



World Health Organization



HIV/AIDS Programme

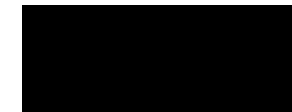
Strengthening health services to fight HIV/AIDS



Antiretroviral medicines in
low- and middle- income countries:
usage in 2008 and a demand forecast
for **2010–2012**
with a special focus on sub-Saharan Africa

Forecasting Demand for ARVs 2011 – 2012

John Stover: Futures Institute
Françoise Renaud-Théry: WHO
Carlos Avila: UNAIDS
(revised version 15 February 2011)



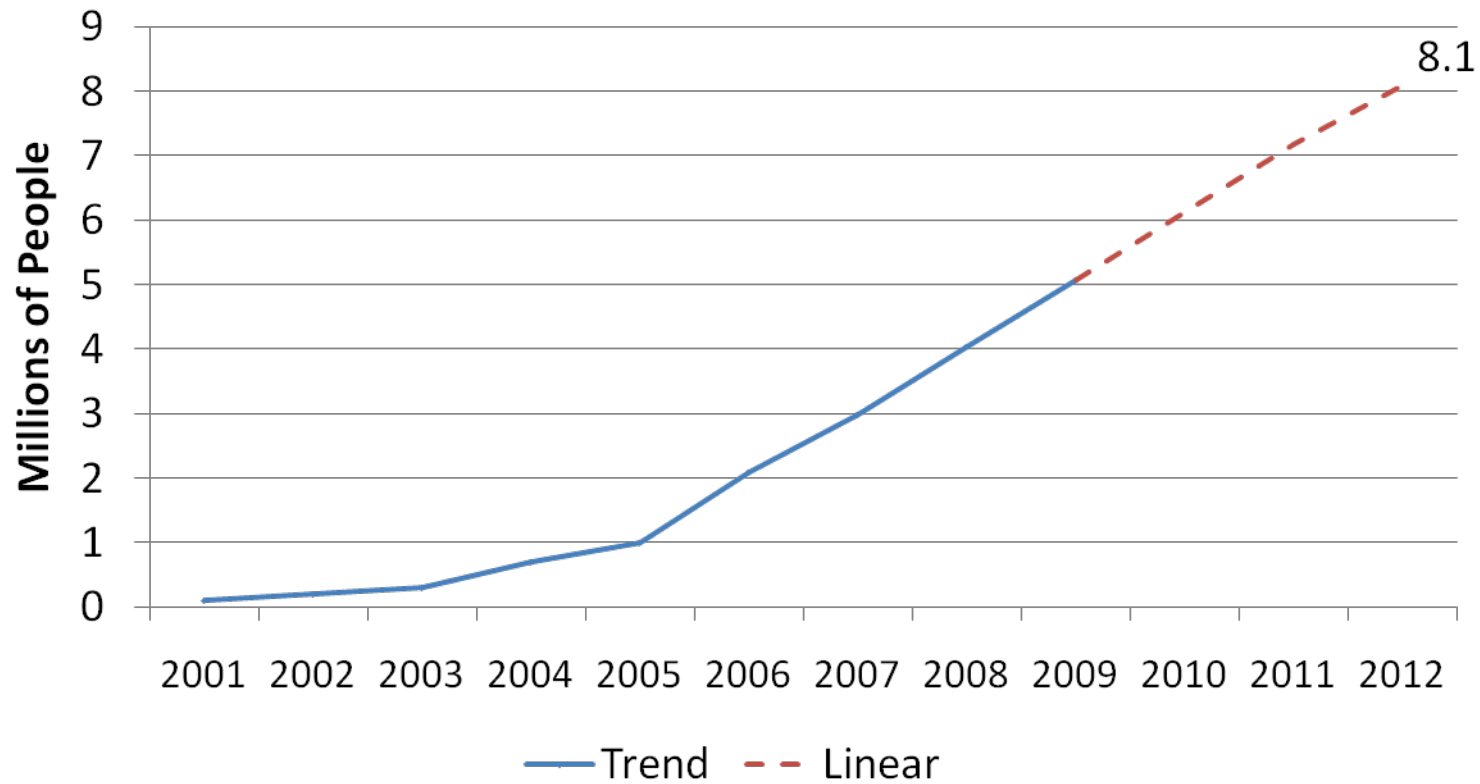
Purpose

- Project API requirements for low- and middle-income countries for 2011 to 2012
 - Using latest information on numbers of people on ART and distribution by regimen published in 2010
 - Two major elements: more patients eligible for ART and the phase out of d4T
 - New: ARV for adults, for children and PMTCT

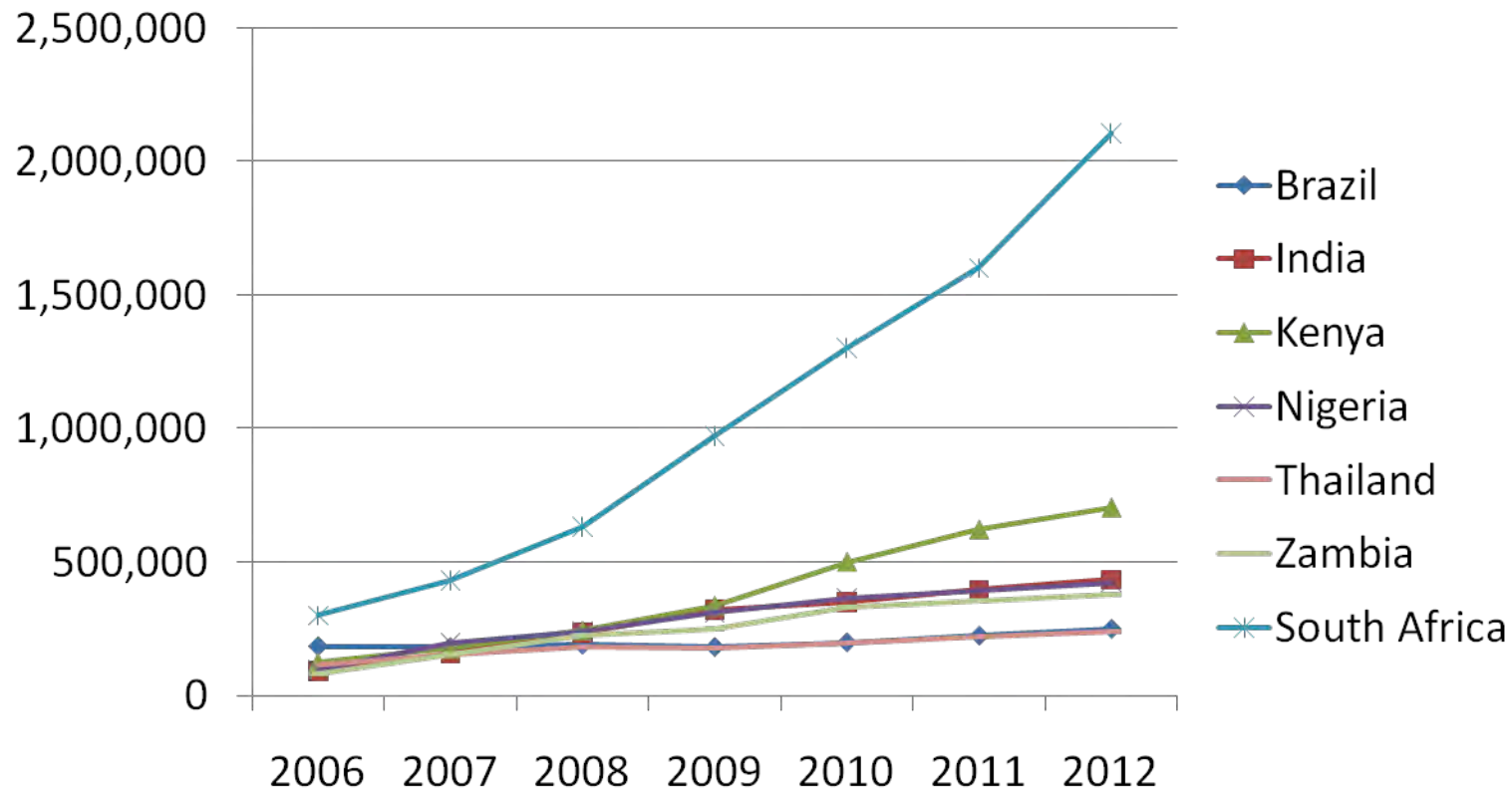
Methods: Number on ART

- Country-specific projections for 154 low- and middle-income countries
- Base projection
 - Linear extrapolation of last three data points
- Alternative projection
 - Country targets

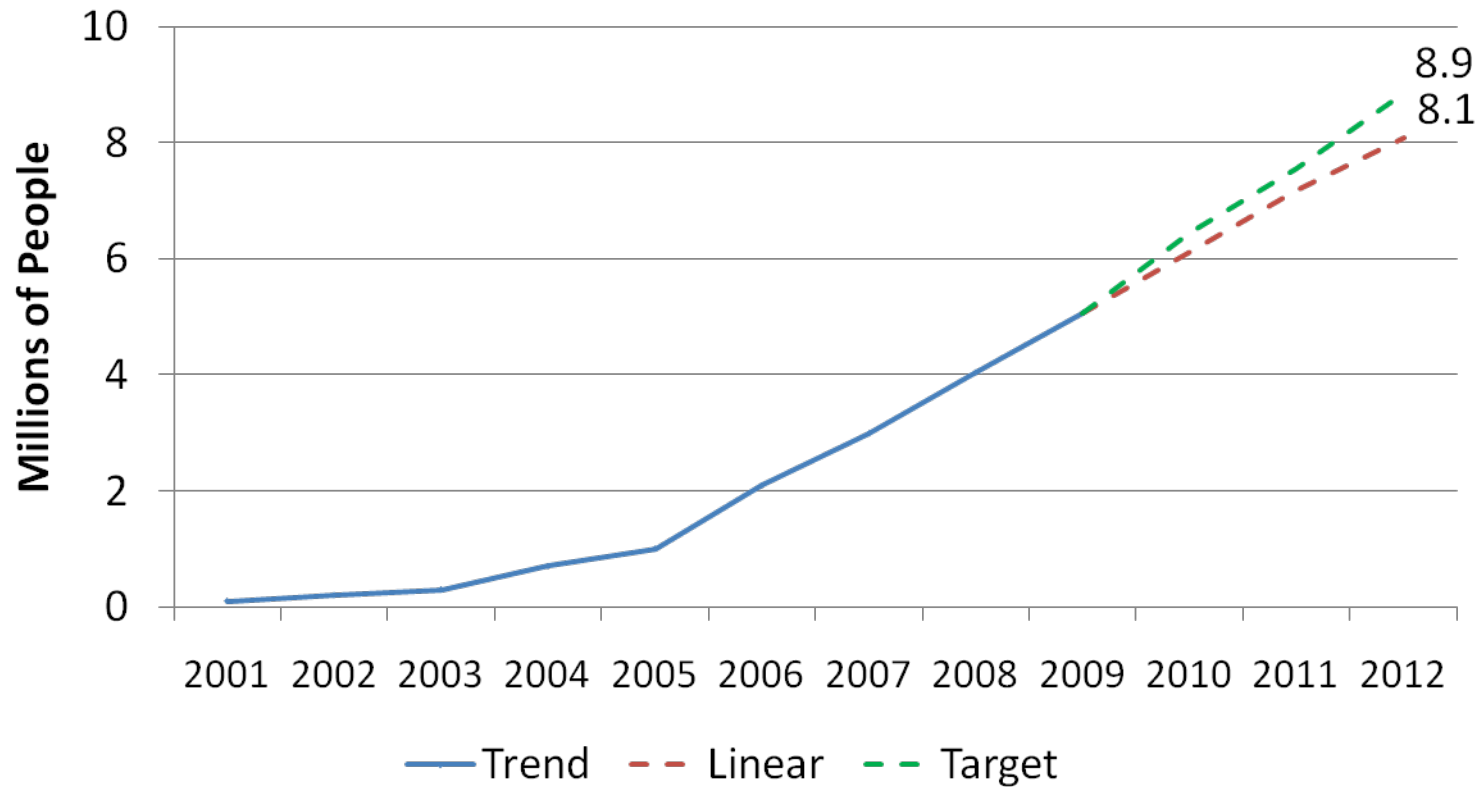
Number of People on ART



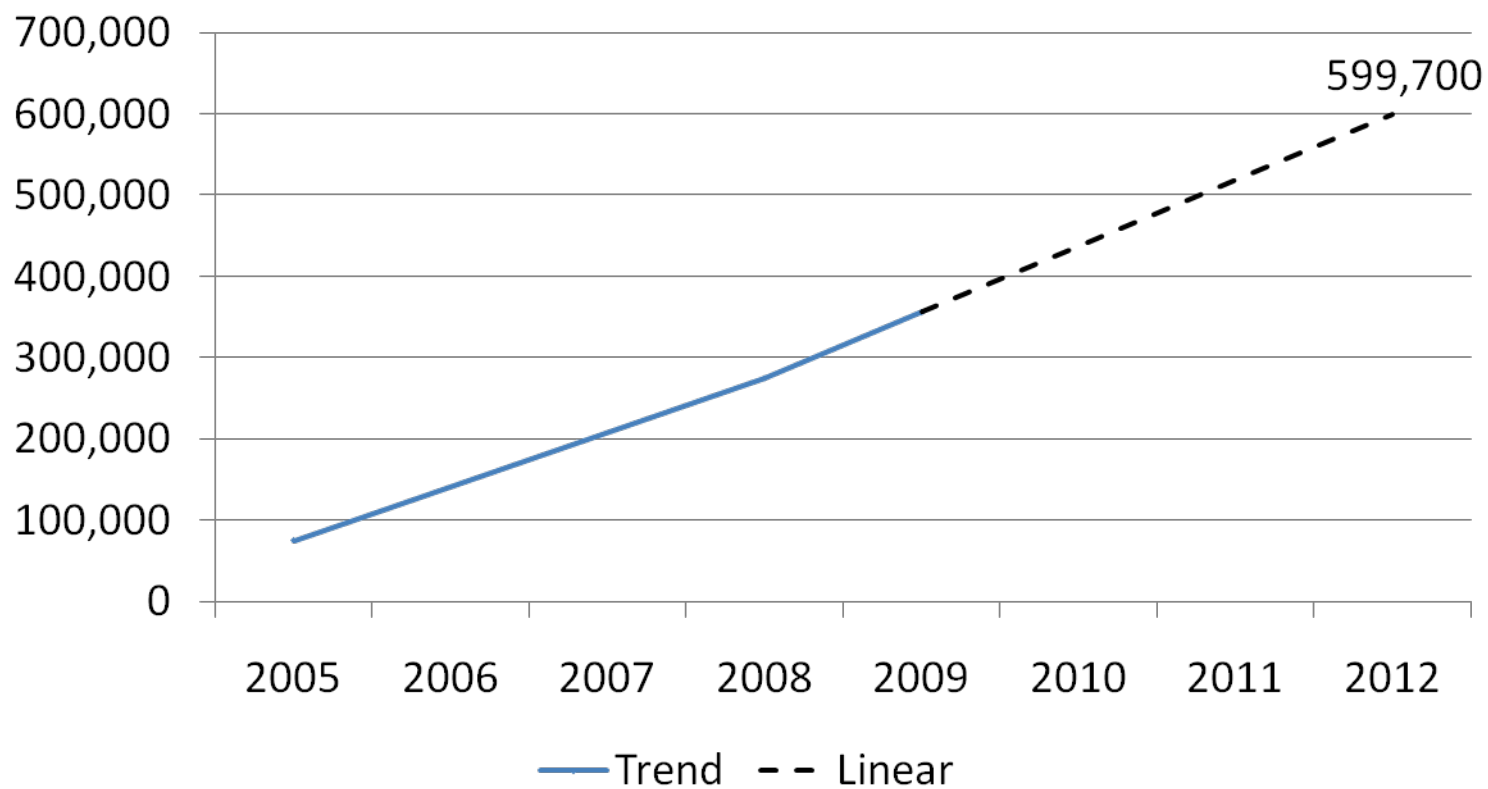
Country Targets



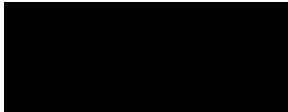
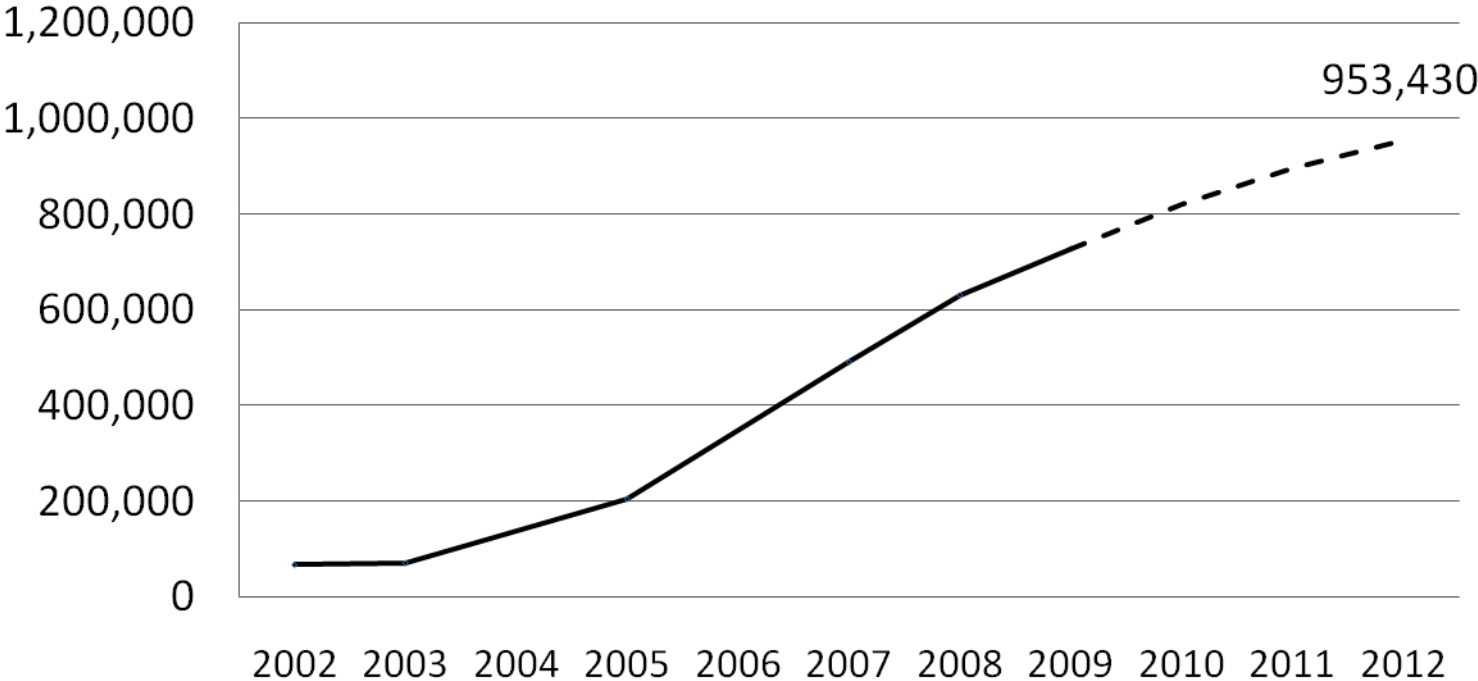
Number of People on ART



Number of Children on ART



Number of Women Receiving ARVs for PMTCT



Retention on Treatment

Region	First Year	Subsequent Years
Asia	80%	88%
Europe and Central Asia	74%	94%
Latin America and Caribbean	86%	94%
North Africa and Middle East	90%	99%
Sub-Saharan Africa	75%	92%
Global	80%	96%

Sources: Towards Universal Access, Progress Report, 2010

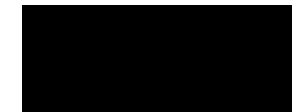
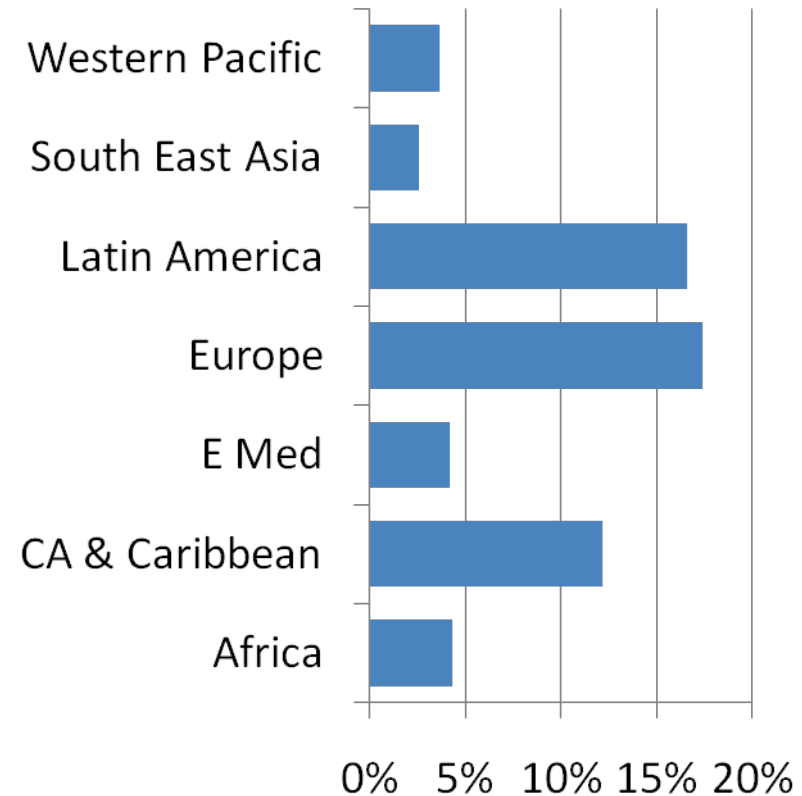
Migration from First to Second Line

Region	Annual Rate of Migration
Africa	2.6%
Latin America	2.6%
South-East Asia	1.1%
Western Pacific	1.1%
Other Regions	1.9%
Countries using routine viral load monitoring	6.0%

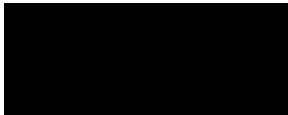
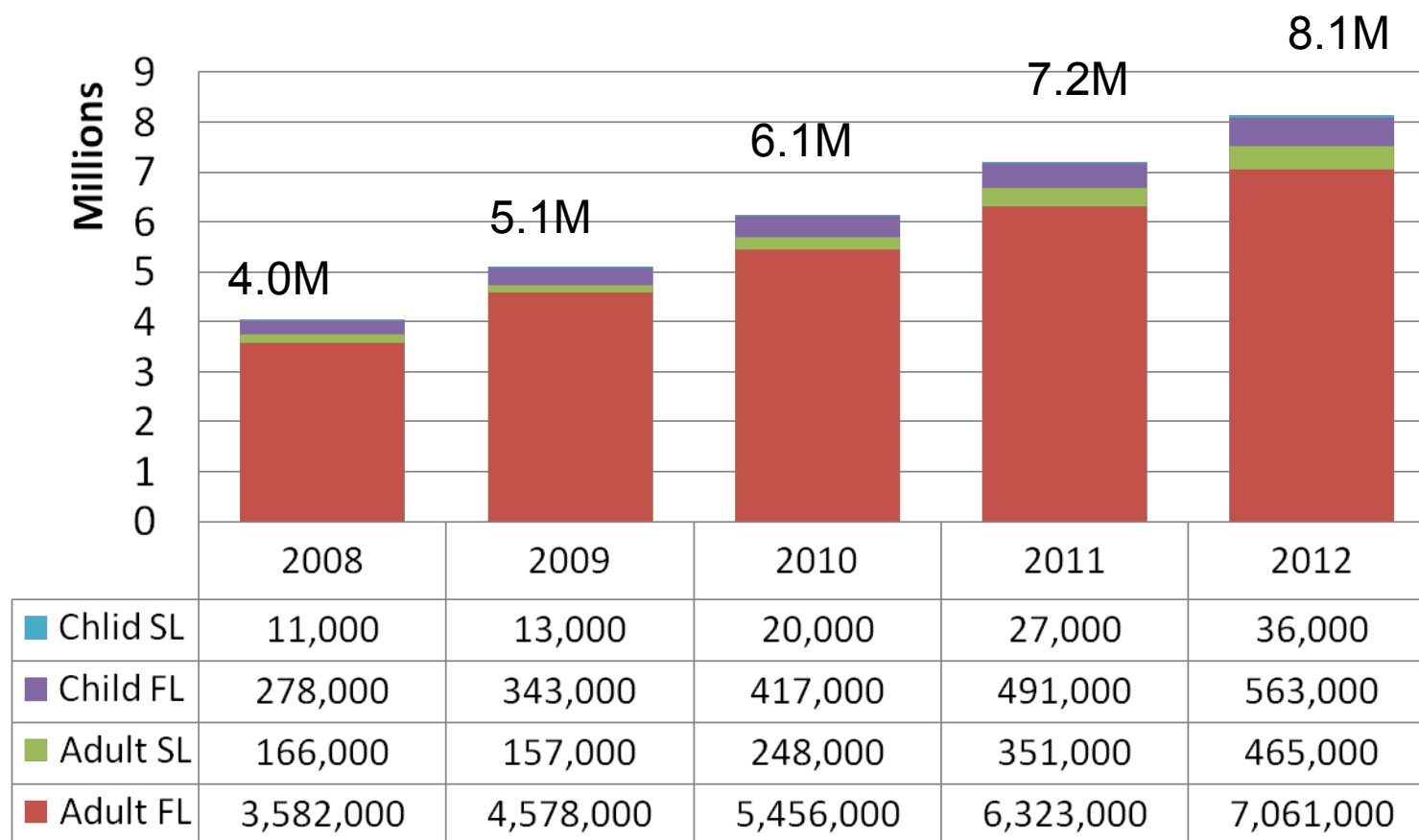
Source: Systematic review by WHO and Australian National Centre in HIV Epidemiology and Clinical Research (CROI 2010)

Proportion of Adults on Second Line in 2009

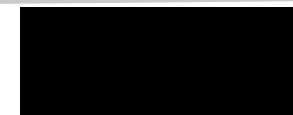
- Data from WHO Survey for 2009
- Regional averages used for all countries not in the survey



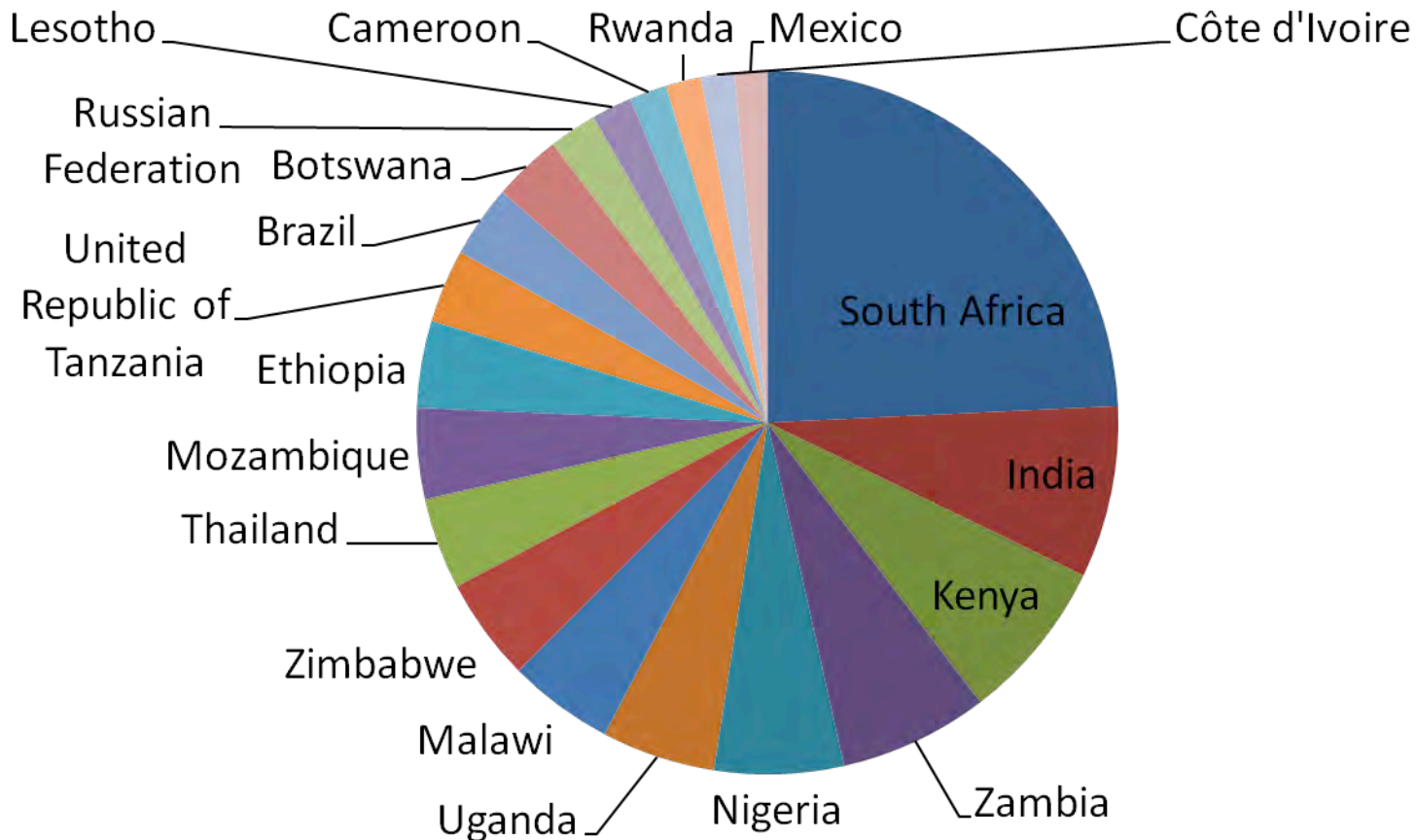
Number on ART : Linear Projection



Proportion on First and Second Line



Countries with the Largest Number on ART in 2012

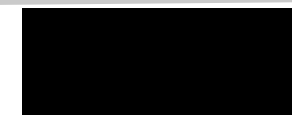


Distribution of ARV Regimens: 2009

- WHO 2009 Survey
 - 76 countries
 - 4.9 million on ART (94% of total)
- For countries not in the survey we applied the regional average distribution in the survey
- Argentina, Brazil, Mexico, Venezuela considered separately with stable 2009 regimen mix

Future ARV Regimens: Continuing Patients

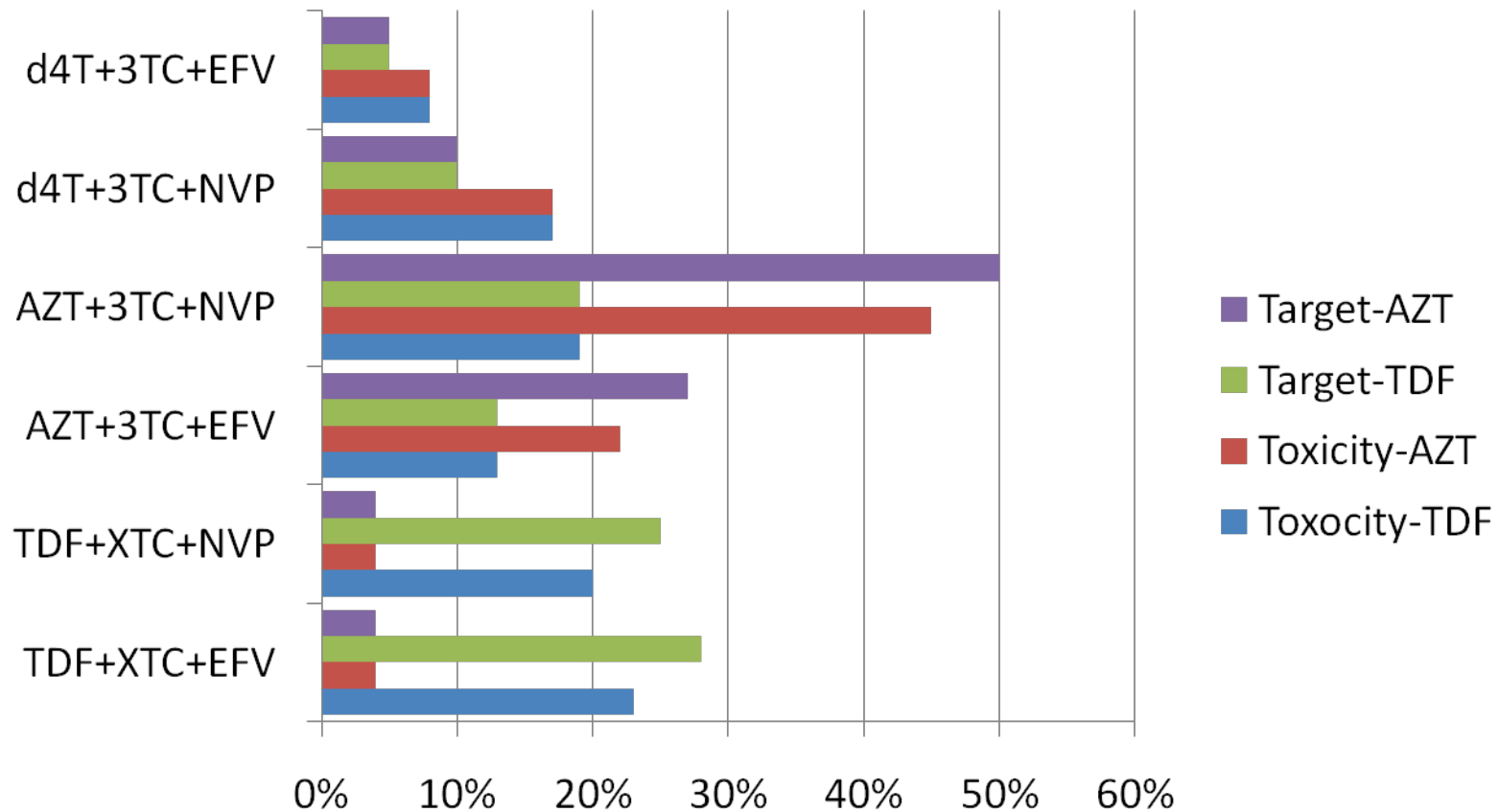
Replace d4T based on toxicity		Replace d4T by target year	
TDF-preferred	AZT-preferred	TDF-preferred	AZT-preferred
Ethiopia Kenya Lesotho South Africa	Mozambique	Botswana Cameroon Malawi Namibia Nigeria Rwanda Zambia Zimbabwe	Côte d'Ivoire India Thailand Uganda
36%	3%	23%	14%



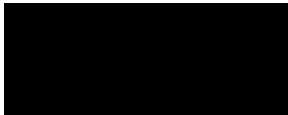
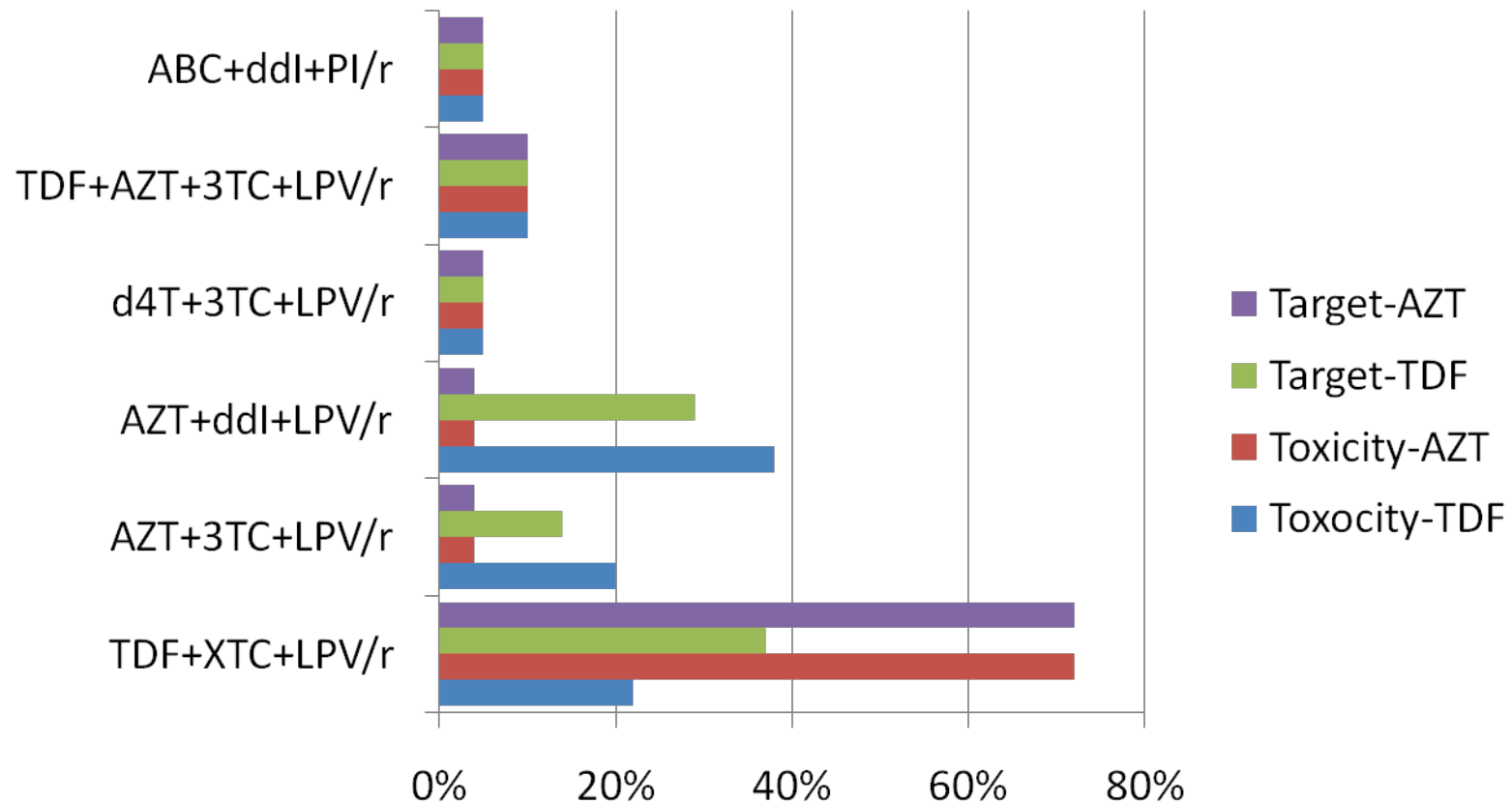
Future ARV Regimens: New Patients

TDF-preferred	AZT-preferred
Botswana	Côte d'Ivoire
Cameroon	India
Ethiopia	Mozambique
Kenya	Thailand
Lesotho	Uganda
Malawi	
Namibia	
Nigeria	
Rwanda	
South Africa	
Zambia	
Zimbabwe	
59%	16%

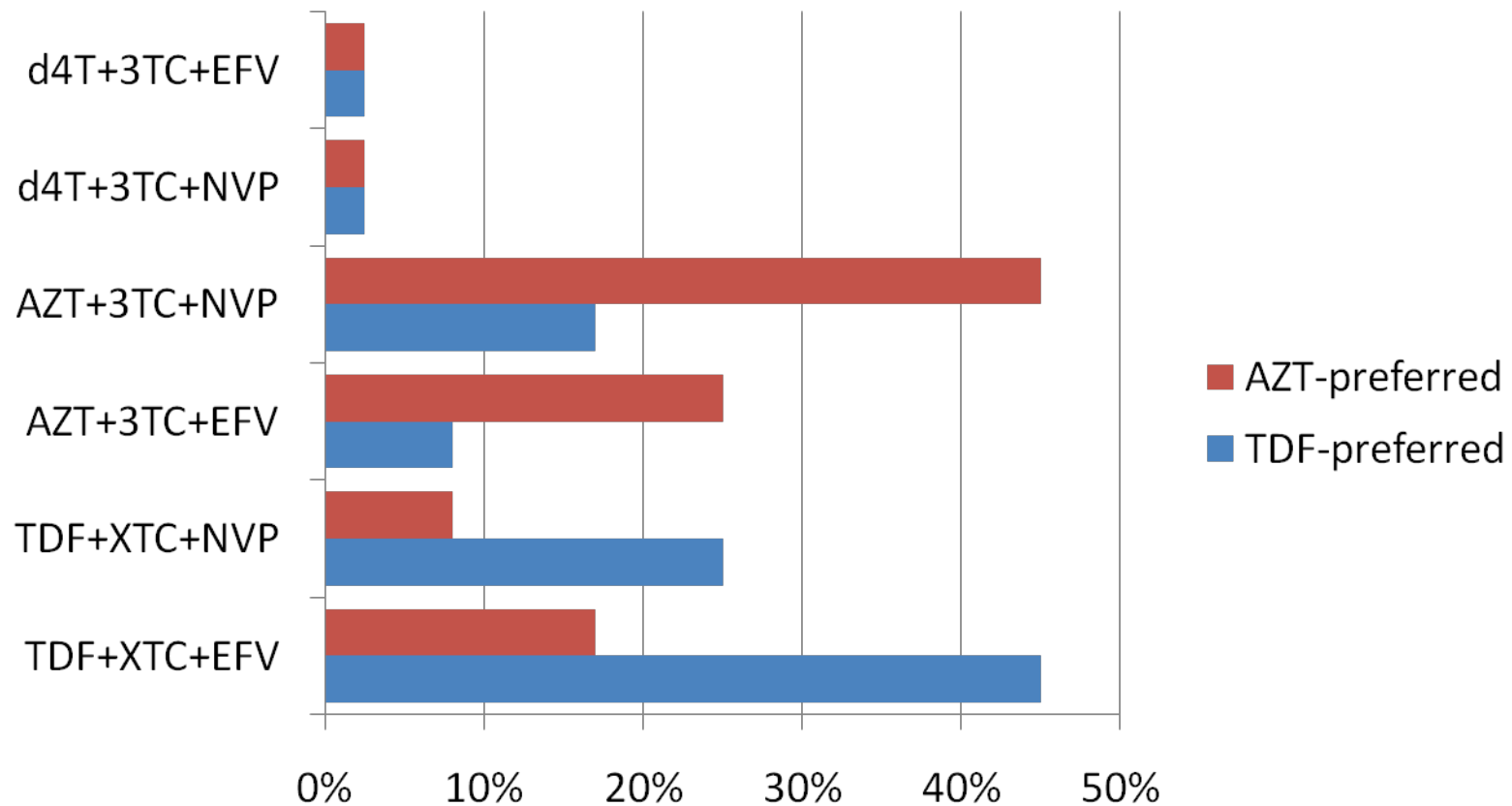
Distribution of FL Regimens for Continuing Patients: 2012



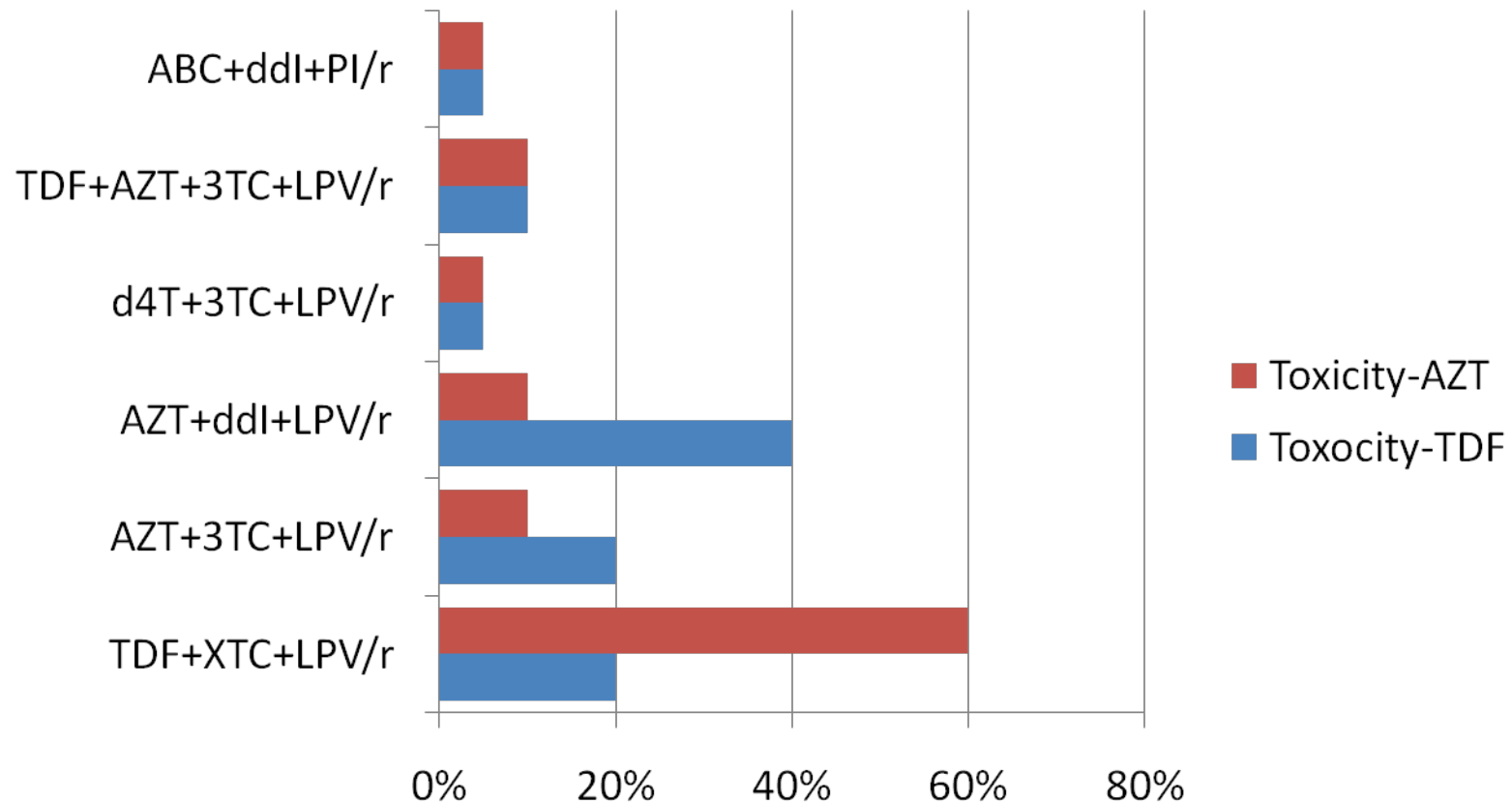
Distribution of SL Regimens for Continuing Patients: 2012



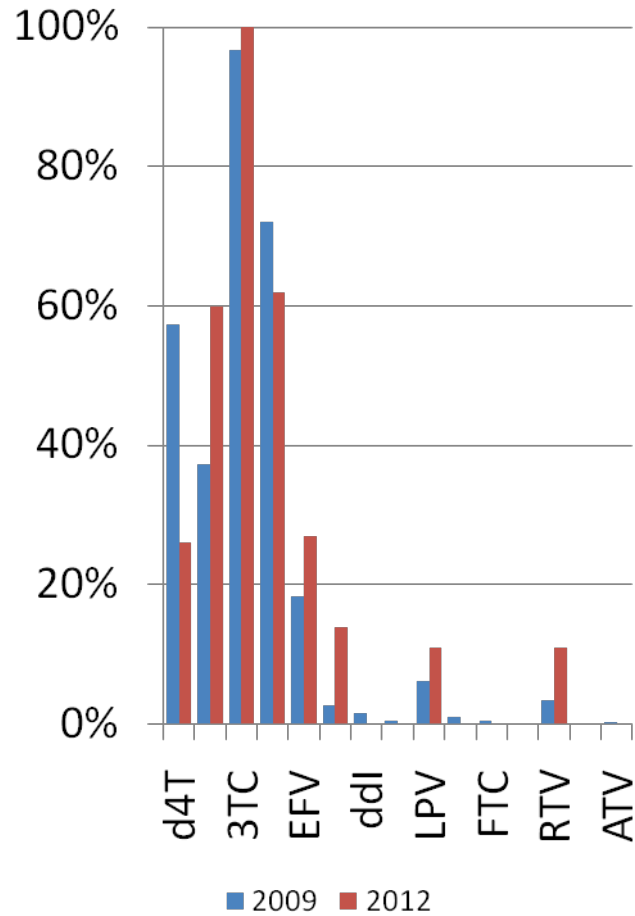
Distribution of FL Regimens for New Patients: 2012



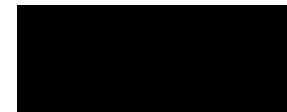
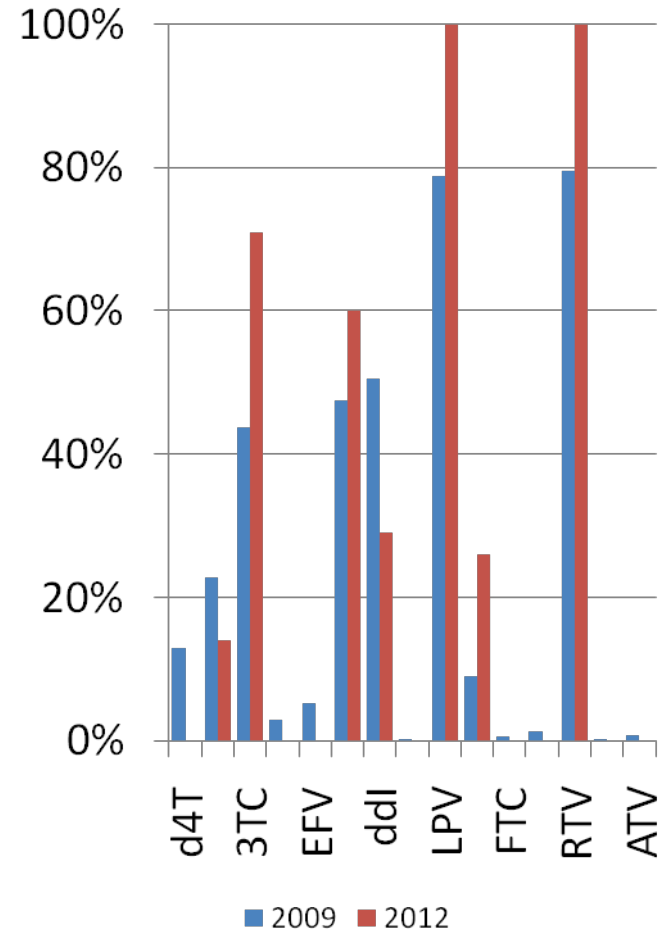
Distribution of SL Regimens for New Patients: 2012



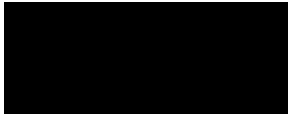
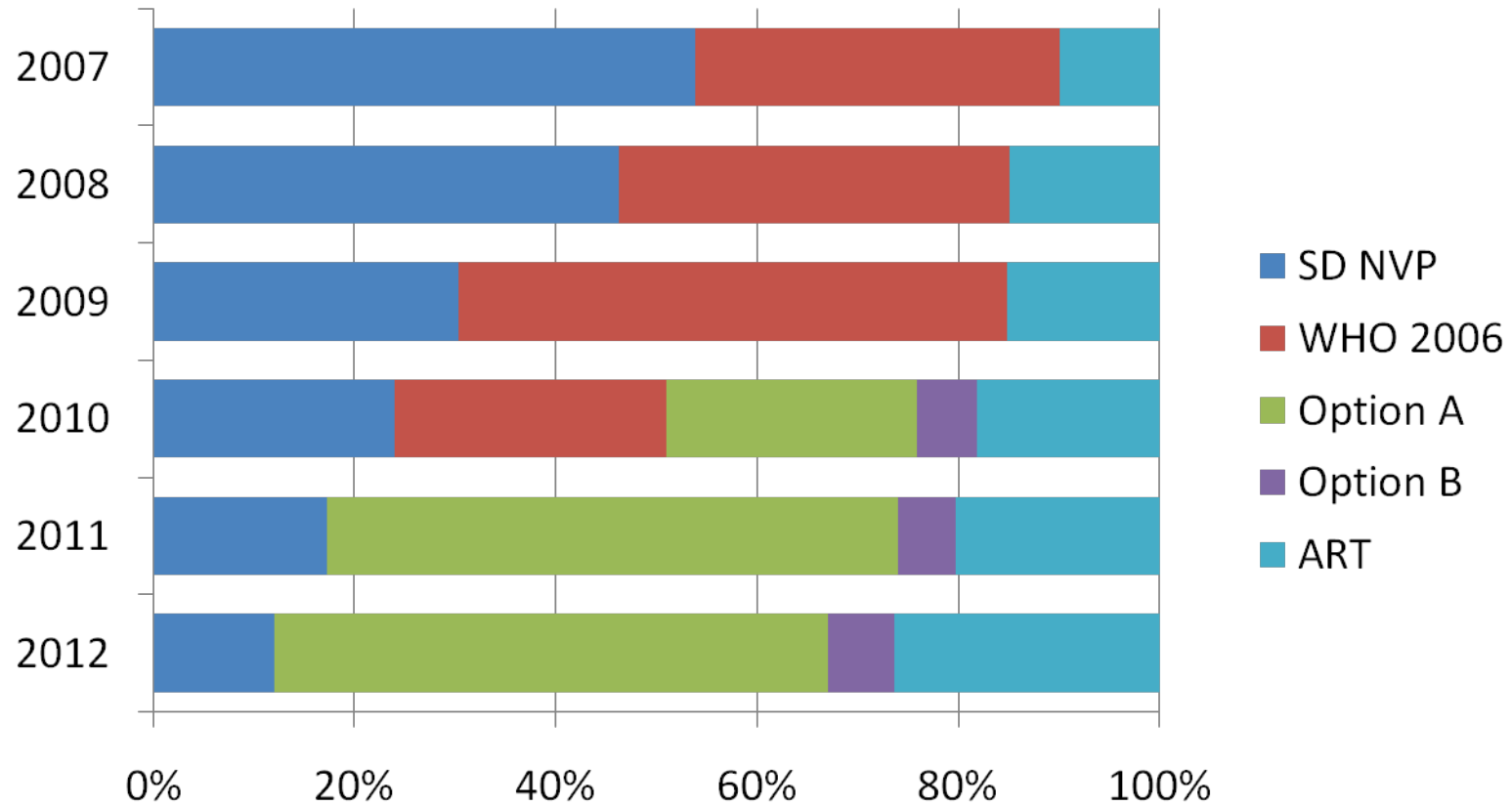
Child First Line



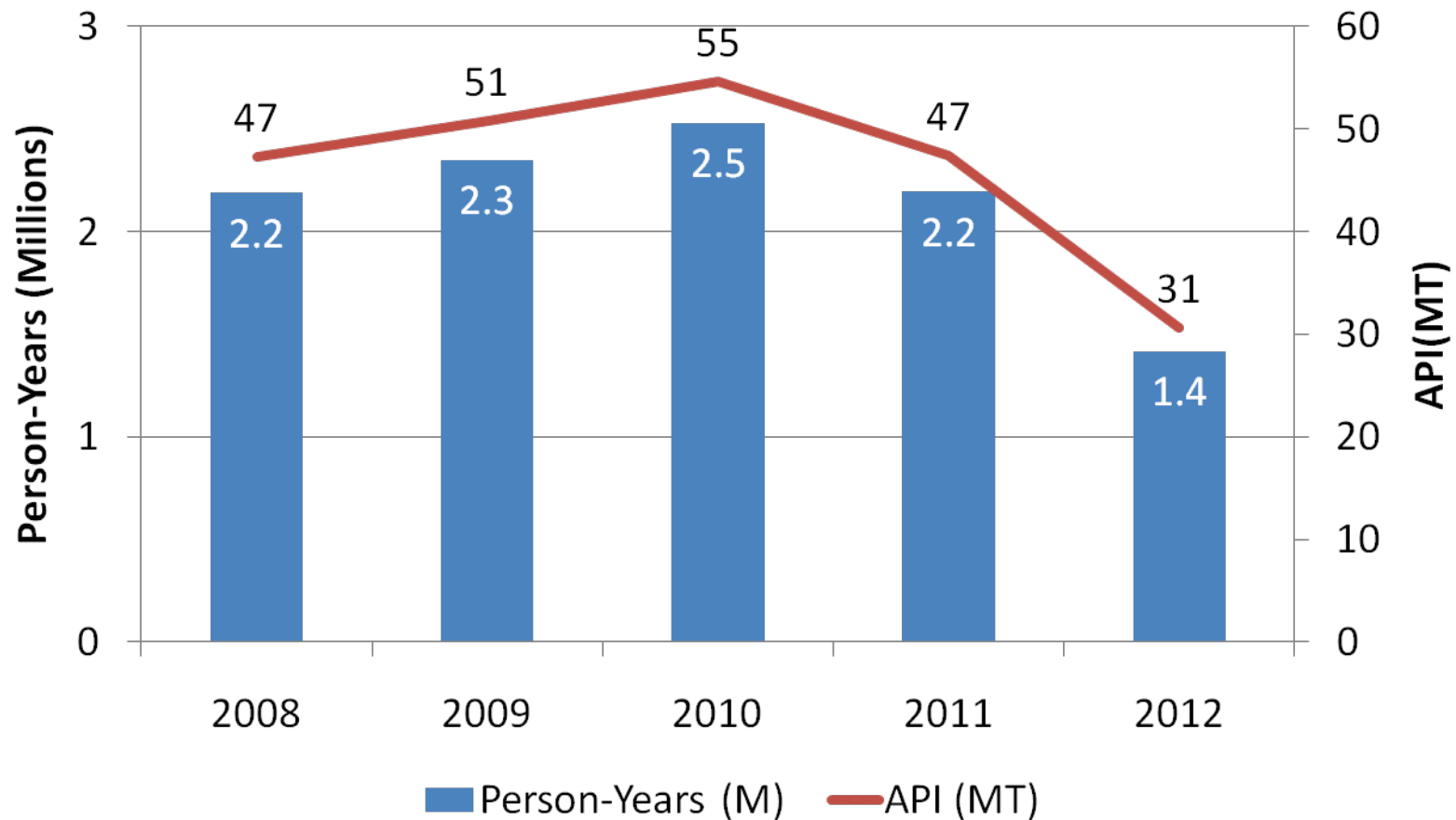
Child Second Line



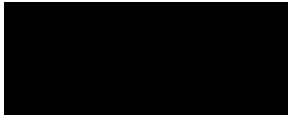
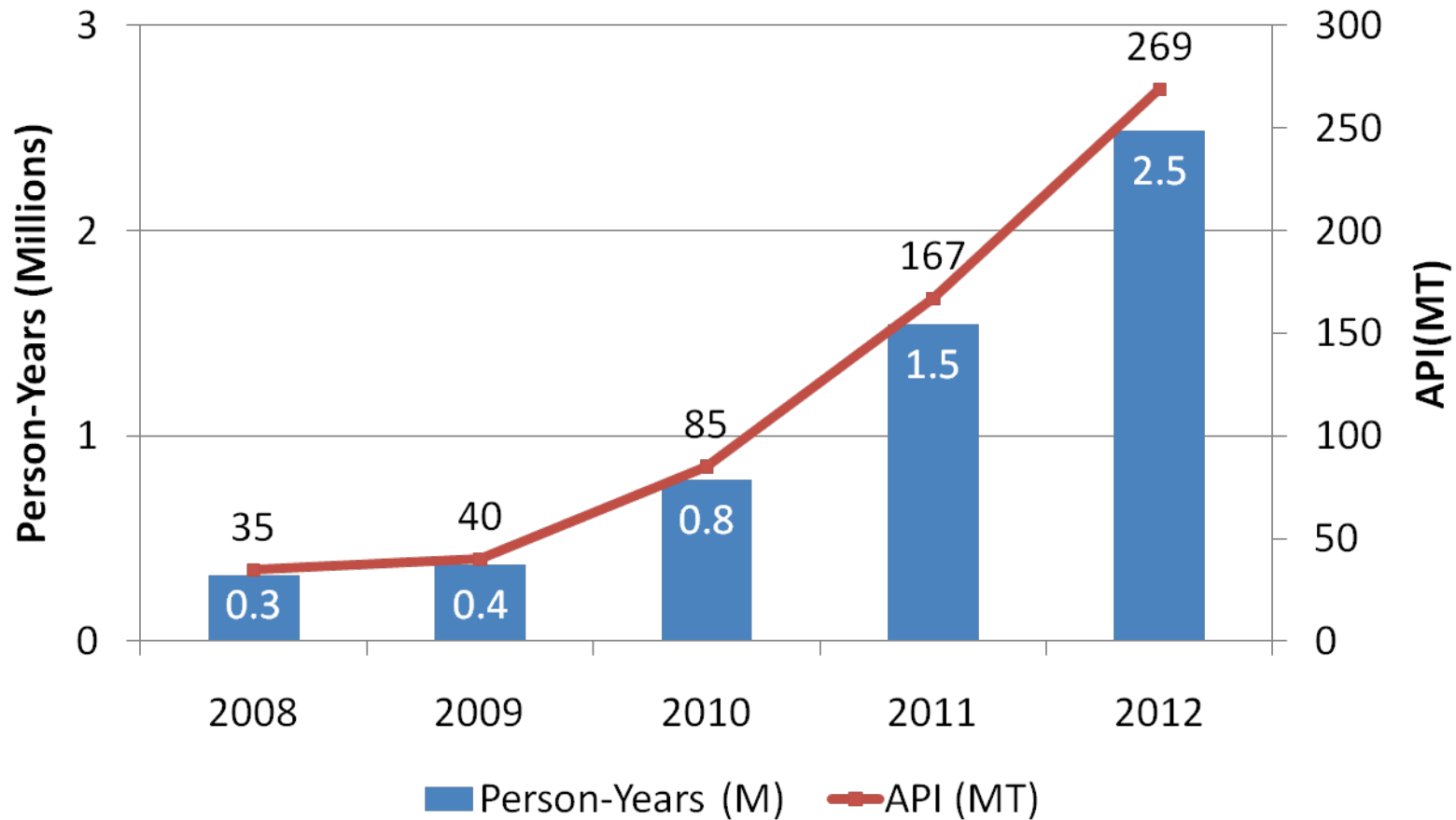
PMTCT Regimens



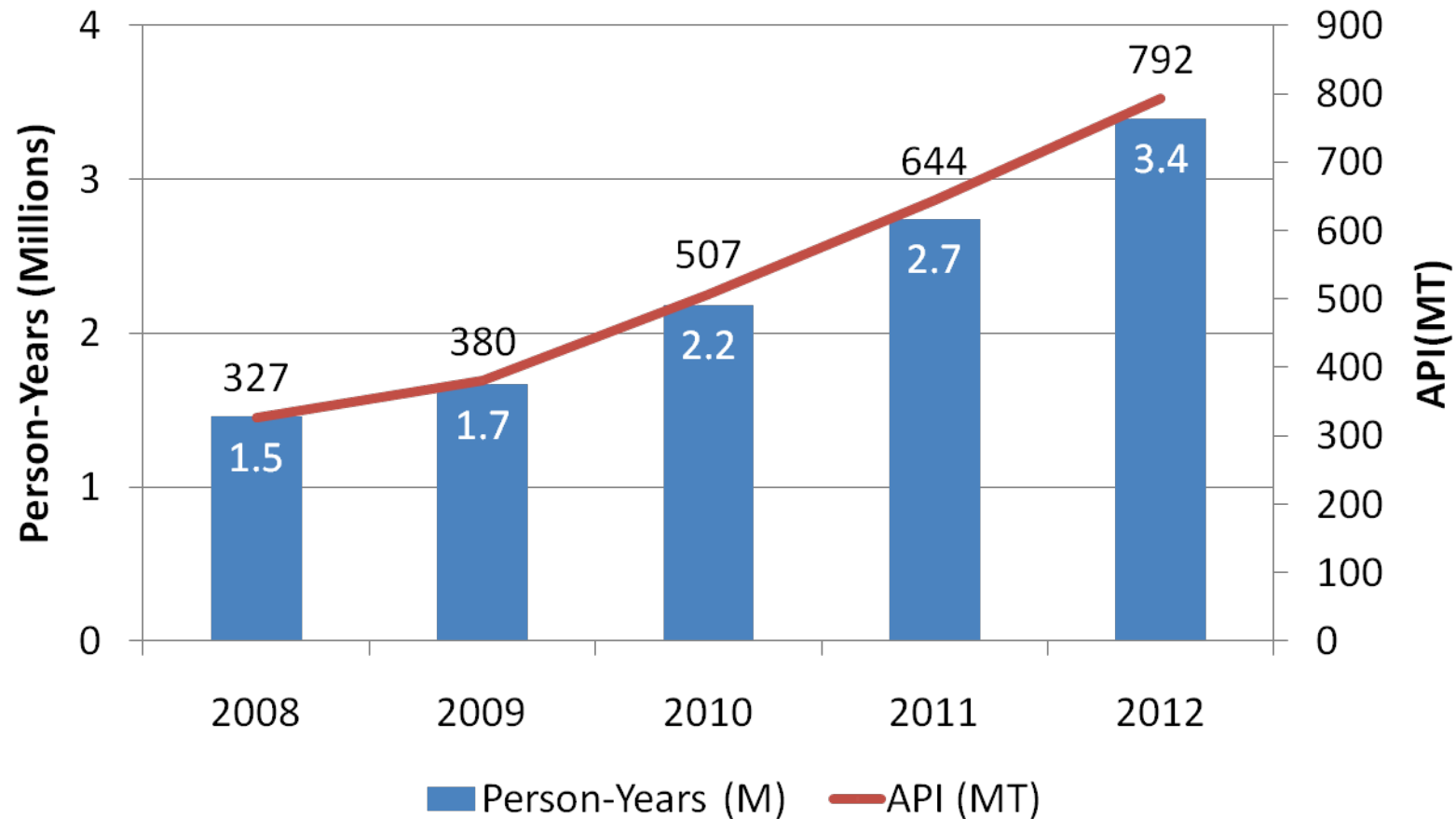
Stavudine (d4T)



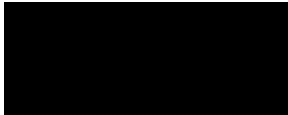
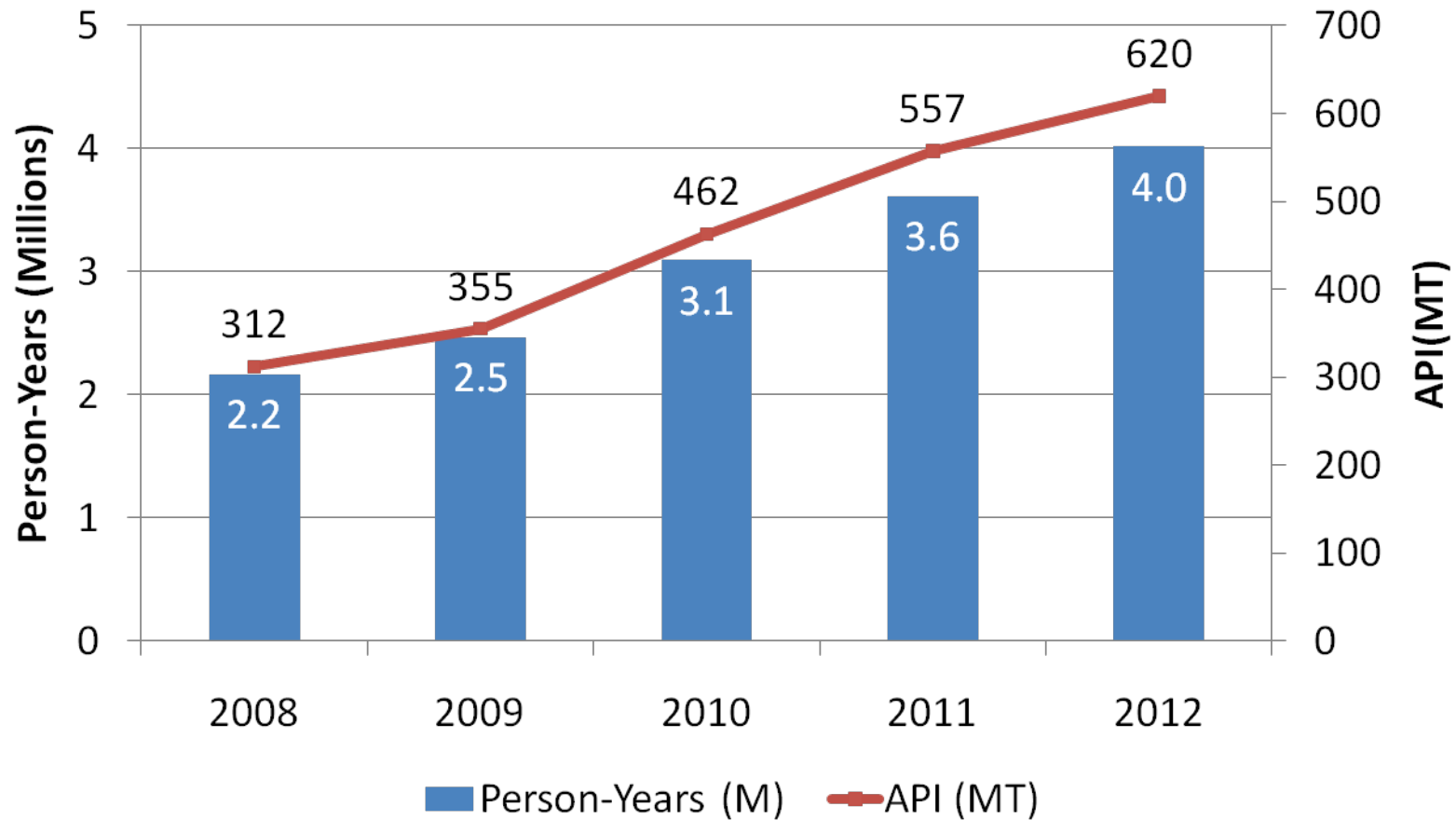
Tenofovir (TDF)



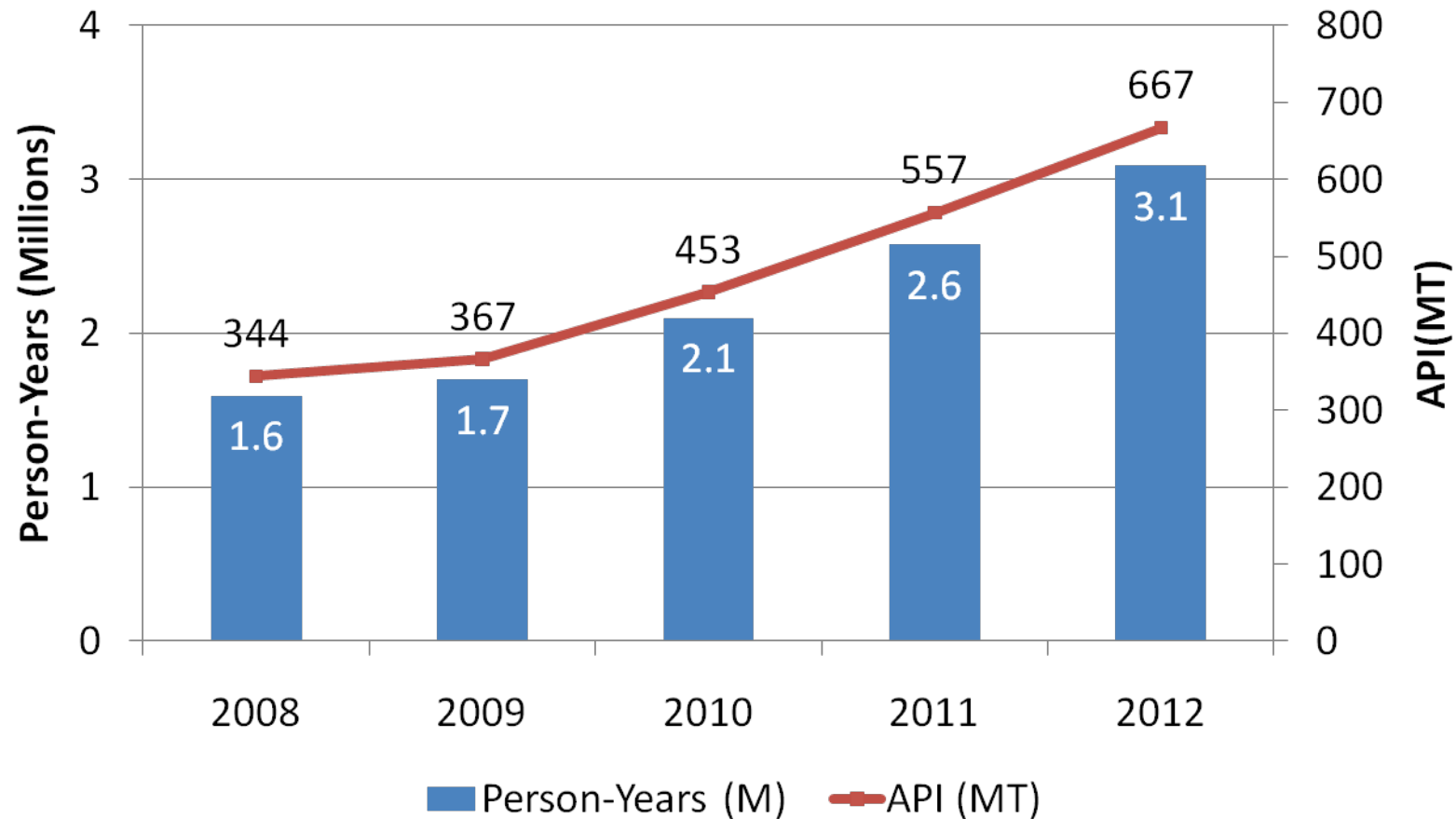
Zidovudine (AZT)



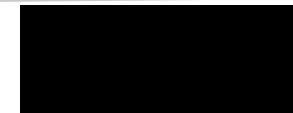
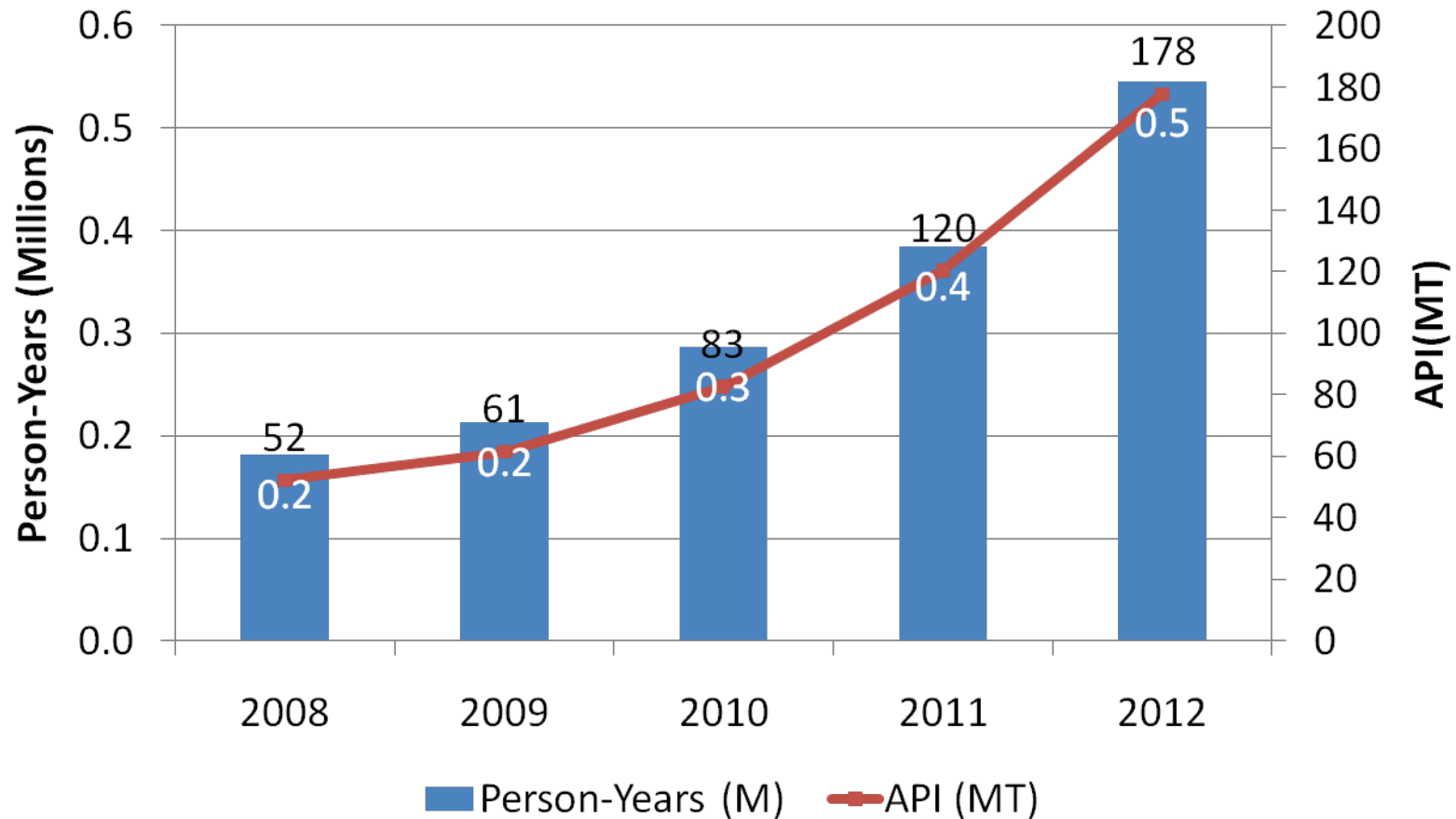
Nevirapine (NVP)



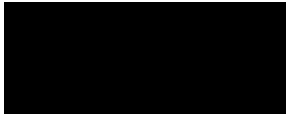
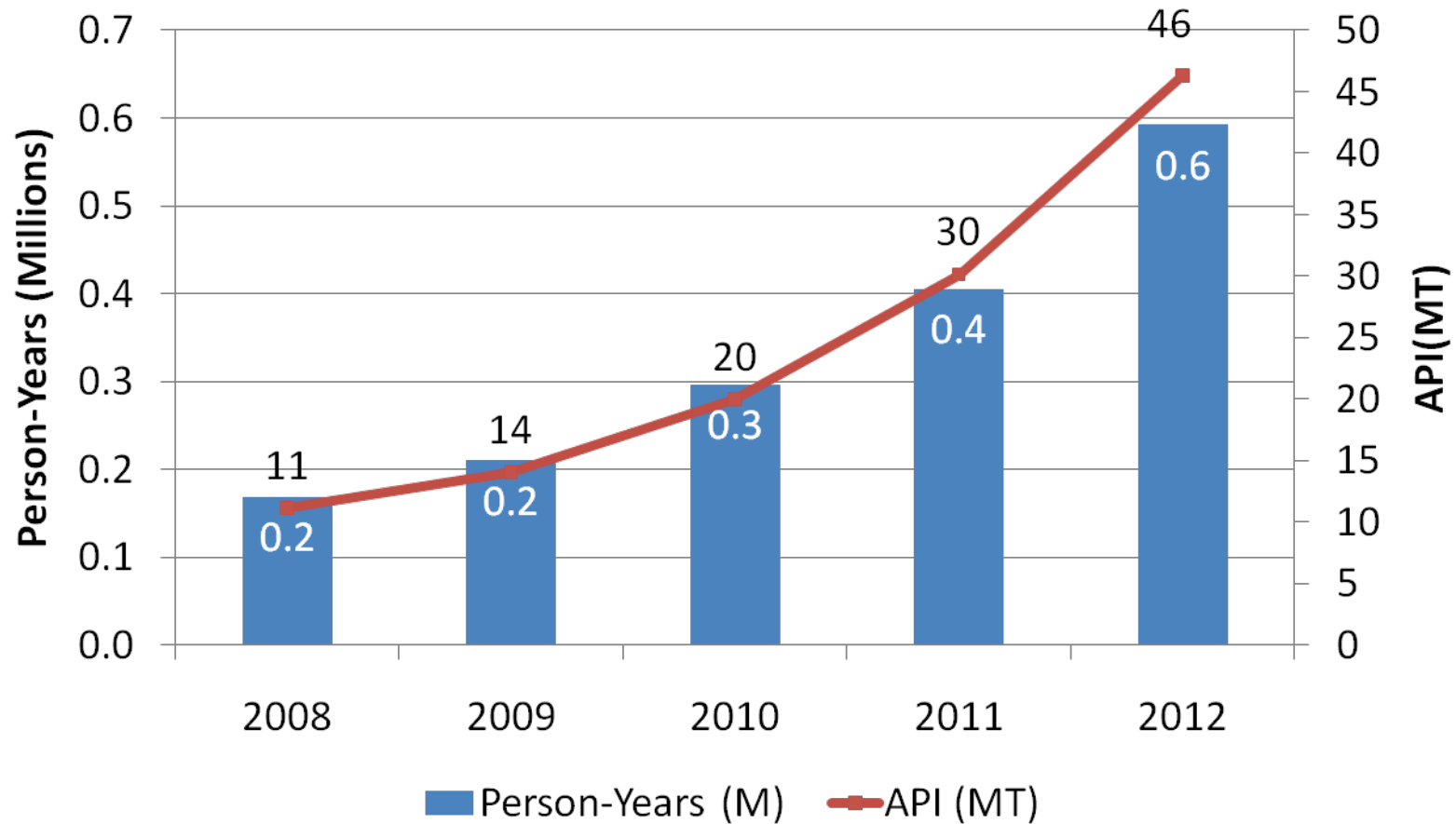
Efavirenz (EFV)



Lopinavir (LPV)



Ritonovir (RTV)



Volume of demand for APIs for antiretrovirals (person-years)

Low and middle income countries

Linear projection

<i>Drug</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>	<i>2011</i>	<i>2012</i>
d4T	2,188,450	2,349,511	2,528,738	2,192,900	1,417,637
ZDV	1,457,387	1,665,857	2,185,189	2,740,096	3,396,641
3TC	3,738,591	4,144,136	5,033,605	5,718,986	6,307,152
NVP	2,165,729	2,463,762	3,093,515	3,612,899	4,014,402
EFV	1,592,326	1,697,706	2,098,144	2,576,579	3,087,793
ABC	54,552	69,166	82,900	85,844	126,847
ddl	85,406	83,299	99,048	132,749	158,976
IDV	11,256	10,486	11,744	10,268	6,530
LPV	181,442	213,521	286,930	384,524	544,552
TDF	321,088	369,305	787,044	1,545,574	2,488,744
FTC	189,817	226,419	435,138	796,787	1,243,228
NFV	7,357	3,285	3,010	2,419	266
RTV	168,302	210,305	296,240	404,892	591,944
SQV	2,427	5,216	8,677	9,127	9,283
ATV	34,108	35,576	41,514	42,140	42,862

Volume of demand for APIs for antiretrovirals (metric tonnes)

Low and middle income countries

Linear

<i>Drug</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>	<i>2011</i>	<i>2012</i>
d4T	47.3	50.7	54.6	47.4	30.6
ZDV	327.3	380.1	507.4	644.1	792.4
3TC	404.4	448.5	547.8	625.5	690.0
NVP	312.0	354.9	462.5	557.2	619.6
EFV	343.9	366.7	453.2	556.5	667.0
ABC	11.8	14.9	17.9	18.5	27.4
ddl	9.2	9.0	10.7	14.3	17.2
IDV	6.5	6.0	6.8	5.9	3.8
LPV	52.3	61.5	82.6	120.4	177.7
TDF	34.7	39.9	85.0	166.9	268.8
FTC	13.7	16.3	31.3	57.4	89.5
NFV	6.6	3.0	2.7	2.2	0.2
RTV	11.2	14.1	20.0	30.1	46.3
SQV	1.7	3.8	6.2	6.6	6.7
ATV	3.7	3.8	4.5	4.6	4.6