0.50,1.04)	0.75 (0.52,1.09)
District	**City of Cape Town (Ref)**			
	Cape Winelands	0.97 (0.74,1.26)	1.01 (0.77,1.31)	1.00 (0.76,1.30)
	Central Karoo	0.75 (0.35,1.47)	0.81 (0.37,1.57)	0.79 (0.36,1.54)
	Garden Route	0.82 (0.64,1.05)	0.84 (0.65,1.07)	0.82 (0.64,1.05)
	Overberg	0.65 (0.39,1.03)	0.66 (0.40,1.05)	0.67 (0.40,1.06)
	West Coast	0.77 (0.50,1.14)	0.79 (0.52,1.18)	0.80 (0.52,1.18)

[1] Time since the most recent evidence of a start of an episode; with episodes beginning after 2 months before the SARS-CoV-2 diagnosis considered as ongoing. [2] Hypertension, diabetes, chronic obstructive pulmonary disease, chronic kidney disease, tuberculosis (at any time). [3] The highest level of protection from among: No vaccine received ('None'); <28 days since a first vaccine dose ('Early'); ≥28 days since 1 dose of a Pfizer vaccine ('1 vaccine (P)'); ≥28 days since 1 Janssen vaccine, possibly with a 2nd vaccine too, or ≥14 days since a 2nd Pfizer vaccine |(combined into the 'primary' series due to the small sample). [4] Among those with evidence of ART at any time. [5] The week's total number of COVID-19 admissions relative to the maximum weekly COVID-19 admissions for that district (as a percent). [6] Akaike Information Criterion (AIC) provides relative measure of models' predictive powers; lower AIC values are more favourable.
ART: Antiretroviral therapy. CI: Confidence interval.

Supplemental Digital Content D: Adjusted odds ratios for models including SARS-CoV-2 infections diagnosed during Wave 4

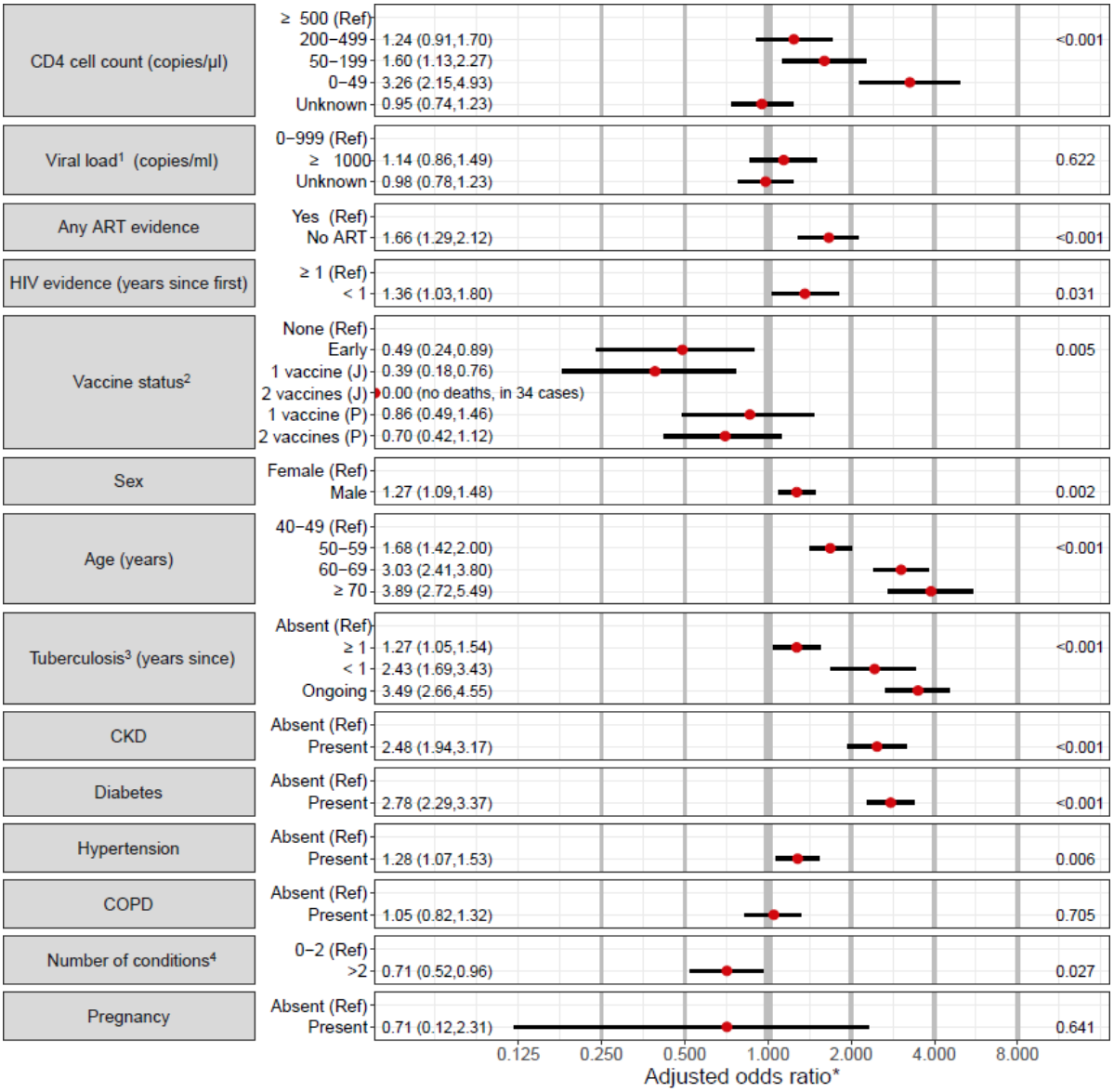
Figure D1: Adjusted odds ratios (and 95% CIs) describing the association of mortality with a person's HIV characteristics, vaccination, demographic characteristics, and co-existing conditions, for 15–39-year-old adults with HIV and SARS-CoV-2 infections in the Western Cape using all infections until 10 March 2022. P-values are reported on the right.



* Also adjusted for district, wave, admission pressure

[1] Among those with evidence of ART at any time. [2] The highest level of protection from among six categories: No vaccine received ('None'); <28 days since a first vaccine dose ('Early'); ≥28 days since a firstdose of a vaccine, by type ('1 vaccine'); or ≥14 days since a second dose, by type ('2 vaccines'). J: Janssen, P: Pfizer. [3] Time since the most recent evidence of a start of an episode; with episodes beginning after 2 months before the SARS-CoV-2 diagnosis considered as ongoing. [4] Hypertension, diabetes, chronic obstructive pulmonary disease, chronic kidney disease, tuberculosis (at any time).
ART: Antiretroviral therapy. CI: Confidence interval. CKD: Chronic kidney disease. COPD: Chronic obstructive pulmonary disease.

Figure D2: Adjusted odds ratios (and 95% CIs) describing the association of mortality with a person's HIV characteristics, vaccination, demographic characteristics, and co-existing conditions, for adults with HIV and SARS-CoV-2 infections aged ≥ 40 years in the Western Cape using all infections until 10 March 2022. P-values are reported on the right.



* Also adjusted for district, wave, admission pressure.

[1] Among those with evidence of ART at any time. [2] The highest level of protection from among six categories: No vaccine received ('None'); <28 days since a first vaccine dose ('Early'); ≥28 days since a firstdose of a vaccine, by type ('1 vaccine'); or ≥14 days since a second dose, by type ('2 vaccines'). J: Janssen, P: Pfizer. [3] Time since the most recent evidence of a start of an episode; with episodes beginning after 2 months before the SARS-CoV-2 diagnosis considered as ongoing. [4] Hypertension, diabetes, chronic obstructive pulmonary disease, chronic kidney disease, tuberculosis (at any time).
ART: Antiretroviral therapy. CI: Confidence interval. CKD: Chronic kidney disease. COPD: Chronic obstructive pulmonary disease.