

The Republic Of Uganda Ministry of Health

# THE 2019 HIV EPIDEMIOLOGICAL SURVEILLANCE REPORT FOR UGANDA

This report is a synthesis of recent epidemiological data on the magnitude and dynamics of the HIV epidemic in Uganda in recent years. It highlights the significant gains that have been made during the past decade towards HIV epidemic control, with over four-fifth of People Living with HIV diagnosed and enrolled on HIV treatment, most of whom have achieved viral load suppression. Although HIV incidence and mortality declined significantly during the decade, there are still pockets of new HIV infections among some population groups. There are also subgroups not yet diagnosed, or enrolled onto antiretroviral treatment, or not achieved viral suppression. These epidemic dynamics, and existing service gaps make a compelling case for intensified focused efforts to attain sustainable HIV epidemic control as we start the new decade

AIDS Control Programme

Kampala 30<sup>th</sup> March 2020 The Status of the HIV Epidemic in Uganda at the Dawn of The Next Decade of HIV Epidemic Control



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# Acronyms

	AIDS Devial and and Dorth and
ADP	AIDS Development Partners
AGYW	Adolescent girls and young women
AIM	AIDS Integrated Module
ANC	Antenatal Care
ANECA	African Network for the Care of Children Affected by HIV/AIDS
AOR	Adjusted Odds ratio
APN	Assisted Partner Notification
AZT	Zidovudine (Azidothymidine)
BSS	Behavioural Surveillance Surveys
CI	Confidence Interval
CLHIV	Children Living with HIV
CQI	Continuous Quality improvement
DHS	Demographic and Health Survey
DNA	Deo-oxyribonucliec Acid
DQA	Data Quality Assessment
DREAMS	Determined, Resilient, Empowere, AIDS-Free, Mentored and Safe
DTG	Doultegravir
EID	Early Infant HIV Diagnosis
EMRS	Electronic Medical Records System
EPP	Epidemic Projection Package
FSW	Female Sex Workers
HBV	Hepatitis B Virus
HC	Health Centre
HIVDR	HIV Drug Resistance
HMIS	Health Management Information System
HRL	HIV Reference Laboratories
HSDP	Health Sector Development Plan
HSHASP	Health Sector HIV/AIDS Strategic Plan
HSV-2	Herpes simplex virus Type 2
HTS	HIV Testing Services
IAC	Intensive Adherence Counselling
IE	Impact Evaluation
IP	Implementing partner
KP	Key Populations
Lag	Limiting Antigen Avidity Assay
MIP	Mother Infant Pairs
MRC	Medical Research Council
MSM	Men who have sex with men
MSPH	Makerere University School of Public Health
NCDs	Non-Communicable Diseases
NDP	National Development Plan
NNRTI	Non-nucleoside reverse transcriptase inhibitors
NRTI	Nucleoside reverse transcriptase inhibitors
NSP	National HIV/AIDS Strategic Plan
NTLP	National TB and Leprosy Programme
PCR	Polymerase Chain Reaction

PI	Protease Inhibitors
PITC	Provider Initiated Testing and Counselling
PLACE	Priorities for Local AIDS Control Efforts
PLHIV	People Living with HIV
POC	Point of care
PP	Priority Populations
PWID	People who Inject Drugs
PY	Person Years
RHSP	Rakai Health Sciences Programme
RHSP	Rakai Health Sciences Programme
STIs	Sexually Transmitted Infections
STS	HIV Self Testing
TDF	Tenofovir
TWG	Technical Working Group
UAC	Uganda AIDS Commission
UAIS	Uganda AIDS Indicator Survey
UBOS	Uganda Bureau of Statistics
UDHS	Uganda Demographic and Health Survey
UHSBS	Uganda HIV Sero behavioural Survey
UNPD	United Nations Population Division
UPHIA	Uganda Population HIV Impact Assessment
UPS	Uganda Prisons Service
UVRI	Uganda Virus Research Institute
VF	Viral failure
VL	Viral Load
VLS	Viral Load Suppression

## Foreword

The Uganda Ministry of Health is committed to evidence-informed planning, implementation and monitoring of HIV and other health services in the country. Understanding and regularly updating the data on the magnitude and dynamics of the HIV epidemic in the country represents an important step in this approach. This 2019 HIV Epidemiological Surveillance Report provides an updated insight into the HIV epidemic in Uganda, and the impact of various interventions, and will greatly contribute to the evidence informed approach to programme planning and implementation.

The data in the report have been derived from several important data sources, and benefits from national consultation with a wide range of stakeholders. The highlights of this report include a steady decline in adult and paediatric HIV incidence during the decade and now estimated at about 53,000 new HIV infections in 2019. This shows that successful implementation of Uganda's HIV prevention and treatment programme has had positive results. With heightened behaviour change and uptake of HIV prevention and treatment services, there will be more reduction in new HIV infections, and HIV epidemic control will be attained in the short run.

A positive outcome of treatment scale up is the reduction in mortality, and a corresponding reduction in the AIDS orphans burden. We however note the wide geographic variation in HIV burden that directs us to redouble our efforts to further reduce the burden, ensuring that no region or population group is left behind.

The Ministry of Health has frameworks complete with accompanying technical policies to comprehensively address the HIV epidemic and lead to sustainable HIV epidemic control. These include the Uganda Health Sector Strategic and Development Plan (HSDP) which incorporates critical indicators on HIV and AIDS; and the Health Sector HIV/AIDS Strategic Plan (HSHASP) 2018/19–2022/23 that provides technical directions to support attainment of HIV epidemic control in Uganda. These technical guidelines are aligned to the Presidential First Track Initiative to Ending AIDS, and the country's long-term development agenda in the National Development Plan III (NDP), the Vision 2040, and global commitments including the Fast Track to End the HIV/AIDS Epidemic by 2030. This is energized by current efforts towards Universal Health Coverage.

I would like to thank the task team that synthesised the data and compiled this HIV Epidemiological Surveillance Report. The team drew experts from different institutions under the overall coordination and leadership of the HIV/AIDS Control Programme in the Ministry. I would especially like to thank the African Network for the Care of Children Affected by HIV/AIDS (ANECCA), the UN Joint Programme on HIV/AIDS (UNAIDS), and Irish AID for the technical and financial support in development of the report.

I'm delighted to commend the report to programme managers, implementing partners, health planners, epidemiologists and research scientists, District Health Teams and health workers across the country.

Dr Diana Atwine

Permanent Secretary, Ministry of Health

## Preface

The accurate and current picture of the HIV/AIDS epidemic and epidemiological trends is critical for directing the national HIV/AIDS response especially at this time when Uganda is committed to sustainable HIV epidemic control. To this end, Uganda is making considerable efforts to improve the HIV surveillance system that generates epidemiological surveillance data. Uganda has expanded HIV surveillance from predominantly surveillance among antenatal women attending antenatal clinics, to include other data sources such as general population surveys, and surveys of key and priority population groups. In recent years, Uganda has conducted population-based HIV serological surveys to complement data from other HIV surveillance systems in order to provide HIV epidemiological data on men as well as remote, rural populations.

While Uganda remains severely affected by HIV/AIDS, there are encouraging prospects of HIV epidemic control with steady decline in new HIV infections and AIDS-related mortality during the past decade. Furthermore, the majority of PLHIV have been diagnosed, enrolled on treatment, and achieved viral suppression during the past decade. However, the magnitude of ongoing transmission remains high. There are also pockets where new infections remain high among some population groups and geographical areas. In addition, significant numbers of PLHIV remain undiagnosed; not linked to care; not enrolled on treatment; and, not virally suppressed. There is heterogeneity in these epidemic dynamics. This report has highlighted these dynamics that still challenge the prospects of sustainable HIV epidemic control.

The Ministry of Health periodically compiles data on the magnitude and dynamics of HIV/AIDS, and shares it with stakeholders. This HIV/AIDS Epidemiological Surveillance Report provides the most recent update of the HIV/AIDS situation in the country. Data were drawn from surveillance of HIV among ANCs; population based HIV serological surveys, behavioural data primarily from demographic and health surveys; and serological surveys among key populations. Additional data come from selected special studies and research. Emerging epidemic trends have been ably highlighted, particularly gender and other disparities in HIV/AIDS burden and new HIV infections, the increasing PLHIV burden among those aged over 50 years, high burden among key and priority populations including the hitherto unrecognized burden among workers in leisure and hospitality industry.

The Uganda Ministry of Health continues to place high priority on working towards HIV epidemic control. It will also continue to provide technical leadership in tracking the magnitude and dynamics of the epidemic, generating evidence, and sharing it will stakeholders at all level.

I hope that the readers will find this report a useful technical support tool to improve national HIV/AIDS responses, including consolidating and improving HIV surveillance systems in the country. I'm delighted to commend this report to stakeholders across the country.

Munch

Dr Henry G Mwebesa Director General Health Services Ministry of Health

# Acknowledgements

This Epidemiological Surveillance Report updates the knowledge and understanding of the ever evolving HIV epidemic in the country. It comes at a time when we are striving to achieve HIV epidemic control in Uganda. The data in this report were obtained from multiple sources including the HIV surveillance system; Monitoring and Evaluation of HIV/AIDS programmes; and routine service delivery data for HIV Testing Services (HTS), Anti-Retroviral Treatment (ART), and other services reported through the Health Management Information System. Data were also obtained from detailed analysis of the Uganda Population-Based HIV Impact Assessment (UPHIA) and other HIV serological surveys, and Demographic and Health Surveys (DHS). Mathematical modelling and epidemiological projections were conducted using Spectrum software developed by UNAIDS and Avenir Health. We are grateful to all partners for their contribution to the generation of this important strategic information.

The Ministry acknowledges the Joint UN Programme on AIDS (UNAIDS) Office in Kampala, Irish AID, and the African Network for Care of Children Affected by HIV/AIDS (ANECCA) for the technical and financial support for development of this report. We are also grateful to the US Centres for Disease Control and Prevention (CDC), the World Health Organisation Office in Kampala, and the Global Fund for supporting the HIV Surveillance activities. We appreciate the research programmes including the Medical Research Council, the Rakai Health Sciences Programme, the Makerere University School of Public Health, etc, that generate additional data and as part of their research which they generously shared to complement the routine surveillance data.

We acknowledge the Uganda Virus Research Institute (UVRI) for conducting laboratory tests. We thank the staff of sentinel surveillance sites who conducted in the antenatal surveys. We also appreciate the health workers who provide HIV prevention and treatment services and routinely compile routine service delivery reports.

The principal authors of this report are Dr. Joshua Musinguzi, Dr. Wilford Kirungi, Alhaj Noordin Mulumba, Mr Lordwin Kasambula, and Mr Ivan Lukabwe. Dr Patrick Turyaguma was the consultant who supported all stages of secondary data synthesis. The report was reviewed by ANNECA which helped to improve the quality of the report. The authors also acknowledge the secretarial support provided by Ms. Annet Katamba and Mrs Promise Mbonye.

We appreciate the input of the Surveillance Working Group / Uganda HIV/AIDS Estimates working group comprising of the Ministry of Health, CDC Uganda, WHO, UNAIDS, UNICEF, USAID, and the Uganda AIDS Commission. They consistently reviewed the assumptions made in mathematical modelling and epidemic projections.

The authors acknowledge the support of the top management of the Ministry of Health for the advocacy and resource mobilisation that enable implementation of HIV/AIDS prevention and control activities in Uganda.

Dr Joshua Musinguzi Programme Manager

## Summary

This HIV Surveillance Report is a synthesis of epidemiological data on the magnitude and dynamics of HIV infection epidemic in Uganda. The data were drawn from the surveillance system and other complimentary data sources obtained during the past decade. The aim of the report is to provide updated information on the HIV epidemic in the country, to aide strategic planning and evaluation of HIV epidemic control initiatives. This is especially important at this time when Uganda is planning for the post 2020 epidemic control agenda, and evaluating programme performance for the past decade.

It describes the HIV burden including data on HIV prevalence and estimated numbers and patterns of PLHIV among various population sub-groups in the country; the magnitude of new HIV infections in various population sub-groups including those at high risk; the magnitude and trends of AIDS-related mortality; and the patterns and trends in vertical HIV infections. In addition, it highlights recent trends in sexual behavior driving new HIV infections in the country; the patterns of viral load suppression; the triple 90s HIV testing and treatment cascades; prevailing patterns of antiretroviral drug resistance; and patterns of co-morbidities with HIV. Finally it delves into the projected future course of the HIV epidemic during the next decade.

For most of the past decade, HIV prevalence in the general population in Uganda remained level at 6 - 7 percent among adults, but heterogeneous across socio-economic and socio-demographic subgroups and geographical areas of the country. However, HIV prevalence among high risk groups such as female sex workers (FSWs) and their clients, as well as women and men who work in places of entertainment and leisure especially in urban and peri-urban hotspots, fishing communities, men who have sex with men (MSM) and men and women in prisons or incarceration, was 3 - 5 fold higher. Approximately 1.46 million people [95% plausibility limits: 1.32 - 1.52 million] were living with HIV in the country by the end of 2019. This continued the increasing HIV burden throughout the decade as HIV epidemic control has not yet been attained. The HIV burden was particularly increasing among older individuals, where PLHIV aged over 50 years accounted for 17% of PLHIV in the country in 2019, and is projected to rise up to 25% by 2025, and 41% by 2030. This arises from the fewer new HIV infections among young people, and decreasing AIDS-related mortality as PLHIV are aging.

HIV incidence in the general population has steadily declined throughout the past decade, to approximately 0.25% [plausibility bounds: 0.20 - 0.33] in 2019. It is also heterogeneous across population sub-groups, with HIV incidence among high-risk groups exceeding that in the general population by 5 - 10 fold. There were approximately 53,000 [plausibility bounds: 43,000 - 71,000] estimated new HIV infections in the country by close of the decade, approximately 50% decline from 2010. This decline fell short of the UNAIDS Fast Track target of 75% reduction in new HIV infections during the decade. Young people 15 - 24 years accounted for over one-third of new HIV infections (37%), with older adolescent girls and young women (AGYW) accounting for a disproportionately share of this number.

AIDS related mortality declined steadily during the past decade, and is currently estimated at 37 / 100,000 or approximately 21,800 [plausibility limits: 18,000 – 28,600] in 2019, still far below the number of new HIV infections. Men continue to predominate in AIDS-related mortality statistics.

New vertical infections fell to an all-time low in 2019 to approximately 5,690 [plausibility limits 4,520 – 8,390], continuing the declining trend throughout the decade. The six week MTCT rate in 2019 was approximately 2.8% [plausibility limits: 2.3% - 4.0%]; while that after breast feeding was approximately 6.0% [plausibility bounds: 4.9% - 8.6%). It is also estimated that approximately 47% of vertical infections were acquired during pregnancy, and the remaining 53% acquired during breast feeding. We estimate that most vertical infections during 2019 occurred among women who dropped off ART with children infected during pregnancy (25%), or breast feeding (21%); and among women who acquired HIV during breast feeding (24%); or pregnancy (11%).

During 2019, over 90 percent of PLHIV enrolled on ART in Uganda had at least one viral load test for clinical monitoring, with over 90% of adults on ART achieving viral load suppression (VLS), defined as 1,000 viral copies/ml. However, over one-quarter of children (26.2%) did not achieve VLS. When prorated to all PLHIV, 83% of women had achieved VLS, surpassing the triple 90 target of 73% by 2020, but falling short of the triple 95 target of 85% by 2020. At VLS of 68%, men were still lagging behind, and off the triple 90s target of 73% by 2020. Children at 48% were lagging far behind the 2020 targets.

Regarding the 90-90-90 targets, triangulation of programme results and spectrum estimates show that Uganda is on course to meet the triple 90-90-90 targets by 2020 among adult men and women, but children were below target. It is estimated that by end of 2019:

- Approximately 94% of HIV-infected women were aware of their HIV-positive serostatus; 94 percent of HIV-infected women were enrolled on antiretroviral therapy; and, 83 percent had achieved VLS, with women having already met the triple 90 targets by 2020 ahead of schedule.
- Men were lagging a little behind with 86 percent diagnosed; 77% enrolled onto ART; and 68% with suppressed HIV viremia, with men poised to meet the triple 90s targets of 73% by 2020
- Among children, 68% were already diagnosed; 68% enrolled on ART; and; only 48% had achieved VLS. Children were still far off the triple 90s targets of 73% VLS by 2020
- Among all adults PLHIVs aged 15 years +, 90 percent were already diagnosed; 88 percent enrolled on ART; and 77% had achieved VLS; with adults already exceeded the triple 90s target of 73% by 2020.

It is likely that Uganda will attain HIV epidemic control around 2023/24 if priority interventions are provided to scale during 2020 - 25 as provided for in the draft National HIV/AIDS Strategic plan 2020/21 – 2025 (NSP). At that point, new HIV infections will fall below all-cause mortality among PLHIV, and the number of PLHIV will level off or begin to decline.

The synthesis of HIV epidemiological data makes a compelling case for intensified scale up of priority HIV prevention and treatment services and planning for the increasing burden of HIV in older individuals who are likely to have comorbidities. Programmes focusing on key and priority populations should increasingly also focus on men and women who work in places of leisure and entertainment especially in urban and periurban hotspots. Behavior interventions will remain important, in part due to population groups that still have unsuppressed virus, and even when the triple 90s are attained, about one-quarter of PLHIV will still have unsuppressed vireamia. The focus should be on sexual behaviours such as casual sex, multiple partnerships, early sexual debut among young people, and the prevailing low levels of condom use. It also makes a compelling case for HIV treatment programmes to focus on men and children that are still lagging behind in the HIV testing and treatment cascade through intensified and tailored case finding, ART linkage, adherence and retention strategies. The surveillance of HIV should be strengthened to fill identified data gaps and to provide more up-to-date data, and reports, including decentralized reports to aide local programme planning efforts.

# Chapter 1: Introduction:

By the end of 2019, Uganda had braved three and half decades of a severe and generalized HIV epidemic. During this time, the epidemic has evolved and so have our epidemic control strategies. An accurate picture of the current magnitude and dynamics of the HIV/AIDS is critical to directing future HIV/AIDS responses. This HIV Epidemiological Surveillance Report provides the latest update on the HIV/AIDS epidemic in Uganda. It is based on triangulation and epidemiological synthesis of data generated by the surveillance systems in the country, primarily for the past decade 2010–2019. It underscores, among others, trend and gender differences in the HIV/AIDS epidemic in the country. The report also examines future epidemic forecasts for the next decade.

Since the outbreak of the HIV epidemic during the late 1980s, Uganda has made considerable efforts to implement and improve HIV surveillance to generate epidemiological data on HIV. This includes active HIV surveillance among pregnant women attending antenatal clinics (ANCs), periodic national and sub-national population-based HIV serological surveys, and annual mathematical modelling and projections to obtain data on other non-prevalence HIV estimates. This is complemented with data from routine service delivery, programme monitoring and evaluation as well as data arising from research studies.

Specifically for this report, data are derived from the surveillance of HIV infection among ANC attendees and STI prevalence surveys, population-based HIV serological surveys conducted in the country; behavioural data mainly from the demographic and health surveys (DHS), and behavioural surveillance surveys (BSS). Data were also drawn from health routine health facility reports of service delivery. Additional data are drawn from selected special studies and research. Uganda is currently conducting another population-based HIV impact assessment survey.

By end of 2019, approximately 1.46 million people were living with HIV, and HIV prevalence among adults aged 15–49 years was about 6 percent. The HIV burden remains heterogeneous across geographical areas of the country and among different socio-economic and social demographic sub-groups. There are also geographical hotspots and key and priority population groups spread throughout the country that are disproportionately affected. However, nearly 85% of the HIV-infected individuals in the country were already diagnosed and a significant proportion already enrolled onto treatment by the end of 2019. Among them, most had achieved viral load suppression.

Since the onset of this epidemic in the 1980s, Uganda has implemented a robust comprehensive national response, with epidemic control efforts evolving as evidence about cost-effective and efficacious interventions came to light. Uganda is committed to sustainable HIV epidemic control under the Fast Track with the ultimate goal of ending AIDS by 2030<sup>1</sup>. Attainment of this goal is contingent on bringing to scale a structured package of interventions, the current thrust of which

<sup>&</sup>lt;sup>1</sup> Political Declaration on HIV and AIDS: On the Fast-Track to Accelerate the Fight against HIV and to End the AIDS Epidemic by 2030. June 2016

is outlined in Health Sector HIV/AIDS Strategic plan  $2017/18-2022/23^2$  (HSHASP) coordinated by the health sector. The public health response is perhaps the backbone of the national multisectoral response outlined in the National HIV/AIDS Strategic Plan 2015/16 - 2019/20(NSP)<sup>3</sup> (currently under revision). Accurate data on HIV epidemic dynamics is critical to effective implementation and monitoring of these plans.

Central to accurate HIV/AIDS data required to inform effective public health response to the HIV epidemic is active HIV surveillance that guides stakeholders about "who is getting infected", their characteristics and risk factors as well as distribution of the HIV burden. In Uganda, the Ministry of Health AIDS Control programme takes a lead in active surveillance of the epidemic and provides periodic updates on the current status of the epidemic. Various avenues for sharing surveillance information are used, key among which is the annual HIV surveillance report that summarises surveillance information garnered from various sources. This HIV Epidemiologic Surveillance Report for 2019 is in line with this tradition.

Uganda's HIV epidemic, despite three and half decades of epidemic control efforts is not yet fully under control. The estimated annual HIV incidence in 2019 was approximately 0.25% or approximately 53,000 new HIV infections. This exceeds AIDS-related mortality by two fold, and still eludes attainment of HIV epidemic control. It is therefore necessary that future HIV epidemic control efforts are guided by accurate data on the epidemic dynamics in order to steadily lead the country to sustainable HIV epidemic control.

The HIV epidemic in Uganda and other high burden countries is complex. In fact, it is comprised of multiple epidemics among different population groups. It is also comprised of different epidemics of the various stages of HIV, i.e. HIV infection, AIDS, emerging and transmitted antiretroviral drug resistance, co-morbidities, etc. Surveillance of these different facets of HIV infection is based on different protocols. Triangulation of data arising out of these different protocols to characterise the epidemic is therefore critical. In fact, HIV surveillance was previously based on second-generation principles<sup>4</sup> where HIV surveillance involved surveillance of behavioural and other risks factors that predispose to HIV infection, in addition to biological surveillance. However, it now ought to be considered on third-generation principles that should include sequela characteristic of mature epidemic.

Uganda's HIV surveillance at this stage should therefore reflect biological surveillance comprised of mainly HIV prevalence and incidence, behavioural surveillance comprised of mainly behavioural risk factors, and surveillance of sequalae characteristics of mature epidemic including antiretroviral drug resistance, co-morbidities, advanced HIV disease, etc. Although data to characterise the different facets of the HIV epidemic are available in the country, they have not

<sup>&</sup>lt;sup>2</sup> Ministry of Health/ AIDS Control Programme: The Health Sector HIV/AIDS Strategic Plan (HSHASP) 2017/18-2022/23: Kampala, Uganda, June 2018

<sup>&</sup>lt;sup>3</sup> Uganda AIDS Commission: The National HIV/AIDS Strategic Plan (NSP) 2015/16 – 2019/20, Kampala Uganda, 2015

<sup>&</sup>lt;sup>4</sup> WHO Guidelines of Second Generation HIV Surveillance

been systematically analysed and triangulated to present a comprehensive picture in form of periodic HIV surveillance report in recent years, yet this is necessary in order to accurately inform programme planning and evaluation. The last national HIV epidemiological surveillance report was produced in 2012/13. This report comes in timely to fill in this void, especially as we plan for the post 2020 HIV epidemic control agenda.

In developing this comprehensive annual HIV Surveillance Report for 2019, the Ministry of Health worked with its stakeholders, and received technical support from the African Network for Care of Children Affected by HIV/AIDS (ANECCA), and the Joint UN Programme on AINDS (UNAIDS) to accomplish this task. This activity was conducted iteratively with stakeholders and technical staff of MoH that coordinate public health HIV surveillance. The highlights of this process was an epidemiologic data review workshop held in March 2020 in Entebbe at which stakeholders from various institutions including research institutions present their epidemiological data that has been included in this report.

The report is structured into 13 chapters. Immediately following this chapter, Chapter 2 describes the data and methods used in generating the contents of the report. Chapter 3 presents data on the HIV prevalence and prevalence trends in the general population, while Chapter 4 presents HIV prevalence among population groups at high risk of HIV. Chapter 5 reports recent data on HIV incidence among various population groups, while Chapter 6 highlights recent trends in sexual behavior driving new HIV infections in the country. The estimated numbers and patterns of PLHIV among various population sub-groups in the country; the magnitude of new HIV infections in various population sub-groups; the magnitude and trends of AIDS-related mortality; and the patterns and trends in vertical HIV infections are presented in Chapter 7. The patterns of viral load suppression among adults and children are summarized in Chapter 8; while chapter 9 presents the triple 90-90-90 HIV testing and treatment cascades. The prevailing patterns of antiretroviral drug resistance are presented in Chapter 10; while the patterns of advanced HIV disease and comorbidities are presented in Chapter 11. Chapter 12 delves into the projected future course of the HIV epidemic during the next decade, while the final Chapter 13 presents data on the global HIV/AIDS estimates.

This report is intended to provide information for the National AIDS Control Programmes in the country, the Ministry of Health, in-country stakeholders including United Nations agencies, and international development partners, implementing partners (IPs), and District Health Teams (DHTs). The information in this report should serve as a technical reference tool for advocacy and resource mobilization, planning and designing of HIV/AIDS interventions to enhance the national response during the next decade.

# Chapter 2: Data and Methods:

This Epidemiological Surveillance Report has been compiled from secondary data from obtained from multiple sources. The data sources include: i) the national HIV surveillance system, ii) the 2016/17 Uganda Population-based HIV Impact Assessment Survey (UPHIA); iii) routine service delivery data for HIV testing services (HTS); Prevention of Mother-to-Child Transmission; Antiretroviral Therapy (ART); etc reported through the Health Management Information System's (HMIS) online reporting platform DHIS-2; iv) programme service delivery data for key and priority populations (KP and PP) reported through PEPFAR's HIBRID and DATIM online platforms; v) research studies on the general populations and key and priority populations by research institutions such as Medical Research Council (MRC) in Masaka and Sembabule; the Rakai Health Sciences Program in Rakai; Makerere University School of Public Health; vi) Mathematical modelling involving triangulation of HIV surveillance, ART, PMTCT statistics and population census data using Spectrum, to obtain non-HIV prevalence estimates of numbers of new HIV infections including vertical infections, AIDS-related mortality, mothers in need of PMTCT services, etc; vii) Behavioural data and trends obtained from HIV population surveys and Demographic and Health Surveys (DHS); viii) Special surveys of key and priority populations such as PLACE and Crane surveys, and studies by MRC in Kampala and Kalangala and RHSP in Kasensero; ix) Viral load dash board for VL and EID data; x) third line programme for data on ARV resistance; etc. Below, we describe the data and methods from the various sources.

#### 2.1 Routine Data from the Health Management Information System

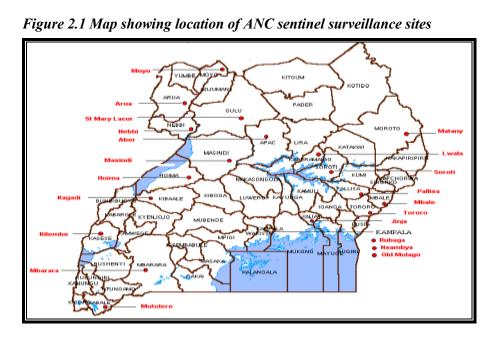
Health facilities routinely report individuals served through the HMIS. Reporting is based on standard reporting forms compiled periodically (monthly or quarterly) through the online reporting platform (DHIS-2). Most HIV indicators are reported quarterly using the quarterly HMIS 106a reporting form, while others such as PMTCT indicators are reported monthly using HMIS 105 reporting form. The routine reports are compiled by facility staff from primary source documents that comprise of patient charts or cards, registers and electronic patient medical records (EMR) platforms. Data are aggregated as they go upstream but retain the identity of the reporting entity. Data are cleaned at regional, district and national level within one month of the end of the reporting quarter. Reporting from health facilities is almost universal. Various data quality assessments (DQAs) have reported data quality deficits at different times. For this report, data relating to antenatal PMTCT services (numbers, HIV test status, etc), HIV testing services, ART, EID services etc were obtained from this source.

## 2.2 Antenatal HIV Sentinel surveillance

Antenatal HIV sero-prevalence data in this report was obtained from two sources i.e. routine antenatal sero-prevalence data reported through the HMIS, and active surveillance based on annual ANC-based HIV sero prevalence surveys conducted in 30 sentinel clinics that are located in different parts of the country. The ANC-based sentinel surveillance has evolved ever since it was

set up, initially in six urban sites in 1989. It is the main source of HIV prevalence trends data spanning over 30 years. The location of the sentinel surveillance sites is shown in Figure 2.1 below. For this report, the latest sentinel surveillance data available was for 2018.

The methods for active antenatal HIV surveillance involves unlinked HIV serological testing of residual blood samples left after performing routine antenatal syphilis serological screening at the clinics. Blood specimens are obtained for mothers attending their first antenatal care visit during the current pregnancy over a 10 - 12 week period. Samples are obtained for consecutive eligible women who attend the sentinel clinics during the sampling period. At the clinics, women with active syphilis are treated according to National guidelines. All women are offered the regular antenatal HIV serological testing at the clinics with return of test results as part of antenatal care. A minimum of 300 samples are collected from each site, with high volume clinics providing at



least 500 samples to enable stratified analyses. A sampling period of 10 - 12weeks is observed simultaneously in all clinics. HIV serological tests are conducted at the Uganda Virus Research Institute HIV Reference Laboratory (HRL) in after Entebbe all identifiers personal been have irreversibly removed.

Serological tests for HIV are based on a serial testing algorithm using rapid tests. In this report, we present HIV sero-prevalence data for the 2014, 2016 and 2018 surveys and trend data since 1989. The data is also used in Spectrum to obtain other non-prevalence HIV estimates.

#### 2.3 HIV Serological surveys of STD Clients

Active surveillance of HIV involves sentinel surveillance of HIV prevalence among STI clinic clients in an urban referral clinic at Mulago Hospital. These data are collected based on anonymous and unlinked HIV serological testing of residual blood samples after performing routine serological testing for syphilis and other STIs at the clinics. The blood specimens are collected consecutively from STI clients attending for the first visit in the clinic during the survey period. The clients are also provided the regular HIV tests with return of test results as part of their clinical care. In this report, we present the annual trends of HIV prevalence among these clients till 2018.

### 2.4 Behavioural Surveillance data

Behavioural surveillance is a key component of second generation HIV surveillance. Behavioural data and trends are essential for explaining the trends in HIV incidence, and for predicting future trends. These data can also be used for risk factor analysis. We report behavioural data and trends from national and sub-national population-based surveys including the latest UPHIA, previous AIDS indicator surveys and DHS. Detailed methods are as follows.

## 2.4.1 Population Based HIV Indicator / Impact Surveys

Three national population-based HIV indicator / Impact surveys have been previously conducted in Uganda, in 2004/05, 2011, and 2016/17. Another survey is currently under way. These crosssectional HIV/AIDS surveys are based on nationally representative samples of adults and children, selected through a two stage procedure. The surveys provide population level data on HIV prevalence and incidence, co-infections (Herpes simplex virus type-2 (HSV-2) in 2004/05 survey, syphilis, and Hepatitis B Virus (HBV); behavior the risk factors, indicators of sexual behavior, and HIV service uptake. They provide national estimates and sub-national estimates for 10 survey regions (nine in 2004/05) including the capital city, Kampala. The methods involve serological testing for HIV and STIs among consenting adult respondents aged 15-59 years, 15 - 64 years in 2016/17. Estimates are weighted for sample design and survey response Detailed reports of these surveys are available on MoH website. In this report, we present data on magnitude of HIV prevalence and incidence, behavior indicators and coverage and uptake of HIV services from the 2016/17 UPHIA, with trend observation based on previous surveys.

#### 2.4.2 The Demographic Health Surveys

Uganda conducts periodic Demographic and Health Surveys every 5 years. Previous surveys were conducted in 1989, 1995, 2000/1, 2006, 2011 and 2016. These surveys are population-based, with national coverage but also provide regional estimates of demographic and health indicators. Estimates are weighted for sample design and survey response. They are based on nationally representative samples selected through a two stage procedure. Data on HIV/AIDS are based on the HIV module that includes data on HIV/AIDS knowledge, attitudes and sexual behavior, but no biological indicators. In this report, trend analysis of behavioural indicators from previous DHS surveys is presented as well as detailed data from the 2016 UPHIA and 2016 UDHS.

## 2.5 Research Studies and Sub-national Longitudinal Surveys

Surveillance of HIV involves collaboration with research programmes including those running longitudinal population-based cohorts. For this report, we obtained data from the two main longitudinal general population cohorts, providing HIV prevalence and incidence data namely the Medical Research Council (MRC) and the Rakai Health Sciences Program (RHSP). These two programmes also have data on specific key populations and priority populations namely sex workers, their clients, and fishing communities

MRC has been running a longitudinal population-based cohort in rural Masaka and Sembabule district in south-west Uganda since 1989, comprising of approximately 10,000 individuals aged 13 years+ residing in clusters of 15 neighbouring villages. Annual sero-prevalence surveys have been conducted since 1989/90. HIV Prevalence and incidence data from this cohort has been previously published. In this report, we report recent trend data in population level HIV prevalence and incidence. MRC data on fishing communities in Kalangala, sex workers in Kampala and another cohort of a high risk group in Masaka is also presented. Baseline HIV prevalence and behavioural indicators are obtained along with annual surveys of sexual behavior, programme uptake, HIV sero-prevalence and prevalence of viral load suppression

The RHSP cohort is a longitudinal cohort of 12,000 adults aged 15 - 49 years residing in 44 communities in Rakai district. Annual surveys have been conducted since 1990. Data from this study has been previously reported. In this issue, we report information on annual trends of HIV sero-prevalence and incidence, as well as data on fishing communities in Kasensero.

## 2.6 Projections of the Magnitude of AIDS Morbidity and Mortality

Estimates of the magnitude of HIV/AIDS morbidity, mortality and new HIV infections in this report are based on triangulation of HIV surveillance data with national population demographic and HIV/AIDS services coverage data. We used the Epidemic Projection Package (EPP) to generate the HIV prevalence and incidence curves for urban and rural areas separately for the period 1989-2019 using the ANC-based surveillance and routine HIV testing data. The urban and rural EPP curves were adjusted based on the results of the past three population-based surveys in Uganda. Using the AIDS integrated Module (AIM) in Spectrum, we triangulated the HIV prevalence and incidence curves with the population and demographic data from the UN Population Division (UNPD) and Uganda Bureau of Statistics (UBOS), and programme coverage data on HIV prevention, ART and PMTCT. From this, we generated estimates of the numbers of people infected with HIV (incident and prevalence estimates. We used the Naomi model that is linked to Spectrum to obtain estimates of HIV burden for regional and district levels. All estimates have 95% plausibility bounds

## 2.7 AIDS Morbidity and Mortality Data

Accurate data on AIDS-mortality from routine reporting by public health facilities and vital registration are not readily available in Uganda. However, data on AIDS morbidity based on the number of clients on treatment in ART centres is available. This data is reported through the HMIS based on the online reporting system DHIS-2.

## **2.8: PMTCT Impact Evaluation Study:**

# Chapter 3: General Population and Antenatal HIV Sero-Prevalence

HIV prevalence or percentage of people living with HIV in the population is a useful indicator to track HIV burden. In view of the longstanding nature of HIV infection, HIV prevalence is no longer used to track recent changes in transmission dynamics and impact of HIV prevention.

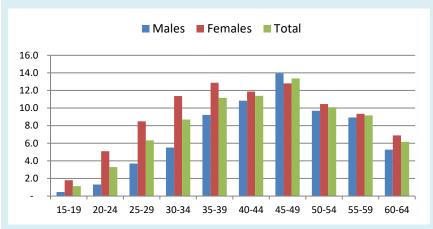
#### 3.1 HIV Prevalence in the General Population:

The most recent empirical data on HIV prevalence in the general population in Uganda is from 2016/17 UPHIA. In the survey, HIV prevalence among adults aged 15 - 49 years countrywide was 6.0%, and 6.2% among adults 15 - 64 years. Among children aged 0 - 14 years, HIV prevalence was 0.5 percent. The prevalence of HIV was heterogeneous across socio-economic and socio-demographic subgroups. HIV prevalence among women exceeds that in men (4.7% vs 6.7% and prevalence among urban residents exceeds that of rural counterparts (7.7% vs 5.8%), Table 3.1.

	Males		Female	es	Total	
Characteristic	Percent HIV+	Number	Percent HIV+	Number	Percent HIV+	Number
Residence						
Urban	4.6	3,155	9.8	4,691	7.5	7,846
Rural	4.7	9,199	6.7	11,979	5.8	21,178
Age						
0-4	0.5	3,261	0.6	3,266	0.5	6,527
5-9	0.2	1,015	0.6	1,072	0.4	2,087
10-14	0.3	845	1.1	886	0.7	1,731
15-19	0.5	2,834	1.8	3,289	1.1	6,123
20-24	1.3	2,063	5.1	3,059	3.3	5,122
25-29	3.7	1,637	8.5	2,574	6.3	4,211
30-34	5.5	1,380	11.4	2,024	8.7	3,404
35-39	9.2	1,143	12.9	1,573	11.2	2,716
40-44	10.8	952	11.9	1,214	11.4	2,166
45-49	14.0	845	12.8	983	13.4	1,828
50-54	9.7	610	10.5	863	10.1	1,473
55-59	8.9	439	9.4	559	9.2	998
60-64	5.3	451	6.9	532	6.2	983
Region						
Central 1	6.4	1,102	9.3	1,570	8.0	2,672
Central 2	5.8	935	9.1	1,304	7.6	2,239
Kampala	3.5	911	9.7	1,378	6.9	2,289
East Central	3.3	1,276	5.9	1,703	4.7	2,979
Mid-East	4.1	1,795	6.0	2,419	5.1	4,214
North East	2.9	1,523	4.5	1,988	3.7	3,511
West Nile	2.3	1,650	3.8	2,335	3.1	3,985
Mid-North	5.4	1,082	9.1	1,253	7.2	2,335
Mid-West	4.2	1,125	7.3	1,379	5.7	2,504
South West	6.3	955	9.3	1,341	7.9	2,296
Pregnancy status						
Currently pregnant	NA	NA	5.7	1,405	NA	NA
Not currently pregnant	NA	NA	7.8	15,018	NA	NA
Total 0-14	0.4	5,121	0.7	5,224	0.5	10,345
Total 15 – 24	0.8	4,897	3.3	6,348	2.1	11,245
Total 15 – 49	4.3	10,854	7.5	14,716	6.0	25,570
Total 50 – 64	8.4	1,500	9.2	1,954	8.8	3,454
Total 15-64	4.7	12,354	7.6	16,670	6.2	29,024

3.1 HIV prevalence by Socio-demographic characteristics: [Source: UPHIA 2016/17].

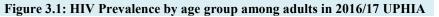
HIV prevalence among young people 15 - 24 years was 2.1 percent. Consistent with previous statistics, HIV sero-prevalence among young women is about 4 fold that of their male counterparts



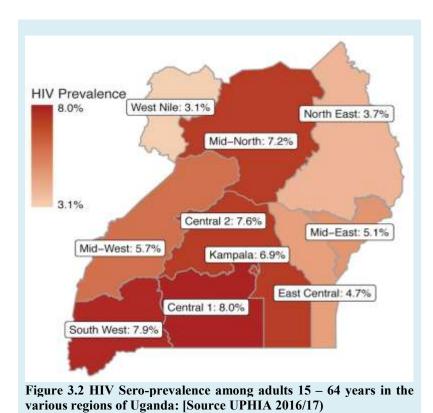
(0.8 versus 3.3 percent).

The prevalence of HIV among women exceeds than among men in all age groups except for the agegroup 45 - 49 years. The peak prevalence among women was attained in the age group 35 - 45 years, while that among men was at 45 - 49 years, Figure 3.1.

geographical



heterogeneity of HIV prevalence in Uganda is demonstrated in Figure 3.2. HIV seroprevalence among adults15-64 years ranged from the highest of 8 percent in South Buganda (Central 1) and South West Uganda, to a lowest of 3.1 in West Nile region. In all regions, HIV prevalence among



women exceeds that among men.

The

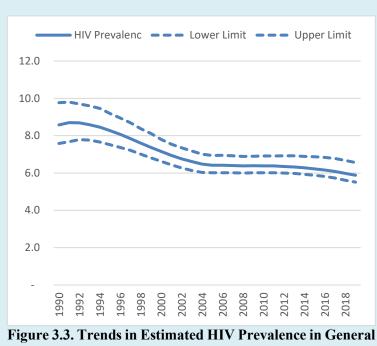
HIV sero-prevalence among women that were pregnant at the time of the survey was 5.7 percent compared to 7.8 percent among women that were not. This is important from the antenatal HIV surveillance point of view.

HIV sero-prevalence also varied by other socio-economic and socio-demographic and behavioural covariates. These variations are described in the main survey report<sup>5</sup>.

<sup>&</sup>lt;sup>5</sup> MOH: Uganda Population-based HIV Impact Assessment (UPHIA) 2016-17, Final Report. Kampala: Ministry of Health; July 2019

#### 3.2: Trends in HIV Prevalence in the General Population

The trends in estimated national HIV prevalence over the last three decades among adults, based on Spectrum estimates is summarised in Figure 3.3. below. HIV prevalence sored in the 1980s



Population of Uganda 1990 – 2019 [Source Spectrum 2019]

and peaked around 1990 and steadily declined in the later part of the 1990s and early 2000. It has remained stable for most of the past 15 years at 6% - 7% as HIV treatment has been rolled out across the country.

The trends in HIV prevalence among adults in the country based on the three previous populationbased surveys also show level prevalence trend for the past 15 years in various population groups as in highlighted in Figure 3.4 below. It would appear however that among urban residents, there has been a consistent decline in HIV sero-prevalence over the past three surveys.

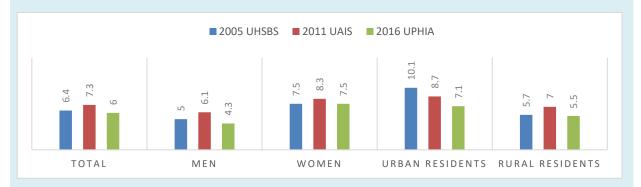


Figure 3.4: Comparision of HIV seroprevalence among adults in 3 previous HIV population surveys

#### 3.3: Antenatal HIV Prevalence

The site-specific antenatal HIV sero-prevalence estimates from sentinel surveillance and routine antenatal HIV testing data for the period 2012 - 18 are summarised in Table 3.2 below. Based on routine antenatal testing data, the median antenatal HIV seroprevalence in 2018 among facilities located in urban centres in Uganda was 7 percent, while that in sentinel sites located outside of major urban areas was 5.6 percent. This is consistent with data reported from population surveys.

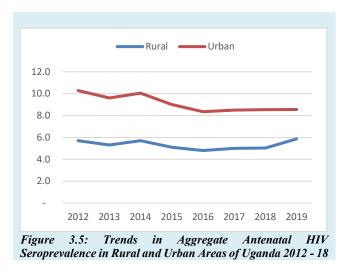
The median HIV prevalence in 2018 among the antenatal HIV sentinel surveillance sites located in the major urban areas ranged from a lowest of 2 percent in Arua Hospital, to a highest of 5.6 percent in Lira. Antenatal prevalence of HIV persistently exceeded 10 percent in Lira hospital for

most of the past				1		<b>F</b>		
decade. The	Table 3.2: Site Specific Anten	atal HIV Sero-j	prevalence	during 201	<u>2 – 18 for</u>	the 30		
	Sentinel Sites							
median appears	Antenatal Sentinel Sites HIV Prevalence							
to have	Antenatai Schunci Sites	2012	2014	2016	2017	2018		
remained level	Major Urban Sites	2012	2011	2010	-017	2010		
between 6.5	Arua hospital	2.4	2.7	3.2	1.5	2.0		
percent - 8.5	Hoima hospital	9.1	9.7	10.4	9.5	13.0		
percent in 2012	Jinja hospital	16.7	8.6	5.8	7.4	7.0		
- 2018.	Lira hospital	15.1	16.6	12.6	15.6	15.6		
- 2010.	Lubaga hospital	5.3	6.3	5.3	4.9	4.0		
The median	Mbale hospital	6.8	7.9	10.8	13.1	7.5		
HIV prevalence	Mbarara hospital	13.5	8.7	8.6	10.6	7.3		
-	Nsambya hospital	4.8	4.0	3.0	4.5	4.7		
in 2018 among	Soroti hospital	8.4	6.4	6.1	7.9	6.3		
the sentinel	Median Prevalence	8.4	7.9	6.1	7.9	7.0		
surveillance	Group Prevalence	8.5	7.3	6.8	7.6	6.6		
sites located	<b>Outside Major Urban Sites</b>							
outside of major	Aber hospital	8.1	5.7	7.1	6.8	6.2		
	Amolatar H/C IV	10.2	4.7	3.5	4.7	4.5		
	Atutur hospital	1.4	5.6	4.3	3.6	5.3		
ranged from a	Bwera hospital	1.2	2.8	0.7	3.5	1.7		
lowest of 1.7	Kaabong hospital	3.5	1.5	2.5	1.4	3.0		
percent in	Kagadi hospital	6.6	5.9	1.7	4.7	2.6		
Bwera Hospital	Kilembe hospital	2.7	2.7	4.6	5.5	4.3		
in Kasese	Kitgum hospital	11.9	11.8	12.2	10.6	8.6		
district, to a	Kiwoko hospital	7.9	8.8	8.4	6.5	7.3		
<i>.</i>	Kyangwali H/C IV	4.0	6.7 5.4	4.7	3.2 6.2	5.6 4.9		
highest of 12.6	Lwala hospital Masindi hospital	4.7	6.9	5.5 11.5	8.0	4.9 9.0		
percent in	Matany hospital	4.3	3.1	0.9	1.5	9.0		
Rwekubo HC	Moyo hospital	1.9	6.6	3.5	4.6	7.1		
IV in Mbarara	Mutolere hospital	0.7	1.5	2.9	1.2	1.5		
district. The	Nebbi hospital	5.5	5.6	3.7	1.5	4.7		
median appears	Nyakibale hospital	9.3	5.8	8.0	10.6	11.2		
11	Pallisa hospital	2.5	3.0	1.4	2.8	2.0		
to have	Rwekubo H/C IV	9.0	7.3	6.1	9.3	12.6		
remained level	Tororo hospital	7.7	5.6	6.6	6.7	6.9		
between 6.6	Median Prevalence	5.1	5.6	4.5	4.7	5.1		
percent – 5.6	Group Prevalence	6.0	5.2	5.2	6.8	5.3		
percent during	Median (All sites)	6.6	5.8	5.3	5.5	5.6		
2012 - 2018.	Prevalence (All sites)	7.2	6.2	5.9	6.1	5.9		

Throughout this period, the median HIV prevalence among sentinel sites in major urban areas remained consistently higher than that among sites located outside of the major urban areas

#### **3.4: Trends in Antenatal HIV Prevalence**

The trends in antenatal HIV prevalence described here are based on two data sources, i.e. routine antenatal data reported through the HMIS for the past 5 years, and HIV sentinel surveillance for



the past 30 years.

Figure 3.5 below shows the trends in median antenatal HIV prevalence from the routine reporting system (DHIS-1) and HIV sentinel surveillance system. Consistent with previous observations, HIV prevalence among women in urban areas exceeds that of their rural counterparts. The trend over the past five years among urban and rural women has remained level.

Figure 3.6 below shows the thirty year trend in median antenatal HIV seroprevalence

among sentinel sites located in major urban centres versus those located in centres outside of major urban areas. Over this period, antenatal HIV sero-prevalence among sites located in major urban areas has consistently exceeded that among facilities located outside of major urban areas.

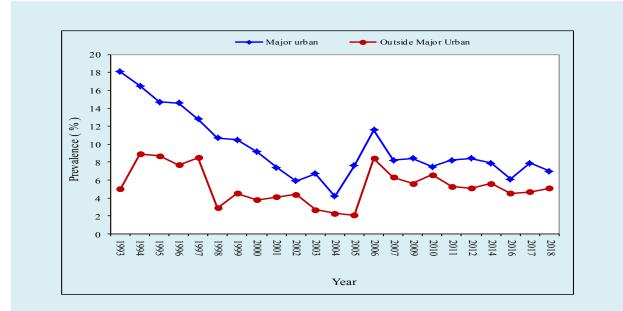


Figure 3.6: Trends in median HIV seroprevalence among sentinel sites located in major urban and outside major urban areas 1989 – 2019

However, the disparity appears to decline over the years as centres outside of major urban areas such as Kiwoko town have increasingly become more urbanised over time.

A similar trend is reflected in site specific antenatal sero-prevalence among nine antenatal surveillance sites located in major urban areas, Figure 3.7. The trend in all sites is level from 2004 - 18 following steep declines in the preceding years.

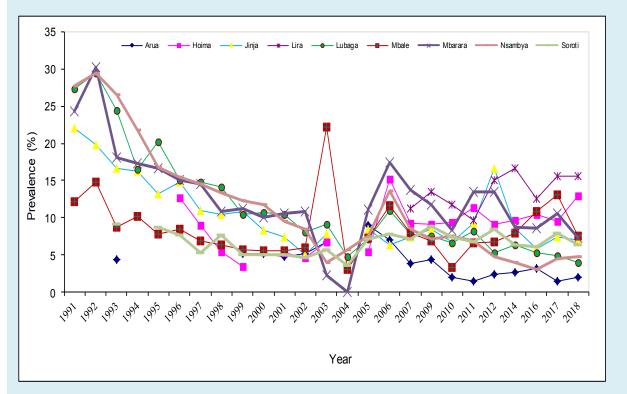
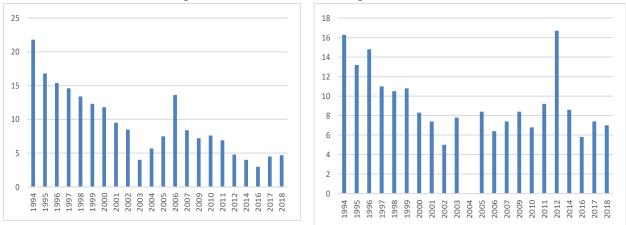


Figure 3.7: Twenty-five year Trends in Antenatal HIV seroprevalence in 9 urban facilities 1990 - 2018



The trends in sentinel site specific HIV prevalence for all the 30 sentinel surveillance sites are summarized in Table 3.3. Figure 3.8 below shows site specific trends for 2 sentinel sites.

Figure 3.8 Sentinel site specific antenatal HIV prevalence trends 1994 -2018 for Nsambya Hospital [Left]; and Jinja Hospital [Right]

Sentinel Site										Anten:	tal HIV	Antenatal HIV Prevalence	ice								
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005 2	2006 2	2007 20	2009 2010	0 2011	11 2012		2014 2016	16 2017	7 2018
<b>Major Urban Areas</b>	reas																				
Arua	:	1	:	I	:	5.2	5.2	4.8	5.2	6.7	:	. 0.6	7.0	3.8 4.	.4 2.0		1.5 2.4	4 2.	.7 3.2	2 1.5	2.0
Hoima	1	1	12.7	9.0	5.4	3.5	:	5.3	4.6	6.7	1	5.4 1	15.2	9.2 9	9.1 9.4		11.4 9.1		9.7 10.4		13.0
Jinja	16.3	13.2	14.8	11.0	10.5	10.8	8.3	7.4	5.0	7.8	1	8.4	6.4	7.4 8	8.4 6.8		9.2 16	16.7 8	8.6 5.8		. 7.0
Lira	1	:	:	I	:	:	:	:	:	:	:	:	-	11.2 13	13.5 11.7		9.6 15.1		16.6 12.6	.6 15.6	5 15.6
Lubaga	16.5	20.2	15.1	14.8	14.2	10.5	10.7	10.4	8.1	9.1	4.8	7.1 1	11.0	7.8 7	7.5 6.6		8.2 5.3		6.3 5.3	3 4.9	4.0
Mbale	10.2	7.8	8.4	6.9	6.3	5.7	5.5	5.6	5.9	22.2	3.1	7.3 1	11.6	8.0 6	6.9 3.3		6.6 6.8		7.9 10.8	.8 13.1	1 7.5
Mbarara	17.3	16.6	15.0	14.5	10.9	11.3	10.0	10.6	10.8	2.3	0.0	11.1	17.5 1	13.7 11	11.8 8.3	—	3.5 13	13.5 8	8.7 8.6	5 10.6	5 7.3
Nsambya	21.8	16.8	15.4	14.6	13.4	12.3	11.8	9.5	8.5	4.0	5.7	7.5 1	9.		7.2 7.6		6.9 4.8		4.0 3.0		4.7
Soroti	1	8.7	7.7	5.3	7.7	5.0	5.0	5.0	4.6	5.7	3.6	7.1	7.8	7.1 8.	.8 7.4		6.7 8.4		6.4 6.1	1 7.9	6.3
Group Median	16.5	14.9	14.8	11.0	10.5	8.1	8.3	6.5	5.6	6.7	3.6	7.4 1	11.3	8.0 8	8.4 7.4	8.	2 8.	4 7	7.9 6.1	I 7.9	7.0
<b>Outside Major Urban Areas</b>	Urban Ar	eas																			
Aber	1	1	1	I	1	:	:	5.3	7.6	7.0	0.0	1	8.8	6.4 6	6.0 8.6		5.8 8.1		5.7 7.1		6.2
Amolatar	:	1	;	I	;	:	:	:	:	:	1	:	1	8.5 6	6.6 6.9		7.7 10	10.2 4	4.7 3.5	5 4.7	4.5
Atutur	:	:	:	I	:	:	:	:	:	2.6	1.2	1.9 1	1.3	9.5 2	2.6 6.9		5.0 1.4		5.6 4.3	3 3.6	5.3
Bwera	1	:	:	I	:	:	:	;	:	0.4	:	1.3	4.0	3.5 3.	3.3 2.5		4.5 1.	1.2 2	2.8 0.7	7 3.5	1.7
Kaabong	:	1	:	I	:	:	:	;	:	2.7	:	0.0 1	12.0	- 2	2.0 7.4		9.7 3.5		1.5 2.5	5 1.4	. 3.0
Kagadi	:	:	:	10.3	11.5	11	10.5	7.4	6.4	5.1	:	1.3	8.9	6.9 7	7.9 3.7		5.8 6.6		5.9 1.7	7 4.7	2.6
Kilembe	16.7	11.1	10.4	8.5	1	7.5	4.2	2.1	4.2	12.1	5.5	4.9	5.1	2	6.3 4.0	0 5.1			2.7 4.6	5.5	4.3
Kitgum	:	1	:	I	:	:	:	;	:	:	:	:	1	7.2 18	18.9 11.1	.1 11.1		11.9 11	11.8 12.2	2 10.6	
Kiwoko	1	:	1	I	1	:	:	:	:	5.8	5.1	4.9	9.7	6.3 8	8.8 6.7			7.9 8	8.8 8.4		
Kyangwali	:	1	;	I	:	:	:	;	:	;	:	:	1	4.8 2	2.9 1.4		2.5 4.0		6.7 4.7		5.6
Lwala	1	1	1	I	1	1	1	7.9	4.4	1.3	0.8			4.8 3	3.9 3.2						
Masindi	:	1	:	I	:	:	:	1	4.7	5.9	5.6	7.8 1	10.0	8.0 7	7.3 6.9		7.2 10	10.5 6	6.9 11.5	5 8.0	9.0
Matany	7.6	1	2.0	1.6	1.3	0.9	1.9	1.7	0.7	0.0	0.0	0.0	5.9	- 3	3.8 2.2		- 4.3		3.1 0.9	9 1.5	1.8
Moyo	:	1	:	I	3.2	5.2	2.7	2.7	4.3	8.4	2.3	2.0	3.9	3.6 5	5.1 4.6	6 5.1		1.9 6	6.6 3.5	-	7.1
Mutolere	1	3.6	2.6	I	2.5	2.3	2.1	4.1	1.5	0.4	1.7	4.7		2.4 1	1.4 1.5				1.5 2.9		1.5
Nebbi	:	1	:	I	:	:	:	1	1.3	1.6	3.1	3.3	6.2 1		5.8 6.5		5.3 5.5		5.6 3.7		4.7
Nyakibale	:	:	:	I	:	:	:	:	:	0.0	5.7	7.9 1	14.2	7.1 7	7.9 7.0		4.6 9.3		5.8 8.0	0 10.6	5 11.2
Pallisa	1.2	1	;	3.2	2.6	3.2	3.8	3.7	:	0.7	1.8	2.1	. 6.7	4.3 2	2.8 3.7	7 4.1	.1 2.5		3.0 1.4	4 2.8	2.0
Rwekubo	1	1	1	I	1	:	:	1	1	1	1	:	-	5.6 5	5.6 16.7		15.3 9.0		7.3 6.1		12.6
Tororo	10.2	12.5	8.2	9.5	10.5	4.5	4.7	7.0	6.3	8.4	7.4			5.9 6	6.8 7.8	_	_	_	_	_	_
Group Median	8.9	II.I	5.4	8.5	2.9	4.5	3.8	4.1	4.4	2.7	2.3	2.1 6	_	_	5.7 6.6	_	5.3 5.1	~	5.6 4.5	_	5.1
<b>Overall Median</b>	16.4	12.9	11.6	9.5	9.1	5.5	5.2	5.5	5.0	5.7	3.1	5.2	8.9	7.1 6	6.7 6.9	_	6.3 6.	6.6 5	5.8 5.3	3 5.5	5.6

Table 3.3: Annual Trends in Antenatal HIV prevalence from Sentinel Sites, 1994 - 2018

 $\sim 23 \sim$ 

# Chapter 4: HIV Prevalence among High Risk Population Groups

HIV seroprevalence data among other population groups that are at high risk of HIV is limited, yet these population groups play a big role in the epidemiology of HIV. However, monitoring HIV prevalence and incidence among population groups at high risk of HIV is the cornerstone of HIV surveillance. In this Chapter we report recent HIV sero-prevalence data on some high-risk population groups as synthesized from recent studies.

#### 4.1: Consensus Estimates of the Sizes of Key and Priority Population groups:

A critical gap in HIV programmes for high risk groups including key population and other priority population groups is the lack of accurate data on the population sizes and mapped locations of the population groups. Several studies that attempted to map and estimate the population sizes of these groups in the country used different sampling methods and came up with often conflicting estimates. In 2018, Uganda AIDS Commission (UAC) undertook a detailed triangulation of data and a consultative process to come up with consensus estimates of the various KPs and PP groups<sup>6</sup>. The national size estimates that were determined based on this exercise are summarized in Table 4.1 below.

Key population	Population estimate	Lower Limit	Upper Limit
Men who have sex with men	22,663	12,692	32,635
Female sex workers	130,359	50,744	210,849
People who inject drugs	7,356	1,839	11,034
Fisher Folk	731,870	176,532	1,289,048

#### Table 4.1: Consensus Estimates of the Population sizes of Key and Priority Populations in Uganda

Source: Consensus Estimates Report

#### 4.1: HIV Prevalence among Key and Priority Population Groups

Studies from Uganda and the region report persistently higher prevalence of HIV among female sex workers (FSW). In this section, we report recent data from studies conducted by MRC in Kampala and Masaka; Makerere School of Public Health (MSPH) under the PLACE methodologies in 25 districts; and the Crane Survey in Kampala.

The MRC Good Health for Women Project (GHWP) enrolled 4,817 female sex workers aged 15 – 49 during 2013 - 19 from the slum areas of Kampala, and found HIV prevalence of  $36\%^7$ . HIV Incidence among the women owing to HIV prevention interventions declined from 4.0 /100 PYs during 2013 - 14 to 2.7 / 100 PYs during 2016 - 17.

<sup>&</sup>lt;sup>6</sup> Uganda AIDS Commission: Synthesis, Consolidation and Building Consensus on Key and Priority Population Size Estimation Numbers in

Uganda: Kampala, December 2019

<sup>&</sup>lt;sup>7</sup> MRC: Good Health for Women Project

The Crane survey conducted in Kampala during 2012 - 13 among high risk populations revealed high HIV prevalence among high risk populations that were several fold that of the general population of Kampala, Figure 4.1<sup>8</sup>.

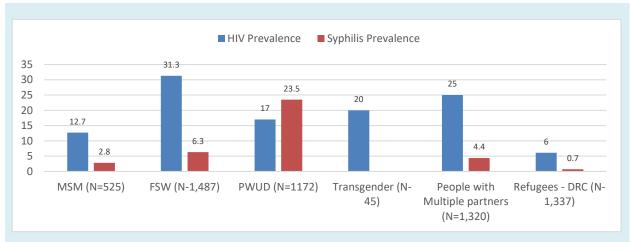


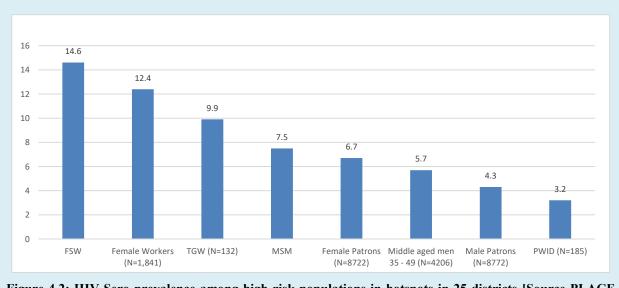
Figure 4.1. HIV and Syphilis prevalence among high risk population groups in Kampala 2012-13 [Source Crane Survey Report]

The high-risk population groups were enrolled through capture-recapture sampling method. The prevalence of HIV among FSWs (31.3%) was five-fold that of the general population of Kampala; while that among MSMs (12.7%) was two-fold. People who inject drugs (PWID), men with multiple partners and the small number of transgender women had HIV prevalence of three – four fold that of the general population. The HIV prevalence among refugees from the Democratic Republic of the Congo (6%) was comparable to that of the general population of Kampala. The prevalence of syphilis among sex workers and men who have multiple partners was about two fold that of the general population of Kampala. However, PWID had a particularly high syphilis prevalence (23.5%) that was almost seven-fold that of the general population. The survey also revealed sexual networks of high-risk groups that were intertwining with that of the general population with a high potential of bridging infections.

The PLACE study<sup>9</sup> conducted by the Makerere University School of Public health also reported high HIV prevalence of HIV among FSWs and female workers in places of recreation / entertainment in the 25 districts in Uganda in 2018. This study that involved HIV testing of over 14,000 young adults located in hotspots in urban centres in 25 districts found HIV prevalence of 14.6% among sex workers, and 12.4% among female workers in recreation / entertainment places, Figure 4.2. Again, this study highlights the importance of women who work in entertainment / recreation places in the epidemiology of HIV that was hitherto unrecognized. These women and men don't currently constitute the focus of HIV prevention programmes for KPs and PPs. The

<sup>&</sup>lt;sup>8</sup> MUSPH: Crane Survey Report: Bio-behavioural Surveys Among Groups at High Risk of HIV in Kampala, Uganda; October 2017

<sup>9</sup> MUSPH: PLACE Study Report



prevalence of HIV among MSM (7.5%) and a small group of Transgender women (12.4%) all exceed by far, the seroprevalence among comparable groups in the general population.

Figure 4.2: HIV Sero-prevalence among high-risk populations in hotspots in 25 districts [Source PLACE Study Report]

#### 4.5: Prisoners

The high prevalence of HIV among prisons inmates and prisons staff (mainly prisons warders) was revealed in the sero-behavioural survey conducted in Uganda prisons in  $2012 - 13^{10}$ , Figure 4.3 below. HIV prevalence among male prisoners (14.1%) was two and half fold that of the general male population in Uganda. Female prisoners had HIV prevalence over three fold (23.9%) that of women in the general population. HIV prevalence among prisons staff (14.7%) was somewhat lower than that of prisons inmates, but nearly twice that of adult men and women in the general population.



Figure 4.3 HIV prevalence among prisons staff and inmates (prisoners) in Uganda 2015 [Source: Uganda Prisons Service Sero-behavioural Survey Report, May 2019]

<sup>&</sup>lt;sup>10</sup> Uganda Prison's Service: Uganda Prison's Service Sero-behavioural survey, 2013 – 14. Kampala, May 2019

This survey also revealed high prevalence of other sexually transmitted infections among prisons inmates and staff. The prevalence of Hepatitis B Virus (HBS), Herpes Simplex Virus type 2 (HSV-2) among inmates and staff is sown in figure 4.4 below.

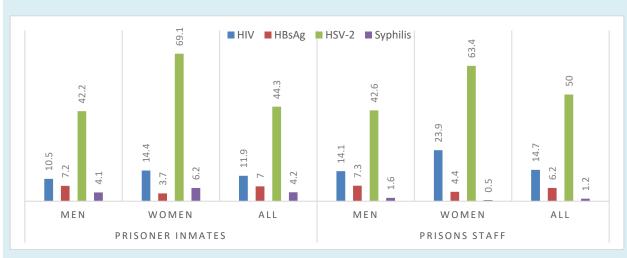
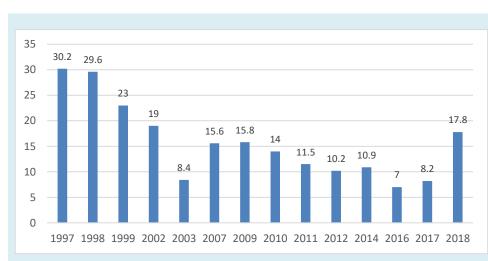


Figure 4.4: Prevalence of HIV, Syphilis, HBsAg, and HSV-2 among prisons inmates and prisons staff in the UPS Bio-behavioural Survey

#### 5.5. HIV Prevalence Among Clients with Sexually Transmitted Infection

Because of the epidemiological synergy between HIV and STIs, STI clients constitute an important at-risk group for HIV infection. Figure 4.5 below shows the trends of HIV prevalence among STI clients at one urban referral clinic in Kampala, ward 12. Even about 20 years ago, HIV prevalence



among STI clients substantially was higher than the general population, Although HIV prevalence in this group may have fallen in recent it still years, exceeds that of the general population several fold.

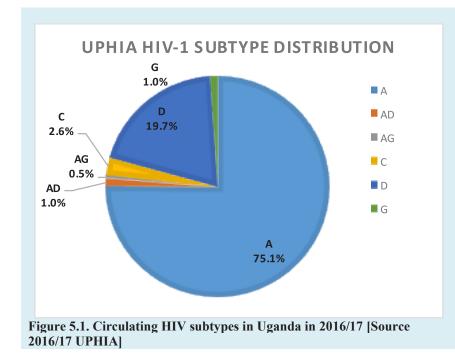
Fig 4.5 Trends in HIV Prevalence 1997 – 2018 among STI clients at the Mulago Hospital STD Clinic

# Chapter 5: HIV Incidence Estimates: Force of New HIV Infections

HIV incidence is the rate of new HIV infections in a population over a given time period. It is a more sensitive indicator of recent HIV transmission dynamics and used to track impact of HIV prevention interventions than HIV prevalence that tracks the burden of HIV in a population. Estimating HIV incidence is however more complicated, ideally requiring following longitudinal cohorts with annual serological surveys to track the rate of sero-conversion. It is a technically and logistically demanding task, and not feasible to conduct at national level. We therefore use indirect methods to determine HIV incidence at national level. In this chapter, we report recent HIV incidence estimates determined through longitudinal cohorts and other measures for sub-national areas or specific population groups, and indirectly determined for national level.

#### 5.1 Circulating HIV Sub-types:

The 2016/17 UPHIA survey was designed to determine HIV incidence using cross section samples with the limiting antigen (LAg) avidity assay based on the LAg Avidity / VL / ARV algorithm on HIV positive cross sectional samples. The first step in this assay involved determining the circulating HIV sub-types in the country. The distribution of the circulating sub-types is



summarized in Figure 5.1.

The predominant circulating sub-type in Uganda was sub-type A, accounting for three quarters of infections. Nearly 20% were sub-type D. The other sub-types and recombinants comprised 5% of all HIV infections. The circulating sub-type distribution was taken into account in determination of HIV incidence using the LAg avidity assay. The two predominant circulating sub-types (A and D) have

different window periods on the LAg assay.

#### 5.2 HIV Incidence among Adults in Uganda:

The most recent nationwide HIV incidence estimates were empirically determined in 2016/17 UPHIA survey. Based on the LAg avidity assay, VL and ARV algorithm, the estimated incidence

of HIV was 0.40% (95% CI: 0.25%-0.56%) among adults aged 15-64 years, (0.35% among men and 0.46% among women). Annual HIV incidence peaked among men aged 35-49 years (0.47%) and among women aged 25-34 years (0.63%), Figure 5.2. HIV incidence for adults aged 15-49 years was estimated at 0.39% (95% CI: 0.24%-0.54%); 0.31% among men and 0.47% among

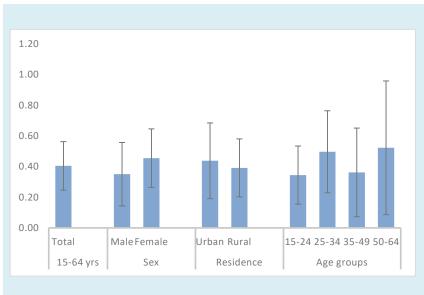


Figure 5.2: HIV Incidence Among Adults in Uganda 2016/17 based on the LAg Avidity Assay [2016/17 UPHIA]

women. The two estimates are not statistically significantly different.

The estimated HIV incidence among adults aged 15 - 64years in urban areas was 0.44% (CI 0.20% - 0.68%), compared to 0.39 (CI: 0.21%- 0.58%) in rural areas. Urban women had almost two fold the HIV incidence of their rural counterparts 0.69%versus 0.36%. The converse was true with rural men having almost two fold the HIV incidence of urban men (0.43% versus 0.15%), Table

#### 5.1

UPHIA was not designed to compare incidence estimates across demographic sub-groups and geographical regions. These estimates based on LAg avidity assay were comparable to that determined by Spectrum for the same period i.e. 032%.

Table 5.1: Annual HIV	Incidence among m	ien and women	in Rural and	Urban Areas in	Uganda in 2016/17
[Source UPHIA 2016/17	<u>'1</u>				

		Ma	le	Fen	nale	To	tal
Area	Age	% Annual Incidence	95% CI	% Annual Incidence	95% CI	% Annual Incidence	95% CI
Urban							
	15 - 49	0.16	0.00-0.39	0.72	0.29 - 1.14	0.46	0.20-0.70
	15 - 64	0.15	0.00-0.36	0.69	0.29 - 1.09	0.44	0.20-0.68
Rural							
	15 - 49	0.37	0.13-0.61	0.36	0.15 - 0.58	0.37	0.19-0.55
	15 - 64	0.43	0.16-0.69	0.36	0.16 - 0.56	0.39	0.21-0.58

#### 5.3: Spectrum HIV Incidence Estimates 2019

Spectrum estimates show that HIV incidence among adults aged 15 - 49 years may have fallen to 0.25 (plausibility limits: 0.20 - 0.33) in 2019. This represents approximately 50% decline in HIV incidence during the past decade, Figure 5.3.

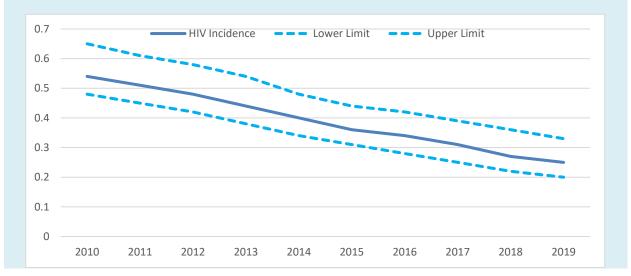


Figure 5.3 Trends in estimated HIV incidence among adults Aged 15 – 49 years in Uganda 2010 – 19 [National Spectrum file 2019]

#### 5.3: HIV Incidence among High Risk:

While HIV incidence in sub groups of the general population is generally less than 1 percent (less than 1 per 100 PYs), HIV incidence among some high risk populations is 3-20 fold higher. These population groups include sex workers, fishing communities, people in prisons incarceration, etc. In this section, we report data on HIV incidence among these population groups with disproportionately high HIV incidence.

A baseline study by MRC among HIV-negative high-risk individuals in a fishing community on the shores of Lake Victoria that aims to establish a high-incidence cohort for future HIV vaccine trials reported high HIV incidence rate of 3.3 / 100 PYs<sup>11</sup> in 2019. This is almost ten-fold that of the general population. However, the incidence rate was higher among sex workers 4.8 / 100 PYs and bar / lodge / saloon workers (6.4/100 PYs), and the female population 5.2/100PYs, - Figure 5.5 below. Like was pointed out in the previous Chapter, this study highlighted the disproportionate burden of HIV among the often invisible or unrecognized group of women that work in entertainment / recreation industry. This group doesn't currently constitute the focus of HIV prevention programmes for the general population of specific interventions for key and priority populations.

<sup>&</sup>lt;sup>11</sup> MRC: Baseline Assessment among High-risk Populations in Preparation for HIV Vaccine Trials

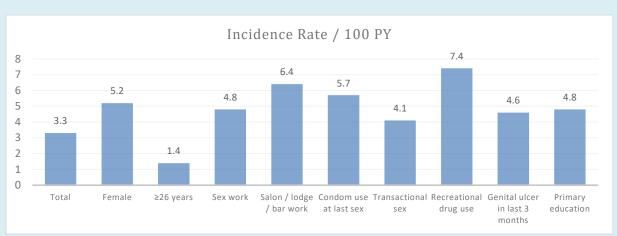


Figure 5.4: HIV Incidence among high risk populations on the shores of Lake Victoria in Masaka District [Source MRC]

#### 5.6 HIV Incidence among prison inmates and prison's staff

The Uganda Prisons Service bio-behavioural survey already presented in Chapter 2, also assessed HIV incidence using the cross-sectional samples based the LAg avidity assay. The results are

summarized in Figure 7.5. HIV incidence was very high among prison inmates 1.462% (CI: 1.462% – 1.465%) almost 3 – 4 that of the fold general population. Among Prisons staff, the HIV incidence was 0.320% (CI 0.319 - 0.322), similar to the general population. The high incidence and prevalence of HIV in prisons setting, calls for special tailored HIV prevention interventions suited to the unique settings of incarceration.

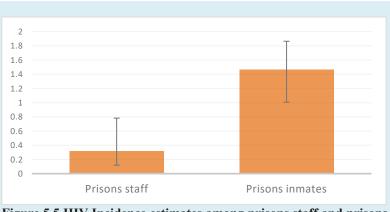
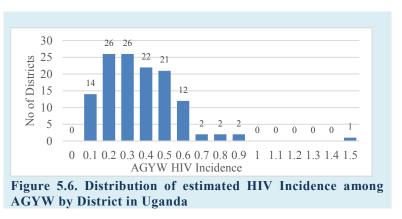


Figure 5.5 HIV Incidence estimates among prisons staff and prisons inmates 2013-14 [Source Uganda Prisons Service Survey Report, May 2019]

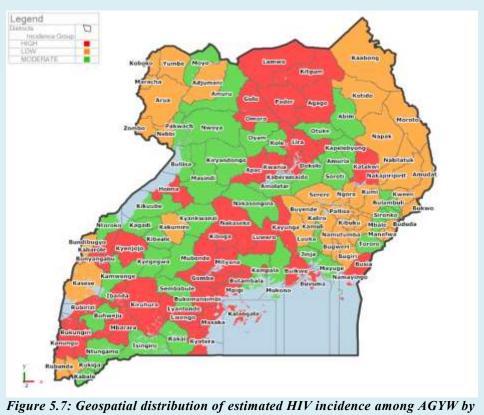
#### 5.7 HIV Incidence among Adolescent Girls and Young Women:

Adolescent girls and young women (AGYW) are associated with disproportionate HIV incidence on account of the high levels of vulnerability to risky sexual behaviour. In recent years, increase focus of HIV prevention programmes have been made on AGYW with tailored layered interventions that aim to address the vulnerability and high HIV risk in this group. Ambitious targets have been set to reduce HIV incidence by 40% in high incidence areas. Such interventions are currently being supported by PEPFAR and the Global Fund. Other development partners and local resources are also increasingly targeted at such interventions. Using the Naomi Model in Spectrum that uses small area estimation methods, HIV incidence

among AGYW has been determined for each of the 135 Uganda. districts in The distribution of the districts by level of the estimated HIV incidence is summarized in Figure 5.6. Based on these estimates, 60 districts had HIV incidence among AGYW of at least 0.4%. Kalangala district stands out as having the highest HIV incidence among AGYW as shown in the figure



The geospatial distribution of HIV incidence among AGYW is shown in Figure 5.7.



District

Table 5.2 below summarized HIV incidence among young antenatal women aged 15 - 19 and 20 - 24 years. Previously, antenatal HIV prevalence among older adolescent girls and young women was used as a proxy of HIV incidence. Trends in HIV prevalence among such women young women was previously used to describe HIV incidence trends.

Sentinel Sites					15-19 yrs	'rs						20-24 yrs	l yrs			
	5	2014	201	)16	20	2017	20	2018	7	2014	30	2016	ñ	2017	5	2018
	%	Z	%	z	%	z	%	Z	z	z	%	z	%	Z	%	z
Sentinel Sites located in Major Urban area	Major Urb	an areas														
Arua hospital	0	127	1.7	115	2.7	75	2.1	146	2.2	269	1.0	205	1.1	181	1.8	342
Hoima hospital	4.7	106	5.3	94	5.3	76	8.8	91	10.1	189	9.4	180	7.1	168	11.7	171
Jinja hospital	7.6	92	0	76	5.3	75	6.0	67	4.8	209	4.7	190	3.8	240	4.3	234
Lira hospital	9.4	85	13.8	87	9.7	62	2.1	48	8.6	186	11.2	179	11.4	176	10.3	156
Lubaga hospital	5.1	39	0	14	3.8	26	7.7	13	5.3	319	4.4	275	3.8	261	2.8	249
Mbale hospital	4.2	48	5.1	39	2.6	39	5.7	35	4.0	149	5.1	138	8.3	109	3.8	133
Mbarara hospital	11.5	61	9.4	85	15.6	32	5.4	56	7.7	207	8.0	313	10.4	115	5.8	206
Nsambya hospital	0	11	0	12	0.0	9	0	9	3.0	164	3.5	171	3.8	133	2.6	152
Soroti hospital	3.1	65	0	41	2.4	41	5.6	36	4.0	150	4.4	182	4.9	164	5.0	161
Group Prevalence	5.2	634	5.2	563	5.6	432	4.8	498	5.5	1,842	5.8	1,833	5.6	1,547	4.9	1804
Sentinel Sites Located C	Outside Maj	or Urban	Areas													
Aber hospital	2.2	92	2.4	85	1.5	67	1.3	80	3.5	114	3.8	133	5.5	110	4.6	108
AmolatarH/C IV	1.6	62	0	57	1.5	99	5.9	51	3.3	91	2.2	92	4.5	111	5.1	78
Atutur hospital	0	36	3.4	59	0	56	2.3	43	3.5	57	3.0	66	3.6	110	3.6	110
Bwera hospital	0.9	108	0	82	2.9	69	2.2	92	3.3	153	0.8	132	4.4	137	0.9	115
Kaabong hospital	0	38	0	15	1.9	52	3.7	27	0	58	4.4	45	2.2	91	1.3	77
Kagadi hospital	2.6	78	0	74	4.3	69	1.6	63	8.2	97	3.3	90	7.1	112	3.4	117
Kilembe hospital	1.9	53	0	40	5.9	17	4.0	25	1.1	93	5.5	73	1.9	52	3.7	82
Kitgum hospital	3.9	77	4.8	63	4.5	4	2.0	51	13	108	8.5	118	7.1	84	9.3	108
Kiwoko hospital	5.4	56	6.6	61	0	48	6.4	47	8.1	111	9.5	105	6.7	120	1.1	87
Kyangwali H/CIV	4.8	62	4.6	87	0	71	1.3	75	5.2	96	4.0	100	5.0	101	5.7	106
Lwala hospital	2.1	48	2.3	43	3.2	31	1.6	61	7.6	99	0	62	4.5	44	4.8	84
Masindi hospital	5.6	89	10.3	78	3.3	90	1.4	70	6.7	163	8.8	137	2.8	180	6.2	130
Matany hospital	0	42	0	25	5.1	39	0	33	1.4	70	1.2	80	1.0	102	1.9	108
Moyo hospital	0	23	0	30	3.3	30	2.6	39	2.2	45	5.6	71	1.7	59	4.8	83
Mutolere hospital	2.3	43	0	32	0	29	0	23	0.7	149	0.8	126	0.7	144	1.0	100
Nebbi hospital	3.2	94	7	66	2.1	97	3.8	105	7.3	123	4.6	108	2.7	113	2.5	122
Nyakibale hospital	5.9	17	2.8	36	3.8	26	4.0	25	1.4	70	4.7	106	5.5	73	9.4	85
Pallisa hospital	0	89	0	76	3.1	64	0	70	3.3	121	2.6	152	0.7	144	1.5	133
Rwekubo H/C IV	5.6	36	3.9	51	3.5	57	13.3	30	7	114	4.0	101	9.4	85	7.0	43
Tororo hospital	1.4	74	0	61	11.3	62	5.2	77	3.1	163	4.1	171	2.4	164	5.2	174
Group Prevalence	2.5	1,217	2.5	1,154	3.0	1,084	2.9	1,087	4.7	2,062	4.1	2,101	3.8	2,136	4.0	2,050
Prevalence (All sites)	3.4	1,851	3.4	1,717	3.7	1,516	3.5	1,585	5.1	3,904	4.9	3,934	4.6	3,683	4.4	3,854

Table 5.2: HIV Prevalence among Young Antenatal Women Aged 15 - 19 and 20 - 24 Years, 2014-2018

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## 5.8 HIV Incidence (MTCT) Rate among Children

The rate of mother-to-child transmission can be taken as a proxy of HIV incidence among children. In this section, we report MTCT data from two sources: i) The PMTCT Impact Evaluation study conducted by MoH and stakeholders in 2018-19 that as estimated early and late MTCT; and ii) Early Infant Diagnosis (EID) testing of exposed infants based on polymerase chain reaction (PCR) DNA testing of samples from health facilities tested at the Central Public Health laboratories.

The PMTCT Impact Evaluation (IE) study<sup>12</sup> was conducted in 206 facilities across the country with the aim of determining early and late MTCT rates in the country and a cluster of DREAMS project districts. It involved recruitment of 17,811 mother-infant pairs (MIP) - 2,283 HIV-positive MIPs; and 15,528 HIV-negative MIPs, recruited from immunization clinics at about 6 - 12 weeks of age of the baby. They were followed up every 3 months with blood draws and HIV testing till 18 months to assess sero-conversion of the baby and the HIV-negative mothers. Preliminary results for the baseline and follow up findings are summarized in Figure 5.8. The results for the mothers are not yet available.

The overall early MTCT rate overall was 2.1% and 2.4 in DREAMS districts. This is comparable to the 6-weeks MTCT rate estimated by Spectrum modelling presented later in Chapter 7.

Over the 18 months follow up, very few sero-conversions were observed among the babies overall and in DREAMS districts although several MIPs were not accounted for, and some children died due to unspecified causes.

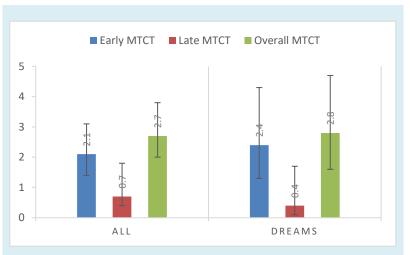


Fig 5.8: Preliminary early and late PMTCT rates determined in the PMTCT Impact Evaluation study

Data analysis is still going on but preliminary findings indicate that the overall MTCT rate was 2.7%. The MTCT rate in DREAMS districts was also similar 2.8%.

Facility data for EID testing and Birth cohort monitoring also provides some estimates of MTCT rates along with trend data for recent years. For EID, samples from HIV-exposed infants are transported via the hub-based sample transportation system to CPHL where they are tested for HIV using DNA PCR. The results are returned to facilities based on an automated results return

<sup>&</sup>lt;sup>12</sup> Citation of the PMTCT Impact Evaluation Study

system. The results are also available on the online EID dashboard. The trends of estimated MTCT rates based on EID tests and birth cohort monitoring is summarized in Table 5.3

Year	EID and Ra	pid Testing	Birth Cohort Monitoring
	First PCR	Overall	
2016	5%	4%	7%
2017	4%	3%	6%
2018	4%	2%	5%
2019	3%	2%	3%

Table 5.3: PMTCT Rates based on EID and birth cohort monitoring:

The MTCT estimates based on EID testing and birth cohort monitoring are comparable to that determined in the Impact Evaluation Study.

# Chapter 6: Sexual Behaviour Driving New HIV Infections

Data on sexual behaviour in the population provide early warning information to explain HIV incidence levels and trends. In the past three decades, considerable efforts have been made to collect behavioural data as part of second generation HIV surveillance. Tracking sexual behaviour is based on standard indicators that are obtained based on responses to standard questions during population-based surveys. In this chapter, we report data on levels and trends of sexual behaviour that are linked to sexual transmission of HIV

## 6.1 Sex with non-marital non-cohabiting or casual partners

Having sex with non-marital or non-cohabiting partners also referred to as casual sex partners is considered high risk for sexual transmission of HIV. The National Programme tracks this behavior in the general population. Figure 6.1 below shows the proportion of sexually active men and women aged 14 - 49 years who reported engaging in casual sexual behavior in the preceding 12 months in the three national surveys of 2004/05, 2011 and 2016/16.

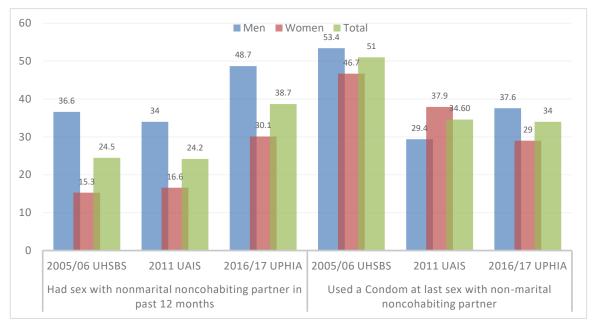


Figure 6.1: Trends in proportion of men and women aged 15 – 49 years that reported sex with a nonmarital non cohabiting partner in the preceding 12 month (Left); and among them, the proportion that used a condom the last time they had sex with such a partner

Sex with non-marital non-cohabiting partners appears to have increased from approximately one-third of men in 2005 - 2011 to nearly half of men in 2016/17. Among women, this proportion doubled from about 15 percent to 30% over the same period. Casual sex was more likely to be reported by urban residents, young people and people in the higher wealth quintiles in the 2016/17 survey

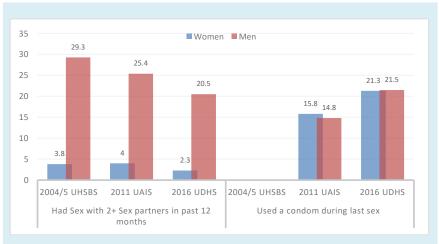
#### 6.2: Condom use with casual partners

While having sex with casual partners is high risk behavior for sexual transmission of HIV, consistent condom use during such encounters is protective. However, the data from the three surveys show that condom use at the last casual sex remains low and appears to be declining. In 2004/05 while at least half (51%) of such casual sex encounters involved use of a condom at the last sex encounter, this had fallen to about one-third (34%) in 2016/17. Men were slightly more likely to report condom use during such encounters than women (38% versus 29%) in 2016/17, Figure 6.1 above. Urban residents, young people and people in the higher wealth quintile were more likely to report condom use during casual sex in 2016/17.

#### 6.3: Multiple Sexual Partnerships:

Having multiple partners (especially concurrent partners) has been associated with high risk of sexual transmission of HIV and constitutes the focus of risk reduction messages of HIV prevention. We track multiple sexual partnerships in the general population using standard indicators as part of behavioral surveillance.

Figure 6.2 below shows the proportion of men and women aged 15 - 49 years that reported having had more than one sex partners in the preceding 12 months during three national surveys 2004/5



UHSBS, 2011 UAIS and 2016 DHS. This data was not readily available in the 2016/17 UPHIA survey. For 2011 and 2016, we also show the proportion that used a condom the last time they had sex

About one in five sexually active men reported having had sex with more than one partner in the past twelve months in 2016 UDHS. Only 2 percent of women

Figure 6.2: The proportion of men and women aged 15 - 49 years that reported having sex with 2+ partners in the preceding 12 months and the proportion that used a condom at last sex in three national surveys:

reported this sexual behavior. The proportion of men reporting multiple partnership declined slightly from 29% in 2004/05 to 25% in 2011. For women, taking the small numbers into account, the proportion remained 2 - 4% during the same period.

Condom use by individuals reporting multiple partnerships also remained suboptimal, with just one-in five such men and women reporting condom use during their last sex encounters in 2016/17.

This represented just a five percentage point increase for both men and women over the preceding five years. Data for 2004/05 for this indicator was not readily available.

#### 6.4: Male Circumcision:

Although not entirely a sexual behavior, behavior and attitudes influence decisions for men to get circumcised. Male circumcision is proven to be protective against HIV acquisition by men. In 2016/17 UPHIA, coverage of male circumcision was 43.3 percent, with 23.2

Table 6.1: Percentage of Males that were circ	umcised
according to the 2016/17 UPHIA	

Characteristic	Medical circumcision	Non-medical circumcision	Total
Result of PHIA su			
HIV positive	12.9	17.1	30.0
HIV negative	22.1	20.7	42.9
Residence			-
Urban	27.5	22.5	50.0
Rural	19.6	19.8	39.3
Region			-
Central 1	28.4	18.9	47.3
Central 2	27.4	20.1	47.5
Kampala	32.2	19.1	51.3
East Central	19.8	34.3	54.1
Mid-Eastern	14.6	54.1	68.7
North East	13.7	5.6	19.4
West Nile	23.9	23.3	47.3
Mid North	13.1	0.6	13.7
Mid-West	23.4	25.7	49.1
South West	20.0	4.9	24.9
Age			
15-19	26.8	16.9	43.7
20-24	29.8	19.8	49.7
25-29	24.0	20.6	44.6
30-34	21.1	23.1	44.2
35-39	16.3	21.2	37.5
40-44	14.2	21.6	35.8
45-49	10.4	24.0	34.4
50-54	9.0	26.3	35.3
55-59	7.9	23.3	31.2
60-64	4.7	22.2	26.9
Total 15-24	28.1	18.2	46.3
Total 15-49	23.2	20.1	43.3
Total 50-64	7.6	24.4	32.0
Total 15-64	21.7	20.5	42.2



Figure 6.3: Coverage of male circumcision among males 15 – 49 years in Uganda based on three previous national surveys

percent having been acquired through medical circumcision in

Health facilities. All three previous HIV population surveys determined the coverage of male circumcision, the trend is summarized in Figure 6.3.

In 2016/17 UPHIA, the coverage of male circumcision was heterogeneous across agegroups, geographical areas and other sociodemographic and economic sub-groups. As expected young people were more likely to be circumcised as well as those in the higher wealth quintiles, and higher education attainment. The Eastern region had the highest coverage of male circumcision while mid north and south west had the lowest coverage with less than one in five adult males circumcised, Table 6.1. In the same vain, urban residents were more likely to be circumcised than rural residents. Individuals that were found to be HIV-negative in the survey were more likely to be circumcised than HIV-positive individuals.

The prevalence of HIV among circumcised men was lower than circumcised men in all the three surveys, 3.7% versus 5.5% in 2005/16 survey, and 4.5% versus 6.7% in 2011 UAIS.

#### 6.5 Early Sexual Debut among Adolescents and Young People

Initiation of sex before turning age fifteen is considered high risk for HIV and is one of the sexual behaviours that we track among young people. The proportion of older adolescent and young people who reported having sex before they turned 15 years of age assessed in the three previous HIV surveys is shown in Figure 6.4.

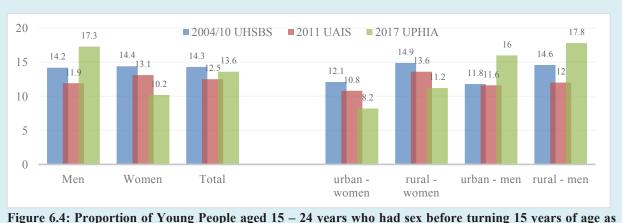


Figure 6.4: Proportion of Young People aged 15 – 24 years who had sex before turning 15 years of age as reported in 2004/05 UHSBS, 2011 UAIS and 2016/17 UPHIA

In the 2016/17 UPHIA, 13.6 percent of young people aged 15 - 24 years reported having their first sex before turning 15 years of age. Yung men were more likely than young women to report this early sexual debut (17.3% versus 10.2%). Among young men, the trend is not clear, but there appears to be a trend in the opposite direction.

Overall, the proportion of young people starting sex before they turn 15 years has not changed much during the past 15 years. However, there is a tendency of young women to delay their first sexual debut, with the proportion starting sex before turning 15 falling from 14.4% in 2004/05 to 10% in 2016/17. This is observed among young girls and young women residing in urban and those in rural areas.

Unadjusted HIV sero prevalence data appears to show that young women who delayed sexual debut in 2016/17 UPHIA were less likely to be HIV-infected than their counterparts who started sex earlier, Figure 6.5. However, there appears to be no obvious trend among young men and in the overall totals.



Figure 6.5: HIV Prevalence by age of sexual debut among young men and women in the 2016/17 UPHIA

# Chapter 7: Spectrum Estimates of Non HIV-Prevalence Parameters

The annual estimates for other non-prevalence HIV estimates for 2019 based on triangulation of HIV surveillance and programme data and national population parameters are summarized in Table 8.1. In this section, we report these estimates and the trends over the past decade. The Estimates were made by the Uganda HIV Estimates working group comprised of representatives from MoH, CDC, UNAIDS, WHO and UNICEF with technical assistance of Avenir Health.

Parameter	Number	Plausib	ility Ra	ange	Percent
Number of People living with HIV		Lower		Upper	
Total	1,461,370	1,367,859	-	1,610,130	
Men	579,318	532,661	-	646,938	40%
Women	882,052	769,780	-	958,117	60%
15 – 49 years	1,109,232	1,007,582	-	1,147,919	76%
15 Years +	1,359,074	1,224,229	-	1,457,232	93%
50 years +	245,684	145,584	-	428,215	17%
15 – 24 years	176,524	232,765	-	232,765	12%
10 – 19 years	103,857	76,467	-	124,451	7%
0 – 14 yrs	102,296	88,893	-	110,148	7%
Number of New HIV Infections					
Total	53,414	40,872	-	68,578	
Men	22,805	15,209	-	31,725	43%
Women	30,608	21,263	-	39,452	57%
15 – 49 years	47,722	34,209	-	57,785	85%
15 years +	45,644	36,109	-	61,940	89%
50 years +	2,315	985	-	5,343	5%
15 – 24 years	19,707	11,872	-	25,887	37%
0 – 14 years	5,692	4,329	-	7,791	11%
Number HIV Related Deaths					
Total	21,267	14,791	-	27,924	
Men	12,435	7,767	-	16,554	58%
Women	8,832	5,682	-	12,253	42%
15 – 49 years	12,942	9,536	-	16,180	61%
15 years +	16,440	12,007	-	21,779	77%
50 years +	3,238	1,873	-	7,426	17%
15 – 24 years	2,400	1,590	-	3,107	12%
0-14 years	4,828	3,494	-	6,087	23%

Table 7.1: Estimates of HIV Burden, New HIV Infections and AIDS-related Mortality in Uganda:

## 7.1 People Living with HIV:

It is estimated that by end of 2019, there were approximately 1.46 million people living with HIV in Uganda. Among these, 93% were adults aged 15 years+, while children aged 0 - 14 years constituted 7 percent. Young people 15 - 24 years constitute 12 percent. Approximately 17% of PLHIV were aged over 50 years.

The geographical burden of HIV in the country at district and regional level based on the Naomi model estimates in Spectrum is shown in Figure 7.1 below. The five districts with the highest burden, and the five with the lowest burden are also summarized in Figure 7.1 alongside the figure.

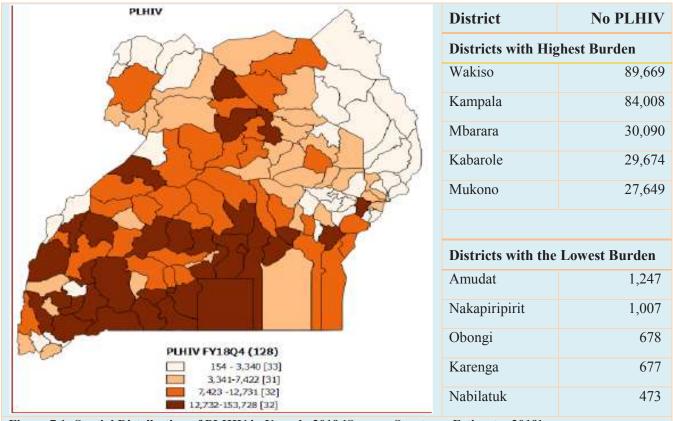
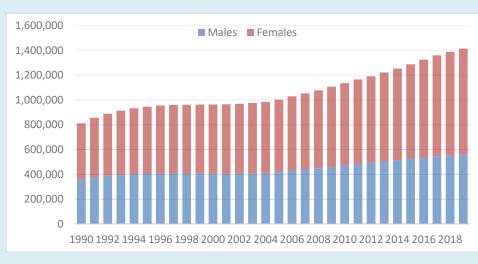


Figure 7.1: Spatial Distribution of PLHIV in Uganda 2019 [Source: Spectrum Estimates 2019]

The trends in the estimated number of PLHIV is summarized in Figure 7.2. It shows that the number of PLHIV in the country has continued to grow over the past decade. However the rate of



growth has slowed down in recent years implying that there are realistic prospects of HIV epidemic control in the short run. Women are disproportionately affected.

The trends of PLHIV varies among age groups

Figure 7.2: Trends in Spectrum estimates of number of PLHIV in Uganda 1990-2019

as shown in Figure 7.3 below. While the number of PLHIV aged 15 - 24 years is declining, the burden among older people aged over 50 years has increased from 9.6 percent of PLHIV in 2010 to 17% in 2019. It is projected that older PLHIV aged over 50 years will constitute 25% of all PLHIV by 2025 and 41% bY 2030. For most of the past three decades, PLHIV aged 15 - 24 years exceeded number of PLHIV aged 50 years + by two fold. However, this may have reversed in the past three years with PLHIV over 50 years exceeding that of young people 15 - 24 years.



Figure 7.3: Thirty year trend in estimated PLHIV aged 15 – 24 years compared to those aged over 50 years

The trends of children living with HIV (CLHIV) is radically different and varies by age group as shown in Figure 7.4. For most of the past decade, CLHIV has been declining with the declines most marked among children under one year of age.

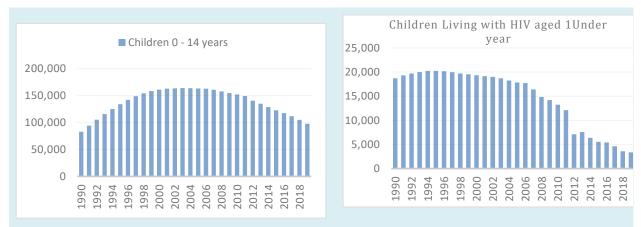


Figure 7.4: Trends in estimated number of children Living with HIV 0-14 yrs (Left); and under 1 year (Right)

## 7.2: Estimates of New HIV Infections:

The estimated number of new HIV infections in Uganda during 2019 was approximately 53,000, 57% being women. Over one-third (37%) of the new infections were among young people aged 15-24 years, with women more disproportionately affected. New HIV infections declined steadily

during the past decade, although the decline fell short of the 75% target under the Fast Track Strategy for ending AIDS by 2030. Figure 7.5 below shows the trend in new infections over the past three decades for all adults and young people aged 15 - 24 years.

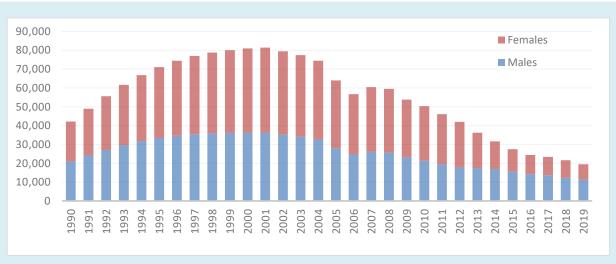


Figure 7.5: Trends in new HIV infections among all individuals (Left), and young people 14 – 24 years (Right)

Among young people 15 - 24 years, young women are disproportionately affected by a factor of 3:1 as shown in the figure.

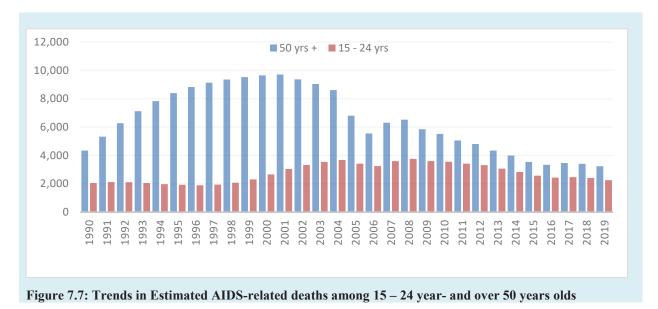
## 7.3: AIDS Related Mortality:

It is estimated that there were approximately 21,500 AIDS-related deaths in 2019, the majority (58%) being among adult men, Table 1.1. However, AIDS-related death declined steadily during the past decade. Unlike the decline in new HIV infection, the declines in mortality were close to meeting the Fast Track target of 75% reduction in AIDS-related deaths during 2010 – 2020. Figure 7.6 below shows the trend in estimated AIDS related deaths during the past three decades. In recent years, men were more disproportionately affected more than women.





The patterns in AIDS-related mortality appear to vary by age-group. The steady decline in AIDS-related mortality is not replicated among adults aged over 50 years (whose share of AIDS burden has been increasing), and among young people 15 - 24 years as shown in Figure 7.7 below.



The estimated AIDS-related mortality rate in 2019 was 47/1000 (55/1000 among males, and 37/1000 among females). This reflects a decline from 166/1000 in 2010, and 364/1000 in 2000. Table 7.2 summarises the estimated age and sex specific AIDS-related mortality rate.

Age Group			AID	S-Related	Mortality	Per Thous	and		
		2000			2010			2019	
	Total	Males	Females	Total	Males	Females	Total	Males	Females
0-4	401	402	400	200	200	200	37	37	37
5-9	63	63	63	43	43	42	10	11	10
10-14	61	62	61	48	48	47	20	21	20
15-19	54	47	60	54	48	59	22	23	21
20-24	69	23	115	64	36	91	31	23	39
25-29	376	166	583	165	85	238	48	45	51
30-34	836	540	1,126	283	188	371	84	93	75
35-39	1,334	1,200	1,461	483	377	582	105	147	67
40-44	1,294	1,380	1,215	545	468	617	129	186	77
45-49	1,099	1,266	952	506	494	516	143	202	88
50-54	929	1,100	782	413	439	391	144	209	85
55-59	661	787	556	285	315	261	121	180	69
60-64	495	586	424	207	230	189	95	146	54
65-69	385	449	338	157	173	146	70	111	39
70-74	304	348	274	122	132	116	51	83	29
75-79	241	269	224	97	102	94	38	63	23
80+	164	180	156	66	69	65	24	43	16
Total	364	332	396	166	144	187	47	55	39

#### 7.4 Vertical Infections:

It is estimated that there were about 5,690 [plausibility limits: 4,420 - 8,390] mother-to-child HIV infections in Uganda in 2019, reflecting the sustained decline in vertical infections during the decade. The trajectory of the estimated annual number of vertical infections over the past 2 decades is shown in Figure 7.8 below. Super-imposed on the same chart is the estimated annual number of vertical infections averted by PMTCT services. We estimate that approximately 16,100 MTCT infections were averted by the PMTCT programme in 2019 alone.

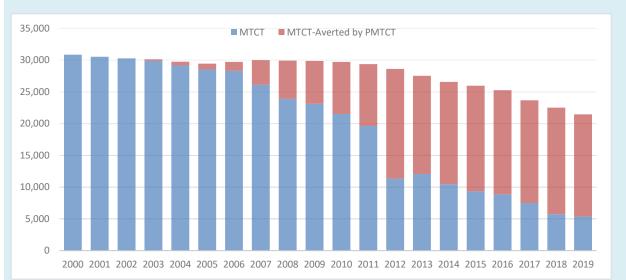


Figure 7.8: Trends in estimated annual vertical infections in Uganda, and vertical infections averted by PMTCT services during the past two decades

The estimated MTCT rate at six weeks of delivery and that after breast feeding for the past two

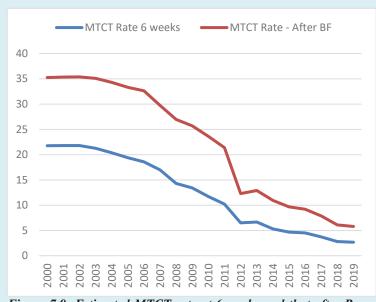


Figure 7.9: Estimated MTCT rate at 6 weeks and that after Breast Feeding in Uganda 2000 – 2019

decades are summarized in Figure 7.9. For 2019, the estimated MTCT rate of 2.8% [plausibility limits: 2.3% - 4.0%] is comparable to that obtained from the recent PMTCT evaluation that impact was conducted in the country in 2019. The estimated MTCT rate after breast feeding was 6.0% [plausibility limits: 4.9% - 8.7%], reflecting a decline from over 30% prior to the past decade.

The estimates indicate that 47% of vertical infections were acquired during pregnancy, while 53% were

acquired after pregnancy. The relative distribution of the sources of these vertical infections during pregnancy and after pregnancy are shown in the stacked bar charts in Figure 7.10. It should be noted that because the reported numbers of women on ART during 2010 exceeded the number of women in need of PMTCT (i.e. HIV-positive pregnant women), it was assumed that there was no transmission among women who were not started on ARVs. However, it is highly likely that this is likely due to data quality deficits



Figure 7.10:Stacked bars of the patterns of the sources of the vertical infections in 2019 – During Pregnancy [Left]; and during breast feeding

We estimate that one quarter of vertical infections (25) occurred during pregnancy among women who dropped off ART during pregnancy, and another 21% were among women who dropped off ART either during pregnancy or breast feeding but the children were infected during breast feeding.

Another leading cause of vertical infections is the high HIV incidence among women during pregnancy and breast feeding. Approximately one-quarter of vertical infections (24%) occurred among women who acquired HIV during breast feeding, and a further 11% among women who acquired HIV infections during pregnancy.

Only a small proportion of the vertical infections occurred among women who were on ART during pregnancy (i.e. started ART during pregnancy or were on ART before pregnancy), i.e. 8% of the infections occurred during pregnancy among such women and another 8 percent during breast feeding. The remaining 4 percent of vertical infections occurred either during pregnancy or breast feeding among women who started ART late i.e. within 2 weeks of delivery and therefore had not yet achieved viral suppression at the time of delivery.

In previous years, we observed that the patterns of vertical infections differed among geographical areas of the country. We have not yet examined these patterns in the 2019 estimates.

## Chapter 8: HIV Viral Load Suppression

Viral load suppression in this report refers to the proportion of HIV-positive individuals with HIV RNA <1,000 copies per milliliter (ml) of plasma. Strong adherence to antiretroviral therapy suppresses viral load to undetectable levels within people living with HIV, greatly reducing the risk of transmitting HIV to others. As part of the triple 90 targets, the third 90 aims for at least 90% of people on treatment having suppressed vireamia. While there are platforms in the country that can now detect VLS as low as 50 copies per ml, for purposes of this chapter we shall use the cut off of less than 1,000 copies per milliliter of plasma.

#### 8.1: Viral Load Suppression Among PLHIV on ART

The magnitude of VLS in Uganda has progressively increased since ART roll out commenced nearly two decades ago. Assessment of VLS for HIV programme monitoring commenced in 2015. Data on VLS was obtained from the online VLS dashboard<sup>13</sup> hosted at the Central Public Health Laboratories where samples from facilities are centrally tested for VL. This data may have a certain level of double counting of individuals tested for VL. Every adult on ART is expected to have at least one VL test annually. The estimated coverage of VLS in Uganda at the end of 2019 among PLHIV on ART is summarized in Table 8.1 below.

	No. PLHIV	No. PLHIV on ART	No. PLHIV Tested for VL	Coverage VL testing among PLHIV on ART	No. with VLS	% of tested VLS
Children 0 - 14 years	102,296	66,203	71,416	108%	52,710	73.8%
Men 15 years +	527,540	403,715	366,904	91%	326,695	89.0%
Women 15 years +	831,534	753,595	707,022	94%	649,060	91.8%
Total Adults 15 years +	1,359,074	1,157,310	1,073,926	93%	975,755	90.9%
Total Adults and Children	1,461,370	1,223,513	1,145,342	94%	1,028,465	89.8%

Table 8.1: The Coverage of Viral Load Tests and VLS among ART Clients Tested in 2019.

The coverage of Viral Load tests has increased since 2015. Blood plasma and dried blood spots (DBS) samples are relayed through the sample transportation system from satellite clinics to hubs and then to CPHL. In 2019, 93% of adults on ART in Uganda had VL tests conducted.

Approximately 91% of adults tested had achieved VLS; however, over three quarters (26.2%) of children 0-14 years on antiretroviral treatment in health facilities in Uganda had not achieved VLS. Among ART clients, VLS was marginally higher among adult women compared to adult men (92% versus 89%).

## 8.2: Estimated Population Level Viral Load Suppression

<sup>&</sup>lt;sup>13</sup> Viral Load dashboard accessed at <u>https://vldash.cphluganda.org/</u> accessed on 23<sup>rd</sup> March 2020

When the ascertained VLS figures are applied to all PLHIV with those on ART but not VL tested assumed to have the same VLS as those tested, VLS among adults falls to 77%. The VLS was highest among adult women 83% than men 68% and children 80%, but all would not have met the 90% target under the conditional third 90 of the triple 90 targets.

	No. PLHIV	No. PLHIV on ART	% PLHIV on ART	No VL tested	% of tested VLS	VLS among all PLHIV
Children 0 - 14 years	102,296	66,203	68%	71,416	73.8%	48%
Men 15 years +	527,540	403,715	79%	366,904	89.0%	68%
Women 15 years +	831,534	753,595	94%	707,022	91.8%	83%
Total Adults 15 years +	1,359,074	1,157,310	88%	1,073,926	90.9%	77%
Total Adults and Children	1,461,370	1,223,513	86%	1,145,342	89.8%	75%

Table 8.2: The Coverage of ART and VLS among all PLHIV in 2019.

When the ascertained VLS is applied against all PLHIV, VLS falls to 77% among adults and 48% among children. Adults had already met the targets for the third 90 under the conditional cascade (target 73%), but not the targets for the third 95 (target 85%). Children had not yet met that target for the third 90 and are unlikely to do so by 2020. Among adults, women at 83% percent would have exceeded the target for the third 90s but stall fall short of the third 95 if the triple 95 targets are taken into account. At 68%, adult men were still falling short of the targets.

#### 8.2 Trends in Viral Load Suppression.

The trends in coverage of viral load suppression among children aged 0 - 14 years, adult men and women aged 15 years+ are summarized in Figure 8.1.

VLS has increased steadily since 2015 among all age groups and gender. However VLS among adult women increased from under 60% four years ago to about 83% in 2019, surpassing the 2020

targets for the third 90 i.e. 73%. Among adult men, VLS increased form 46% in 2016 to 68% in 2019, falling short of the triple 90 target for the third 90 of 73%. Among children, the increased coverage is more dismal. It increased from 36% in 2016 to 48% in 2019, falling far short of the 2020 targets for the third 90 of the triple 90 targets.



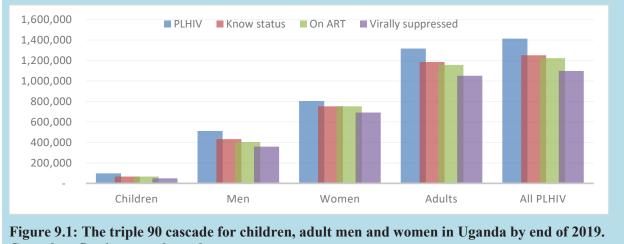
Figure 8.1: Trends in Viral Load Suppression among men and women aged 15 years+ and Children aged 0-14 years during 2015 – 19

## Chapter 9: HIV Testing and Treatment Cascade

As part of the Fast Track Strategy for ending HIV/AIDS, ambitious targets were set for 2020 including the triple 90 HIV testing and treatment targets. Uganda signed up to the Fast Track strategy and committed to meeting these targets. These targets are tracked based on data from mathematical modelling in Spectrum (PLHIV), the Shiny 90s model in Spectrum (first 90), and the routine health information reporting system for the second and third 90s. The cascade is best determined from representative population-based surveys that cannot provide annual data.

#### 9.1 Status of Triple 90s by end of 2019:

Based on the above stated data sources for the triple 90s, the status of the triple 90 HIV testing and treatment cascade for adults and children in Uganda is summarized in Figure 9.1 below.



Cascade reflecting actual numbers

To better reflect the cascade by percentages, the same cascade above if shown as non-conditional cascade and the conditional cascades separately for children aged 0-14 years, adult men, adult women, all adults, and all adults and children combined, in Figure 9.2 and 9.3 below.

The conditional cascade reveals shortfalls in the attainment of the first 90 among children (68%), and adult men (84%) all of which fall below the target of 90% of PLHIV. At 94%, women would have already exceeded the target for the triple 90 and even the triple 95 with regard to the first element of the cascade. Attainment of the second 90 may be affected by data quality issues on tracking and reporting of linkage to care. However, available data shows that at 94%, it is only men that appear to have deficits with linkage. Among PLHIV on treatment, the third 90 reveals sub-optimal VLS especially among children with one-quarter not achieving suppressed vireamia. Men also have sub-optimal VLS with 11% of men on ART not achieving suppressed vireamia.

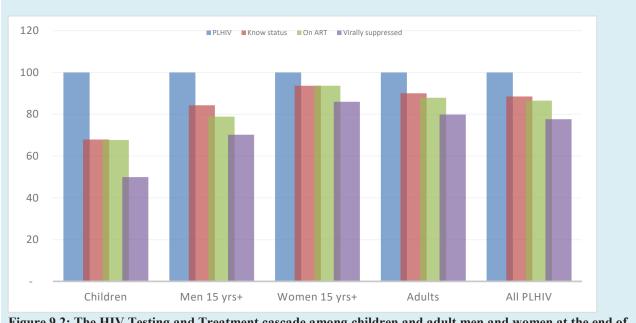


Figure 9.2: The HIV Testing and Treatment cascade among children and adult men and women at the end of 2019 as non-conditional cascade

The unconditional HIV testing and treatment cascade again highlighting the low levels of coverage of the three 90s among children and men at population levels.

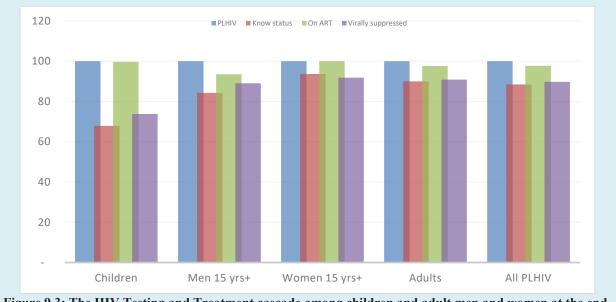


Figure 9.3: The HIV Testing and Treatment cascade among children and adult men and women at the end of 2019 conditional cascade

Only two-thirds of HIV-infected children and five out of every six HIV-infected men were already diagnosed and aware of their serostatus. the other hand, among individuals who know their status, linkage to treatment is good even among children, although for men, at 94%, linkage is not optimal yet. Therefore, only two-thirds of HIV-infected children and 79 percent of HIV-infected adult men

are on treatment. Viral suppression is sub-optimal among children with approximately one-half not achieving viral load suppression as already pointed out in the preceding chapters.

## 9.2 Trends in the Triple 90s HIV Testing and Treatment Cascade:

The trends in the triple 90s cascades for children, adult men and women as well as that of all adults is shown in Figure 9.4 below.



Figure 9.4: Trends in the Triple 90s cascades among Children, Men, Women and All Adults 2015 - 19

## 9.3: HIV Cascades among Other Population Groups:

The data on the HIV testing and treatment cascades for the other population groups is not readily available from the routine reporting system. There are hardly population-based studies that have data on the HIV testing and treatment cascades. The data from the routine reporting system is constrained by lack of accurate estimates on the base population size of PLHIV in the population group, as well as lack of disaggregated data for service delivery. The HIV testing and treatment cascades for the other population groups will be provided in the next issue of the surveillance report.

## Chapter 10: Prevalence of Antiretroviral Drug Resistance

Uganda's HIV treatment programme has been growing steadily for nearly two decades. The inevitable consequences of a long-standing antiretroviral treatment programme is the emergence of antiretroviral drug resistance (HIVDR). The Ministry of Health HIVDR technical working group (TWG) tracks various aspects of HIVDR, ranging from early warning indicators (EWIs), to transmitted and acquired HIVDR based on standard survey protocols in line with the WHO HIVDR strategy<sup>14</sup>. Other independent research institutions as well as the third line ARVs programme in the Ministry of Health also collect data on genotypic HIVDR mutations that can also be used for HIVDR surveillance. Data on magnitude of HIVDR informs strategies for optimized first- and second-line ARV regimen selection. In this chapter, we report some recent HIVDR surveillance data in the country.

## 10.1 Transmitted Antiretroviral Drug Resistance Patterns Based on 2016/17 UPHIA:

In the 2016/17 UPHIA, 36 samples that were classified as recent based on the VL/ARV/LAg assay were genotyped for HIVDR. This enabled determination of population level transmitted HIVDR for the first time in Uganda. The pattern of transmitted HIVDR resistance revealed in this survey is summarized in Table 10.1.

Among the 36 (81%) successfully amplified samples from recently infected HIV-positive adults, three (8.3%) had genotypic resistance mutations to ARVs. Three samples had mutations associated with resistance to non-nucleoside reverse transcriptase inhibitors (NNRTIs) only, one had mutations associated

with resistance to both nucleoside reverse transcriptase inhibitors (NRTIs), and NNRTIs, and one mutations had associated with resistance to NRTI only. None had resistance to protease inhibitors (PIs), or all

<u>Table 10.1 Patterns of Transmi</u> recently HIV-infected Adults A						
Antiretroviral Drug Class	Number	Percent	DR Mutations Detected <sup>1</sup>			
Successfully amplified	36	80.8				
Any	3	8.3	G190A, K103N, T215S			
NRTI	1	2.8	T215S			
NNRTI 3 8.3 G190A, K103N						
PI	0	0.0				
NRTI & NNRTI	1	2.8	G190A, T215S			
NRTI, NNRTI & PI	0	0.0				
<sup>1</sup> Based on <i>Stanford Database for HIV Dr</i> . https://hivdb.stanford.edu/assets/media/re	0		eb2017.516aee6f.pdf			

three ARV classes. These mutations among recently infected individuals had important implications because NNRTIs and NRTIs at the time of the survey were still part of the preferred

<sup>&</sup>lt;sup>14</sup> WHO: HIV Drug resistance Surveillance guidance – 201 Technical Update, WHO Geneva Switzerland, December 2015

first line regimen for ART. However, this has since changed with recent adoption of Dolutegravir (DTG)-based ARVs combination as the preferred first-line regimen for Uganda.

## **10.2: HIVDR Early Warning Indicators:**

The Ministry tracks HIV treatment programme practices that present risk for emergence of HIVDR as early warning indicators. The data on these indicators are collected periodically from health facilities by study teams constituted to conduct record reviews and abstract retrospective data over defined reference periods relating to the variables that constitute the EWIs. Each indicator has a threshold target cut off for acceptable performance. Four previous surveys have been carried in health facilities in the country.

The most recent EWI assessment was carried out in keeping with the elements of the World Health Organisation guidance, based on a nationally representative randomly selected sample of 304 ART service outlets in Uganda during October  $2017 - \text{March } 2018^{15}$ . In this survey, six indicators were assessed. The results are summarized in Table 10.2, while the aggregate performance for all facilities is summarized in Figure 10.1

HIVDR Early Warning Indicator	Performance Target	Percent facilities meeting Target
On-time pill pick-up: Percentage of patients that pick-up	Excellent>90%	9.5% (29)
ART no more than two days late at the first pick-up after the	Fair 80–90%	16.5% (50)
baseline pick-up	Poor <80).	74% (225)
Patient retention on ART: Percentage of patients known to	Excellent >85%,	24.2% (73)
be alive and on treatment 12 months after initiation of ART	Fair 75–85%	22.8% (69)
	Poor <75%	53.1% (161)
<i>Pharmacy Stock Outs:</i> Percentage of months with no day(s)	Excellent 0%	33.6% (102)
of stock-out of any routinely dispensed ARV drugs	Poor > 0%	66.4% (202)
ARV drug dispensing practices: Percentage of patients	Excellent 0%	100% (304)
prescribed or picking up mono or dual ARV therapy	Poor $> 0\%$ .	0% (0)
Viral load suppression: Percentage of patients receiving	Excellent>90%	49.2% (146)
ART at the site after the first 12 months of ART whose VL is	Fair 80–90%	36.3% (108)
<1,000 copies/ml	Poor <80%.	14.5% (43)
Viral Load Completion: Percentage of patients with a 12-	Excellent>70%	50.8% (151)
month VL test result available	Poor <70%.	49.2% (146)

Table 10.2: Performance of Facilities Against the Targets for the HIVDR Early	v Warning Indicators:
	, indicated by

The performance of facilities against the threshold targets for the various indicators were:

<sup>&</sup>lt;sup>15</sup> Asio J, Watera C, Namuwenge N, Kirungi W, Musinguzi J, Mugagga K, et al. (2020) Population-based monitoring of HIV drug resistance early warning indicators in Uganda: A nationally representative survey following revised WHO recommendations. PLoS ONE 15(4): e0230451. https://doi.org/10.1371/journal.pone.0230451

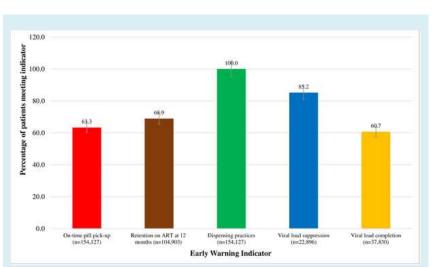
- On-time pill pick-up was met by 9.5% of facilities, with more facilities in the north meeting this target (p = 0.040).
- Retention on ART at 12 months: The target was met in just one quarter of facilities (24.1%), with facilities in Kampala region (p < 0.001), and specialized ART clinics (p = 0.01), performing better in this indicator.
- Pharmacy stock-outs: There were no ART stock outs in one-third of facilities (33.6%), with more facilities in Kampala (p < 0.001), specialized ART clinics (p < 0.001), and private-for-profit (p < 0.001) meeting this target.
- Dispensing practices: The target was met by all (100%) of the facilities.
- VLS: The target was met by just under one-half (49.2%) of facilities;
- Viral Load Completion: Just over half (50.8%) of facilities met VL completion target with facilities in central region performing better (p < 0.001).

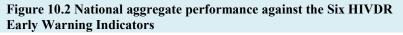
Only one (0.3%) facility (i.e. Mbarara Regional Referral Hospital) met all the targets for the six EWIs. Eleven facilities (3.6%) met targets for five EWIs; 53 (17.4%) facilities met targets for four EWIs; 97 (31.9%) facilities met targets for three EWIs; 107 (35.2%) facilities met targets for 2 EWIs; and 35 (11.5%) facilities met the targets for only one EWI. Twenty-eight (80.0%) of the 35 facilities which met the target for only one indicator i.e. dispensing practices were health centres.

The findings of the EWI assessment indicate a high potential for emergence of HIVDR in the Uganda HIV treatment programme. This make a compelling case for HIV treatment centres to address these programme weaknesses to avoid emergence of HIVDR that could potentially lead to switching to more expensive ARV combinations.

When all the patients across facilities were aggregated to determine national performance against the targets for the six EWIs, the findings are summarized in Figure 10.2

- On-time pill pick-up of ARVs among all patients was 63.3% (CI: 58.9–67.8) against the optimal target of 90%
- Retention on ART at 12 months among all patients was 69.9% (CI: 63.8–76.0) against the target for this indicator of >85%
- Dispensing practices for all clients were met for all (100%) of the clients





- Viral Load Suppression was 85.2% (CI: 81.8–88.5), falling short of the target of 90%
- Viral Load completion for all clients in all facilities during the reference period was 60.7% (CI: 56.9–64.6), falling short of the target of >70%

These findings revealed weaknesses in ART programme practices that risk emergence of HIVDR with all indicator targets except one, not met. These weaknesses should be addressed by the treatment programme and facilities as part of their continuous quality improvement (CQI).

#### 10.3: Antiretroviral Drug Resistance among individuals on HIV treatment

The WHO HIVDR surveillance and monitoring strategy recommends monitoring of HIVDR among individuals starting and those already on ART. Surveillance of HIVDR in populations receiving first-line ART assesses ART programme quality and informs optimisation of second-line ART regimens. Suboptimal VLS and detection of HIVDR in populations receiving ART may reflect gaps in ART programme quality, including inadequate adherence assessment and support, interruptions in drug supply and low retention in care. A cross-sectional survey conducted in a nationally representative sample of adults receiving first-line ART<sup>16</sup> in 23 clinics (for 12 months of ART), and 43 clinics (for 48 months of ART), conducted in 2016 – 17, highlighted the patterns of VLS and HIVDR among individuals at the respective duration of treatment, Table 10.3.

Outcome	12 months Treatment Cohort		48 months Treatment Cohort	
	Percent	No	Percent	No
Viral Load Suppression		-		
All	95.0%	493/533	87.9%	926/1,064
Males	97.7%	169/182	87.5%	319/369
Females	93.6%	324/351	88.2%	607/695
HIVDR Mutations				
Any	4.7%	28/533	7.6%	88/1,064
NRTI	4.4%	23/533	7.3%	84/1,064
NNRTI	4.6%	26/533	7.4%	86/1,064
NNRTI+NRTI	4.4%	22/533	7.0%	81/1,064
PI	0.1%	1/533	-	-
HIVDR among VF				
Any	96.1%	28/30	90.4%	88/95
NRTI	90.3%	23/30	86.8%	84/95
NNRTI	94.1%	26/30	87.6%	86/95
NNRTI+NRTI	89.5%	22/30	81.9%	82/95
PI	1.1%	1/30	-	-

Table 10.3 Prevalence of VLS and HIVDR among ART clients at 12 and 48 months of Treatment:

<sup>16</sup> <u>Ssemwanga</u> D, <u>Asio</u> J, <u>Watera</u> C, <u>Nannyonjo</u> M, <u>Nassolo</u> F, <u>Lunkuse</u> S, <u>Salazar-Gonzalez</u> J, <u>Salazar</u> M, <u>Sanyu</u> G, <u>Lutalo</u> T, <u>Kabuga</u>

U, <u>Ssewanyana I, Namatovu F, Namayanja G, Namale A, ERaizes A, Kaggwa M, Namuwenge N, Kirungi W, Edward Mbidde E, Kaleebu P, Prevalence of viral load suppression, predictors of virological failure and patterns of HIV drug resistance after 12 and 48 months on first-line antiretroviral therapy: a national cross-sectional survey in Uganda : *Journal of Antimicrobial Chemotherapy*, <u>https://doi.org/10.1093/jac/dkz561</u> 05 February 2020</u>

In the 12-months of ART group, VLS was high, 95.0% (CI: 93.4% - 96.5%) among the 533 patients, while in the 48 month of ART group, VLS was 87.9% (CI: 85.0% - 90,9%) among the 1,064 patients.

The prevalence of acquired HIVDR was also high among virological failures (VFs). Among the 30 successfully amplified VF samples in the 12 months of ART group, HIVDR was 96.1% (CI: 72.9%-99.6%) or 4.7% (CI 3.3% - 6.1%) among all clients on treatment. Among the 30 samples successfully amplified, 28 had at least one HIVDR mutation. One had a mutation for protease inhibitors (PIs), 23 NRTI mutations, 26 has NNRTI mutations, and 22 had both NNRTI and NRTI mutations. None had mutations to all three drug classes.

The prevalence of HIVDR mutations among the 95 successfully amplified VF samples from the 48 months of ART group was 90.4% (CI: 73.6% - 96.8%), or 7.6% (CI 5.4% - 9.5%) of all clients on ART at that duration of treatment. Out of the 95 successfully amplified samples, 88 had at least one HIVDR mutation; 84 had NRTI mutations, 86 had NNRTI mutations, 82 had both NRTI and NNRTI, while none had a PI mutation.

The factors independently associated with HIVDR mutations at 48 months of treatment was ART initiation with a zodovudine (AZT)-based regimen relative to a tenofovir (TDF)-based regimen, adjusted odds ratio (AOR) 3.16 (CI 1.34-7.46, p-0.01). There was also a weak association with having been on ART for > 82 months, AOR 1.92 (CI: 1.03-3.59, p=0.04). The assessment didn't identify any factor independently associated with HIVDR and VLS in the first 12 months of ART.

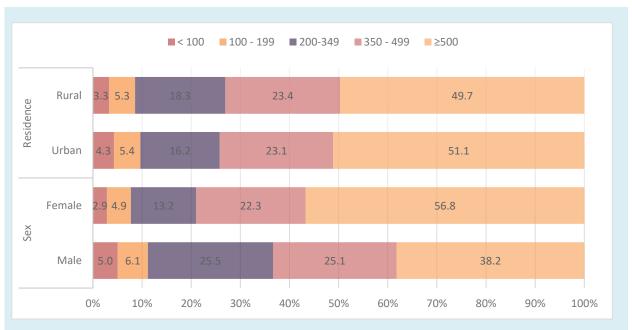
## Chapter 11: Advanced HIV Disease and Co-morbidities

Although the rapid scale up of HIV treatment in recent years, and the high coverage of ART in Uganda have dramatically reduced morbidity and mortality associated with HIV, there are still individuals that present with advanced disease. There are also individuals that disengage from care and often return late with advanced HIV disease. In addition, HIV often presents with concurrent morbidities (infectious and non-communicable diseases) all of which combine to complicate morbidity and mortality associated with HIV. Some of the co-morbidities are a direct result of the epidemiological synergy with HIV, e.g. Tuberculosis and sexually transmitted infections. Other comorbidities especially NCDs are a consequence of long-standing ART or aging of HIV population. In this section, we present some data on advanced HIV disease and co-morbidities.

#### 11.1 Advanced HIV Disease:

Individuals with advanced HIV disease present with low CD-4 t-cell counts. The 2016/17 UPHIA offered an opportunity to determine advanced HIV disease at population level for the first time in Uganda. In the survey, CD-4 T-cell enumeration of HIV-positive samples collected during the survey was conducted using point of care (POC) diagnostics. The findings are summarized in Figure 11. 1 and 11.2

Approximately 9% of adults were severely immunosuppressed with advanced HIV disease (defined as CD-4 T-cells < 200 /ul), with men (11.2%) more likely than women (7.7%) to have advanced HIV disease. The were no significant difference between urban and rural residents.





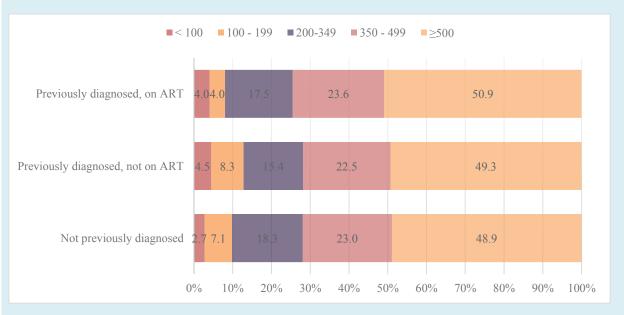


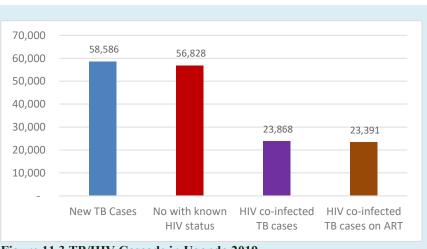
Figure 11.2: CD-4 T-cell Counts among HIV-positive individuals in the 2016/17 UPHIA

Among individuals previously diagnosed and on ART, 8 percent had advanced HIV disease and therefore in need of close monitoring. However, a higher proportion 12.8% had been previously diagnosed and not on ART, while the proportion among those not previously diagnosed was 9.8%. It is likely that this may have changed since 2017, especially after the adoption of the new HIV test and treat policy in 2016 that was rolled out in 2017.

Among all adults living with HIV, 3.6% had very severe immunosuppression, with CD4 counts less than 100 cells/µL: 2.9% of women and 5.0% of men. This includes adults aware of their status and on treatment. In addition, among adults, over one-third (36.6%) of HIV-positive men and one-fifth (21.0 percent) of HIV-positive women had low CD-4 T-cell counts of less than 350 cells/ul.

#### 11.2 TB/HIV Co-infection

During 2019 there were 57,706 documented new / TB relapse cases, of which 98% had known HIV status. Among those with known HIV status, 23.868 (43%) were HIV / TB coinfected; 31% of these being newly diagnosed (Figure 11.3). Nearly all (97%) the identified TB/HIV co-infected clients





were on ART, 58% of whom were newly started on ART. The cascade reveals the extent to which facilities are effectively linking HIV-infected TB patients to appropriate HIV treatment. This timely provision of ART implies successful integration of TB and HIV treatment services.

It appears that the magnitude of TB/HIV co-infection varies among the geographical regions of the country. It ranged from 25% in West Nile region, to 53% in Central 1 region and in the South Western region of greater Ankole and Kigezi subregions. This geospatial distribution appears to correlate with the distribution of HIV prevalence as was established in the 2016/17 UPHIA, Figure 11.4 below.

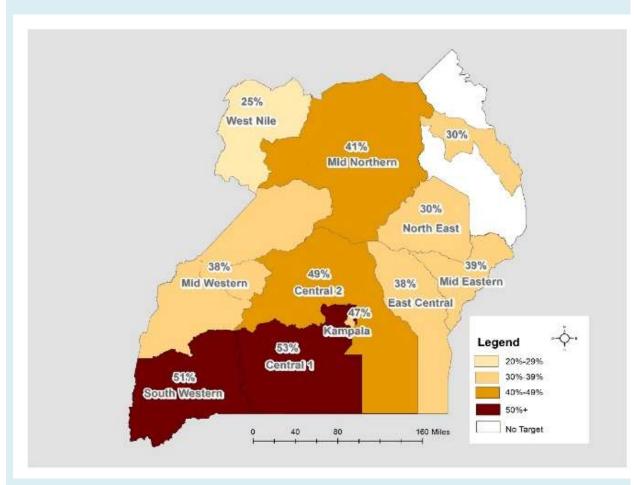


Figure 11.4: Geo-spatial distribution of TB/HIV co-infection in Uganda in 2019

Among adults (aged 15 years+), men are more disproportionately affected by TB than their female counterparts (63% versus 37%). However, adult women had a higher HIV/TB co-infection prevalence than men.

## 11.3 HIV and Syphilis Co-Infection

In the 2016/17 UPHIA, all respondents were also tested for syphilis in the field using a POC Dual Path Platform (DPP Syphilis Screen and Confirm) assay for syphilis. Overall, the prevalence of

having ever had syphilis<sup>17</sup>among adults was 6.0% (6.1% among 5.8% women, and men). The among prevalence of ever having had syphilis was lower among HIVnegative (5.5%) than among **HIV-positive** (13.6%)participants. The overall prevalence of active syphilis infection was 2.1% (2.2% among women and 2.0% among men). Active syphilis was

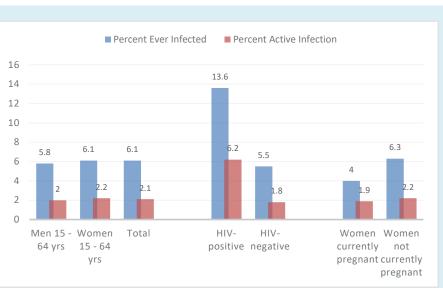


Figure 11.6: Prevalence of active and ever-infected with Syphilis among Adults 15 – 64 years by HIV Status and other covariates

more than three times higher among HIV-positive (6.2%) than HIV-negative (1.8%) participants, Figure 11.6.

About 2 percent of women that said they were currently pregnant had active syphilis, compared to 4 percent who had ever been infected. Pregnant women with active syphilis are at high risk of transmitting congenital syphilis to their babies.

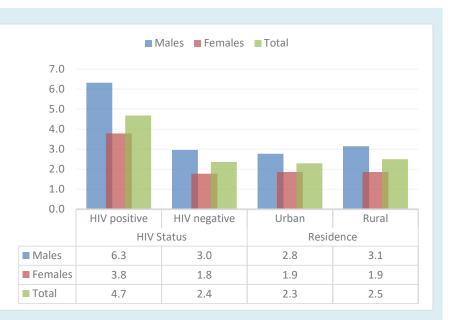
#### 11.4: HIV and Hepatitis B Virus Co-Infection

In the 2016/17 UPHA, all respondents were tested in the field for Hepatitis B virus (HBV) surface antigen (HBsAg) using POC rapid tests. The prevalence of Hepatitis B virus surface antigen was 4.1% among adults (5.4% among men, and 3.0% among women) and 0.6% among children (0.7% among boys, and 0.6% among girls). The prevalence of HBV did not vary between urban and rural areas (2.3% and 2.5%). However, there were differences among geographical regions, with the highest prevalence in the Mid-North (4.6%) and the lowest in the South-West region (0.8%).

<sup>&</sup>lt;sup>17</sup> The percentage of adults who ever had syphilis includes people with active infection. Participants whose test was reactive only to treponemal antibodies were considered ever infected. Participants whose test was reactive to both treponemal and nontreponemal antibodies were considered to have an active infection.

#### HIV-infected

individuals in the survey were more likely to be infected with HBV. The prevalence of HBV infection among HIVnegative adults was 2.4% (3.0% among men, 1.8% among women), while the prevalence of HBV among HIVpositive adults in the same age group was 4.7% (men: 6.3%, women: 3.8%), Figure 11.7. This again highlights the need for



#### Figure 11.7: Prevalence of Hepatitis B Virus Surface Antigen by HIV Serostatus and Urban – Rural residence

closer integration of HIV and HBV prevention and treatment programmes and services.

# Chapter 12: Projected Future Course of the HIV Epidemic in Uganda

During the past decade, new HIV infections, AIDS-related mortality and vertical infections in Uganda have declined substantially, although the declines are likely to fall short of the 2020 Fast Track targets. The future course of the HIV epidemic will in part be determined by the package of HIV interventions that will be rolled out and level of scale that the interventions will be brought to, and the timeframe of attainment of full scale. In this section, we discuss the projected future course of the HIV epidemic in Uganda considering two scenarios of coverage of priority HV prevention and treatment services.

## 12.1 Is Uganda on Course to Achieve HIV Epidemic Control?

The trajectory of new HIV infections and AIDS-related mortality during the past decade in Uganda is shown in Figure 12.1 below. At the current rate of incidence decline, Uganda is unlikely to meet the 75% reduction of new infections by 2020. However, the reduction of AIDS-related mortality is likely to meet the 2020 target. A more ambitious scale up of HIV prevention and treatment services along with improved efficiency of the services have been projected to substantially reduced new HV infections and significantly reduce the incidence mortality ratio and enable the country to achieve HIV epidemic control in the next 2 - 4 years as shown in the Figure.

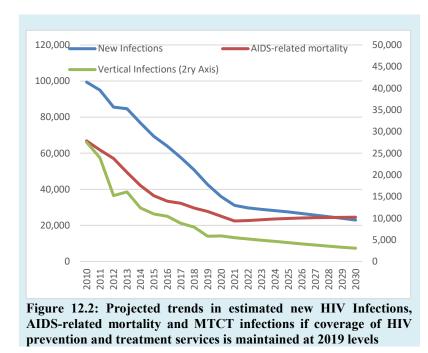


Figure 12.1: Trend in new HIV infections and AIDS-related mortality compared to the expected trajectory under the Fast Track [Left] and HIV Incidence and all-cause mortality ratio among PLHIV [Right]

#### 12.2 Scenario of Constant Coverage of HIV Prevention and Treatment Services

If the 2019 coverage levels of core HIV prevention, care and treatment services were to be maintained through 2019 - 2030 (i.e. status quo), the trajectory of the HIV epidemic with regard to new HIV infections, AIDS-related mortality, and vertical infections would be as shown in Figure 12.2. Under this scenario, the downward trend in new HIV infections, and AIDS related

mortality would not be sustained during 2020 - 2030, and would reverse over the next 2 - 3 years. A similar trend would be observed with new vertical HIV infections. It should be noted that even with this constant scenario, there will still be need for new enrolment in core HIV prevention, care and treatment services. This increment would be needed to keep constant coverage of services in light of population growth and attrition of already enrolled individuals.



Under this Scenario, it is projected that 181,000 new HIV infections would occur during 2020 -25, and 305,000 during 2020 - 2030. During the same period, the corresponding figures for AIDS related morality would be 141,000 and 263,000 respectively. New MTCT infections projected to occur would be 31,000 and 48,000 for the respective time periods.

## 12.2: Scenario of Scale up of Priory HIV Prevention and Treatment Services:

To estimate the impact of further

scale-up of the programme during 2020 - 25 we considered an alternative projection, called the Prioritized Scale-Up Scenario. This scenario envisions rapid scale-up to maximum feasible coverage levels of a comprehensive set of interventions. The targets applied are shown in Table 12.1. It should be noted that HIV treatment has already reached high levels of coverage. This scenario assumes that it increases to reach 90% coverage of all PLHIV by 2020 and to 95% by 2025. The proportion of individuals that needs to be tested each year will actually decline because high knowledge of status has already been attained. The programme will shift to focus on finding those newly infected with targeted approaches such as index partner notification (IPN) and testing, risk assessment for provider-initiated testing (PITC) and expansion of self-testing (STS).

The critical interventions that should be scaled up for impact are HIV testing, treatment, condoms, SMC, PMTCT, EID and programs for key populations. These all have proven effectiveness. Other programs (SBCC, AGYW, stigma, violence) are enablers that may influence the uptake of key services and may provide non-HIV benefits but their impact on HIV is not as well documented.

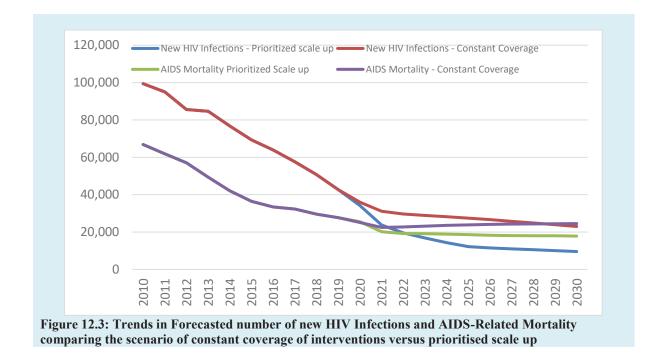
We have assumed aggressive targets for AGYW, violence prevention, and stigma reduction in order to illustrate the impact of achieving high coverage in these areas. In the final analysis, these targets may be scaled back or implemented through co-funding from other sectors.

	Table 12.1 Proposed C	Coverage targets for	<b>Prioritized Scale</b>	e-Up Scenario
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Intervention	2019	2025	2030
Testing (% adults tested annually) <sup>18</sup>	15%	5%	5%
Percent of population diagnosed	87%	95%	95%
Annual number of new diagnoses		8,700	14,000
Percentage of HIV tests by type			
-Provider initiated	70%	40%	40%
-Index partner testing (APN)	10%	30%	30%
-Community-based testing	15%	5%	5%
-Self-Tests (STS)	5%	25%	25%
-Early infant diagnosis (EID)	88%	95%	95%
Treatment			
Adult women	93%	> 95%	>95%
Adult men	81%	> 95%	>95%
Children	68%	90%	>95%
Viral load suppression	86%	95%	95%
РМТСТ	95%	95%	95%
General population aged 25+			
Condom use with non-regular partner	32%	50%	70%
Programs for key populations			
Female sex workers (FSW)	77%	90%	90%
Men who have sex with men (MSM)	35%	90%	90%
People who inject drugs (PWID)	8%	90%	90%
PrEP for sero-discordant couples	0%	100%	100%
Programs for adolescent girls and young women	8%	16%	22%
PrEP	1%	4%	7%
Safe medical circumcision	68%	80%	90%
Condom use with non-regular partners	41%	60%	80%
Comprehensive sexuality education	8%	16%	20%
Programs to reduce stigma and discrimination	0%	50%	90%
Prevention of gender-based violence	0%	45%	90%

The projected trajectory of new HIV infections and AIDS-related mortality under the prioritised scale up scenario above is summarised in Figure 12.3 below. Under this scenario, new HIV

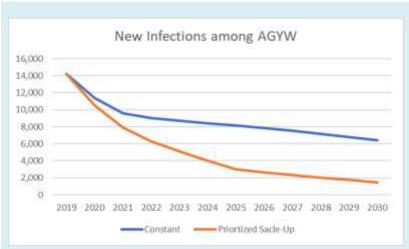
<sup>&</sup>lt;sup>18</sup> Testing coverage declines as knowledge of status reaches very high levels as fewer tests are needed to sustain knowledge than in the catch-up phase.

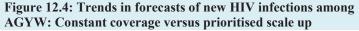


infections are projected to fall to 15 - 20,000 annually for most of the time during 2020 - 2030. At the same time mortality among PLHIV from all causes would be around 12,000 - 15,000 annually. Note that the new HIV infections fall below AIDS-related mortality around 2022/23 i.e. HIV epidemic control would be attained i.e. epidemic transition after which the number of PLHIV will begin to decline.

#### 12.3 Impact on HIV Burden among Adolescent Girls and Young Women

Interventions for Adolescent Girls and young Women aim to reduce HIV transmission, risk and vulnerability in this population group that bears a disproportionate share on new HIV infections



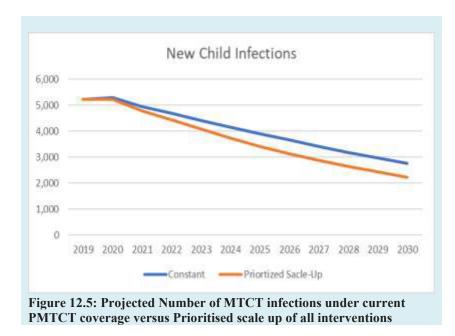


(almost about one-third of all infections). The trend in new infections among

Adolescent girls and young women is shown in Figure 12.4. New infections decline by almost 80% from 2019 to 2025, to about 3,000 per year under the prioritised scale up scenario relative to keeping interventions at constant coverage at 2019 coverage levels.

### **12.4 Impact on new Vertical Infections:**

The PMTCT coverage under this analysis was already high with a baseline of over 95% of HIV-



infected pregnant women receiving HAART (although adherence and retention is sub-optimal). There is therefore little room for increased coverage of this service. However, given that even at this high level of coverage, there are significant MTCT infections, new further gains are only possible through efficiency of PMTCT services especially reducing drop-outs during antenatal and postnatal period and other prongs of PMTCT reducing

HIV prevalence and incidence among women of reproductive age. Reducing drop outs by 80% results in significant infections averted and reduced MTCT rate as shown in Figure 12.5.

#### 12.5 New HIV Infections and AIDS-related Mortality Averted:

Implementing the prioritized scale up scenario will have a lot of advantages for Uganda. Under this scenarios, it is projected that about 132,000 new infections during 2020 - 2030, and 51,000 AIDS-related mortality will be averted during as summarised in Figure 11.5 below.

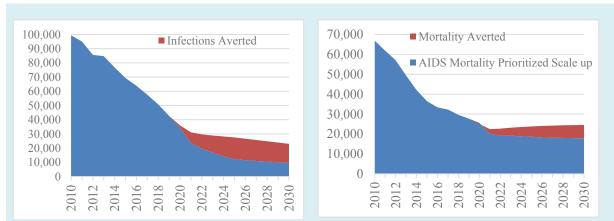


Figure 12.5: Trends of estimated new HIV infections (Right) and AIDS-related mortality (Left) and number that would be averted during 2020 – 30 if the targets under the Prioritised Scenario were met.

#### 12.6 Change in Age Patterns of PLHIV

The age distribution of the population living with HIV will change over the next ten years as fewer new infections are added at the younger ages and fewer AIDS deaths occur at older ages. The proportion of PLHIV under age 25 will drop from 12% in 2019 to 10% by 2025 and to 8% by 2030 and the proportion aged 50 years and older will rise from just 17% in 2019 to 41% by 2030.

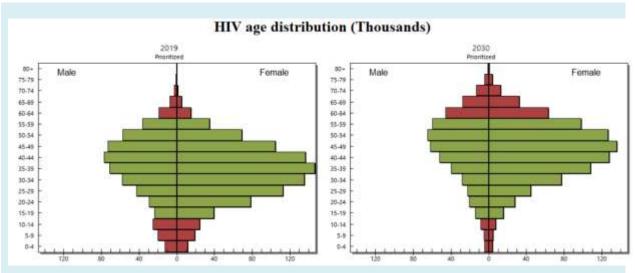


Figure 12.6. projected Age and Sex Distribution of PLHIV under the Prioritized Scale-Up scenario

# Chapter 13: Global Estimates of HIV/AIDS

The joint UN Programme on AIDS compiles annual statistics on HIV/AIDS for all counties across the globe, working with national governments to obtain the data. UNAIDS is still compiling global estimates for 2019 that will be released on World AIDS Day 2020. Below is a summary of the global and regional estimates that UNAIDS released for 2018 on World AIDS Day 2019.

Parameter	Geographical Region	Estimate
No of People Living with HIV in 2018	Global	39.9 [32.7 – 44.0] million
	Eastern and Southern Africa	20.6 [18.2 –23.2] million
	Western and Central Africa	5 [4 -6.3] million
	Middle East and North Africa	240,000 [160,000-390,000]
	North America, Western and Central Europe	2.2 [1.9 – 2.4] million
	Caribbean	340,000 [290,000 - 390,000
	Latin America	1.9 [1.6 – 2.4 ] million
	Eastern Europe and Central Asia	1.7 [1.5 – 1.9 ] million
	Asia and the Pacific	5.9 [5.1 – 7.1] million
New HIV Infections in 2018	Global	1.7 [1.4 – 2.3] million
in 2018	Eastern and Southern Africa	800,000 [620,000 - 1,000,000]
	Western and Central Africa	280,000 [180,000 - 420,000]
	Middle East and North Africa	20,000 [8,500 - 40,000]
	North America, Western and Central Europe	68,000 [58,000 - 77,000]
	Caribbean	16,000 [11,000 – 24,000]
	Latin America	100,000 [ 79,000 – 130,000]
	Eastern Europe and Central Asia	150,000 [140,000 - 160,000]
	Asia and the Pacific	310,000 [270,000 - 380,000]
AIDS-related Deaths	Global	770,000 [570,000 – 1,000,000]
	Eastern and Southern Africa	310,000 [230,000 - 400,000]
	Western and Central Africa	160,000 [110,000 – 230,000]
	Middle East and North Africa	8,400 [ 4,800 – 14,000]
	North America, Western and Central Europe	13,000 [9,400 - 16,000]
	Caribbean	6,700 [5,100 – 9,100]
	Latin America	35,000 [25,000 - 46,000]
	Eastern Europe and Central Asia	38,000 [28,000 - 48,000]
	Asia and the Pacific	200,000 [160,000 - 290,000]

#### Table 13.1 Global / Regional Estimates of PLHIV, New HIV Infections and AIDS-related deaths 2018

Source: UNAIDS Fact Sheet

The global and regional estimates of Children living with HIV/AIDS, new HIV infections, and AIDS-related mortality for 2018 as released on World AIDS Day 2019 are summarized in Table 13.2. Estimates for 2019 are still being compiled and will be released on World AIDS Day 2020.

Parameter	Geographical Region	Estimate
No of People Living	Global	1.7 [1.1 – 22] million
with HIV in 2018	Eastern and Southern Africa	1.1 [850,000 – 1.4 million
	Western and Central Africa	450,000 [320,000 -590,000]
	Middle East and North Africa	9,00 [6,800 - 14,000]
	North America, Western and Central Europe	**
	Caribbean	11,000 [9,000 – 13,000]
	Latin America	31,000 [25,000 - 40,000]
	Eastern Europe and Central Asia	**
	Asia and the Pacific	110,000 [ 95,160,000]
New HIV Infections in	Global	160,000 [110,000-260,000]
2018	Eastern and Southern Africa	84,000 [57,000 - 140,000]
	Western and Central Africa	58,000 [36,000 - 87,000]
	Middle East and North Africa	1,500 [710 – 2,800]
	North America, Western and Central Europe	**
	Caribbean	1,100 [660 – 1,500]
	Latin America	3,100 [2,100 – 4,600]
	Eastern Europe and Central Asia	**
	Asia and the Pacific	12,000 [ 9,800 – 18,000]
AIDS-related Deaths	Global	100,000 [64,000 – 160,000]
	Eastern and Southern Africa	49,000 [31,000 - 80,000]
	Western and Central Africa	38,000 [24,000 - 57,000]
	Middle East and North Africa	950 [520,1,700]
	North America, Western and Central Europe	**
	Caribbean	660 [<500 - 910]
	Latin America	2000 [1,400 - 3,100]
	Eastern Europe and Central Asia	**
	Asia and the Pacific	6,700 [5,100 – 9,600]

Table 13.2: Global and Regional Estimates of Children 0 – 14 Living with HIV, New HIV Infections and
AIDS-related mortality [Source UNAIDS Fact Sheet].

## Chapter 14: Discussion and Recommendations

This synthesis of HIV epidemiological data has documented the magnitude and dynamics of the HIV epidemic in recent years in Uganda. It has revealed that Uganda is still facing a severe, generalised yet heterogeneous HIV epidemic, fortunately with over 80% of HIV-infected individuals already diagnosed and enrolled on antiretroviral therapy. HIV incidence is nevertheless still high, resulting in new HIV infections (approximately 50,000 in 2019) that still exceed AIDS-related mortality by two-fold, and all-cause mortality among PLHIV by 60%, eluding attainment of HIV epidemic control. However, both HIV incidence and mortality have declined substantially over the decade by 50% and 75% respectively. While the 2020 HIV incidence and mortality targets might not be met, Uganda is on the course to achieve HIV epidemic control in 2 - 4 years, at that point, the HIV burden is projected to start falling.

Furthermore, two disturbing trends in Uganda's HIV epidemic have been highlighted in this synthesis. The number of PLHIV aged over 50 years has been expanding during the decade and already surpassed that among young people aged 15 - 24 years. For most of the past three decades of the HIV epidemic, young PLHIV aged 15 - 24 years exceeded those aged 50 years + by two fold, but that situation reversed three years ago. Currently estimated at 17% of PLHIVs, the burden of HIV among people over the age of 50 is projected to grow, perhaps to 25% by 2025 and 41% by 2030. HIV among older individuals comes along with co-morbidities especially non communicable diseases (NCDs). This raises the need for HIV treatment programmes to strengthen integration and management of comorbidities especially NCDs that might include cardiovascular diseases, diabetes, degenerative disorders, mental illness, etc, most of which increase with age. HIV treatment programmes should strengthen linkages with / integrate services for management of the co-morbidities.

Another disturbing feature of the HIV epidemic in Uganda is the persisting high HIV incidence and prevalence among key populations / priority population groups, and adolescent girls and young women. The HIV incidence in some of these population groups is over 10 fold that in the general population. The high-incidence groups include sex workers and their clients, people in prisons including prisons service workers, MSM and transgender women, etc. While these population groups might be small, the associated high HIV incidence and sexual mixing patters threatens attainment of the HIV epidemic control goals.

A hitherto unknown and largely neglected or ignored group that has emerged from this synthesis as having high HIV incidence and prevalence of the same order as the recognised key populations and priority populations are men and women that work in entertainment, recreation and leisure venues in urban and peri-urban hotspots. These include people who work in bars and lodges, masseurs in massage parlours and "health clubs", workers in discotheques, etc. these groups that were found in recent studies to have HIV incidence and prevalence of the order of over 10 times that of the general population. We were not able to ascertain the testing and treatment cascade as

well as viral load suppression among these groups, but it would appear that these population groups are also at the risk of being left behind in HIV treatment services. We also lack data on their sexual behavior. This makes a compelling case for increasing attention to these groups, especially by programmes providing dedicated services to keys and priority populations. Closer monitoring of HIV burden and dynamics should also be included in ACPs enhanced surveillance efforts.

This report does not provide sufficient data on other population groups that are expected to have high HIV prevalence. We lacked HIV prevalence and incidence data on long-distance truck drivers, refugees, fishing communities, the military, migrant workers, miners, etc. In addition, data on the other high risk groups was old and some of it not comprehensive. We also lack their up-todate HIV testing and treatment cascade data. The Ministry of Health needs to strengthen HIV surveillance to provide comprehensive and up-to-date data on all the high-risk groups to aide efficient programme planning and focus if sustainable HIV epidemic control is to be achieved.

The low levels and declining trends of preventive sexual behavior and apparent increase in risk taking behavior highlighted by behavioural data in this report makes a case for concern. Casual sex among men and women appears to have increased during the past decade while condom use during such encounters appears to have declined. Multiple partnerships are still frequent especially among men with low levels of condom use during such partnerships. While further analysis of these behavioural trends is required, the behaviour practices and trends reported call for attention of HIV prevention programmes. Behavioural interventions remain important because even if the triple 90s cascade were achieved, that would still leave one-quarter of HIV-infected individuals with unsuppressed vireamia. Further analysis and studies to adequately characterize the population groups with these behavioural trends and the motivation for such behaviours appear to be waranted. The HIV surveillance programme ought to pay more attention to this aspect of HIV surveillance.

Vertical infections in Uganda have declined steadily during the past decade. The PMTCT and other HIV prevention and treatment services have averted big numbers of vertical infections. However, at 5,690 vertical infection in 2019, this is still high. Most vertical infections occur among children born to women who either drop off ART, or acquire HIV during pregnancy or breast feeding. It is also likely that there are also high numbers among children of women who don't start ART either through not attending ANC or not taking up ART during ANC. However, data quality issues might have obscured that fact. Nevertheless, patterns of vertical infections highlighted in this report makes a compelling case for PMTCT services to continue stressing all the four prongs of PMTCT including family planning by HIV-infected women, primary prevention of HIV among women of reproductive age, enhanced case finding, ART linkage, adherence and retention of HIV-infected pregnant and breast feeding women. The PMTCT elimination plan is already taking this direction.

The level of viral load suppression remains low among men and children. In addition, these two population groups were also lagging behind on the HIV testing and treatment cascades and some

of these groups appear likely to be left behind. Women on the other hand were performing well. We did not have adequate age disaggregation to identify age groups of men and women at granular level that are likely to be left behind, but it is likely that young people and adolescent are likely to have more undiagnosed infections, not linked to treatment, and also have unsuppressed viremia. This synthesis did not also explore geographical performance in this regard at sub-national level. Furthermore, we did not have adequate data on viral suppression and HIV testing and treatment cascades for high-risk groups. These aspects of HIV surveillance need to be prioritised as part of the enhanced surveillance in order to adequately inform HIV epidemic control efforts. Nevertheless, tailored interventions for men and children to support case finding, linkage, retention and adherence are critical.

This report documents the high levels of antiretroviral drug resistance mutations to NRTIs and NNRTIs among individuals in treatment at 12 moths and those at 48 months of treatment as well as naïve recently infected individuals in a cross-sectional national survey in keeping with previous studies. The prevalence of HIVDR mutations among individuals with virological failures was very high. The investigators recommended immediate switch for clients with virological and a review of the policy of three intensive adherence counselling (IAC) sessions followed by repeat viral load session before the switch. We are not constrained to endorse this recommendation. The HIV treatment guidelines were already revised to take into consideration these HIVDR patterns.

Although quite old, the findings of recent HIVDR EWIs assessment make a compelling case for more focus on health facility practices to reduce the risk of emergence of HIVDR. Practices relating to retention of first line, on-time ARV pick up, VLS, Viral load completion and pharmacy stocks were all found to have suboptimal performance at facility level, revealing weaknesses that risk the emergence of HIVDR. The necessary corrective measures should be in the context of CQI projects at facility level.

This synthesis concluded highlighting the forecasted future course of the HIV epidemic. The forecasts make a compelling case that achieving sustainable HIV epidemic control in Uganda is contingent on bringing to scale priority evidence proven HIV prevention and treatment interventions. Strategic and operational plans in Uganda should embrace the ambitious targets.

## Limitations:

We recognize several limitations to the synthesis of epidemiological data in this report. First, the report is compiled from data obtained from different sources, with different methods of data collection and sampling probabilities. For instance, trend observations and comparision have been made between different surveys even when the data is based on different sampling probabilities. Secondly, there were data gaps with regard to some population groups and geographical areas. Most data are not appropriately disaggregated by age, geographical location or other population sub-groups. Thirdly, most data is descriptive without undertaking detailed regression analyses. Therefore associations in most instances are subject to confounding. In addition, estimates for

MTCT might be under-estimated due to data quality deficits, for instance women on MTCT exceed HIV-positive pregnant women. This is likely to be due to data quality deficits, but its net effect is to obscure the magnitude of vertical infections among women who don't take ARVs. Routine data are often encumbered by data quality concerns. Finally, we have presented largely national level data with limited disaggregation to sub-national areas. Regional and in some instances district level analyses and reports would have been more appropriate for local programme planning and focus.

## **Conclusion:**

The synthesis of HIV epidemiological data in this report makes a compelling case for intensified scale up of priority HIV prevention and treatment services. Addressing the increasing burden of HIV in older populations with the likely comorbidities should be considered by HIV treatment services. Programmes focusing on key and priority populations should increasingly address persisting high HIV incidence, and also focus on men and women who work in places of leisure and entertainment especially in urban and peri-urban hotspots. There should also be emphasis on behavior interventions in view of some population groups that still have unsuppressed vireamia, with focus on sexual behaviours such as casual sex, multiple partnerships, early sexual debut among young people, and low levels of condom use. Behavioural interventions remain necessary owing to the high levels of unsuppressed vireamia even when the triple 90s are attained. The report also makes a compelling case for HIV treatment programmes to focus on men and children that are still lagging behind in the HIV testing and treatment cascade through intensified and tailored case finding, ART linkage, and adherence and retention strategies. It also identifies gaps in the HIV surveillance system for Uganda. These include lack of recent and comprehensive data on high-risk populations, lack of more decentralized analyses and reports to aide local programme planning. These should constitute priorities for enhanced HIV surveillance in order to strengthen HIV surveillance in the country.

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## Annex 2: List of Participants of the HIV Epidemiological Data Review Workshop, March 2020

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