Can HIV Low Level Viremia Predict Future Raised HIV Viral Load? A Retrospective Cohort Analysis From Lusaka Province.

Presented By: **Daniel Mwamba MD, MSc, PGDip HIV/AIDS**

Outline

Background

Method

Results

Conclusion

Acknowledgement

Background

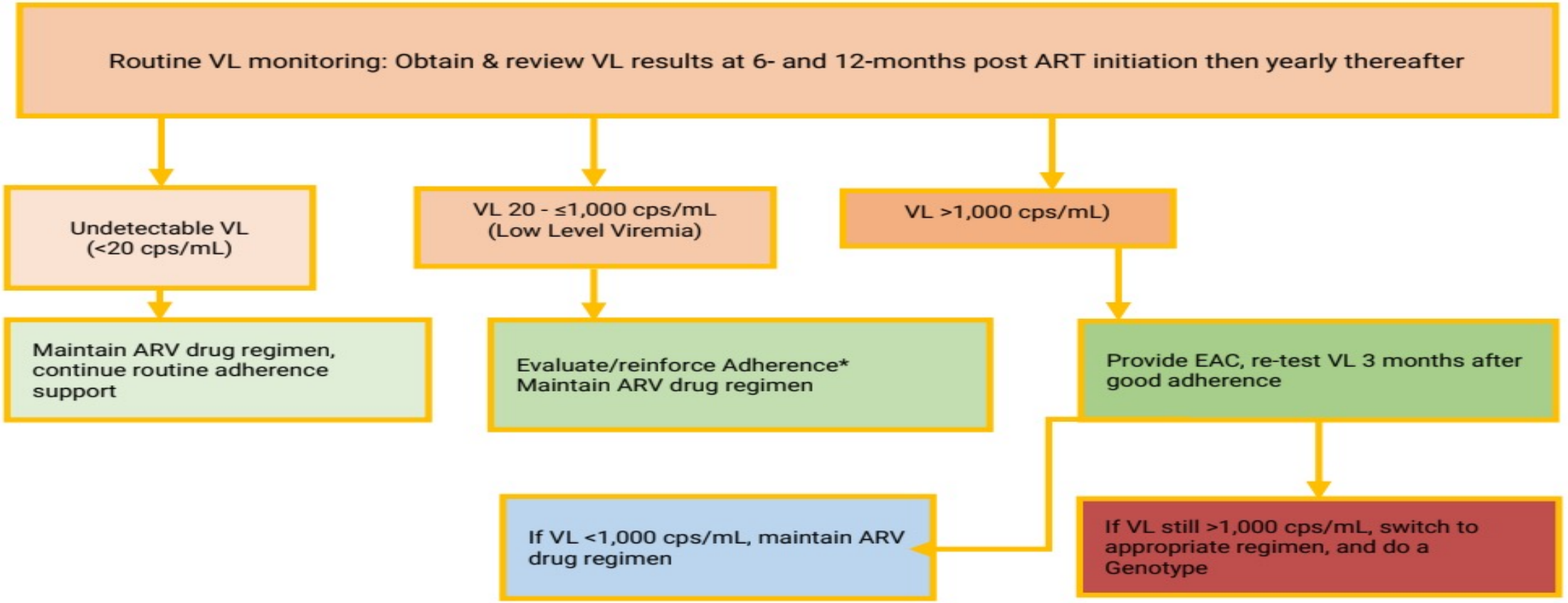
- HIV RNA viral load (VL) remains the most reliable marker to assess HIV treatment success to date.
- The Zambia HIV consolidated guideline define viral load suppression as any VL test result of below 1000 copies/ml.

- Studies suggest that low-level viremia (LLV) defined as VL between 60 to 999 copies/ml is associated with increased risk of antiretroviral drug resistance and ultimately treatment failure (Fleming et al.2019).

- The Zambia HIV consolidated guideline 2020 recommends that all HIV patients on Highly Antiretroviral Treatment (HAART) for at least 6 months with VL above 1000 copies/ml should be enrolled on enhanced adherence counselling (EAC), this recommendation differs from WHO guidance that suggests that even those with LLV should be offered EAC.

CIDRZ for a healthy Zambia 20 years

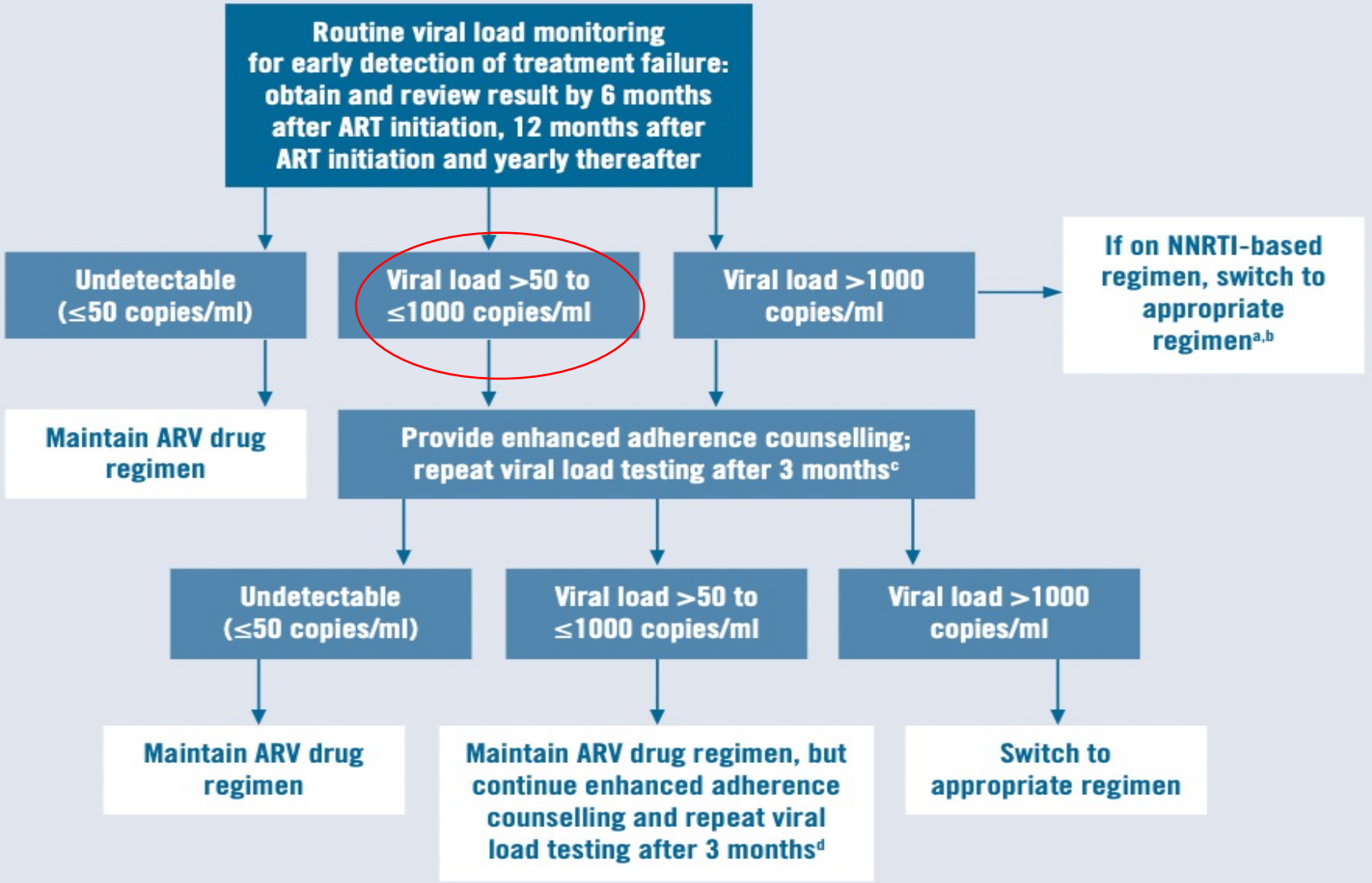
2022ZCG Algorithm for VL Monitoring



*Adapted from WHO Consolidated Guidelines on HIV Prevention, Testing, Treatment, Service delivery and monitoring, July 2021 (Page 148)

**Follow normal VL monitoring algorithm. The clinical management of low-level viremia (LLV) remains unclear. LLV ≥ 200 is associated with virologic failure. Persistent viremia ≥ 200 may require more intensive monitoring because of increased risk for virologic failure. (adapted from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6774874/)

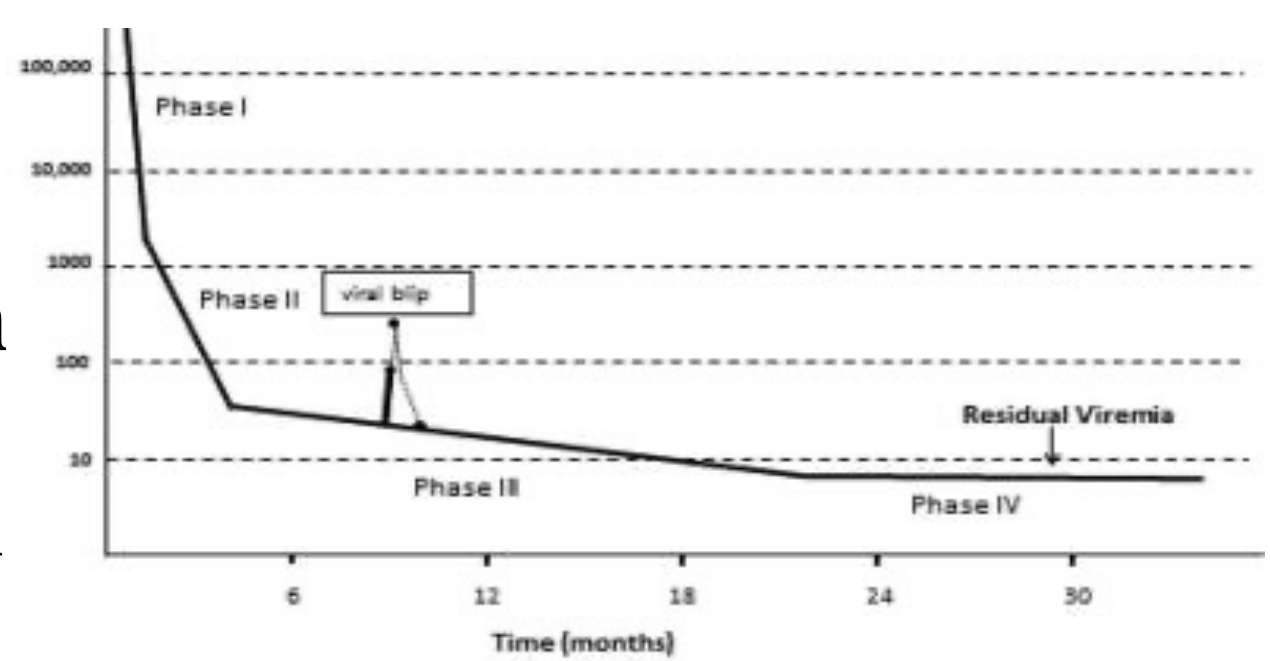
Fig 1. Treatment monitoring algorithm

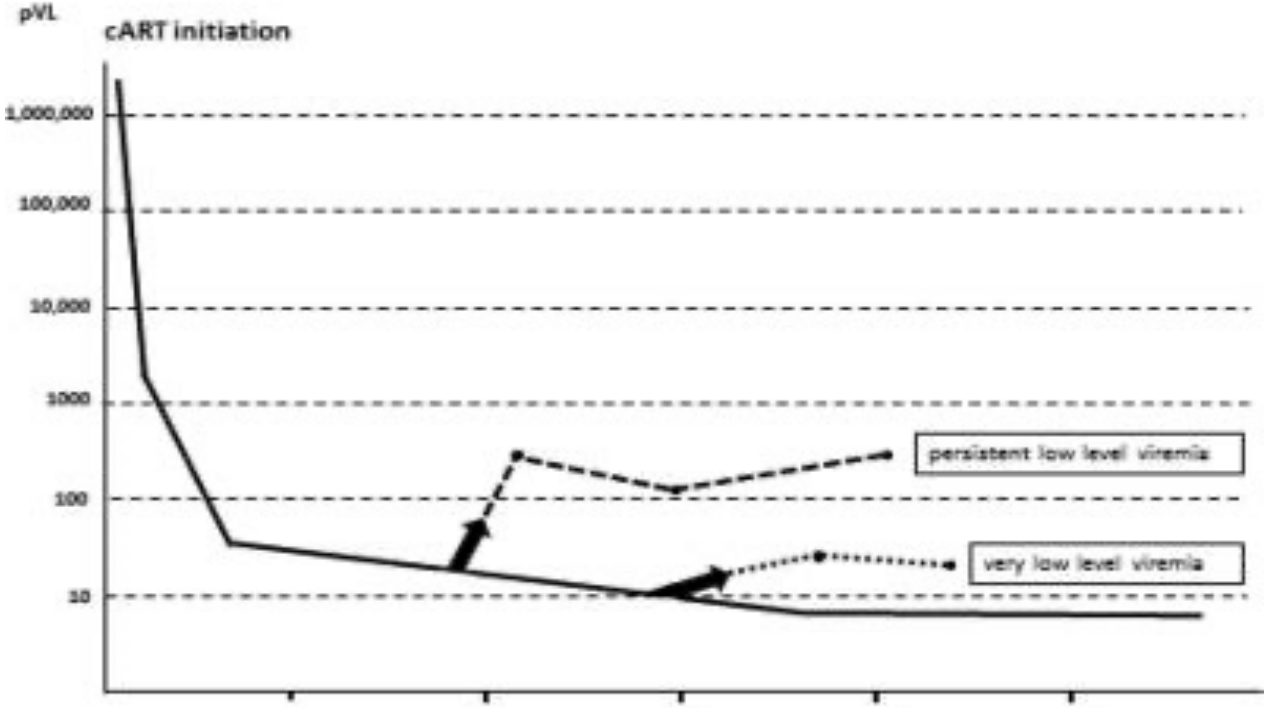


Adherence counselling should be provided at all visits to ensure that viral suppression is maintained or given priority throughout care

LLV risk factor

- Conflicting evidence on stage of HIV infection prior to cART initiation
- Viral blips of low amplitude are unlikely to lead to persistent LLV.
- Adherence.
- Antiretroviral regimen.





Background

We hypothesized that patients who develop unsuppressed VL above 1000 copies/ml could have had a progressive increase in their VLs from previous tests.

Therefore, we assumed that identifying HIV patients with low level viremia could help Health Care Providers take proactive steps in preventing development of treatment failure.

CIDRZ
for a healthy Zambia
20 years

Methods

- Data from electronic medical records (SmartCare) of patients who had at least one VL result documented between 1st April 2018 and 31st January 2022 across 6 districts of Lusaka province.
- Conducted retrospective cohort analysis to determine the proportion of patients with latest VL above 1000 copies who had recorded LLV - defined as VL copies/ml between 60 and 999 - on their previous VL lab tests.
- Secondarily we extracted demographic characteristics of patients with LLV and describe factors associated with LLV and unsuppressed VL.

CIDRZ for a healthy Zambia 20 years

Table 1.			
	Total sample of RoC with atleast one VL result on file in reporting period	Latest VL Suppression Status on File	
	N %	Suppressed n (%)	Unsuppressed n (%)
	220010 (100)	211400 (96.1)	8610 (3.9)
District			
Chilanga	8259 (3.8)	7975 (96.6)	284 (3.4)
Chirundu	4906 (2.2)	4717 (96.1)	189 (3.9)
Chongwe	10131 (4.6)	9463 (93.4)	668 (6.6)
Kafue	12715 (5.8)	12328 (97.0)	387 (3.0)
Luangwa	1936 (0.9)	1852 (95.7)	84 (4.3)
Lusaka Urban	178066 (80.9)	171222 (96.2)	6844 (3.8)
Rufunsa	3997 (1.8)	3843 (96.1)	154 (3.9)
Sex			
Female	140338 (63.8)	135502 (96.6)	4836 (3.4)
Male	79672 (36.2)	75898 (95.3)	3774 (4.7)
Age group			
<1	22 (0.0)	15 (68.2)	7 (31.8)
1-4	851 (0.4)	644 (75.7)	207 (24.3)
5-9	2384 (1.1)	2158 (90.5)	226 (9.5)
10-14	3414 (1.6)	3133 (91.8)	281 (8.2)
15-19	4719 (2.1)	4185 (88.7)	534 (11.3)
20-24	10174 (4.6)	9265 (91.1)	909 (8.9)
25-29	22150 (10.1)	20937 (94.5)	1213 (5.5)
30-34	29452 (13.4)	28117 (95.5)	1335 (4.5)
35-39	37685 (17.1)	36331 (96.4)	1354 (3.6)
40-44	37484 (17.0)	36449 (97.2)	1035 (2.8)
45-49	31146 (14.2)	30420 (97.7)	726 (2.3)
50-54	19131 (8.7)	18739 (98.0)	392 (2.0)
55-59	11229 (5.1)	11036 (98.3)	193 (1.7)
60-64	5863 (2.7)	5750 (98.1)	113 (1.9)
65+	4306 (2.0)	4221 (98.0)	85 (2.0)
Duration on ART (in months)			
<6	15389 (7.0)	13205 (85.8)	2184 (14.2)
6-12	18013 (8.2)	17119 (95.0)	894 (5.0)
13-18	12278 (5.6)	11741 (95.6)	537 (4.4)
19-24	12879 (5.9)	12305 (95.5)	574 (4.5)
>24	161451 (73.4)	157030 (97.3)	4421 (2.7)

Table 1.			
	Total sample of RoC with atleast one VL result on file in reporting period	Latest VL Suppression Status on File	
	N %	Suppressed n (%)	Unsuppressed n (%)
	220010 (100)	211400 (96.1)	8610 (3.9)
District			
Chilanga	8259 (3.8)	7975 (96.6)	284 (3.4)
Chirundu	4906 (2.2)	4717 (96.1)	189 (3.9)
Chongwe	10131 (4.6)	9463 (93.4)	668 (6.6)
Kafue	12715 (5.8)	12328 (97.0)	387 (3.0)
Luangwa	1936 (0.9)	1852 (95.7)	84 (4.3)
Lusaka Urban	178066 (80.9)	171222 (96.2)	6844 (3.8)
Rufunsa	3997 (1.8)	3843 (96.1)	154 (3.9)
Sex			
Female	140338 (63.8)	135502 (96.6)	4836 (3.4)
Male	79672 (36.2)	75898 (95.3)	3774 (4.7)
Age group			
<1	22 (0.0)	15 (68.2)	7 (31.8)
1-4	851 (0.4)	644 (75.7)	207 (24.3)
5-9	2384 (1.1)	2158 (90.5)	226 (9.5)
10-14	3414 (1.6)	3133 (91.8)	281 (8.2)
15-19	4719 (2.1)	4185 (88.7)	534 (11.3)
20-24	10174 (4.6)	9265 (91.1)	909 (8.9)
25-29	22150 (10.1)	20937 (94.5)	1213 (5.5)
30-34	29452 (13.4)	28117 (95.5)	1335 (4.5)
35-39	37685 (17.1)	36331 (96.4)	1354 (3.6)
40-44	37484 (17.0)	36449 (97.2)	1035 (2.8)
45-49	31146 (14.2)	30420 (97.7)	726 (2.3)
50-54	19131 (8.7)	18739 (98.0)	392 (2.0)
55-59	11229 (5.1)	11036 (98.3)	193 (1.7)
60-64	5863 (2.7)	5750 (98.1)	113 (1.9)
65+	4306 (2.0)	4221 (98.0)	85 (2.0)
Duration on ART (in months)			
<6	15389 (7.0)	13205 (85.8)	2184 (14.2)
6-12	18013 (8.2)	17119 (95.0)	894 (5.0)
13-18	12278 (5.6)	11741 (95.6)	537 (4.4)
19-24	12879 (5.9)	12305 (95.5)	574 (4.5)
>24	161451 (73.4)	157030 (97.3)	4421 (2.7)

Table 1.

	Total sample of RoC with atleast one VL result on file in reporting period	Latest VL Suppression Status on File	
	N %	Suppressed n (%)	Unsuppressed n (%)
	220010 (100)	211400 (96.1)	8610 (3.9)
District			
Chilanga	**8259 (3.8)**	7975 (96.6)	284 (3.4)
Chirundu	**4906 (2.2)**	4717 (96.1)	189 (3.9)
Chongwe	**10131 (4.6)**	9463 (93.4)	668 (6.6)
Kafue	**12715 (5.8)**	12328 (97.0)	387 (3.0)
Luangwa	**1936 (0.9)**	1852 (95.7)	84 (4.3)
Lusaka Urban	**178066 (80.9)**	171222 (96.2)	6844 (3.8)
Rufunsa	**3997 (1.8)**	3843 (96.1)	154 (3.9)
Sex			
Female	**140338 (63.8)**	135502 (96.6)	4836 (3.4)
Male	**79672 (36.2)**	75898 (95.3)	3774 (4.7)
Age group			
<1	**22 (0.0)**	15 (68.2)	7 (31.8)
1-4	**851 (0.4)**	644 (75.7)	207 (24.3)
5-9	**2384 (1.1)**	2158 (90.5)	226 (9.5)
10-14	**3414 (1.6)**	3133 (91.8)	281 (8.2)
15-19	**4719 (2.1)**	4185 (88.7)	534 (11.3)
20-24	**10174 (4.6)**	9265 (91.1)	909 (8.9)
25-29	**22150 (10.1)**	20937 (94.5)	1213 (5.5)
30-34	**29452 (13.4)**	28117 (95.5)	1335 (4.5)
35-39	**37685 (17.1)**	36331 (96.4)	1354 (3.6)
40-44	**37484 (17.0)**	36449 (97.2)	1035 (2.8)
45-49	**31146 (14.2)**	30420 (97.7)	726 (2.3)
50-54	**19131 (8.7)**	18739 (98.0)	392 (2.0)
55-59	**11229 (5.1)**	11036 (98.3)	193 (1.7)
60-64	**5863 (2.7)**	5750 (98.1)	113 (1.9)
65+	**4306 (2.0)**	4221 (98.0)	85 (2.0)
Duration on ART (in months)			
<6	**15389 (7.0)**	13205 (85.8)	2184 (14.2)
6-12	**18013 (8.2)**	17119 (95.0)	894 (5.0)
13-18	**12278 (5.6)**	11741 (95.6)	537 (4.4)
19-24	**12879 (5.9)**	12305 (95.5)	574 (4.5)
>24	**161451 (73.4)**	157030 (97.3)	4421 (2.7)

Table 1.			
	Total sample of RoC with atleast one VL result on file in reporting period	Latest VL Suppression Status on File	
	N %	Suppressed n (%)	Unsuppressed n (%)
	220010 (100)	211400 (96.1)	8610 (3.9)
District			
Chilanga	8259 (3.8)	7975 (96.6)	284 (3.4)
Chirundu	4906 (2.2)	4717 (96.1)	189 (3.9)
Chongwe	10131 (4.6)	9463 (93.4)	668 (6.6)
Kafue	12715 (5.8)	12328 (97.0)	387 (3.0)
Luangwa	1936 (0.9)	1852 (95.7)	84 (4.3)
Lusaka Urban	178066 (80.9)	171222 (96.2)	6844 (3.8)
Rufunsa	3997 (1.8)	3843 (96.1)	154 (3.9)
Sex			
Female	140338 (63.8)	135502 (96.6)	4836 (3.4)
Male	79672 (36.2)	75898 (95.3)	3774 (4.7)
Age group			
<1	22 (0.0)	15 (68.2)	7 (31.8)
1-4	851 (0.4)	644 (75.7)	207 (24.3)
5-9	2384 (1.1)	2158 (90.5)	226 (9.5)
10-14	3414 (1.6)	3133 (91.8)	281 (8.2)
15-19	4719 (2.1)	4185 (88.7)	534 (11.3)
20-24	10174 (4.6)	9265 (91.1)	909 (8.9)
25-29	22150 (10.1)	20937 (94.5)	1213 (5.5)
30-34	29452 (13.4)	28117 (95.5)	1335 (4.5)
35-39	37685 (17.1)	36331 (96.4)	1354 (3.6)
40-44	37484 (17.0)	36449 (97.2)	1035 (2.8)
45-49	31146 (14.2)	30420 (97.7)	726 (2.3)
50-54	19131 (8.7)	18739 (98.0)	392 (2.0)
55-59	11229 (5.1)	11036 (98.3)	193 (1.7)
60-64	5863 (2.7)	5750 (98.1)	113 (1.9)
65+	4306 (2.0)	4221 (98.0)	85 (2.0)
Duration on ART (in months)			
<6	15389 (7.0)	13205 (85.8)	2184 (14.2)
6-12	18013 (8.2)	17119 (95.0)	894 (5.0)
13-18	12278 (5.6)	11741 (95.6)	537 (4.4)
19-24	12879 (5.9)	12305 (95.5)	574 (4.5)
>24	161451 (73.4)	157030 (97.3)	4421 (2.7)

Table 1.

Characteristics	1st Previous Suppressed VL Result			2nd Previous Suppressed VL Result			3rd Previous Suppressed VL Result		
	N (%)	0-59 copies/ml n (%)	60-999 copies/ml n (%)	N (%)	0-59 copies/ml n (%)	60-999 copies/ml n (%)	N (%)	0-59 copies/ml n (%)	60-999 copies/ml n (%)
	2707 (100)	1975 (73.0)	732 (27.0)	**1841 (100)**	1345 (73.1)	496 (26.9)	**1003 (100)**	722 (72.0)	281 (28.0)
District									
Chilanga	**73 (2.7)**	56 (76.7)	17 (23.3)	**62 (3.4)**	49 (79.0)	13 (21.0)	**27 (2.7)**	18 (66.7)	9 (33.3)
Chirundu	**64 (2.4)**	46 (71.9)	18 (28.1)	**66 (3.6)**	53 (80.3)	13 (19.7)	**45 (4.5)**	36 (80.0)	9 (20.0)
Chongwe	**215 (7.9)**	136 (63.3)	79 (36.7)	**131 (7.1)**	86 (65.6)	45 (34.4)	**70 (7.0)**	45 (64.3)	25 (35.7)
Kafue	**118 (4.4)**	91 (77.1)	27 (22.9)	**92 (5.0)**	72 (78.3)	20 (21.7)	**56 (5.6)**	39 (69.6)	17 (30.4)
Luangwa	**23 (0.8)**	18 (78.3)	5 (21.7)	**15 (0.8)**	9 (60.0)	6 (40.0)	**12 (1.2)**	7 (58.3)	5 (41.7)
Lusaka Urban	**2162 (79.9)**	1595 (73.8)	567 (26.2)	**1434 (77.9)**	1052 (73.4)	382 (26.6)	**770 (76.8)**	562 (73.0)	208 (27.0)
Rufunsa	**52 (1.9)**	33 (63.5)	19 (36.5)	**41 (2.2)**	24 (58.5)	17 (41.5)	**23 (2.3)**	15 (65.2)	8 (34.8)
Sex									
Female	**1498 (55.3)**	1093 (73.0)	405 (27.0)	**1051 (57.1)**	767 (73.0)	284 (27.0)	**587 (58.5)**	416 (70.9)	171 (29.1)
Male	**1209 (44.7)**	882 (73.0)	327 (27.0)	**790 (42.9)**	578 (73.2)	212 (26.8)	**416 (41.5)**	306 (73.6)	110 (26.4)
Age group									
<1	**35 (1.3)**	23 (65.7)	12 (34.3)	**16 (0.9)**	7 (43.8)	9 (56.3)	**5 (0.5)**	2 (40.0)	3 (60.0)
1-4	**61 (2.3)**	38 (62.3)	23 (37.7)	**42 (2.3)**	26 (61.9)	16 (38.1)	**18 (1.8)**	12 (66.7)	6 (33.3)
5-9	**111 (4.1)**	68 (61.3)	43 (38.7)	**62 (3.4)**	40 (64.5)	22 (35.5)	**28 (2.8)**	20 (71.4)	8 (28.6)
10-14	**183 (6.8)**	112 (61.2)	71 (38.8)	**142 (7.7)**	90 (63.4)	52 (36.6)	**71 (7.1)**	48 (67.6)	23 (32.4)
15-19	**226 (8.3)**	158 (69.9)	68 (30.1)	**146 (7.9)**	102 (69.9)	44 (30.1)	**81 (8.1)**	54 (66.7)	27 (33.3)
20-24	**292 (10.8)**	224 (76.7)	68 (23.3)	**193 (10.5)**	150 (77.7)	43 (22.3)	**104 (10.4)**	77 (74.0)	27 (26.0)
25-29	**385 (14.2)**	293 (76.1)	92 (23.9)	**254 (13.8)**	190 (74.8)	64 (25.2)	**135 (13.5)**	96 (71.1)	39 (28.9)
30-34	**435 (16.1)**	336 (77.2)	99 (22.8)	**281 (15.3)**	213 (75.8)	68 (24.2)	**158 (15.8)**	111 (70.3)	47 (29.7)
35-39	**346 (12.8)**	252 (72.8)	94 (27.2)	**252 (13.7)**	187 (74.2)	65 (25.8)	**140 (14.0)**	102 (72.9)	38 (27.1)
40-44	**303 (11.2)**	222 (73.3)	81 (26.7)	**207 (11.2)**	150 (72.5)	57 (27.5)	**116 (11.6)**	86 (74.1)	30 (25.9)
45-49	**163 (6.0)**	121 (74.2)	42 (25.8)	**113 (6.1)**	82 (72.6)	31 (27.4)	**65 (6.5)**	51 (78.5)	14 (21.5)
50-54	**79 (2.9)**	58 (73.4)	21 (26.6)	**63 (3.4)**	53 (84.1)	10 (15.9)	**42 (4.2)**	35 (83.3)	7 (16.7)
55-59	**51 (1.9)**	40 (78.4)	11 (21.6)	**40 (2.2)**	34 (85.0)	6 (15.0)	**26 (2.6)**	19 (73.1)	7 (26.9)
60-64	**37 (1.4)**	30 (81.1)	7 (18.9)	**30 (1.6)**	21 (70.0)	9 (30.0)	**14 (1.4)**	9 (64.3)	5 (35.7)
65+									
Duration on ART (in months)									
<6	**41 (1.5)**	31 (75.6)	10 (24.4)	**8 (0.4)**	7 (87.5)	1 (12.5)	**7 (0.7)**	4 (57.1)	3 (42.9)
6-12	**121 (4.5)**	83 (68.6)	38 (31.4)	**36 (2.0)**	24 (66.7)	12 (33.3)	**22 (2.2)**	14 (63.6)	8 (36.4)
13-18	**151 (5.6)**	117 (77.5)	34 (22.5)	**61 (3.3)**	47 (77.0)	14 (23.0)	**35 (3.5)**	31 (88.6)	4 (11.4)
19-24	**225 (8.3)**	170 (75.6)	55 (24.4)	**101 (5.5)**	76 (75.2)	25 (24.8)	**939 (93.6)**	673 (71.7)	266 (28.3)
>24	**2169 (80.1)**	1574 (72.6)	595 (27.4)	**1635 (88.8)**	1191 (72.8)	444 (27.2)			

Table 1.

Characteristics	1st Previous Suppressed VL Result			2nd Previous Suppressed VL Result			3rd Previous Suppressed VL Result		
	N (%)	0-59 copies/ml n (%)	60-999 copies/ml n (%)	N (%)	0-59 copies/ml n (%)	60-999 copies/ml n (%)	N (%)	0-59 copies/ml n (%)	60-999 copies/ml n (%)
	2707 (100)	1975 (73.0)	732 (27.0)	**1841 (100)**	1345 (73.1)	496 (26.9)	**1003 (100)**	722 (72.0)	281 (28.0)
District									
Chilanga	**73 (2.7)**	56 (76.7)	17 (23.3)	**62 (3.4)**	49 (79.0)	13 (21.0)	**27 (2.7)**	18 (66.7)	9 (33.3)
Chirundu	**64 (2.4)**	46 (71.9)	18 (28.1)	**66 (3.6)**	53 (80.3)	13 (19.7)	**45 (4.5)**	36 (80.0)	9 (20.0)
Chongwe	**215 (7.9)**	136 (63.3)	79 (36.7)	**131 (7.1)**	86 (65.6)	45 (34.4)	**70 (7.0)**	45 (64.3)	25 (35.7)
Kafue	**118 (4.4)**	91 (77.1)	27 (22.9)	**92 (5.0)**	72 (78.3)	20 (21.7)	**56 (5.6)**	39 (69.6)	17 (30.4)
Luangwa	**23 (0.8)**	18 (78.3)	5 (21.7)	**15 (0.8)**	9 (60.0)	6 (40.0)	**12 (1.2)**	7 (58.3)	5 (41.7)
Lusaka Urban	**2162 (79.9)**	1595 (73.8)	567 (26.2)	**1434 (77.9)**	1052 (73.4)	382 (26.6)	**770 (76.8)**	562 (73.0)	208 (27.0)
Rufunsa	**52 (1.9)**	33 (63.5)	19 (36.5)	**41 (2.2)**	24 (58.5)	17 (41.5)	**23 (2.3)**	15 (65.2)	8 (34.8)
Sex									
Female	**1498 (55.3)**	1093 (73.0)	405 (27.0)	**1051 (57.1)**	767 (73.0)	284 (27.0)	**587 (58.5)**	416 (70.9)	171 (29.1)
Male	**1209 (44.7)**	882 (73.0)	327 (27.0)	**790 (42.9)**	578 (73.2)	212 (26.8)	**416 (41.5)**	306 (73.6)	110 (26.4)
Age group									
<1	**35 (1.3)**	23 (65.7)	12 (34.3)	**16 (0.9)**	7 (43.8)	9 (56.3)	**5 (0.5)**	2 (40.0)	3 (60.0)
1-4	**61 (2.3)**	38 (62.3)	23 (37.7)	**42 (2.3)**	26 (61.9)	16 (38.1)	**18 (1.8)**	12 (66.7)	6 (33.3)
5-9	**111 (4.1)**	68 (61.3)	43 (38.7)	**62 (3.4)**	40 (64.5)	22 (35.5)	**28 (2.8)**	20 (71.4)	8 (28.6)
10-14	**183 (6.8)**	112 (61.2)	71 (38.8)	**142 (7.7)**	90 (63.4)	52 (36.6)	**71 (7.1)**	48 (67.6)	23 (32.4)
15-19	**226 (8.3)**	158 (69.9)	68 (30.1)	**146 (7.9)**	102 (69.9)	44 (30.1)	**81 (8.1)**	54 (66.7)	27 (33.3)
20-24	**292 (10.8)**	224 (76.7)	68 (23.3)	**193 (10.5)**	150 (77.7)	43 (22.3)	**104 (10.4)**	77 (74.0)	27 (26.0)
25-29	**385 (14.2)**	293 (76.1)	92 (23.9)	**254 (13.8)**	190 (74.8)	64 (25.2)	**135 (13.5)**	96 (71.1)	39 (28.9)
30-34	**435 (16.1)**	336 (77.2)	99 (22.8)	**281 (15.3)**	213 (75.8)	68 (24.2)	**158 (15.8)**	111 (70.3)	47 (29.7)
35-39	**346 (12.8)**	252 (72.8)	94 (27.2)	**252 (13.7)**	187 (74.2)	65 (25.8)	**140 (14.0)**	102 (72.9)	38 (27.1)
40-44	**303 (11.2)**	222 (73.3)	81 (26.7)	**207 (11.2)**	150 (72.5)	57 (27.5)	**116 (11.6)**	86 (74.1)	30 (25.9)
45-49	**163 (6.0)**	121 (74.2)	42 (25.8)	**113 (6.1)**	82 (72.6)	31 (27.4)	**65 (6.5)**	51 (78.5)	14 (21.5)
50-54	**79 (2.9)**	58 (73.4)	21 (26.6)	**63 (3.4)**	53 (84.1)	10 (15.9)	**42 (4.2)**	35 (83.3)	7 (16.7)
55-59	**51 (1.9)**	40 (78.4)	11 (21.6)	**40 (2.2)**	34 (85.0)	6 (15.0)	**26 (2.6)**	19 (73.1)	7 (26.9)
60-64	**37 (1.4)**	30 (81.1)	7 (18.9)	**30 (1.6)**	21 (70.0)	9 (30.0)	**14 (1.4)**	9 (64.3)	5 (35.7)
65+									
Duration on ART (in months)									
<6	**41 (1.5)**	31 (75.6)	10 (24.4)	**8 (0.4)**	7 (87.5)	1 (12.5)	**7 (0.7)**	4 (57.1)	3 (42.9)
6-12	**121 (4.5)**	83 (68.6)	38 (31.4)	**36 (2.0)**	24 (66.7)	12 (33.3)	**22 (2.2)**	14 (63.6)	8 (36.4)
13-18	**151 (5.6)**	117 (77.5)	34 (22.5)	**61 (3.3)**	47 (77.0)	14 (23.0)	**35 (3.5)**	31 (88.6)	4 (11.4)
19-24	**225 (8.3)**	170 (75.6)	55 (24.4)	**101 (5.5)**	76 (75.2)	25 (24.8)	**939 (93.6)**	673 (71.7)	266 (28.3)
>24	**2169 (80.1)**	1574 (72.6)	595 (27.4)	**1635 (88.8)**	1191 (72.8)	444 (27.2)			

Table 1.

Characteristics	1st Previous Suppressed VL Result			2nd Previous Suppressed VL Result			3rd Previous Suppressed VL Result		
	N (%)	0-59 copies/ml n (%)	60-999 copies/ml n (%)	N (%)	0-59 copies/ml n (%)	60-999 copies/ml n (%)	N (%)	0-59 copies/ml n (%)	60-999 copies/ml n (%)
	2707 (100)	1975 (73.0)	732 (27.0)	**1841 (100)**	1345 (73.1)	496 (26.9)	**1003 (100)**	722 (72.0)	281 (28.0)
District									
Chilanga	**73 (2.7)**	56 (76.7)	17 (23.3)	**62 (3.4)**	49 (79.0)	13 (21.0)	**27 (2.7)**	18 (66.7)	9 (33.3)
Chirundu	**64 (2.4)**	46 (71.9)	18 (28.1)	**66 (3.6)**	53 (80.3)	13 (19.7)	**45 (4.5)**	36 (80.0)	9 (20.0)
Chongwe	**215 (7.9)**	136 (63.3)	79 (36.7)	**131 (7.1)**	86 (65.6)	45 (34.4)	**70 (7.0)**	45 (64.3)	25 (35.7)
Kafue	**118 (4.4)**	91 (77.1)	27 (22.9)	**92 (5.0)**	72 (78.3)	20 (21.7)	**56 (5.6)**	39 (69.6)	17 (30.4)
Luangwa	**23 (0.8)**	18 (78.3)	5 (21.7)	**15 (0.8)**	9 (60.0)	6 (40.0)	**12 (1.2)**	7 (58.3)	5 (41.7)
Lusaka Urban	**2162 (79.9)**	1595 (73.8)	567 (26.2)	**1434 (77.9)**	1052 (73.4)	382 (26.6)	**770 (76.8)**	562 (73.0)	208 (27.0)
Rufunsa	**52 (1.9)**	33 (63.5)	19 (36.5)	**41 (2.2)**	24 (58.5)	17 (41.5)	**23 (2.3)**	15 (65.2)	8 (34.8)
Sex									
Female	**1498 (55.3)**	1093 (73.0)	405 (27.0)	**1051 (57.1)**	767 (73.0)	284 (27.0)	**587 (58.5)**	416 (70.9)	171 (29.1)
Male	**1209 (44.7)**	882 (73.0)	327 (27.0)	**790 (42.9)**	578 (73.2)	212 (26.8)	**416 (41.5)**	306 (73.6)	110 (26.4)
Age group									
<1	**35 (1.3)**	23 (65.7)	12 (34.3)	**16 (0.9)**	7 (43.8)	9 (56.3)	**5 (0.5)**	2 (40.0)	3 (60.0)
1-4	**61 (2.3)**	38 (62.3)	23 (37.7)	**42 (2.3)**	26 (61.9)	16 (38.1)	**18 (1.8)**	12 (66.7)	6 (33.3)
5-9	**111 (4.1)**	68 (61.3)	43 (38.7)	**62 (3.4)**	40 (64.5)	22 (35.5)	**28 (2.8)**	20 (71.4)	8 (28.6)
10-14	**183 (6.8)**	112 (61.2)	71 (38.8)	**142 (7.7)**	90 (63.4)	52 (36.6)	**71 (7.1)**	48 (67.6)	23 (32.4)
15-19	**226 (8.3)**	158 (69.9)	68 (30.1)	**146 (7.9)**	102 (69.9)	44 (30.1)	**81 (8.1)**	54 (66.7)	27 (33.3)
20-24	**292 (10.8)**	224 (76.7)	68 (23.3)	**193 (10.5)**	150 (77.7)	43 (22.3)	**104 (10.4)**	77 (74.0)	27 (26.0)
25-29	**385 (14.2)**	293 (76.1)	92 (23.9)	**254 (13.8)**	190 (74.8)	64 (25.2)	**135 (13.5)**	96 (71.1)	39 (28.9)
30-34	**435 (16.1)**	336 (77.2)	99 (22.8)	**281 (15.3)**	213 (75.8)	68 (24.2)	**158 (15.8)**	111 (70.3)	47 (29.7)
35-39	**346 (12.8)**	252 (72.8)	94 (27.2)	**252 (13.7)**	187 (74.2)	65 (25.8)	**140 (14.0)**	102 (72.9)	38 (27.1)
40-44	**303 (11.2)**	222 (73.3)	81 (26.7)	**207 (11.2)**	150 (72.5)	57 (27.5)	**116 (11.6)**	86 (74.1)	30 (25.9)
45-49	**163 (6.0)**	121 (74.2)	42 (25.8)	**113 (6.1)**	82 (72.6)	31 (27.4)	**65 (6.5)**	51 (78.5)	14 (21.5)
50-54	**79 (2.9)**	58 (73.4)	21 (26.6)	**63 (3.4)**	53 (84.1)	10 (15.9)	**42 (4.2)**	35 (83.3)	7 (16.7)
55-59	**51 (1.9)**	40 (78.4)	11 (21.6)	**40 (2.2)**	34 (85.0)	6 (15.0)	**26 (2.6)**	19 (73.1)	7 (26.9)
60-64	**37 (1.4)**	30 (81.1)	7 (18.9)	**30 (1.6)**	21 (70.0)	9 (30.0)	**14 (1.4)**	9 (64.3)	5 (35.7)
65+									
Duration on ART (in months)									
<6	**41 (1.5)**	31 (75.6)	10 (24.4)	**8 (0.4)**	7 (87.5)	1 (12.5)	**7 (0.7)**	4 (57.1)	3 (42.9)
6-12	**121 (4.5)**	83 (68.6)	38 (31.4)	**36 (2.0)**	24 (66.7)	12 (33.3)	**22 (2.2)**	14 (63.6)	8 (36.4)
13-18	**151 (5.6)**	117 (77.5)	34 (22.5)	**61 (3.3)**	47 (77.0)	14 (23.0)	**35 (3.5)**	31 (88.6)	4 (11.4)
19-24	**225 (8.3)**	170 (75.6)	55 (24.4)	**101 (5.5)**	76 (75.2)	25 (24.8)	**939 (93.6)**	673 (71.7)	266 (28.3)
>24	**2169 (80.1)**	1574 (72.6)	595 (27.4)	**1635 (88.8)**	1191 (72.8)	444 (27.2)			

Table 1.

Characteristics	1st Previous Suppressed VL Result			2nd Previous Suppressed VL Result			3rd Previous Suppressed VL Result		
	N (%)	0-59 copies/ml n (%)	60-999 copies/ml n (%)	N (%)	0-59 copies/ml n (%)	60-999 copies/ml n (%)	N (%)	0-59 copies/ml n (%)	60-999 copies/ml n (%)
	2707 (100)	1975 (73.0)	732 (27.0)	**1841 (100)**	1345 (73.1)	496 (26.9)	**1003 (100)**	722 (72.0)	281 (28.0)
District									
Chilanga	**73 (2.7)**	56 (76.7)	17 (23.3)	**62 (3.4)**	49 (79.0)	13 (21.0)	**27 (2.7)**	18 (66.7)	9 (33.3)
Chirundu	**64 (2.4)**	46 (71.9)	18 (28.1)	**66 (3.6)**	53 (80.3)	13 (19.7)	**45 (4.5)**	36 (80.0)	9 (20.0)
Chongwe	**215 (7.9)**	136 (63.3)	79 (36.7)	**131 (7.1)**	86 (65.6)	45 (34.4)	**70 (7.0)**	45 (64.3)	25 (35.7)
Kafue	**118 (4.4)**	91 (77.1)	27 (22.9)	**92 (5.0)**	72 (78.3)	20 (21.7)	**56 (5.6)**	39 (69.6)	17 (30.4)
Luangwa	**23 (0.8)**	18 (78.3)	5 (21.7)	**15 (0.8)**	9 (60.0)	6 (40.0)	**12 (1.2)**	7 (58.3)	5 (41.7)
Lusaka Urban	**2162 (79.9)**	1595 (73.8)	567 (26.2)	**1434 (77.9)**	1052 (73.4)	382 (26.6)	**770 (76.8)**	562 (73.0)	208 (27.0)
Rufunsa	**52 (1.9)**	33 (63.5)	19 (36.5)	**41 (2.2)**	24 (58.5)	17 (41.5)	**23 (2.3)**	15 (65.2)	8 (34.8)
Sex									
Female	**1498 (55.3)**	1093 (73.0)	405 (27.0)	**1051 (57.1)**	767 (73.0)	284 (27.0)	**587 (58.5)**	416 (70.9)	171 (29.1)
Male	**1209 (44.7)**	882 (73.0)	327 (27.0)	**790 (42.9)**	578 (73.2)	212 (26.8)	**416 (41.5)**	306 (73.6)	110 (26.4)
Age group									
<1	**35 (1.3)**	23 (65.7)	12 (34.3)	**16 (0.9)**	7 (43.8)	9 (56.3)	**5 (0.5)**	2 (40.0)	3 (60.0)
1-4	**61 (2.3)**	38 (62.3)	23 (37.7)	**42 (2.3)**	26 (61.9)	16 (38.1)	**18 (1.8)**	12 (66.7)	6 (33.3)
5-9	**111 (4.1)**	68 (61.3)	43 (38.7)	**62 (3.4)**	40 (64.5)	22 (35.5)	**28 (2.8)**	20 (71.4)	8 (28.6)
10-14	**183 (6.8)**	112 (61.2)	71 (38.8)	**142 (7.7)**	90 (63.4)	52 (36.6)	**71 (7.1)**	48 (67.6)	23 (32.4)
15-19	**226 (8.3)**	158 (69.9)	68 (30.1)	**146 (7.9)**	102 (69.9)	44 (30.1)	**81 (8.1)**	54 (66.7)	27 (33.3)
20-24	**292 (10.8)**	224 (76.7)	68 (23.3)	**193 (10.5)**	150 (77.7)	43 (22.3)	**104 (10.4)**	77 (74.0)	27 (26.0)
25-29	**385 (14.2)**	293 (76.1)	92 (23.9)	**254 (13.8)**	190 (74.8)	64 (25.2)	**135 (13.5)**	96 (71.1)	39 (28.9)
30-34	**435 (16.1)**	336 (77.2)	99 (22.8)	**281 (15.3)**	213 (75.8)	68 (24.2)	**158 (15.8)**	111 (70.3)	47 (29.7)
35-39	**346 (12.8)**	252 (72.8)	94 (27.2)	**252 (13.7)**	187 (74.2)	65 (25.8)	**140 (14.0)**	102 (72.9)	38 (27.1)
40-44	**303 (11.2)**	222 (73.3)	81 (26.7)	**207 (11.2)**	150 (72.5)	57 (27.5)	**116 (11.6)**	86 (74.1)	30 (25.9)
45-49	**163 (6.0)**	121 (74.2)	42 (25.8)	**113 (6.1)**	82 (72.6)	31 (27.4)	**65 (6.5)**	51 (78.5)	14 (21.5)
50-54	**79 (2.9)**	58 (73.4)	21 (26.6)	**63 (3.4)**	53 (84.1)	10 (15.9)	**42 (4.2)**	35 (83.3)	7 (16.7)
55-59	**51 (1.9)**	40 (78.4)	11 (21.6)	**40 (2.2)**	34 (85.0)	6 (15.0)	**26 (2.6)**	19 (73.1)	7 (26.9)
60-64	**37 (1.4)**	30 (81.1)	7 (18.9)	**30 (1.6)**	21 (70.0)	9 (30.0)	**14 (1.4)**	9 (64.3)	5 (35.7)
65+									
Duration on ART (in months)									
<6	**41 (1.5)**	31 (75.6)	10 (24.4)	**8 (0.4)**	7 (87.5)	1 (12.5)	**7 (0.7)**	4 (57.1)	3 (42.9)
6-12	**121 (4.5)**	83 (68.6)	38 (31.4)	**36 (2.0)**	24 (66.7)	12 (33.3)	**22 (2.2)**	14 (63.6)	8 (36.4)
13-18	**151 (5.6)**	117 (77.5)	34 (22.5)	**61 (3.3)**	47 (77.0)	14 (23.0)	**35 (3.5)**	31 (88.6)	4 (11.4)
19-24	**225 (8.3)**	170 (75.6)	55 (24.4)	**101 (5.5)**	76 (75.2)	25 (24.8)	**939 (93.6)**	673 (71.7)	266 (28.3)
>24	**2169 (80.1)**	1574 (72.6)	595 (27.4)	**1635 (88.8)**	1191 (72.8)	444 (27.2)			

Results

220,010 VL records were extracted of which 8610 (3.9%) had an unsuppressed VL result from their last VL test.

There were 4836 (3.4%) female and 3774 (4.7%) unsuppressed males.

Chongwe district reported a slightly higher proportion (6.6%) of unsuppressed VL in comparison to the other districts.

Of the 8610 records 2707 (31.4%) had a one previous VL on file, 1841 (21.3%) had 2 previous VL and 1003 (11.6) had 3 previous VL during the period under review.

LLV accounted for 27% (732), 26.9% (496) and 28% (281) of the 1st ,2nd, and 3rd previous VL respectively.

LLV among pediatric and adolescents varied from 31% in those aged 15 – 19 years to 50% among the 1 – 4 years. Rufunsa District reported higher proportion of LLV at 37.6%.

Patients on ART for 6 to 12 months had LLV at 35% VS 22% among those on treatment for 13 to 18 months.

Conclusion

- Our analysis revealed that 27% of patients in Lusaka province develop low level viremia prior to have an unsuppressed viral load.

- Residing in Rufunsa, aged below 19 years and being on ART for 6 to 12 months were found to be associated with LLV prior to develop an unsuppressed VL.

- While further studies are required to establish other predictors of LLV, it would be justifiable to provide enhanced adherence counseling to all patients with VL between 60 and 999 copies to prevent occurrence of viral mutation and treatment failure.

CIDRZ for a healthy Zambia 20 years

Acknowledgements

Ministry of Health

Thank You

- **For more information:**

- **Email : @cidrzinfo**
- **Website : www.cidrz.org**

- **Social Media :**