The CHAI Simple Tool for ARV Forecasting

Training Slides Last Updated: December 2021



Forecasting can either be consumption or morbidity based, and the CHAI Simple Tool is a *morbidity based tool* which reflects the evolving nature of HIV treatment

	Consumption	Morbidity
Approach	Uses historical consumption data to predict future needs	Estimation of ARV needs based on the prevalence of a disease or patient populations
Starting Point	Quantities of products historically consumed	Number of patients (baseline and throughout forecast period)
Requirements	Robust data on the quantities of drugs actually dispensed to patients at the service delivery point; high data reporting rate	Robust data on patient numbers and ART regimens ; understanding of how trends will change
Dangers	If there were stock-outs, historical consumption data will not reflect true demand; difficult to account for changing trends	Treatment protocols or scale-up targets may not accurately reflect trends on the ground

PREFERRED BECAUSE MORE REFLECTIVE OF THE EVOLVING NATURE OF THE HIV DISEASE AND TREATMENT

CHAI Simple Tool Overview

CHAI Simple Tool for ARV Forecasting

- Morbidity-based forecasting tool that allows for quantification of ARV needs for a period of 3 years
- Uses Microsoft Excel with separate files for adult and pediatric ARV forecasts (available in English and French)
 - 11 tabs per file, calculating # patients per regimen per month, ARV
 order needs, cost of 3-year forecast, and partner allocation for ARVs
- Each file contains spreadsheets for user input (orange colored cells) and automatically generated outputs or results (white colored cells)
- No special configuration or additional setup is required to use the tool on personal computers



CHAI Simple Tool Tabs

CHAI Simple Tool Tab Order



Tab 1: General Inputs

General Inputs Protocols ARV Sub.

1. General Inputs			
Quantification start (MM/YYYY)	Jan-19	Dec-21	
Number of patients currently on ART (Y0)	1L 10,000	2L 500	3L 10
Annual inclusions (new patients only!)	Year 1 2,000	Year 2 3,000	Year 3 4,000
Annual 1L -> 2L migration (%)	Year 1 5.0%	Year 2 5.0%	Year 3 5.0%
Annual 2L -> 3L migration (%)	Year 1 1.0%	Year 2 1.0%	Year 3 1.0%
Annual attrition rate (%)	1L 3.0%	2L 3.0%	3L 3.0%
NVP lead-in dosing?	Yes	(see '7. Consu	mption' tab - row 58 - jo
Percentage of a bottle required for each induction (%)	50%		
Required months of security stock	6		
Projected Annual Patient Totals Year 1 - total Year 2 - total Year 3 - total 12,510 15,510 19,510 before applying attrition 12,145 14,741 18,245 after applying attrition attrition Note: above table updates after '2. Protocols' tab is filled out	and migration rates nd migration rates		

Tab 1 Purpose

This tab is where the user enters baseline information, such as number of patients, new annual inclusions, migration rates, etc. It is how the tool calculates the number of patients on each line each month.

Tab 1 Data Requirements

- Baseline number of patients per line
- New patients per year
- Migration rates per year (1L to 2L, 2L to 3L)
- Attrition rates (for 1L, 2L, and 3L)
- NVP induction inclusion
- Buffer stock requirements

Enter relevant information here

Tab 2: Protocols

Pediatric toolspecific instructions on next slide



ol Brea	kdown						
	Reg	imens					Bre
				Step 1. Existing Patients	Step 2. Pr (% of	ojected Nev Total Inclus	v Patient ions)
	1st	Line		Y0 (Baseline) Y0%	Y1	Y2	Y3
TDF	+ ;	STC +	EFV600	8,000 80%	15.0%	5.0%	0.0%
TDF	+ 5	STC +	DTG	0 0%	80.0%	90.0%	95.0%
-	+ 3	STC +	NVP	400 4%			
AZT	+ 8	STC +	NVP	1,500 15%	5.0%	5.0%	5.0%
AZT	+ 3	STC +	EFV600	100 1%			
	+	+		0%			
	+	+		0%			
	+	+		0%			
	+	+		0%			
	+	+		0%			
	-	Ļ			F. 1		- (
	En	iter		Enter baseline	Ent	er %	OT .
	rogime						U .
	regime	ens ner	e	patient	new	patie	ents
	regime	ens ner	e	patient numbers here	new or regin	patie n eac nen l	ents h here
	regime	ens ner	e	patient numbers here	new or regin for e	patie n eac nen l ach y	ents h nero /ea
	regime	ens ner	e	patient numbers here	new or regin for e (ea	patie neac nen h ach y ch ye	ents h nero /ea
	regime	ens ner	e	patient numbers here	new or regin for e (ea shou	patien nen h ach ye ch ye Id ad	ent h ner yea ear ld t

Tab 2 Purpose

This tab allows the user to select all regimens currently in use (and those that will be used in the future), and allocate new patients to each regimen.

Tab 2 Data Requirements

- All regimens currently in use and regimens to be used in the future
- Number of baseline ("Year 0") patients on each regimen
- Percent of new patients that will be put on each regimen in future years (e.g., 80% of new patients on TLD in year 1, but 90% of new patients on TLD in year 2)

Tab 2: Protocols: Pediatric-specific tab inputs

General Inputs Protocols ARV Sub.

Pediatric tool only!



Enter number of pediatric

In addition to the regimen-level information discussed on the previous slide, the pediatric forecasting tool has an additional input section in the *2. Protocols* tab.

The user must fill in the **number of pediatric patients per weightband**.

If you do not have weightband data, you can put in age data organized by age group. The tool will then estimate the weight breakdown using standard tables

Pediatric Tab 2 Data Requirements

• Number (or estimated number) of pediatric patients per weightband or by age

3. Non-failure substitutions - OPTIONAL FEATURE									
Regimen Substitution Table									
(note: for regin	nen % swi	itch of 1	00%> enter 99.	999%)					
Indicate		Regime	n Switch	Mo	<u>nth</u>	% Switch	% Switch		
1L / 2L / 3L	Fro	m	То	Start	End	over Period	/ Month		
1st Line	AZT+3TC+NVP		ABC+3TC+EFV	1	12	80%	12.6%		
							-		

Select relevant lines and regimens from the previous tab Enter start and stop month and total percent of patients switched over the course of the switch period. If 100% of patients are to switch, enter "99.999%"

Note: The same "from" regimen cannot be used to switch to multiple "to" regimens (e.g., 50% of pediatric ZLN patients to ABC/3TC/LPV/r and 50% to ABC/3TC + DTG). If you require this type of switching please reach out to the market intelligence team Tab 3 Purpose

This tab allows the user to model proactive switching from one regimen to another (e.g., switching patients from AZT+3TC+NVP to TDF+3TC+DTG as part of national DTG rollout).

Protocols

ARV Sub.

> Formulat

This tab is particularly useful as products are introduced or phased out of national programs.

Tab 3 Data Requirements

- Users must select relevant regimens entered on the previous *Protocols* tab
- Users must enter the month when proactive switching will start and stop
- Users must also enter the percent of patients who will be switched over the course of the transition (as defined by the start and stop months above)

Tab 4: Formulations



Regimens are automatically pulled from the 2. Protocols tab Enter the formulation breakdown for each regimen each year

S+S+S	Three single tablets
D+S	A dual FDC and a single table
Т	Triple FDC

Tab 4 Purpose

This tab allows the user to specify whether regimens are made up of three singles, a single and a dual fixed dose combination (FDC) or a triple FDC.

ARV. Sub Formulat.

Dosing

The tab allows the user to change the formulation breakdown each year, for cases when regimen formulations may change over time (e.g., moving to a triple FDC from duals and singles currently used).

Tab 4 Data Requirements

- The user must enter what percent of each regimen dispensed is accounted for by singles, duals, and triples
- For example, TDF+3TC+EFV may be 100% triple FDC for the forecast period, but ABC+3TC+LPV/r is 100% duals plus a single for the forecast period (as shown in the picture to the left)

Tab 5: Dosing



Formulat. Dosing Patients

5. Formulation Dosing

Please specify which formulation is being used (by % split of molecule) for 3TC, DRV, and ETV (sum of % in orange cells for Please specify the pack size for DRV (300 mg), DRV/r (400/50 mg), RTV (100 mg), and TDF+3TC+EFV600 Please specify the units/day for DRV/r

Product List

ARV	Strength	Form	Units/Pack	Units/Day	% of Molecule
		Singles			
3TC	150	tab	60	2	80%
3TC	300	tab	30	1	20%
ABC	300	tab	60	2	100%
ATV/r	300/100	tab	30	1	100%
AZT	300	tab	60	2	100%
DRV	300	tab	240	4	
DRV	400	tab	60	2	
DRV	600	tab	60	2	70%
DRV	800	tab	60	1	30%
DRV/r	400/50	tab	60	2	100%
DTG	50	tab	30	1	100%
EFV600	600	tab	30	1	100%
FTC	200	tab	30	1	100%
ETV	100	tab	120	4	100%
ETV	200	tab	60	2	
LPV/r	200/50	tab	120	4	100%
NVP	200	tab	60	2	100%
RAL	400	tab	60	2	100%
RTV	100	tab	60	1	100%
TDF	300	tab	30	1	100%

↓ Enter pack size here

Enter daily dose here

Tab 5 Purpose

This tab allows the user to account for non-standard pack sizes, variable daily dosing, and the formulation breakdown of each API.

Tab 5 Data Requirements

- Pack sizes of products with multiple pack sizes (e.g., TLD in 30 or 90 packs)
- Daily dose of products with variable dosing (e.g., DRV (400 when used in second- vs. third-line
- What percent of each API/molecule is made up of differing formulations (e.g., 80% of adult 3TC used is the 150 mg formulation, while the remaining 20% is the 300 mg formulation as shown in the purple circle)

Enter API formulation breakdown here (must add to 100%)

Tab 5: Dosing: Pediatric-specific dosing tab inputs



5. Form and Dose

1) Please enter the percentage breakdown of patients by weightband for each formulation. FDCs can be found at bottom of table. The sum of percentages in each column/weightband should add u 2) Please input the correct Units/Pack (column I) for the formulations your country consumes, as some formulations have multiple pack sizes.

3) All dosing based on 2016 WHO Guidelines except for AZT 100mg capsules (based on 2010 WHO Guidelines), and RTV singles (based on Kenya's 2016 National HIV Treatment Guidelines) Product List Breakdown of patients by weightband 2018 WHO ARV Description Units/Pack 0 - 5.9 kg 6 - 9.9 kg 10 - 13.9 kg 14 - 19.9 kg 20 - 24.9 kg 25 - 34.9 kg Strength Form Formulary Statu **Single Drug Formulations** 3TC dose in ml 100 100% 100% 100% 0 susp imited Use 3TC 300 tab 30 Adult 100% 240 ABC 0 dose in ml susp Non-Essential ABC 300 tab 60 Adult ABC 60 tab 60 Limited Use dispersible ATV 100 caps 60 Non-Essential ATV 200 60 Limited Use caps ATV 300 caps 30 Adult ATV/r 300/100 tab 30 Adult AZT 0 dose in ml susp 100 Optimal 100% 50% 100% AZT 100 100 Non-Essential 50% 100% 100% 50% caps AZT 300 tab 60 50% AZT 60 tab 60 Non-Essential dispersible DRV 0 dose in ml susp 200 Non-Essential DRV 150 tab 240 Non-Essential DRV 75 tab 480 Limited Use 50 30 DTG tab Adult 100% EFV 200 90 Non-Essential caps 200 30 EFV tab Non-Essential 200 tab 90 EFV scored Limited Use 100% 100% 100% EFV 50 30 Non-Essential caps EFV 50 tab 30 Non-Essential EFV 600 tab 30 100% Adult ETV 100 tab 120 FTC 200 30 caps Enter pack Enter weightband distribution size here by API and formulation

Formulat. Dosing Patients

This tab allows the user to specify what APIs and formulations each weightband is using.

For example, if 50% of 6-9.9kg patients on AZT are using the oral solution, and 50% are using 100 mg capsules, indicate that as shown in the purple circle.

Pediatric Tab 5 Data Requirements

- Pack size information
- Weightband distribution by API and formulation

NOTE: Total percentages for each ARV used in each weightband must add up to 100% across formulations

Tab 6: Patients



Tab 6 Purpose

This tab shows the number of patients on each regimen (first-, second-, and third-line) each month during the forecast period.

This tab allows the user to see if previous information was entered correctly (e.g., all expected regimens are appearing with patients, general trends are accurate, annual patient volumes match the input tab)

Tab 6 Data Requirements

• None. This tab does not require the user to enter any data. It is simply a reference tab.

Patients

Dosing

>Consumpt.

Tab 7: Consumption

7. Consumption Forecast **Monthly Consumption of Formulations** Packs consumed Q1 Formulation API % of API Btls/mth Jan-19 Feb-19 Mar-19 3TC (150) - 60 tab 3TC 1.0 86 85 80% 3TC 1.0 22 22 3TC (300) - 30 tab 20% 1.0 ABC (300) - 60 tab ABC 100% 6 6 1.0 ATV/r (300/100) - 30 tab ATV/r 100% 376 417 457 AZT (300) - 60 tab AZT 100% 1.0 102 101 100 AZT+3TC 1.0 421 461 AZT+3TC (300/150) - 60 tab 100% 381 AZT+3TC+ABC (300/150/300) - 60 tab ZT+3TC+ATV/r ((300/150)+(300/100)) - 30 co-pack 1.0 1,525 1,523 1,521 AZT+3TC+NVP (300/150/200) - 60 tab AZT+3TC+NVP 100% RV (300) - 240 tab RV (400) - 60 tab DRV 1.0 DRV (600) - 60 tab 70% DRV 0.5 DRV (800) - 60 tab 30% 1.0 1.0 21 DTG (50) - 30 tab DTG 100% 21 1.0 102 100 EFV600 (600) - 30 tab EFV600 100% 101 1.0 ETV (100) - 120 tab ETV 100% 6 TV (200) - 60 tab LPV/r (200/50) - 120 tab LPV/r 100% 1.0 154 155 157 1.0 NVP 406 403 400 NVP (200) - 60 tab 100% RAL 1.0 RAL (400) - 60 tab 100% 6 6 0.5 RTV (100) - 60 tab RTV 100% 3 3 1.0 TDF (300) - 30 tab TDF 100% 6 6 1.0 559 558 557 TDF+3TC (300/300) - 30 tab TDF+3TC 100% 0.5 TDF+3TC+DTG (300/300/50) - 30 tab TDF+3TC+DTG 100% 1.0 475 1,379 2,197

Tab 7 Purpose

85

22

20

6

6

6

This tab shows the number of packs of each formulation required for each month of the forecast period. It also shows the cost of the consumption each month based on costs entered in tab 10. Coût.

This is the projected theoretical monthly demand of the patient cohort.

Tab 7 Data Requirements

• None. This tab does not require the user to enter any data. It is simply a reference tab.

Formulations

Packs required/consumed each month

Consumpt. Patients SOH

Tab 8: SoH & Pipeline

8. Current Stock Pipeline							
Note: this tab reflects stock status WITHOUT additional orders generated from this tool							
Stock-on-Hand: Input the number of packs current Stock On-Hand To the best of your ability, ensure that the date of the best of your ability, ensure that the date of the best of your ability.							
	TOTAL SOH	Jan-19	Feb-19	Mar-19	Apr-19	May-19	
Formulation							
3TC (150) - 60 tab	400			400			
3TC (300) - 30 tab	-						
ABC (300) - 60 tab	600						
ABC+3TC (600/300) - 30 tab	-						
ATV/r (300/100) - 30 tab	-						
AZT (300) - 60 tab	-						
AZT+3TC (300/150) - 60 tab	500					500	
AZT+3TC+ABC (300/150/300) - 60 tab	-						
AZT+3TC+ATV/r ((300/150)+(300/100)) - 30 co-pack	-						
AZT+3TC+NVP (300/150/200) - 60 tab	28,000					20,000	

Consumpt. SOH Ordering

Tab 8 Purpose

This tab develops a supply plan based on existing stock on hand and orders in the pipeline.

The tool uses this as a baseline when determining what products to order, and how many packs of each product are needed to meet forecasted consumption.

Enter existing stock on hand here

Expected Deliveries			
	Jan-19 Feb-19	Jan-19 Feb-19 Mar-19	Jan-19 Feb-19 Mar-19 Apr-19
nulation			
C (150) - 60 tab			
C (300) - 30 tab			
C (300) - 60 tab			
C+3TC (600/300) - 30 tab			
V/r (300/100) - 30 tab			
T (300) - 60 tab			
T+3TC (300/150) - 60 tab			
T+3TC+ABC (300/150/300) - 60 tab			
T+3TC+ATV/r ((300/150)+(300/100)) - 30 co-pack			
T+3TC+NVP (300/150/200) - 60 tab		5,000	5,000

Tab 8 Data Requirements

- Existing stock on hand (and expiration month)
- Orders that have already been placed *before this* round of quantification

Enter expected deliveries here

Tab 8: SoH & Pipeline (Continued)

Consumpt. SOH Ordering

	Packs available	at end of	month und	er current	supply pla	n (excluding
Stocks without additional orders						
	Starting	Jan-19	Feb-19	Mar-19	Apr-19	May-19
Formulation						
3TC (150) - 60 tab	400	314	229	0	0	0
3TC (300) - 30 tab		0	0	0	0	0
ABC (300) - 60 tab	600	594	588	582	576	569
ABC+3TC (600/300) - 30 tab						
ATV/r (300/100) - 30 tab		0	0	0	0	0
AZT (300) - 60 tab		0	0	0	0	0
AZT+3TC (300/150) - 60 tab	500	119	0	0	0	0
AZT+3TC+ABC (300/150/300) - 60 tab						
AZT+3TC+ATV/r ((300/150)+(300/100)) - 30 co-pack						
AZT+3TC+NVP (300/150/200) - 60 tab	28,000	26,475	24,952	28,431	26,912	13,000
DPV (300) 240 tab						

The final section of this tab produces a supply plan based on existing stock on hand and deliveries scheduled *before* orders quantified by the tool

An updated supply plan based on orders from this tool is generated on '*Tab 9*. *Ordering*'

Supply plan based on *existing SoH and deliveries* here

Tab 9: Ordering

Select when first orders will arrive at ART sites

								
9. Orders								
When will the first orders be delivered to ART sites Mar-18	,	Quantity to Orders show	be delivered	I to cover the in advance so	expected de	mand and mo	eet the secur e fulfilled and	ity stock require I reach ART sites
		Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19
Formulation								
3TC (150) - 60 tab		195	83	312	83	82	83	82
3TC (300) - 30 tab		151	21	21	21	21	21	21
ABC (300) - 60 tab								
ABC+3TC (600/300) - 30 tab								
ATV/r (300/100) - 30 tab		3,489	663	705	748	790	833	876
AZT (300) - 60 tab		698	97	96	96	95	94	94
AZT+3TC (300/150) - 60 tab		3,018	668	710	752	794	837	882
AZT+3TC+ABC (300/150/300) - 60 tab								
AZT+3TC+ATV/r ((300/150)+(300/100)) - 30 co-pa	ck							
AZT+3TC+NVP (300/150/200) - 60 tab								590
A2113101141 (300/130/200) - 00 tab								550

Monthly quantity to order

Stock Available with Deliveries	New supply	New supply plan (to replace plan on previous page) taking into account new orders shown a							
	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19		
Molecule									
3TC (150) - 60 tab	509	507	505	503	501	500	498		
3TC (300) - 30 tab	129	128	127	126	126	126	126		
ABC (300) - 60 tab	594	588	582	576	569	562	555		
ABC+3TC (600/300) - 30 tab									
ATV/r (300/100) - 30 tab	3,113	3,359	3,607	3,857	4,108	4,361	4,615		
AZT (300) - 60 tab	596	592	588	584	580	576	572		
AZT+3TC (300/150) - 60 tab	3,137	3,384	3,633	3,883	4,134	4,387	4,643		
AZT+3TC+ABC (300/150/300) - 60 tab									
AZT+3TC+ATV/r ((300/150)+(300/100)) - 30 co-pack									
AZT+3TC+NVP (300/150/200) - 60 tab	26,475	24,952	28,431	26,912	11,483	9,968	9,045		
DDV/2001 240+									

SOH. Ordering Cost

Tab 9 Purpose

This tab shows users the quantity of packs that must be ordered each month* to cover expected demand and meet security stock requirements, and is based on the existing SoH from tab 8. SoH & Pipeline.

It also shows the order requirements on a quarterly basis.

The bottom of the tab shows the new supply plan accounting for orders forecasted using this tool.

Tab 9 Data Requirements

• The user must specify when the first orders will be delivered to *ART sites* (not to the country warehouses) in cell C5*

New supply plan based on orders forecasted using the tool

10. Cost & Order Summary

Enter the price per pack your country pays for each formulation in column D. The latest Global Fund Note: If you DON'T enter a 'Price Paid', the product will not be costed below and will remain greyed of

Quarterly Volume and Cost of Stocks

Cost of incoming stocks:

Formulation	Price Paid	Q1	Q2
3TC (150) - 60 tab	\$2.25	\$1,328	\$558
3TC (300) - 30 tab			
ABC (300) - 60 tab			
ABC+3TC (600/300) - 30 tab			
ATV/r (300/100) - 30 tab	\$14.90	\$72,369	\$35,328
AZT (300) - 60 tab	\$5.60	\$4,990	\$1,596
AZT+3TC (300/150) - 60 tab	\$5.10	\$22,420	\$12,153
AZT+3TC+ABC (300/150/300) - 60 tab			
AZT+3TC+ATV/r ((300/150)+(300/100)) - 30 co-pack			
AZT+3TC+NVP (300/150/200) - 60 tab			
DRV (300) - 240 tab			
DRV (400) - 60 tab			
DRV (600) - 60 tab	\$54.00	\$1,782	\$972
DRV (800) - 60 tab			
DRV/r (400/50) - 60 tab			
DTG (50) - 30 tab	\$44.00	\$8,008	\$2,552
EFV600 (600) - 30 tab	\$3.15	\$2,807	\$898
ETV (100) - 120 tab			
ETV (200) - 60 tab			
FTC (200) - 30 tab			
LPV/r (200/50) - 120 tab	\$18.41	\$26,621	\$9,444
NVP (200) - 60 tab	\$2.20	\$7,821	\$2,501
RAL (400) - 60 tab	\$55.50	\$3,386	\$1,443
RTV (100) - 60 tab	\$6.85	\$185	\$62
TDF (300) - 30 tab	\$3.50	\$214	\$91

Tab 10 Purpose

This tab calculates the *quarterly* cost of each formulation. It also sums the cost by year and the grand total across the 3-year forecast period.

Ordering

Cost

Partner All

Tab 10 Data Requirements

• Price per pack for each formulation of interest. These can be actual prices paid or reference prices

Quarterly cost per formulation

Tab 11: Partner Allocation

Display orders by cost or volume

11. Partner Allocation Display orders in volume (# packs) or cost (total) -	Volume					For every year, enter the percentage of each product that each partner is responsible for. Summary allocations can be found in the final table and displayed by year or for the 3-year total. Relevant partners in row 7 can be changed below						
rmulation	Price /Pack	V1	¥2	V3	ΤΟΤΑΙ	PEPEAR	Global Fund	MoH	Other 1	Other 2	Other 3	
(150) - 60 tab	\$2.25	1.328	974	993	3,295	50%	1%	24%	1%	23%	1%	
00) - 30 tab	\$0.00	382	252	252	886							
(300) - 60 tab	\$0.00	105	185	274	564	50%	1%	24%	1%	23%	1%	
3TC (600/300) - 30 tab	\$0.00											
300/100) - 30 tab	\$14.90	13,145	16,936	23,459	53,540	50%	1%	24%	1%	23%	1%	
00) - 60 tab	\$5.60	1,730	1,043	970	3,743	50%	1%	24%	1%	23%	1%	
TC (300/150) - 60 tab	\$5.10	12,735	17,030	23,559	53,324	50%	1%	24%	1%	23%	1%	

Tab 11 Purpose

This tab allows the user to allocate responsibility for procuring each formulation to various partners (e.g., PEPFAR, Global Fund, MoH) by either volume or cost. The tab also displays each partner's responsibility by year, or in aggregate for the total forecast period.

Tab 11 Data Requirements

responsibility for each product

• Each partner's commitment for procuring various ARVs over the three-year forecast period

Partner All. Reference

Cost



Tabs 12 and 13 Purpose

These unlocked blank reference tabs allow the user to fill in any data. They can be used for calculations, additional input tabs, data storage, etc.

Tabs 12 and 13 Data Requirements

• There are no data requirements for these tabs. The user can choose to use them how they wish, or not use them at all.