

Supplementary file 6: Main Characteristics of prevalence surveys of antiretroviral medicines

Reference / country of collection	Active pharmaceutical ingredient (API)	Brand name	Outlet/ Sampling type	Reference specifications standard	Test (s) performed and main analytical technique	No. Failed n (%)
Penzak, S.R. 2003 [1] Kenya, Lithuania, Zambia, South Africa	Nevirapine	Triomune 40 Nevimune(200) Nevirex Viramune (Nev 200) Triomune 30	Private pharmacy/ Convenience	Unspecified	API content <i>High-performance liquid chromatography /ultraviolet (HPLC-UV)</i>	0 /6 (0.0%)
Ramachandran, G. 2004 [2] Zimbabwe, South Africa, Lithuania, Jamaica, Zambia	Efavirenz Indinavir Lopinavir-ritonavir Amprenavir Ritonavir Saquinavir soft-gel capsules	Sustiva Stocrin Crixivan Indivex-400 Kaletra Agenerase Norvir Fortovase	Unspecified/ Convenience	United States Pharmacopeia (USP) /National Formulary	API content <i>HPLC-UV</i>	3/12 (25.0%)
Ramachandran, G, 2004 [3] India	Lamivudine-Nevirapine- Stavudine Efavirenz Nevirapine Zidovudine Stavudine Lamivudine Didanosin	Unspecified	Manufacturer/ Convenience	Unspecified	API content <i>HPLC-UV</i>	0/17 (0.0%)
Ciss, M. 2006 [4] Senegal	Stavudine Nevirapine Indinavir	Unspecified	Combination of outlets / Convenience	USP + European Pharmacopeia + International Pharmacopoeia	API content <i>HPLC-unknown detector</i>	1/12 (8.3%)
M.H.Chambuso, 2006 [5] Tanzania	Indinavir Stavudine	Unspecified	Private pharmacy/ Unspecified	British Pharmacopoeia (BP) + USP	API content, API identification, Dissolution, Visual inspection <i>UV-visible spectrophotometry</i>	4/5 (80.0%)
WHO, 2007 [6] Uganda, Tanzania,	Didanosin, Efavirenz, Lamivudine, Nevirapine, Stavudine, Zidovudine,	Unspecified	Combination of outlets / Random	Brazilian Pharmacopeia, USP 2008	API content, Content uniformity, Dissolution, weight, Visual inspection, impurity, API identification	8/394 (2.0%)

Reference / country of collection	Active pharmaceutical ingredient (API)	Brand name	Outlet/ Sampling type	Reference specifications stassindard	Test (s) performed and main analytical technique	No. Failed n (%)
Democratic Republic of the Congo, Zambia, Kenya, Nigeria, Cameroon	Lamivudine-Zidovudine, Lamivudine-Nevirapine-Stavudine				<i>HPLC-UV/Vis</i>	
Sarr, S. O. 2008 [7] Senegal	Didanosin Indinavir Lamivudine Nevirapine Stavudine Zidovudine	Unspecified	Hospital/health centres / Convenience	Unspecified	API content (semi-quantitation), Disintegration, Visual inspection <i>Thin Layer Chromatography (TLC)</i>	7/43 (16.3%)
Musoke. D 2008 [8] Uganda	Lamivudine-Nevirapine-Stavudine	Unspecified	Hospital/health centres / Random	USP	API content, Visual inspection, dissolution <i>HPLC-Ultra-Violet</i>	0/14 (0.0%)
Munkombwe, D 2010 [9] Zambia	Nevirapine Lamivudine-Nevirapine-Stavudine Efavirenz Lamivudine-Stavudine	Unspecified	Government outlets/ Random	BP + USP	API content, API identification <i>TLC</i>	1/11 (9.1%)
NASCOP 2012 [10] Kenya	Abacavir Abacavir-Lamivudine Didanosin Efavirenz Emtricitabine-Efavirenz- Tenofovir Disoproxil Lamivudine Lamivudine-Stavudine Lamivudine-Nevirapine-Stavudine Lamivudine-Zidovudine Lamivudine-Zidovudine-Nevirapine Nevirapine Stavudine Tenofovir Disoproxil Tenofovir disoproxil – Lamivudine	Unspecified	Combination of outlets / Convenience	BP + USP	API content, Dissolution, weight, Friability <i>HPLC- Unknown detector</i>	1/284 (0.4%)

Reference country / of collection	Active pharmaceutical ingredient (API)	Brand name	Outlet/ Sampling type	Reference specifications stassindard	Test (s) performed and main analytical technique	No. Failed n (%)
	Zidovudine Lopinavir-Ritonavir					
Chigunta, M.[11] 2013 Zambia	Nevirapine	Unspecified	Combination of outlets/ Convenience	USP	API content , API identification, Visual inspection <i>HPLC – unknown detector</i>	0/9 (0.0%)
Krech. L.A. 2014 [12] Cambodia	Lamivudine-Nevirapine- Stavudine	Unspecified	Combination of outlets/ Convenience	USP and Cambodia Pharmacopeia	Visual inspection, API content , API identification, Impurity, Disintergration <i>HPLC, TLC</i>	1/7 (14.3%)
Wang, T. 2015 [13] Thailand, Nigeria, Ethiopia, China, United States of America, South Africa	Lamivudine Nevirapine Zidovudine Efavirenz	Unspecified	Government outlets, Non-governmental organization, Website, Private pharmacy / Convenience	USP	API content, Visual inspection, Impurity <i>HPLC-UV</i>	6/46 (13.0%)
Sapsirisavat, V. 2016 [14] Thailand, Viet Nam	Lopinavir-Ritonavir Tenofovir Efavirenz		Combination of outlets / Random and convenience	WHO International Pharmacopoeia	API content, API identification, Uniform of mass, Dissolution <i>Pharmacopeial techniques followed, no detail of the specific techniques</i>	0/42 (0.0%)
Kamangu, E.N. 2017 [15] Democratic Republic of the Congo	Abacavir Zidovudine Efavirenz Nevirapine	Nevipan (200) Nevimune (200) Nevirapine (200) EstivaN Aviroz Abacavir sulfate	Hospital/health centres / Convenience	European Pharmacopoeia, BP, International Pharmacopoeia 6th Edition.	API content, Disintegration, Friability <i>UV-visible spectrophotometry</i>	1/10 (10.0%)
WHO 2017 [16] Burkina Faso, Democratic Republic of the	Unspecified	Unspecified	Combination of outlets / Convenience	BP+USP+ International Pharmacopoeia	Where applicable: Appearance, API identification, API content , Weight variation, Dissolution, Impurity, Related substances, Fineness of	1/126 (0.8%)

Reference / country of collection	Active pharmaceutical ingredient (API)	Brand name	Outlet/ Sampling type	Reference specifications standard	Test (s) performed and main analytical technique	No. Failed n (%)
Congo (DRC), Nigeria, Rwanda and Zambia.					dispersion, Water content – no details on results per test <i>TLC, HPLC -unknown detector, IR (depending on API and formulation)</i>	
Djobet. M.P.N 2017 [17] Cameroon	Efavirenz Lamivudine-Stavudine Nevirapine Lamivudine-Zidovudine-Nevirapine Lamivudine-Zidovudine	Unspecified	Combination of outlets / Convenience	USP	API content , API identification, Visual inspection, Disintegration <i>UV Spectrophotometry TLC</i>	0/35 (0.0%)
Wang, X 2019 [18] United Kingdom	Emtricitabine-Tenofovir Disoproxil	Unspecified	Website , Hospital/health centers / Convenience	Unspecified	API content , API identification <i>Ultra-Performance Liquid Chromatography (UPLC)</i>	0/16 (0.0%)
Mziray S 2021 [19] Tanzania	Efavirenz Nevirapine Lamivudine Zidovudine Tenofovir Disoproxil Fumarate Lamivudine/Zidovudine Abacavir Sulphate Lopinavir/Ritonavir Tenofovir Disoproxil Fumarate /Emtricitabin Tenofovir Disoproxil Fumarate /Lamivudine/ Efavirenz Lamivudine/Zidovudine/ Nevirapine Lamivudine/Stavudine/ Nevirapine Tenofovir Disoproxil Fumarate /Efavirenz/ Emtricitabine	Unspecified	Combination of outlets / Convenience	USP or manufacturer's methods or in-house specifications	API content, API identification, Disintegration, Dissolution, Visual inspection, Related substances, Weight uniformity <i>TLC and HPLC</i> <i>Tier analysis: Tier 1 : screening testing using the GPHF-Minilab Tier 2 : samples failing Tier 1 and 10% samples not failing Tier 1 followed full pharmacopeial testing</i>	17/2630 (0.6%)

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HPLC, High-performance liquid chromatography; IR, Infrared; UV, Ultraviolet; TLC, Thin Layer Chromatography; BP, British Pharmacopeia; USP, United States Pharmacopeia; API, Active Pharmaceutical Ingredient						

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