





**Estimating the size of populations
at risk of acquiring HIV in
settings with high HIV incidence**

**A User's Guide to the 'SHIPP Tool'
for Population Size Estimation**

Updated version, 2026

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Part I. Introduction

1. Purpose of the User Guide

This User Guide was created to assist national and district-level HIV programmers in estimating the size of populations at different levels of HIV risk. The Guide accompanies an Excel-based tool that offers an easy-to-use approach to generate population size estimates that reflect both background HIV incidence and reported behavioural risk for males and females aged 15 to 49 years. By linking district-level estimates on HIV incidence and behavioural data for the first time, the new Sub-national HIV Estimates in Priority Populations tool (the ‘SHIPP Tool’) can be used to prioritise districts and sub-populations for HIV prevention programmes and to ensure such programmes are adequately resourced and tailored to the local risk composition.

The UNAIDS [Global AIDS Strategy 2026-2031](#) sets prevention targets based on a combination of age, sex, location and behavioural factors, as does the UNAIDS 2016 [Guidance on HIV Prevention among Adolescent Girls and Young Women](#). The SHIPP Tool provides HIV risk and population size estimates disaggregated by these 4 factors – age, sex, location and sexual behaviour categories – to enable detailed HIV prevention planning. As shown in Figure 1, analyses by Howes et al¹ demonstrate there is efficiency gained from using a risk-stratification approach. Specifically, going beyond geographic prioritisation, to further stratify by behavioural risk, can help to reduce the numbers needed to reach by about ten percentage points, for example, reaching 5% rather than 15% of 15-24yr-old females in order to find half the new cases of HIV in a country.

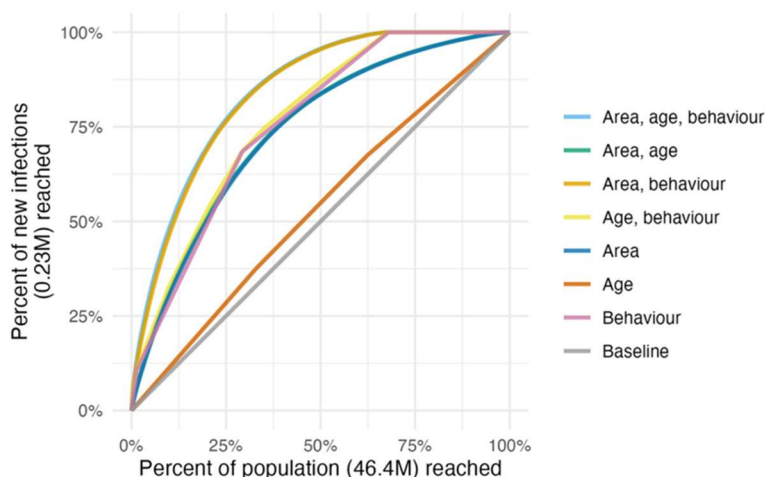


Figure 1. Percentage of new infections reached across all 13 countries, taking a variety of risk stratification approaches, against the percentage of at-risk population required to be reached [Source: Howes et al 2023]

The estimates in the SHIPP Tool can serve as denominators for the number of people who should receive differentiated HIV prevention packages (by this we mean combination prevention packages that are differentiated by level of risk). For example, by estimating the numbers of adolescent girls

¹ Howes et al., 2023. Spatio-temporal estimates of HIV risk group proportions for AGYW across 13 countries. *PLOS Global Public Health*.

and young women aged 15-19, 20-24, and 25-29 years in each sexual behavioural category, within each district, country teams can allocate HIV prevention packages and resources, targeting the geographical areas with the largest numbers of young women in high-risk categories. This information can also help HIV prevention programmers determine how they will distribute service packages both geographically and by behavioural risk, guided by the updated UNAIDS [*Decision-making Aide for Investments into HIV Prevention Programmes among Adolescent Girls and Young Women*](#).

To aid this process, this User's Guide will demonstrate and explain each step required to produce district-level differentiated risk estimates and to interpret the results and implications for delivering appropriate HIV prevention packages to those who need them most.

While the SHIPP Tool helps to estimate the size of priority populations for HIV prevention, and identifies where such groups are concentrated, it does not provide the means by which individuals in different behavioural risk categories can be identified. Various strategies for reaching such priority populations are discussed at the end of this Guide.

Short Summary: What is the SHIPP Tool?

The SHIPP Tool was developed by UNAIDS and partners to better understand HIV incidence of priority groups at sub-national level. The Tool disaggregates HIV incidence and population sizes by age group, sex, location and sexual behaviour risk. The tool distinguishes four sexual behaviour categories:

- Not sexually active
- Sexually active, one cohabiting partner
- Non-regular sexual partner(s)
- Key populations

The SHIPP Tool draws from a combination of survey data and mathematical model outputs from 34 countries in eastern and southern Africa, specifically: Angola, Benin, Burundi, Burkina Faso, Botswana, Cameroon, Central African Republic, Chad, Congo, Democratic Republic of the Congo, Eswatini, Ethiopia, Gabon, Ghana, Guinea, Gambia, Kenya, Lesotho, Liberia, Malawi, Mali, Mozambique, Namibia, Niger, Rwanda, Senegal, Sierra Leone, South Africa, Tanzania, Togo, Uganda, Zambia and Zimbabwe.

The Tool is pre-populated with the latest Spectrum and Naomi estimates and uses estimates of the prevalence of behaviours from the most recent Demographic Health Surveys (DHS) and/or AIDS Indicator Surveys and/or Population-based HIV Impact Assessment (PHIA) surveys in each country (by district and age group). In the case of the Democratic Republic of Congo, the most recent Multiple Cluster Indicator Survey (MICS) has been used.

UNAIDS will update the tool as part of the annual HIV estimates process that starts every October. For questions, please send an email to: estimates@unaids.org

2. Who is this User Guide for?

This User Guide (the 'Guide', for short) is intended for users of the Excel-based Population Size Estimation tool. This includes experts in HIV strategic information, programme managers, service providers and policy makers involved in planning for HIV prevention within their respective countries and districts.

In using the SHIPP Tool and Guide together, programme managers and strategic information experts will be able to produce, analyze and use population size estimates to plan HIV prevention programmes. This can help teams to align country programming efforts with global targets and guidance. Also, those involved in reporting and monitoring coverage of priority populations with intensified support may be able to leverage the population estimates in tracking implementation, although the estimates produced can only be taken as indicative denominators rather than exact figures. (Users should be aware of the limitations of the SHIPP Tool and the estimates it generates, and limitations are discussed below in Section 10.)

3. Data Inputs: What are the data sources used in the population size estimation tool?

The SHIPP Tool is pre-populated with relevant data for the following 34 Global Fund priority countries:

- Angola
- Benin
- Botswana
- Burundi
- Burkina Faso
- Cameroon
- Central African Republic
- Chad
- Congo
- DRC
- eSwatini
- Ethiopia
- Gabon
- Ghana
- Guinea
- Gambia
- Kenya
- Lesotho
- Liberia
- Malawi
- Mali
- Mozambique
- Namibia
- Niger
- Rwanda
- Senegal
- Sierra Leone
- South Africa
- Tanzania
- Togo
- Uganda
- Zambia
- Zimbabwe

The population size estimates in the SHIPP Tool are generated from a combination of survey data and statistical model outputs. A complete list of all the datasets used to generate the population size estimates in the Tool is provided in the Excel booklet itself, and a brief summary follows here.

For estimates of HIV incidence at a district level by age (in 5-year age bands), the SHIPP Tool draws on the Naomi small-area estimation model². Background HIV incidence in each district is classified into the following four levels – “low”, “moderate”, “high” and “very high” – as specified in the [Global AIDS Strategy 2026-2031](#) and shown in Table 1. In the Naomi model, population estimates by sex and age group are drawn from district population projections produced by national statistical offices, household censuses, or global population data products such as the Gridded Population of the World or the WorldPop projects.

² <https://onlinelibrary.wiley.com/doi/10.1002/jia2.25788>

Table 1: HIV incidence categories defined in the Global AIDS Strategy 2021-2026

District-level HIV incidence	
HIV incidence rate (annual cases per 100 person-years)	HIV incidence category thresholds
< 0.2	Low
0.2-<0.5	Moderate
0.5-2.0	High
>2.0	Very High

The HIV-related behavioural risk categories employed by the model in the SHIPP Tool are based on sexual behaviour and relationship status and are listed in Table 2. They are intended to support differentiated, data-informed prevention planning in line with the Global AIDS Strategy 2026-2031, which emphasizes people-centred HIV prevention for people living with, affected by or at risk of HIV, including adolescent girls and young women and key populations. For the first three categories, the SHIPP Tool estimates the prevalence of these behaviours using geospatial data (survey cluster locations) from large-scale population-based surveys such as the Demographic Health Surveys (DHS) and/or AIDS Indicator Surveys and/or Population-based HIV Impact Assessment (PHIA) surveys and/or Multiple Indicator Cluster Surveys (MICS) in each country, to fit spatially smoothed district-level models (see Annex 1 for further details). Men and women's behavioural data are fitted separately.

Table 2: Categories of risk in relation to sexual behaviour and key populations

Sexual behaviour categories	Behavioural risk definition
No sexual risk	Not sexually active. (respondent reports no sex in the past 12 months).
One cohabiting partner	Sexually active with one cohabiting partner (one regular partner). (respondent reports sex with one marital or cohabiting partner in the past 12 months)
Non-regular sexual partner/s	Sexually active with at least one non-regular sexual partner (non-cohabiting, non-marital) or two or more partners (of any type). (respondent reports sex with at least one non-regular partner [neither marital nor cohabiting] or 2+ sexual partners [any partner type] in the past 12 months).
Key populations	
Females	Women who sell sex. (further details below).
Males	Gay men and other men who have sex with men. Men who use injection drugs. (further details below).

Estimates in the highest-risk behavioural categories for 'key populations' are derived from an existing small-area estimation model³, which outputs population size proportions and HIV prevalence estimates for female sex workers (FSWs), men who have sex with men (MSM) and people who inject drugs (PWID). Briefly, this approach synthesized all available KP data and

³ Stevens O, Sabin K, Anderson R, Garcia SA, Willis K, Rao A, et al. Population size, HIV prevalence, and antiretroviral therapy coverage among key populations in sub-Saharan Africa: collation and synthesis of survey data 2010-2023. medRxiv. 2023:2022.07.27.22278071.

matched the geography by name and corresponding population (i.e. women for FSW, men for MSM and PWID) and fits a small-area estimation model to this data. The KP model assumes that rural KP population size estimates are approximately 60% that of urban KP estimates. The approach fits a second small-area estimation model to estimate HIV prevalence in KPs using age-location-year matched HIV prevalence estimates in the general population to predict HIV prevalence in KPs. KP estimates are at the admin-1 level and assumed to be uniform across all districts within an admin-1 unit. Note that admin-1 can vary by country and can refer to “province”, “district”, “municipality” or “county”.

Table 3 summarises the risk ratio used in the SHIPP Tool to estimate HIV incidence for each behavioural group. The HIV risk for those who have non regular partner/s and those among the key population categories is relative to the group reporting one regular sex partner in the past 12 months.

Table 3. Risk ratios used to estimate HIV incidence for each behavioural risk group

Sexual behaviour category	HIV risk ratio used to generate HIV incidence estimates (relative to the reference category)	
Not sexually active	0	
Sexually active with 1 cohabiting partner	1 (Reference category)	
Sexually active with non-regular sexual partner(s)	Females* 1.72 (15-24 yrs) 2.10 (25-49 yrs)	Males* 1.89 (15-24 yrs) 2.10(25-49 yrs)
<i>Females in key populations</i> - Women who sell sex **	District-level HIV incidence[^]	HIV risk ratio ± (relative to 'Low risk' group above)
	3.0%+	3
	1.0-2.99%	4
	0.3-0.99%	7
	0.1-0.3%	11
	<0.1%	17
<i>Males in key populations</i> - Men who have sex with men - Men who inject drugs ^^	2.5-250 (MSM)	
	2.5-55 (MWID)	

* These relative risk assumptions are based on analyses of risk factors for incident HIV infection from studies in sub-Saharan Africa by Slaymaker et al CROI 2020; Jia et al JIAS 2022; Ssempijja et al JAIDS 2022; Hoffman et al JAIDS 2022

[^] These HIV incidence categories are drawn from the UNAIDS Global AIDS Strategy 2021-2026

± See Annex 1 (Frequently Asked Questions) for more information on the relationship between HIV risk and district-level HIV incidence for female sex workers. Values are interpolated between these points for a smooth non-linear relationship between population-level incidence and risk ratio.

** The relative risk assumptions for women in key populations are from an analysis by Jones & Anderson et al medRxiv (<https://www.medrxiv.org/content/10.1101/2023.10.17.23297108v2.full.pdf>)

^{^^}The relative risk assumptions for men in key populations are from Stevens et al medRxiv (Admin 1 KP prevalence estimates relative to general population prevalence) and Stannah et al medRxiv 2022 (systematic review & meta regression)

Figure 2 illustrates the relationship between behavioural risk categories and HIV incidence levels by location. The colour coding is illustrative of how HIV incidence is expected to be distributed

with green representing no or very low HIV incidence and red very high HIV incidence. It shows that the same sexual behaviours (like having multiple sexual partners) do not confer the same risk of HIV infection everywhere. Rather, as the background level of HIV incidence increases, the risk of HIV infection associated with sexual behaviours also increases.

Figure 2: Combining HIV incidence estimates by location and behavioural factors

HIV incidence by location	Low HIV incidence	Moderate HIV incidence	High HIV incidence	Very high HIV incidence
Sexual behaviour categories				
Not sexually active				
One cohabiting sex partner				
1+ non-regular sex partner(s)				
Key populations				

By considering HIV incidence disaggregated by age, sex, geography and behavioural risk category, the tool supports differentiated, data-informed HIV prevention planning in line with the Global AIDS Strategy 2026–2031 and the HIV Prevention 2030 Access Framework. It is also important to interpret risk in the context of social and economic vulnerabilities and inequalities, particularly those shown to increase HIV risk. As the estimation Tool expands in successive versions, some ‘structural’ factors (such as education level, orphan status, early marriage) can be incorporated into the estimates for further granularity. Until then, locally available data can be considered alongside the spreadsheet estimates. Considering structural vulnerabilities is further addressed in Section 9 and Annex 1.

ACTIVITY:

Try [this quiz](#)⁴ to test your learning from Part 1. (To play the interactive quiz, you will be prompted to login or sign up for a free Kahoot account)

For deeper understanding of the data sources and models used to generate the SHIPP Tool estimates, please see Annex 1 for Frequently Asked Questions. Also, a slide deck on the model development is available on the UNAIDS HIV Tools website, here: <https://hivtools.unaids.org/>

⁴ If the link above does not work, copy and paste this pathway onto your internet browser:
<https://create.kahoot.it/share/pse-tool-quiz-data-inputs/ed19b5f7-1789-4ed3-90be-52adef0fb08a>

Part II. How to use the population size estimation tool

4. Getting prepared

For the best use of the SHIPP Tool, it is advisable to form a working group that will generate and review the estimates and discuss interpretation and implications. Alternatively, an existing group may be well placed to guide this work. The working group can set out in advance:

- The specific aims for using the SHIPP Tool in your context, e.g., to identify the geographic areas with the largest priority populations and allocate resources proportionally to offer differentiated HIV prevention packages
- The estimates and visual outputs that will be most useful to achieve your aims
- The process and timeline for reviewing and interpreting the estimates
- How the estimates will be used to inform decisions and responsibilities in your setting

The working group should ideally consist of a mix of stakeholders including strategic information experts, prevention programme managers, service providers, government technical leads, civil society, community and academia.

5. Data Outputs: What estimates does the SHIPP Tool produce?

The spreadsheet generates two types of estimates: population sizes and new HIV infections expressed both as a number (of new cases) and an HIV incidence rate (new cases per 100 person-years). These are presented by age, sex, place and the behavioural risk categories listed in Table 2 above (the '4D' disaggregation). More specifically, the Tool produces population size and HIV incidence estimates separately for females and males aged 15-49 years (in 5-year age bands), and further disaggregated by behavioural risk categories both nationally and by district.

These estimates are organised as follows:

- **Population size** with the size of population sub-groups presented as *a number (n; population size)* of HIV-negative individuals and as *a proportion (%)* of the total population
- Estimated **new HIV infections** as the *number (n) of new HIV cases* per year and the *proportion* these new cases contribute to all new infections per year in a given group.
- The annual **HIV incidence rate** (*new HIV infections* per 100 person-years) estimated for sub-group. These cells are colour-coded as follows to reflect categories of HIV incidence:
 - **green** for no new HIV cases
 - **pale green** for a low incidence rate (<0.2 per 100py)
 - **yellow** for moderate incidence (0.2–<0.5 per 100py)
 - **pink** for high incidence (0.5–2.0 per 100py)
 - **dark orange** for a very high incidence rate (>2.0 per 100py)
- The **total population estimates per HIV incidence category**. This combines the above population size and HIV incidence estimates to calculate the approximate number of people in each HIV risk category. These estimates can be used as **denominators** or the number in need of prevention packages based on their HIV risk category.

These outputs are explained further and demonstrated in the next section (Step-by-step approach). Note that cells will say "N/A" when there are no data available to produce the required estimates. The 'Information' comment will say "Value Not Available Error".

6. Step-by-step approach to generate outputs

First: Download and familiarize yourself with the SHIPP Tool spreadsheet

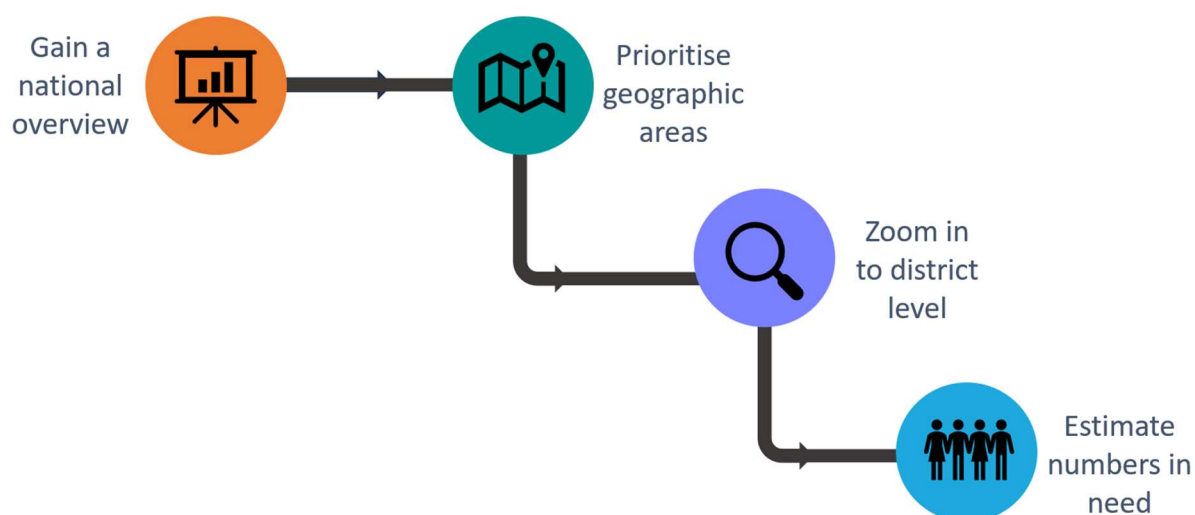
The SHIPP Tool can be downloaded from the UNAIDS HIV Tools website here <https://hivtools.unaids.org/shipp/>. The tool is now available as country-specific Excel files, organised by region. Users should first download the relevant regional set of country files, such as the files for eastern and southern Africa or for western and central Africa, and then open the Excel file for the country they wish to review.

After opening the Tool, you can use the tabs running along the bottom to navigate. The first tab, entitled 'Category descriptions' includes helpful reminders of the definitions and categories used throughout the Tool. This includes the thresholds for HIV incidence levels, definitions of sexual behaviour risk categories and the HIV risk ratios applied to different behavioural groups. The second tab, 'Model Inputs' includes the latest quarter and year of Naomi estimates and the latest surveys used for sexual behaviour estimates for each country.



Users can scan through each tab to view how the data are organised in the Tool. Here, we suggest a user pathway that can help users explore the main features and estimates generated by the Tool. It is not the only way to interact with the Tool but it is a useful way to become acquainted with the Tool, its features, and how they can help you make priorities for HIV prevention programming. We include some hands-on exercises to demonstrate the features, so it is a good idea to have the SHIPP Tool open as you use this Guide.

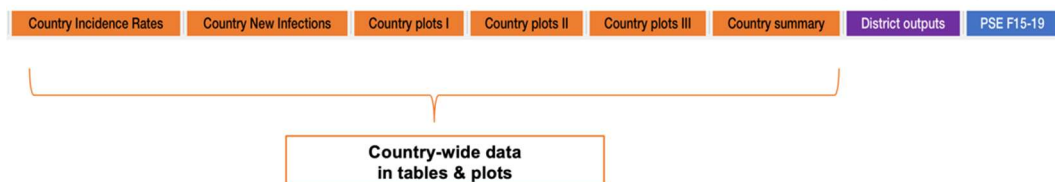
A user pathway to explore and apply the SHIPP Tool features and estimates





Step 1: Gain a national overview of HIV risk composition in your country

The first series of orange tabs summarise data at the national level, in a variety of ways.



The first two orange tabs offer a complete summary of HIV infections for all districts in a country. Specifically, they summarise HIV incidence rates and new HIV infections, respectively, by sex, age group, and behavioural group, across all districts. These tabs are useful for scanning all data in a country to identify patterns (by age, sex, behaviour) and hotspots (by district). You can start to see which sub-populations experience the highest HIV rates and infections, and in which districts.

Try this yourself with the **Country Incidence Rates** tab

After downloading the relevant SHIPP country files from the UNAIDS HIV Tools website, open the Excel file for the country you wish to review. Country files are organised by region, including separate download folders for eastern and southern Africa and for western and central Africa.

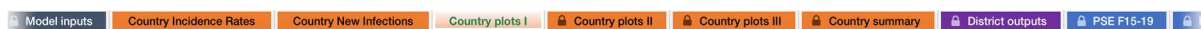
In the country-specific Excel file, go to the Country Incidence Rates tab. Each row summarises data for one district (or another sub-national unit like 'county', as applicable). Along the columns, HIV incidence rates are summarised separately by sex (females and males), sexual behaviour groups, and age group (15-24, 25-34, 35-49). The cells are colour-coded to reflect categories of HIV incidence, as summarised in this table.

No new HIV cases
Low incidence (0.2%)
Moderate incidence (0.2-0.5%)
High incidence (0.5-2.0%)
Very high incidence (>2.0%)

Scan the HIV incidence rates to identify patterns, for example:

- Which population groups experience the highest HIV incidence rates across most districts?
- How would you report the highest HIV incidence rate you see?
- Which groups experience the lowest HIV incidence rates?
- Which district experiences the highest HIV incidence rates, across most sub-groups?
- Select another country and see how patterns differ.

The orange tab entitled 'Country plots I' presents a national summary of HIV incidence rates and new infections across all districts, averaged across the country,



Try this yourself with the **Country plots I** tab

After opening the SHIPP Excel file for the country you wish to review, go to the Country plots I tab. This tab presents a national summary of HIV incidence rates, population size estimates and estimated new infections for that country.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	National population size estimation					Zambia							
2	ZMB	Women's national HIV incidence: Moderate					ZMB	Men's national HIV incidence level: Low					
4	Adolescent girls and women by level of HIV risk						Adolescent boys and men by level of HIV risk						
	No sex	One regular partner	Non-regular partner(s)	KPs	All	WLHIV	No sex	One regular partner	Non-regular partner(s)	KPs	All	MLHIV	
6	Population in % of total												
7	15-49	28.1	51.8	19.1	1.1	100.0	12.3	31.0	37.7	35.0	1.0	100.0	6.4
8	15-24	43.9	30.5	24.2	1.4	100.0	3.6	52.5	8.2	39.0	1.1	100.0	1.6
9	25-49	15.2	69.3	14.8	0.8	100.0	18.4	13.3	62.0	31.7	0.8	100.0	9.9
10	15-19	61.7	13.6	23.4	1.3	100.0	2.0	68.5	0.7	29.9	1.0	100.0	1.1
11	20-24	21.8	51.4	25.3	1.5	100.0	5.5	32.7	17.5	50.2	1.3	100.0	2.1
12	25-34	12.4	69.5	16.9	1.1	100.0	13.2	14.3	54.4	36.5	1.2	100.0	5.3
13	35-49	18.3	69.0	12.3	0.4	100.0	23.6	12.2	70.7	26.1	0.4	100.0	14.4
14	Population sizes												
15	15-49	1,331,935	#####	902,602	50,347	5,401,257	663,614	1,469,054	1,787,022	1,656,676	45,471	5,298,873	340,649
16	15-24	938,325	652,237	518,855	30,372	2,218,965	79,175	1,122,798	1,75,719	834,363	24,016	2,190,958	34,062
17	25-49	393,610	#####	383,746	19,975	3,182,291	584,439	346,256	1,611,303	822,314	21,455	3,107,915	306,587
18	15-19	729,508	160,380	276,719	15,690	1,205,988	23,691	809,813	8,443	353,804	11,281	1,196,267	12,925
19	20-24	208,817	491,857	242,137	14,682	1,012,978	55,485	312,985	167,276	480,558	12,735	994,691	21,137
20	25-34	172,740	965,398	234,921	15,160	1,598,748	210,529	198,630	755,562	506,538	16,901	1,560,699	83,067
21	35-49	220,869	835,123	148,825	4,815	1,583,543	373,910	147,626	855,740	315,775	4,554	1,547,215	223,520
22	Estimated annual new HIV infections												
23	15-49	0	8,969	7,804	732	17,505	0	0	3,178	5,492	63	8,732	0
24	15-24	0	3,309	5,034	449	8,792	0	0	293	2,195	27	2,515	0
25	25-49	0	5,660	2,770	283	8,713	0	0	2,885	3,297	35	6,217	0
26	15-19	0	921	2,886	207	4,013	0	0	7	589	6	602	0
27	20-24	0	2,388	2,148	243	4,779	0	0	286	1,606	21	1,913	0
28	25-34	0	3,672	1,990	230	5,892	0	0	1,527	2,203	30	3,760	0
29	35-49	0	1,988	780	53	2,821	0	0	1,358	1,095	5	2,457	0
30	Contribution to all new HIV infections in age group												
31	15-49	-	51	45	4	100	-	-	36	63	1	100	-
32	15-24	-	38	57	5	100	-	-	12	87	1	100	-
33	25-49	-	65	32	3	100	-	-	46	53	1	100	-
34	15-19	-	23	72	5	100	-	-	1	98	1	100	-
35	20-24	-	50	45	5	100	-	-	15	84	1	100	-
36	25-34	-	62	34	4	100	-	-	41	59	1	100	-
37	35-49	-	70	28	2	100	-	-	55	45	0	100	-
38	Estimated HIV incidence rates												
39	15-49	0.00	0.37	0.86	1.45	0.37	0.00	0.00	0.18	0.33	0.14	0.18	0.00
40	15-24	0.00	0.51	0.97	1.48	0.41	0.00	0.00	0.17	0.26	0.11	0.12	0.00
41	25-49	0.00	0.31	0.72	1.41	0.34	0.00	0.00	0.18	0.40	0.16	0.22	0.00
42	15-19	0.00	0.57	1.04	1.32	0.34	0.00	0.00	0.09	0.17	0.05	0.05	0.00
43	20-24	0.00	0.49	0.89	1.65	0.50	0.00	0.00	0.17	0.33	0.17	0.20	0.00
44	25-34	0.00	0.38	0.85	1.52	0.42	0.00	0.00	0.20	0.43	0.18	0.25	0.00
45	35-49	0.00	0.24	0.52	1.09	0.23	0.00	0.00	0.16	0.35	0.11	0.19	0.00

In the above example, we use the Zambia country file. The table summarises the following estimates by sex, age group and behavioural risk category:

- The **population size** of each sub-group is presented as a **proportion (%)** of the total population [in Rows 7-13] and as a **number** (population size) [in Rows 15-21].
- **New HIV infections** are estimated as the **number of new HIV cases** per year [in Rows 23-29] and the **proportion these new cases contribute to all new HIV infections** per year [in Rows 31-37].
- The **annual HIV incidence rate** (new HIV infections per 100 person-years; PY) is estimated for sub-group [in Rows 39-45], where they are colour-coded to reflect the categories of HIV incidence described above.

Using the data for Zambia in Country plots I, try the following short and long exercises to become more familiar with the estimates.



Short exercise

Country Plots I

With Country Plots I, use national-level summaries to find:

1. Approximately how many **15-24yr females** are in Zambia?
 - Of those, approximately how many are living with HIV?
 - And approximately how many are HIV-negative?
2. Approximately how many **15-24yr males** are in Zambia?
3. Of those, approximately how many are living with HIV?
4. And approximately how many are HIV-negative?



Short exercise

Country Plots I

With Country Plots I, use national-level summaries to find:

1. Approximately how many **15-24yr females** are in Zambia? **2,218,965**
 - Of those, approximately how many are living with HIV? **79,175**
 - And approximately how many are HIV-negative? **2,139,789**
2. Approximately how many **15-24yr males** are in Zambia? **2,190,958**
 - Of those, approximately how many are living with HIV? **34,062**
 - And approximately how many are HIV-negative? **2,156,896**

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	National population size estimation				Zambia								
2		ZMB		Women's national HIV incidence level: Moderate	ZMB				Men's national HIV incidence level: Low				
4		Adolescent girls and women by level of HIV risk					Adolescent boys and men by level of HIV risk						
		No sex	One regular partner	Non-regular partner(s)	KPs	All	WLHIV	No sex	One regular partner	Non-regular partner(s)	KPs	All	MLHIV
6	Population in % of total												
7	15-49	28.1	51.8	19.1	1.1	100.0	12.3	31.0	37.7	35.0	1.0	100.0	6.4
8	15-24	43.9	30.5	24.2	1.4	100.0	3.6	52.5	8.2	39.0	1.1	100.0	1.6
9	25-49	15.2	69.3	14.8	0.8	100.0	18.4	13.3	62.0	31.7	0.8	100.0	9.9
10	15-19	61.7	13.6	23.4	1.3	100.0	2.0	68.5	0.7	29.9	1.0	100.0	1.1
11	20-24	21.8	51.4	25.3	1.5	100.0	5.5	32.7	17.5	50.2	1.3	100.0	2.1
12	25-34	12.4	69.5	16.9	1.1	100.0	13.2	14.3	54.4	36.5	1.2	100.0	5.3
13	35-49	18.3	69.0	12.3	0.4	100.0	23.6	12.2	70.7	26.1	0.4	100.0	14.4
14	Population sizes												
15	15-49	1,331,935	2,452,758	902,602	50,347	5,401,257	663,614	1,469,054	1,787,022	1,656,676	45,471	5,298,873	340,645
16	15-24	938,325	652,237	518,855	30,374	2,218,965	79,175	1,122,798	175,719	834,363	24,016	2,190,958	34,062
17	25-49	393,610	1,800,521	383,746	19,973	3,182,291	584,439	346,256	1,611,303	822,314	21,455	3,107,915	306,587
18	15-19	729,508	160,380	276,719	15,690	1,205,988	23,691	809,813	8,443	353,804	11,281	1,196,267	12,925
19	20-24	208,817	491,857	242,137	14,682	1,012,978	55,485	312,985	167,276	480,558	12,735	994,691	21,137
20	25-34	172,740	965,398	234,921	15,160	1,598,748	210,529	198,630	755,562	506,538	16,901	1,560,699	83,067
21	35-49	220,869	835,123	148,825	4,815	1,583,543	373,910	147,626	855,740	315,775	4,554	1,547,215	223,520
22	Estimated annual new HIV infections												
23	15-49	0	8,969	7,804	732	17,505	0	0	3,178	5,492	63	8,732	0
24	15-24	0	3,309	5,034	449	8,792	0	0	293	2,195	27	2,515	0
25	25-49	0	5,660	2,770	283	8,713	0	0	2,885	3,297	35	6,217	0
26	15-19	0	921	2,886	207	4,013	0	0	7	589	6	602	0
27	20-24	0	2,388	2,148	243	4,779	0	0	286	1,606	21	1,913	0
28	25-34	0	3,672	1,990	230	5,892	0	0	1,527	2,203	30	3,760	0
29	35-49	0	1,988	780	53	2,821	0	0	1,358	1,095	5	2,457	0

 **Can you find these national level summaries...?** 

In Zambia, among <u>15-24 year-olds</u> who are not living with HIV	Females (N=2,218,965)	Males (2,190,958)
What is the estimated HIV incidence rate? And how could you classify this level of HIV risk		
What proportion of the population (of HIV-negative 15-24yr olds) are in the 'key population' group?		
What is the HIV incidence rate among females in key population groups?		
What proportion of all new HIV infections among 15-24 yr-old females are among key populations?		
What proportion of the population report a 'non-regular sexual partner'?		
What is the HIV incidence rate among females with non-regular sexual partner(s)?		
Which behavioural group accounts for the highest number of new HIV infections among 15-24 yr-olds? Why?		

Did you find the answers?

Can you find these national level summaries...?

In Zambia, among 15-24 year-olds who are not living with HIV	Females (N=2,218,965)	Males (2,190,958)
What is the estimated HIV incidence rate? And how could you classify this level of HIV risk	0.41 per 100 PY — moderate'	0.12 per 100 PY — low
What proportion of the population (of HIV-negative 15-24yr olds) are in the 'key population' group?	1.4% (FSW)	1.1% (MSM/MID)
What is the HIV incidence rate among females in key population groups?	1.48 per 100 PY — high	0.11 per 100 PY — low
What proportion of all new HIV infections among 15-24 yr-old females are among key populations?	5.1%	1.1%
What proportion of the population report a 'non-regular sexual partner'?	24.2%	39.0%
What is the HIV incidence rate among females with non-regular sexual partner(s)?	0.97 per 100 PY — high	0.26 per 100 PY — moderate
Which behavioural group accounts for the highest number of new HIV infections among 15-24 yr-olds? Why? Larger population size for those with non-regular partners compared to young people KPS	Non-regular partners (5,034)	Non-regular partners (2,195)

In the below example, we show how you can interpret these estimates and start to build a picture and narrative about the size of populations at highest HIV risk. See if you can fill in the blank at the end.

	A	B	C	D	E	F	G
1	National population size estimation						
2	ZMB	Women's national HIV incidence li Moderate					
4	Adolescent girls and women by level of HIV risk						
	No sex	One regular partner	Non-regular partner(s)	KPs	All	WLHIV	
6	Population in % of total						
7	15-49	28.1	51.8	11.3	1.1	100.0	12.3
8	15-24	43.9	30.5	24.3	1.4	100.0	3.6
9	25-49	15.2	69.3	14.8	0.8	100.0	18.4
10	15-19	61.7	13.6	23.4	1.9	100.0	2.0
11	20-24	21.8	51.4	25.3	1.5	100.0	5.5
12	25-34	12.4	69.5	16.9	1.1	100.0	13.2
13	35-49	18.3	69.0	12.3	0.4	100.0	23.6
14	Population sizes						
15	15-49	1,331,935	2,452,759	902,602	56,347	5,401,257	663,614
16	15-24	938,325	652,217	518,855	30,372	2,218,965	79,175
17	25-49	393,610	1,800,511	383,746	19,975	3,182,291	584,439
18	15-19	729,508	160,380	276,719	15,690	1,205,988	23,691
19	20-24	208,817	491,857	242,137	14,682	1,012,978	55,485
20	25-34	172,740	965,398	234,921	15,160	1,598,748	210,529
21	35-49	220,869	835,123	148,825	4,815	1,583,543	373,910
22	Estimated annual new HIV infections						
23	15-49	0	8,969	7,804	792	17,505	0
24	15-24	0	3,305	5,034	449	8,792	0
25	25-49	0	5,660	2,770	283	8,713	0
26	15-19	0	921	2,886	297	4,013	0
27	20-24	0	2,388	2,148	243	4,779	0
28	25-34	0	3,672	1,990	230	5,892	0
29	35-49	0	1,988	780	53	2,821	0
30	Contribution to all new HIV infections in age group						
31	15-49	-	51	45	4	100	-
32	15-24	-	38	57	5	100	-
33	25-49	-	65	32	3	100	-
34	15-19	-	23	72	5	100	-
35	20-24	-	50	45	5	100	-
36	25-34	-	62	34	4	100	-
37	35-49	-	70	28	2	100	-
38	Estimated HIV incidence rates						
39	15-49	0.00	0.37	0.86	1.45	0.37	0.00
40	15-24	0.00	0.51	0.97	1.48	0.41	0.00
41	25-49	0.00	0.11	0.72	1.41	0.34	0.00
42	15-19	0.00	0.57	1.04	1.32	0.34	0.00
43	20-24	0.00	0.49	0.89	1.65	0.50	0.00
44	25-34	0.00	0.38	0.85	1.52	0.42	0.00
45	35-49	0.00	0.24	0.52	1.09	0.23	0.00

Prioritising those at highest risk:

There are ~30,400 young women who sell sex (KP) aged 15–24 in Zambia, or about 1.4% of HIV-negative 15–24-year-old females.

YWSS in Zambia experience ~450 new infections annually (high incidence rate of 1.48 cases per 100 PY).

Reaching this group with effective combination prevention could avert around 5% of all HIV infections among 15–24-year-old females.

As resources allow:

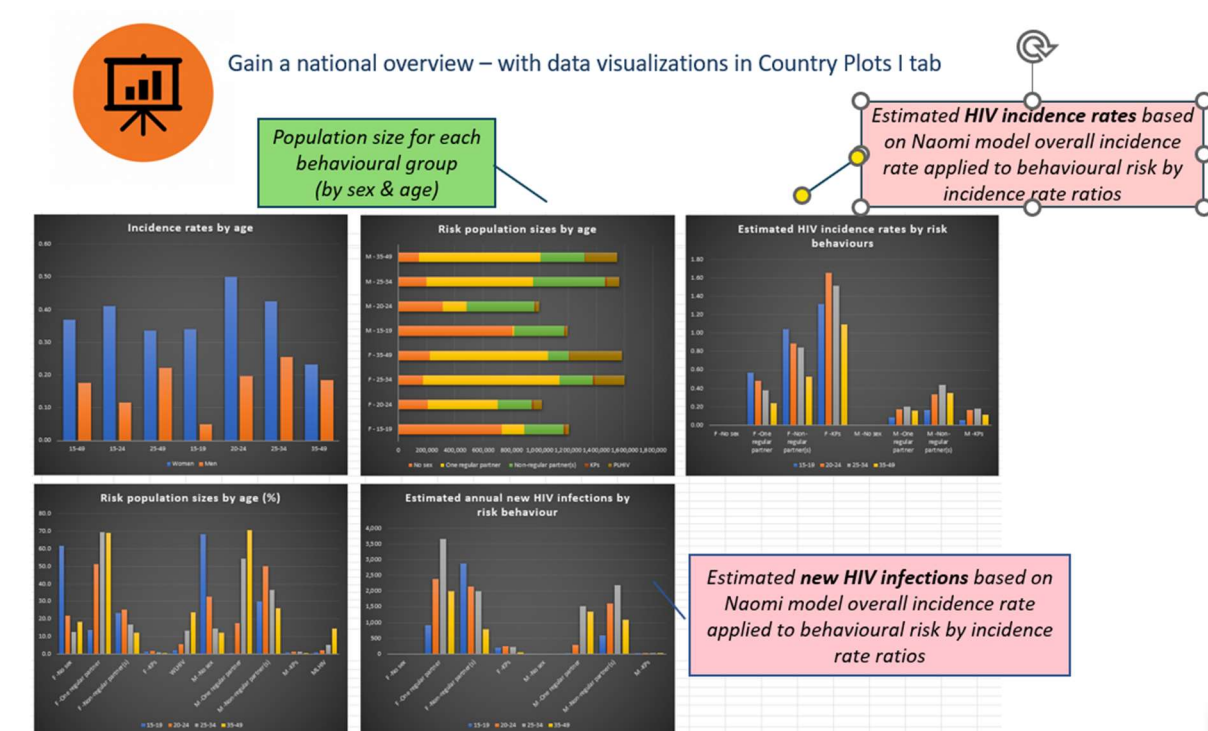
A further 24.2%, or another ~518,900 females aged 15–24, report non-regular sex partners.

They experience ~5,000 new infections per year (a high incidence rate of 0.97 cases per 100 PY).

This accounts for ~57% of all new infections among 15–24-year-old females.

Reaching this group too, in addition to YWSS above (~24.8% of HIV-negative females aged 15–24), with effective combination prevention, could avert ~ % of all HIV infections among 15–24-year-old females in Zambia.

The Country Plots I tab also presents estimates visually in the form of five bar charts, see example below. The first chart presents national-level incidence rates by age and sex (top, left). This is followed by two charts presenting the distribution of behavioural risk categories, summarised as a proportion [bottom, left] and number [top, middle] of people in each behavioural category, separately by age and sex. HIV incidence estimates are presented as rates [top, right] and new infections [bottom, middle], disaggregated by age, sex and behavioural group (with the latter generated through incidence rate ratios described in Part 1 applied to Naomi model estimates).





Step 2: Prioritise geographic areas (districts)

The Tool can help you to see variation in HIV risk profiles in order to prioritise districts for programme planning. As shown above, we can scan rates and numbers of infections across districts in the first two orange tabs, to explore this variation. In addition, the Tool can rank districts in order of highest incidence rates and numbers. The **Country Plots III** tab ranks the 'top 10' districts according to the sex, age group, and behavioural risk group of your choice.

Using insights gained from Step 1 to select a priority sub-population, the Country plots III tab will generate plots ranking the top 10 districts according to: (1) the highest HIV incidence rates; and (2) the largest number of new HIV infections in this sub-population.

Try this yourself with the **Country plots III** tab

In Step 1 above, we observed that HIV incidence in Zambia is substantially higher among females aged 15–24 than among males of the same age group. Within this group, the highest HIV incidence rates are found among young women in key populations, whilst the largest number of new HIV infections occurs among young women reporting non-regular sexual partner(s). To identify districts to prioritise for prevention with young females, try the below example to rank districts by selecting females aged 15-24 years in Zambia.

Go to the Country plots III tab and select the sex, age group and behavioural risk category of interest to rank districts by HIV incidence rate and estimated number of new infections.

This selection will generate the following district rankings.



From the above output, you will see that the district rankings (by HIV incidence rate and by HIV infections) are not the same.

- **Q:** Why do you think the ranking of Top 10 districts differs in the first and second list?

- **A:** The districts with the highest HIV incidence rates are not always the most populous districts. Some may be in rural, dispersed, less populous areas. A third plot generated in Country plots III ranks the districts by the size of the HIV-negative population (in our example, it ranks districts with the highest concentration of females aged 15-24 years who are HIV-negative). Large population sizes can drive large numbers of new infections, even if HIV incidence rates are not very high. This shows us that it is important to consider both the rates and numbers of new HIV infections, to identify priority districts.



Step 3: 'Zoom in' to understand HIV risk composition at the district level (one district at a time)

Once you have prioritised geographic areas, the purple 'District outputs' tab allows you to generate district-level summaries of all estimates, in both tabular and graphical formats. This is useful for programme and resource planning at the individual district level (or other sub-national unit such as 'county', depending on the country).

Try this yourself with the **District outputs** tab

Using insights gained from district ranking in Step 2, choose a district that you have designated as a priority for HIV prevention, on the basis of both HIV incidence rates and numbers of new HIV infections.

After opening the relevant country-specific SHIPP file, go to the District outputs tab. Select the district or subnational unit of interest from the drop-down menu in the blue box at the top left. The spreadsheet will automatically populate with estimates and data plots for that district.

In the below example we have selected Kisumu county in Kenya. (This is a district in the Top 10 for both HIV incidence rates and new infections, based on the rankings generated in Country Plots III) As you can see, the table summarises estimates in the same format as the national level summaries explored above.

Estimating the size of populations at risk of acquiring HIV in settings with high HIV incidence:
A User's Guide to the SHIPP Tool [2026]

	A	B	C	D	E	F	G	H	I	J	K	L	M	
1	District population size estimation	Kenya				Kisumu								
2		KEN_2_42 Women's district HIV incidence				Laikipia				District HIV incidence: Low				
4		Adolescent girls and women by level of HIV risk				Nakuru				Adolescent boys and men by level of HIV risk				
5		No sex	One regular partner	Non-regular partner(s)	KPs	Narok				One regular partner	Non-regular partner(s)	KPs	All	MLHIV
6	Population in % of total					Kajiado								
7	15-49	26.5	44.7	27.4	1.4	Kericho				30.6	43.5	1.4	100.0	7.8
8	15-24	45.5	26.5	25.2	1.7	Bomet				5.6	47.8	1.6	100.0	3.1
9	25-49	10.8	59.7	28.4	1.1	Kakamega				50.6	40.1	1.2	100.0	11.3
10	15-19	68.6	10.4	19.5	1.5	Vihiga				0.5	32.1	1.4	100.0	2.1
11	20-24	20.1	44.3	33.7	2.0	Bungoma				10.7	63.5	1.8	100.0	4.1
12	25-34	9.0	60.2	29.3	1.5	Busia				44.0	45.3	1.6	100.0	7.6
13	35-49	13.0	59.1	27.3	0.6	Siaya				59.6	32.9	0.6	100.0	15.9
14	Population sizes					Kisumu								
15	15-49	83,692	141,296	86,695	4,315	Kisumu				96,930	137,667	4,309	343,493	26,891
16	15-24	64,968	37,926	37,484	2,466	Kisumu				7,877	67,174	2,247	145,077	4,455
17	25-49	18,724	103,370	49,211	1,849	Kisumu				89,053	70,493	2,062	198,416	22,437
18	15-19	51,276	7,796	14,557	1,137	Kisumu				335	22,606	976	71,943	1,480
19	20-24	13,692	30,129	22,927	1,329	Kisumu				7,541	44,567	1,272	73,134	2,975
20	25-34	8,673	57,775	28,172	1,473	Kisumu				44,638	45,945	1,634	103,834	8,379
21	35-49	10,051	45,535	21,035	436	Kisumu				44,476	24,548	428	66,582	14,057
22	Estimated annual new HIV infections													
23	15-49	0	249	383	83	714	0	0	82	238	29	348	0	
24	15-24	0	118	252	53	423	0	0	8	106	13	126	0	
25	25-49	0	131	131	30	232	0	0	74	132	16	222	0	
26	15-19	0	51	163	26	239	0	0	0	23	2	25	0	
27	20-24	0	68	89	27	185	0	0	7	82	11	100	0	
28	25-34	0	81	83	24	188	0	0	44	96	14	155	0	
29	35-49	0	49	48	6	103	0	0	30	35	2	68	0	
30	Contribution to all new HIV infections in age group													
31	15-49	-	35	54	12	100	-	-	23	68	8	100	-	
32	15-24	-	29	60	12	100	-	-	5	84	10	100	-	
33	25-49	-	45	45	10	100	-	-	33	59	7	100	-	
34	15-19	-	21	68	11	100	-	-	1	91	9	100	-	
35	20-24	-	37	48	15	100	-	-	7	82	11	100	-	
36	25-34	-	43	44	13	100	-	-	29	62	9	100	-	
37	35-49	-	48	45	6	100	-	-	44	52	3	100	-	
38	Estimated HIV incidence rates													
39	15-49	0.00	0.18	0.44	1.91	0.23	0.00	0.00	0.08	0.17	0.67	0.11	0.00	
40	15-24	0.00	0.31	0.67	2.74	0.30	0.00	0.00	0.10	0.16	0.57	0.09	0.00	
41	25-49	0.00	0.13	0.27	1.62	0.17	0.00	0.00	0.08	0.19	0.79	0.13	0.00	
42	15-19	0.00	0.65	1.12	2.26	0.32	0.00	0.00	0.05	0.10	0.23	0.04	0.00	
43	20-24	0.00	0.22	0.39	2.03	0.27	0.00	0.00	0.10	0.19	0.83	0.14	0.00	
44	25-34	0.00	0.14	0.30	1.70	0.20	0.00	0.00	0.10	0.21	0.86	0.05	0.00	
45	35-49	0.00	0.11	0.23	1.35	0.13	0.00	0.00	0.07	0.14	0.51	0.19	0.00	
46														
47	Population sizes per HIV incidence category	AGYW 15-24				ABYM 15-24								
48	Categories	No sex	One regu	Non-regu	KPs	Total	No sex	One regu	Non-regu	KPs	Total			
49	Low HIV Incidence	64,968	0	0	0	64,968	63,325	7,877	67,174	0	138,375			
50	Moderate HIV Incidence	0	30,129	22,927	0	53,057	0	0	0	932	932			
51	High HIV Incidence	0	7,796	14,557	0	22,353	0	0	0	1,316	1,316			
52	Very high HIV Incidence	0	0	0	2,466	2,466	0	0	0	0	0			
53	Total	64,968	37,926	37,484	2,466	142,843	63,325	7,877	67,174	2,247	140,623			
54														
55	Population sizes per HIV incidence category	Women 25-49				Men 25-49								
56	Categories	No sex	One regu	Non-regu	KPs	Total	No sex	One regu	Non-regu	KPs	Total			
57	Low HIV Incidence	18,724	103,370	0	0	122,094	14,371	89,053	24,548	28	128,000			
58	Moderate HIV Incidence	0	0	49,211	0	49,211	0	0	45,945	311	46,256			
59	High HIV Incidence	0	0	0	1,849	1,849	0	0	0	1,723	1,723			
60	Very high HIV Incidence	0	0	0	0	0	0	0	0	0	0			
61	Total	18,724	103,370	49,211	1,849	173,154	14,371	89,053	70,493	2,062	175,979			



Short exercise

District outputs

With the **Districts outputs** tab, use district-level summaries in the table & plots to find:

- Among **females** in Kisumu, Kenya, which sub-group experiences the highest HIV incidence rate? How would you describe this rate? How many new infections are estimated per year in this sub-group?
 - ...
 - ...
- Among **males** in Kisumu, Kenya, which sub-group experiences the highest HIV incidence rate? How would you describe this rate? How many new infections are estimated per year in this sub-group?
 - ...
 - ...

Did you find the answers?



Short exercise

District outputs

With the District outputs tab, use district-level summaries in the table & plots to find:

- 1. Among females in Kisumu, Kenya, which sub-group experiences the highest HIV incidence rate? How would you describe this rate? How many new infections are estimated per year in this sub-group?**
 - Females aged 15–19 years in 'key populations' (young women who sell sex)
 - The incidence rate is approximately 2.26 new infections per 100 person-years; this is a 'very high' level
 - The estimated number of new HIV infections among 15–19 females in key populations is ~26 per year
- 2. Among males in Kisumu, Kenya, which sub-group experiences the highest HIV incidence rate? How would you describe this rate? How many new infections are estimated per year in this sub-group?**
 - Males aged 25–34 years in 'key populations' (MSM and men who inject drugs)
 - The rate is approximately 0.86 new infections per 100 person-years; this is 'high'
 - The estimated number of new HIV infections among 25–34 males in key populations is ~14 per year



Step 4: Estimate numbers in need

The SHIPP Tool adds up population sizes in each HIV incidence category. This generates population size estimates that can serve as denominators for differentiated HIV prevention planning, for example:

- The estimated number of people at 'high' and 'very high' HIV risk and in need of intensive HIV prevention programming. These may include PrEP, STI diagnoses and treatment, and economic empowerment strategies. (Programming strategies are discussed further in Part III below.)
- The estimated number of people in need of a basic minimum package of comprehensive HIV prevention strategies. These may include HIV testing, treatment and condom promotion, and are recommended for everyone regardless of HIV risk.

The Tool generates population size estimates at both national and district level. For national-level denominators, use the Country plots II tab in the relevant country-specific SHIPP file. For district-level denominators, use the District outputs tab [rows 47-61].

Try this yourself with the **Country plots II** tab



Can be used as denominators for programme planning



	A	B	C	D	E	F	G	H	I	J	K
1	National population size estimation				Zambia						
2		ZMB	Women's national HIV incidence level High				Men's national HIV incidence level: Low				
3	Population sizes per HIV incidence category	Women & Adolescent Girls					Men & Adolescent Boys				
4		AGYW 15-24					ABYM 15-24				
5	Categories	No sex	One regular partner	Non-regular partner(s)	YWKPs	Total	No sex	One regular partner	Non-regular partner(s)	KPs	Total
6	Low HIV Incidence	938,325	55,850	2,634	0	996,809	1,122,798	121,595	384,655	20,779	1,649,827
7	Moderate HIV Incidence	0	301,645	102,297	0	403,942	0	54,124	377,057	3,237	434,418
8	High HIV Incidence	0	294,742	388,567	26,971	710,279	0	0	72,651	0	72,651
9	Very high HIV Incidence	0	0	25,358	3,402	28,759	0	0	0	0	0
10	Total	938,325	652,237	518,855	30,372	2,139,790	1,122,798	175,719	834,363	24,016	2,156,896
11		Women aged 25-49					Men aged 25-49				
12	Categories	No sex	One regular partner	Non-regular partner(s)	KPs	Total	No sex	One regular partner	Non-regular partner(s)	KPs	Total
13	Low HIV Incidence	393,610	510,929	15,008	0	919,546	346,256	1,029,873	109,806	15,848	1,501,784
14	Moderate HIV Incidence	0	1,016,962	110,312	88	1,127,362	0	581,429	459,208	5,607	1,046,245
15	High HIV Incidence	0	272,630	258,427	17,965	549,022	0	0	253,299	0	253,299
16	Very high HIV Incidence	0	0	0	1,922	1,922	0	0	0	0	0
17	Total	393,610	1,800,521	383,746	19,975	2,597,852	346,256	1,611,303	822,314	21,455	2,801,327

Use the output from the above example to answer the following questions.

*Estimating the size of populations at risk of acquiring HIV in settings with high HIV incidence:
A User's Guide to the SHIPP Tool [2026]*

In Zambia, among <u>15-24</u> year-old young people (YP)...	Females	Males
How many YP should be reached with a basic minimum package of comprehensive HIV prevention strategies? <i>[Clue: this is recommended for everyone regardless of risk level]</i>		
How many YP are in a 'high' or 'very high' incidence category, and thus in need of intensive HIV prevention programming?		
How many YP may be in need of a 'key population' programme?		

Did you find the answers?

In Zambia, among 15-24 year-old young people (YP)...	Females	Males
How many YP should be reached with a basic minimum package of comprehensive HIV prevention strategies? [Clue: this is recommended for everyone regardless of risk level]	2,139,790	2,156,896
How many YP are in a 'high' or 'very high' incidence category, and thus in need of intensive HIV prevention programming?	High: 710,279 + Very high: 28,759	72,651 + 0
How many YP may be in need of a 'key population' programme?	30,372	24,016

	A	B	C	D	E	F	G	H	I	J	K	
1	National population size estimation	Zambia										
2		ZMB	Women's national HIV incidence level High				Men's national HIV incidence level: Low					
3	Population sizes per HIV incidence category	Women & Adolescent Girls				Men & Adolescent Boys						
4		AGYW 15-24				ABYM 15-24						
5	Categories	No sex	One regular partner	Non-regular partner(s)	YWKPs	Total	No sex	One regular partner	Non-regular partner(s)	KPs	Total	
6	Low HIV Incidence	938,325	55,850	2,634	0	996,809	1,122,798	121,595	384,655	20,779	1,649,827	
7	Moderate HIV Incidence	0	301,645	102,297	0	403,942	0	54,124	377,057	3,237	434,418	
8	High HIV Incidence	0	294,742	388,567	26,971	710,279	0	0	72,651	0	72,651	
9	Very high HIV Incidence	0	0	25,358	3,402	28,759	0	0	0	0	0	
10	Total	938,325	652,237	518,855	30,372	2,139,790	1,122,798	175,719	834,363	24,016	2,156,896	

Finally, if you have identified a priority population group from the steps above, population size estimates are listed for sub-groups in the series of blue and green tabs which summarise all data in separate age & sex groupings.

PSE F45-49	PSE F15-24	PSE F25-49	PSE F15-49	PSE M15-19	PSE M20-24	PSE M25-29	PSE M30-34
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For example, if you have identified females aged 15-24 as a priority population in your country, you can use the blue 'PSE F15-24' tab for a complete list of population size estimates in all districts, in columns Z through AG. You can also view estimates for narrower 5-year age groups in 'PSE F15-19' and 'PSE F20-24'.

7. Troubleshooting

It is anticipated that country applications may lead to technical questions, problems and suggestions. Those might include how to consider additional data, how to deal with implausible results or simply technical issues when using or making adjustments to the file.

For technical support requests and related questions, please contact

- as a first entry point for all technical support, estimates@unaids.org
- for general questions and support, the technical focal point in the Global Prevention Coalition Secretariat: benediktc@unaids.org
- for any questions related to the NAOMI model estimates: wanyekii@unaids.org
- for any questions on the spreadsheet: krisher@pennstatehealth.psu.edu

8. Interpreting Results and Acknowledging Uncertainty

Neither the population size nor behavioural risk data will be static or exact (see Section 10 on Limitations). They will change over time, sometimes more quickly than new data are collected and added to the Tool. Also, as the HIV incidence estimates are based on assumptions about relative risks, the output should be considered indicative rather than precise enough for specific target-setting, e.g., they are not accurate enough to identify an exact number of individuals to find and enrol into services.

Outputs may be ambiguous, and there might be missing data and/or some gaps, depending on what was available in the dataset used to populate the spreadsheet. It is valuable to consider any recent studies that have been conducted and include other data on populations at risk of HIV within your context, in your interpretation and use of the estimates.

As an example with adolescent girls and young women, Table 4 illustrates structural vulnerabilities that are often associated with risk or – in the case of adolescents who are not yet sexually active – potential future risk. Structural vulnerabilities are important to consider in understanding the social context of behavioural risks and structural barriers affecting key populations, however, such factors are not yet incorporated within the estimation Tool.

Table 4: HIV-related risk in the context of structural vulnerabilities

Sexual behavioural category	Associated structural vulnerabilities
Not sexually active	Low access to secondary education, orphanhood, exposure to violence, household poverty, food insecurity
Sexually active with one cohabiting partner	+ Early sexual debut, early motherhood, sexual power imbalance, inter-personal violence and conflict, economic dependence on partner, spousal separation
Sexually active with at least one non-regular sexual partner(s) (non-cohabiting, non-marital) or two or more partners (of any type)	+ Alcohol, transactional sexual relationships, mobility
Young women who sell sex	Factors above + Stigma, discrimination, systematic exclusion from health and social services, criminalization, lack of legal protections, increased risk of violence

Existing programme data on numbers reached, numbers and proportions of adolescent girls and young women (in different behavioural categories) receiving existing services, and other routine data may also offer insights into who is being missed and where efforts need to be intensified and redirected (regardless of the estimated numbers).

It is important to note that the SHIPP Tool produces population size estimates of all people in need of HIV prevention services (in the given population). This is considered the denominator for a given population, and does not take existing programme coverage into account. In other words, the number of people *already* receiving HIV prevention services have not been deducted from the estimates. This is something that can be done with programmatic, clinical or research data specific to the context.

Part III. From data to programming

9. Using the population size estimates

In principle, HIV prevention services and tools should be made available universally. Where resources are limited, however, priorities can be made on the basis of risk, in particular for programme components that are more costly, such as interpersonal outreach, PrEP or social support interventions.

This section outlines strategies to use the estimates generated by the SHIPP Tool for such prioritisation, **focusing on adolescent girls and young women as an example.**

Once the estimated numbers of adolescent girls and young women stratified by risk have been produced, there are two ways to use the data for prioritisation and planning. The first approach is to review the data geographically in order *to identify districts* with a high concentration of young women likely to be at risk of contracting HIV. The second is to determine the specific service packages that should be offered *within any given district*, including the likely financial and human resources required to deliver them. These two approaches are addressed in turn.

1. *Geographic prioritisation.* Comparison between districts will highlight settings with greater need for intensified HIV prevention, e.g., the districts with the highest concentration of young women likely to be at risk of HIV infection. There will be some districts with overall low HIV incidence but with significant numbers of adolescent girls and young women reporting high risk behaviours. This could result from a large population size in general (such as in urban areas or larger districts) and/or location of numerous “hot spots” where high risk behaviour is concentrated, such as border towns. On the other hand, there may be districts with high background HIV incidence but relatively few numbers of adolescent girls and young women at risk, perhaps in rural, dispersed or sparsely populated areas. Combined with existing contextual information about demographic and socio-economic patterns of HIV transmission, the estimates can help select or confirm geographical allocation of programme efforts.
2. *Prioritisation within districts.* The Tool highlights how behavioural risk is distributed across adolescent girls and young women by age group, facilitating the planning of differentiated HIV prevention packages. The *Decision-making Aide for Investments into HIV Prevention Programmes among Adolescent Girls and Young Women*, updated in 2026, specifies **that the following standard and comprehensive services should be made available to ALL adolescent girls and young women**, regardless of risk level or location:

Through general health, education and social development funding:

- Access to primary and secondary education
- School health programmes
- Comprehensive Sexuality Education (CSE) in both school and out-of-school settings
- Social support and empowerment of vulnerable adolescents
- Access to integrated sexual and reproductive health services delivered through youth-friendly systems

Through HIV response funding:

- Access to male and female condoms and lubricants
- Comprehensive HIV information
- Access to HIV testing and treatment services

- Post-exposure HIV prophylaxis and prevention of mother-to-child transmission of HIV within maternal and child health services
- Dedicated HIV prevention programmes for and with key populations (including young key populations) in line with available guidance

Specific additional HIV prevention components should be added differentiated by the district's combined location and population-based risk levels as follows:

HIV incidence generated by the spreadsheet (disaggregated by location & behaviour categories)	HIV incidence risk category	Additional Core Package Components (from 2021-2026 <i>Global AIDS Strategy</i> and 2016 <i>UNAIDS Guidance on HIV Prevention among Adolescent Girls and Young Women</i>)
< 0.2	Low	N/A The standard package of services listed above are recommended for all adolescent girls and young women
0.2-<0.5	Moderate	The above plus... <ul style="list-style-type: none"> ● Risk assessment for STI/HIV and counselling and testing ● Active provider-initiated condom and lubricant promotion and provision
0.5-2.0	High	The above plus... <ul style="list-style-type: none"> ● Dedicated school-based HIV prevention campaigns (knowledge, risk perception, methods, skills, GBV) linked to services in all schools/tertiary educational settings ● Community-based demand generation and outreach HIV prevention services ● STI diagnosis (including as indicator for HIV risk) and treatment ● HIV&STI service integration into family planning services ● Male partner testing (invitation letter + self-test) + ART referral ● Access to HIV pre-exposure prophylaxis (PrEP) ● Community-based active PrEP demand generation
>2.0	Very High	The above plus... <ul style="list-style-type: none"> ● Active promotion of PrEP services to all who are currently sexually active ● Structured interpersonal communication outreach using evidence-based curricula, e.g., SASA! ● Cash transfers, incentives, economic empowerment targeting most vulnerable adolescent girls and young women ● Social asset-building, safe spaces, parenting programmes, and mentoring targeting most vulnerable adolescent girls and young women ● Keep girls in school or provide education assistance targeting vulnerable adolescent girls and young women at high risk

An important aspect of multi-component differentiated packages is the ability to “layer” services so that each adolescent girl and young woman receives a mix based on her individual needs and circumstances. Where different organisations are commissioned to offer various components in the package, careful attention should be given to putting coordination mechanisms and referral systems in place to avoid patchy coverage. Lessons about different models of coordination have been learned from the DREAMS Partnership in diverse settings.⁵

⁵ Chimbindi & Birdthistle, et al. Translating DREAMS into practice: Early lessons from implementation in six settings. *PLoS One* 2018. <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0208243>

The SHIPP Tool will be most useful if used as part of comprehensive situation and response analysis leading to strategic prioritization. Strategic decision-making needs to consider the very large differences in risk of acquiring HIV, which the Tool illustrates, but also adolescent girls' and young women's circumstances and contextual drivers of HIV risk (for example, those who are unemployed, out of school, orphaned, at risk of violence victimisation, in receipt of government welfare grants, or characteristics of male sexual partners) rather than sexual behaviours only.

Where the module for young women in the PrEP-Implementation⁶ and target setting tools^{7,8} has been used, it will be useful to compare findings. The PrEP implementation tool will provide more precise PrEP needs estimates, while this SHIPP Tool provides estimates that can be linked to a full set of HIV prevention activities.

Finally, it is essential that population size estimates and prioritization exercises are not used for targeting and labelling individual women. The Tool's purpose is to help estimate how many AGYW are at risk and should be prioritized in programme planning and resource allocation. Strategies for reaching priority populations are discussed in the next section.

Part IV. Reflections on use of the SHIPP Tool

10. Limitations

While the population size estimates described in this Guide can facilitate national and district-based planning, there are limitations that should be taken into consideration.

First, the SHIPP model relies on the accuracy and quality of the survey data that underpin its calculations, some of which may be out-of-date, especially where HIV incidence and behaviours change with time. Wherever possible, SHIPP estimates should be triangulated with other available data, including local knowledge from existing programmes and community representatives. For example, service providers reaching specific sub-populations of adolescent girls and young women (e.g., out-of-school girls or young sex workers) may have relevant, current data from local mapping exercises or clinic registers.

Second, the spreadsheet generates very specific numbers that can give a false sense of precision and accuracy. Programme implementers may be tempted to use these exact numbers as specific targets for service delivery and use them as denominators for calculating coverage of different service packages. While some monitoring with these estimates will be appropriate, it is important to consider population size figures as indicative rather than exact. They are estimates, based on a range of assumptions, and likely to be more useful for prioritisation (relative comparisons between districts and sub-groups) rather than to monitor programme performance, for example, by a particular implementing organisation.

A third limitation of the SHIPP tool is its use of rigid behavioural risk categories, which may not accurately represent behaviour over time, particularly among young people. Social science research

⁶ <https://www.who.int/tools/prep-implementation-tool>

⁷ <https://www.prepwatch.org/resource/prep-it/>

⁸ https://jointsiwg.unaids.org/wp-content/uploads/2022/01/3.-Using_the_PrEP-KP-tools.pdf

has consistently shown the diversity of sexual behaviour and its relationship to HIV, the dynamic nature of young people's behaviours and relationships (between the categories listed above), and how factors that shape sexual vulnerability change across time and between contexts. Furthermore, labelling individuals as "high" or "extremely high" risk can be stigmatising and reduce their willingness to engage with prevention services. This is particularly true in the case of young key populations, for example, females who sell or exchange sex but may not self-identify as part of the community of female sex workers, or men who have sex with men who may not self-identify as gay men.

Annex 1.

Frequently Asked Questions about the SHIPP Tool: data inputs, sources & modelling

Populations included/excluded

Q: Which key population groups are included in the SHIPP Tool estimates?

- For females, the SHIPP Tool includes women who sell sex (whether they do or do not identify as sex workers). Note this is **not** women who report transactional sex.
- For males: the SHIPP Tool includes men who have sex with men and men who inject drugs.

Q: Which key populations are not included in the SHIPP Tool, and why?

- Transgender women – due to lack of reliable data and small population size, particularly for spatially disaggregated estimates at 5-year age categories.
- Women who inject drugs – due to small population size. Based on the literature review of roughly 17 peer-reviewed studies, about 94% of the populations sampled were males. Therefore, in the SHIPP Tool we assume a 1:10 female to male ratio.
- Men in prisons.

Q: Why are estimates for 10-14 year olds not included? Aren't they a priority group for HIV prevention among adolescents, especially girls?

- Estimates for 10-14 year-olds have not been included in the SHIPP Tool due to the sparsity of sexual behaviour data for this age group. The main demographic and health surveys used in the Tool do not ask detailed sexual behaviour questions to children under age 15.
- However, the SHIPP Tool identifies areas in which HIV risk is high or very high among 15-19 year old girls; it would be advantageous to prioritise such areas with comprehensive prevention programmes for 10-14 year olds before their risk of HIV escalates and to reduce new infections among the next cohort of 15-19 year olds.
- (Note that the Naomi model estimates HIV prevalence for those under 15 years, based on data from sources such as routine testing, PMTCT and ART programmes).

Q: Why are some countries not included in the SHIPP Tool?

- The SHIPP Tool includes countries that have validated the Naomi model and have at least one household survey within the past 15 years.

Data Sources

Q: Do model estimates match the Modes of Transmission Model?

- At present, no.

Q: Do model estimates match the Key Population 'workbook' population sizes?

- Work is underway to be able to scale national KP population size estimates to the workbook, it is anticipated that during the estimates process, if a KP workbook is available, it will be used to scale national KP population sizes within the tool.

Q: What is the Naomi Model?

- Naomi is a Bayesian small-area estimation model, which estimates the number of people living with HIV (PLHIV), antiretroviral treatment (ART) coverage and unmet need, and

new HIV infections by district, or equivalent subnational administrative level. The model presents the data stratified by subnational administrative units, sex, and five-year age groups.

- For more information on the Naomi model, please see the article *Naomi: a new modelling tool for estimating HIV epidemic indicators at the district level in sub-Saharan Africa* by Eaton JW et al. *Journal of the International AIDS Society* 2021, 24(S5):e25788.
- The development of the data viewer for Naomi is led by UNAIDS, Avenir Health, Imperial College London and the UNAIDS Reference Group on Estimates, Models and Projections.
- You can find the data viewer here: <https://naomi-spectrum.unaids.org/>

Q: Should the estimate of new infections by district be similar to what we observe in Naomi?

- Yes, they should match exactly to what we observe in Naomi. Additionally, Naomi provides the following inputs to the SHIPP Tool: total population, HIV incidence, HIV prevalence, new infections and the number of people living with HIV (disaggregated by age, sex and district). The overall estimates by age, sex and district are identical to the Naomi model results.
- The addition the SHIPP tool makes is to integrate sexual behavioural data in order to further disaggregate HIV estimates by behavioural categories. This helps to identify priority sub-populations for differentiated HIV prevention (e.g., to plan the most intensive prevention for the highest risk groups).

Q: Why does the SHIPP Tool pool data from Naomi and not other models like Spectrum or Thembisa?

- The main reason that we are pulling data from the Naomi model is to have district-level estimates. The lowest level of geographical information for Thembisa (South Africa-specific) is provincial and for Spectrum (all countries) is national.
- Because the Naomi model is calibrated to the Thembisa model (in the case of South Africa) and to Spectrum (in the case of other countries), the estimates in the SHIPP Tool are also aligned with Thembisa and Spectrum.

Q: What is the data source for the population size estimates and HIV prevalence for Key Populations?

- The estimates come from the work of a team lead by Oli Stevens at Imperial College London and UNAIDS. They have synthesised available data on population sizes, HIV prevalence and ART coverage for KPs in sub-Saharan Africa to develop a small area estimation model to output KP estimates at an Admin-1 level (i.e., province, state, district or municipality, depending on the country; see next question).
- Available data used to build the model includes: The UNAIDS Global AIDS Monitoring & Key Population Atlas, the CDC Surveillance Database, the GFATM Surveillance Database, Peer-reviewed sources such as the Global.HIV and a systematic review by Degenhardt et al on people who inject drugs (PWID) systematic review.
- Based on the year and geography that the data were collected in, population size estimates are matched to a geography by name and corresponding population in order to obtain a baseline of general population size to compare to.
- Currently the model provides estimates for 3 KPs: FSW, MSM, and PWID.
- To estimate the population size, the Stevens et al model incorporates: an overall fixed effect for the study method category (i.e., empirical, PLACE, mapping, other); a random effect for the specific study method; an intrinsic conditional autoregressive (ICAR) spatial smoothing random effect at Admin-1 level and a study random effect (IID). Stevens et al's population size model specifically estimates urban proportions. When

there is no information for a particular area, data is borrowed from neighbouring areas, that is, they are spatially correlated between admin-1 neighbours.

- There is limited empirical data on the urban to rural KP ratio but it is widely held that the urban proportion of KPs is greater in urban areas. The assumption in Oli's model is that the KP size in rural areas is about 60% of what it is in urban areas.
- To estimate HIV prevalence, the Stevens et al model incorporates the following terms: a fixed effect to matched population prevalence for a given population group, year and admin-1; fixed effect for Region (e.g., west and central Africa vs, east and southern Africa); interaction between matched population HIV prevalence and region (to allow for the relationship between general population prevalence and KP prevalence to vary based on which region you are in); fixed effect for HIV status method (self-report vs laboratory) and a study random effect.

Q: What does Admin-1 level mean?

- Admin-1 level refers to the first level of spatial disaggregation in a country. It varies from country to country and can be: province, state, district or municipality.

Q: What is the data source for Key Population HIV incidence data?

- For FSW, the SHIPP Tool utilizes a systematic review of age and sex-matched HIV incidence estimates among FSW relative to the general population in Jones & Anderson et al medRxiv (<https://www.medrxiv.org/content/10.1101/2023.10.17.23297108v2.full.pdf>).
- For MSM and PWID, the SHIPP Tool utilizes the relative prevalence of HIV at an Admin-1 level in the Stevens et al modeling working described above to approximate relative incidence. These estimates are substantially lower for MSM than the relative incidence estimates calculated in a systematic review by Stannah et al medRxiv (<https://www.medrxiv.org/content/10.1101/2022.11.14.22282329v1>). UNAIDS analyses have found an inconsistency between empirical incidence and prevalence estimates among MSM, with empirical incidence estimates resulting in drastically higher HIV prevalence than is found in surveys of MSM. The hypotheses are that either empirical incidence estimates are increased due to the populations recruited in longitudinal incidence studies being substantially higher risk than most MSM, due to very young MSM experiencing a very short extremely high HIV risk period in their lives, or a further explanation. As a result, the SHIPP tool uses the prevalence ratio to approximate incidence rate ratio instead of empirical incidence estimates.

Q: How are HIV incidence rates by behaviour derived?

- The Model maintains the overall Naomi incidence rates and number of new infections in a given district and 5-year age group but pulls in literature estimates of incidence rate ratios by each of the behavioural categories to get estimates of HIV incidence rates by behaviours.
- The Model makes the assumption that the incidence rate ratios are the same across populations.

Q: Which behavioural surveys are included in the SHIPP Tool?

- Demographic Health Surveys (DHS), Population-based HIV Impact Assessment Surveys (PHIAs), the Botswana HIV/AIDS Impact Surveys, and Multiple Indicator Cluster Surveys (MICS).

Q: Where to find what survey data informs the Model?

- In the 'Model Inputs' tab of the SHIPP Tool.

Q: Why are multiple surveys listed in the table?

- This is a spatio-temporal model of sexual behaviour over time in a country. We find that there is relatively little change over time in sexual behaviour reporting, but we include multiple surveys to improve estimation. The year of each survey included is listed on the table in the 'Model Inputs' tab mentioned above.

Q: How reliable are the sexual behaviour data? How confidently can we interpret the estimates in each age group?

- The behavioural survey data may be subject to selection bias (if some groups are systematically excluded from participation) and to reporting bias (e.g., if there is under- or over-reporting of sexual behaviours, and these differ systematically by age, sex or geographic area).
- The SHIPP Tool does not account for these biases. If data are available to quantify the extent of reporting biases by age, we may be able to adjust for this in future iterations of the Tool.

Q: Why aren't other known behavioural risk factors included in the model, like condom use or condomless sex? e.g., if somebody with multiple sex partners uses a condom, the HIV risk estimate should be lower.

- Currently, we are not using any questions on inconsistent condom use or transactional sex from behavioural surveys. While this would add an additional feature, this represents an additional layer of complexity that ultimately would be too great for the quality of the data available.
- There continue to be challenges with collecting reliable data on condom use (including problems with measurement definitions and social desirability bias). Also, consistent condom use is rare among those cohabiting, or in a relationship with a regular partner.

Q: How are missing data from behavioural surveys handled?

- Although the rates of missing data from the survey questions used is very low, the SHIPP Tool is currently ignoring any missing data and doing a complete case analysis.
- The analysis accounts for sampling weights, which accounts for survey non-response but does not account for non-response from within individual indicators. This is a limitation of the SHIPP Tool.

Q: Why aren't social and structural determinants of HIV risk included in the SHIPP estimates, e.g., educational level, orphan status, socio-economic status, experience of violence?

- The SHIPP Tool fits data for all countries in a single model, and the risk associated with social and structural determinants varies by context (it is not universal).
- Going forward, it may be possible to fit separate models for countries with strong data on the HIV risks associated with important social and structural factors.

Updates to the SHIPP Tool

Q: How often will estimates in the SHIPP tool be updated?

- Tool updates will be incorporated into the annual HIV estimation process coordinated by UNAIDS. They will be finalised as each country's Naomi estimates are finalised in the early months of the following year (Jan-April).
- For behavioural data, any new survey data will be pulled in advance of the estimates process around December of each year.

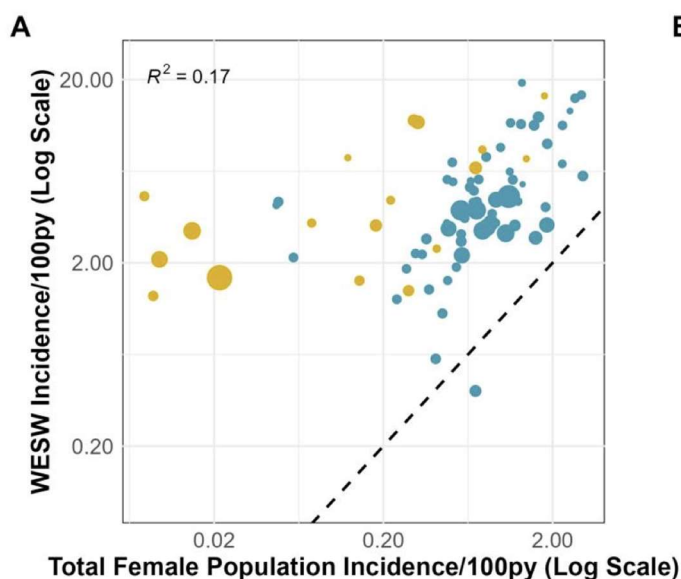
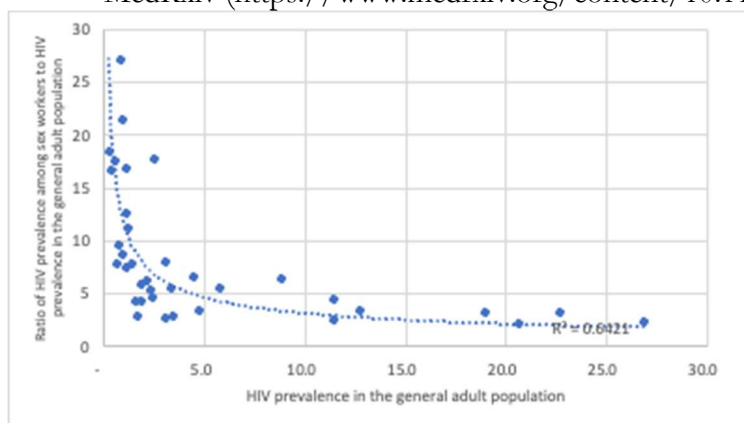
Q: How current are the estimates produced by the Tool?

- The HIV incidence rates are drawn from the Naomi model, which is updated annually (see previous question)
- The behavioural data are drawn from the most recent surveys available, and more than one survey if possible (for spatio-temporal modelling). The data suggest that there is little change over time in the proportions of the general population reporting the sexual behaviours used in this Tool.

Data Interpretation

Q: In Table 3 of the User Guide, why does the HIV risk ratio for female sex workers increase as the district-level HIV incidence decreases? Shouldn't HIV risk increase where HIV is more common in the community?

- The risk ratio represents a relative measure; in this case, it is a comparison of HIV risk among sex workers and those who do not sell sex in the same geographic area. In areas where HIV prevalence is low in the general adult population, the HIV risk among sex workers will be very high compared to the risk among those who do not sell sex. With increasing levels of HIV in the general population, HIV risk increases for all sexually active groups and the risk among sex workers becomes comparatively less than that of non sex workers.
- This relationship is illustrated in the figures below (from Jones & Anderson et al MedRxiv (<https://www.medrxiv.org/content/10.1101/2023.10.17.23297108v2.full.pdf>))



Q: Is the category of “No Sex” adjusted for survivors of rape in geographic areas where prevalence of sexual violence may be high? We know that survivors of rape may report “no” to survey questions like “have you had sex in the last 12 months?” or “zero” to questions such as “how many sexual partners have you had in the last 12 months?”.

- No. The SHIPP Tool is not currently adjusted for social stigma around reporting sexual activity to survey questions. Currently the SHIPP tool is outputting the estimates directly from the data, without adjusting to account for any potential differences on how the data is reported. However, this is something that the team of developers is exploring for future iterations of the tool.

Annex 2.

Reaching priority populations of adolescent girls and young women

The SHIPP Tool assists in estimating the number and concentration of HIV risk among adolescent girls and young women, but it does not provide the means by which individuals in different behavioural risk categories can be identified. Programmers will need to find locally appropriate ways of determining where and how to reach individuals to whom they intend to offer the different HIV prevention packages.

There are many approaches to conducting risk and vulnerability assessments, and tools that attempt to identify the highest risk individuals on a collective (based on structural or aggregated criteria) or individual (usually screening questionnaires) basis. These are not standardised nor well-evidenced. UNICEF conducted a review of over 40 tools and studies attempting to operationalise categories of sexual and reproductive health (including HIV) risk or vulnerability for adolescent girls and young women.⁹ The review identified great diversity in approaches, but no standardised or universally applicable ways to reliably screen individuals into programmatic risk categories. A recent systematic review and meta-analysis analyzed risk scores predicting HIV incidence among adult heterosexual populations in sub-Saharan Africa. Younger age, non-cohabiting partner(s) and recent sexually transmitted infections were consistently identified as predicting future HIV infection.¹⁰ The review concluded that both community HIV burden and individual factors should be considered to quantify HIV risk, while considering that HIV risk scores had only low-to-moderate predictive ability. The resulting uncertainties imply that risk differentiation can be useful for identifying priority groups for intensified outreach and active demand generation but should not be used to deny access to specific services.

Individual screening tools can be stigmatising and feel invasive and judgmental to the people to whom they are administered, although less sensitive proxy behaviours can be used in place of questions about behaviours that are deemed sensitive. Open-ended, interview-style screening methods have also been recommended, which allow for required information about difficult topics like sexual behaviour and gender-based violence to be collected through a natural conversation. As individuals often move between risk levels over time, including moving back and forth from lower to higher risk, as their circumstances and partnerships change, any form of screening should be considered less of a “one time” measure and more of a continuous process.

Good local information and familiarity with HIV risk environments will prove critical in deciding the best platforms for delivery of prevention packages. These should build on successful models in place, including existing governmental and non-governmental services providing sexual and reproductive health and social care to adolescent girls and young women in different settings.

In all settings the SHIPP Tool will show that HIV incidence rates are particularly high among (young) key populations. It is therefore essential to ensure that dedicated programmes with (young) key populations are developed in line with existing implementation tools and guidelines.

⁹ <https://www.unicef.org/esa/media/9146/file/UNICEF-ESARO-AGYW-RV-Assessment-2021.pdf>

¹⁰ Jia KM, Eilerts H, Edun O, et al. Risk scores for predicting HIV incidence among adult heterosexual populations in sub-Saharan Africa: a systematic review and meta-analysis. *J Int AIDS Soc.* 2022;25(1):e25861. doi:10.1002/jia2.25861

Among adolescent girls and young women at highest risk are those engaged in transactional sex, or who self-identify as sex workers. In addition to having multiple sexual partners, they are often less able to negotiate condom use and can be difficult to engage with health services. There is a continuum of sexual exchange. Some adolescent girls and young women offer sex through a range of informal arrangements usually referred to as transactional sex, where there is an expectation of financial or material compensation but not necessarily an agreed price in advance of the sex taking place. When adolescent girls and young women rely on selling sex as their main source of income, they are considered part of Key Populations.¹¹ Some adolescent girls and young women who sell sex consider themselves to be sex workers while others do not, particularly if they are still transitioning from more diffuse forms of sexual exchange, although they are likely to experience similar risks. A recent study with young women who sell sex in Zimbabwe (aged 18-24 years) found little difference in behavioural risk for HIV among those who did or did not self-identify as professional sex workers. However, those who did not identify as sex workers were less engaged with HIV and other SRH services.¹²

There is usually a very steep rise in HIV incidence by age among young key populations.¹³ There are particular challenges in engaging this group of adolescent girls and young women, as they may not be willing to disclose their involvement in selling sex among peer groups in general community settings but may also not feel comfortable attending targeted key population services. Delivering any package of services to adolescent girls and young women selling sex will thus require a two-pronged approach through which they can be identified and supported by both interventions designed for vulnerable adolescent girls and young women and services targeted at female sex workers.¹⁴

A combination of peer outreach and location-based approaches can help ensure adolescent girls and young women most in need of HIV prevention and treatment do not fall through the gaps. PLACE and Respondent Driven Sampling (RDS) are examples of location- and social network-based approaches used for recruitment into services.^{15,16} Local organisations serving key populations may also have programmatic insights into where younger sex workers can be found and can extend their services accordingly, or partner with organisations focused on a broader category of vulnerable adolescent girls and young women to ensure they are reached with all the relevant package components.

In location-based approaches, outreach by specially trained workers from organisations already considered key population or youth “friendly” can help to identify and refer adolescent girls and

¹¹ Girls under the age of 18 years who sell sex are defined as sexually exploited children in line with the UN Convention on the Rights of the Child.

¹² Hensen & Chabata, et al. HIV risk among young women who sell sex by whether they identify as sex workers: Analysis of respondent-driven sampling surveys, Zimbabwe, 2017. *JIAS* 2019. <https://onlinelibrary.wiley.com/doi/10.1002/jia2.25410>

¹³ Birdthistle I, Tanton C, Tomita A, et al. Recent levels and trends in HIV incidence rates among adolescent girls and young women in 10 high-prevalence African countries: a systematic review and meta analysis. *Lancet Global Health* 2019: 7(11). [Table 2]

¹⁴ Reference SWIT and the South Africa Sex Work Strategy [South African National Sex Worker HIV Plan 2016 - 2019 FINAL Launch Copy... \(2\) \(1\).pdf \(unfpa.org\)](#) regarding women who self identify as sex workers. Reference the UNAIDS transactional sex and HIV risk document for transactional sex programme approaches: [Transactional sex and HIV risk: from analysis to action \(unaids.org\)](#)

¹⁵ Olawore O & Astatke H, et al. Peer recruitment strategies for female sex workers not engaged in HIV prevention and treatment services in Côte d'Ivoire: Program data analysis. *JMIR Public Health Surveill* 2020. doi: 10.2196/18000. PubMed PMID: 33001039

¹⁶ Reference new paper in press with *JMIR Surveillance* comparing 2 methods of reaching young women who sell sex in Zimbabwe, by Chabata S et al

young women into services.¹⁷ “Hotspot” locations that are known as sites where people look for casual or commercial sexual partners often have concentrations of YWSS regardless of whether they self-identify as sex workers. These can be entertainment venues, truck stops, bar and hotel areas, for example.

Peer referral is also an effective way to reach adolescent girls and young women who are “hidden” and do not already have good contact with services.¹⁸ They are often more willing to take advice from those similar to themselves. A standardised approach to peer outreach and case management is Microplanning, where young peer educators identify, screen, and liaise with high risk adolescent girls and young women to link them to relevant services.¹⁹ Key population-friendly outreach workers can also help YWSS overcome their anxiety about taking up referrals to other interventions for adolescent girls and young women such as educational subsidies and social protection.

Differentiated models of care²⁰ allow for more client-centred approaches and increase the number of services delivered in community settings by lay workers and peers. STI and HIV testing, and ART and PrEP distribution are being made available through lay health workers or peer outreach workers. HIV self-testing is increasingly available. Where services require trained health professional and/or specialised equipment, mobile clinics that visit “hotspot” locations at specified times may work well for mobile adolescent girls and young women. Static clinics to which adolescent girls and young women have to travel can be less popular, particularly where adolescent girls and young women worry that they will be identified by community or family members. If static clinics are the only viable option, using outreach workers to accompany YWSS may improve their willingness to attend.

Finally, internet and phone-based communication and services may be especially suitable for adolescent girls and young women, depending on rates of ownership of phones and other digital devices. As exposure to social media increases, and digital equity improves, there are new opportunities for engaging priority populations, including adolescents and young people.

¹⁷ Reference the WHO recommendation on AFHS and the global standards:
<https://www.who.int/publications-detail-redirect/9789240031593>
<https://apps.who.int/iris/handle/10665/183935>

¹⁸ WHO reference <https://apps.who.int/iris/handle/10665/329993>

¹⁹ Reference the adapted microplanning approach trialled in Zimbabwe: <https://pubmed.ncbi.nlm.nih.gov/35279215/>

²⁰ WHO reference <https://apps.who.int/iris/handle/10665/258506>