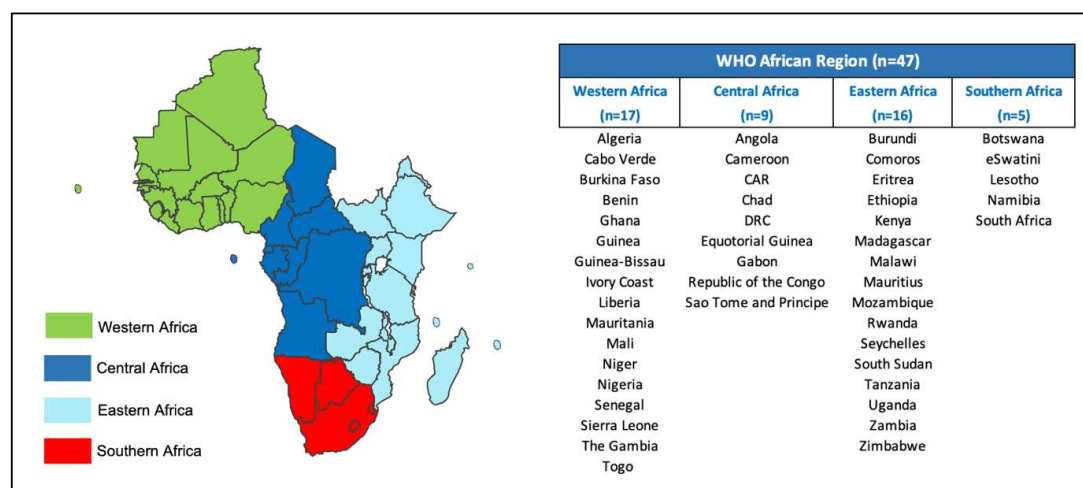


## Supplementary Appendix

Country adoption of WHO 2019 guidance on HIV testing strategies and algorithms: a policy review across the WHO African region

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**Supplementary Figure 1.** Countries in the WHO African Region and grouping by subregion



**Supplementary Table 1.** Categories for data extraction

<b>1. Policy Information</b>	
<ul style="list-style-type: none"> <li>▪ Country</li> <li>▪ WHO region</li> <li>▪ HIV testing policy identified?</li> </ul>	<ul style="list-style-type: none"> <li>▪ Year of policy publication</li> <li>▪ Type of policy document</li> <li>▪ National HIV prevalence</li> </ul>
<b>2. HIV testing algorithm (after 18 months of age)</b>	
<ul style="list-style-type: none"> <li>▪ HIV testing algorithm provided?</li> <li>▪ Image or text format?</li> <li>▪ Type of scenario in which algorithm is used</li> <li>▪ Number of assays used in algorithm</li> <li>▪ Serial or parallel strategy</li> <li>▪ Use of tiebreaker?</li> <li>▪ Use of Western Blot or LIA?</li> <li>▪ Mention of test order relating to sens/spec?</li> <li>▪ High or low prevalence strategy used?</li> <li>▪ Type of tests mentioned?</li> <li>▪ Brand of tests mentioned?</li> <li>▪ Are assays pre-qualified by WHO?</li> <li>▪ A1 test name</li> <li>▪ A1 type of assay</li> </ul>	<ul style="list-style-type: none"> <li>▪ A1 sens-/spec</li> <li>▪ A2 test name</li> <li>▪ A2 type of assay</li> <li>▪ A2 sens-/spec</li> <li>▪ A3 test name</li> <li>▪ A3 type of assay</li> <li>▪ A3 sens-/spec</li> <li>▪ Source of assay sens/spec</li> <li>▪ Mention of in-country assay validation</li> <li>▪ Alignment with WHO policy?</li> <li>▪ Primary reason(s) algorithm fails to meet WHO recommendations</li> <li>▪ Other notes about testing strategy</li> </ul>
<b>3. HIV testing algorithm among pregnant women using dual HIV/Syphilis RDTs</b>	
<ul style="list-style-type: none"> <li>▪ HIV testing algorithm provided?</li> <li>▪ Image or text format?</li> <li>▪ Type of scenario in which algorithm is used</li> <li>▪ Type of scenario in which algorithm should not be used (women on ART, already diagnosed/treated for syphilis, retesting for HIV)</li> <li>▪ What is there syphilis testing strategy for women with HIV?</li> <li>▪ Is dual test used as A1 or A0?</li> <li>▪ Is the dual test algorithm aligned with the national HIV testing algorithm?</li> <li>▪ Is the dual test algorithm aligned with the national syphilis testing algorithm?</li> <li>▪ Brand of dual test mentioned?</li> </ul>	<ul style="list-style-type: none"> <li>▪ Is dual test prequalified by WHO?</li> <li>▪ Dual test name</li> <li>▪ Mention of penicillin treatment for reactive TP?</li> <li>▪ Mention of further testing for reactive TP?</li> <li>▪ Mention of in-country assay validation</li> <li>▪ Alignment with WHO policy?</li> <li>▪ Primary reason(s) algorithm fails to meet WHO recommendations</li> <li>▪ Other notes about testing strategy</li> </ul>
<b>4. Retesting prior to ART initiation</b>	
<ul style="list-style-type: none"> <li>▪ Retest required before starting ART?</li> <li>▪ Retest strategy same as national algorithm?</li> <li>▪ Notes about retesting strategy</li> </ul>	

**Supplementary Table 2.** List of national policies on HIV testing services in the WHO African Region collected in 2018 and 2021 by subregion

Subregion	Count	Country	Policy reviewed in 2018?	New policy or algorithm identified?	Publication year	Type of document	Language	Algorithm provided?	National HIV prevalence
Central Africa	1	Angola	Yes, 2015	Yes	2020	HTS	Portuguese	Yes	Low
	2	Cameroon	Yes, 2015	Yes	2019	ART	French	Yes	Low
	3	CAR	Yes, 2010	Yes	2018	ART	French	Yes	Low
	4	Chad	Yes, 2011	Yes	2017	HTS	French	Yes	Low
	5	DRC	Yes, 2017	Yes	2020	ART	French	Yes	Low
	6	Equatorial Guinea	No	Yes	2018	ART	Spanish	Yes	Low
	7	Gabon	No	Yes	2017	HTS	French	Yes	Low
	8	Republic of the Congo	No	<b>No</b>	–	–	–	–	–
	9	São Tomé e Príncipe	No	Yes	2018	Algorithm	Portuguese	Yes	Low
Eastern Africa	10	Burundi	Yes, 2016	Yes	2020	HTS	French	Yes	Low
	11	Comoros	Yes, 2007	Yes	2016	HTS	French	Yes	Low
	12	Eritrea	No	Yes	2019	HTS	English	Yes	Low
	13	Ethiopia	Yes, 2017	Yes	2018	ART	English	Yes	Low
	14	Kenya	Yes, 2017	Yes	2021	HTS	English	Yes	Low
	15	Madagascar	Yes, 2011	Yes	2018	HTS	French	Yes	Low
	16	Malawi*	Yes, 2016	Yes*	2016	HTS	English	Yes	High
	17	Mauritius	No	Yes	2020	HTS	English	Yes	Low
	18	Mozambique	Yes, 2016	Yes	2020	PMTCT	Portuguese	Yes	High
	19	Rwanda	Yes, 2016	Yes	2018	HTS	English	Yes	Low
	20	Seychelles	No	Yes	2019	HTS	English	Yes	Low
	21	South Sudan	Yes, 2017	Yes	2020	ART	English	Yes	Low
	22	Tanzania	Yes, 2017	Yes	2021	HTS	English	Yes	High
	23	Uganda	Yes, 2016	Yes	2020	ART	English	Yes	High
	24	Zambia	Yes, 2018	Yes	2020	HTS	English	Yes	High
25	Zimbabwe*	Yes, 2016	Yes*	2016	Other	English	Yes	High	
Southern Africa	26	Botswana**	Yes, 2016	<b>No</b>	2016	ART	English	Yes	High
	27	eSwatini**	Yes, 2018	<b>No</b>	2018	ART	English	Yes	High
	28	Lesotho	Yes, 2016	Yes	2021	PMTCT	English	Yes	High

	29	Namibia	Yes, 2016	Yes	2018	HTS	English	Yes	High
	30	South Africa	Yes, 2016	Yes	2020	ART	English	Yes	High
Western Africa	31	Algeria**	Yes, 2013	<b>No</b>	2013	HTS	French	Yes	Low
	32	Benin	No	Yes	2017	HTS	French	Yes	Low
	33	Burkina Faso	Yes, 2008	Yes	2021	ART	French	Yes	Low
	34	Cabo Verde	No	<b>No</b>	–	–	–	–	–
	35	Ghana	Yes, 2014	Yes	2019	ART	English	Yes	Low
	36	Guinea	No	Yes	2019	HTS	French	Yes	Low
	37	Guinea-Bissau	No	Yes	2021	ART	Portuguese	Yes	Low
	38	Ivory Coast**	Yes, 2016	<b>No</b>	2016	HTS	French	Yes	Low
	39	Liberia	Yes, 2015	Yes	2020	HTS	English	Yes	Low
	40	Mauritania	No	Yes	2020	HTS	French	Yes	Low
	41	Mali	No	Yes	2017	HTS	French	Yes	Low
	42	Niger	No	Yes	2020	HTS	French	Yes	Low
	43	Nigeria	Yes, 2016	Yes	2020	ART	English	Yes	Low
	44	Senegal	Yes, 2017	Yes	2018	HTS	French	Yes	Low
	45	Sierra Leone	Yes, 2017	Yes	2020	ART	English	Yes	Low
46	The Gambia	Yes, 2014	Yes	2019	ART	English	Yes	Low	
47	Togo	No	Yes	2019	HTS	French	Yes	Low	

\*These countries provided an updated HIV testing algorithm despite having an old HIV testing guideline

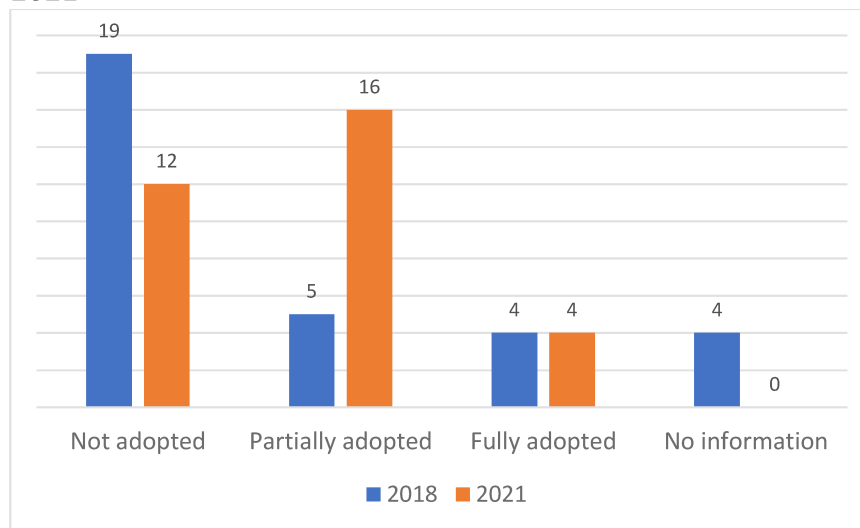
\*\* These countries did not provide an update HIV testing guideline but were included in the analysis

**Supplementary Table 3.** Progress on policy adoption in the WHO African Region from 2018 to 2021

Subregion	Count	Country	Policy reviewed in 2018?	Adherence in 2018	Policy reviewed in 2021	Adherence in 2021
Central Africa	1	Angola	Yes, 2015	Not adopted	2020	Mostly adopted
	2	Cameroon	Yes, 2015	Not adopted	2019	Mostly adopted
	3	CAR	Yes, 2010	Not adopted	2018	Not adopted
	4	Chad	Yes, 2011	Not adopted	2017	Mostly adopted
	5	DRC	Yes, 2017	Adopted	2020	Adopted
	6	Equatorial Guinea	No	–	2018	Not adopted
	7	Gabon	No	–	2017	Mostly adopted
	8	Republic of the Congo	No	–	–	–
	9	São Tomé e Príncipe	No	–	2018	Not adopted
Eastern Africa	10	Burundi	Yes, 2016	Not adopted	2020	Mostly adopted
	11	Comoros	Yes, 2007	No information	2016	Not adopted
	12	Eritrea	No	–	2019	Not adopted
	13	Ethiopia	Yes, 2017	No information	2018	Mostly adopted
	14	Kenya	Yes, 2017	Mostly adopted	2021	Adopted
	15	Madagascar	Yes, 2011	No information	2018	Mostly adopted
	16	Malawi	Yes, 2016	Not adopted	2016	Mostly adopted
	17	Mauritius	No	–	2020	Not adopted
	18	Mozambique	Yes, 2016	Not adopted	2020	Mostly adopted
	19	Rwanda	Yes, 2016	Not adopted	2018	Mostly adopted
	20	Seychelles	No	–	2019	Not adopted
	21	South Sudan	Yes, 2017	Not adopted	2020	Adopted
	22	Tanzania	Yes, 2017	Not adopted	2021	Mostly adopted
	23	Uganda	Yes, 2016	Mostly adopted	2020	Mostly adopted
	24	Zambia	Yes, 2018	Not adopted	2020	Not adopted
	25	Zimbabwe	Yes, 2016	Adopted	2016	Adopted
Southern Africa	26	Botswana	Yes, 2016	Mostly adopted	2016	Not adopted
	27	eSwatini	Yes, 2018	Not adopted	2018	Not adopted
	28	Lesotho	Yes, 2016	Adopted	2021	Mostly adopted
	29	Namibia	Yes, 2016	No information	2018	Not adopted
	30	South Africa	Yes, 2016	Mostly adopted	2020	Not adopted
Western Africa	31	Algeria	Yes, 2013	Adopted	2013	Not adopted
	32	Benin	No	–	2017	Not adopted
	33	Burkina Faso	Yes, 2008	Not adopted	2021	Mostly adopted
	34	Cabo Verde	No	–	–	–
	35	Ghana	Yes, 2014	Not adopted	2019	Mostly adopted
	36	Guinea	No	–	2019	Mostly adopted
	37	Guinea-Bissau	No	–	2021	Not adopted
	38	Ivory Coast	Yes, 2016	Not adopted	2016	Not adopted
	39	Liberia	Yes, 2015	Not adopted	2020	Mostly adopted
	40	Mauritania	No	–	2020	Not adopted
	41	Mali	No	–	2017	Not adopted
	42	Niger	No	–	2020	Not adopted
	43	Nigeria	Yes, 2016	Not adopted	2020	Mostly adopted
	44	Senegal	Yes, 2017	Mostly adopted	2018	Not adopted
	45	Sierra Leone	Yes, 2017	Not adopted	2020	Not adopted
	46	The Gambia	Yes, 2014	Not adopted	2019	Not adopted
	47	Togo	No	–	2019	Not adherent

A total of 32 countries had policies reviewed in 2018 and 2021. Those highlighted in red are policies reviewed in 2018 that were updated (n=28). Number of policies deemed adopted in 2018 (n=7) and number deemed adopted in 2021 (n=20)

**Supplementary Figure 2.** Comparing policy adoption across countries, 2018 vs 2021



**Supplementary Table 4.** Policy adoption of 2019 WHO-recommended HIV testing strategies in the WHO African region, 2014-2021

AFRO subregions (countries)	Policies reviewed			Serial testing strategy			Discontinuation of tiebreaker* testing strategy			Retesting prior to ART initiation		Universal 3-test strategy	Use of dual HIV/syphilis test**	No use of Western Blot
	Year	2014	2018	2021	2014	2018	2021	2014	2018	2021	2018	2021	2021	2021
All (n=47)	25 (53%)	32 (68%)	45 (96%)	21 (84%)	26 (81%)	29 (64%)	15 (60%)	26 (81%)	37 (82%)	16 (50%)	23 (51%)	21 (47%)	21 (47%)	35 (78%)
Western (n=17)	6 (35%)	9 (53%)	16 (94%)	5 (83%)	7 (78%)	9 (56%)	4 (67%)	5 (56%)	9 (56%)	1 (11%)	5 (31%)	8 (50%)	7 (44%)	10 (63%)
Central (n=9)	4 (44%)	5 (56%)	8 (89%)	4 (100%)	5 (100%)	7 (88%)	3 (75%)	4 (80%)	7 (88%)	1 (20%)	5 (63%)	3 (38%)	2 (25%)	6 (75%)
Eastern (n=16)	11 (69%)	13 (81%)	16 (100%)	10 (91%)	10 (77%)	12 (75%)	5 (45%)	12 (92%)	16 (100%)	9 (69%)	9 (56%)	9 (56%)	9 (56%)	14 (88%)
Southern (n=5)	4 (80%)	5 (100%)	5 (100%)	2 (40%)	4 (80%)	1 (20%)	3 (75%)	5 (100%)	5 (100%)	5 (100%)	4 (80%)	1 (20%)	3 (60%)	5 (100%)

\*Use of a third assay to rule-in HIV infection

\*\*Dual HIV/syphilis RDT as first test in ANC

**Supplementary Table 5.** Short name of products used as part of the 2-assay or 3-assay HIV testing algorithm in 28 HIV national testing policy documents reviewed in 2021

Strategy	Count	Country	Assay 1	Assay 2	Assay 3
2-assay	1	Angola	Determine	Uni-Gold	–
	2	Cameroon	Determine or Uni-Gold	OraQuick or Shanghai	–
	3	CAR	Determine	Uni-Gold	–
	4	Cote D'Ivoire	Determine	SD Bioline or GenieFast	StatPak or EIA (as tiebreaker)
	5	Equatorial Guinea	Determine	Hexagon	Uni-Gold (for discordants)
	6	eSwatini	Determine	Uni-Gold	–
	7	Gambia	Determine	SD Bioline or First Response	–
	8	Guinea Bissau	Determine	First Response	PCR (as tiebreaker)
	9	Mali	Alere Combo	SD Bioline	First Response (as tiebreaker)
	10	Mozambique	Determine	Uni-Gold	–
	11	Rwanda	Alere Combo	StatPak	–
	12	São Tomé e Príncipe	Determine	SD Bioline	PCR (as tiebreaker)
	13	Sierra Leone	Determine	SD Bioline	Uni-Gold (as tiebreaker)
	14	Uganda	Determine	StatPak	SD Bioline (for discordants)
	15	Nigeria	Determine Uni-Gold Stat-Pak Double Check Gold Sure Check HIV Quick Check	Determine Uni-Gold Stat-Pak Double Check Gold Sure Check HIV Quick Check	Determine Uni-Gold Stat-Pak Double Check Gold Sure Check HIV Quick Check (as tiebreaker)
	16	Togo	Murex HIV Ag/Ab Apdia HIV Ag/Ab Determine Alere Combo Vikia HIV 1/2 Wanta Rapid Test ABON HIV 1/2/0 Standard Q Hexagon Genie Fast SD Bioline First Response SD Bioline HIV/Syphilis OraQuick HIV Self-Test	ABON HIV 1/2/0 Standard Q SD Bioline First Response HIV Tri-Dot	INNOLIA or Genius (as tiebreaker)
3-assay	17	Burundi	Alere Combo or Determine	SD Bioline or Uni-Gold	Wondfo One Step
	18	Gabon	Alere Combo	Determine	SD Bioline
	19	Ghana	First Response	OraQuick	SD Bioline
	20	Guinea	Determine	SD Bioline	Multisure
	21	Kenya	INSTI	Uni-Gold	SD Bioline
	22	Liberia	Determine	SD Bioline	Uni-Gold
	23	Madagascar	Determine	Uni-Gold	SD Bioline
	24	Mauritius	GenScreen Ultra Ag/Ab	Alere Combo	Western Blot
	25	Malawi	INSTI	Uni-Gold	SD Bioline



	26	Niger	Alere Combo	Wondfo One Step	SD Bioline
	27	Senegal	Determine	SD Bioline	Multisure
	28	Zimbabwe	Determine	ChemBio	INSTI
	29	Burkina Faso	3rd generation: Determine Double check Gold Ultra Onsite HIV1+2 Plus Combo VIKIA HIV 1/2 4th generation: Alere Ag/Ab Combo OnSite HIV Ab/Ag (CTK)	HIV TriDot ImmunoFlow OnSite HIV 1/2 Ab Plus (CTK) SD Bioline	Any of those not selected as A1 or A2