Rwanda Population-based HIV Impact Assessment

RPHIA 2018-2019

FINAL REPORT

SEPTEMBER 2020

RPHIA
RWANDA POPULATION-BASED HIV IMPACT ASSESSMENT

rbc RWANDA BIOMEDICAL CENTER
A Healthy People. A Wealthy Nation

nisr NATIONAL INSTITUTE OF STATISTICS OF RWANDA

CDC CENTERS FOR DISEASE CONTROL AND PREVENTION

Westat

ICAP Columbia University Mailman School of Public Health

Rwanda Population-based HIV Impact Assessment
RPHIA 2018-2019

RPHIA 2018-2019 COLLABORATING INSTITUTIONS

Rwanda Biomedical Center (RBC)
National Institute of Statistics of Rwanda (NISR)
The United States President's Emergency Plan for AIDS Relief (PEPFAR)
The United States Centers for Disease Control and Prevention (CDC)
Westat
ICAP at Columbia University

DONOR SUPPORT AND DISCLAIMER

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GLOSSARY OF TERMS

90-90-90: An ambitious treatment target to help end the AIDS epidemic. By 2020, 90% of all people living with the Human Immunodeficiency Virus (HIV) will know their HIV status; 90% of all people with diagnosed HIV will receive sustained antiretroviral therapy (ART); and 90% of all people receiving ART will have viral load (VL) suppression (VLS).

Acquired Immunodeficiency Syndrome (AIDS): AIDS is a disease that can develop after HIV causes severe damage to the immune system, leaving the body vulnerable to life-threatening conditions, such as infections and cancers.

Adolescents: Unless otherwise noted, children aged 10-14 years are referred to as young adolescents and young people aged 15-19 years are referred to as older adolescents. Note: Older adolescents are often categorized as part of the adult population for reporting purposes.

Adults: Defined in this survey as the population of individuals aged 15-64 years.

Antiretroviral (ARV): A type of medication used in the treatment of HIV.

Antiretroviral Therapy (ART): Treatment with antiretroviral (ARV) drugs that inhibit the ability of HIV to multiply in the body, leading to improved health and survival among people living with HIV.

CD4+ T-Cells (CD4): CD4+ T-cells are white blood cells that are an essential part of the human immune system. These cells are often referred to as T-helper cells. HIV attacks and kills CD4 cells, leaving the body vulnerable to a wide range of infections. The CD4 count is used to determine the degree of weakness of the immune system from HIV infection.

De Facto Household Resident: A person who slept in the household (HH) the night prior to the survey.

Emancipated Minor: An older adolescent aged 16-17 years who has been recognized as an independent person by the court or is free from any competent representative as defined by law in Rwanda.

Enumeration Area (EA): A limited geographic area defined by the National Institute of Statistics of Rwanda (NISR) and the primary sampling unit for the Population-based HIV Impact Assessment (PHIA) surveys.

Head of Household: The person who is recognized within the HH as being the head and is aged 18 years or older, or is considered an emancipated minor.

Human Immunodeficiency Virus (HIV): HIV is the virus that causes AIDS. The virus is passed from person to person through blood, semen, vaginal fluids, and breast milk. HIV attacks CD4 cells in the body, leaving a person living with HIV vulnerable to illnesses that a healthy immune system would have eliminated.

HIV Incidence: A measure of the frequency with which new cases of HIV occur in a population over a period of time. The denominator is the population at risk; the numerator is the number of new cases that occur during a given time period.

HIV Prevalence: The proportion of persons in a given population who are living with HIV at a specific point in time.

HIV Viral Load (VL): The concentration of HIV RNA in the blood, usually expressed as copies per milliliter (mL).

HIV Viral Load Suppression (VLS): An HIV VL of less than 1,000 copies per mL.

Household: A person or group of persons related or unrelated to each other who live in the same compound (fenced or unfenced), share the same cooking arrangements, and have one person whom they identify as their head.

Informed Consent: Informed consent is a legal condition whereby a person can give consent based upon a clear understanding of the facts, implications, and future consequences of an action. In order to give informed consent, the individual concerned must have adequate reasoning faculties and be in possession of all relevant facts at the time he or she gives consent.

Male Circumcision: Male circumcision is the removal of some or the entire foreskin (prepuce) from the penis. Medically supervised adult male circumcision is a scientifically proven method for reducing a man's risk of acquiring HIV through heterosexual intercourse. Voluntary medical male circumcision is an important part of national HIV prevention programs in most HIV high burden countries.

Prevention of Mother-to-Child-Transmission (PMTCT): Activities to prevent an HIV-positive woman passing HIV to her baby during pregnancy, labor and delivery, or breastfeeding. The World Health Organization (WHO) recommends effective PMTCT to include a four-fold approach: (1) primary prevention of HIV infection among women of childbearing age; (2) preventing unintended pregnancies among women living with HIV; (3) preventing HIV transmission from women living with HIV to their infants; and (4) providing appropriate treatment, care, and support to mothers living with HIV and their children and families.

Tuberculosis: Tuberculosis (TB) is a contagious bacterial disease that spreads through the air and is the leading cause of death among people living with HIV in Africa.

Young People: Defined in this survey as the population aged 15-24 years (including older adolescents and young adults).

LIST OF ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
ANC	Antenatal Care
Anti-HBc	Anti-hepatitis B core Antibody
ART	Antiretroviral Therapy
ARV	Antiretroviral
CDC	U.S. Centers for Disease Control and Prevention
CD4	CD4+ T-cell
CI	Confidence Interval
DBS	Dried Blood Spot
DR	Drug Resistance
EA	Enumeration Area
GoR	Government of Rwanda
HBsAg	Hepatitis B Surface Antigen
HBTC	Home-based Testing and Counseling
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HH	Household
HIV	Human Immunodeficiency Virus
HPV	Human Papillomavirus
IgM	Immunoglobulin M
LAg	Limiting Antigen
mL	Milliliter
MDRI	Mean Duration of Recent Infection
MTCT	Mother-to-Child Transmission
NISR	National Institute of Statistics of Rwanda
NNRTI	Non-Nucleoside Reverse Transcriptase Inhibitors
NRL	National Reference Laboratory
ODn	(normalized) Optical Density
PCR	Polymerase Chain Reaction
PEPFAR	U.S. President's Emergency Plan for AIDS Relief
PFR	Proportion False Recent
PHIA	Population-based HIV Impact Assessment
PMTCT	Prevention of Mother-to-Child Transmission
QA	Quality Assurance
QC	Quality Control
RBC	Rwanda Biomedical Center
RORC	Return of Results Coordinator
RPHIA	Rwanda Population-based HIV Impact Assessment
RR	Response Rate
RSE	Relative Standard Error
RT	Rapid Test
STI	Sexually Transmitted Infection
T	Time Cutoff
TB	Tuberculosis
UNAIDS	Joint United Nations Programme on HIV and AIDS
VL	Viral Load
VLS	Viral Load Suppression
WHO	World Health Organization

FOREWORD

The Rwanda Population-based HIV Impact Survey 2018-2019 (RPHIA) is the fifth in a series of household-based surveys to include HIV biomarkers and to assess numerous HIV-related indicators in Rwanda. The first was the 2005 Rwanda Demographic Health Survey (RDHS); and subsequently, Demographic Health Surveys, measuring HIV prevalence, were conducted in 2010 and 2014/2015. In addition to the RDHS, a population-based survey, the Rwanda AIDS Indicator and HIV incidence Survey (RAIHIS) was conducted between 2013 and 2014, to measure not only HIV prevalence, but also to prospectively estimate HIV incidence in adults aged 15-59 years.

All of these surveys were designed to provide information on numerous HIV and related indicators for Rwanda.

RPHIA, which included individuals aged 10-64 years of age, is the first national HIV survey that was designed to measure both HIV incidence and viral load (VL) suppression (VLS). Additional biomarker-based indicators unique to RPHIA are antiretroviral (ARV) drug resistance (DR) and presence of ARV drugs in the blood and testing for hepatitis B and hepatitis C infection.

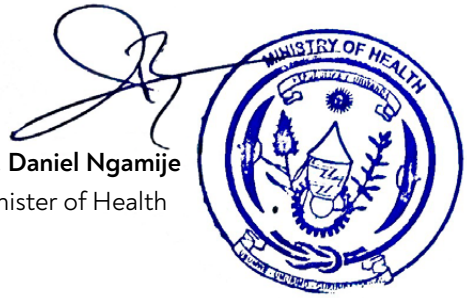
Additionally, RPHIA collected data on indicators to measure progress toward the Joint United Nations Programme on HIV/AIDS (UNAIDS) 90-90-90 goals:

- 90% of people living with HIV know their status
- 90% of those who know their status are on antiretroviral therapy (ART), and
- 90% of those on ART have suppressed VL

RPHIA was led by the Government of Rwanda (GoR) under the Ministry of Health, through the Rwanda Biomedical Center (RBC) and the National Institute of Statistics of Rwanda (NISR). The survey was conducted with funding from the United States (U.S.) President's Emergency Plan for AIDS Relief (PEPFAR) and technical assistance through the U.S. Centers for Disease Control and Prevention (CDC). RPHIA was implemented by ICAP at Columbia University in collaboration with various GoR institutions including the HIV Division, the National Reference Laboratory, Rwanda Military Hospital, various regional and district hospitals, local government entities, and various partners operating in the health sector.

This report is meant to present detailed survey findings covering all primary and secondary survey objectives of the RPHIA. The descriptive statistics and accompanying analyses furnish government, stakeholders, and the general public with official statistics for use in planning, policy making, monitoring, and evaluating programs on HIV and viral hepatitis.

I would like to encourage policy makers, planners, program managers, and other stakeholders who work in the area of HIV/AIDS and other communicable and related diseases in the country to use these findings to make informed policy decisions based on the current statistics presented in this report and through further analyses of the rich dataset that resulted from the survey.



Dr. Daniel Ngamije
Minister of Health

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The Rwanda Biomedical Center (RBC) wishes to acknowledge the efforts of a number of organizations and individuals who contributed substantially to the success of RPHIA.

First, we would like to acknowledge the financial assistance from the United States Government (USG) through PEPFAR that made it possible to implement this survey.

We express our gratitude to the NISR for its close collaboration and to ICAP at Columbia University and the CDC for their technical assistance throughout the survey. We gratefully acknowledge the support of the Steering Committee, the Technical Working Group (TWG) and the Data Analysis Advisory Committee members, who contributed to the successful preparation and implementation of the survey and the report.

We wish to express great appreciation for the work carried out by the RPHIA staff—namely monitors, coordinators, supervisors, and cartographers—from RBC, NISR, University of Rwanda (School of Public Health), ICAP, CDC, Women's Equity in Access to Care and Treatment, University of Maryland, UNAIDS, UNICEF, WHO, and Project San Francisco, who worked with dedication and enthusiasm to make the survey a success.

We recognize the valuable support provided by the administration, finance, and procurement departments of ICAP; their interventions allowed this survey to run smoothly, safely, and in good conditions.

We would like to express our special thanks to the Ministry of Local Government and to the local authorities, health facilities, as well as community health workers for their assistance and contribution to the smooth implementation of the survey.
Special thanks go to the team leaders, interviewers, drivers, and laboratory technologists for their valuable time that made this survey possible.

Finally, we are grateful to the survey respondents who generously gave their time to provide the information that forms the basis of this report.

Dr Sabin Nsanzimana
Director General, Rwanda Biomedical Center

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY/SUMMARY OF KEY FINDINGS

The Rwanda Population-based HIV Impact Assessment (RPHIA) was a nationally representative, cross-sectional, population-based survey of households (HHs). Conducted between October 2018 and March 2019, the survey focused on measuring key biological endpoints to provide direct estimates of HIV infection risk and burden, and of the effectiveness and population-level impact of the HIV-related prevention, care, and treatment interventions implemented in the country. The primary objectives of RPHIA were to estimate the national-level annual HIV incidence among adults (defined as those aged 15-64 years), and the subnational prevalence of HIV VLS (HIV RNA less than 1,000 copies/mL) among adults living with HIV. Secondary objectives of RPHIA were to measure national and provincial adult HIV prevalence, detection of ARVs in blood, national prevalence of transmitted HIV DR, progress toward the 90-90-90 targets defined by the UNAIDS, and national prevalence of hepatitis B and hepatitis C. The survey also collected information on behaviors associated with HIV acquisition and transmission, common HIV comorbidities, and other health conditions.

A two-stage, stratified cluster sample design was used in RPHIA, in which census enumeration areas (EAs) were selected in the first stage and HHs in the second stage. The sample was stratified by the five provinces. Data collection was conducted between October 2018 and March 2019. The survey interviewed 11,219 HHs. In the HHs surveyed, 31,028 adults and 8,655 young adolescent children (ages 10-14 years) were eligible to participate. Altogether, 30,715 (99.1%) of the eligible adults were interviewed, and of those interviewed, 30,637 (99.8%) provided blood for biomarkers assessment. Among the eligible young adolescents, 8,613 (99.6%) were interviewed, and of those interviewed, 8,605 (99.9%) provided blood for biomarkers assessment.

Home-based HIV testing and counseling (HBTC) and hepatitis B (HBV) testing with return of results was conducted. HIV VL and hepatitis C (HCV) results were returned to participants through health facilities of their choice.

Estimates presented in this report are weighted. Analysis weights account for sample selection probabilities and are adjusted for nonresponse and noncoverage. The key findings of RPHIA are:

INCIDENCE, PREVALENCE, AND COMMUNITY VIRAL LOAD SUPPRESSION

- Percentage annual incidence of HIV infection among adults was 0.08% (95% confidence interval [CI]: 0.02%-0.14%), which corresponds to approximately 5,400 new cases of HIV infection among adults in the country during the year. Percentage annual incidence of HIV infection among adults in the City of Kigali was 0.11% (95% CI: 0.00%-0.26%) (Tables 5.A and 5.B).
- Overall, HIV prevalence among people aged 15-64 years was 3.0%: 2.2% in men, and 3.7% in women (Table 6.A). This corresponds to approximately 210,200 adults living with HIV in Rwanda (Table 5.B). HIV prevalence in urban areas was 4.8% and 2.5% in rural areas. HIV prevalence in the City of Kigali, which is predominantly urban, was 4.3% (Table 6.A).
- HIV prevalence was approximately two or more times greater in older adolescent girls and young women (ages 15-24 years) compared to older adolescent boys and young men (1.2% [95% CI: 0.9%-1.5%] vs. 0.5% [95% CI: 0.3%-0.7%]), and in women aged 25-29 years and 30-34 years compared to men in the same age groups (3.4% [95% CI: 2.5%-4.3%] and 3.7% [95% CI: 2.7%-4.7%], respectively, vs 1.3% [95% CI: 0.6%-1.9%] and 1.4% [95% CI: 0.8%-2.0%] respectively) (Table 6.C).
- HIV prevalence among those aged 10-14 years was 0.4% (Table 6.C).
- Viral load suppression among all HIV-positive adults in Rwanda was 76.0%; 79.1% in women and 70.5% in men (note, this was regardless of whether these individuals were on treatment) (Table 9.A). Among adolescents aged 10-19 years living with HIV, VLS was 69.4% (Table 9.B).

UNAIDS 90-90-90 TARGETS

Adults (Table 10.A):

- **Diagnosed (ARV-adjusted awareness of HIV-positive status)**: Based on self-report and ARV detection data, it is estimated that in Rwanda, 83.8% of adults living with HIV were already aware of HIV status when tested in RPHIA (85.6% of HIV-positive women and 80.4% of HIV-positive men). Awareness ranged from 69.4% among young people (those aged 15-24 years) to 89.3% among adults aged 35-49 years. Among adults aged 25-34 years, women living with HIV were significantly more likely to be aware of their HIV-positive status than men (82.8% [95% CI: 76.8%-88.8%] compared to 51.7% (95% CI: 35.6%-67.9%]) although this comparison should be interpreted with caution due to the small number of men diagnosed in this age group.
- **On treatment (ARV-adjusted treatment status)**: Based on self-report and ARV detection data, it is estimated that among the adults living with HIV who were aware of their HIV status, 97.5% were receiving ART, 97.6% of women and 97.2% men.
- V**iral load suppression:** Among the HIV-positive adults on ART (ARV-adjusted treatment status), 90.1% had VLS (92.4% of women and 85.4% of men), ranging from 86.0% among those aged 15-24 years to 91.7% among those aged 35-49 years.

Adolescents aged 10-19 years (Table 13.B):

- **Diagnosed (ARV-adjusted awareness of HIV-positive status):** Based on survey response (guardian report for those aged 10-14 years and self-report for those aged 15-19 years) and ARV detection data, 81.0% of HIV-positive adolescents were classified as previously diagnosed; 92.4% and 71.9% among those aged 10-14 years and 15-19 years, respectively.
- **On treatment (ARV-adjusted treatment status)**: Based on survey response and ARV detection data, 100.0% of previously diagnosed HIV-positive adolescents were on ART.
- **Viral load suppression:** Among adolescents who were on ART, 82.2% had VLS.

OTHER KEY FINDINGS

Response rates and household composition

- Weighted response rates for HH interview, individual interview, and blood draw were 99.1%, 99.1% and 99.8% among adults, respectively (Tables 2.7.A and 2.7.B). Among the 11,219 HHs surveyed, 66.9% were male-headed and median HH size was 5 (Table 3.A).
- In Rwanda, 6.8% of the HHs had at least one HIV-positive member (5.8% in rural, and 10.8% in urban HHs) (Table 3.D).
- Among HHs with at least one person living with HIV, 21.5% had 2 or more people living with HIV (Table 3.E).
- Overall, 4.8% of HHs were headed by a person living with HIV (8.4% of the female-headed and 3.2% of the male-headed HHs) (Table 3.F).

HIV TESTING

Overall, 76.9% of the adult population reported that they had ever tested for HIV and received their results. However, only 52.4% of young people aged 15-24 years reported ever testing for HIV and receiving their test results: 50.2% in older adolescent boys and young men and 54.4% in older adolescent girls and young women (Tables 7.A, 7.B, and 7.C).

HIV diagnosis and treatment status

- Among HIV-positive adults aged 15-64 years, 16.2% were unaware of their HIV status (based upon self-report adjusted for ARV detection data) (95% CI: 12.8%-19.7%). This percentage is higher among people living with HIV aged 15-24 years (30.6% [95% CI: 20.0%-41.3%]). Among adults with no education, 20.9% were unware of their status (Table 8.C).

- Concordance between self-report of taking ART and detection of ARVs was high among adults, with 94.7% of those who reported current ART use having detectable ARVs in blood. In contrast, 39.4% of those who reported that they were not previously diagnosed with HIV had detectable ARVs in their blood (Table 8.F).

Clinical perspectives on people living with HIV

- Among HIV-positive adults, 97.5% of those who reported initiating ART less than 12 months before the survey, and 98.1% of those who reported initiating ART more than 12 months before the survey reported that they were still taking ART at the time of the survey (Tables 11.A and 11.B).
- Among 8 samples from recently infected HIV-positive persons identified in RPHIA, 1 had mutations associated with resistance to non-nucleoside reverse transcriptase inhibitors (NNRTIs). None of the samples had mutations associated with resistance to protease inhibitors or nucleoside reverse transcriptase inhibitors (Table 11.C).
- Among the 58 samples from HIV-positive individuals who did not have VLS but reported current use of ART, 50 (86.2%) had a detectable mutation associated with NNRTI resistance (Table 11.D).
- Among the subset of 92 samples that underwent genotyping, 77.2% were subtype A, 13.0% were subtype C, 7.6% were recombinant, and 2.2% were subtype D (Table 11.E).

Prevention of mother-to-child transmission of HIV

- Among women of childbearing age (15-49 years of age) who delivered in the three years preceding the survey, 98.0% had at least one antenatal care (ANC) visit during their most recent pregnancy. This percentage was lower amongst those with no education (94.3% [95% CI: 91.5%-97.0%]) compared to those with primary, or more than secondary education (98.0% [95% CI: 97.5%-98.6%], 99.3% [95% CI: 98.8%-99.9%], and 98.6% [95% CI: 97.1%-100.0%], respectively) (Table 12.A).
- Among HIV-positive women of childbearing age who delivered in the three years before the survey, 25.9% of women with last-born children 18-36 months of age were currently breastfeeding (Table 12.C).
- Among women who delivered in the 12 months before the survey, 96.9% reported knowing their HIV status (Table 12.E).
- Among HIV-positive women who delivered within the 12 months preceding the survey, 98.0% received ART to reduce the risk of mother-to-child transmission (MTCT), suggesting high coverage of PMTCT programs. Further, 75.8%* reported receiving ARVs prior to pregnancy, indicating early diagnosis and initiation of ARVs in women of reproductive age; 22.3%* reported initiating ARVs during pregnancy, labor, or delivery (Table 12.F).

Young adolescents and young people

- In adolescents aged 10-19 years living with HIV, based upon survey response (parent/guardian reported data for young adolescents aged 10-14 years and self-report for older adolescents aged 15-19 years) both adjusted for ARV detection data, 19.0% were unaware of their HIV status. However, the remaining 81.0% were both aware of their HIV-positive status and on ART (Table 13.A).
- Among young people aged 15-24 years, 8.7% reported having sexual intercourse before the age of 15 years (11.9% among the male and 5.7% among female population) (Table 13.C).

HIV risk factors

- HIV prevalence among adults with two or more partners in the 12 months before the survey was more than double that of those reporting one partner in the same time period (5.9% [95% CI: 4.7%-7.0%] versus 2.9% [95% CI: 2.5%-3.3%]) (Table 14.A).

- HIV prevalence among adults who reported first sexual intercourse before the age of 15 years was 3.1%; HIV prevalence among women who reported first sexual intercourse before age of 15 years was 5.8% (95% CI: 3.8%-7.9%) and significantly greater compared to men (1.7% [95% CI: 0.8%-2.6%]). HIV prevalence among those who reported an older age at first sexual intercourse (20 years or more) was similar between men and women (Table 14.A).
- Among adults who reported having sex in the last 12 months, 27.6% (32% of men and 23.2% of women) reported having sex with a non-marital, non-cohabitating partner. Of these adults, 41.5% (50.2% of men and 30.2% of women) reported using a condom during their last sexual intercourse with this non-marital, non-cohabitating partner (Tables 14.B, 14.C and 14.D).
- Among those who reported having sex in the 12 months before the survey with a non-marital, non-cohabitating partner, self-report use of condom during the last sexual intercourse with a non-marital, non-cohabitating partner was significantly lower in rural areas (37.8% [95% CI: 35.7%-39.8%) compared to urban areas (50.7% [95% CI: 47.1%-54.2%]) (Table 14.D).
- The percentage of adult men who were reported to have had medical circumcision was 39.4%. The percentage of men who reported being uncircumcised ranged from 40.3% of those aged 20-24 years to 88% of those aged 60-64 years (Table 14.G).

HIV and tuberculosis

- Based on self-report, 76.0% of adults who visited a tuberculosis (TB) clinic were tested for HIV during a TB clinic visit; however, 17.7% were not tested for HIV during the visit and did not know their HIV status (Table 15.A).
- Overall, 39.3% of HIV-positive adults had ever visited a TB clinic; among those, 24.2% were diagnosed with TB and, among the diagnosed, 100% were treated for TB (Table 15.B).

Hepatitis B and hepatitis C

- The overall prevalence of acute or chronic hepatitis B in Rwanda among adults aged 15-64 years was 2.0%. Prevalence of acute or chronic hepatitis B in HIV-positive participants, 10-64 years of age was 3.6% (95% CI: 2.3%-4.8%), over two times that in HIV-negative participants, 1.6% [95% CI: 1.1%-2.2%] (Table 15.C).
- Among adults with acute or chronic hepatitis B, the percentage of participants with recent HBV infection (through immunoglobulin M [IgM] testing) was 3.0%: 4.2% among men and 0.7%* among women (Table 15.E).
- The overall prevalence of past or current hepatitis C among adults in Rwanda was 1.2%. Among those aged 10-64 years, it varied from 0.5 in the City of Kigali to 1.8% in the South. Prevalence of past or current hepatitis C is significantly higher among those 50 years and older (6.1% [95% CI: 3.2%-9.0%] compared to 0.5% [95% CI: 0.2%-0.8%] among adults aged 15-49 years), peaking at 7.3% in those aged 55-59 years (Table 15.F).
- Among women, the prevalence of past or current hepatitis C peaked among those aged 50-54 years (6.8%) and among men, the prevalence was highest among those aged 55-59 years (11.0%) (Table 15.F).
- The overall prevalence of current hepatitis C (HCV VL positive) among adults aged 15-64 years in Rwanda was 0.8%. Among women, the current hepatitis C prevalence peaked among those aged 50-54 years (5.9%) and among men, the prevalence was highest among those aged 55-59 years (6.9%) (Table 15.G).
- Among persons aged 10-64 years with past or current hepatitis C (rapid test positive for HCV infection), 62.4% had current hepatitis C (detectable HCV VL) (Table 15.H).
- An estimated 2,500 young adolescents and 54,100 adults aged 15-64 years are living with current hepatitis C in Rwanda (Table 15.I).

* Estimate is based on a denominator of 25-49 and should be interpreted with caution.

Cervical cancer screening

- Among women aged 30-49 years living with HIV, 9.8% reported having been screened for cervical cancer. The screening percentage was 16.6% in urban areas and 6.4% rural areas, and varied considerably by province, ranging from 0% in the South to 28.2% in the City of Kigali (Table 15.J).

PROGRAMMATIC RESPONSES OR RECOMMENDATIONS

- In order to better understand the HIV transmission dynamics at subnational level and within sub-groups, further strengthening of HIV surveillance activities is recommended. With low HIV incidence and high VLS shown through RPHIA, the national program should continue to strengthen surveillance of recent HIV infection and among key populations to ensure that interventions are effective in preventing new HIV infections. Similarly, with national implementation of VL testing in Rwanda, the national program may consider population viremia (proportion of the population with unsuppressed VL) as an indicator of on-going transmission.
- Innovative approaches are needed to increase testing where awareness of HIV status is lowest—among young people.
- As access to treatment and care among people living with HIV in Rwanda is high, people are living longer with the virus; therefore, there is a need to implement tailored programs to address the needs of an aging population living with HIV in the country, including the chronic conditions such as diabetes, and hypertension, that are more prevalent in older individuals, particularly those living with HIV.
- National guidelines recommend that HIV-positive mothers should breastfeed their children up to 15 months of age, but the data showed that 26% of HIV-positive women continue breastfeeding their children until 18-36 months of age. Women should be counseled on safe weaning practices at appropriate age of the child.
- Strategies to increase condom use among people with non-marital or non-cohabitating partners should be put in place, especially in rural areas.
- The Government of Rwanda recommends medical circumcision for all males 15+ years of age. Strategies to increase utilization of medical circumcision services by men 30 years of age or older should be implemented, as this is the age group with lowest coverage.
- HIV testing at TB clinics should be further strengthened to avoid the missed opportunities in diagnosing individuals living with HIV.
- Screening and testing for hepatitis C should be strengthened, with a special emphasis on the older population. Anti-HCV medications should be made available at all health facilities.
- The national guidelines for cervical cancer screening recommend that all HIV-positive women should be screened every three years. Raising awareness of cervical screening and increasing provision of services, especially among women residing in rural areas and among those not educated, is urgently needed.

CONCLUSION

RPHIA's results are an indication of Rwanda's National HIV Program's remarkable efforts and high-level political commitment to address the HIV epidemic. Data shows high coverage and utilization of HIV services throughout the country.

However, RPHIA results highlighted remaining gaps and areas of future investment towards ending AIDS by 2030—urban settings are disproportionately affected; men and youth are not utilizing available services adequately and cervical cancer screening coverage is low. Tailored programs to address HIV in the urban setting amongst the male population and the youth shall help bridge the remaining gaps.

As disease control programs reach a high level of coverage of diagnosis and intervention, the unit cost of achieving further coverage is usually much greater than at lower coverage. Sustaining the current level of success and covering the remaining gaps (reaching the unreached) will require greater efforts, costly investments, and the use of innovative approaches.

1. INTRODUCTION

1.1 BACKGROUND

The Population-based HIV Impact Assessment (PHIA) is a multicounty project funded by the United States (U.S.) President's Emergency Plan for AIDS Relief (PEPFAR) to conduct national HIV-focused surveys that describe the status of the HIV epidemic. The surveys measure important national and sub-national HIV-related parameters, including progress toward the achievement of the Joint United Nations Programme on HIV/AIDS (UNAIDS) 90-90-90 targets (UNAIDS, 2014), and will guide policy and funding priorities.

The Rwanda Population-Based HIV Impact Assessment (RPHIA) was led by the Government of Rwanda (GoR) through the Rwanda Biomedical Center (RBC) in the Ministry of Health and the National Institute of Statistics (NISR), with technical assistance by the U.S. Centers for Disease Control and Prevention (CDC). The survey was implemented by ICAP at Columbia University in collaboration with the GoR institutions: NISR, RBC (the HIV/AIDS, STIs and OBBI [HIV, sexually transmitted infections and other blood-borne infections] and the National Reference Laboratory Divisions), district, provincial and referral hospitals, and local government authorities. GoR, local civil society organizations, and international development partners participated in the steering committees and technical working group during survey implementation.

1.2 OVERVIEW OF RPHIA 2018-2019

RPHIA, a household (HH)-based national survey, was conducted between October 2018 and March 2019 to measure the status of Rwanda's national HIV response. RPHIA offered home-based HIV testing and counseling (HBTC) with return of results, and collected information about HHs and individuals' backgrounds, as well as the uptake of HIV care and treatment services. This survey is the first in Rwanda to estimate both the national HIV incidence and viral load (VL) suppression (VLS). The results provide information on national and provincial progress toward control of the HIV epidemic.

Although HIV facility-based sentinel surveillance and previously conducted population-based studies provided useful knowledge regarding Rwanda's HIV epidemic and HIV control efforts, there were still gaps in information needed to understand the current status of the epidemic fully. While population-level outcomes and impact may be inferred and modeled from facility-level data, this requires a series of untested assumptions about trends in the unobserved segments of the population. In addition, the population-based data that were available for HIV focused largely on knowledge, attitudes, and self-reported risk behaviors.

With its focus on measuring key biological endpoints in a nationally representative sample of the population, RPHIA provides direct estimates of HIV-infection risk and burden; the effectiveness and population-level impact of HIV-related prevention, care, and treatment interventions implemented in the country; and Rwanda's progress toward the achievement of the UNAIDS 90-90-90 targets.

1.3 SPECIFIC OBJECTIVES

The goal of the survey was to estimate national incidence and provincial prevalence of VLS in Rwanda, to assess the coverage and impact of HIV services at the population level and to characterize HIV-related risk behaviors using a nationally representative sample of adults (defined as participants aged 15-64 years in this survey unless otherwise indicated) and young adolescents (defined as participants aged 10-14 years).

Primary Objectives

- To estimate the provincial prevalence of VLS (defined as HIV RNA less than 1,000 copies/milliliter [mL]) among HIV-positive adults.
- To estimate national-level annual HIV incidence among adults.

Secondary Objectives

To estimate the following in the population 10-64 years:

- National and provincial HIV prevalence
- Incidence of HIV in the City of Kigali (15-64 years)
- Prevalence of HIV-related risk behaviors, knowledge, and attitudes
- Behavioral and demographic determinants of HIV incidence and prevalence
- Uptake of HIV-related services and exposure to HIV interventions
- Prevalence of transmitted antiretroviral (ARV) drug-resistance (DR)
- Prevalence of ARV DR among those HIV-positive persons on antiretroviral therapy (ART) who do not have VLS
- Assess progress toward achievement of the UNAIDS 90-90-90 targets
- National prevalence of hepatitis B
- Percent with recent hepatitis B virus (HBV) infection
- National prevalence of hepatitis C
- National prevalence of HBV and HIV co-infection
- National prevalence of hepatitis C and HIV co-infection

2. SURVEY DESIGN, METHODS, AND RESPONSE RATES

RPHIA was a nationally representative, cross-sectional, two-stage, population-based survey of HHs across Rwanda. Its target population corresponded to young adolescents (defined as individuals aged 10-14 years) and adults (defined as individuals aged 15-64 years).

2.1 SAMPLE FRAME AND DESIGN

RPHIA used a two-stage, stratified cluster sample design. The sampling frame was comprised of all HHs in the country, based upon the 2012 census in Rwanda, which included 16,728 enumeration areas (EAs) containing 2,424,898 HHs and 10,378,021 persons, with an average number of HHs and persons per EA of 145 and 623, respectively. The first stage selected 375 EAs using a probability proportional to size method. The 375 EAs were stratified by provinces. During the second stage, a sample of HHs was randomly selected within each EA, using an equal probability method, where the average number of HHs selected per EA was 30 and the actual number of HHs selected per EA ranged from 14 to 60 (Table 2.1.A).

The sample size was calculated to provide a representative national estimate of HIV incidence among adults aged 15-49 years with a relative standard error (RSE) less than or equal to 38%, as well as representative provincial estimates of VLS prevalence among HIV-positive adults with CIs of +/- 10%. The interest in a subnational incidence estimate for Kigali City implied a reallocation of sample from other provinces to the capital while retaining CIs of +/- 10% for VLS in all provinces other than in City of Kigali. All eligible young adolescents in the selected HHs were invited to participate in the survey, which was designed to provide a representative national estimate of young adolescent HIV prevalence with an RSE less than or equal to 28% if prevalence among young adolescent was as high as 0.3%, or an RSE less than 34% if prevalence among young adolescent was at 0.2%. The total target sample size was 24,523 for adults, and 5,411 for young adolescents.

RPHIA also included hepatitis B virus (HBV) and hepatitis C virus (HCV) testing for the participants aged 10-64 years. All participants who tested HIV positive were offered a rapid HBV and HCV test. In addition, a subset of individuals who tested HIV negative, from randomly selected three HH per EA, were offered testing for HBV and HCV.

Table 2.1.A Distribution of sampled enumeration areas and households, by region

Distribution of sampled enumeration areas and households, by province, RPHIA 2018-2019

	Enumeration Areas			Households		
Province	Urban	Rural	Total	Urban	Rural	Total
City of Kigali	66	13	79	2,042	453	2,495
South	7	61	68	256	1,923	2,179
West	9	67	76	354	2,078	2,432
North	6	70	76	219	2,181	2,400
East	5	69	74	191	2,146	2,337
Total	93	280	373[1]	3,062	8,781	11,843

Unweighted figures

*Of the 375 sampled EAs, data could not be collected in two EAs (one EA each from South and West provinces). Population in these EAs were relocated due to fear of landslides.

Refer to *Appendix A: Sample Design and Weighting* for a detailed explanation of the sampling and weighting processes.

2.2 ELIGIBILITY CRITERIA AND CONSENT PROCEDURES

Eligibility criteria

In RPHIA, the survey population is defined as individuals aged 10-64 years who slept in the household the night before the survey. The criteria for survey participation are determined in each country—and it should be noted that the age categories for consent are different than the adult, adolescent, and child age definitions used for sampling and reporting purposes in this report. Sometimes, the age of majority crosses age brackets; therefore, the legal age of consent or age at which a minor is able to give consent may vary. In Rwanda, the criteria for survey participation were as follows:

- In RPHIA, the eligible survey population included individuals aged 10-64 years. This included:
- People aged 18-64 years living in the selected HHs and adult visitors who slept in the HH the night before the survey who were willing and able to provide written consent.
- Minors aged 10-17 years living in the selected HHs and visitors in the same age bracket who slept in the HH the night before the survey who were willing and able to provide written assent, and whose parents or guardians were willing and able to provide written permission for their participation.
- Emancipated minors (16-17 years) who slept in the HH the night before the survey and were willing and able to provide written consent.

Exclusion criteria

- Persons who were unable to give consent/assent due to cognitive impairment or intellectual disability were not eligible to participate.
- Individuals with disabilities who were otherwise able to give written consent or mark were offered survey participation if the survey team was able to accommodate the disability.

Household consent procedures

An electronic informed consent form was administered using a tablet. Additionally, two printed hardcopies were signed by those participants who consented to participation in the survey: One copy was handed to the participant and one was kept with the survey team as a Rwanda National Ethics Committee requirement. A designated head of HH consented to HH participation in the survey, after which individual members were rostered during a HH interview.

Individual interview and biomarker consent procedures

Adults and emancipated minors (ages 16-17) then provided written consent for an interview and for participation in the biomarker component of the survey, including HBTC, with return of HIV and HBV testing results during the HH visit. Receipt of tests results was a requirement for participation in the biomarker component. If an individual did not want to receive his or her HIV test result, this was considered a refusal and the survey was concluded. Adults were also asked for written consent to store their blood samples in a repository to perform additional tests in the future.

Minors aged 10-17 years were asked for assent to the interview and biomarker components after permission was granted by their parents or guardians. Parents provided consent for biomarker testing for minors below the age of assent (ages 10-17 years). In both cases, if a parent or guardian did not want to receive the minor's HIV test result, this was considered a refusal and the survey was concluded.

Procedures with illiterate participants or participants with a sight disability involved the use of an impartial witness, chosen by the potential participant, who also signed or made a mark on the consent form on the tablet and the printed copies. If no witness could be identified, the potential participant or HH (if the head of HH was sight-disabled or illiterate) was deemed ineligible.

All PHIA survey protocols, consent forms, screening forms, refusal forms, referral forms, recruitment materials, and questionnaires were reviewed and approved by in-country ethics and regulatory bodies and the institutional review boards of Columbia University Medical Center, Westat, and the CDC.

2.3 SURVEY IMPLEMENTATION

Training of field and laboratory staff

Survey staff received training on both the contents of the data collection instruments and tablet use. The training curriculum included:

- Scientific objectives of the survey
- Survey design and methods
- Completion of survey forms
- Data collection
- Staff responsibilities
- Recruitment of participants
- Informed consent procedures, including human participants' protection, privacy, and confidentiality
- Blood collection for children and adults, including venipuncture and finger stick
- HBTC
- Referral of participants to health and social services
- Management and transportation of blood specimens
- Biosafety
- Communication skills
- Protocol deviations, adverse events, and reporting of events
- Human participants research ethics

Laboratory staff were trained in specimen management, including sample processing, labeling, HIV confirmatory testing, and quality assurance (QA). Central laboratory staff were trained in VL measurement, HIV recency testing using a limiting antigen (LAg) avidity enzyme immunoassay, DR testing, anti-hepatitis B core antibody (anti-HBc testing), total and immunoglobulin M (IgM) anti-HBc testing, HCV antibody testing, and HCV RNA measurement using an RNA polymerase chain reaction (PCR) assay.

Survey staff

Fieldwork started in mid-October 2018 and was completed in mid-March 2019. Community mobilization was conducted by 746 Community Health Workers (two per EA), supported by nine Community Mobilization Coordinators, and supervised by three Provincial Community Mobilization Coordinators.

Fieldwork was conducted by 30 data collection teams composed of a team leader and six nurses/laboratory technologists per team. All nurses and laboratory technologists were trained to conduct interviews and HBTC. The data collection teams were supervised by 6 field coordinators. Team members spoke Kinyarwanda plus English and/or French.

In addition, the laboratory staff was organized at different levels: Three central laboratory staff, three provincial lab coordinators, 21 satellite lab technicians and logisticians. Satellite and central laboratory technicians processed samples and performed additional procedures for HIV-1 VL, HBV and HCV testing, and quality control (QC) and QA.

A central survey management team guided and oversaw data collection activities, performed quality checks, and provided technical support (Appendix D). National and international monitors periodically conducted direct observation of data collection activities in the field and in the laboratories to provide technical support and ensure quality.

Community sensitization and mobilization

Community mobilization was conducted prior to data collection to maximize community support and participation in the survey. The mobilization began before fieldwork commenced with a high-level national launch meeting that included key national and provincial leaders, mass media, and other stakeholders. Community mobilization teams visited each EA prior to initiation of data collection and partnered with community mobilizers to meet key gatekeepers in the communities (village chiefs, local government officials, heads of health facilities, and religious/opinion leaders). The mobilization teams held community sensitization meetings, disseminated written informational materials such as brochures and posters, and held discussions with selected HHs and other community residents.

Supervision

Data collection teams were continuously overseen by field-based supervisors as well as periodically monitored by national and international teams with representation from collaborating institutions. Monitoring teams visited field and laboratory sites at least monthly and provided direct supervision as well as verification of results by HH revisits. Daily monitoring forms for HH and individual outcome tracking were also reviewed by monitors for completeness. Field-based supervisors also supported teams by organizing supplies and transport of blood samples, coordinating community-mobilization efforts, providing technical troubleshooting, and checking the quality of HH procedures and data collected.

The national and international monitoring teams observed and assessed the quality of survey procedures, including adherence to protocol and standard operating procedures, and identified and responded to challenges with data collection. Regular debriefing sessions were held between field-based supervisors and monitoring teams. Monitoring reports were circulated to collaborating institutions and the RPHIA Technical Working Group to respond to any issues.

Electronic monitoring system

An electronic dashboard system was established to monitor the progression of the survey. The dashboard summarized data uploaded to the PHIA server daily. The dashboard tracked coverage and completion of EAs, sampled HHs, HH response, eligible HH members providing consent to the interview, and biomarker components of the survey, blood draws, response rates (RRs), and overall progress toward the achievement of the target sample.

Questionnaire data collection

Questionnaire and field laboratory data were collected on mobile tablet devices using an application programmed in Open Data Kit, an open-source mobile data collection application. The HH interview collected information on HH residents, assets, economic support, recent deaths, and orphans and vulnerable children (see Appendix E). The adult interview was administered to participants aged 15 years and older and included modules on demographic characteristics; marriage, sexual activity and HIV-related risk behaviors; reproductive history (women only) including antenatal care (ANC) and PMTCT services uptake; children; male circumcision (men only); previous HIV testing experience; HIV serostatus knowledge, and continuum (uptake) of HIV care services; TB, and other health issues; gender norms; and attitudes about HIV treatment and prevention (see Appendix F).

The Young Adolescent Questionnaire was administered to adolescents aged 10-14 years. This questionnaire included questions on demographic characteristics; HIV prevention interventions; sexual behavior; social norms; self-efficacy and assertiveness; exposure to HIV prevention interventions; HIV risk perception; HIV knowledge; HIV testing experience; HIV stigma; alcohol and drug use; and parental support (Appendix G). The questionnaires were administered in English, French, or Kinyarwanda. The questionnaires were reviewed and tested thoroughly for acceptability, feasibility, and flow of questions.

2.4 FIELD-BASED BIOMARKER TESTING

Blood collection

Blood was collected by trained and qualified survey staff from consenting participants: 14 mL of venous blood from persons aged 10-64 years, and 1 mL of capillary blood was collected from all participants who either refused to give venous blood or failed to be collected using vacuum tubes.

Blood samples were labeled with a unique barcoded participant identification number and stored in temperature-controlled cooler boxes. At the end of each day, samples were transported to a satellite laboratory for processing into plasma aliquots and dried blood spots (DBS), and were frozen within 24 hours of blood collection.

HIV home-based testing and counseling

HIV HBTC was conducted in each HH in accordance with national guidelines (Figure 2.4.A). As per these guidelines, the survey used a sequential rapid-testing algorithm in the field: First Alere Combo (Alere Determine ™ HIV-1/2 Ag/Ab Combo) (Alere Inc., Waltham, Massachusetts, United States) followed by the HIV 1/2 Stat-Pak™ (Chembio Diagnostic Systems, Medford, New York, United States).

Individuals with a non-reactive result on the first test were reported as HIV negative. Individuals with a reactive first test result underwent subsequent testing with Stat-Pak. Those with a reactive result on both screening tests were classified as HIV positive for the purposes of the survey but were referred to the nearby health facility for verification testing, and subsequent enrollment into care, as required by the national testing algorithm. Individuals with a reactive first test result followed by a non-reactive second test result were classified as inconclusive and were referred for retesting in four weeks as per the national guidelines.

HIV-positive participants were referred to HIV care and treatment services at a health facility of their choice. For children aged 10-11 years, results were returned to a parent or guardian without the presence of the child. For adolescents aged 12-17 years, results were returned to the adolescents without the presence of the parent or guardian. Participants with indeterminate results were advised to attend a facility in four weeks for repeated testing, as per national guidelines.

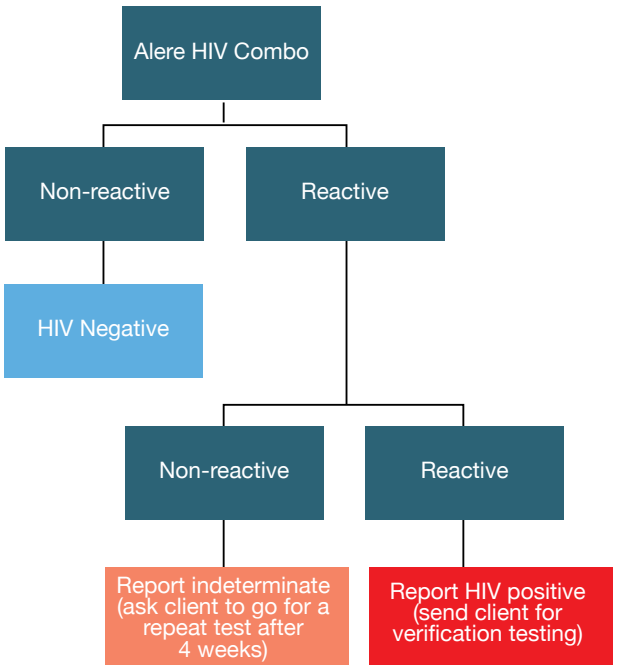


Figure 2.4.A
Household-based HIV testing algorithm for participants aged 10-64 years, RPHIA 2018-2019

Hepatitis B virus testing

All individuals aged 10-64 years who tested positive for HIV, and a subsample who tested HIV negative, were tested at the HH for HBV infection using a rapid test (RT) for hepatitis B surface antigen (HBsAg) (SD Bioline HBsAg/WB (Standard Diagnostics, Inc., Suwon, Kyonggi-do, South Korea). Participants who tested positive for HBsAg were considered as having acute or chronic hepatitis B and referred to their selected health facility for subsequent management in accordance with national guidelines. Those participants with negative results were referred for vaccination, if not already vaccinated.

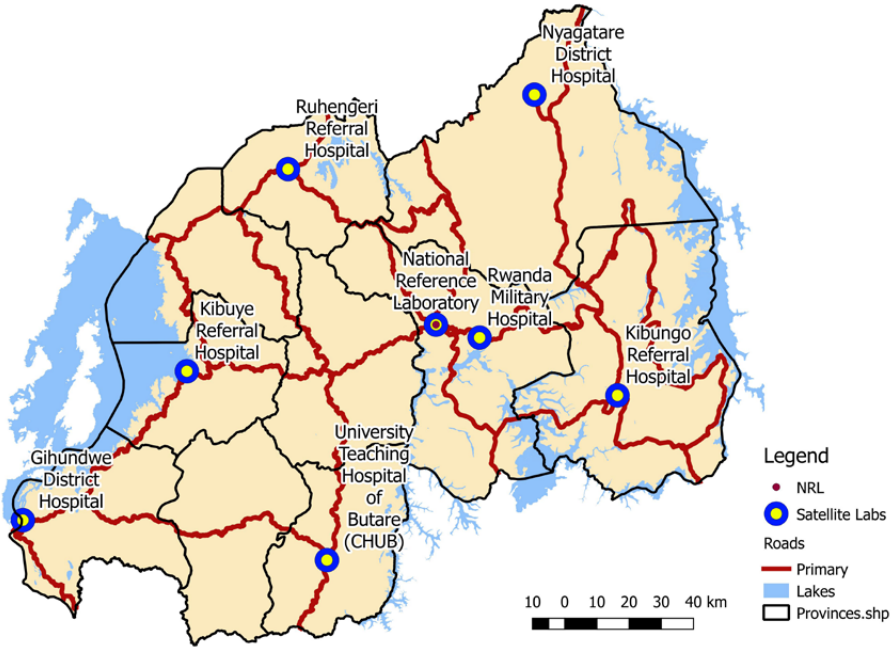
2.5 LABORATORY-BASED BIOMARKER TESTING

Satellite and central laboratories

Seven satellite laboratories for the survey were established in existing health facility laboratories (Figure 2.5.A). One central laboratory (NRL) was chosen for more specialized tests. At each satellite laboratory, trained technicians performed HIV confirmatory testing, testing for QA, processing of whole blood specimens into plasma aliquots and DBS cards for temporary storage at -20°C. For QA of the HIV RT conducted in the field, the first 50 samples tested by each field tester and a random sample of 5% of specimens that tested HIV negative during HBTC were retested in the laboratory using the national HIV rapid-testing algorithm. All specimens that tested HIV positive during HBTC, and those that had confirmed positive RT results during QA, underwent confirmatory testing using the Geenius™ HIV 1/2 Supplemental Assay (Bio-Rad, Hercules, California, United States). HIV confirmatory testing was conducted at the satellite laboratories in accordance with the manufacturer-specified protocol. A positive Geenius result defined HIV-positive status for the survey.

For the purposes of the survey, samples with inconclusive results received further testing and evaluation to allow for final classification of HIV status. Inconclusive results recorded as reactive for the antigen line on Alere Combo were tested for HIV VL (platform described under HIV VL testing section). Inconclusive results recorded as reactive for the antibody line underwent Geenius testing to determine final classification.

Figure 2.5.A
Satellite laboratories used during data collection, RPHIA 2018-2019



For participants who self-reported being HIV positive but who tested HIV negative at the time of the survey, an additional HIV RT was conducted (following the same national algorithm) as well as HIV DNA PCR for confirmation of HIV status. Survey staff was trained on how to interpret the initial RT results for the participants and provide counseling as appropriate. Survey staff returned to the HH for these participants to provide counseling on the final confirmed result. The survey team visiting these participants was trained to provide counseling on the interpretation of the laboratory results.

Quality control using a panel of positive and negative dried tube specimens was performed on a biweekly basis by field staff performing HIV testing. In addition, QA proficiency testing was conducted twice in the course of the survey, using a panel of masked HIV-positive and negative dried tube specimens. Proficiency in the correct performance and interpretation of the HIV testing algorithm was assessed for each tester.

The survey revisited HH for investigation of discrepancies between the results of testing in the field and in the laboratory. The specimens collected during the revisit underwent comprehensive retesting in the laboratory. For each case, an analysis of the nature of the discrepancy, and potential sources of error, was performed to define the definitive HIV status for analytical purposes.

Hepatitis B virus antibody testing

Samples that tested positive for HBsAg underwent testing with the IgM Anti-HBc Enzyme Immunoassay (DiaSorin S.p.a, Saluggia, Italy) in the central lab to estimate recent infection in the population. The IgM was performed at the central National Reference Laboratory (NRL). The number of hepatitis B IgM positive results out of the total number tested using HBsAg was used as an indicator for recent (or acute) hepatitis B infection.

Hepatitis C virus testing

All individuals aged 10-64 years who tested positive for HIV and a subsample of HIV negative were tested for HCV using an antibody test, using the SD Bioline HCV Rapid Test (Standard Diagnostics., Inc.) at the NRL. Participants who tested positive for HCV RT were considered as having past or current hepatitis C and referred to their selected health facility for subsequent management in accordance with national guidelines. Samples positive for HCV antibodies were tested for HCV RNA using Roche COBAS AmpliPrep /COBAS TaqMan HCV quantitative assay, Version 2 (Roche Molecular Systems, Branchburg, New Jersey, United States) at the central laboratory and those with detectable VL were considered as having current HCV infection. Participants selected for HCV testing were referred to the health facility of their choice. The HCV VL results were returned to the health facility chosen by the participant within 8-12 weeks from the survey date.

HIV viral load testing

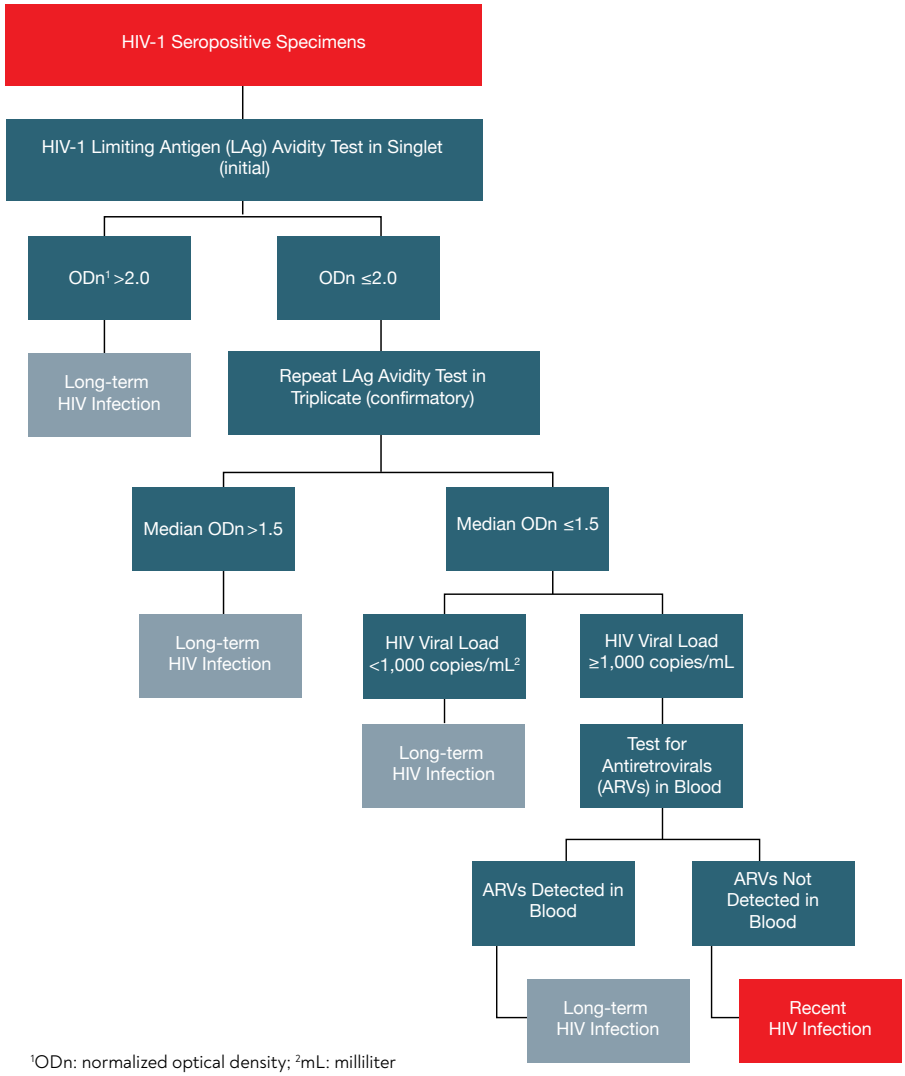
Viral load (HIV RNA copies/mL) of HIV-positive participants was measured using the COBAS® TaqMan® Analyser on the COBAS AmpliPrep/COBAS TaqMan HIV-1 Test, v2.0 instrument (Roche Molecular Diagnostics, South Branchburg, New Jersey, United States) for plasma samples. The COBAS AmpliPrep/COBAS TaqMan HIV-1 Test v2.0 free virus elution protocol was used to measure VL from DBS specimens from children and adults with insufficient volume of plasma.

Viral load results were returned by the return of results coordinator (RORC) within 8 to 12 weeks to the health facility chosen by each HIV-positive participant. Participants were provided with a referral form during HBTC for subsequent retrieval of their results. Survey staff (RORC) also contacted each participant via mobile phones, informing them that their VL results were available at the chosen facility and further advising them to seek care and treatment.

HIV recent infection testing algorithm

To distinguish recent from long-term HIV infections, in order to estimate incidence, specimens from HIV-positive participants aged 10-64 years were tested for recent HIV infection using an HIV-1 LAg avidity assay. The Maxim HIV-1 Limiting Antigen-Avidity EIA kit (Maxim Biomedical, Bethesda, Maryland, United States) was used on DBS, and the HIV-1 LAg-Avidity EIA (Sedia Biosciences Corporation, Portland, Oregon, United States) on plasma. Specimens with median normalized optical density (ODn), ≤ 1.5 using LAg avidity testing were classified as potential recent infections, and their VL results were assessed. Specimens with VL < 1,000 copies/mL were classified as long-term infections, while those with VL ≥ 1,000 copies/mL were tested for detectable ARVs. Specimens with detectable ARVs were classified as long-term infections and those with VL ≥ 1,000 copies/mL and without detectable ARVs were classified as recent infections (Figure 2.5.B).

Figure 2.5.B
HIV-1 recent infection testing algorithm adjusted for detection of antiretrovirals among HIV-positive participants aged 15-64 years, RPHIA 2018-2019



[1]ODn: normalized optical density; [2]mL: milliliter

Detection of antiretroviral drug resistance

HIV resistance to ARVs was assessed for all those HIV-positive participants classified as recent HIV infections and a small subset of confirmed long-term infections. Mutations in the HIV protease and reverse transcriptase genes that confer ARV DR (according to the Stanford University HIV Drug Resistance Database) were detected simultaneously by use of the CDC in-house multiplex allele-specific DR assay. Specimens were tested at the NRL for DR testing.

Detection of antiretrovirals

Qualitative screening for detectable concentrations of ARVs was conducted on DBS specimens from all HIV-positive adults and children by means of high-resolution liquid chromatography coupled with tandem mass spectrometry. The method used for ARV detection was a modified version of the methodology described by Koal et al.[1] This qualitative assay was highly specific, as it separates the parent compound from the fragments, and highly sensitive, with a limit of detection of 0.02 µg/mL for each drug and a signal-to-noise ratio of at least 5:1 for all drugs. As detection of all ARVs in use at the time of the survey was cost-prohibitive,

four ARVs, efavirenz, tenofovir, nevirapine, and atazanavir, were selected as markers for the most commonly prescribed first- and second-line regimens. These ARVs were also selected based on their relatively long half-lives, allowing for a longer period of detection following intake.

Detection of ARVs indicates participant use of a given drug at the time of blood collection. Results below the limit of detection among individuals who reported taking ART indicate that there was no recent exposure to the regimen and that adherence to a prescribed regimen is suboptimal but cannot be interpreted as "not on ART." In addition, given the limited number of ARVs selected for detection, their absence could not rule out the use of other ART regimens that do not include them.

ARV detection was performed by the Division of Clinical Pharmacology of the Department of Medicine at the University of Cape Town, South Africa.

Long-term storage

Specimens from participants who consented to long-storage were stored at -80°C at the central lab.

2.6 DATA PROCESSING AND ANALYSIS

All field data were collected on tablets, transmitted to a central server using a secure virtual private network, and stored in a secure PostgreSQL database. Data cleaning was conducted using SAS 9.4 (SAS Institute Inc. Cary, North Carolina, United States). Laboratory data were cleaned and merged with the final questionnaire database using unique specimen barcodes and study identification numbers.

All results presented in the report are based on weighted estimates unless otherwise noted. Analysis weights account for sample selection probabilities and adjusted for nonresponse and noncoverage. Nonresponse-adjusted weights were calculated for HHs, individual interviews, and individual blood draws in a hierarchical form. Adjustment for nonresponse for initial individual and blood-level weights was based on the development of weighting adjustment cells defined by a combination of variables that are potential predictors of response and HIV status. The nonresponse adjustment cells were constructed using the Least Absolute Shrinkage and Selection Operator (LASSO) and Chi-square Automatic Interaction Detection (CHAID) algorithms. The cells were defined based on data from the HH interview for the adjustment of individual-level weights, and from both the HH and individual interviews for the adjustment of blood sample-level weights. Post-stratification to compensate for non-coverage in the sampling process was done by adjusting the weights so that the sum of each set of weights conformed to national population totals by sex and five-year age groups. Finally, interview and blood weight normalization factors were applied so that the final sum of weights matches the number of respondents. Weights used in the analyses presented in this report are described in Appendix A. For a more detailed explanation of the sampling and weighting processes, see the Sampling and Weighting Technical Report, available on the PHIA website at https://phia-data.icap.columbia.edu/.

Descriptive analyses of RRs, characteristics of respondents, HIV prevalence, HIV testing, self-reported HIV status, self-reported ART, VLS, PMTCT indicators, and sexual behavior were conducted using SAS 9.4.

HIV incidence estimates were based on the number of HIV infections identified as recent with the HIV-1 LAg Avidity plus VL and ARV detection algorithm, and obtained using the formula recommended by the World Health Organization (WHO) Incidence Working Group and Consortium for Evaluation and Performance of Incidence Assays, and with assay performance characteristics of a mean duration of recent infection (MDRI) = 130 days (95% confidence interval [CI]: 118, 142), a time cutoff (T) = 1.0 year, and proportion false recent (PFR) = 0.00.

Unless otherwise noted, claims of statistically significant comparisons in the report were based upon non-overlapping 95% CIs (the CIs shown in the narrative are in the final release data set available on the PHIA website).

Where applicable, the UNAIDS and PEPFAR indicators corresponding to a given table are specified at the end of the table. The UNAIDS Global Monitoring indicators refer to the 2020 release of the indicators, available at: https://www.unaids.org/sites/default/files/media_asset/global-aids-monitoring_en.pdf and the PEPFAR indicators are available at: https://www.state.gov/wp-content/uploads/2019/10/PEPFAR-MER-Indicator-Reference-Guide-Version-2.4-FY20.pdf.

2.7 RESPONSE RATES

Household RRs were calculated using the American Association for Public Opinion Research Response Rate 4 method (AAPOR, 2016) as the number of complete and incomplete HH interviews among all eligible HHs and those estimated to be eligible among those with unknown eligibility (HHs not located, not attempted, or unreachable). Vacant and destroyed HHs, not residential units, and HH units with no eligible respondents were considered not eligible and excluded from the calculation.

Individual interview RRs were calculated as the number of individuals who were interviewed divided by the number of individuals eligible to participate in the survey. Blood draw RRs were calculated as the number of individuals who provided blood divided by the number of individuals who were interviewed.

Of the 11,843 selected HHs, 11,339 and 11,219 were occupied and interviewed, respectively. The overall HH RR (unweighted) was 98.9%. After adjusting for differential sampling probabilities and nonresponse, the overall weighted HH RR was 99.1% (Table 2.7.A).

A total of 31,028 adults (14,025 men and 17,003 women) were eligible to participate in the survey. A total of 30,715 adults participated in the individual interview: Interview RRs (unweighted) were 98.5% for men and 99.4% for women. Among those adults who were interviewed, 99.7% of men and 99.8% of women also had their blood drawn (unweighted) (Table 2.7.B).

A total of 8,655 young adolescents aged 10-14 years were eligible to participate in the survey. A total of 8,613 young adolescents participated in the individual interview (unweighted interview RRs: 99.5%). Among young adolescents who were interviewed, 99.9% also had their blood drawn (unweighted) (Table 2.7.B).

Table 2.7.A Household response rates

Number of households selected, occupied, and interviewed and household response rates (unweighted and weighted), by residence, RPHIA 2018-2019

	Residence		Total
Result	Urban	Rural	
Household interviews			
Households selected	3,062	8,781	11,843
Households occupied	2,955	8,384	11,339
Households interviewed	2,875	8,344	11,219
Household response rate[1] (unweighted)	97.2	99.5	98.9
Household response rate[1] (weighted)	97.6	99.5	99.1

[1]Household response rate was calculated using the American Association for Public Opinion Research (AAPOR) Response Rate 4 (RR4) method: http://www.aapor.org/AAPOR_Main/media/publications/Standard-Definitions20169theditionfinal.pdf

Table 2.7.B Interview and blood draw response rates

Number of eligible individuals and response rates for individual interviews[1] and blood draws[2] (unweighted and weighted), by residence and sex, RPHIA 2018-2019

	Residence						
	Urban		Rural		Total		
Result	Male	Female	Male	Female	Male	Female	Total
Eligible individuals, ages 10-14 years							
Number of eligible individuals	646	612	3,686	3,711	4,332	4,323	8,655
Interview response rate (unweighted)	98.9	99.2	99.5	99.7	99.4	99.7	99.5
Interview response rate (weighted)	99.1	99.2	99.5	99.7	99.4	99.7	99.6
Blood draw response rate (unweighted)	99.7	99.5	100.0	99.9	99.9	99.9	99.9
Blood draw response rate (weighted)	99.8	99.6	100.0	99.9	99.9	99.9	99.9
Eligible individuals, ages 15-19 years							
Number of eligible individuals	545	778	2,554	2,590	3,099	3,368	6,467
Interview response rate (unweighted)	98.9	99.5	99.2	99.4	99.1	99.4	99.3
Interview response rate (weighted)	98.9	99.4	99.1	99.4	99.1	99.4	99.2
Blood draw response rate (unweighted)	99.8	99.9	100.0	100.0	100.0	99.9	100.0
Blood draw response rate (weighted)	99.9	99.9	100.0	100.0	100.0	100.0	100.0

Table 2.7.B Interview and blood draws response rate (continued)

Number of eligible individuals and response rates for individual interviews[1] and blood draws[2] (unweighted and weighted), by residence and sex, RPHIA 2018-2019

	Residence						
	Urban		Rural		Total		
Result	Male	Female	Male	Female	Male	Female	Total
Eligible individuals, ages 10-19 years							
Number of eligible individuals	1,191	1,390	6,240	6,301	7,431	7,691	15,122
Interview response rate (unweighted)	98.9	99.4	99.3	99.6	99.3	99.6	99.4
Interview response rate (weighted)	99.0	99.3	99.3	99.6	99.3	99.6	99.4
Blood draw response rate (unweighted)	99.7	99.7	100.0	100.0	99.9	99.9	99.9
Blood draw response rate (weighted)	99.8	99.8	100.0	100.0	100.0	99.9	99.9
Eligible individuals, ages 15-24 years							
Number of eligible individuals	1,302	1,637	4,060	4,483	5,362	6,120	11,482
Interview response rate (unweighted)	98.3	99.0	99.0	99.4	98.8	99.3	99.1
Interview response rate (weighted)	98.6	99.0	98.9	99.5	98.8	99.4	99.1
Blood draw response rate (unweighted)	99.3	99.8	100.0	99.9	99.8	99.9	99.8
Blood draw response rate (weighted)	99.4	99.8	100.0	99.9	99.9	99.9	99.9
Eligible individuals, ages 15-49 years							
Number of eligible individuals	3,452	3,836	8,943	10,957	12,395	14,793	27,188
Interview response rate (unweighted)	97.2	98.8	98.9	99.5	98.5	99.3	98.9
Interview response rate (weighted)	97.7	99.0	99.0	99.5	98.7	99.4	99.1
Blood draw response rate (unweighted)	98.9	99.3	100.0	99.9	99.7	99.8	99.7
Blood draw response rate (weighted)	99.0	99.4	100.0	99.9	99.8	99.8	99.8
Eligible individuals, ages 15-64 years							
Number of eligible individuals	3,711	4,140	10,314	12,863	14,025	17,003	31,028
Interview response rate (unweighted)	97.2	98.8	99.0	99.5	98.5	99.4	99.0
Interview response rate (weighted)	97.6	98.9	99.0	99.6	98.7	99.4	99.1
Blood draw response rate (unweighted)	99.0	99.3	100.0	99.9	99.7	99.8	99.7
Blood draw response rate (weighted)	99.1	99.4	100.0	99.9	99.8	99.8	99.8
Overall response rate (unweighted)[3]	93.5	95.4	98.5	99.0	97.2	98.1	97.7

[1]Interview response rate = number of individuals interviewed/number of eligible individuals
[2]Blood draw response rate = number of individuals who provided blood/number of individuals interviewed
[3]Overall response rate = household response rate × interview response rate × blood draw response rate.

2.8 REFERENCES

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2. American Association for Public Opinion Research (AAPOR). Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys. 9th edition. AAPOR; 2016. http://www.aapor.org/AAPOR_Main/media/publications/Standard-Definitions20169theditionfinal.pdf. Accessed on 23 October 2019.

3. SURVEY HOUSEHOLD CHARACTERISTICS

3.1 BACKGROUND

This chapter presents data on the characteristics of HHs surveyed in RPHIA. HH composition is described in terms of sex of the head of HH, as well as the size of the HH. The age structure of the de facto HH population (i.e., persons who slept in the HH the night before) is described by sex as well as urban/rural residence. This chapter also describes the prevalence and composition of HHs impacted by HIV, which are HHs with one or more HIV-positive members.

3.2 RESULTS

The following tables and figures describe the HH characteristics in RPHIA.

Table 3.A Household composition

Percent distribution of households by sex of head of household; median (Q1, Q3) size of household; and median (Q1, Q3) number of children under 18 years of age, by residence, RPHIA 2018-19

	Residence					
	Urban		Rural		Total	
Characteristic	Percent	Number	Percent	Number	Percent	Number
Head of household						
Male	66.3	1,925	67.1	5,621	66.9	7,546
Female	33.7	950	32.9	2,723	33.1	3,673
Total	100.0	2,875	100.0	8,344	100.0	11,219

	Residence					
	Urban		Rural		Total	
Characteristic	Median	Q1, Q3	Median	Q1, Q3	Median	Q1, Q3
Size of households	4	(2, 6)	5	(4, 7)	5	(3, 7)
Number of children under 18 years of age	1	(0, 3)	2	(1, 4)	2	(1, 3)

Weighted figures calculated using final household weights (hhwt0).

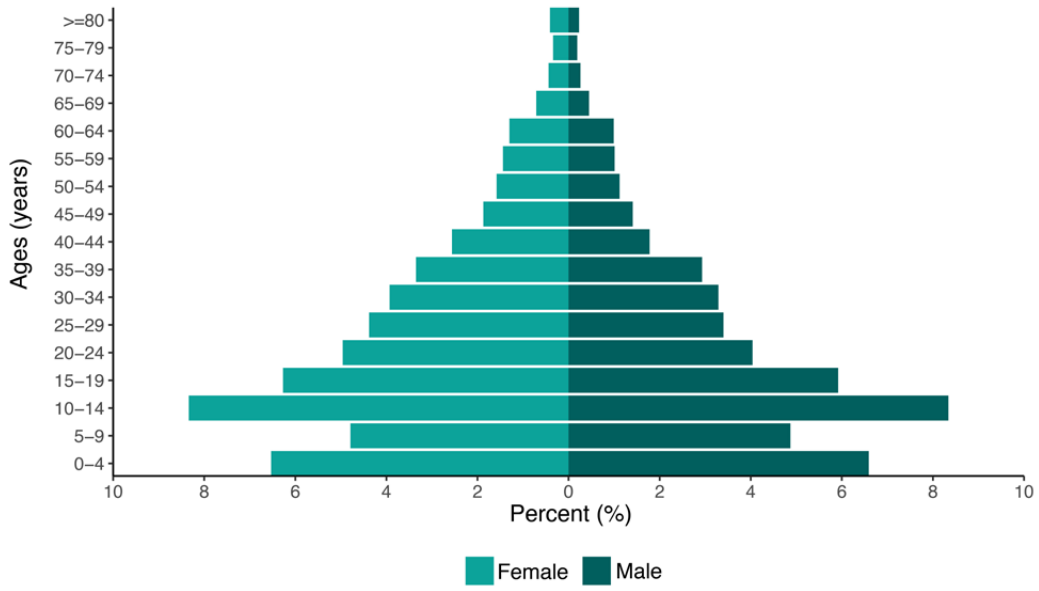


Figure 3.A
Distribution of the de facto population by sex and age, RPHIA 2018-2019

Table 3.B Distribution of de facto household population

Percent distribution of the de facto household population, by five-year age groups and sex, RPHIA 2018-2019

	Male		Fenale		Total	
Age	Percent	Number	Percent	Number	Percent	Number
0-4	6.6	3,520	6.5	3,493	13.1	7,013
5-9	4.9	2,610	4.8	2,555	9.7	5,165
10-14	8.3	4,333	8.3	4,323	16.7	8,656
15-19	5.9	3,099	6.3	3,369	12.2	6,468
20-24	4.0	2,264	5.0	2,753	9.0	5,017
25-29	3.4	1,912	4.4	2,421	7.8	4,333
30-34	3.3	1,829	3.9	2,142	7.2	3,971
35-39	2.9	1,596	3.4	1,784	6.3	3,380
40-44	1.8	971	2.6	1,352	4.3	2,323
45-49	1.4	725	1.9	974	3.3	1,699
50-54	1.1	602	1.6	818	2.7	1,420
55-59	1.0	520	1.4	732	2.5	1,252
60-64	1.0	510	1.3	660	2.3	1,170
65-69	0.4	234	0.7	359	1.2	593
70-74	0.3	131	0.4	225	0.7	356
75-79	0.2	95	0.3	176	0.5	271
≥80	0.2	118	0.4	214	0.6	332
Total	46.8	25,069	53.2	28,350	100.0	53,419

Weighted figures calculated using final household weights (hhwt0).

Figure 3.B
Household population by age, sex, and residence, RPHIA 2018-2019

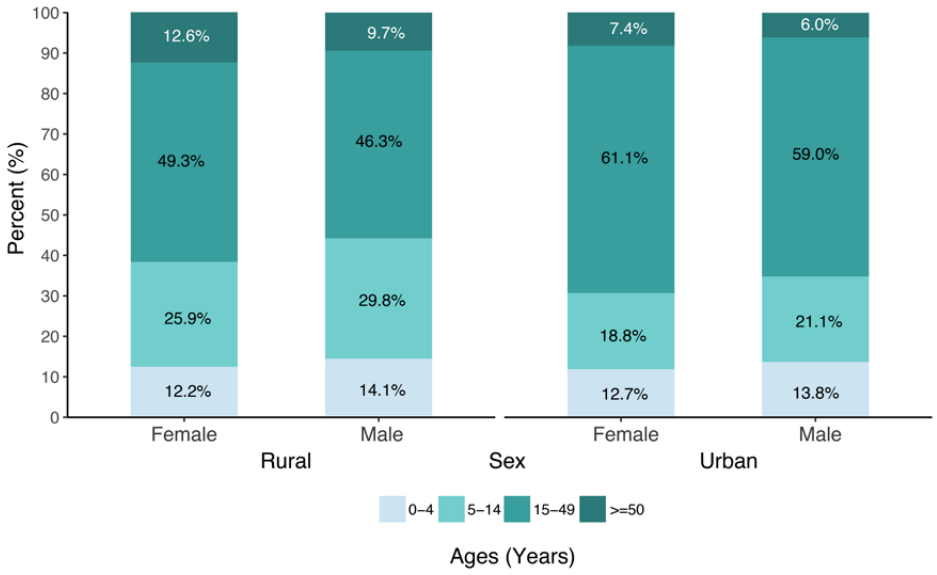


Table 3.C De facto household population by age, sex, and residence

Percent distribution of the household population, by age, sex, and residence, RPHIA 2018-2019

	Urban						Rural					
	Male		Female		Total		Male		Female		Total	
Age	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number
0-4	13.8	778	12.7	775	13.2	1,553	14.1	2,742	12.2	2,718	13.1	5,460
5-9	9.1	516	8.5	525	8.8	1,041	10.7	2,094	9.1	2,030	9.8	4,124
10-14	12.0	646	10.3	612	11.1	1,258	19.1	3,687	16.8	3,711	17.9	7,398
15-24	22.5	1,302	25.9	1,638	24.3	2,940	21.0	4,061	20.1	4,484	20.5	8,545
25-34	21.5	1,273	21.1	1,331	21.3	2,604	12.7	2,468	14.5	3,232	13.7	5,700
35-49	15.0	877	14.0	868	14.5	1,745	12.6	2,415	14.7	3,242	13.8	5,657
≥50	6.0	330	7.4	430	6.7	760	9.7	1,880	12.6	2,754	11.3	4,634
15-49	59.0	3,452	61.1	3,837	60.1	7,289	46.3	8,944	49.3	10,958	47.9	19,902
15-64	63.7	3,713	66.3	4,141	65.1	7,854	53.5	10,315	58.0	12,864	55.9	23,179
Total	100.0	5,722	100.0	6,179	100.0	11,901	100.0	19,347	100.0	22,171	100.0	41,518

Weighted figures calculated using final household weights (hhwt0).

Table 3.D Prevalence of HIV-affected households

Percentage of households with at least one HIV-positive household member, by residence, RPHIA 2018-2019

Residence	Percent	Number
Urban	10.8	2,840
Rural	5.8	8,209
Total	6.8	11,049

Weighted figures calculated using final household weights (hhwt0).

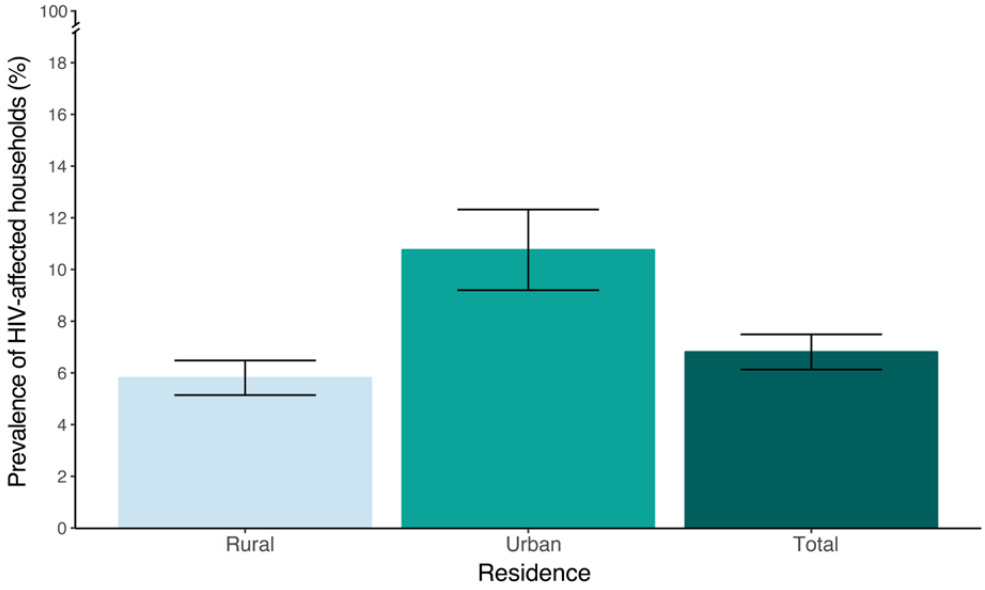


Figure 3.C
Prevalence of HIV-affected households by residence, RPHIA 2018-2019

Table 3.E HIV-affected households by number of HIV-positive members

Among households with at least one HIV-positive household member, percent distribution of households by number of HIV-positive household members, by residence, RPHIA 2018-2019

	Residence					
	Urban		Rural		Total	
Number of HIV-positive household members	Percent	Number	Percent	Number	Percent	Number
1	78.8	240	78.3	368	78.5	608
2	16.1	45	17.9	89	17.3	134
3	3.6	9	3.1	13	3.3	22
4	1.0	2	0.6	3	0.7	5
≥5	0.5	1	0.0	0	0.2	1
Total	100.0	297	100.0	473	100.0	770

Weighted figures calculated using final household weights (hhwt0).

Figure 3.D
HIV-affected households by number of HIV-positive members and residence, RPHIA 2018-2019

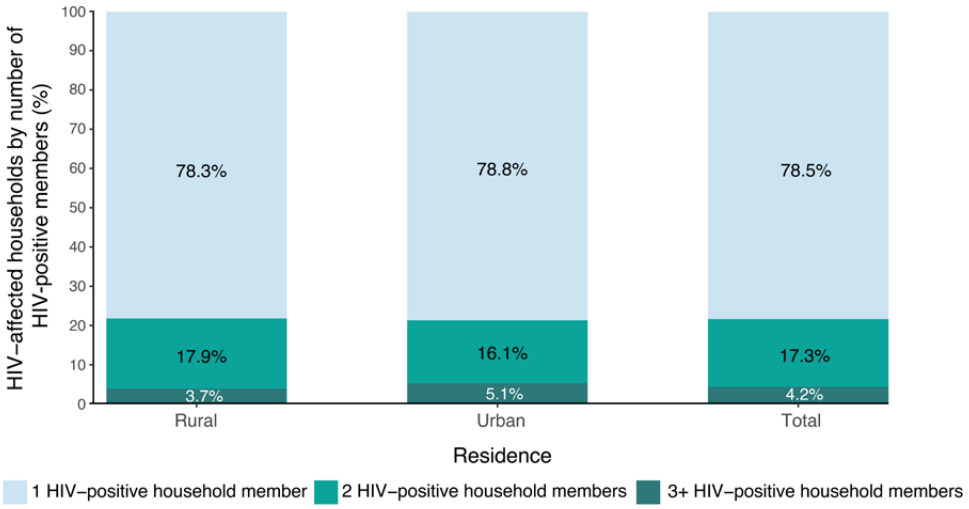


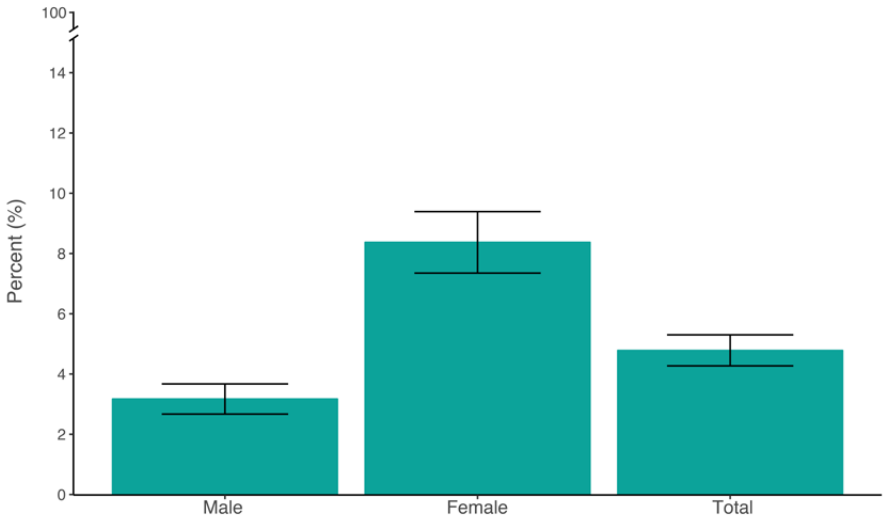
Table 3.F Prevalence of households with an HIV-positive head of household

Percentage of households with an HIV-positive head of household, by sex of head of household, RPHIA 2018-2019

Sex of head of household	Percent	Number
Male	3.2	6,616
Female	8.4	2,959
Total	4.8	9,575

Weighted figures calculated using final blood test weights (btwt0).

Figure 3.E
Prevalence of households with an HIV-positive head of household by sex, RPHIA 2018-2019



4. SURVEY RESPONDENT CHARACTERISTICS

4.1 BACKGROUND

RPHIA assessed key indicators and outcomes for children (those aged 10-14 years), and adults (defined as those aged 15-64 years). To provide context for these outcomes, this chapter summarizes the basic demographic and socioeconomic characteristics of survey respondents. Most key indicators in this report are stratified according to these characteristics.

4.2 RESULTS

The following tables present the demographic characteristics of RPHIA's respondents.

Table 4.A Demographic characteristics of the adult population

Percent distribution of the population aged 15-64 years, by sex and selected demographic characteristics, RPHIA 2018-2019

	Male		Female		Total	
Characteristic	Percent	Number	Percent	Number	Percent	Number
Residence						
Urban	21.3	3,607	19.5	4,090	20.3	7,697
Rural	78.7	10,214	80.5	12,804	79.7	23,018
Province						
City of Kigali	12.9	2,787	10.9	3,010	11.9	5,797
South	24.5	2,713	25.3	3,417	24.9	6,130
West	24.2	3,226	26.1	4,253	25.1	7,479
North	14.7	2,588	15.5	3,326	15.1	5,914
East	23.7	2,507	22.2	2,888	22.9	5,395
Marital status						
Never married	45.4	6,635	35.4	6,365	40.2	13,000
Married or living together	51.3	6,753	49.1	8,026	50.1	14,779
Divorced or separated	2.8	353	8.3	1,331	5.7	1,684
Widowed	0.6	74	7.2	1,162	4.0	1,236
Education						
No education or nursery	7.9	1,004	11.7	1,868	9.9	2,872
Primary	62.6	8,436	60.6	9,938	61.6	18,374
Secondary	24.5	3,575	24.6	4,409	24.5	7,984
More than secondary	5.0	801	3.2	663	4.0	1,464
Wealth quintile						
Lowest	17.1	2,166	20.2	3,126	18.8	5,292
Second	18.5	2,396	19.8	3,168	19.2	5,564
Middle	20.1	2,636	19.8	3,169	20.0	5,805
Fourth	21.5	2,866	20.1	3,235	20.8	6,101
Highest	22.7	3,744	20.0	4,189	21.3	7,933

Table 4.A Demographic characteristics of the adult population (continued)

Percent distribution of the population aged 15-64 years, by sex and selected demographic characteristics, RPHIA 2018-2019

	Male		Female		Total	
Characteristic	Percent	Number	Percent	Number	Percent	Number
Age						
15-19	19.1	3,072	18.1	3,349	18.5	6,421
20-24	16.3	2,226	15.6	2,729	15.9	4,955
25-29	14.7	1,874	14.5	2,404	14.6	4,278
30-34	13.6	1,788	13.0	2,130	13.3	3,918
35-39	11.3	1,573	11.1	1,773	11.2	3,346
40-44	7.3	957	7.9	1,344	7.7	2,301
45-49	5.6	716	6.2	965	5.9	1,681
50-54	4.5	595	5.0	813	4.8	1,408
55-59	4.3	516	4.9	728	4.6	1,244
60-64	3.1	504	3.7	659	3.4	1,163
Total 15-24	35.4	5,298	33.7	6,078	34.5	11,376
Total 15-49	88.0	12,206	86.4	14,694	87.2	26,900
Total 15-64	100.0	13,821	100.0	16,894	100.0	30,715

Note: Education categories refer to the highest level of education attended, whether or not that level was completed.
Weighted figures calculated using final interview weights (intwt0).
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.

Table 4.B Demographic characteristics of the young adolescent population

Percent distribution of the young adolescent population aged 10-14 years, by sex and selected demographic characteristics, RPHIA 2018-2019

	Male		Female		Total	
Characteristic	Percent	Number	Percent	Number	Percent	Number
Residence						
Urban	12.2	639	11.5	607	11.8	1,246
Rural	87.8	3,666	88.5	3,701	88.2	7,367
Province						
City of Kigali	6.4	465	5.8	431	6.1	896
South	25.6	909	26.1	928	25.8	1,837
West	29.0	1,243	27.8	1,197	28.4	2,440
North	15.5	881	16.3	930	15.9	1,811
East	23.5	807	23.9	822	23.7	1,629
Education						
Currently attending primary school	94.7	4,068	95.7	4,110	95.2	8,178
Currently attending secondary school	0.8	34	1.1	49	1.0	83
Not currently attending school	4.5	193	3.2	141	3.8	334
Total 10-14	100.0	4,305	100.0	4,308	100.0	8,613

Weighted figures calculated using final interview weights (intwt0).
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.

5. HIV INCIDENCE

5.1 BACKGROUND

HIV incidence, the measure of new HIV infections in a population over time, provides important information on the status of the HIV epidemic. It can be used for effective targeted HIV prevention planning in groups that are most vulnerable to recent infection and to measure impact of HIV prevention programs. This chapter presents annual estimates of HIV incidence among adults (defined as the population aged 15-64 years in this survey) at the national level. For the purposes of this analysis, HIV incidence is expressed as the cumulative incidence or risk of new infections in a 12-month period, which is a close approximation to the instantaneous incidence rate. Although RPHIA was powered to estimate incidence in Kigali City, the survey was not powered to estimate incidence at the provincial level or across different sub-groups.

A laboratory-based incidence testing algorithm (HIV-1 LAg avidity plus VL and ARV detection) was used to distinguish recent from long-term infection, and incidence estimates were obtained from the formula recommended by the WHO Incidence Working Group and Consortium for Evaluation and Performance of Incidence Assays, and with assay performance characteristics of a MDRI=130 days (95% CI: 118, 142), with T=1.0 year and residual PFR=0.00. Survey weights are utilized for all estimates. All HIV-positive participants aged 15-64 years were tested for recent infection using HIV-1 LAg avidity assay.

Incidence estimation is based on recent/long-term classification using algorithm with LAg avidity1,2,3 that uses VL testing to exclude specimens with low VL and limit misclassification of persons as recent infections who are elite controllers or on effective ART, and then uses ARV detection to exclude specimens with high VL and limit misclassification as recent infections of persons who are on ART but have DR or poor treatment adherence.

5.2 RESULTS

These tables report HIV incidence in Rwanda at the time of the RPHIA survey.

Table 5.A Annual HIV incidence using the limiting antigen (LAg), viral load (VL), and antiretroviral (ARV) biomarker testing algorithm

Annual incidence of HIV among adults aged 15-49 years by sex, and among adults aged 15-64 years by residence (urban and rural), within the City of Kigali and by sex, using LAg+VL+ARVs algorithm, RPHIA 2018-2019

	Male		Female		Total	
Characteristic	Percentage annual incidence[1]	95% CI	Percentage annual incidence[1]	95% CI	Percentage annual incidence[1]	95% CI
Residence[2]						
Urban	0.07	0.00-0.21	0.18	0.00-0.46	0.12	0.00-0.27
Rural	0.09	0.00-0.20	0.05	0.00-0.12	0.07	0.01-0.13
City of Kigali[2]	0.11	0.00-0.33	0.11	0.00-0.32	0.11	0.00-0.26
Age						
15-49	0.10	0.00-0.20	0.06	0.00-0.13	0.08	0.02-0.14
15-64	0.09	0.00-0.17	0.07	0.00-0.15	0.08	0.02-0.14

[1]Relates to Global AIDS Monitoring 2020 Indicator 3.1: HIV incidence.
[2]Residence and province figures are among adults aged 15-64 years.
Weighted figures calculated using final blood test weights (btwt0).

Table 5.B People living with HIV and number of new HIV infections per year incorporating viral load and antiretroviral (ARV) detection into the recent infection algorithm

People living with HIV and number of new HIV infections per year, by age, using LAg+VL+ARVs recent infection algorithm, RPHIA 2018-2019				
Age	People living with HIV	95% CI	Number of new infections per year	95% CI
10-14	5,900	3,500-8,300	NA	NA
15-24	20,800	16,100-25,600	1,300	0-3,300
25-34	48,100	39,200-57,000	2,700	0-5,500
35-49	88,700	75,700-101,700	700	0-2,000
15-49	157,700	137,800-177,500	4,700	900-8,400
15-64	210,200	186,400-234,000	5,400	1,400-9,400

Weighted figures calculated using final blood test weights (btwt0) and 2018 population projections by age using the medium scenario, available at http://www.statistics.gov.rw/publication/rphc4-population-projections.

5.3 REFERENCES

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6. HIV PREVALENCE

6.1 BACKGROUND

This chapter presents representative estimates of HIV prevalence among people aged 15-64 years at the national and provincial level by selected demographic and behavioral characteristics. It also presents estimates of the number of people living with HIV in Rwanda. HIV testing was conducted in each HH using a serological rapid diagnostic testing algorithm based on Rwanda's national guidelines, with laboratory confirmation of seropositive samples using a supplemental assay.

Appendix B describes the RPHIA HIV testing methodology.

6.2 RESULTS

The following tables and figures report HIV prevalence data in Rwanda at the time of the RPHIA survey.

Table 6.A HIV prevalence by demographic characteristics: Ages 15-64 years

Prevalence of HIV among persons aged 15-64 years, by sex and selected demographic characteristics, RPHIA 2018-2019						
	Male		Female		Total	
Characteristic	Percentage HIV positive	Number	Percentage HIV positive	Number	Percentage HIV positive	Number
Residence						
Urban	3.2	3,570	6.5	4,061	4.8	7,631
Rural	2.0	10,210	3.0	12,796	2.5	23,006
Province						
City of Kigali	3.0	2,752	5.7	2,982	4.3	5,734
South	2.3	2,712	3.4	3,414	2.9	6,126
West	2.4	3,225	3.6	4,251	3.0	7,476
North	1.5	2,586	2.8	3,323	2.2	5,909
East	2.0	2,505	3.9	2,887	2.9	5,392
Marital status						
Never married	0.9	6,610	2.0	6,349	1.4	12,959
Married or living together	3.0	6,740	3.0	8,008	3.0	14,748
Divorced or separated	7.5	351	8.0	1,328	7.9	1,679
Widowed	10.8	73	12.0	1,162	11.9	1,235
Education						
No education	4.3	1,004	6.0	1,865	5.4	2,869
Primary	2.3	8,431	3.9	9,931	3.2	18,362
Secondary	1.5	3,558	2.3	4,397	1.9	7,955
More than secondary	1.1	782	2.2	648	1.5	1,430

Table 6.A HIV prevalence by demographic characteristics: Ages 15-64 years (continnued)

Prevalence of HIV among persons aged 15-64 years, by sex and selected demographic characteristics, RPHIA 2018-2019

Characteristic	Male		Female		Total	
	Percentage HIV positive	Number	Percentage HIV positive	Number	Percentage HIV positive	Number
Wealth quintile						
Lowest	2.2	2,166	3.1	3,123	2.7	5,289
Second	1.6	2,396	2.8	3,166	2.3	5,562
Middle	2.3	2,635	3.2	3,169	2.8	5,804
Fourth	2.4	2,864	4.7	3,230	3.6	6,094
Highest	2.5	3,707	4.7	4,162	3.6	7,869
Pregnancy status						
Currently pregnant	NA	NA	2.3	979	NA	NA
Not currently pregnant	NA	NA	3.8	15,729	NA	NA
Total 15-64	2.2	13,780	3.7	16,857	3.0	30,637

Weighted figures calculated using final blood test weights (btwt0).
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.

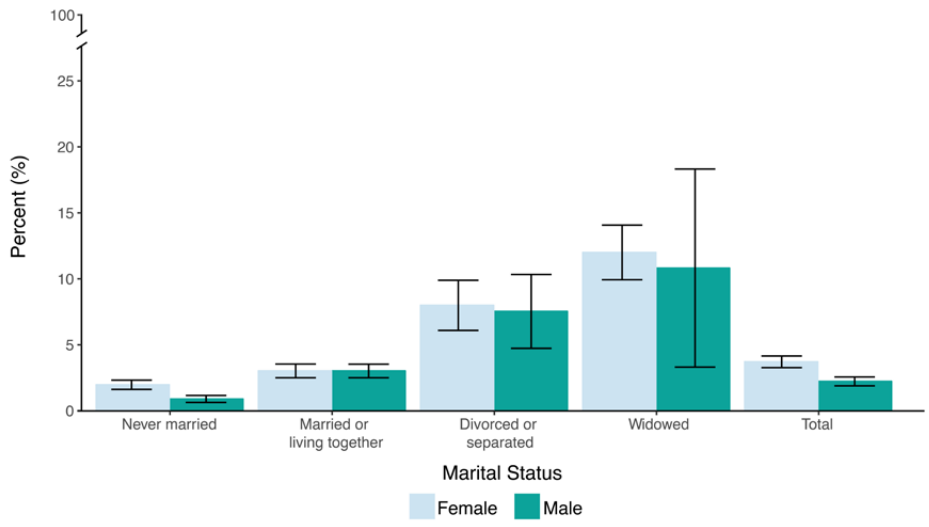


Figure 6.A
HIV prevalence by marital status: Ages 15-64 years, RPHIA 2018-2019

Table 6.B HIV prevalence by demographic characteristics: Ages 15-49 years

Prevalence of HIV among persons aged 15-49 years, by sex and selected demographic characteristics, RPHIA 2018-2019

Characteristic	Male		Female		Total	
	Percentage HIV positive	Number	Percentage HIV positive	Number	Percentage HIV positive	Number
Residence						
Urban	2.5	3,320	5.8	3,763	4.1	7,083
Rural	1.5	8,847	2.7	10,896	2.1	19,743
Province						
City of Kigali	2.6	2,555	4.9	2,786	3.7	5,341
South	1.7	2,333	2.8	2,807	2.3	5,140
West	1.9	2,845	3.6	3,713	2.8	6,558
North	1.1	2,236	2.4	2,856	1.8	5,092
East	1.6	2,198	3.4	2,497	2.5	4,695
Marital status						
Never married	0.9	6,582	1.9	6,282	1.3	12,864
Married or living together	2.4	5,260	3.0	6,882	2.7	12,142
Divorced or separated	7.0	293	8.6	1,119	8.3	1,412
Widowed	(17.3)	27	15.9	368	16.0	395
Education						
No education	3.8	698	6.8	1,082	5.5	1,780
Primary	1.9	7,332	3.6	8,678	2.7	16,010
Secondary	1.2	3,395	2.0	4,263	1.6	7,658
More than secondary	1.1	739	1.7	624	1.3	1,363
Wealth quintile						
Lowest	2.0	1,878	2.8	2,638	2.4	4,516
Second	1.2	2,048	2.5	2,648	1.9	4,696
Middle	1.9	2,278	3.2	2,705	2.6	4,983
Fourth	1.7	2,508	4.0	2,788	2.9	5,296
Highest	2.0	3,443	4.1	3,873	3.0	7,316
Pregnancy status						
Currently pregnant	NA	NA	2.2	974	NA	NA
Not currently pregnant	NA	NA	3.4	13,537	NA	NA
Total 15-49	1.8	12,167	3.3	14,659	2.6	26,826

Weighted figures calculated using final blood test weights (btwt0).
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

Table 6.C HIV prevalence by age and sex

Prevalence of HIV among persons aged 10-64 years, by sex and age, RPHIA 2018-2019

Age	Male		Female		Total	
	Percentage HIV positive	Number	Percentage HIV positive	Number	Percentage HIV positive	Number
10-14	0.3	4,302	0.5	4,303	0.4	8,605
15-19	0.4	3,071	0.8	3,347	0.6	6,418
20-24	0.6	2,217	1.8	2,723	1.2	4,940
25-29	1.3	1,869	3.4	2,394	2.4	4,263
30-34	1.4	1,777	3.7	2,120	2.6	3,897
35-39	2.9	1,567	4.5	1,770	3.7	3,337
40-44	4.9	950	7.1	1,342	6.1	2,292
45-49	5.6	716	7.0	963	6.4	1,679
50-54	6.3	594	7.4	812	6.9	1,406
55-59	6.5	516	5.9	728	6.2	1,244
60-64	3.3	503	4.4	658	3.9	1,161
Total 15-24	0.5	5,288	1.2	6,070	0.9	11,358
Total 15-49	1.8	12,167	3.3	14,659	2.6	26,826
Total 15-64	2.2	13,780	3.7	16,857	3.0	30,637

Weighted figures calculated using final blood test weights (btwt0).

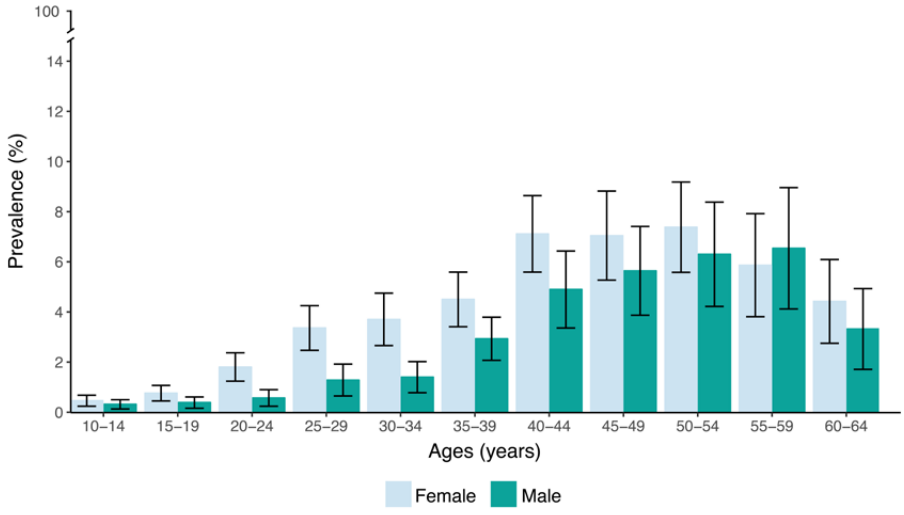


Figure 6.B
HIV prevalence by age and sex, RPHIA 2018-2019

Figure 6.C
HIV prevalence among adults, ages 15-64 years, by province, RPHIA 2018-2019

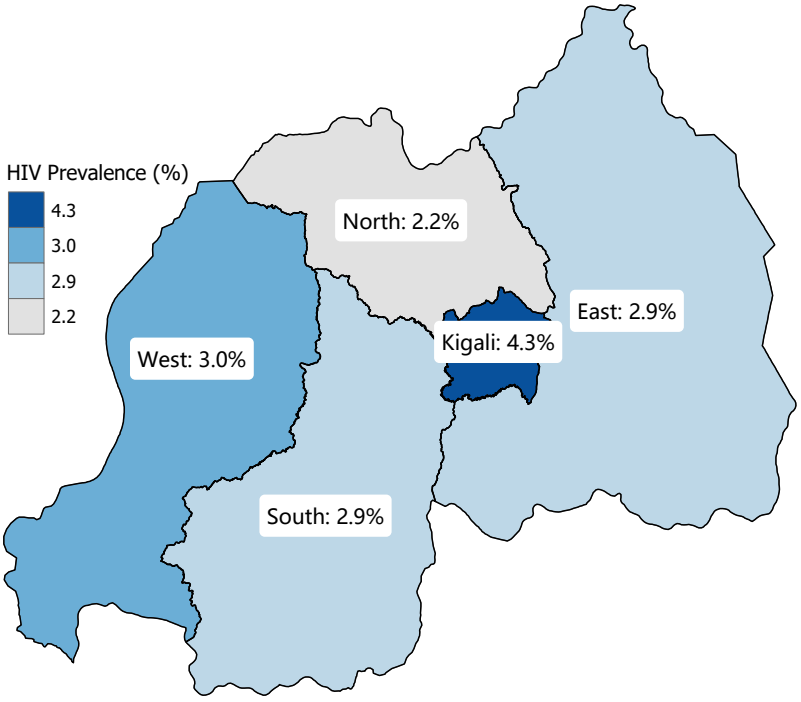
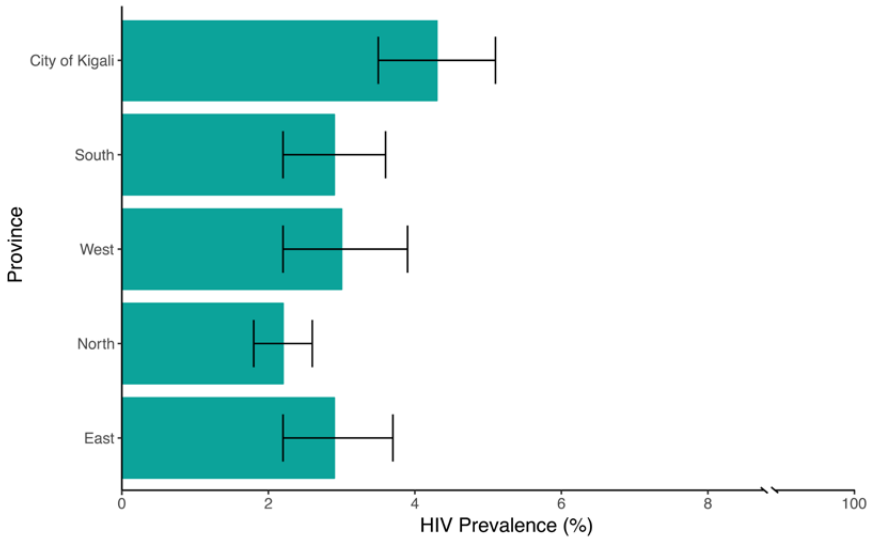


Figure 6.D
HIV prevalence among adults, ages 15-64 years, by province, RPHIA 2018-2019



7. SELF-REPORTED HIV TESTING

7.1 BACKGROUND

HIV testing is necessary for awareness of HIV status and is a critical component of HIV epidemic control targets. Awareness of HIV-positive status is the entry point into the HIV care and treatment cascade: Testing, linkage to care, initiating and retention on ART. Awareness of HIV status also helps with accessing prevention services including counseling for HIV-positive and HIV-negative individuals to reduce risk of HIV transmission or acquisition, and access to screening services for other comorbidities.

This section reports data on individuals aged 15-64 years, men and women, who reported ever receiving an HIV test and receiving the test results. Results on HIV testing in the last 12 months and receiving the test results are also presented to understand frequent or recent testing.

7.2 RESULTS

The following tables and figures show RPHIA's HIV testing results.

Table 7.A Self-reported HIV testing: Men

Percentage of men aged 15-64 years who, according to self-report, ever received HIV testing and received their test results, and percentage who received HIV testing and received their test results in the 12 months before the survey, by result of PHIA survey HIV test and selected demographic characteristics, RPHIA 2018-2019

Characteristic	Percentage who ever received HIV testing and received results	Percentage who received HIV testing in the 12 months before the survey and received results[1]	Number
Result of PHIA survey HIV test			
HIV positive	92.2	29.6	300
HIV negative	75.6	28.0	13,427
Not tested	(91.4)	(42.1)	41
Residence			
Urban	82.1	32.1	3,592
Rural	74.3	27.0	10,176
Province			
City of Kigali	84.2	31.2	2,776
South	74.9	29.2	2,700
West	73.7	28.6	3,221
North	78.2	25.3	2,579
East	73.6	26.5	2,492
Marital status			
Never married	55.7	21.4	6,610
Married or living together	93.3	33.5	6,725
Divorced or separated	88.1	36.9	353
Widowed	80.0	22.2	74

Table 7.A Self-reported HIV testing: Men (continued)

Percentage of men aged 15-64 years who, according to self-report, ever received HIV testing and received their test results, and percentage who received HIV testing and received their test results in the 12 months before the survey, by result of PHIA survey HIV test and selected demographic characteristics, RPHIA 2018-2019

Characteristic	Percentage who ever received HIV testing and received results	Percentage who received HIV testing in the 12 months before the survey and received results[1]	Number
Education			
No education	77.0	24.1	999
Primary	75.1	27.3	8,405
Secondary	75.1	29.3	3,559
More than secondary	90.1	38.2	800
Wealth quintile			
Lowest	72.8	26.8	2,156
Second	73.4	26.9	2,391
Middle	74.3	24.3	2,624
Fourth	75.1	29.0	2,855
Highest	82.7	32.6	3,729
Age			
15-19	33.9	12.0	3,062
20-24	69.4	28.7	2,214
25-29	88.3	39.2	1,870
30-34	93.9	38.9	1,785
35-39	95.6	32.6	1,566
40-44	95.0	33.5	954
45-49	90.4	26.6	712
50-54	87.8	23.1	592
55-59	77.7	20.0	514
60-64	69.7	15.2	499
Total 15-24	50.2	19.7	5,276
Total 15-49	75.5	29.2	12,163
Total 15-64	76.0	28.1	13,768

[1]Relates to PEPFAR Indicator HTS_TST: Number of individuals who received HIV Testing Services (HTS) and received their test results.
Weighted figures calculated using final interview weights (intwt0).
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

Table 7.B Self-reported HIV testing: Women

Percentage of women aged 15-64 years who, according to self-report, ever received HIV testing and received their test results, and percentage who received HIV testing and received their test results in the 12 months before the survey, by result of survey HIV test and selected demographic characteristics, RPHIA 2018-2019

Characteristic	Percentage who ever received HIV testing and received results	Percentage who received HIV testing in the 12 months before the survey and received results[1]	Number
Result of PHIA survey HIV test			
HIV positive	93.3	28.3	629
HIV negative	77.1	28.2	16,185
Not tested	(92.5)	(51.6)	37
Residence			
Urban	81.7	34.4	4,075
Rural	76.7	26.7	12,776
Province			
City of Kigali	83.3	33.9	2,998
South	77.9	29.9	3,406
West	74.5	27.0	4,245
North	77.8	24.2	3,321
East	78.4	27.7	2,881
Marital status			
Never married	53.2	21.8	6,340
Married or living together	94.2	34.2	8,013
Divorced or separated	90.5	30.7	1,330
Widowed	70.3	16.2	1,158
Education			
No education	77.0	22.5	1,860
Primary	79.6	27.5	9,919
Secondary	71.3	30.3	4,396
More than secondary	94.2	46.8	660
Wealth quintile			
Lowest	75.7	27.4	3,120
Second	75.7	26.5	3,163
Middle	77.1	24.6	3,160
Fourth	79.0	28.8	3,228
Highest	80.9	33.7	4,173

Table 7.B Self-reported HIV testing: Women (continued)

Percentage of women aged 15-64 years who, according to self-report, ever received HIV testing and received their test results, and percentage who received HIV testing and received their test results in the 12 months before the survey, by result of survey HIV test and selected demographic characteristics, RPHIA 2018-2019

Characteristic	Percentage who ever received HIV testing and received results	Percentage who received HIV testing in the 12 months before the survey and received results[1]	Number
Age			
15-19	31.5	13.0	3,338
20-24	80.9	38.3	2,720
25-29	94.6	41.7	2,400
30-34	97.3	38.2	2,127
35-39	97.5	32.7	1,771
40-44	93.2	25.1	1,342
45-49	89.5	21.8	964
50-54	78.9	17.9	808
55-59	68.6	13.5	726
60-64	51.9	9.4	655
Total 15-24	54.4	24.7	6,058
Total 15-49	79.2	30.5	14,662
Total 15-64	77.7	28.2	16,851

[1]Relates to PEPFAR Indicator HTS_TST: Number of individuals who received HIV Testing Services (HTS) and received their test results.
Weighted figures calculated using final interview weights (intwt0).
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

Table 7.C Self-reported HIV testing: Total

Percentage of persons aged 15-64 years who, according to self-report, ever received HIV testing and received their test results, and percentage who received HIV testing and received their test results in the 12 months before the survey, by result of PHIA survey HIV test and selected demographic characteristics, RPHIA 2018-2019

Characteristic	Percentage who ever received HIV testing and received results	Percentage who received HIV testing in the 12 months before the survey and received results[1]	Number
Result of PHIA survey HIV test			
HIV positive	92.9	28.8	929
HIV negative	76.3	28.1	29,612
Not tested	91.9	46.4	78
Residence			
Urban	81.9	33.2	7,667
Rural	75.6	26.9	22,952

Table 7.C Self-reported HIV testing: Total (continued)

Percentage of persons aged 15-64 years who, according to self-report, ever received HIV testing and received their test results, and percentage who received HIV testing and received their test results in the 12 months before the survey, by result of PHIA survey HIV test and selected demographic characteristics, RPHIA 2018-2019

Characteristic	Percentage who ever received HIV testing and received results	Percentage who received HIV testing in the 12 months before the survey and received results[1]	Number
Province			
City of Kigali	83.8	32.5	5,774
South	76.5	29.6	6,106
West	74.1	27.8	7,466
North	78.0	24.7	5,900
East	76.0	27.1	5,373
Marital status			
Never married	54.6	21.6	12,950
Married or living together	93.7	33.9	14,738
Divorced or separated	89.9	32.2	1,683
Widowed	71.0	16.6	1,232
Education			
No education	77.0	23.1	2,859
Primary	77.4	27.4	18,324
Secondary	73.1	29.8	7,955
More than secondary	91.8	41.7	1,460
Wealth quintile			
Lowest	74.4	27.1	5,276
Second	74.6	26.7	5,554
Middle	75.7	24.5	5,784
Fourth	77.1	28.9	6,083
Highest	81.8	33.2	7,902
Age			
15-19	32.7	12.6	6,400
20-24	75.3	33.6	4,934
25-29	91.5	40.5	4,270
30-34	95.6	38.5	3,912
35-39	96.6	32.7	3,337
40-44	94.1	29.0	2,296
45-49	89.9	24.0	1,676
50-54	82.9	20.3	1,400
55-59	72.7	16.4	1,240
60-64	59.7	12.0	1,154
Total 15-24	52.4	22.3	11,334
Total 15-49	77.4	29.8	26,825
Total 15-64	76.9	28.2	30,619

[1]Relates to PEPFAR Indicator HTS_TST: Number of individuals who received HIV Testing Services (HTS) and received their test results.
Weighted figures calculated using final interview weights (intwt0).
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.

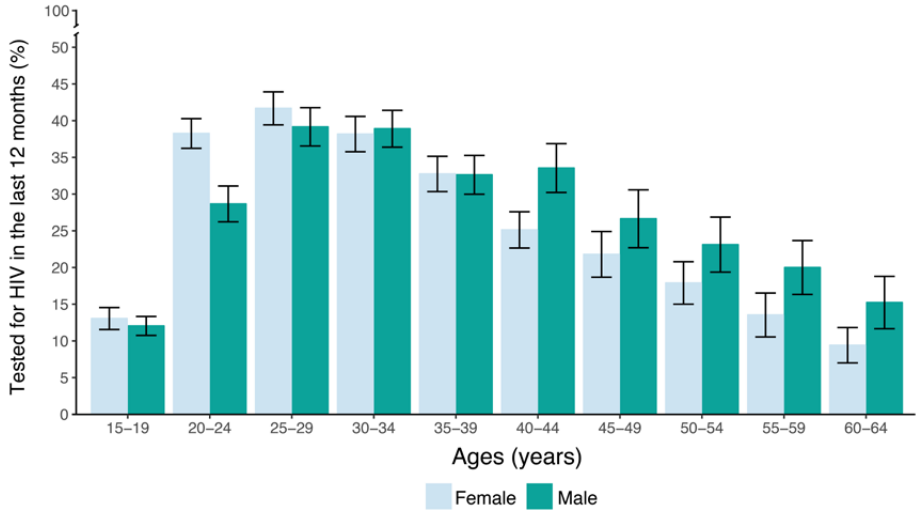


Figure 7.A
Proportion of adults, ages 15-64 years, who self-reported having received an HIV test in the last 12 months, by age and sex, RPHIA 2018-2019

8. HIV DIAGNOSIS AND TREATMENT

8.1 BACKGROUND

In 2016, after extensive review of evidence of both the clinical and population-level benefits of expanding ART, WHO changed their recommendation to support a policy of "Treatment for All," regardless of CD4 count.[1,2] By November 2017, almost all countries in sub-Saharan Africa had adopted this policy, despite the challenges in ensuring uptake and implementation.[2] This policy was adopted in Rwanda in 2016.

RPHIA determined the presence of four ARVs (efavirenz, tenofovir, nevirapine, and atazanavir) in blood as markers of first- and second-line regimes prescribed in the country at the time of the survey.

8.2 RESULTS

The following tables and figures describe the uptake of ART in Rwanda at the time of the RPHIA survey.

Table 8.A HIV diagnosis and treatment status (adjusted for ARV detection in blood): Men

Percent distribution of HIV-positive men aged 15-64 years, by HIV diagnosis and treatment status (based on self-reported HIV status and antiretroviral [ARV] therapy [ART] use [adjusted by detection of an ARV in blood]) and by selected demographic characteristics, RPHIA 2018-2019

Characteristic	Unaware of HIV status[2]	Aware of HIV status[3] and not on ART[4]	Aware of HIV status[3] and on ART[5.1]	Total	Number
Residence					
Urban	15.5	4.3	80.2	100.0	109
Rural	21.3	1.3	77.4	100.0	192
Province					
City of Kigali	17.7	5.0	77.3	100.0	81
South	19.8	1.7	78.5	100.0	60
West	22.3	1.3	76.4	100.0	74
North	(10.4)	(5.3)	(84.3)	(100.0)	39
East	(22.0)	(0.0)	(78.0)	(100.0)	47
Marital status					
Never married	45.3	6.1	48.6	100.0	56
Married or living together	10.6	1.6	87.8	100.0	207
Divorced or separated	(24.1)	(0.0)	(75.9)	(100.0)	30
Widowed	*	*	*	*	7
Education					
No education	(33.5)	(0.0)	(66.5)	(100.0)	44
Primary	17.5	2.3	80.2	100.0	192
Secondary or more	15.6	3.8	80.6	100.0	64

Table 8.A HIV diagnosis and treatment status (adjusted for ARV detection in blood): Men (continued)

Percent distribution of HIV-positive men aged 15-64 years, by HIV diagnosis and treatment status (based on self-reported HIV status and antiretroviral [ARV] therapy [ART] use [adjusted by detection of an ARV in blood]) and by selected demographic characteristics, RPHIA 2018-2019

Characteristic	Unaware of HIV status[2]	Aware of HIV status[3] and not on ART[4]	Aware of HIV status[3] and on ART[5, 1]	Total	Number
Wealth quintile					
Lowest	(24.3)	(1.6)	(74.1)	(100.0)	47
Second	(27.2)	(0.0)	(72.8)	(100.0)	38
Middle	17.4	3.9	78.7	100.0	54
Fourth	14.3	1.2	84.5	100.0	70
Highest	18.8	3.5	77.7	100.0	91
Age					
15-19	*	*	*	*	12
20-24	*	*	*	*	14
25-29	*	*	*	*	24
30-34	*	*	*	*	23
35-39	(18.9)	(0.0)	(81.1)	(100.0)	46
40-44	10.6	1.7	87.7	100.0	50
45-49	(8.8)	(2.4)	(88.8)	(100.0)	43
50-54	(13.4)	(1.6)	(84.9)	(100.0)	40
55-59	(9.4)	(0.0)	(90.6)	(100.0)	33
60-64	*	*	*	*	16
Total 15-24	(32.5)	(2.8)	(64.7)	(100.0)	26
Total 15-49	23.4	2.9	73.8	100.0	212
Total 15-64	19.6	2.2	78.2	100.0	301

[1]Relates to Global AIDS Monitoring 2020 Indicator 1.2: People living with HIV on antiretroviral therapy and PEPFAR Indicator TX_CURR_NAT / SUBNAT: Percentage of adults and children receiving antiretroviral therapy.
[2]Unawareness of HIV-positive status if self-reporting not being HIV positive and not having detectable ARV in blood.
[3]Awareness of HIV-positive status is defined as self-reporting HIV positive and/or having a detectable ARV in the blood.
[4]Not being on ART is defined as self-reporting not being on ART and not having a detectable ARV in the blood.
[5]Being on ART is defined as self-reporting current use of ART and/or having a detectable ARV in the blood.
Weighted figures calculated using final blood test weights (btwt0).
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.
*Estimates based on a very small denominator (less than 25) have been suppressed with an asterisk.
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

Table 8.B HIV diagnosis and treatment status (adjusted for ARV detection in blood): Women

Percent distribution of HIV-positive women aged 15-64 years by HIV diagnosis and treatment status (based on self-reported HIV status and antiretroviral [ARV] therapy [ART] use [adjusted by detection of an ARV in blood]) and by selected demographic characteristics, RPHIA 2018-2019

Characteristic	Unaware of HIV status[2]	Aware of HIV status[3] and not on ART[4]	Aware of HIV status[3] and on ART[5.1]	Total	Number
Residence					
Urban	11.2	1.9	86.9	100.0	253
Rural	16.0	2.1	81.9	100.0	379
Province					
City of Kigali	13.7	2.3	84.0	100.0	169
South	15.5	0.9	83.6	100.0	116
West	11.3	0.7	87.9	100.0	148
North	11.1	5.5	83.4	100.0	90
East	18.7	2.8	78.6	100.0	109
Marital status					
Never married	18.3	2.5	79.2	100.0	124
Married or living together	15.3	3.5	81.2	100.0	248
Divorced or separated	13.5	0.5	86.0	100.0	115
Widowed	10.2	0.4	89.4	100.0	145
Education					
No education	15.2	0.5	84.3	100.0	113
Primary	15.1	2.6	82.4	100.0	402
Secondary or more	10.8	1.9	87.3	100.0	117
Wealth quintile					
Lowest	14.6	1.2	84.2	100.0	96
Second	20.6	3.6	75.8	100.0	86
Middle	12.7	1.4	85.9	100.0	100
Fourth	11.0	2.5	86.5	100.0	155
Highest	15.2	1.6	83.2	100.0	195

Table 8.B HIV diagnosis and treatment status (adjusted for ARV detection in blood): Women (continued)

Percent distribution of HIV-positive women aged 15-64 years by HIV diagnosis and treatment status (based on self-reported HIV status and antiretroviral [ARV] therapy [ART] use [adjusted by detection of an ARV in blood]) and by selected demographic characteristics, RPHIA 2018-2019

Characteristic	Unaware of HIV status[2]	Aware of HIV status[3] and not on ART[4]	Aware of HIV status[3] and on ART[5, 1]	Total	Number
Age					
15-19	(28.5)	(0.0)	(71.5)	(100.0)	26
20-24	30.6	6.1	63.3	100.0	51
25-29	20.3	4.2	75.5	100.0	78
30-34	14.1	1.7	84.2	100.0	86
35-39	11.6	2.1	86.4	100.0	86
40-44	9.9	1.4	88.7	100.0	97
45-49	6.4	1.1	92.5	100.0	71
50-54	15.9	0.0	84.1	100.0	64
55-59	(12.6)	(0.0)	(87.4)	(100.0)	43
60-64	(3.4)	(4.2)	(92.5)	(100.0)	30
Total 15-24	30.0	4.1	65.9	100.0	77
Total 15-49	15.0	2.4	82.6	100.0	495
Total 15-64	14.4	2.1	83.6	100.0	632

[1]Relates to Global AIDS Monitoring 2020 Indicator 1.2: People living with HIV on antiretroviral therapy and PEPFAR Indicator TX_CURR_NAT / SUBNAT: Percentage of adults and children receiving antiretroviral therapy.
[2]Unawareness of HIV-positive status if self-reporting not being HIV positive and not having detectable ARV in blood.
[3]Awareness of HIV-positive status is defined as self-reporting HIV positive and/or having a detectable ARV in the blood.
[4]Not being on ART is defined as self-reporting not being on ART and not having a detectable ARV in the blood.
[5]Being on ART is defined as self-reporting current use of ART and/or having a detectable ARV in the blood.
Weighted figures calculated using final blood test weights (btwt0).
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

Table 8.C HIV diagnosis and treatment status (adjusted for ARV detection in blood): Total

Percent distribution of HIV-positive adults aged 15-64 years by HIV diagnosis and treatment status (based on self-reported HIV status and antiretroviral [ARV] therapy [ART] use [adjusted by detection of an ARV in blood]) and by selected demographic characteristics, RPHIA 2018-2019

Characteristic	Unaware of HIV status[2]	Aware of HIV status[3] and not on ART[4]	Aware of HIV status and on ART[5, 1]	Total	Number
Residence					
Urban	12.6	2.7	84.7	100.0	362
Rural	18.0	1.8	80.2	100.0	571
Province					
City of Kigali	15.2	3.3	81.5	100.0	250
South	17.1	1.2	81.7	100.0	176
West	15.3	1.0	83.7	100.0	222
North	10.9	5.5	83.7	100.0	129
East	19.8	1.9	78.4	100.0	156
Marital status					
Never married	27.7	3.8	68.5	100.0	180
Married or living together	13.0	2.6	84.4	100.0	455
Divorced or separated	15.9	0.4	83.7	100.0	145
Widowed	13.2	0.4	86.4	100.0	152
Education					
No education	20.9	0.4	78.8	100.0	157
Primary	16.0	2.5	81.6	100.0	594
Secondary or more	12.6	2.6	84.8	100.0	181
Wealth quintile					
Lowest	18.1	1.3	80.6	100.0	143
Second	22.8	2.4	74.8	100.0	124
Middle	14.5	2.4	83.0	100.0	154
Fourth	12.1	2.1	85.8	100.0	225
Highest	16.5	2.3	81.2	100.0	286
Age					
15-19	(28.1)	(0.0)	(71.9)	(100.0)	38
20-24	32.1	5.8	62.1	100.0	65
25-29	28.5	4.5	67.0	100.0	102
30-34	21.9	3.6	74.5	100.0	109
35-39	14.3	1.3	84.4	100.0	132
40-44	10.1	1.5	88.4	100.0	147
45-49	7.4	1.6	91.0	100.0	114
50-54	14.9	0.7	84.4	100.0	104
55-59	11.1	0.0	88.9	100.0	76
60-64	(4.8)	(2.6)	(92.6)	(100.0)	46

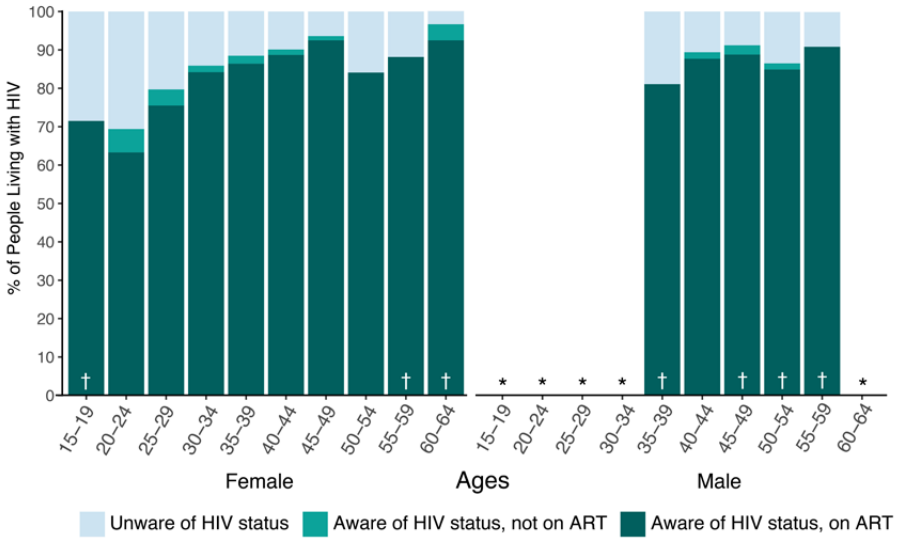
Table 8.C HIV diagnosis and treatment status (adjusted for ARV detection in blood): Total (continued)

Percent distribution of HIV-positive adults aged 15-64 years by HIV diagnosis and treatment status (based on self-reported HIV status and antiretroviral [ARV] therapy [ART] use [adjusted by detection of an ARV in blood]) and by selected demographic characteristics, RPHIA 2018-2019

Characteristic	Unaware of HIV status[2]	Aware of HIV status[3] and not on ART[4]	Aware of HIV status and on ART[5,1]	Total	Number
Total 15-24	30.6	3.8	65.6	100.0	103
Total 15-49	17.8	2.6	79.7	100.0	707
Total 15-64	16.2	2.1	81.7	100.0	933

[1]Relates to Global AIDS Monitoring 2020 Indicator 1.2: People living with HIV on antiretroviral therapy and PEPFAR Indicator TX_CURR_NAT / SUBNAT: Percentage of adults and children receiving antiretroviral therapy.
[2]Unawareness of HIV-positive status if self-reporting not being HIV positive and not having detectable ARV in blood.
[3]Awareness of HIV-positive status is defined as self-reporting HIV positive and/or having a detectable ARV in the blood.
[4]Not being on ART is defined as self-reporting not being on ART and not having a detectable ARV in the blood.
[5]Being on ART is defined as self-reporting current use of ART and/or having a detectable ARV in the blood.
Weighted figures calculated using final blood test weights (btwt0).
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

Figure 8.A
Proportion of HIV-positive adults, ages 15-64 years, aware of HIV status and antiretroviral therapy status, by age and sex, RPHIA 2018-2019



*An asterisk indicates that an estimate was based upon a very small denominator (less than 25) and has been suppressed.
†A dagger indicates than an estimate was based on a small denominator (25-49) and should be interpreted with caution.
Note: HIV-positive adults were classified as: unaware of HIV status if they reported not knowing their HIV-positive status before testing positive in RPHIA and did not have a detectable antiretroviral (ARV) in their blood; aware of their status if they reported knowing their HIV-positive status before testing positive in RPHIA or had a detectable ARV in their blood; not on antiretroviral therapy (ART) if they reported that they were not on ART and did not have a detectable ARV in their blood; and on ART if they reported they were on ART or had a detectable ARV in their blood.

Table 8.D Concordance of self-reported treatment status versus presence of antiretrovirals: Men

Percent distribution of HIV-positive men aged 15-64 years by presence of detectable ARVs versus self-reported HIV treatment status, RPHIA 2018-2019

	ARV status			
Characteristic	Not detectable	Detectable	Total	Number
Self-reported treatment status				
Not previously diagnosed	71.9	28.1	100.0	80
Previously diagnosed, not on ART	*	*	*	8
Previously diagnosed, on ART	3.7	96.3	100.0	213

Weighted figures calculated using final blood test weights (btwt0).
*Estimates based on a very small denominator (less than 25) have been suppressed with an asterisk.

Table 8.E Concordance of self-reported treatment status versus presence of antiretrovirals (ARVs): Women

Percent distribution of HIV-positive women aged 15-64 years by presence of detectable ARVs versus self-reported HIV treatment status, RPHIA 2018-2019

	ARV status			
Characteristic	Not detectable	Detectable	Total	Number
Self-reported treatment status				
Not previously diagnosed	54.1	45.9	100.0	165
Previously diagnosed, not on ART	*	*	*	19
Previously diagnosed, on ART	6.3	93.7	100.0	444

Weighted figures calculated using final blood test weights (btwt0).
*Estimates based on a very small denominator (less than 25) have been suppressed with an asterisk.

Table 8.F Concordance of self-reported treatment status versus presence of antiretrovirals (ARVs): Total

Percent distribution of HIV-positive adults aged 15-64 years by presence of detectable ARVs versus self-reported HIV treatment status, RPHIA 2018-2019

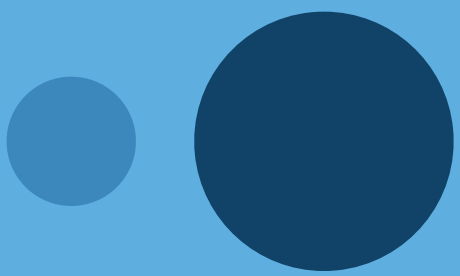
	ARV status			
Characteristic	Not detectable	Detectable	Total	Number
Self-reported treatment status				
Not previously diagnosed	60.6	39.4	100.0	245
Previously diagnosed, not on ART	(82.2)	(17.8)	(100.0)	27
Previously diagnosed, on ART	5.3	94.7	100.0	657

Weighted figures calculated using final blood test weights (btwt0).
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

8.3 REFERENCES

1. World Health Organization. *Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection.* Geneva: World Health Organization; 2016. https://www.who.int/hiv/pub/arv/arv-2016/en/. Accessed March 26, 2020.

2. World Health Organization. *Treat all: policy adoption and implementation status in countries.* Geneva: World Health Organization; 2017. http://apps.who.int/iris/bitstream/handle/10665/259532/WHO-HIV-2017.58-eng.pdf;jsessionid=B3857967C208CC9E4093EEA9CEDC3A0C?sequence=1 Accessed March 26, 2020.



9. VIRAL LOAD SUPPRESSION

9.1 BACKGROUND

VLS is a key indicator of treatment success in HIV-positive individuals. For the purposes of RPHIA, VLS is defined as: VL less than 1,000 HIV RNA copies per mL. This chapter describes VLS among the population of HIV-positive adults by age, sex, province, and other demographic characteristics.

9.2 RESULTS

The following tables and figures present VLS data of people living with HIV in Rwanda at the time of the RPHIA survey.

Table 9.A Viral load suppression by demographic characteristics

Among HIV-positive adults aged 15-64 years, percentage with viral load suppression (VLS) (< 1,000 copies/mL), by sex, self-reported diagnosis and treatment status, and selected demographic characteristics, RPHIA 2018-2019

	Male		Female		Total	
Characteristic	Percentage VLS	Number	Percentage VLS	Number	Percentage VLS	Number
Self-reported diagnosis and treatment status						
Not previously diagnosed	38.3	80	46.8	165	43.7	245
Previously diagnosed, not on ART	*	8	*	19	(23.8)	27
Previously diagnosed, on ART	84.4	213	93.2	444	90.1	657
Missing	*	1	*	4	*	5
Residence						
Urban	74.1	109	82.4	253	79.7	362
Rural	68.9	193	77.3	379	74.2	572
Province						
City of Kigali	71.3	81	80.9	169	77.4	250
South	77.9	60	80.0	116	79.2	176
West	74.6	74	81.1	148	78.7	222
North	(74.2)	39	82.3	90	79.6	129
East	(54.3)	48	73.0	109	66.7	157
Marital status						
Never married	50.1	56	69.2	124	62.5	180
Married or living together	76.4	208	81.6	248	79.1	456
Divorced or separated	(78.6)	30	79.4	115	79.2	145
Widowed	*	7	82.4	145	79.0	152

Table 9.A Viral load suppression by demographic characteristics (continued)

Among HIV-positive adults aged 15-64 years, percentage with viral load suppression (VLS) (< 1,000 copies/mL), by sex, self-reported diagnosis and treatment status, and selected demographic characteristics, RPHIA 2018-2019

Characteristic	Male		Female		Total	
	Percentage VLS	Number	Percentage VLS	Number	Percentage VLS	Number
Education						
No education	(63.0)	44	78.1	113	73.4	157
Primary	72.1	193	78.5	402	76.2	595
Secondary or more	70.5	64	82.1	117	77.7	181
Wealth quintile						
Lowest	(71.3)	47	78.6	96	76.0	143
Second	(71.2)	38	74.2	86	73.2	124
Middle	66.8	55	82.1	100	76.1	155
Fourth	72.2	70	81.8	155	78.6	225
Highest	70.8	91	77.4	195	75.1	286
Total 15-24	(55.9)	26	62.3	77	60.6	103
Total 15-49	65.7	213	78.6	495	74.3	708
Total 15-64	70.5	302	79.1	632	76.0	934

Weighted figures calculated using final blood test weights (btwt0).
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.
*Estimates based on a very small denominator (less than 25) have been suppressed with an asterisk.
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

Table 9.B Viral load suppression by age (5-year age groups)

Among HIV-positive persons aged 10-64 years, percentage with viral load suppression (< 1,000 copies/mL), by sex and age, RPHIA 2018-2019

Age	Male		Female		Total	
	Percentage VLS	Number	Percentage VLS	Number	Percentage VLS	Number
10-14	*	13	*	20	(72.5)	33
15-19	*	12	(71.4)	26	(67.0)	38
20-24	*	14	57.9	51	57.0	65
25-29	*	24	67.3	78	61.0	102
30-34	*	24	79.7	86	71.3	110
35-39	(74.7)	46	82.2	86	79.4	132
40-44	75.3	50	87.9	97	83.2	147
45-49	(74.1)	43	89.1	71	83.1	114
50-54	(77.4)	40	79.7	64	78.7	104
55-59	(86.8)	33	(79.4)	43	82.9	76
60-64	*	16	(85.7)	30	(83.5)	46

Table 9.B Viral load suppression by age (5-year age groups) (continued)

Among HIV-positive persons aged 10-64 years, percentage with viral load suppression (< 1,000 copies/mL), by sex and age, RPHIA 2018-2019

	Male		Female		Total	
Age	Percentage VLS	Number	Percentage VLS	Number	Percentage VLS	Number
Total 10-19	(68.0)	25	(70.3)	46	69.4	71
Total 15-24	(55.9)	26	62.3	77	60.6	103
Total 15-49	65.7	213	78.6	495	74.3	708
Total 15-64	70.5	302	79.1	632	76.0	934

Weighted figures calculated using final blood test weights (btwt0).
*Estimates based on a very small denominator (less than 25) have been suppressed with an asterisk.
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

Table 9.C Viral load suppression by age (10-to-15-year age groups)

Among HIV-positive adults aged 15-64 years, percentage with viral load suppression (< 1,000 copies/mL, by sex and age, RPHIA 2018-2019

	Male		Female		Total	
Age	Percentage VLS	Number	Percentage VLS	Number	Percentage VLS	Number
15-24	(55.9)	26	62.3	77	60.6	103
25-34	(45.9)	48	73.5	164	66.2	212
35-44	75.0	96	85.2	183	81.4	279
45-54	75.7	83	84.8	135	81.1	218
55-64	(84.9)	49	81.7	73	83.1	122

Weighted figures calculated using final blood test weights (btwt0).
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

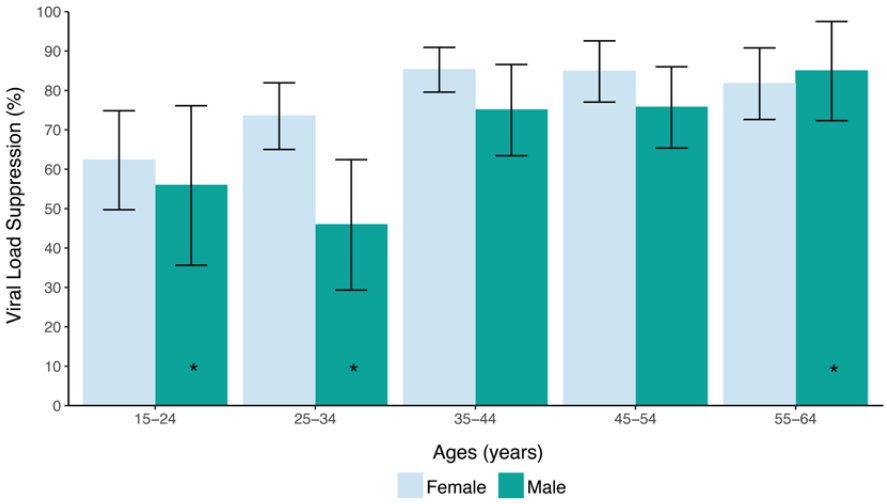


Figure 9.A
Proportion of viral load suppression (<1,000 copies/mL) among people living with HIV, ages 15-64 years, by age and sex, RPHIA 2018-2019

*These estimates are based on a denominator of 25-49 and should be interpreted with caution.

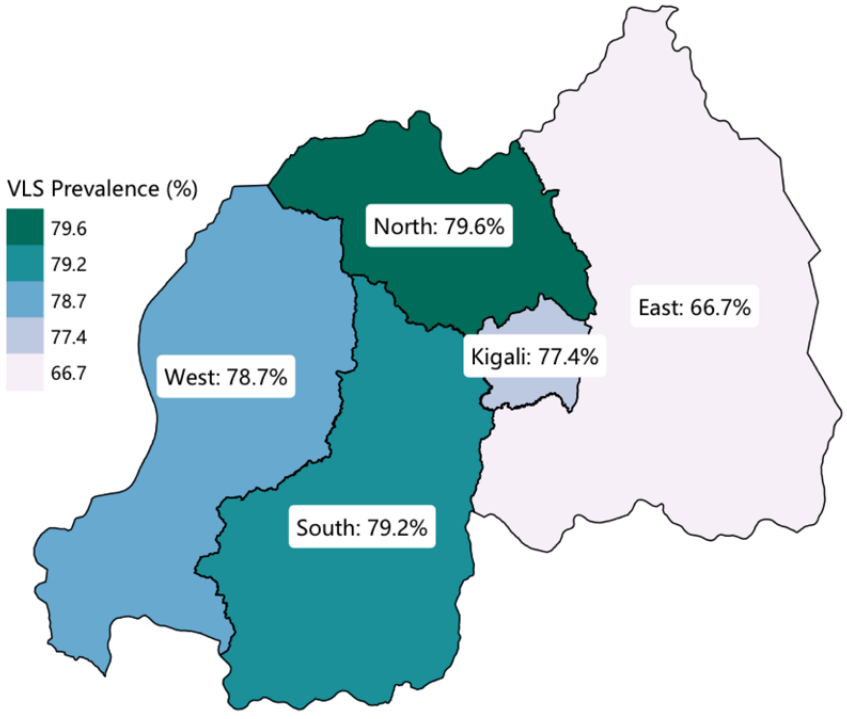
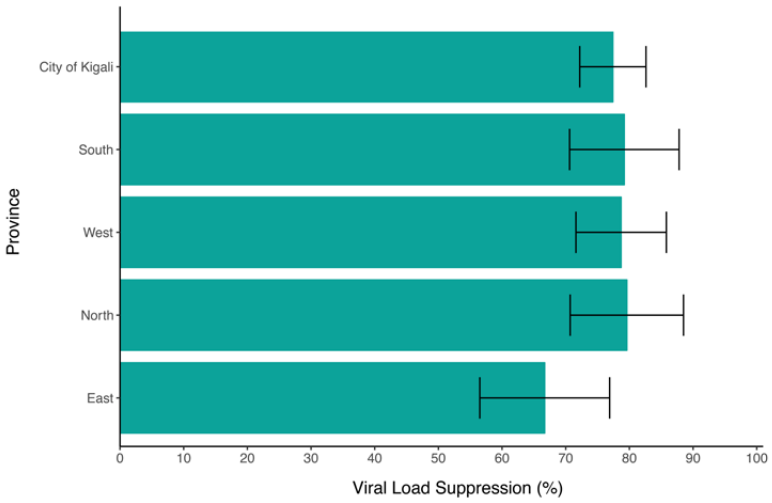


Figure 9.B
Prevalence of viral load suppression (<1,000 copies/mL) among HIV-positive adults, ages 15-64 years, by province, RPHIA 2018-2019

Figure 9.C
Prevalence of viral load suppression (<1,000 copies/ml) among HIV-positive adults, ages 15-64 years, by province, RPHIA 2018-2019



10. UNAIDS 90-90-90 TARGETS

10.1 BACKGROUND

In order to achieve HIV epidemic control, UNAIDS has set ambitious targets referred to as 90-90-90: by 2020, 90% of all people living with HIV will know their HIV status; 90% of all people diagnosed with HIV will receive ART; and 90% of all people receiving ART will have VLS.[1]

The previous chapters on HIV testing and treatment provide results on coverage of HIV testing and treatment services, while the previous chapter on VLS presents VLS among all HIV-positive individuals, irrespective of knowledge of status or ART use.

This chapter presents the status of the 90-90-90 indicators, which indicate program performance among adults (ages 15-64 years). Awareness of HIV-positive status and receipt of treatment among those who are aware of their HIV-positive status are indicators of access to services. VLS among those who know their HIV-positive status and are on treatment provides an indication of access to and retention in care, providing a measure of program success.

The 90-90-90 results in this chapter are measured using both self-reported and ARV biomarker data (Table 10.A). In this table, "aware" and "on treatment" have been adjusted so that adults in whom ARVs were detected are classified as "aware" and "on treatment" even if they did not report it. Individuals are classified as "on treatment" if they reported that they were taking ART or had detectable ARVs in their blood. The prevalence of VLS is reported for all of those classified as on treatment.

10.2 RESULTS

The following tables and figure describe progress toward the 90-90-90 targets in adults at the time of the RPHIA survey.

Table 10.A Adult 90-90-90 (self-reported antiretroviral therapy [ART] status and laboratory antiretroviral [ARV] data; conditional percentages)

90-90-90 targets among adults living with HIV aged 15-64 years, by sex and age, RPHIA 2018-2019						
	Diagnosed					
	Male		Female		Total	
Age	Percentage aware of HIV status[1, 2]	Number	Percentage aware of HIV status[1, 2]	Number	Percentage aware of HIV status[1, 2]	Number
15-24	(67.5)	26	70.0	77	69.4	103
25-34	(51.7)	47	82.8	164	74.7	211
35-49	87.2	139	90.6	254	89.3	393
15-49	76.6	212	85.0	495	82.2	707
15-64	80.4	301	85.6	632	83.8	933

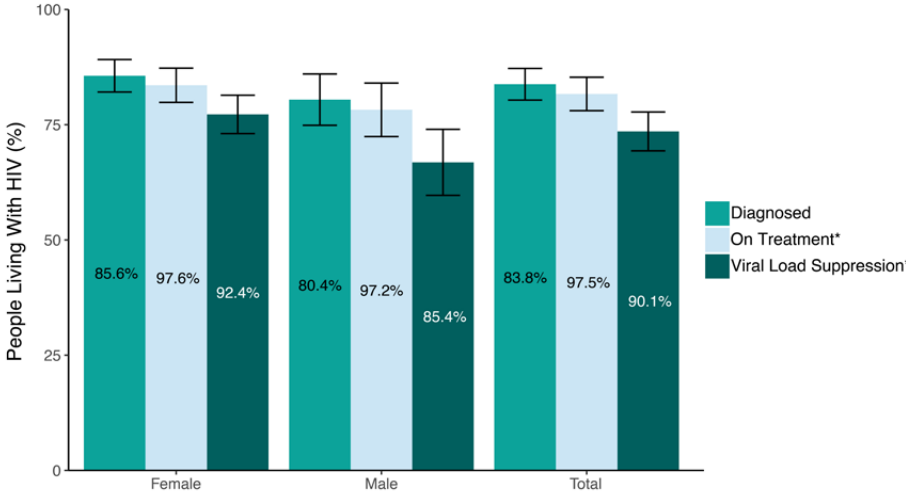
Table 10.A Adult 90-90-90 (self-reported antiretroviral therapy [ART] status and laboratory antiretroviral [ARV] data; conditional percentages) (continued)

90-90-90 targets among adults living with HIV aged 15-64 years, by sex and age, RPHIA 2018-2019

	On Treatment					
	Among men aware[2] of HIV status		Among women aware[2] of HIV status		Total	
Age	Percentage on ART[3,4]	Number	Percentage on ART[3,4]	Number	Percentage on ART[3,4]	Number
15-24	*	18	94.1	53	94.6	71
25-34	*	24	96.4	138	94.6	162
35-49	98.4	124	98.3	232	98.3	356
15-49	96.2	166	97.2	423	96.9	589
15-64	97.2	245	97.6	544	97.5	789
	Viral Load Suppression (VLS)					
	Among men on ART[4]		Among women on ART[4]		Total	
Age	Percentage with VLS[5]	Number	Percentage with VLS[5]	Number	Percentage with VLS[5]	Number
15-24	*	17	89.2	50	86.0	67
25-34	*	20	88.4	133	86.5	153
35-49	85.0	122	95.7	227	91.7	349
15-49	83.1	159	92.6	410	89.7	569
15-64	85.4	237	92.4	530	90.1	767

[1]Relates to Global AIDS Monitoring 2020 Indicator (GAM 2020) 1.1: People living with HIV who know their HIV status and PEPFAR Indicator DIAGNOSED_NAT: The percentage of adults and children living with HIV who know their status (have been diagnosed).
[2]Awareness of HIV-positive status is defined as self-reporting HIV positive and/or having a detectable ARV in the blood.
[3]Relates to GAM 2020 1.2: People living with HIV on antiretroviral therapy and PEPFAR TX_CURR_NAT / SUBNAT: Percentage of adults and children receiving antiretroviral therapy.
[4]Being on ART is defined as self-reporting current use of ART and/or having a detectable ARV in the blood.
[5]Relates to GAM 2020 1.3: People living with HIV who have suppressed viral loads and PEPFAR Indicator VL_SUPPRESSION_NAT: Percentage of people living with HIV on ART with a suppressed viral load.
Weighted figures calculated using final blood test weights (btwt0).
*Estimates based on a very small denominator (less than 25) have been suppressed with an asterisk.
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

Figure 10.A Adult 90-90-90 (adjusted for laboratory antiretroviral [ARV] data among adults aged 15-64 years), RPHIA 2018-2019



Note:
In the antiretroviral (ARV)-adjusted 90-90-90, HIV-positive adults were classified as "aware" or "diagnosed" if they reported knowing their HIV-positive status before testing positive in RPHIA or had a detectable ARV in their blood. They were classified as "on treatment" if they reported that they were on antiretroviral therapy (ART) or if they had a detectable ARV in their blood.
*Inset numbers are conditional proportions.
The height of the bars represents population-coverage of each indicator among all adolescents living with HIV.

10.3 REFERENCES

1. Joint United Nations Programme on HIV/AIDS (UNAIDS). 90-90-90: *An ambitious treatment target to help end the AIDSepidemic.* Geneva: UNAIDS; 2014. http://www.unaids.org/sites/default/files/media_asset/90-90-90_en_0.pdf. Accessed March 26, 2020.

11. CLINICAL PERSPECTIVES ON PEOPLE LIVING WITH HIV

11.1 BACKGROUND

As countries implement treatment for all people living with HIV, ensuring a sustainable health system that is people-centered and innovative requires diligent monitoring and responsiveness.[1] Indicators such as CD4 count at diagnosis, retention on ART, VLS, and HIV DR can provide evidence of program coverage and quality of care.

This chapter covers retention on ART and transmitted HIV DR among those recently infected identified using the Recent Infection Testing Algorithm, and DR among those with unsuppressed VL on treatment. Finally, it also covers HIV subtype description.

11.2 RESULTS

The following tables and figure present data on the clinical characteristics of people living with HIV.

Table 11.A Retention on antiretroviral therapy (ART): people initiating ART LESS THAN 12 months before the survey

Among HIV-positive adults aged 15-64 years who reported initiating ART less than 12 months before the survey, percentage who reported still receiving ART, by sex and selected demographic characteristics, RPHIA 2018-2019

	Total	
Characteristic	Percentage still receiving ART	Number
Presence of detectable ARVs		
Detectable	(100.0)	45
Not detectable	*	7
Total 15-49	(97.1)	45
Total 15-64	97.5	52

*Estimates based on a very small denominator (less than 25) have been suppressed with an asterisk.
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

Table 11.B Retention on antiretroviral therapy (ART): people initiating ART MORE THAN 12 months before the survey

Among HIV-positive persons aged 15-64 years who reported initiating ART more than 12 months before the survey, percentage who reported still receiving ART, by sex and selected demographic characteristics, RPHIA 2018-2019

Characteristic	Male		Female		Total	
	Percentage still receiving ART	Number	Percentage still receiving ART	Number	Percentage still receiving ART	Number
Presence of detectable ARVs						
Detectable	100.0	187	99.4	386	99.6	573
Not detectable	*	9	(84.3)	30	(75.7)	39
Residence						
Urban	95.7	72	98.7	170	97.7	242
Rural	98.6	124	98.1	246	98.3	370
Province						
City of Kigali	(95.9)	49	95.7	112	95.7	161
South	(97.3)	38	98.7	72	98.2	110
West	98.0	50	98.9	96	98.6	146
North	(96.4)	29	97.0	68	96.8	97
East	(100.0)	30	100.0	68	100.0	98
Marital status						
Never married	*	24	98.7	69	96.6	93
Married or living together	98.4	152	98.1	165	98.2	317
Divorced or separated	*	17	98.4	75	98.7	92
Widowed	*	2	98.3	107	98.4	109
Education						
No education	*	19	97.8	77	98.3	96
Primary	97.8	130	98.7	251	98.4	381
Secondary	(95.7)	39	97.1	78	96.6	117
More than secondary	*	8	*	10	*	18
Wealth quintile						
Lowest	(100.0)	32	98.4	64	99.0	96
Second	*	21	95.5	53	96.9	74
Middle	(93.4)	33	100.0	67	97.6	100
Fourth	(98.3)	48	99.4	103	99.0	151
Highest	97.5	61	97.5	129	97.5	190

Table 11.B Retention on antiretroviral therapy (ART): people initiating ART MORE THAN 12 months before the survey (continued)

Among HIV-positive persons aged 15-64 years who reported initiating ART more than 12 months before the survey, percentage who reported still receiving ART, by sex and selected demographic characteristics, RPHIA 2018-2019

Characteristic	Male		Female		Total	
	Percentage still receiving ART	Number	Percentage still receiving ART	Number	Percentage still receiving ART	Number
Age						
15-19	*	8	*	15	*	23
20-24	*	5	*	15	*	20
25-29	*	9	(98.1)	39	(97.0)	48
30-34	*	11	98.8	57	95.3	68
35-39	(100.0)	31	96.2	64	97.5	95
40-44	(100.0)	35	99.1	66	99.5	101
45-49	(96.9)	35	98.5	56	97.9	91
50-54	(97.9)	30	(100.0)	48	99.1	78
55-59	*	21	(100.0)	32	100.0	53
60-64	*	11	*	24	(96.5)	35
Total 15-24	*	13	(97.8)	30	(98.5)	43
Total 15-49	97.1	134	98.1	312	97.8	446
Total 15-64	97.7	196	98.3	416	98.1	612

Weighted figures calculated using final blood test weights (btwt0).
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.
*Estimates based on a very small denominator (less than 25) have been suppressed with an asterisk.
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

Table 11.C Resistance to antiretrovirals (ARVs) among those recently infected

Among persons aged 15-64 years who were recently infected with HIV, percentage with resistance to ARVs by class of ARV resistance, RPHIA 2018-2019

	Percent	Number	DR Mutations Detected[1]
Successfully amplified	100.0	8	
Any	12.5	1	K103N
Nucleoside reverse transcriptase inhibitor (NRTI)	0.0	0	
Non-nucleoside reverse transcriptase inhibitor (NNRTI)	12.5	1	K103N
Protease inhibitor (PI)	0.0	0	
NRTI & NNRTI	0.0	0	
NRTI, NNRTI & PI	0.0	0	

[1]Based on Stanford University HIV Drug Resistance Database.
https://hivdb.stanford.edu/assets/media/resistance-mutation-handout-feb2019.b0204a57.pdf

Table 11.D Resistance to antiretrovirals (ARVs) among HIV-positive individuals with unsuppressed viral loads on treatment

Among HIV positive persons aged 15-64 years who reported being on antiretroviral therapy (ART) but did not have VLS, percentage with resistance to ARVs, by class of ARV resistance, RPHIA 2018-2019			
	n (Percent)	Number	DR Mutations Detected[1]
Successfully amplified	58 (98.3)	59	
Any	50 (86.2)	58	D67DN, D67G, D67N, F77FL, G190A, K103KN, K103N, K103S, K219E, K219EQ, K219KE, K219KQ, K219Q, K219R, K65KR, K65R, K70AE, K70E, K70KR, K70R, L100I, L100LI, L74I, L74IV, L74LV, M184I, M184IV, M184MV, M184V, M230L, M41L, M41ML, N88S, P225H, P225PH, T215C, T215F, T215V, T69D, V106IM, V106M, V106VM, V75VIM, V75VM, Y115F, Y115YF, Y181C, Y181CF, Y181YC, Y188H, Y188Y*FL, Y188YC
Nucleoside reverse transcriptase inhibitor (NRTI)	35 (60.3)	58	D67DN, D67G, D67N, F77FL, K219E, K219EQ, K219KE, K219KQ, K219Q, K219R, K65KR, K65R, K70AE, K70E, K70KR, K70R, L74I, L74IV, L74LV, M184I, M184IV, M184MV, M184V, M41L, M41ML, T215C, T215F, T215V, T69D, V75VIM, V75VM, Y115F, Y115YF
Non-nucleoside reverse transcriptase inhibitor (NNRTI)	50 (86.2)	58	G190A, K103KN, K103N, K103S, L100I, L100LI, M230L, P225H, P225PH, V106IM, V106M, V106VM, Y181C, Y181CF, Y181YC, Y188H, Y188Y*FL, Y188YC
Protease inhibitor (PI)	1 (1.7)	58	N88S
NRTI & NNRTI	35 (60.3)	58	D67DN, D67G, D67N, F77FL, G190A, K103KN, K103N, K103S, K219E, K219EQ, K219KE, K219KQ, K219Q, K219R, K65KR, K65R, K70AE, K70E, K70KR, K70R, L100I, L100LI, L74I, L74IV, L74LV, M184I, M184IV, M184MV, M184V, M230L, M41L, M41ML, P225H, P225PH, T215C, T215F, T215V, T69D, V106M, V75VIM, V75VM, Y115F, Y115YF, Y181C, Y181CF, Y181YC, Y188H, Y188Y*FL
NRTI, NNRTI & PI	1 (1.7)	58	M184V, N88S, T215V, Y181CF

[1]Based on Stanford University HIV Drug Resistance Database.
https://hivdb.stanford.edu/assets/media/resistance-mutation-handout-Feb2017.516aee6f.pdf

Table 11.E HIV subtype analysis

Percent distribution of HIV-positive adults aged 15-64 years who underwent genotyping, by HIV subtype, RPHIA 2018-2019		
	Percent	Number
Subtype A	77.2	71
Subtype B	0.0	0
Subtype C	13.0	12
Subtype D	2.2	2
Subtype G	0.0	0
Recombinant	7.6	7
Total	100.0	92

Unweighted figures.

11.3 REFERENCES

1. World Health Organization. *Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection.* Geneva: World Health Organization; 2016. http://www.who.int/hiv/pub/arv/arv-2016/en/. Accessed Sep 4, 2019.

12. PREVENTION OF MOTHER-TO-CHILD TRANSMISSION

12.1 BACKGROUND

Pregnant women living with HIV are at high risk of transmitting HIV to their infants during pregnancy, during labor, or through breastfeeding. Over 90% of new infections among infants and young children occur through mother-to-child transmission (MTCT). Without any interventions, between 20-45% of infants may become infected with HIV, with an estimated risk of 5-10% during pregnancy, 10-20% during labor and delivery, and 5-20% through breastfeeding.[1] In 2010, global targets were set to decrease new HIV infections in children and reduce mortality among mothers living with HIV, including a 90% reduction in child HIV infections, a 50% reduction in AIDS-related maternal deaths, and virtual elimination of MTCT.[2]

To prevent MTCT, WHO recommends a comprehensive four-pronged approach including: (1) primary prevention of HIV infection among women of childbearing age (henceforth in this chapter referred to as women); (2) preventing unintended pregnancies among women living with HIV; (3) preventing HIV transmission from women living with HIV to their infants; and (4) providing appropriate treatment, care, and support to mothers living with HIV and their children and families.[2]

12.2 RESULTS

The following tables present data on ANC attendance, breastfeeding practices, awareness of a woman's HIV status prior to or during pregnancy, and use of ART during pregnancy in women who were aware of their HIV-positive status during pregnancy.

Table 12.A Antenatal care

Among women aged 15-49 years who delivered in the three years before the survey, percentage who attended at least one antenatal care visit for her most recent birth, by selected demographic characteristics, RPHIA 2018-2019

Characteristic	Percentage who attended at least one ANC visit	Number
Residence		
Urban	98.1	1,003
Rural	97.9	3,539
Province		
City of Kigali	97.0	759
South	98.4	898
West	97.7	1,173
North	98.6	873
East	97.8	839
Marital status		
Never married	95.8	579
Married or living together	98.7	3,533
Divorced or separated	95.4	379
Widowed	(94.4)	49

Table 12.A Antenatal care (continued)

Among women aged 15-49 years who delivered in the three years before the survey, percentage who attended at least one antenatal care visit for her most recent birth, by selected demographic characteristics, RPHIA 2018-2019

Characteristic	Percentage who attended at least one ANC visit	Number
Education		
No education	94.3	378
Primary	98.0	3,029
Secondary	99.3	912
More than secondary	98.6	218
Wealth quintile		
Lowest	97.0	901
Second	97.1	889
Middle	99.0	843
Fourth	98.5	895
Highest	98.5	1,010
Age		
15-19	98.2	125
20-24	97.6	884
25-29	98.7	1,199
30-34	98.5	1,082
35-39	96.8	802
40-44	97.2	386
45-49	98.0	64
Total 15-24	97.7	1,009
Total 15-49	98.0	4,542

Weighted figures calculated using final interview weights (intwt0).
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

Table 12.B Breastfeeding status by child's age and mother's HIV status

Percent distribution of last-born children born to women aged 15-49 years in the three years before the survey by breastfeeding status, by child's age, and mother's HIV status, RPHIA 2018-2019

Characteristic	Never breastfed	Ever breastfed, but not currently breastfeeding	Currently breastfeeding	Number
Child's age (months)				
0-1	0.0	12.9	87.1	258
2-3	0.0	10.4	89.6	283
4-5	0.5	14.1	85.4	272
6-8	0.9	11.6	87.5	413
9-11	0.3	13.1	86.5	421
12-17	0.4	18.6	81.0	798
18-23	0.3	26.0	73.7	746
24-36	0.4	49.4	50.2	1313
Result of mother's PHIA survey HIV test				
HIV positive	0.5	49.1	50.4	123
HIV negative	0.4	25.9	73.7	4378
Not tested	*	*	*	13
Total	0.4	26.5	73.1	4514

Weighted figures calculated using final interview weights (intwt0).
An asterisk indicates that an estimate is based on a very small number (a denominator of less than 25) of unweighted cases and has been suppressed.

Table 12.C Breastfeeding status by child's age: Mother tested HIV positive in RPHIA

Percent distribution of last-born children born to HIV positive women aged 15-49 years in the three years before the survey by breastfeeding status, by child's ages, RPHIA 2018-2019

Characteristic	Never breastfed	Ever breastfed, but not currently breastfeeding	Currently breastfeeding	Total	Number
Child's age (months)					
0-17	0.0	27.3	72.7	100.0	65
18-36	1.0	73.0	25.9	100.0	58
Total	0.5	49.1	50.4	100.0	123

Weighted figures calculated using final blood test weights (btwt0).

Table 12.D Breastfeeding status by child's age: Mother tested HIV negative in RPHIA

Percent distribution of last-born children born to HIV negative women aged 15-49 years in the three years before the survey by breastfeeding status, by child's age, RPHIA 2018-2019

Characteristic	Never breastfed	Ever breastfed, but not currently breastfeeding	Currently breastfeeding	Total	Number
Child's age (months)					
0-17	0.4	14.0	85.6	100.0	2,371
18-36	0.3	40.0	59.7	100.0	1,997
Total	0.4	25.9	73.7	100.0	4,378

Weighted figures calculated using final blood test weights (btwt0).

Table 12.E Prevention of mother-to-child transmission, known HIV status

Among women aged 15-49 years who gave birth within the 12 months before the survey, percentage who were tested for HIV during antenatal care and received their results or who already knew they were HIV positive, by selected demographic characteristics, RPHIA 2018-2019

Characteristic	Tested for HIV during ANC and received results		Percentage who already knew they were HIV positive	Total percentage with known HIV status[1]	Total percentage with unknown HIV status	Number of women who gave birth within the 12 months before the survey
	Percentage who tested HIV positive	Percentage who tested HIV negative				
Residence						
Urban	0.6	95.0	2.8	98.4	1.6	351
Rural	0.3	95.1	1.1	96.6	3.4	1,271
Province						
City of Kigali	0.4	95.2	2.9	98.5	1.5	255
South	0.0	94.8	1.1	95.9	4.1	359
West	0.7	95.6	1.5	97.8	2.2	410
North	0.0	96.9	0.6	97.5	2.5	310
East	0.7	93.5	1.7	95.9	4.1	288
Marital status						
Never married	0.3	94.7	0.6	95.5	4.5	220
Married or living together	0.4	95.7	1.3	97.3	2.7	1,277
Divorced or separated	0.9	91.6	2.1	94.5	5.5	115
Widowed	*	*	*	*	*	10

Table 12.E Prevention of mother-to-child transmission, known HIV status (continued)

Among women aged 15-49 years who gave birth within the 12 months before the survey, percentage who were tested for HIV during antenatal care and received their results or who already knew they were HIV positive, by selected demographic characteristics, RPHIA 2018-2019

Characteristic	Tested for HIV during ANC and received results		Percentage who already knew they were HIV positive	Total percentage with known HIV status[1]	Total percentage with unknown HIV status	Number of women who gave birth within the 12 months before the survey
	Percentage who tested HIV positive	Percentage who tested HIV negative				
Education						
No education	0.8	90.3	2.4	93.6	6.4	123
Primary	0.4	94.5	1.7	96.7	3.3	1,066
Secondary	0.2	97.8	0.4	98.4	1.6	350
More than secondary	0.0	100.0	0.0	100.0	0.0	80
Wealth quintile						
Lowest	0.6	91.9	1.5	94.0	6.0	333
Second	0.0	94.6	1.6	96.2	3.8	327
Middle	0.0	95.3	1.8	97.1	2.9	276
Fourth	0.7	96.7	1.5	98.9	1.1	348
Highest	0.6	97.4	0.7	98.7	1.3	337
Age						
15-19	0.0	95.7	0.0	95.7	4.3	77
20-24	0.6	92.8	1.1	94.5	5.5	371
25-29	0.2	97.0	0.7	97.9	2.1	432
30-34	0.8	95.3	2.3	98.4	1.6	361
35-39	0.0	95.1	2.2	97.3	2.7	258
40-44	0.0	93.7	1.6	95.3	4.7	108
45-49	*	*	*	*	*	15
Total 15-24	0.5	93.3	0.9	94.7	5.3	448
Total 15-49	0.4	95.1	1.4	96.9	3.1	1,622

[1]Relates to PEPFAR Indicator PMTCT_STAT_NAT / SUBNAT: Percentage of pregnant women with known HIV status.
Weighted figures calculated using final interview weights (intwt0).
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.
*Estimates based on a very small denominator (less than 25) have been suppressed with an asterisk.

Table 12.F Prevention of mother-to-child transmission, HIV-positive pregnant women who received antiretrovirals

Among HIV-positive women aged 15-49 years who gave birth in the 12 months before the survey, percentage who received antiretrovirals during pregnancy to reduce the risk of mother-to-child-transmission, RPHIA 2018-2019

Characteristic	Percentage who were already on ARVs prior to pregnancy	Percentage who were newly initiated on ARVs during pregnancy or labor and delivery	Total percentage who received ARVs[1]	Number of HIV-positive women who gave birth in the 12 months before the survey
Total 15-49	(75.8)	(22.3)	(98.0)	29

[1]Relates to Global AIDS Monitoring 2020 Indicator 2.3: Preventing the mother-to-child transmission of HIV and PEPFAR Indicator PMTCT_ARV_NAT / SUBNAT: Number and percentage of HIV-positive pregnant women who received antiretroviral medicine (ARV) during pregnancy to reduce the risk of mother-to-child transmission.
Weighted figures calculated using final interview weights (intwt0).
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.
*Estimates based on a very small denominator (less than 25) have been suppressed with an asterisk.
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

12.3 REFERENCES

1. De Cock KM, Fowler MG, Mercier E, et al. Prevention of mother-to-child HIV transmission in resource-poor countries: translating research into policy and practice. *JAMA*, 2000, 283:1175–1182. doi:10.1001/jama.283.9.1175.

2. World Health Organization. *Towards the elimination of mother-to-child transmission of HIV: report of a WHO technical consultation.* Geneva: World Health Organization; 2011. http://apps.who.int/iris/bitstream/handle/10665/44638/9789241501910_eng.pdf;jsessionid=CD35DAE3C3D00349A9B149BCFF9262C4?sequence=1. Accessed Sep 4, 2019.

13. ADOLESCENTS AND YOUNG PEOPLE

13.1 BACKGROUND

One-third of the population of sub-Saharan Africa is between the ages of 10-24 years.[1] Young adolescents (defined as children aged 10-14 years) are on the cusp of becoming sexually active, but many may not yet know how to protect themselves from HIV. Meanwhile, older adolescents (ages 15-19 years) and young adults (ages 20-24 years)— collectively defined as young people (ages 15-24 years) are more likely to engage in risky sexual behaviors than older adults and have less frequent contact with the healthcare system. HIV prevention, access to testing and treatment, and achieving VLS in these demographics are critical for long-term epidemic control but are also particularly challenging.

13.2 RESULTS

This chapter presents estimates for the conditional 90-90-90 targets among adolescents aged 10-19 years that reflect the treatment and VLS outcomes only among those receiving care in HIV treatment programs (Table 13.A and Figure 13.A).

Table 13.B shows the prevalence of early sexual debut before 15 years of age among young men and women, by marital status, region, and socio-demographic characteristics.

Table 13.A HIV diagnosis and treatment status: Adolescents

Percent distribution of HIV-positive adolescents aged 10-19 years by HIV diagnosis and treatment status (based on parent/guardian-reported data for ages 10-14 years and self-reported data for ages 15-19 years, and antiretroviral [ARV] therapy [ART] use [adjusted by detection of an ARV in blood]) and by selected demographic characteristics, RPHIA, 2018/19

Characteristic	Unaware of HIV status[2]	Aware of HIV status[3] and not on ART[4]	Aware of HIV status[3] and on ART[5,1]	Total	Number
Residence					
Urban	*	*	*	*	21
Rural	20.5	0.0	79.5	100.0	50
Province					
City of Kigali	*	*	*	*	9
South	*	*	*	*	19
West	*	*	*	*	20
North	*	*	*	*	15
East	*	*	*	*	8
Total 10-14	(7.6)	(0.0)	(92.4)	(100.0)	33
Total 15-19	(28.1)	(0.0)	(71.9)	(100.0)	38
Total 10-19	19.0	0.0	81.0	100.0	71

[1]Relates to Global AIDS Monitoring Indicator 2020 1.2: People living with HIV on antiretroviral therapy and PEPFAR TX_CURR_NAT / SUBNAT: Percentage of adults and children receiving antiretroviral therapy;
[2]Unawareness of HIV-positive status if self-reporting not being HIV positive and not having detectable ARV in blood.
[3]Awareness of HIV-positive status is defined as self-reporting HIV positive and/or having a detectable ARV in the blood.
[4]Not being on ART is defined as self-reporting not being on ART, and not having a detectable ARV in the blood.
[5]Being on ART is defined as self-reporting current use of ART and/or having a detectable ARV in the blood.
Weighted figures calculated using final blood test weights (btwt0).

Table 13.B Adolescent 90-90-90 (parent/guardian or self-reported antiretroviral therapy [ART] status and laboratory antiretroviral [ARV] data; conditional percentages)

90-90-90 targets among adolescents living with HIV aged 10-19 years, based on parent/guardian-reported data for ages 10-14 years and self-reported data for ages 15-19 years, and adjusted for having a detectable ARV in the blood, by age, RPHIA 2018-2019

	Diagnosed		On Treatment		Viral Load Suppression (VLS)	
Age	Percentage aware of HIV status[1]	Number	Among adolescents aware of HIV status, percentage on ART[2]	Number	Among adolescents on ART, percentage with VLS[3]	Number
10-14	(92.4)	33	(100.0)	30	(76.0)	30
15-19	(71.9)	38	(100.0)	28	(88.6)	28
10-19	81.0	71	100.0	58	82.2	58

[1]Relates to Global AIDS Monitoring 2020 Indicator (GAM 2020) 1.1: People living with HIV who know their HIV status and PEPFAR Indicator DIAGNOSED_NAT: The percentage of adults and children living with HIV who know their status (have been diagnosed). Awareness of HIV-positive status is defined as a report of HIV-positive status (parent-reported for young adolescents aged 10-14 years and self-reported for older adolescents aged 15-19 years) and/or having a detectable ARV in the blood.
[2]Relates to GAM 2020 1.2: People living with HIV on antiretroviral therapy and PEPFAR TX_CURR_NAT / SUBNAT: Percentage of adults and children receiving antiretroviral therapy. Being on ART is defined as reporting current use of ART (parent-reported for young adolescents aged 10-14 years and self-reported for older adolescents aged 15-19 years) and/or having a detectable ARV in the blood.
[3]Relates to GAM 2020 1.3: People living with HIV who have suppressed viral loads and PEPFAR Indicator VL_SUPPRESSION_NAT: Percentage of people living with HIV on ART with a suppressed viral load.
Weighted figures calculated using final blood test weights (btwt0).
*Estimates based on a very small denominator (less than 25) have been suppressed with an asterisk.
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

Table 13.C Sex before the age of 15 years

Percentage of young people aged 15–24 years who have had sexual intercourse before the age of 15 years; by sex and selected demographic characteristics, RPHIA, 2018-19

	Male		Female		Total	
Characteristic	Percentage who had sex before the age of 15 years	Number	Percentage who had sex before the age of 15 years	Number	Percentage who had sex before the age of 15 years	Number
Residence						
Urban	11.2	1,263	6.6	1,609	8.8	2,872
Rural	12.1	3,999	5.4	4,441	8.7	8,440
Province						
City of Kigali	10.8	921	6.6	1,149	8.6	2,070
South	11.6	1,011	6.3	1,047	9.0	2,058
West	10.9	1,335	4.4	1,635	7.5	2,970
North	11.8	1,060	5.0	1,223	8.3	2,283
East	13.9	935	6.8	996	10.4	1,931

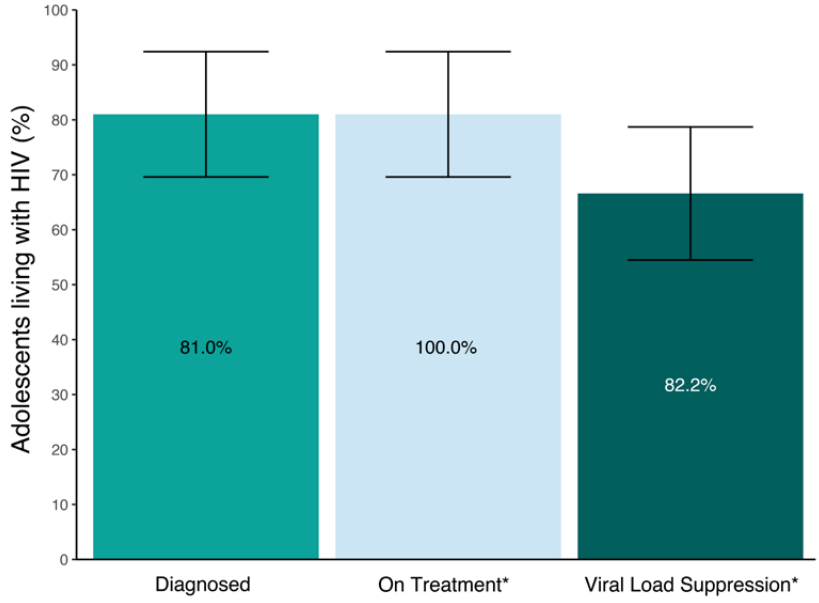
Table 13.C Sex before the age of 15 (continued)

Percentage of young people aged 15–24 years who have had sexual intercourse before the age of 15 years; by sex and selected demographic characteristics, RPHIA, 2018-19

Characteristic	Male		Female		Total	
	Percentage who had sex before the age of 15 years	Number	Percentage who had sex before the age of 15 years	Number	Percentage who had sex before the age of 15 years	Number
Marital status						
Never married	12.3	4,943	5.8	5,016	9.2	9,959
Married or living together	5.6	292	4.4	864	4.7	1,156
Divorced or separated	*	24	9.9	164	9.6	188
Widowed	*	0	*	3	*	3
Education						
No education	12.1	142	7.7	118	10.2	260
Primary	12.6	2,960	6.6	2,973	9.8	5,933
Secondary	11.2	2,005	4.8	2,831	7.6	4,836
More than secondary	5.6	153	0.0	124	3.3	277
Wealth quintile						
Lowest	11.4	819	5.8	1,024	8.4	1,843
Second	10.8	938	5.5	1,097	8.1	2,035
Middle	11.5	1,077	5.1	1,116	8.3	2,193
Fourth	13.9	1,144	5.5	1,117	9.9	2,261
Highest	11.6	1,283	6.5	1,695	8.9	2,978
Age						
15-19	13.6	3,051	6.3	3,333	9.9	6,384
20-24	9.9	2,211	5.0	2,717	7.4	4,928
Total 15-24	11.9	5,262	5.7	6,050	8.7	11,312

Weighted figures calculated using final interview weights (intwt0).
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.
*Estimates based on a very small denominator (less than 25) have been suppressed with an asterisk.

Figure 13.A
90-90-90: Young adolescent children, ages 10-19 years, (laboratory antiretroviral [ARV]-adjusted data), RPHIA 2018-2019



Note:
In the ARV-adjusted 90-90-90, HIV-positive adolescents were classified as "aware" or "diagnosed" if they reported knowing their HIV-positive status before testing positive in RPHIA or had a detectable ARV in their blood. They were classified as "on treatment" if they reported that they were on ART or if they had a detectable ARV in their blood.

*Inset numbers are conditional proportions.
The height of the bars represents population-coverage of each indicator among all adolescents living with HIV.

13.3 REFERENCES

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14. HIV RISK FACTORS

14.1 BACKGROUND

This chapter describes the prevalence of sexual behaviors that increase the risk of HIV infection. RPHIA asked questions about high-risk behaviors, including early sexual debut, recent engagement in multiple sexual partnerships, condom use at last sexual intercourse, and condom use at last sexual intercourse with a non-marital, non-cohabitating partner. With this information, programs can target those individuals most in need of information and most at risk for HIV infection.

Since 2007, WHO and UNAIDS have recommended voluntary medical male circumcision as a cost-effective strategy to reduce male acquisition of HIV. To inform voluntary medical male circumcision programs, men aged 15-64 years were asked if they had been medically or traditionally circumcised.

14.2 RESULTS

The following tables present RPHIA's data on HIV risk factors in Rwanda.

Table 14.A HIV prevalence by sexual behavior

Prevalence of HIV among persons aged 15-64 years, by sex and sexual behavior characteristics, RPHIA 2018-2019

Characteristic	Male		Female		Total	
	Percentage HIV positive	Number	Percentage HIV positive	Number	Percentage HIV positive	Number
Age at first sexual intercourse						
<15	1.7	980	5.8	563	3.1	1,543
15-19	2.9	3,708	5.9	5,922	4.7	9,630
20-24	2.9	3,552	3.2	4,801	3.1	8,353
≥25	2.6	2,081	3.5	1,625	3.0	3,706
Number of sexual partners in the 12 months before the survey*						
0	2.4	1,611	7.2	3,007	5.4	4,618
1	2.6	6,944	3.2	9,313	2.9	16,257
≥2	3.8	1,809	13.0	631	5.9	2,440
Condom use at last sexual intercourse in the past 12 months						
Used condom	6.5	1,446	10.5	1,103	8.1	2,549
Did not use condom	2.0	6,599	2.6	8,562	2.3	15,161
No sexual intercourse in the 12 months before the survey	2.4	1,611	7.2	3,007	5.4	4,618
Total 15-24	0.5	5,288	1.2	6,070	0.9	11,358
Total 15-49	1.8	12,167	3.3	14,659	2.6	26,826
Total 15-64	2.2	13,780	3.7	16,857	3.0	30,637

Weighted figures calculated using final blood test weights (btwt0).
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.
*Individuals who reported never having had sex are not including in this stratification.

Table 14.B Condom use at last sex with a non-marital, non-cohabitating partner: Men

Among men aged 15-64 years who reported having sex in the 12 months before the survey, percentage who reported having a non-marital, non-cohabitating partner during that time; among those who reported having sex with a non-marital, non-cohabitating partner during that time, percentage who reported using a condom the last time they had sex with a non-marital, non-cohabitating partner, by selected demographic characteristics, RPHIA 2018-2019

Characteristic	Among men who reported having sex in the 12 months before the survey		Among men who reported having sex with a non-marital, non-cohabitating partner in the 12 months before the survey	
	Percentage who reported having sex with a non-marital, non-cohabitating partner during that time	Number	Percentage who reported using a condom the last time they had sex with a non-marital, non-cohabitating partner[1]	Number
Residence				
Urban	46.3	2,405	58.1	919
Rural	28.0	6,374	46.8	1,558
Province				
City of Kigali	47.8	1,902	59.2	713
South	29.4	1,646	46.1	438
West	26.7	1,963	49.0	468
North	26.5	1,657	54.6	388
East	34.1	1,611	45.9	470
Marital status				
Never married	97.1	1,996	56.0	1,614
Married or living together	11.1	6,502	40.5	661
Divorced or separated	90.9	242	39.5	174
Widowed	(82.0)	36	(33.0)	26
Education				
No education	21.3	787	37.9	148
Primary	27.8	5,705	45.3	1,396
Secondary	49.9	1,720	61.9	746
More than secondary	41.0	564	55.6	187
Wealth quintile				
Lowest	23.1	1,331	41.5	280
Second	27.0	1,507	42.9	353
Middle	29.0	1,640	48.6	425
Fourth	30.8	1,786	48.6	483
Highest	45.5	2,504	59.4	932

Table 14.B Condom use at last sex with a non-marital, non-cohabitating partner: Men (continued)

Among men aged 15-64 years who reported having sex in the 12 months before the survey, percentage who reported having a non-marital, non-cohabitating partner during that time; among those who reported having sex with a non-marital, non-cohabitating partner during that time, percentage who reported using a condom the last time they had sex with a non-marital, non-cohabitating partner, by selected demographic characteristics, RPHIA 2018-2019

	Among men who reported having sex in the 12 months before the survey		Among men who reported having sex with a non-marital, non-cohabitating partner in the 12 months before the survey	
Characteristic	Percentage who reported having sex with a non-marital, non-cohabitating partner during that time	Number	Percentage who reported using a condom the last time they had sex with a non-marital, non-cohabitating partner[1]	Number
Age				
15-19	96.8	337	55.4	297
20-24	75.3	1,075	60.0	689
25-29	47.4	1,371	51.3	559
30-34	25.9	1,566	49.9	351
35-39	18.8	1,437	37.9	237
40-44	17.9	870	43.3	128
45-49	14.6	659	32.4	88
50-54	10.4	533	30.6	51
55-59	9.1	478	(36.9)	39
60-64	9.5	453	(11.3)	38
Total 15-24	79.7	1,412	58.8	986
Total 15-49	36.4	7,315	51.5	2,349
Total 15-64	32.0	8,779	50.2	2,477

[1]Relates to Global AIDS Monitoring 2020 Indicator 3.18: Condom use at last high-risk sex.
Weighted figures calculated using final interview weights (intwt0).
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

Table 14.C Condom use at last sex with a non-marital, non-cohabitating partner: Women

Among women aged 15-64 years who reported having sex in the 12 months before the survey, percentage who reported having a non-marital, non-cohabitating partner during that time; among those who reported having sex with a non-marital, non-cohabitating partner during that time, percentage who reported using a condom the last time they had sex with a non-marital, non-cohabitating partner, by selected demographic characteristics, RPHIA 2018-2019

	Among women who reported having sex in the 12 months before the survey		Among women who reported having sex with a non-marital, non-cohabitating partner in the 12 months before the survey	
Characteristic	Percentage who reported having sex with a non-marital, non-cohabitating partner during that time	Number	Percentage who reported using a condom the last time they had sex with a non-marital, non-cohabitating partner[1]	Number
Residence				
Urban	34.6	2,461	40.3	761
Rural	20.4	7,504	26.4	1,442
Province				
City of Kigali	36.3	1,865	39.9	587
South	23.7	1,968	27.2	439
West	19.8	2,438	30.3	465
North	17.8	1,934	28.8	329
East	23.5	1,760	27.3	383
Marital status				
Never married	94.0	1,558	37.2	1,342
Married or living together	2.9	7,570	26.3	213
Divorced or separated	86.9	684	16.8	530
Widowed	84.4	149	26.3	118
Education				
No education	14.7	1,170	15.6	150
Primary	20.5	6,332	27.0	1,245
Secondary	38.0	1,991	38.0	703
More than secondary	24.4	461	44.9	101
Wealth quintile				
Lowest	23.2	1,787	21.9	393
Second	22.4	1,852	24.8	389
Middle	18.4	1,865	24.4	326
Fourth	19.8	1,951	33.4	364
Highest	32.2	2,507	42.1	731

Table 14.C Condom use at last sex with a non-marital, non-cohabitating partner: Women (continued)

Among women aged 15-64 years who reported having sex in the 12 months before the survey, percentage who reported having a non-marital, non-cohabitating partner during that time; among those who reported having sex with a non-marital, non-cohabitating partner during that time, percentage who reported using a condom the last time they had sex with a non-marital, non-cohabitating partner, by selected demographic characteristics, RPHIA 2018-2019

	Among women who reported having sex in the 12 months before the survey		Among women who reported having sex with a non-marital, non-cohabitating partner in the 12 months before the survey	
Characteristic	Percentage who reported having sex with a non-marital, non-cohabitating partner during that time	Number	Percentage who reported using a condom the last time they had sex with a non-marital, non-cohabitating partner[1]	Number
Age				
15-19	83.7	448	42.6	348
20-24	48.4	1,554	34.0	690
25-29	27.0	1,864	27.8	473
30-34	15.9	1,842	27.4	276
35-39	11.4	1,498	21.8	154
40-44	12.5	1,036	25.1	116
45-49	13.3	677	15.4	83
50-54	9.0	458	(17.1)	37
55-59	5.2	346	*	16
60-64	4.8	242	*	10
Total 15-24	55.7	2,002	36.7	1,038
Total 15-49	25.2	8,919	30.7	2,140
Total 15-64	23.2	9,965	30.2	2,203

[1]Relates to Global AIDS Monitoring 2020 Indicator 3.18: Condom use at last high-risk sex.
Weighted figures calculated using final interview weights (intwt0).
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.
*Estimates based on a very small denominator (less than 25) have been suppressed with an asterisk.
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

Table 14.D Condom use at last sex with a non-marital, non-cohabitating partner: Total

Among persons aged 15-64 years who reported having sex in the 12 months before the survey, percentage who reported having a non-marital, non-cohabitating partner during that time; among those who reported having sex with a non-marital, non-cohabitating partner during that time, percentage who reported using a condom the last time they had sex with a non-marital, non-cohabitating partner, by selected demographic characteristics, RPHIA 2018-2019

	Among persons who reported having sex in the 12 months before the survey		Among persons who reported having sex with a non-marital, non-cohabitating partner in the 12 months before the survey	
Characteristic	Percentage who reported having sex with a non-marital, non-cohabitating partner during that time	Number	Percentage who reported using a condom the last time they had sex with a non-marital, non-cohabitating partner[1]	Number
Residence				
Urban	40.8	4,866	50.7	1,680
Rural	24.1	13,878	37.8	3,000
Province				
City of Kigali	42.6	3,767	51.4	1,300
South	26.5	3,614	37.3	877
West	23.1	4,401	40.4	933
North	22.1	3,591	43.7	717
East	29.0	3,371	38.2	853
Marital status				
Never married	95.8	3,554	48.2	2,956
Married or living together	7.0	14,072	37.5	874
Divorced or separated	88.1	926	23.1	704
Widowed	83.9	185	27.5	144
Education				
No education	17.6	1,957	27.5	298
Primary	24.2	12,037	37.4	2,641
Secondary	43.9	3,711	51.1	1,449
More than secondary	34.3	1,025	52.1	288
Wealth quintile				
Lowest	23.2	3,118	30.7	673
Second	24.7	3,359	34.1	742
Middle	23.7	3,505	38.9	751
Fourth	25.4	3,737	42.7	847
Highest	39.3	5,011	52.6	1,663

Table 14.D Condom use at last sex with a non-marital, non-cohabitating partner: Total (continued)

Among persons aged 15-64 years who reported having sex in the 12 months before the survey, percentage who reported having a non-marital, non-cohabitating partner during that time; among those who reported having sex with a non-marital, non-cohabitating partner during that time, percentage who reported using a condom the last time they had sex with a non-marital, non-cohabitating partner, by selected demographic characteristics, RPHIA 2018-2019

	Among persons who reported having sex in the 12 months before the survey		Among persons who reported having sex with a non-marital, non-cohabitating partner in the 12 months before the survey	
Characteristic	Percentage who reported having sex with a non-marital, non-cohabitating partner during that time	Number	Percentage who reported using a condom the last time they had sex with a non-marital, non-cohabitating partner[1]	Number
Age				
15-19	89.5	785	48.7	645
20-24	60.4	2,629	47.9	1,379
25-29	36.6	3,235	41.6	1,032
30-34	20.8	3,408	40.7	627
35-39	15.1	2,935	31.8	391
40-44	15.2	1,906	35.4	244
45-49	14.0	1,336	24.5	171
50-54	9.8	991	25.3	88
55-59	7.6	824	32.6	55
60-64	7.9	695	(8.8)	48
Total 15-24	66.4	3,414	48.2	2,024
Total 15-49	30.6	16,234	42.3	4,489
Total 15-64	27.6	18,744	41.5	4,680

[1]Relates to Global AIDS Monitoring 2020 Indicator 3.18: Condom use at last high-risk sex.
Weighted figures calculated using final interview weights (intwt0).
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

Table 14.E Sexual behavior according to HIV status: Men

Sexual behavior in the 12 months before the survey among men aged 15-64 years, according to HIV status, RPHIA 2018-2019

	HIV Positive		
Characteristic	Unaware of HIV status or aware of HIV Status and not on ART (N= 64)	Aware of HIV Status and on ART (N= 237)	HIV Negative (N = 13,478)
Number of sexual partners in the 12 months before the survey			
0	13.4	13.1	15.2
1	54.1	65.8	67.9
≥2	32.4	21.1	16.8

Table 14.E Sexual behavior according to HIV status: Men (continued)

Sexual behavior in the 12 months before the survey among men aged 15-64 years, according to HIV status, RPHIA 2018-2019

Characteristic	HIV Positive		HIV Negative (N = 13,478)
	Unaware of HIV status or aware of HIV Status and not on ART (N= 64)	Aware of HIV Status and on ART (N= 237)	
Condom use at last sexual intercourse in the 12 months before the survey			
Used condom	10.8	41.0	13.8
Did not use condom	74.1	44.7	69.9
No sexual intercourse in the 12 months before the survey	15.1	14.3	16.3
Condom use at last sex with a non-marital non-cohabitating partner			
Used condom	*	(57.9)	50.4
Did not use condom	*	(42.1)	49.6
Total 15-64	100.0	100.0	100.0

Weighted figures calculated using final interview weights (intwt0).
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.
*Estimates based on a very small denominator (less than 25) have been suppressed with an asterisk.
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

Table 14.F Sexual behavior according to HIV status: Women

Sexual behavior in the 12 months before the survey among women aged 15-64 years, according to HIV status, RPHIA 2018-2019

Characteristic	HIV Positive		HIV Negative (N = 16,225)
	Unaware of HIV status or aware of HIV Status and not on ART (N= 102)	Aware of HIV Status and on ART (N= 530)	
Number of sexual partners in the 12 months before the survey			
0	26.4	38.9	22.6
1	60.3	48.5	73.3
≥2	13.4	12.6	4.1
Condom use at last sexual intercourse in the 12 months before the survey			
Used condom	8.0	22.2	7.8
Did not use condom	64.3	36.1	69.2
No sexual intercourse in the 12 months before the survey	27.7	41.7	23.0
Condom use at last sex with a non-marital non-cohabitating partner			
Used condom	(18.3)	49.1	29.3
Did not use condom	(81.7)	50.9	70.7
Total 15-64	100.0	100.0	100.0

Weighted figures calculated using final interview weights (intwt0).
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.
*Estimates based on a very small denominator (less than 25) have been suppressed with an asterisk.
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

Table 14.G Male circumcision

Percent distribution of men aged 15-64 years by self-reported circumcision status, by result of RPHIA survey HIV test and selected demographic characteristics, RPHIA 2018-2019

Characteristic	Circumcised[1]		Uncircumcised	Unknown	Total	Number
	Medical circumcision	Non-medical circumcision				
Result of RPHIA survey HIV test						
HIV positive	23.8	1.2	73.9	1.1	100.0	302
HIV negative	39.7	2.4	56.8	1.1	100.0	13,478
Not tested	(76.2)	(0.0)	(23.8)	(0.0)	(100.0)	41
Residence						
Urban	61.8	4.4	31.8	2.0	100.0	3,607
Rural	33.4	1.8	64.0	0.8	100.0	10,214
Province						
City of Kigali	60.6	3.0	34.0	2.4	100.0	2,787
South	29.9	0.6	68.6	0.8	100.0	2,713
West	43.9	5.8	49.6	0.7	100.0	3,226
North	35.7	0.5	63.2	0.6	100.0	2,588
East	35.5	1.5	61.7	1.3	100.0	2,507
Marital status						
Never married	54.2	2.1	42.7	1.0	100.0	6,635
Married or living together	27.4	2.5	69.0	1.1	100.0	6,753
Divorced or separated	26.0	2.9	69.2	1.9	100.0	353
Widowed	12.3	2.5	85.3	0.0	100.0	74
Education						
No education	14.7	1.9	82.3	1.2	100.0	1,004
Primary	29.3	2.2	67.8	0.8	100.0	8,436
Secondary	65.6	2.8	30.1	1.6	100.0	3,575
More than secondary	78.5	3.2	16.3	2.0	100.0	801
Wealth quintile						
Lowest	22.1	0.7	76.9	0.3	100.0	2,166
Second	28.3	1.9	68.8	0.9	100.0	2,396
Middle	34.7	2.2	62.5	0.7	100.0	2,636
Fourth	42.4	2.8	53.7	1.1	100.0	2,866
Highest	62.9	3.7	31.3	2.1	100.0	3,744

Table 14.G Male circumcision (continued)

Percent distribution of men aged 15-64 years by self-reported circumcision status, by result of RPHIA survey HIV test and selected demographic characteristics, RPHIA 2018-2019

Characteristic	Circumcised[1]		Uncircumcised	Unknown	Total	Number
	Medical circumcision	Non-medical circumcision				
Age						
15-19	51.9	1.5	46.1	0.5	100.0	3,072
20-24	56.0	2.6	40.3	1.1	100.0	2,226
25-29	49.7	2.8	45.9	1.6	100.0	1,874
30-34	39.3	3.6	55.9	1.3	100.0	1,788
35-39	30.1	2.8	66.0	1.1	100.0	1,573
40-44	23.8	1.8	73.3	1.1	100.0	957
45-49	18.3	2.4	78.6	0.7	100.0	716
50-54	15.9	2.4	80.3	1.5	100.0	595
55-59	11.7	0.8	86.4	1.0	100.0	516
60-64	10.1	1.0	88.0	0.9	100.0	504
Total 15-24	53.8	2.0	43.4	0.8	100.0	5,298
Total 15-49	43.0	2.5	53.4	1.1	100.0	12,206
Total 15-64	39.4	2.4	57.1	1.1	100.0	13,821

[1]Relates to Global AIDS Monitoring 2020 Indicator 3.16: Prevalence of male circumcision and PEPFAR Indicator VMMC_TOTALCIRC NAT / SUBNAT: Total number of men ever circumcised.

Weighted figures calculated using final interview weights (intwt0).

The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.

( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

15. TUBERCULOSIS, HEPATITIS B, HEPATITIS C, AND CERVICAL CANCER SCREENING

15.1 BACKGROUND

People living with HIV are at risk for acquiring other diseases, including TB, hepatitis B, syphilis, and other STIs. TB is the leading cause of death for people living with HIV in Africa. HIV infection predisposes a person to TB infection and progression to active disease. Information regarding health-seeking behavior, particularly for TB health services, is therefore very important. A UNAIDS model estimates that there were 320 [uncertainty bounds: 220 to 420] TB-related deaths among HIV-positive persons in Rwanda in 2017.[1] This chapter describes the TB clinical care cascade for HIV-positive individuals: HIV testing in TB clinics, TB clinic attendance by self-reported HIV-positives; TB diagnoses among those receiving care, and treatment among those diagnosed with TB.

HIV and HBV have similar transmission routes and concurrent infection with both viruses often results in more rapid progression of hepatitis B to cirrhosis and higher liver-disease mortality. RPHIA 2018-2019 calculated the population-based prevalence of acute or chronic hepatitis B among HIV-positive individuals and a subset of those who tested HIV negative. The proportion of those with acute or chronic hepatitis B who were recently infected with HBV was also assessed. These results will support actionable policy recommendations for screening and treatment and may potentially provide evidence of the impact of national HBV vaccination programs.

The prevalence of past or current hepatitis C is also high among people living with HIV in most countries and poses an even greater risk of cirrhosis and liver disease-related mortality. RPHIA also provided population-based prevalence of past or current hepatitis C among HIV-positive individuals and a subset of HIV-negative individuals. Hepatitis C VL tests were also performed to determine the prevalence of current hepatitis C, and to determine the size of the population in need of treatment.
This chapter presents data on the prevalence of acute or chronic hepatitis B and recent HBV infection, and past or current hepatitis C as well as current hepatitis C in individuals aged 10-64 years, by province, HIV status, sex, age, and socioeconomic and demographic characteristics.

Women living with HIV are at greater risk of developing cervical cancer because their weakened immune systems are not able to clear human papillomavirus (HPV) infections. The WHO recommends HPV screening and treatment for all sexually active HIV-positive women.[2] RPHIA provided population-based rates of screening not available from routine clinic data, which does not capture women not in care. This chapter presents self-reported cervical cancer screening rates by age and socio-demographic characteristics.

15.2 RESULTS

The following tables report RPHIA's findings on other diseases associated with HIV, including TB, hepatitis B, hepatitis C, and cervical cancer.

Table 15.A HIV testing in tuberculosis (TB) clinics

Percent distribution of persons aged 15-64 years who had ever visited a TB clinic by whether they were tested for HIV during a TB clinic visit, by sex, RPHIA 2018-2019

Characteristic	Tested for HIV during a TB clinic visit	Not tested for HIV during a TB clinic visit		Total	Number
		Already knew they were HIV positive	Did not know their status		
Sex					
Male	73.9	7.4	18.7	100.0	162
Female	79.7	4.3	15.9	100.0	106
Total 15-49	78.2	6.1	15.6	100.0	187
Total 15-64	76.0	6.3	17.7	100.0	268

Weighted figures calculated using final interview weights (intwt0).

Table 15.B Tuberculosis (TB) clinic attendance and services among HIV-positive adults

Among self-reported HIV-positive persons aged 15-64 years, percentage who ever visited a TB clinic; among those who had ever visited a TB clinic, percentage who were diagnosed for TB; and among those diagnosed with TB, percentage who were treated for TB based on self-report, by sex, RPHIA 2018-2019

Characteristic	Among HIV-positive persons		Among HIV-positive persons who ever visited a TB clinic		Among HIV-positive persons who were diagnosed with TB	
	Percentage who ever visited a TB clinic	Number	Percentage who were diagnosed with TB	Number	Percentage who were treated for TB	Number
Sex						
Male	46.1	220	30.3	103	(100.0)	31
Female	35.6	473	20.0	179	(100.0)	36
Total 15-49	35.4	517	22.9	191	(100.0)	43
Total 15-64	39.3	693	24.2	282	100.0	67

Weighted figures calculated using final blood test weights (btwt0).
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

Table 15.C Acute or chronic hepatitis B prevalence

Prevalence of acute or chronic hepatitis B[1] among RPHIA participants aged 10-64 years (unless otherwise noted), by sex, result of RPHIA HIV test, and selected demographic characteristics, RPHIA 2018-2019

Characteristic	Male		Female		Total	
	Percentage with acute or chronic hepatitis B	Number	Percentage with acute or chronic hepatitis B	Number	Percentage with acute or chronic hepatitis B	Number
Result of RPHIA HIV test						
HIV positive	6.7	311	1.8	638	3.6	949
HIV negative	2.2	1,669	1.1	1,967	1.6	3,636
Residence						
Urban	2.4	484	1.3	642	1.9	1,126
Rural	2.2	1,496	1.0	1,963	1.6	3,459
Province						
City of Kigali	2.2	353	1.4	463	1.8	816
South	0.6	412	0.5	494	0.5	906
West	2.4	495	2.1	668	2.2	1,163
North	1.5	372	0.2	509	0.8	881
East	4.4	348	1.0	471	2.6	819
Marital status†						
Never married	1.5	660	0.7	719	1.1	1,379
Married or living together	3.7	822	1.1	968	2.4	1,790
Divorced or separated	6.6	64	5.0	225	5.4	289
Widowed	*	20	1.8	235	1.7	255
Education†						
No education	5.3	143	0.9	274	2.7	417
Primary	2.6	978	1.3	1,312	1.9	2,290
Secondary	2.5	380	1.5	497	2.0	877
More than secondary	2.9	65	0.0	65	1.6	130
Age						
10-14	0.0	413	0.0	456	0.0	869
15-19	1.1	307	0.7	345	0.9	652
20-24	1.6	203	2.1	300	1.8	503
25-29	3.2	186	0.7	296	1.9	482
30-34	5.3	202	0.8	273	3.0	475
35-39	4.5	192	2.0	255	3.2	447
40-44	3.8	140	0.8	207	2.2	347
45-49	0.5	99	1.6	137	1.1	236
50-54	0.5	83	1.9	137	1.3	220
55-59	2.2	87	0.0	116	1.0	203
60-64	5.6	68	4.3	83	4.9	151

Table 15.C Acute or chronic hepatitis B prevalence (continued)

Prevalence of acute or chronic hepatitis B[1] among RPHIA participants aged 10-64 years (unless otherwise noted), by sex, result of RPHIA HIV test, and selected demographic characteristics, RPHIA 2018-2019

Characteristic	Male		Female		Total	
	Percentage with acute or chronic hepatitis B	Number	Percentage with acute or chronic hepatitis B	Number	Percentage with acute or chronic hepatitis B	Number
Total 15-24	1.3	510	1.3	645	1.3	1,155
Total 15-49	2.8	1,329	1.2	1,813	2.0	3,142
Total 50-64	2.4	238	1.8	336	2.1	574
Total 15-64	2.8	1,567	1.3	2,149	2.0	3,716
Total 10-64	2.3	1,980	1.1	2,605	1.7	4,585

Weighted figures calculated using hepatitis test weights (hepbcwt0).
[1]Prevalence of acute or chronic hepatitis B was measured using a serological hepatitis B surface antigen rapid diagnostic test.
†Estimates for these stratification variables include only participants aged 15-64 years.
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.
*Estimates based on a very small denominator (less than 25) have been suppressed with an asterisk.

Table 15.D Recent hepatitis B virus infection

Prevalence of recent infection with hepatitis B virus (HBV)[1] among RPHIA participants aged 10-64 years, by sex and age, RPHIA 2018-2019

Characteristic	Male				Female	
	Percentage with recent HBV infection	Number	Percentage with recent HBV infection	Number	Percentage with recent HBV infection	Number
Residence						
Urban	0.02	484	0.00	642	0.01	1,126
Rural	0.11	1,496	0.01	1,963	0.06	3,459
Province						
City of Kigali	0.03	353	0.00	463	0.02	816
South	0.00	412	0.00	494	0.00	906
West	0.03	495	0.00	668	0.01	1,163
North	0.00	372	0.00	509	0.00	881
East	0.37	348	0.03	471	0.19	819

Table 15.D Recent hepatitis B virus infection (continued)

Prevalence of recent infection with hepatitis B virus (HBV)[1] among RPHIA participants aged 10-64 years, by sex and age, RPHIA 2018-2019

	Male		Female			
Characteristic	Percentage with recent HBV infection	Number	Percentage with recent HBV infection	Number	Percentage with recent HBV infection	Number
Age						
15-24	0.26	510	0.00	645	0.13	1,155
25-34	0.05	388	0.00	569	0.02	957
35-49	0.04	431	0.04	599	0.04	1,030
15-49	0.13	1,329	0.01	1,813	0.07	3,142
15-64	0.12	1,567	0.01	2,149	0.06	3,716
10-64	0.09	1,980	0.01	2,605	0.05	4,585

Weighted figures calculated using hepatitis test weights (hepbcwt0).
[1]Prevalence of recent infection with hepatitis B virus was measured using IgM Anti-HBc enzyme immunoassay.

Table 15.E Recent hepatitis B virus infection among individuals with hepatitis B

Percentage of recent infection with hepatitis B virus (HBV)[1] among RPHIA participants aged 10-64 years with acute or chronic hepatitis B,[2] by sex and age, RPHIA 2018-2019

Characteristic	Percentage with recent HBV infection	Number
Residence		
Urban	(0.5)	29
Rural	3.7	56
Age		
15-24	*	14
25-34	(0.9)	28
35-49	(1.6)	29
15-49	3.5	71
15-64	3.0	85
10-64	3.0	85

Weighted figures calculated using hepatitis test weights (hepbcwt0).
[1]Prevalence of recent infection with HBV was measured using IgM Anti-HBc enzyme immunoassay.
[2]Prevalence of acute or chronic hepatitis B was measured using a serological hepatitis B surface antigen rapid diagnostic test.
*Estimates based on a very small denominator (less than 25) have been suppressed with an asterisk.
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

Table 15.F Past or current hepatitis C prevalence

Prevalence of past or current hepatitis C[1] among RPHIA participants aged 10-64 years (unless otherwise noted), by sex, result of RPHIA HIV test, and selected demographic characteristics, RPHIA 2018-2019

Characteristic	Male		Female		Total	
	Percentage past or current hepatitis C	Number	Percentage past or current hepatitis C	Number	Percentage past or current hepatitis C	Number
Result of RPHIA survey HIV test						
HIV positive	3.6	311	2.1	638	2.6	949
HIV negative	1.0	1,669	1.0	1,967	1.0	3,636
Residence						
Urban	1.2	484	1.3	642	1.3	1,126
Rural	1.1	1,496	1.0	1,963	1.0	3,459
Province						
City of Kigali	0.1	353	0.8	463	0.5	816
South	1.6	412	2.1	494	1.8	906
West	0.7	495	0.4	668	0.6	1,163
North	1.0	372	1.3	509	1.2	881
East	1.4	348	0.6	471	1.0	819
Marital status[†]						
Never married	0.0	660	0.3	719	0.1	1,379
Married or living together	2.3	822	0.9	968	1.6	1,790
Divorced or separated	0.2	64	2.3	225	1.8	289
Widowed	*	20	5.4	235	5.4	255
Education[†]						
No education	0.1	143	1.9	274	1.2	417
Primary	1.8	978	1.3	1,312	1.6	2,290
Secondary	0.1	380	0.4	497	0.3	877
More than secondary	1.5	65	0.0	65	0.8	130
Wealth quintile						
Lowest	1.6	394	0.8	530	1.2	924
Second	1.1	378	1.4	512	1.3	890
Middle	0.4	379	1.3	444	0.9	823
Fourth	0.6	368	0.7	525	0.6	893
Highest	1.7	454	1.1	590	1.4	1,044

Table 15.F Past or current hepatitis C prevalence (conclusion)

Prevalence of past or current hepatitis C[1] among RPHIA participants aged 10-64 years (unless otherwise noted), by sex, result of RPHIA HIV test, and selected demographic characteristics, RPHIA 2018-2019

Characteristic	Male		Female		Total	
	Percentage past or current hepatitis C	Number	Percentage past or current hepatitis C	Number	Percentage past or current hepatitis C	Number
Age						
10-14	0.3	413	0.6	456	0.5	869
15-19	0.0	307	0.0	345	0.0	652
20-24	0.1	203	1.3	300	0.7	503
25-29	0.0	186	1.1	296	0.6	482
30-34	0.9	202	0.1	273	0.5	475
35-39	0.5	192	0.0	255	0.3	447
40-44	1.1	140	0.3	207	0.7	347
45-49	2.3	99	0.2	137	1.2	236
50-54	3.4	83	6.8	137	5.2	220
55-59	11.0	87	4.4	116	7.3	203
60-64	7.3	68	4.3	83	5.6	151
Total 15-24	0.0	510	0.6	645	0.3	1,155
Total 15-49	0.5	1,329	0.5	1,813	0.5	3,142
Total 50-64‡	7.1	238	5.3	336	6.1	574
Total 15-64	1.3	1,567	1.1	2,149	1.2	3,716
Total 10-64	1.1	1,980	1.0	2,605	1.1	4,585

Weighted figures calculated using hepatitis test weights (hepbcwt0).
[1]Past or current hepatitis C was measured using a hepatitis C virus antibody test.
*Estimates based on a very small denominator (less than 25) have been suppressed with an asterisk.
†Estimates for these stratification variables include only participants aged 15-64 years.
‡The sample size for prevalence of past or current hepatitis C virus (HCV) infection measurement was not powered to provide reliable estimates and did not account for oversampling on older age groups most likely to be infected with HCV.
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.

Table 15.G Current hepatitis C prevalence

Prevalence of current hepatitis C[1] among RPHIA participants aged 10-64 years (unless otherwise noted) by sex, result of RPHIA HIV test, and selected demographic characteristics, RPHIA 2018-2019

Characteristic	Male		Female		Total	
	Percentage with current hepatitis C	Number	Percentage with current hepatitis C	Number	Percentage with current hepatitis C	Number
Result of RPHIA survey HIV test						
HIV positive	2.3	311	1.0	638	1.5	949
HIV negative	0.8	1,669	0.5	1,967	0.6	3,636
Residence						
Urban	1.0	484	0.4	642	0.7	1,126
Rural	0.7	1,496	0.6	1,963	0.7	3,459
Province						
City of Kigali	0.1	353	0.7	463	0.4	816
South	0.9	412	1.1	494	1.0	906
West	0.7	495	0.2	668	0.5	1,163
North	1.0	372	0.5	509	0.7	881
East	0.9	348	0.3	471	0.6	819
Marital status[†]						
Never married	0.0	660	0.0	719	0.0	1,379
Married or living together	1.6	822	0.4	968	1.0	1,790
Divorced or separated	0.2	64	1.4	225	1.1	289
Widowed	*	20	4.6	235	4.7	255
Education[†]						
No education	0.0	143	0.4	274	0.2	417
Primary	1.4	978	0.9	1,312	1.1	2,290
Secondary	0.1	380	0.1	497	0.1	877
More than secondary	0.0	65	0.0	65	0.0	130
Wealth quintile						
Lowest	1.2	394	0.6	530	0.9	924
Second	0.5	378	0.9	512	0.7	890
Middle	0.2	379	0.8	444	0.5	823
Fourth	0.5	368	0.0	525	0.3	893
Highest	1.4	454	0.4	590	0.9	1,044

Table 15.G Current hepatitis C prevalence (continue)

Prevalence of current hepatitis C[1] among RPHIA participants aged 10-64 years (unless otherwise noted) by sex, result of RPHIA HIV test, and selected demographic characteristics, RPHIA 2018-2019

Characteristic	Male		Female		Total	
	Percentage with current hepatitis C	Number	Percentage with current hepatitis C	Number	Percentage with current hepatitis C	Number
Age						
10-14	0.3	413	0.0	456	0.2	869
15-19	0.0	307	0.0	345	0.0	652
20-24	0.0	203	0.3	300	0.1	503
25-29	0.0	186	0.2	296	0.1	482
30-34	0.6	202	0.0	273	0.3	475
35-39	0.5	192	0.0	255	0.3	447
40-44	1.1	140	0.2	207	0.6	347
45-49	2.2	99	0.2	137	1.1	236
50-54	3.3	83	5.9	137	4.7	220
55-59	6.9	87	3.2	116	4.9	203
60-64	3.4	68	2.9	83	3.1	151
Total 15-24	0.0	510	0.1	645	0.1	1,155
Total 15-49	0.4	1,329	0.1	1,813	0.2	3,142
Total 50-64	4.6	238	4.1	336	4.3	574
Total 15-64	0.9	1,567	0.7	2,149	0.8	3,716

Weighted figures calculated using hepatitis test weights (hepbcwt0).

[1]Current hepatitis C was measured using a hepatitis C virus (HCV) RNA polymerase chain reaction (PCR) among those who tested hepatitis C virus (HCV) antibody positive. This table presents the prevalence of current hepatitis C over the total number of RPHIA participants tested with the hepatitis C rapid test.

†Estimates for these stratification variables include only participants aged 15-64 years.

The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.

*Estimates based on a very small denominator (less than 25) have been suppressed with an asterisk.

Table 15.H Detectable hepatitis C viral load among hepatitis C rapid test positives

Percentage of current hepatitis C[1] among RPHIA participants aged 10-64 years with past or current hepatitis C[2], by sex and age, RPHIA 2018-2019

Characteristic	Male		Total			
	Percentage with current hepatitis C	Number	Percentage with current hepatitis C	Number	Percentage with current hepatitis C	Number
Result of RPHIA survey HIV test						
HIV positive	*	10	*	13	*	23
HIV negative	*	17	*	19	(62.7)	36
Total 15-49	*	10	*	14	*	24
Total 50-64	*	16	*	16	(71.0)	32
Total 15-64	(71.2)	26	(58.1)	30	64.7	56
Total 10-64	(72.8)	27	(52.3)	32	62.4	59

Weighted figures calculated using hepatitis test weights (hepbcwt0).
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.
[1]Current hepatitis C was measured using a hepatitis C virus (HCV) RNA polymerase chain reaction (PCR) among those who tested HCV antibody positive.
[2]Past or current HCV infection was measured using an HCV antibody test.
*Estimates based on a very small denominator (less than 25) have been suppressed with an asterisk.
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

Table 15.I People living with hepatitis C

People living with current hepatitis C[1], among persons aged 10-64 years, by age, RPHIA 2018-2019

Age	People living with hepatitis C	95% CI
10-14	2,500	0–7,600
15-24	1,600	0–5,000
25-34	3,600	0–9,300
35-49	9,800	0–20,400
15-49	15,100	2,600–27,600
15-64	54,100	29,200–79,000

Weighted figures calculated using hepatitis test weights (hepbcwt0).
[1]Current hepatitis C was measured using a hepatitis C virus (HCV) RNA polymerase chain reaction (PCR) among those who tested HCV antibody positive.

Table 15.J Cervical cancer screening among women living with HIV

Among HIV-positive women aged 30-49 years, percentage who report being screened for cervical cancer, by selected demographic characteristics, RPHIA 2018-2019

Characteristic	Percentage who reported that they had ever had a screening test for cervical cancer[1]	Number
Residence		
Urban	16.6	130
Rural	6.4	209
Province		
City of Kigali	28.2	90
South	0.0	50
West	6.6	91
North	11.8	51
East	7.3	57
Marital status		
Never married	(7.2)	38
Married or living together	8.8	161
Divorced or separated	10.0	82
Widowed	13.8	58
Education		
No education	3.5	62
Primary	10.4	224
Secondary	(15.7)	48
More than secondary	*	5
Wealth quintile		
Lowest	3.3	52
Second	(11.4)	44
Middle	8.3	61
Fourth	6.5	87
Highest	18.6	95
Age		
30-34	8.6	86
35-39	8.3	85
40-44	12.9	97
45-49	8.6	71
Total 30-49	9.8	339

[1]Relates to Global AIDS Monitoring 2020 Indicator 10.10: Cervical cancer screening among women living with HIV.
Weighted figures calculated using final blood test weights (btwt0).
The sum of the sample sizes for a given classification may be less than the total sample size because of missing responses to the classification variable.
*Estimates based on a very small denominator (less than 25) have been suppressed with an asterisk.
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

15.3 REFERENCES

1. Joint United Nations Programme on HIV/AIDS. *UNAIDS data tables*, 2017. http://aidsinfo.unaids.org/. Accessed March 26, 2020.

APPENDICES

APPENDIX A SAMPLE DESIGN AND WEIGHTING

Appendix A provides a high-level overview of sampling and weighting procedures for RPHIA 2018-2019. In-depth details are provided in the *RPHIA 2018-2019 Sampling and Weighting Technical Report*, which may be found on the the PHIA website https://phia.icap.columbia.edu/.

A.1 SAMPLE DESIGN

Overview

The sample design for the RPHIA 2018-2019 is a stratified multistage probability sample design, with strata defined by the five provinces of the country, first-stage sampling units defined by EAs within strata, second-stage sampling units defined by HHs within EAs, and finally eligible persons within HHs. Within each province, the first-stage sampling units (also referred to as PSUs) were selected with probabilities proportionate to the number of HHs in the PSU based on the 2012 Census sampling frame. The allocation of the sample PSUs to the five provinces was made in a manner designed to achieve specified precision levels for (1) a national estimate of the HIV incidence rate among adults aged 15-49 years and (2) provincial estimates of VLS among adults aged 15-49 years.

A larger share of the sample was allocated to Kigali City in order to estimate incidence for this much higher-prevalence province in the country. Therefore, estimates for the proposed sample design were carried out by allocating the minimum amount of sample to provinces other than Kigali City and maximizing the sample allocation to Kigali City to arrive at an overall sample size and allocation to meet survey objectives.

The second-stage sampling units were selected from lists of dwelling units/HHs compiled by trained staff for each of the sampled PSUs. Upon completion of the listing process, a random systematic sample of dwelling units/HHs was selected from each PSU at rates designed to yield self-weighting (i.e., equal probability) samples within each province to the extent feasible.

Within the sampled HHs, all eligible adults aged 15-64 years were included in the study sample for data collection. All eligible children aged 10-14 years in sampled HHs were included in the study for data collection.

Population of Inference

The population of inference for the RPHIA 2018-2019 is comprised of individuals aged 10-64 years old who were present in HHs (i.e., "slept in the HH") on the night prior to the date of interview. This population is referred to as the de facto HH population. In contrast, the de jure population is comprised of individuals who are usual residents of the HH, irrespective of whether or not they slept in the HH on the night prior to the HH interview.

Precision Specifications and Assumptions

The following specifications were used to develop the sample design for the RPHIA 2018-2019.

- Relative standard error (RSE) of 33% for the national estimate of HIV incidence among persons aged 15-49 years; RSE of 36.5% for Kigali City incidence estimate.
- 95% confidence bounds of ±0.10 around an estimated VLS rate among all HIV-positive adults aged 15-49 years for four of the five sampling strata (North, South, East, and West provinces provinces) of Rwanda and ±0.06 for Kigali City.

The following assumptions were used to develop the sample design for the RPHIA 2018-2019.

- An overall HIV prevalence rate of 0.029 (2.9%) among persons aged 15-49 years that varies by stratum. Source: *2014 Rwanda Demographic and Health Survey* (DHS).
- An annual national HIV incidence rate for adults aged 15-49 years of P_a=0.0013 (0.13%). Source: 2016 UNAIDS estimate.
- A mean duration of recent infections (MDRI) of 130 days, yielding an annualization rate of 365/130= 2.8077. Hence, the estimated incidence rate for MDRI = 130 days is P_m=0.0013/2.8077 = 0.0005 (0.05%).
- A VLS rate of P_vh = 0.50 (50%) among HIV-positive adults aged 15-49. This is a conservative assumption because it will overstate the actual variance of the estimated VLS rate.
- An average sample size of 30 HHs per PSU (after losses due to vacancy and nonresponse).

- An intra-cluster correlation (ICC) of ρ = 0.0136 for HIV prevalence and VLS rates. An intra-cluster correlation (ICC) of ρ = 0.0005 for HIV incidence rates. The assumed values are based on analyses of recent DHS and PHIA surveys. The ICC provides an average measure of the homogeneity of responses within the first-stage sampling units.
- An occupancy rate of 95% for sampled dwellings. Source: 2011 Rwanda Demographic and Health Survey (DHS).
- An overall HH response rate of 96% among occupied HHs based on experience in recent PHIA surveys.
- The average number of persons aged 15-49 years per urban HH is 2.10. Source: *2012 Rwanda Population and Housing Census*.
- The overall percentage of persons in HHs who are 10-14 years of age is 12.0%. Source: *2012 Rwanda Population and Housing Census*.
- The overall percentage of persons in urban HHs who are 50-64 years of age is 7.2%. Source: *2012 Rwanda Population and Housing Census*.
- Among the eligible individuals 15-64 years of age in HHs completing the HH roster, a biomarker response rate of 94% based on recent PHIA experience.
- Among the eligible children 10-14 years of age in HHs completing the HH roster, a biomarker response rate of 96% based on recent PHIA experience.

Selection of the Primary Sampling Units

The PSUs for the RPHIA 2018-2019 were defined to be the EAs created for the 2012 Census sampling frame. The sampling frame consisted of approximately 16,728 EAs containing an estimated 2,424,898 HHs and 10,378,021 persons.

A stratified sample of 375 EAs was selected from the sampling frame. The five strata specified for sampling were the five provinces of Rwanda. The EA samples were selected systematically and with probabilities proportionate to a measure of size (MOS) equal to the number of HHs in the EA based on the 2012 Census. Prior to sampling, the EAs were sorted by district within province, sector within district, administrative unit (cellule) within sector, village within administrative unit, and finally by urban-rural status within village. Sorting of the EAs prior to sample selection induces an implicit geographic stratification. To select the sample from a particular stratum, the cumulative MOS was determined for each EA in the ordered list of EAs, and the sample selections were designated using a sampling interval equal to the total MOS of the EAs in the stratum divided by the number of EAs to be selected and a random starting point. The resulting sample had the property that the probability of selecting an EA within a particular stratum was proportional to the MOS of the EA in the stratum.

Two of the originally-sampled enumeration areas were deleted from the sample because they no longer contained HHs as a result of landslides. Thus, 373 of the 375 sampled EAs remained in the study for data collection after deleting these two ineligible (out-of-scope) EAs.

Details regarding EA substitution and segmentation may be found in the *RPHIA 2018-2019 Sampling and Weighting Technical Report* available at the on the PHIA website https://phia-data.icap.columbia.edu/files.

Selection of Households

For both sampling and analysis purposes, a HH was defined as a group of individuals who reside in a physical structure such as a house, apartment, compound, or homestead, and share in housekeeping arrangements. The physical structure in which people reside was referred to as the dwelling unit, which may have contained more than one HH meeting the above definition. HHs were eligible for participation in the study if they were located within the sampled EA.

The selection of HHs for the RPHIA involved the following steps: (1) listing all potentially eligible dwelling units/HHs within the sampled EAs; (2) assigning eligibility codes to the listed dwelling unit/HH records based on characteristics of the listed units; and (3) selecting the sample of dwelling units/HHs from those records determined to be eligible for selection.

A description of the HH listing process as well as a summary of HH eligibility may be found in the *RPHIA 2018-2019 Sampling and Weighting Technical Report* at https://phia-data.icap.columbia.edu/files.

Selection of HHs utilized an equal probability design. In order to achieve equal probability samples of HHs within each of the five provinces of Rwanda, the sampling rates required to select dwelling units/HHs within an EA depended on the difference between the MOS used in sampling and the actual number of dwelling units/HHs found at the time of listing. Thus, application of these within-EA sampling rates could have yielded more or less than the desired 30 HHs in EAs where the sampling MOS differs from the actual listing

count. The *RPHIA 2018-2019 Sampling and Weighting Technical Report* provides an in-depth description of the equal probability sample design, as well as a detailed summary of the results of the HH selection.

Selection of Individuals

The selection of individuals for the RPHIA 2018-2019 involved the following steps: (1) compiling a list of all individuals known to reside in the HH or who slept in the HH during the night prior to data collection; (2) identifying those rostered individuals who were eligible for data collection; and (3) selecting for the study those individuals who met the age and residency requirements of the study. However, only those individuals who slept in the HH the night before the HH interview (i.e., the de facto population) were retained for subsequent weighting and analysis.

The *RPHIA 2018-2019 Sampling and Weighting Technical Report* provides a brief description of the process for listing and selecting individuals for participation in the RPHIA 2018-2019, and also presents detailed summaries of the distributions of eligible individuals and participants in individual interviews and HIV testing by strata and age.

A.2 WEIGHTING

Overview

In general, the purpose of weighting survey data from a complex sample design is to (1) compensate for variable probabilities of selection; (2) account for differential nonresponse rates within relevant subsets of the sample; and (3) adjust for possible under-coverage of certain population groups. Weighting is accomplished by assigning an appropriate sampling weight to each responding sampled unit (e.g., a HH or person), and using that weight to calculate weighted estimates from the sample. The critical component of the sampling weight is the base weight, which is defined as the reciprocal of the probability of including a HH or person in the sample. The base weights are used to inflate the responses of the sampled units to population levels and are generally unbiased (or consistent) if there is no nonresponse or noncoverage in the sample. When nonresponse or noncoverage occurs in the survey, weighting adjustments are applied to the base weights to compensate for both types of sample omissions.

Nonresponse is unavoidable in virtually all surveys of human populations. For RPHIA 2018-2019, nonresponse could have occurred at different stages of data collection, for example, (1) before the enumeration of individuals in the HH; (2) after HH enumeration and selection of persons, but before completion of the individual interview; and (3) after completion of the interview, but before collection of a viable blood sample.

Noncoverage arises when some members of the survey population have no chance of being selected for the sample. For example, noncoverage can occur if the field operations fail to enumerate all dwelling units during the listing process, or if certain HH members are omitted from the HH rosters. To compensate for such omissions, post-stratification procedures were used to calibrate the weighted sample counts to available population projections.

The final weights for RPHIA 2018-2019 were normalized so that the HH weights sum to the total number of responding HHs, interview weights sum to the total number of interview respondents, and HIV testing weights sum to total number of respondents with valid HIV test results.

Methods

The overall weighting approach for RPHIA 2018-2019 included several steps. Methods and results for each of the steps below are detailed in the *RPHIA 2018-2019 Sampling and Weighting Technical Report*.

Initial checks: Checks of the data files were carried out as part of the survey and data QC, and the probabilities of selection for PSUs and HHs were calculated and checked.

Creation of jackknife replicates: The variables needed to create the jackknife replicates for variance estimation were established at this point. This step was implemented immediately after the PSU sample was selected. All of the subsequent weighting steps described below were applied to the full sample and to each of the jackknife replicates.

Calculation of PSU base weights: The weighting process began with the calculation and checking of the sample PSU (EA) base weights as the reciprocals of the overall PSU probabilities of selection.

Calculation of HH weights: The next step was to calculate HH weights. The HH base weights were calculated as the PSU weights times the reciprocal of the within-EA HH selection probabilities. The HH base weights were adjusted first to account for dwelling units for which it could not be determined whether the dwelling unit contained an eligible HH and then the responding HHs had their weights

adjusted to account for nonresponding eligible HHs. This adjustment was made based on the EA the HHs were in. To compute the final HH weight, an overall normalization factor was applied so that the sum of the final HH weights is equal to the total number of responding HHs.

Calculation of person-level interview weights: Once the HH weights were determined, they were used to calculate the individual base weights. The individual base weights were then adjusted for nonresponse among the eligible individuals, with a final adjustment for the individual weights to compensate for under-coverage in the sampling process by post-stratifying (i.e., weighting up) to 2018 population projections by sex and five-year age groups. These weights were then adjusted by an overall normalization factor so that the sum of the final weights is equal to the total number of interview respondents.

Calculation of person-level HIV testing weights: The individual weights adjusted for nonresponse were, in turn, the initial weights for the HIV testing data sample, with a further adjustment for nonresponse to HIV testing. The same calibration and normalization used for the interview weights was applied to HIV test respondents, so that the final weights are compensated for undercoverage and sum to the total number of respondents with valid HIV test results.

Calculation of person-level weights for analysis of hepatitis B and hepatitis C testing: A separate set of weights was constructed for a subsample of individuals with HIV testing weights who were also selected for hepatitis B and hepatitis C testing. The initial weights were the nonresponse-adjusted HIV testing weights divided by the corresponding probabilities of selecting the individual for hepatitis B and hepatitis C testing. The initial weights were further post-stratified to 2018 population projections and then normalized to the number of cases that were tested for hepatitis B and hepatitis C.

Application of weighting adjustments to jackknife replicates: All of the adjustment processes were applied to the full sample and the replicate samples so that the final set of full sample and replicate weights could be used for variance estimation that accounted for the complex sample design and every step of the weighting process.

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APPENDIX B HIV TESTING METHODOLOGY

B.1 SPECIMEN COLLECTION AND HANDLING

Blood was collected by qualified survey staff from consenting participants: 14 mL of venous blood from all participants aged 10-64 years.

Blood samples were labeled with a unique barcoded participant identification and stored in temperature-controlled cooler boxes. At the end of each day, samples were transported to a satellite laboratory for registration in a laboratory information management system, processing into plasma and dried blood spots (DBS), and storage at -20°C within 24 hours of blood collection. Approximately weekly, samples were transported to the National Reference Laboratory (NRL) for additional testing and long-term storage at -80°C.

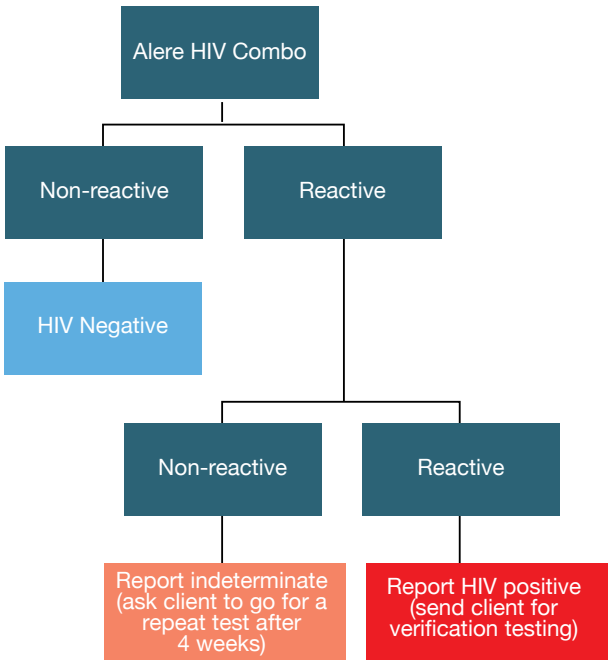
B.2 HOUSEHOLD-BASED PROCEDURES

HIV Rapid Testing

HIV rapid testing was conducted in each household in accordance with Rwanda's national guidelines (Figure B.2.A). Individuals with a non-reactive result on the first test, Alere Determine ™ HIV-1/2 Ag/Ab Combo (Alere Inc., Waltham, Massachusetts, United States) were reported as HIV-negative. Individuals with a reactive first test result underwent subsequent testing with the Chembio HIV 1/2 STAT-PAK® Assay (Chembio Diagnostic Systems, Medford, New York, United States). Those with a reactive result on both screening tests were classified as HIV positive for the purposes of the survey. Individuals with a reactive first test result followed by a non-reactive second test result were classified as inconclusive, and for the purposes of the survey, received further testing and evaluation to allow for final classification of HIV status.

For participants with a self-reported HIV-positive status but who tested HIV negative during the survey, additional testing was conducted at NRL, as described in Section B.3.

Figure B.2.A
Household-based HIV testing algorithm, ages 10-64 years, RPHIA, 2019/20



Hepatitis B Testing

All individuals aged 10-64 years who tested positive for HIV and a subsample of HIV-negative individuals were tested for hepatitis B using serological hepatitis B surface antigen rapid diagnostic test, SD Bioline HBsAg /WB (Standard Diagnostics, Inc., Suwon, Kyonggi-do, South Korea). The immunoglobulin M (IgM) was performed at the central lab (NRL) using the IgM Anti-HBc Enzyme Immunoassay (DiaSorin S.p.a, Saluggia, Italy). Participants who tested positive for HBsAg were referred to their selected health facility for subsequent management. Those participants with negative results were referred for vaccination, if not already vaccinated. Invalid results were repeated once.

Counseling, Referral to Care, and Active Linkage to Care

Pre- and post-test counseling were conducted in each household in accordance with Rwanda's national guidelines. For adults and adolescents aged 12 to 64 years, results were communicated directly to the participant, while for minors aged 10-11 years, results were communicated to the participant's parent or guardian. All participants who consented to HIV testing were asked to share contact information and to select a referral health facility prior to testing. Participants with an HIV-positive test result were referred to HIV care and treatment at the health facility of their choice, while participants with an HIV-indeterminate test result were advised to seek repeated testing at the health facility of their choice in four weeks. Further, HIV-positive participants were asked to consent to be contacted by qualified healthcare personnel in order to facilitate active linkage to HIV care and treatment in Rwanda's healthcare system.

In rare cases where participants were provided an incorrect HIV test result, reported an HIV-positive status but tested HIV negative during the survey, or required additional collection of blood to complete testing, households were revisited by qualified personnel to provide participants with correct information and guidance on appropriate actions.

Quality Assurance and Control

To control the quality of the performance of HIV rapid tests, field staff conducted testing of a panel of HIV-positive and HIV-negative DTS on a biweekly basis. To assure the quality of the performance of field staff conducting HIV testing, proficiency testing using a panel of blinded HIV-positive and HIV-negative DTS was evaluated once during the course of fieldwork. Additionally, sample re-testing was conducted at a satellite lab for (1) the first 50 samples tested by each field staff member, (2) a random sample of 5% of HIV-negative specimens, and (3) all HIV-indeterminate specimens.

A limitation of the survey was the limited potential of rapid tests to detect low levels of HIV antibodies among people within the serological window of infection, and in HIV-positive patients on ART. Participants in these two categories were not expected to be a significant source of bias.

B.3 LABORATORY-BASED PROCEDURES

Seven survey satellite laboratories were established in existing health facility laboratories across the country. One central laboratory was established at the NRL in Kigali City, Rwanda.

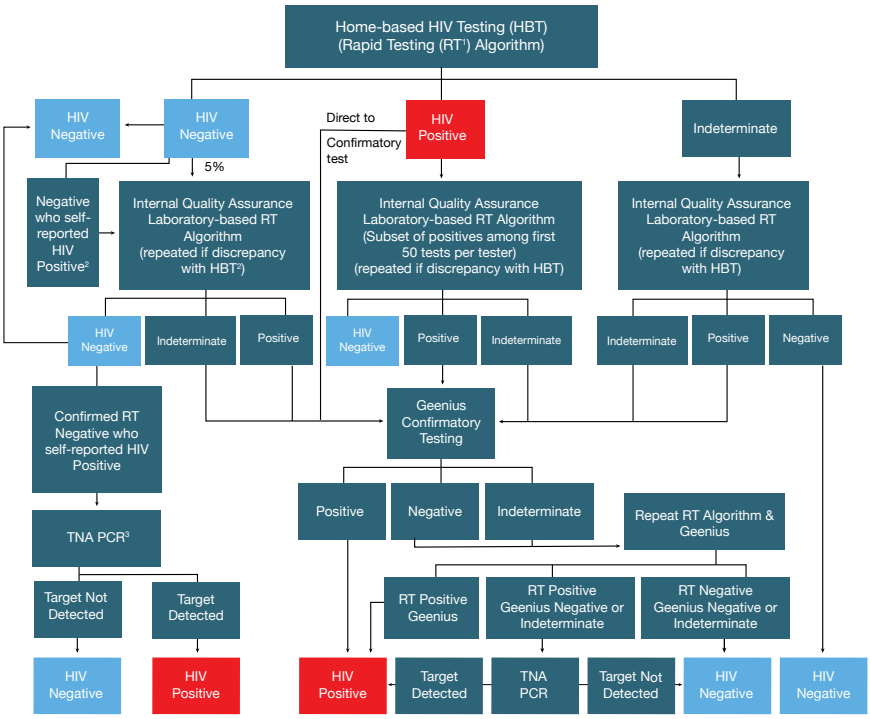
Geenius Testing

All HIV-positive samples, as well as samples with discrepant or indeterminate results, were tested using the Geenius™ HIV 1/2 Supplemental Assay (Bio-Rad, Hercules, California, United States) (Figure B.3.A). Testing was conducted at the satellite laboratories in accordance with the manufacturer-specified protocol.

Classification of Final HIV Status

For all participants, the algorithm for classification of final HIV status included results from HIV rapid testing and Geenius testing (Figure B.3.A).

Figure B.3.A
Final HIV Status Classification Algorithm, RPHIA, 2018/19



[1]RT: rapid test; [2]HBT: home-based testing; [3]TNA PCR: total nucleic acid polymerase chain reaction
Note: Red boxes indicate a final HIV-positive status determination

Viral Load Testing

HIV-1 VL (HIV RNA copies per mL) of confirmed HIV-positive participants was measured using the COBAS® TaqMan® Analyser on the COBAS AmpliPrep/COBAS TaqMan HIV-1 Test, v2.0 instrument (Roche Molecular Diagnostics, South Branchburg, New Jersey, United States) for plasma samples. The COBAS AmpliPrep/COBAS TaqMan HIV-1 Test v2.0 was used to measure VL from DBS specimens from children and adults with an insufficient volume of plasma.

Viral load results were returned to the health facility chosen by each HIV-positive participant. Participants were provided with a referral form during HTBC for subsequent retrieval of their results. Survey staff also contacted participants who provided contact information, informing them that their VL results were available at the chosen facility and further advising them to seek care and treatment.

HIV Recency Testing

Estimation of annualized HIV-1 incidence was based on the classification of confirmed HIV-positive cases as recent or long-term HIV infections. The survey used a laboratory-based testing algorithm to estimate incidence, using a combination of a HIV-1 LAg avidity EIA, VL results and detectable ARVs (Figure B.3.B). The Maxim HIV-1 Limiting Antigen-Avidity EIA kit (Maxim Biomedical, Bethesda, Maryland, United States) was used on DBS, and the HIV-1 LAg-Avidity EIA (Sedia Biosciences Corporation, Portland, Oregon, United States) on plasma. The HIV recent infection testing algorithms were applied to repository specimens from all confirmed HIV-positive participants.

LAg avidity testing was performed twice, with an initial screening test followed by a confirmatory test. Samples with a ODn > 2.0 during initial testing were classified as long-term infections, while those with ODn ≤ 2.0 underwent further testing of the specimen in triplicate. Samples with a median ODn > 1.5 during confirmatory testing were classified as long-term infections. Samples with a median ODn < 0.4 were retested using the HIV diagnostic testing algorithm to confirm HIV-1 positive classification, and samples identified as HIV-1 negative were excluded from the total number of HIV positives and incorporated into the total number of negative specimens for incidence estimation.

Samples with a median ODn ≤ 1.5 were classified as potential HIV-recent infections, and their VL results were assessed. Specimens with VL <1,000 copies/mL were classified as long-term infections, while those with VL ≥ 1,000 copies/mL were classified as recent infections. Those classified as recent infections by the first algorithm were reclassified using ARV detection data. Those specimens in which efavirenz, tenofovir, nevirapine, and atazanavir were detected were classified as long-term infections and those in which no ARVs were detected remained classified as recent infections. These results are not returned to the participants.

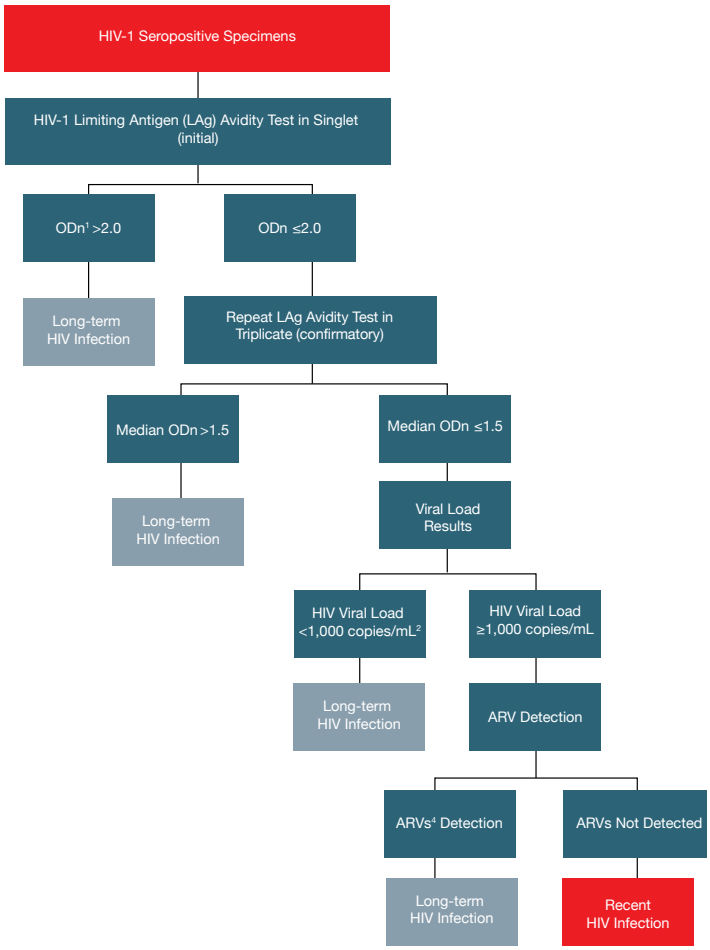


Figure B.3.B HIV-1 Recent Infection Testing Algorithm (LAg/ VL/ARV algorithm), RPHIA, 2018-2019

[1]ODn: normalized optical density; [2]LAg: Limiting Antigen; [3]mL: milliliter; [4]ARV: antiretroviral

HIV Incidence Estimation

Incidence estimates were obtained using the formula recommended by the WHO Incidence Working Group and Consortium for Evaluation and Performance of Incidence Assays. Weighted counts for HIV-negative persons (N); HIV-positive persons (P); numbers tested on the LAg assay (Q); and numbers HIV recent (R) were provided for use in incidence calculations or the Joint United Nations Programme on HIV/AIDS Spectrum models (Tables B.3.A). Incidence estimates were calculated using the following parameters: MDRI = 130 days (95% CI: 118-142 days); proportion false recent (PFR) = 0.00; time cutoff (T) = 1 year. In-depth details are provided in the RPHIA Technical Report, which may be found online on the PHIA Project website.

Table B.3.A Annual HIV incidence auxiliary data: N, P, Q, R, MDRI, PFR, and T

Annual incidence of HIV auxiliary data by residence, province, age, and sex, using the limiting antigen + viral load + antiretroviral detection algorithm, RPHIA, 2018/19

Age	Males				Females				Total			
	Number HIV negative[1] (N)	Number HIV positive[1] (P)	Number tested on LAg assay[1] (Q)	Number HIV recent[1] (R)	Number HIV negative[1] (N)	Number HIV positive[1] (P)	Number tested on LAg assay[1] (Q)	Number HIV recent[1] (R)	Number HIV negative[1] (N)	Number HIV positive[1] (P)	Number tested on LAg assay[1] (Q)	Number HIV recent[1] (R)
Residence[2]												
Urban	3456.67	113.33	113.33	0.83	3796.45	264.55	264.55	2.38	7261.70	369.30	369.30	3.12
Rural	10008.79	201.21	201.21	3.25	12408.28	387.72	387.72	2.20	22424.40	581.60	581.60	5.55
Province[2]												
City of Kigali	2668.88	83.12	83.12	1.06	2812.82	169.18	169.18	1.09	5487.97	246.03	246.03	2.16
South	2649.76	62.24	62.24	0.00	3296.75	117.25	117.25	1.99	5948.53	177.47	177.47	1.89
West	3147.94	77.06	77.06	1.95	4099.34	151.66	151.66	1.05	7249.83	226.17	226.17	3.08
North	2545.93	40.07	40.07	0.00	3231.15	91.85	91.85	0.00	5779.24	129.76	129.76	0.00
East	2455.41	49.59	49.59	1.10	2775.07	111.93	111.93	0.00	5233.62	158.38	158.38	1.18
15-24	5263.13	24.87	24.87	0.93	5994.66	75.34	75.34	1.33	11260.09	97.91	97.91	2.25
25-34	3597.18	48.82	48.82	3.07	4354.97	159.03	159.03	0.66	7959.29	200.71	200.71	3.95
35-49	3098.83	134.17	134.17	0.00	3832.64	242.36	242.36	1.04	6935.15	372.85	372.85	0.99
15-49	11952.02	214.98	214.98	4.15	14169.10	489.90	489.90	3.03	26134.07	691.93	691.93	7.29
15-64	13473.19	306.81	306.81	4.14	16231.97	625.03	625.03	4.25	29718.64	918.36	918.36	8.44

[1]Weighted number.
[2]Residence and Province figures are among adults aged 15-64 years.
Note: mean duration recent infection (MDRI) = 130 days (95% CI: 118-142 days); proportion false recent (PFR) = 0.00; time cutoff (T) = 1 year

HBV IgM

For HBV, the samples that tested positive using an HBsAg rapid test at the household were tested with IgM anti-HBc test at the central laboratory to detect incident HBV infection. These results were not returned to the participants.

Hepatitis C Testing

All individuals aged 10-64 years who tested positive for HIV and a subsample of HIV-negative individuals were tested for hepatitis C using an HCV antibody test (HCV Ab) at the central lab. Samples positive for HCV Abs were tested for HCV RNA using an RNA PCR at the central laboratory at NRL.

Detection of Antiretrovirals

To understand recent exposure to ARVs and hence the level of ART coverage, samples from all confirmed HIV-positive participants were evaluated for the presence of selected ARVs, using high-resolution liquid chromatography coupled with tandem mass spectrometry to detect ARVs from DBS specimens.[4] Three ARVs (one nucleoside reverse transcriptase inhibitor, two non-nucleoside reverse transcriptase inhibitors and one protease inhibitor): efavirenz, tenofovir, nevirapine, and atazanavir were used as markers for both first- and second-line regimens, based on the Rwanda's national treatment guidelines. The ARVs were selected based on their long half-lives, allowing for a longer window period from drug exposure to detection.

To qualitatively detect ARVs, a single DBS was eluted, and chromatographic separation carried out on a Luna 5µm PFP column (110 Å, 50 x 2 mm) (Phenomonex, Torrance, California, United States). Each ARV was detected using an API 4000 LC/MS/MS instrument (Applied Biosystems, Foster City, California, United States). Internal standards and in-house QC cut-off samples, including negative controls, were utilized in each run. This qualitative method used a limit of detection of 0.02 µg/mL for each ARV, with a signal-to-noise ratio of at

least 5:1 for all ARVs. Samples with concentrations above 0.02 µg/mL were considered positive for each ARV. ARV testing was performed by the Division of Clinical Pharmacology of the Department of Medicine at the University of Cape Town in South Africa. These results were not returned to the participants.

Genotyping for Detection of Antiretroviral Drug Resistance and HIV Subtyping

To determine the extent of transmitted HIV-1 DR mutations among participants in RPHIA 2019/20, samples from confirmed HIV-positive participants who were classified as recent infections, and an equal or greater number of whom were classified as true long-term infections, based on the incidence algorithm, as well as all those who reported that they were on ART but who did not have VLS, were evaluated using the commercial kit "Thermofisher kit" "to detect major DR mutations in the protease (6-99 codons) and RT (1-251 codons) Pol regions. Plasma viral RNA was extracted using "the QIAmp viral RNA Mini Kit" (Qiagen), according to manufacturer instructions. The HIV pol gene was amplified by one step-reverse transcription polymerase chain reaction (RT-PCR) which was followed by nested PCR. Sequencing of the approximately one-kilo base amplicons was performed on the ABI 3500 xL Genetic Analyzer. The customized RECall V2.2 software was used to edit and analyze raw sequences and generate consensus sequences. Mutations in the protease and reverse transcriptase genes were classified as potentially associated with DR, according to the Stanford University HIV DR Database. HIV subtypes were determined using REGA HIV subtyping tool and then confirmed based on the phylogenetic tree constructed in MEGA v.6 software.

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APPENDIX C ESTIMATES OF SAMPLING ERRORS

Estimates from sample surveys are affected by two types of errors: non-sampling errors and sampling errors. Non-sampling errors result from mistakes made during data collection (e.g., misinterpretation of an HIV test result) and data management (e.g., transcription errors in data entry). While RPHIA 2018/19 implemented numerous QA and QC measures minimize non-sampling errors, these errors are impossible to avoid and difficult to evaluate statistically.

In contrast, sampling errors can be evaluated statistically. The sample of respondents selected for RPHIA 2018/19 is only one of many samples that could have been selected from the same population, using the same design and expected size. Each of these samples would yield results that differ somewhat from the results of the actual sample selected. Sampling errors are a measure of the variability between all possible samples. Although the degree of variability is not known exactly, it can be estimated from the survey results.

The standard error, which is the square root of the variance, is the usual measurement of sampling error for a particular statistic (e.g., proportion, mean, rate, count). In turn, the standard error can be used to calculate confidence intervals within which the true value for the population can reasonably be assumed to fall. For example, for any given statistic calculated from a sample survey, the value of that statistic will fall within a range of approximately plus or minus two times the standard error of that statistic in 95% of all possible samples of identical size and design.

RPHIA 2018/19 utilized a multi-stage stratified sample design, which required complex calculations to obtain sampling errors. Specifically, a variant of the jackknife replication method was implemented in SAS to estimate variance for proportions (e.g., HIV prevalence), rates (e.g., annual HIV incidence), and counts (e.g., numbers of people living with HIV). Each replication considered all but one cluster in the calculation of the estimates. Pseudo-independent replications were thus created. In RPHIA 2018/19, a jackknife replicate was created by randomly deleting one cluster from each variance-estimation stratum and retaining all of the clusters in the remaining strata. A total of 186 variance-estimation strata were created by pairing (or occasionally tripling) the sample clusters in the systematic order in which they had been selected. Hence, 186 replications were created. The variance of a sample-based statistic, y, was calculated as follows:

$$var(y) = \sum_{k=1}^{K} (y_k - y)^2$$

where y is the full-sample estimate, and y_k is the corresponding estimate for jackknife replicate k (k = 1, 2, ..., K).

In addition to the standard error, the design effect for each estimate was also calculated. The design effect is defined as the ratio of the standard error using the given sample design to the standard error that would result if a simple random sample had been used. A design effect of 1.0 indicates that the sample design is as efficient as a simple random sample, while a value greater than 1.0 indicates the increase in the sampling error due to the use of a more complex and less statistically efficient design. Confidence limits for the estimates, which are calculated as $y \pm t(0.975; K)$, where $t(0.975; K)$ is the 97.5th percentile of a t-distribution with K degrees of freedom, were also computed.

Sampling errors for selected variables from the RPHIA 2018/19 are presented in tables C.1 through C.8, and sampling errors for all survey estimates may be found online on the PHIA website. For each variable, sampling error tables include the weighted estimate, unweighted denominator, standard error, design effect, and lower and upper 95% confidence limits.

Table C.1 Sampling errors: Annual HIV incidence by age, RPHIA 2018/19

Age (years)	Weighted estimate (%)	Design effect	Lower confidence limit (%)	Upper confidence limit (%)
		TOTAL		
15-24	0.06	1.30	0.00	0.14
25-34	0.14	1.12	0.00	0.28
35-49	0.04	0.98	0.00	0.12
15-49	0.08	1.17	0.02	0.14
15-64	0.08	1.16	0.02	0.14
		MALE		
15-24	0.05	0.90	0.00	0.15
25-34	0.24	1.12	0.00	0.51
35-49	0.00	0.00	0.00	0.33
15-49	0.10	1.12	0.00	0.20
15-64	0.09	1.12	0.00	0.17
		FEMALE		
15-24	0.06	1.66	0.00	0.20
25-34	0.04	0.65	0.00	0.14
35-49	0.08	1.03	0.00	0.22
15-49	0.06	1.19	0.00	0.13
15-64	0.07	1.20	0.00	0.15

Table C.2 Sampling errors: HIV prevalence by age, RPHIA 2018/19

Ages	Weighted estimate (%)	Unweighted number	Standard error (%)	Lower confidence limit (%)	Upper confidence limit (%)
			TOTAL		
10-14	0.4	8605	0.1	0.2	0.5
15-19	0.6	6418	0.1	0.4	0.8
20-24	1.2	4940	0.2	0.9	1.5
25-29	2.4	4263	0.3	1.8	2.9
30-34	2.6	3897	0.3	1.9	3.2
35-39	3.7	3337	0.4	3.0	4.5
40-44	6.1	2292	0.6	4.9	7.3
45-49	6.4	1679	0.7	5.0	7.8
50-54	6.9	1406	0.7	5.5	8.3
55-59	6.2	1244	0.8	4.5	7.8
60-64	3.9	1161	0.6	2.7	5.2
Total 15-24	0.9	11358	0.1	0.7	1.1
Total 15-49	2.6	26826	0.2	2.3	2.9
Total 15-64	3.0	30637	0.2	2.7	3.3

Table C.2 Sampling errors: HIV prevalence by age, RPHIA 2018/19 (continued)

Ages	Weighted estimate (%)	Unweighted number	Standard error (%)	Lower confidence limit (%)	Upper confidence limit (%)
			MALE		
10-14	0.3	4302	0.1	0.1	0.5
15-19	0.4	3071	0.1	0.2	0.6
20-24	0.6	2217	0.2	0.2	0.9
25-29	1.3	1869	0.3	0.6	1.9
30-34	1.4	1777	0.3	0.8	2.0
35-39	2.9	1567	0.4	2.1	3.8
40-44	4.9	950	0.7	3.4	6.4
45-49	5.6	716	0.9	3.9	7.4
50-54	6.3	594	1.0	4.2	8.4
55-59	6.5	516	1.2	4.1	9.0
60-64	3.3	503	0.8	1.7	4.9
Total 15-24	0.5	5288	0.1	0.3	0.7
Total 15-49	1.8	12167	0.1	1.5	2.1
Total 15-64	2.2	13780	0.2	1.9	2.6
			FEMALE		
10-14	0.5	4303	0.1	0.2	0.7
15-19	0.8	3347	0.2	0.4	1.1
20-24	1.8	2723	0.3	1.2	2.4
25-29	3.4	2394	0.4	2.5	4.3
30-34	3.7	2120	0.5	2.7	4.7
35-39	4.5	1770	0.5	3.4	5.6
40-44	7.1	1342	0.7	5.6	8.6
45-49	7.0	963	0.9	5.3	8.8
50-54	7.4	812	0.9	5.6	9.2
55-59	5.9	728	1.0	3.8	7.9
60-64	4.4	658	0.8	2.7	6.1
Total 15-24	1.2	6070	0.1	0.9	1.5
Total 15-49	3.3	14659	0.2	2.9	3.8
Total 15-64	3.7	16857	0.2	3.3	4.1

Table C.3 Sampling errors: HIV prevalence by residence and province, ages 15-64 years, RPHIA 2018/19

Characteristic	Weighted estimate (%)	Unweighted number	Standard error (%)	Lower confidence limit (%)	Upper confidence limit (%)
			TOTAL		
Residence					
Urban	4.8	7631	0.4	4.0	5.7
Rural	2.5	23006	0.1	2.2	2.8
Province					
City of Kigali	4.3	5734	0.4	3.5	5.1
South	2.9	6126	0.3	2.2	3.6
West	3.0	7476	0.4	2.2	3.9
North	2.2	5909	0.2	1.8	2.6
East	2.9	5392	0.4	2.2	3.7
			MALE		
Residence					
Urban	3.2	3570	0.4	2.4	3.9
Rural	2.0	10210	0.2	1.6	2.3
Province					
City of Kigali	3.0	2752	0.3	2.4	3.7
South	2.3	2712	0.4	1.5	3.1
West	2.4	3225	0.4	1.6	3.2
North	1.5	2586	0.2	1.2	1.9
East	2.0	2505	0.3	1.3	2.7
			FEMALE		
Residence					
Urban	6.5	4061	0.6	5.3	7.7
Rural	3.0	12796	0.2	2.7	3.4
Province					
City of Kigali	5.7	2982	0.6	4.5	6.9
South	3.4	3414	0.4	2.6	4.2
West	3.6	4251	0.5	2.6	4.6
North	2.8	3323	0.3	2.2	3.3
East	3.9	2887	0.5	2.9	4.9

Table C.4 Sampling errors: Viral load suppression by age, RPHIA 2018/19

Age (years)	Weighted estimate (%)	Unweighted number	Standard error (%)	Lower confidence limit (%)	Upper confidence limit (%)
			TOTAL		
10-14	(72.5)	33	8.0	56.1	89.0
15-24	60.6	103	5.4	49.5	71.6
25-34	66.2	212	4.5	56.8	75.5
35-44	81.4	279	2.8	75.7	87.1
45-54	81.1	218	3.1	74.7	87.5
55-64	83.1	122	4.0	75.0	91.3
Total 10-19	69.4	71	5.5	58.1	80.8
Total 15-24	60.6	103	5.4	49.5	71.6
Total 15-49	74.3	708	2.2	69.7	78.8
Total 15-64	76.0	934	1.9	72.0	80.0
			MALE		
10-14	*	13	11.6	54.3	100.0
15-24	(55.9)	26	9.8	35.6	76.1
25-34	(45.9)	48	8.0	29.3	62.4
35-44	75.0	96	5.6	63.4	86.6
45-54	75.7	83	5.0	65.4	86.0
55-64	(84.9)	49	6.1	72.3	97.5
Total 10-19	(68.0)	25	9.8	47.8	88.2
Total 15-24	(55.9)	26	9.8	35.6	76.1
Total 15-49	65.7	213	4.1	57.2	74.2
Total 15-64	70.5	302	3.3	63.8	77.2
			FEMALE		
10-14	*	20	10.5	47.0	90.4
15-24	62.3	77	6.1	49.7	74.8
25-34	73.5	164	4.1	65.0	81.9
35-44	85.2	183	2.8	79.6	90.9
45-54	84.8	135	3.8	77.1	92.6
55-64	81.7	73	4.4	72.6	90.8
Total 10-19	(70.3)	46	7.4	55.0	85.6
Total 15-24	62.3	77	6.1	49.7	74.8
Total 15-49	78.6	495	2.1	74.2	83.0
Total 15-64	79.1	632	2.0	74.9	83.2

*Estimates based on a very small denominator (less than 25) have been suppressed with an asterisk.
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

Table C.5 Sampling errors: Viral load suppression by residence and province, ages 15-64 years, RPHIA 2018/19

Characteristic	Weighted estimate (%)	Unweighted number	Standard error (%)	Lower confidence limit (%)	Upper confidence limit (%)
TOTAL					
Residence					
Urban	79.7	362	2.8	74.0	85.4
Rural	74.2	572	2.4	69.2	79.2
Province					
City of Kigali	77.4	250	2.5	72.2	82.6
South	79.2	176	4.2	70.6	87.8
West	78.7	222	3.4	71.6	85.8
North	79.6	129	4.3	70.7	88.5
East	66.7	157	4.9	56.6	76.9
MALE					
Residence					
Urban	74.1	109	5.2	63.4	84.8
Rural	68.9	193	3.9	60.8	77.1
Province					
City of Kigali	71.3	81	4.9	61.2	81.4
South	77.9	60	6.1	65.3	90.4
West	74.6	74	5.9	62.5	86.6
North	74.2	39	6.8	60.1	88.2
East	54.3	48	8.5	36.8	71.8
FEMALE					
Residence					
Urban	82.4	253	2.7	76.9	87.9
Rural	77.3	379	2.6	72.0	82.6
Province					
City of Kigali	80.9	169	2.9	75.0	86.8
South	80.0	116	5.0	69.6	90.4
West	81.1	148	3.3	74.3	87.9
North	82.3	90	4.7	72.7	92.0
East	73.0	109	4.7	63.3	82.6

Table C.6 Sampling errors: ARV-adjusted 90-90-90 by age (conditional percentages), RPHIA 2018/19

Age (years)	Weighted estimate (%)	Unweighted number	Standard error (%)	Lower confidence limit (%)	Upper confidence limit (%)
TOTAL					
DIAGNOSED					
15-24	69.4	103	5.2	58.7	80.0
25-34	74.7	211	3.7	67.2	82.3
35-49	89.3	393	2.0	85.3	93.3
15-49	82.2	707	1.9	78.3	86.2
15-64	83.8	933	1.7	80.3	87.2
ON TREATMENT					
15-24	94.6	71	3.5	88.8	100.0
25-34	94.6	162	1.5	90.9	98.3
35-49	98.3	356	0.8	97.0	99.7
15-49	96.9	589	0.8	95.4	98.4
15-64	97.5	789	0.6	96.3	98.7
VIRAL LOAD SUPPRESSION					
15-24	86.0	67	5.0	75.7	96.2
25-34	86.5	153	3.5	79.2	93.8
35-49	91.7	349	1.7	88.1	95.3
15-49	89.7	569	1.5	86.7	92.7
15-64	90.1	767	1.2	87.6	92.5
MALE					
DIAGNOSED					
15-24	(67.5)	26	9.5	48.0	87.0
25-34	(51.7)	47	7.8	35.6	67.9
35-49	87.2	139	3.5	80.1	94.4
15-49	76.6	212	3.5	69.4	83.8
15-64	80.4	301	2.7	74.9	86.0
ON TREATMENT					
15-24	*	18	4.2	87.1	100.0
25-34	*	24	7.3	71.4	100.0
35-49	98.4	124	1.1	96.1	100.0
15-49	96.2	166	1.5	93.2	99.3
15-64	97.2	245	1.0	95.1	99.4
VIRAL LOAD SUPPRESSION					
15-24	*	17	10.2	55.9	98.1
25-34	*	20	10.1	56.2	97.9
35-49	85.0	122	3.9	77.0	93.0
15-49	83.1	159	3.5	75.9	90.3
15-64	85.4	237	2.7	80.0	90.9

Table C.6 Sampling errors: ARV-adjusted 90-90-90 by age (conditional percentages), RPHIA 2018/19 (continued)

Age (years)	Weighted estimate (%)	Unweighted number	Standard error (%)	Lower confidence limit (%)	Upper confidence limit (%)
FEMALE					
DIAGNOSED					
15-24	70.0	77	5.9	57.9	82.2
25-34	82.8	164	2.9	76.8	88.8
35-49	90.6	254	2.0	86.4	94.8
15-49	85.0	495	1.9	81.2	88.9
15-64	85.6	632	1.7	82.1	89.1
ON TREATMENT					
15-24	94.1	53	3.5	87.0	100.0
25-34	96.4	138	1.5	93.3	99.5
35-49	98.3	232	0.8	96.6	100.0
15-49	97.2	423	0.8	95.5	98.8
15-64	97.6	544	0.6	96.3	98.9
VIRAL LOAD SUPPRESSION					
15-24	89.2	50	4.8	79.3	99.2
25-34	88.4	133	3.0	82.1	94.6
35-49	95.7	227	1.4	92.8	98.5
15-49	92.6	410	1.3	89.9	95.2
15-64	92.4	530	1.1	90.2	94.6

*Estimates based on a very small denominator (less than 25) have been suppressed with an asterisk.
( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

Table C.7 Sampling errors: ARV-adjusted 90-90-90 by age (unconditional percentages), RPHIA 2018/19

Age (years)	Weighted estimate (%)	Unweighted number	Standard error (%)	Lower confidence limit (%)	Upper confidence limit (%)
TOTAL					
DIAGNOSED					
15-24	69.4	103	5.2	58.7	80.0
25-34	74.7	211	3.7	67.2	82.3
35-49	89.3	393	2.0	85.3	93.3
15-49	82.2	707	1.9	78.3	86.2
15-64	83.8	933	1.7	80.3	87.2
ON TREATMENT					
15-24	65.6	103	5.6	54.1	77.1
25-34	70.7	211	3.7	63.0	78.4
35-49	87.8	393	2.1	83.6	92.1
15-49	79.7	707	2.0	75.5	83.9
15-64	81.7	933	1.8	78.0	85.3

Table C.7 Sampling errors: ARV-adjusted 90-90-90 by age (unconditional percentages), RPHIA 2018/19 (continued)

Age (years)	Weighted estimate (%)	Unweighted number	Standard error (%)	Lower confidence limit (%)	Upper confidence limit (%)
VIRAL LOAD SUPPRESSION					
15-24	56.4	103	5.4	45.3	67.5
25-34	61.2	211	4.1	52.7	69.6
35-49	80.5	393	2.5	75.5	85.6
15-49	71.5	707	2.3	66.8	76.1
15-64	73.5	933	2.0	69.3	77.8
MALE					
DIAGNOSED					
15-24	(67.5)	26	9.5	48.0	87.0
25-34	(51.7)	47	7.8	35.6	67.9
35-49	87.2	139	3.5	80.1	94.4
15-49	76.6	212	3.5	69.4	83.8
15-64	80.4	301	2.7	74.9	86.0
ON TREATMENT					
15-24	(64.7)	26	9.6	44.9	84.5
25-34	(44.7)	47	8.1	27.9	61.4
35-49	85.9	139	3.6	78.5	93.3
15-49	73.8	212	3.6	66.3	81.2
15-64	78.2	301	2.8	72.4	84.0
VIRAL LOAD SUPPRESSION					
15-24	(49.8)	26	10.0	29.3	70.4
25-34	(34.4)	47	7.6	18.8	50.0
35-49	73.0	139	4.8	63.2	82.8
15-49	61.3	212	4.2	52.6	70.0
15-64	66.8	301	3.5	59.7	74.0
FEMALE					
DIAGNOSED					
15-24	70.0	77	5.9	57.9	82.2
25-34	82.8	164	2.9	76.8	88.8
35-49	90.6	254	2.0	86.4	94.8
15-49	85.0	495	1.9	81.2	88.9
15-64	85.6	632	1.7	82.1	89.1
ON TREATMENT					
15-24	65.9	77	6.4	52.7	79.2
25-34	79.8	164	3.0	73.7	85.9
35-49	89.0	254	2.2	84.6	93.5
15-49	82.6	495	2.0	78.5	86.7
15-64	83.6	632	1.8	79.8	87.3

Table C.7 Sampling errors: ARV-adjusted 90-90-90 by age (unconditional percentages), RPHIA 2018/19 (continued)

Age (years)	Weighted estimate (%)	Unweighted number	Standard error (%)	Lower confidence limit (%)	Upper confidence limit (%)
VIRAL LOAD SUPPRESSION					
15-24	58.8	77	6.2	46.1	71.5
25-34	70.5	164	3.7	63.0	78.1
35-49	85.2	254	2.3	80.4	89.9
15-49	76.5	495	2.1	72.1	80.8
15-64	77.2	632	2.0	73.1	81.4

( ) Estimates based on a denominator of 25-49 are included in parentheses and should be interpreted with caution.

Table C.8 Sampling errors: Number of new infections annually and number of people living with HIV (ages 15-64 years), RPHIA 2018/19

	Weighted estimate	Standard error	Lower confidence limit	Upper confidence limit
Number of new infections annually (using LAg + VL + antiretroviral algorithm)	5,400	1954	1,400	9,400
Number of people living with HIV	210,200	11551	186,400	234,000

APPENDIX D SURVEY PERSONNEL

Rwanda Biomedical Center
Sabin Nsanzimana
Jeanine U. Condo
Innocent Turate
Placidie Mugwaneza
Jean Paul Uwizihiwe
Janvier Serumondo
Dieudonné Sebuhoro
Gentille Musengimana
Eric Remera
Muhammed Semakula
Alice Kabanda
Emil Ivan Mwikarago
Clarisse Musanabaganwa
Beatrice Sangwayire
Muhayimpundu Ribakare
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Elizabeth Radin
Erika Fazito
Suzue Saito
Yen Pottinger
David Hoos
Stephen Delgado
Andrea Low
Herbert Longwe
Nahima Ahmed
Greet Vandebriel
Theo Smart
Natasha McLeod
Rachel Bray
Leticia Urquiza Froix
Shannon Farley

ICAP at Columbia University, Rwanda
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Felix Kayigamba
Collins Kamanzi
Agnes Iraguha
Innocent Nkurikiyinka
Lusako Malwenge
Gallican Rwibasira Nshogoza
Sandrine Gatesi
Sylvie Umutoni
Dieudonne Rwabasigari
Jean Paul Ntwari
Isaie Nzeyimana Nsanzimana
Maliwa Vusumuzi
Tafadzwa Dzinamarira
Felicien Rusagara
Eugenie Musanabaganwa
Maurice Kwizera
Claude Muvunyi Mambo
Denys Ndangurura
Assoumpta Muhorakeye
Emmanuel Nshimiyimana
Peninah Ikirezi
Marie Musabeyezu
Caleb Muhoza
Marie Claire Iribagiiza
Fabrice Twizeyimana
Alphonsine Imanishimwe
Mariette Uwihoreye
Aphrodice Tuyishimire
Patrick Ngungu Mutatwa
Papias Bagabo
Onesime Manishimwe
Zephanie Nzeyimana

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Samuel Malamba
Jared Omolo
Richard Mwesigwa
Haotian Cai
Christina Mwangi
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Canisious Musoni
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Katrina Sleeman
Keisha Jackson
Kristin Brown
Laura Porter
Linda Fleming
Mervi Dattorio
Nikhil Kothegal
Paul Stupp
Sasi Jonnalagadda
Sehin Birhanu
Stephen McCracken
Steven Kinchen
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Emille Habanabakize
Jean Bosco Hakizuwera
Leon Fidele Harerimana Turikumwe
Francois Xavier Kabayiza
Erneste Kagiraneza
Gylaine Mfurakazi
Amon Mpozayo
Leonard Muhire Munyarugerero
Immaculee Mukangendo
Alphonsine Mukatete
Christine Mumarashavu
Merci Dieu Ndikumana
Jean Marie Vianney Ndayambaje
Philippe Niyigaba
Evode Niyonsaba
Norbert Rugira Nkubiri
Regis Nsabiyumva
Venuste Ntibayazi
Aphrodis Ntigulirwa
Marie Goretti Nyirakamali
Christian Rudatinya
Claude Serugo
Alphonsine Uwamaliya
Neema Uwineza
Callixte Uwizeyimana
Emma Umutoniwabo
Willy Patel Moise
Eugene Mubanda Ndikubwimana

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Sylvie Akamikazi
Beatha Akayezu
Marie Chantal Akineza
Nicole Akizanye
Therese Bagwaneza
Solange Baribeza
Jeanne Batamuriza
Emmanuel Bikolimana
Christophe Bizimana
Jean Claude Bizimana
Marie Claire Bucyedusenge
Asman Bwesigye
Floride Dukuzeyezu
Emmarance Mukayubusa
Eve Dusabe

Interviewers (continued)

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Liliane Nyirizina
Clarisse Gasengayire
Liliane Gashagaza
Marie Alice Gatete Umwali
Joseph Habakurama
Isabelle Habayo
Fidele Habimana
Evariste Habiyaremye
Maurice Hategekimana
Fidele Havugimana
Yvonne Higiro
Diane Imanishimwe
Rebecca Imanishimwe
Jeanne Ingabire
Marie Anaise Ingabire
Nadine Ingabire
Alice Ingabire
Methode D'amour Iraguha
Natasha Irakoze
Sylvie Ishimwe Uwimana
Marie Diane Buzizi Kabahire
Carine Kabanyana
Claudine Mukandori
Esperance Mukangango
Jeannette Mukansanga
Aliane Mukantiyamira
Vestine Mukarurangwa
Jeannette Mukarusine
Juliette Mukasafari
Francoise Mukasekuru
Esperance Mukashema
Marie Jeanne Mukasoni
Chantal Mukazayire
Joy Happiness Mukeshimana
Sylvie Mukundankase
Sabine Mukunduhirwe
Theogene Munyampundu
Angelique Mupenzi
Immaculee Murekatete
Gerardine Musabyeyezu
Immaculee Musabyimana
Evelyne Mushimiyimana
Jules Musilimu
Jean De Dieu Musore
Jean Berchmas Mutijima
Floribert Mwambutsa
Onesme Ndagijimana
Sylvain Ndagiwenimana
Aline Ndamijuwimye
Fotide Ndayishimiye
Jacqueline Nibamureke
Judith Nimuragire
Eric Niragira
Caritas Niyibigira
Sylvestre Niyitegeka
David Niyomugabo
Angelique Niyomukesha
Pierre Chrisologue Nizeyimana
Jean Pierre Nkurikiyumugisha
Assinapol Nkuriyekubona
Jean Baptiste Nsabiyera
Didace
Vestine Umwali
Liliane Urujeni
Odette Uwabyaye
Jacqueline Uwamahoro
Vestine Uwamahoro
Janviere Uwambaye
Angelique Uwamungu
Clementine Uwanyirigira
Claudine Uwase
Landouard Uwayezu
Claudine Uwera
Beatha Uwimana
Francoise Uwimana
Joseline Uwimana
Marie Therese Uwimpuhwe
Alodie Uwitonze
Aime Christian Uwizera
Ninette Uwizeye
Ruth Uzayisenga
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Clementine Nyirarukundo
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Dative Kabatsi
Rosine Kabega
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Staphanie Karega
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Jeanne D'arc Kayitesi
Aime Bonheur Kwitonda
Egide Kwizera
Etienne Kwizera
Marie Louise Kwizera
Sandrine Manishimwe
Carine Mapenzi
Alice Mbabazi
Olivier Mbabazi
Malachie Mbonigaba
Jean Bosco Mbonimpa
Dominique Micyomyiza
Raymond Fidele Migisha
Esperance Sifa Minga
Sarah Betty Mugabekazi
Clotilde Muhimpundu
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Solange Mukabatsinda
Gentille Mukafurere
Francine Mukagakwaya
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Josee Mukagatera
Antoinette Mukakarangwa
Pelagie Mukampunga
Consolee Mukamugema
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Illuminee Mukamwiza
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Bernard Nsengimana
Marcel Nshunguyabahizi
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Jeanine Nyinawabega
Olive Nyirabagoyi
Patricia Nyirahabimana
Claudine Nyirahabineza
Marie Chantal Nyirahirwa
Beatrice Nyirahirwa
Claudette Nyiramana
Claudine Nyiramiryango
Lydia Nyirandamira
Anastase Nzeyimana
Gloria Rubayiza
Diane Rubayiza Mukamisha
Marie Aimee Rwakazina
Honore Sangwa Nsibika
Origene Sebazungu
Andre Sekuye
Jacques Selemani
Origene Simbi
Beatrice Tuyiringire
Joselyne Uwamahoro
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Jean Paul Twahirwa
Diogene Twarayisenze
Nemesis Twizeyimana
Claudine Umubyeyi
Stella Umugwaneza
Alice Umuhongerwa
Alice Umuhoza
Joselyne Umuhoza
Sandrine Umuhoza
Dalie Umukundwa
Alice Umulisa
Monique Umurerwa
Redempta Umutanguha
Marie Chantal Umutesi

APPENDIX E HOUSEHOLD QUESTIONNAIRE

We will now begin the interview. Your answers will be kept between us. If you don't understand a question, please stop me. You can refuse to answer a question if you don't want to.

HOUSEHOLD SCHEDULE

LINE NO.	USUAL RESIDENTS AND VISITORS	RELATIONSHIP TO HEAD OF HOUSEHOLD	SEX	RESIDENCE		AGE	
	Please give me the names of the persons who usually lives in your household or guests of the household who stayed here last night, starting with the head of the household.					IF LESS THAN 2 YEARS, RECORD IN MONTHS.	
	AFTER LISTING THE **NAME** AND RECORDING THE RELATIONSHIP AND SEX FOR EACH PERSON ASK QUESTIONS 2A-2C BELOW TO BE SURE THAT THE SCHEDULE IS COMPLETE.	What is the relationship of (**NAME**) to the head of the household? SEE CODES BELOW	Is (**NAME**) Male or Female?	Does (**NAME**) usually live here?	Did (**NAME**) sleep here last night?	How old is (**NAME**)?	Is age of (**NAME**) recorded in MONTHS/ YEARS?
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1			M F	Y N	Y N		MONTHS YEARS
2			M F	Y N	Y N		MONTHS YEARS
3			M F	Y N	Y N		MONTHS YEARS
4			M F	Y N	Y N		MONTHS YEARS
5			M F	Y N	Y N		MONTHS YEARS
6			M F	Y N	Y N		MONTHS YEARS
7			M F	Y N	Y N		MONTHS YEARS
8			M F	Y N	Y N		MONTHS YEARS
9			M F	Y N	Y N		MONTHS YEARS
10			M F	Y N	Y N		MONTHS YEARS

NO.	QUESTIONS AND INSTRUCTIONS	CODING CATEGORIES	SKIP
	Thank you for completing the Household Roster. The next step will be to ask some confirmation questions.		
2A)	Just to make sure I have a complete listing, are there any other persons such as small children or infants that we have not listed?	YES ☐ NO ☐	
2B)	Are there any other people such as domestic servants, lodgers, or friends who may not be members of your household who usually live here?	YES ☐ NO ☐	
2C)	Are there any guests or temporary visitors staying here, or anyone else who stayed here last night who we have not seen?	YES ☐ NO ☐	
		ADD TO SCHEDULE	

CODES FOR COLUMN 3: RELATIONSHIP TO HOUSEHOLD HEAD

01 = HEAD
02 = WIFE/HUSBAND/ PARTNER
03 = SON OR DAUGHTER
04 = SON-IN-LAW/ DAUGHTER-IN-LAW
05 = GRANDCHILD
06 = PARENT
07 = PARENT-IN-LAW
08 = BROTHER/SISTER
09 = CO-WIFE
10 = OTHER RELATIVE
11 = ADOPTED FOSTER/STEPCHILD
12 = NOT RELATED
-8 = DON'T KNOW

HOUSEHOLD SCHEDULE (CONTINUED)

IF **(NAME)** IS **0-17 YEARS**

LINE NO.	EMANC STATUS	ORPHAN STATUS/PARENT OR GUARDIAN						
	Is **(NAME)** emancipated? [someone who is 16-17 years old who has been recognized as an independent person by the court, or is free from any competent representative.]	Is (**NAME**)'s natural mother alive?	Does **(NAME)**'s natural mother usually live in this household or was a guest last night? IF YES: RECORD MOTHER'S LINE NUMBER. IF NO: RECORD FEMALE GUARDIAN'S LINE NUMBER OR '00' IF FEMALE PARENT OR GUARDIAN NOT PRESENT IN HH.	Is (**NAME**)'s natural father alive?	Does **(NAME)**'s natural father usually live in this household or was a guest last night? IF YES: RECORD FATHER'S LINE NUMBER. IF NO: RECORD MALE GUARDIAN'S LINE NUMBER OR '00' IF MALE PARENT OR GUARDIAN NOT PRESENT IN HH.	RECORD LINE NUMBER OF PARENT/GUARDIAN WHO WILL FILL OUT CHILDREN'S MODULE FOR **(NAME)**	DO NOT READ: IS (**NAME**) ELIGIBLE FOR SURVEY?
(1)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	
1	Y N DK	Y N DK → 12		Y N DK → 14			Y	N
2	Y N DK	Y N DK → 12		Y N DK → 14			Y	N
3	Y N DK	Y N DK → 12		Y N DK → 12			Y	N
4	Y N DK	Y N DK → 12		Y N DK → 14			Y	N
5	Y N DK	Y N DK → 12		Y N DK → 14			Y	N
6	Y N DK	Y N DK → 12		Y N DK → 14			Y	N
7	Y N DK	Y N DK → 12		Y N DK → 14			Y	N
8	Y N DK	Y N DK → 12		Y N DK → 14			Y	N

(1)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
9	Y N DK	Y N DK → 12		Y N DK → 14			Y N
10	Y N DK	Y N DK → 12		Y N DK → 14			Y N

TOTAL ELIGIBLE MEN (ADULTS 15+ YEARS AND EMANCIPATED MINORS)

TOTAL ELIGIBLE WOMEN (ADULTS 15+ YEARS AND EMANCIPATED MINORS)

TOTAL ELIGIBLE CHILDREN (10 TO 14 YEARS)

TOTAL ELIGIBLE CHILDREN (0 MONTHS TO 9 YEARS)

HOUSEHOLD SCHEDULE (OPTIONAL) (CONTINUED)							
	IF (**NAME**) is 18+	IF (**NAME**) is 0-17 years					
LINE NO.	SICK PERSON	SICKNESS AND RESIDENCE OF BIOLOGICAL PARENTS					
	CHECK COLUMNS 7 AND 8, IF UNDER 18 → 17 IF 18 YEARS OR MORE: Has (**NAME**) been very sick for at least 3 months during the past 12 months, that is was (**NAME**) too sick to work or do normal activities?	CHECK COLUMN 10, IF COLUMN 10 'N' OR 'DK' → 21 IF COLUMN 10 'Y': Has (**NAME**)'s natural mother been very sick for at least 3 months during the past 12 months, that is she was she too sick to work or do normal activities?	IF MOTHER SICK: Does (**NAME**)'s natural mother has HIV/AIDS?*	CHECK COLUMN 12, IF COLUMN 12 'N' OR 'DK' → 23 IF COLUMN 12 'Y': Has (**NAME**)'s natural father been very sick for at least 3 months during the past 12 months, that is was he was too sick to work or do normal activities?	IF FATHER SICK: Does (**NAME**)'s natural father has HIV/AIDS?*	IF CHILD'S NATURAL MOTHER HAS DIED (COLUMN 10 'N') OR BEEN SICK (COLUMN 18 'Y'), SELECT Y.	IF CHILD'S NATURAL FATHER HAS DIED (COLUMN 12'N') OR BEEN SICK (COLUMN 20 'Y'), SELECT Y.
(1)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1	Y N DK	Y N DK → 19	Y N DK	Y N DK → 21	Y N DK	Y N	Y N
2	Y N DK	Y N DK → 19	Y N DK	Y N DK → 21	Y N DK	Y N	Y N
3	Y N DK	Y N DK → 19	Y N DK	Y N DK → 21	Y N DK	Y N	Y N
4	Y N DK	Y N DK → 19	Y N DK	Y N DK → 21	Y N DK	Y N	Y N
5	Y N DK	Y N DK → 19	Y N DK	Y N DK → 21	Y N DK	Y N	Y N
6	Y N DK	Y N DK → 19	Y N DK	Y N DK → 21	Y N DK	Y N	Y N
7	Y N DK	Y N DK → 19	Y N DK	Y N DK → 21	Y N DK	Y N	Y N
8	Y N DK	Y N DK → 19	Y N DK	Y N DK → 21	Y N DK	Y N	Y N
9	Y N DK	Y N DK → 19	Y N DK	Y N DK → 21	Y N DK	Y N	Y N
10	Y N DK	Y N DK → 19	Y N DK	Y N DK → 21	Y N DK	Y N	Y N

HOUSEHOLD SCHEDULE (CONTINUED)

LINE NO.	HOUSEHOLD SPOUSES/LIVE-IN PARTNERS							
	Does [HHRNAME*] have a spouse or co-habitating partner who usually lives in the household or was a guest last night?	How many spouses or co-habitating partners (those who usually live in the household or stayed here last night) does [HHRNAME*] have?	Select [HHRNAME*] 'S [# SPOUSE] or partner from the list below	Select [HHR-NAME*]'S [# SPOUSE] or partner from the list below	Select [HHR-NAME*]'S [# SPOUSE] or partner from the list below	Select [HHR-NAME*]'S [# SPOUSE] or partner from the list below	Select [HHR-NAME*]'S [# SPOUSE] or partner from the list below	Select [HHR-NAME*]'S [# SPOUSE] or partner from the list below
(1)	(21)	(22)	(23a)	(23b)	(23c)	(23d)	(23e)	(23f)
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

NO.	QUESTIONS AND INSTRUCTIONS	CODING CATEGORIES	SKIP
	SUPPORT FOR ORPHANS AND VULNERABLE CHILDREN (OPTIONAL)		
101	DO NOT READ: CHECK COLUMN 7 IN THE HOUSEHOLD SCHEDULE. **ANY CHILD AGE 0-17 YEARS?**	NUMBER OF CHILDREN 0-17 YRS: ☐☐	NONE→114
102	DO NOT READ: CHECK COLUMN 16 IN THE HOUSEHOLD SCHEDULE. **ANY SICK ADULT AGE 18+ YEARS?**	YES _____ 1 NO _____ 2	YES →105
103	DO NOT READ: CHECK COLUMN 21 IN THE HOUSEHOLD SCHEDULE. **ANY CHILD WHOSE MOTHER HAS DIED OR IS VERY SICK?**	YES _____ 1 NO _____ 2	YES→105
104	DO NOT READ: CHECK COLUMN 22 IN THE HOUSEHOLD SCHEDULE. **ANY CHILD WHOSE FATHER HAS DIED OR IS VERY SICK?**	YES _____ 1 NO _____ 2	NO→114
105	**Record names, line numbers, and ages of all children 0-17 who are identified in columns 16, 21, and 22 as having a sick adult in their household or having a mother and/or father who has died or has been very sick.**		

	CHILD (1)	CHILD (2)	CHILD (3)
	NAME _____	NAME _____	NAME _____
LINE NUMBER (FROM COLUMN 1)	☐☐	☐☐	☐☐
AGE (FROM COLUMN 7)	☐☐	☐☐	☐☐

NO.	QUESTIONS AND INSTRUCTIONS	CODING CATEGORIES	SKIP
	SUPPORT FOR ORPHANS AND VULNERABLE CHILDREN (OPTIONAL) (CONTINUED)		
	INTERVIEWER SAY: "Thank you for completing the questions for the household's women. The next step will be to complete some additional questions regarding the household itself. I would like to ask you about any formal, organized help or support for children that your household may have received for which you did not have to pay. By formal, organized support, I mean help provided by someone working for a program. This program could be government, private, religious, charity, or community-based."		
106	Now I would like to ask you about the support your household received for (**NAME**). In the last 12 months, has your household received any medical support for (**NAME**), such as medical care, supplies, or medicine, for which you did not have to pay?	YES _____ 1 NO _____ 2 DON'T KNOW _____ -8	
107	In the last 12 months, has your household received any emotional or psychological support for (**NAME**), such as companionship, counseling from a trained counselor, or spiritual support, which you received at home and for which you did not have to pay?	YES _____ 1 NO _____ 2 DON'T KNOW _____ -8	NO, DK → 109
108	Did your household receive any of this emotional or psychological support for (**NAME**) in the past 3 months?	YES _____ 1 NO _____ 2 DON'T KNOW _____ -8	
109	In the last 12 months, has your household received any material support for (**NAME**), such as clothing, food, or financial support, for which you did not have to pay?	YES _____ 1 NO _____ 2 DON'T KNOW _____ -8	NO, DK → 111
110	Did your household receive any of this material support for (**NAME**) in the past 3 months?	YES _____ 1 NO _____ 2 DON'T KNOW _____ -8	
111	In the last 12 months, has your household received any social support for (**NAME**) such as help in household work, training for a caregiver, or legal services, for which you did not have to pay?	YES _____ 1 NO _____ 2 DON'T KNOW _____ -8	NO, DK → 113

NO.	QUESTIONS AND INSTRUCTIONS	CODING CATEGORIES	SKIP
112	Did your household receive any of this social support for (**NAME**) in the past 3 months?	YES ____ 1 NO ____ 2 DON'T KNOW ____ -8	
113	In the last 12 months, has your household received any support for (**NAME**)'s schooling, such as allowance, free admission, books, or supplies, for which you did not have to pay?	YES ____ 1 NO, DID NOT RECEIVE SUPPORT ____ 2 NO, CHILD DOES NOT ATTEND SCHOOL ____ 3 DON'T KNOW ____ -8	SKIP IF CHILD<5 YEARS

CONTINUE TO NEXT CHILD IF OTHER CHILDREN WHOSE MOTHER AND/OR FATHER HAS DIED OR IS VERY SICK.

SUPPORT FOR ORPHANS AND VULNERABLE CHILDREN (OPTIONAL) (CONTINUED)

MATRIX END

INTERVIEWER SAYS: "Thank you for the information regarding (**NAME**)."

IF THERE IS ANOTHER CHILD 0-17 YEARS IN THE HOUSEHOLD WHO HAS BEEN IDENTIFIED IN COLUMN 17 AS HAVING A MOTHER/FATHER WHO HAS DIED OR IS VERY SICK BESIDES (NAME) → CONTINUE TO 106 AND ASK ABOUT THE NEXT CHILD.

INTERVIEWER SAYS: "Next, I would like to ask you about (**NAME**)".

☐ **TICK IF CONTINUATION SHEET REQUIRED.**

IF NO OTHER CHILDREN, CONTINUE HOUSEHOLD INTERVIEW.

NO.	QUESTIONS AND INSTRUCTIONS	CODING CATEGORIES			SKIP
	HOUSEHOLD DEATHS (OPTIONAL)				
114	Now I would like to ask you more questions about your household. Has any usual resident of your household died since January 1, 2016?	YES ____ 1 NO ____ 2 DON'T KNOW ____ -8			NO, DK →201
115	How many usual household residents died since January 1, 2016?	NUMBER OF DEATHS [ ][ ] DON'T KNOW ____ -8			
ASK 116-119 AS APPROPRIATE FOR EACH PERSON WHO DIED. IF THERE WERE MORE THAN 3 DEATHS USE ADDITIONAL QUESTIONNAIRES.					
116	What was the name of the person who died (most recently/before him/her)?	NAME 1ST DEATH ____	NAME 2ND DEATH ____	NAME 3RD DEATH ____	
117	When did (**NAME**) die? Please give your best guess.	DAY [ ][ ] MONTH [ ][ ] YEAR [ ][ ] DON'T KNOW DAY = -8 REFUSED DAY = -9 DON'T KNOW MONTH = -8 REFUSED MONTH =-9 DON'T KNOW YEAR = -8 REFUSED YEAR = -9	DAY [ ][ ] MONTH [ ][ ] YEAR [ ][ ] DON'T KNOW DAY = -8 REFUSED DAY = -9 DON'T KNOW MONTH = -8 REFUSED MONTH =-9 DON'T KNOW YEAR = -8 REFUSED YEAR = -9	DAY [ ][ ] MONTH [ ][ ] YEAR [ ][ ] DON'T KNOW DAY = -8 REFUSED DAY = -9 DON'T KNOW MONTH = -8 REFUSED MONTH =-9 DON'T KNOW YEAR = -8 REFUSED YEAR = -9	
118	Was (**NAME**) male or female?	YES ____ 1 NO ____ 2 DON'T KNOW ____ -8 CURRENT DATE> DATE OF DEATH 1 > JANUARY 1, [INSERT YEAR]	YES ____ 1 NO ____ 2 DON'T KNOW ____ -8 CURRENT DATE> DATE OF DEATH 1 > JANUARY 1, [INSERT YEAR]	YES ____ 1 NO ____ 2 DON'T KNOW ____ -8 CURRENT DATE> DATE OF DEATH 1 > JANUARY 1, [INSERT YEAR]	

NO.	QUESTIONS AND INSTRUCTIONS	CODING CATEGORIES			SKIP
119	How old was (**NAME**) when (he/she) died? RECORD DAYS IF LESS THAN 1 MONTH, MONTHS IF LESS THAN 1 YEAR, AND COMPLETED YEARS IF 1 YEAR OR MORE.	DAYS ☐☐ MONTHS ☐☐ YEARS ☐☐ DON'T KNOW _____-8	DAYS ☐☐ MONTHS ☐☐ YEARS ☐☐ DON'T KNOW _____-8	DAYS ☐☐ MONTHS ☐☐ YEARS ☐☐ DON'T KNOW _____-8	

☐ **CONTINUE TO NEXT DEATH ACCORDING UP TO THE NUMBER REPORTED FROM 115. TICK IF CONTINUATION SHEET REQUIRED.**

HOUSEHOLD CHARACTERISTICS

INTERVIEWER SAY: "Now I would like to ask you more questions about your household. As I explained to you at the beginning, your answers will be kept between us. If you don't understand a question, please stop me. You can refuse to answer a question if you don't want to."

201	What is the main source of drinking water for members of your household?	**PIPED WATER** PIPED INTO DWELLING_____11 PIPED TO YARD/PLOT_____12 PUBLIC TAP/STANDPIPE_____13 TUBE WELL OR BOREHOLE_____21 **DUG WELL** PROTECTED WELL _____31 UNPROTECTED WELL _____32 **WATER FROM SPRING** PROTECTED SPRING _____41 UNPROTECTED SPRING _____42 RAINWATER_____51 TANKER TRUCK_____61 CART WITH SMALL TANK_____71 SURFACE WATER (RIVER/DAM/ LAKE/ POND/STREAM/CANAL) _____81 BOTTLED WATER_____91 IRRIGATION CHANNEL_____95 OTHER_____96 (SPECIFY)_____	
202	Do you do anything to the water to make it safer to drink?	YES_____1 NO_____2 DON'T KNOW_____-8	NO, DK→204

NO.	QUESTIONS AND INSTRUCTIONS	CODING CATEGORIES	SKIP
203	What do you do to make your water safe for drinking?	BOILING 1 FILTRATION (CERAMIC/SAND/ COMPOSITE/CHARCOAL FILTER) 2 SEDIMENTATION (LET IT STAND AND SETTLE) 3 DISINFECTION (WATERGUARD/ BLEACH/CHLORINE) 4 USE BOTTLED WATER 5 STRAIN THROUGH A CLOTH 6 OTHER 96 (SPECIFY) DON'T KNOW -8	
204	What kind of toilet facility do members of your household usually use?	FLUSH OR POUR FLUSH TOILET 11 TRADITIONAL PIT LATRINE 21 VENTILATED IMPROVED PIT LATRINE (VIP) 22 COMPOSTING TOILET 31 BUCKET TOILET 32 HANGING TOILET/LATRINE 33 NO FACILITY/BUSH/FIELD 61 OTHER 96 (SPECIFY)	NO FACILITY, OTHER → 207
205	Do you share this toilet facility with other households?	YES 1 NO 2	NO→207
206	How many households use this toilet facility?	NO. OF HOUSEHOLD IF LESS THAN 10 10 OR MORE HOUSEHOLDS 96 DON'T KNOW -8	
PREFACE BEFORE QUESTIONS 207-211: Does your household have:			
207	Electricity	YES 1 NO 2	
208	A radio	YES 1 NO 2	
209	A television	YES 1 NO 2	
210	A telephone/mobile telephone	YES 1 NO 2	
211	A refrigerator	YES 1 NO 2	

NO.	QUESTIONS AND INSTRUCTIONS	CODING CATEGORIES	SKIP
		HOUSEHOLD CHARACTERISTICS (CONTINUED)	
212	What type of fuel does your household mainly use for cooking? SELECT ONLY ONE RESPONSE.	ELECTRICITY 1 LPG/NATURAL GAS 2 BIOGAS 3 PARAFFIN / KEROSENE 4 COAL, LIGNITE 5 CHARCOAL FROM WOOD 6 FIREWOOD / STRAW 7 DUNG 8 NO FOOD COOKED IN HOUSEHOLD 9 OTHER 96 (SPECIFY)	
213	MAIN MATERIAL OF FLOOR RECORD OBSERVATION.	**NATURAL FLOOR** EARTH / SAND 11 DUNG 12 **RUDIMENTARY FLOOR** WOOD PLANKS 21 PALM / BAMBOO 22 **FINISHED FLOOR** PARQUET OR POLISHED WOOD 31 VINYL OR ASPHALT STRIP 32 CERAMIC TILES 33 CEMENT/TERAZO 34 CARPET 35 OTHER 96 (SPECIFY)	
214	MAIN MATERIAL OF THE ROOF RECORD OBSERVATION.	**NATURAL ROOFING** NO ROOF 11 THATCH/PALM LEAF/GRASS 12 DUNG / MUD 13 **RUDIMENTARY ROOFING** CORRUGATED IRON (MABATI) 21 TIN CANS 22 **FINISHED ROOFING** ASBESTOS SHEET 31 CONCRETE 32 TILES (CERAMIC/BRICK/ETC.) 33 OTHER 96 (SPECIFY)	

NO.	QUESTIONS AND INSTRUCTIONS	CODING CATEGORIES	SKIP
215	MAIN MATERIAL OF THE EXTERIOR WALLS RECORD OBSERVATION.	**NATURAL WALLS** NO WALLS 11 CANE/PALM/TRUNKS 12 DIRT 16 **RUDIMENTARY WALLS** DUNG/MUD/CLAY 13 STICKS WITH MUD/CLAY/DUNG 14 BAMBOO WITH MUD/CLAY/DUNG 21 STONE WITH MUD 22 CARTON 24 REUSED WOOD 25 PLYWOOD 26 CARDBOARD 27 UNCOVERED ADOBE 29 **FINISHED WALLS** CEMENT 31 STONE WITH LIME/CEMENT 32 BRICKS 33 CEMENT BLOCKS 34 WOOD PLANKS/SHINGLES 35 OTHER 96 (SPECIFY)	
216	How many rooms are used for sleeping?	NUMBER OF ROOMS: ☐☐	
PREFACE BEFORE QUESTIONS 217-HHX14: **Does any member of your household own:**			
217	A bicycle?	YES 1 NO 2	
218	A motorcycle or motor scooter?	YES 1 NO 2	
219	A car or truck?	YES 1 NO 2	
220	A boat with a motor?	YES 1 NO 2	

NO.	QUESTIONS AND INSTRUCTIONS	CODING CATEGORIES	SKIP
221	Cows (Cattle)?	YES ____ 1 NO ____ 2	
222	Goats/Sheep?	YES ____ 1 NO ____ 2	
223	Poultry (e.g., ducks, chickens)?	YES ____ 1 NO ____ 2	
224	Dogs?	YES ____ 1 NO ____ 2	
225	Other animals (camels, horses, donkeys)?	YES ____ 1 NO ____ 2	
226	Does your household have any health insurance?	YES ____ 1 NO ____ 2	
227	What type of health insurance do you have?	RAMA ____ 1 CBHI (MITUEL DE SANTE) ____ 2 PRIVATE (e.g., SORAS, UAP, etc.) ____ 3 MMI ____ 4 FARG ____ 5 HIGHER EDUCATION INSTITUTION'S INSURANCE ____ 6 OTHER ____ 96 DON'T KNOW ____ -8	

NO.	QUESTIONS AND INSTRUCTIONS	CODING CATEGORIES	SKIP
		MALARIA & FOOD SECURITY (OPTIONAL)	
228	Does your household have any mosquito nets that can be used while sleeping?	YES ____ 1 NO ____ 2 DON'T KNOW ____ -8 REFUSED ____ 9	
229	In the past 4 weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	YES ____ 1 NO ____ 2 DON'T KNOW ____ -8	NO, DK→229
230	How often did this happen in the past 4 weeks?	RARELY (1-2 TIMES) ____ 1 SOMETIMES (3-10 TIMES) ____ 2 OFTEN (MORE THAN 10 TIMES) ____ 3 DON'T KNOW ____ -8	
231	In the past 4 weeks, did you or any household member go to sleep at night hungry because there was not enough food?	YES ____ 1 NO ____ 2 DON'T KNOW ____ -8	NO, DK→231
232	How often did this happen in the past 6 months?	RARELY (1-2 TIMES) ____ 1 SOMETIMES (3-10 TIMES) ____ 2 OFTEN (MORE THAN 10 TIMES) ____ 3	
233	In the past 4 weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	YES ____ 1 NO ____ 2 DON'T KNOW ____ -8	NO, DK→301
234	How often did this happen in the past 4 weeks?	RARELY (1-2 TIMES) ____ 1 SOMETIMES (3-10 TIMES) ____ 2 OFTEN (MORE THAN 10 TIMES) ____ 3 DON'T KNOW ____ -8	

NO.	QUESTIONS AND INSTRUCTIONS	CODING CATEGORIES	SKIP
		ECONOMIC SUPPORT (OPTIONAL)	
Now I will ask you questions on economic support you have received. As I explained to you at the beginning, your answers will be kept between us. If you don't understand a question, please stop me. You can refuse to answer a question if you don't want to.			
301	Has your household received any of the following forms of external economic support in the last 12 months? SELECT ALL THAT APPLY. READ THE RESPONSES ALOUD.	NOTHING_____A CASH TRANSFER (E.G. PENSIONS, DISABILITY GRANTS, CHILD GRANT, VETERAN'S GRANT)_____B ASSISTANCE FOR SCHOOL FEES_C MATERIAL SUPPORT FOR EDUCATION (E.G. UNIFORMS, SCHOOL BOOKS, EDUCATION, TUITION SUPPORT,BURSARIES)___D INCOME GENERATION SUPPORT IN CASH OR IN KIND (E.G. AGRIGULTURAL INPUTS) ____E FOOD ASSISTANCE PROVIDED AT THE HOUSEHOLD OR EXTERNAL INSTITUTION_____F MATERIAL OR FINANCIAL SUPPORT FOR SHELTER_____G SOCIAL PENSION_____H OTHER_____X (SPECIFY)_____ DON'T KNOW_____Y	NOTHING, DON'T KNOW →END OF SECTION
302	Has your household received any of the following forms of external economic support in the last 3 months? READ THE RESPONSES ALOUD. SELECT ALL THAT APPLY.	NOTHING_____A CASH TRANSFER (E.G. PENSIONS, DISABILITY GRANTS, CHILD GRANT,VETERAN'S GRANT)_____B ASSISTANCE FOR SCHOOL FEES_C MATERIAL SUPPORT FOR EDUCATION (E.G. UNIFORMS, SCHOOL BOOKS, EDUCATION, TUITION SUPPORT,BURSARIES)___D INCOME GENERATION SUPPORT IN CASH OR IN KIND (E.G. AGRIGULTURAL INPUTS)_____E FOOD ASSISTANCE PROVIDED AT THE HOUSEHOLD OR EXTERNAL INSTITUTION_____F MATERIAL OR FINANCIAL SUPPORT FOR SHELTER_____G SOCIAL PENSION_____H OTHER_____X (SPECIFY)_____ DON'T KNOW_____Z	

NO.	QUESTIONS AND INSTRUCTIONS	CODING CATEGORIES	SKIP

END OF HOUSEHOLD INTERVIEW

INTERVIEWER SAY: "This is the end of the household survey. Thank you very much for your time and for your responses. Do you have any questions for me at this time?"

END TIME

END	Record the end time.	HOUR:	
		MINUTES:	

END OF HH QUESTIONNAIRE/COMMENTS

COMMENTS ABOUT RESPONDENT:

COMMENTS ABOUT SPECIFIC QUESTIONS:

GENERAL QUESTIONS:

APPENDIX F ADULT QUESTIONNAIRE

NO	QUESTIONS	CODING CATEGORIES	SKIPS
MODULE 1: RESPONDENT BACKGROUND			
Interviewer says: "Thank you for agreeing to participate in this survey. The first set of questions is about your life in general. Afterwards, we will move on to other topics."			
101	Have you ever attended school?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED → 105
102	Are you enrolled in school?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	DK, REFUSED → 105
103	What is the highest level of school you attended: primary, secondary or higher?	NURSERY = 1 PRIMARY = 2 SECONDARY = 3 HIGHER = 4 DON'T KNOW = -8 REFUSED = -9	
104	What is the highest [class/grade] you completed at that level?	CLASS/GRADE ____ DON'T KNOW = -8 REFUSED = -9	
105	Have you done any work in the last 12 months for which you received cash or goods as payment?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED → NEXT MODULE
106	Have you done any work in the last seven days for which you received cash or goods as payment?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	
MODULE 2: MARRIAGE			
Interviewer says: "Now I would like to ask you about your current and previous relationships and/or marriages. As I explained to you at the beginning, your answers will be kept between us. If you don't understand a question, please stop me. You can refuse to answer a question if you don't want to."			
201	Have you ever been married or lived together with a [man/woman] as if married?	YES = 1 NO = 2 DON'T KNOW =-8 REFUSED = -9	NO, DK, REFUSED → NEXT MODULE
202	What is your marital status now: are you married, living together with someone as if married, widowed, divorced, or separated?	MARRIED = 1 LIVING TOGETHER = 2 WIDOWED = 3 DIVORCED = 4 SEPARATED = 5 DON'T KNOW = -8 REFUSED = -9	WIDOWED, DIVORCED, SEPARATED, DK, REFUSED → NEXT MODULE

NO	QUESTIONS	CODING CATEGORIES	SKIPS
Interviewer says: "The next several questions are about your current spouse or partner(s)."			
203	Altogether, how many wives or live-in partners do you have? CODE '0' IF NONE.	NUMBER OF WIVES OR LIVE-IN PARTNERS ____ DON'T KNOW = -8 REFUSED = -9	0, DK, REFUSED →NEXT MODULE SKIP IF FEMALE
204	The Household Schedule listed [INSERT NUMBER OF REPORTED PARTNERS] household members as your wives/partners. Please review the list below. Are all of the listed household members your wives/ partners who live in the household?	YES = 1 NO = 2	NO → 207 SKIP IF FEMALE
205	Is **[NAME]** your wife/partner?	YES = 1 NO = 2	SKIP IF FEMALE
206	Does **[NAME]** live in the household?	YES = 1 NO = 2	SKIP IF FEMALE
207	Do you have additional spouse(s)/ partner(s) that live with you?	YES = 1 NO = 2	SKIP IF FEMALE
208	How many additional spouse(s)/ partners(s) live with you?	NUMBER OF SPOUSES OR LIVE-IN PARTNERS _ _	SKIP IF FEMALE
209	Please enter the name of your spouse/ partner that lives with you.	NAME OF SPOUSE/PARTNER ____ DON'T KNOW = -8 REFUSED = -9	SKIP IF FEMALE
210	How many wives or live-in partners do you have who live elsewhere?	NUMBER OF ADDITIONAL SPOUSE(S)/PARTNERS ____ DON'T KNOW = -8 REFUSED = -9	SKIP IF FEMALE
211	Is your husband or partner living with you now or is he staying elsewhere?	LIVING TOGETHER = 1 STAYING ELSEWHERE = 2 DON'T KNOW = -8 REFUSE TO ANSWER = -9	STAYING ELSEWHERE, DK, REFUSED → 215 STAYING ELSEWHERE & LISTED PARTNER IN HH ROSTER → 212 SKIP IF MALE
212	The household schedule listed [NAME OF HUSBAND/PARTNER] as your husband/partner who is living here. Is that correct?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	YES DK, REF → 215 SKIP IF MALE
213	Please select the spouse/partner that lives with you.	[LIST OF PERSONS ON HH ROSTER]NOT LISTED IN HOUSEHOLD = 96	LISTED → 215 SKIP IF MALE
214	Please enter the name of your spouse/ partner that lives with you.	NAME OF SPOUSE/PARTNER ___ DON'T KNOW = -8 REFUSED = -9	SKIP IF MALE
215	Does your husband or partner have other wives or does he live with other women as if married?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSE TO ANSWER = -9	NO, DK, REFUSED →NEXT MODULE SKIP IF MALE

NO	QUESTIONS	CODING CATEGORIES	SKIPS
216	Including yourself, in total, how many wives or live-in partners does your husband or partner have?	NUMBER OF WIVES OR LIVE-IN PARTNERS ___ DON'T KNOW = -8 REFUSE TO ANSWER = -9	SKIP IF MALE
MODULE 3: REPRODUCTION			
Interviewer says: "Now I would like to ask you questions about your pregnancies and your children. As I explained to you at the beginning, your answers will be kept between us. If you don't understand a question, please stop me. You can refuse to answer a question if you don't want to."			MALE →336
301	How many times have you been pregnant including a current pregnancy? CODE '0' IF NONE.	NUMBER OF TIME(S) ___ DON'T KNOW = -8 REFUSED = -9	NONE, DK, REFUSED→336
302	Have you ever had a pregnancy that resulted in a live birth? A live birth is when the baby shows signs of life, such as breathing, beating of the heart, or movement.	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED→335
303	How many live births have you had since **January 1, 2015]**? CODE '0' IF NONE.	NUMBER OF CHILDREN ___ DON'T KNOW = -8 REFUSED = -9	NONE, DK, REFUSED→335 YEAR IS SURVEY YEAR – 3 YEARS
Interviewer says: "Now I would like to ask you some questions about the last pregnancy that resulted in a live birth since [January 1, 2015]."			
304	Did your last pregnancy result in birth to twins or more?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REF→ 306
305	What is the name of the [ORDER OF BIRTH] born child from your last pregnancy that resulted in a live birth? IF THE CHILD WAS NOT NAMED BEFORE DEATH, INPUT BIRTH 1	NAME _____	WILL BE REPEATED FOR EACH MULTIPLE BIRTH
306	What is the name of the child from your last pregnancy that resulted in a live birth? A live birth is when the baby shows signs of life, such as breathing, beating of the heart, or movement. IF THE CHILD WAS NOT NAMED BEFORE DEATH, INPUT BIRTH 1.	NAME _____	
307	When you were pregnant with **[NAME]**, did you plan to get pregnant at that time?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	

NO	QUESTIONS	CODING CATEGORIES	SKIPS
308	When you were pregnant with **[NAME]**, did you visit a health facility for antenatal care?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	YES → 310 DK, REFUSED → 319
309	What is the main reason you did not visit a clinic for antenatal care when you were pregnant with **[NAME]**?	CLINIC WAS TOO FAR AWAY = 1 COULD NOT TAKE TIME OFF WORK/TOO BUSY = 2 COULD NOT AFFORD TO PAY FOR THE VISIT = 3 DID NOT TRUST THE CLINIC STAFF = 4 RECEIVED CARE AT HOME = 5 DID NOT WANT AN HIV TEST DONE = 6 HUSBAND/FAMILY WOULD NOT LET ME GO = 7 USED TRADITIONAL BIRTH ATTENDANT/HEALER = 8 COST OF TRANSPORT = 9 RELIGIOUS REASONS = 10 OTHER = 96 SPECIFY: _____ DON'T KNOW = -8 REFUSED = -9	ALL→ 319 ADAPT RESPONSES TO LOCAL CONTEXT.
Interviewer says: "I will now be asking you questions on HIV testing. Please remember that your responses will be kept confidential and will not be shared with anyone else."			
310	Have you ever tested for HIV before your pregnancy with **[NAME]**?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED→ 313
311	Did you test positive for HIV before your pregnancy with **[NAME]**?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED → 313
312	At the time of your first antenatal care visit when you were pregnant with **[NAME]**, were you taking ARVs, that is, antiretroviral medications to treat HIV?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	YES→ 319 NO, DK, REFUSED→ 317 ELECTRONIC AID IF DON'T KNOW
313	During any of your visits to the antenatal care clinic when you were pregnant with **[NAME],** were you offered an HIV test?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	
314	Were you tested for HIV during any of your antenatal care clinic visits when you were pregnant with **[NAME]**?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	YES → 316 DK, REFUSED → 319

NO	QUESTIONS	CODING CATEGORIES	SKIPS
315	What is the main reason you were not tested for HIV during antenatal care with **[NAME]**?	did not want an hiv test done / DID NOT WANT TO KNOW MY STATUS = 1 DID NOT RECEIVE PERMISSION from spouse/family = 2 afraid others would know about test results = 3 DID not NEED TEST/IOW RISK = 4 OTHER = 96 SPECIFY: _____ DON'T KNOW = -8 REFUSED = -9	ALL→ 319
316	What was the result of your last HIV test during your pregnancy with **[NAME]**?	POSITIVE = 1 NEGATIVE = 2 UNKNOWN/INDETERMINATE = 3 DID NOT RECEIVE RESULTS = 4 DON'T KNOW = -8 REFUSED = -9	NEGATIVE, UNK, NO RESULTS, DK, REF → 319
317	Did you take ARVs during your pregnancy with [NAME] to stop **[NAME]** from getting HIV?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	YES, DK, REFUSED→ 319
318	What was the main reason you did not take ARVs while you were pregnant with **[NAME]**?	WAS NOT PRESCRIBED = 1 I FELT HEALTHY/NOT SICK = 2 COST OF MEDICATIONS = 3 COST OF TRANSPORT = 4 RELIGIOUS REASONS = 5 WAS TAKING TRADITIONAL MEDICATIONS = 6 MEDICATIONS OUT OF STOCK = 7 DID NOT WANT PEOPLE TO KNOW HIV STATUS = 8 DID NOT RECEIVE PERMISSION FROM SPOUSE/FAMILY = 9 OTHER = 96 SPECIFY: _____ DON'T KNOW = -8 REFUSED = -9	
319	Where did you give birth to **[NAME]**?	AT HOME = 1 AT A HEALTH FACILITY = 2 IN TRANSIT = 3 OTHER = 96 SPECIFY: _____ DON'T KNOW = -8 REFUSED = -9	HOME, TRANSIT, OTH, DK, REFUSED → 326
320	Were you offered an HIV test during labor?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	
321	Did you test for HIV during labor?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED → 326 SKIP IF HIV POSITIVE

NO	QUESTIONS	CODING CATEGORIES	SKIPS
322	What was the result of that test?	POSITIVE = 1 NEGATIVE = 2 UNKNOWN/INDETERMINATE = 3 DID NOT RECEIVE RESULTS = 4 DON'T KNOW = -8 REFUSED = -9	NEG, UNK/INDET, NO RESULTS, DK, REFUSED → 326 SKIP IF HIV POSITIVE
323	During labor, were you offered ARVs to protect **[NAME]** against HIV?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	SKIP IF ALREADY ON ARVS.
324	During labor, did you take ARVs to protect **[NAME]** against HIV?	YES = 1 NO=2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED→ 326 ELECTRONIC AID IF DON'T KNOW. SKIP IF ALREADY ON ARVS.
325	Did you continue to take the ARVs after delivery?	YES = 1 NO= 2 DON'T KNOW =8 REFUSED = -9	
326	When did you give birth to **[NAME]**? Please give your best guess.	DAY __ __ DON'T KNOW DAY= -8 REFUSED DAY= -9 MONTH __ __ DON'T KNOW MONTH= -8 REFUSED MONTH= -9 YEAR __ __ __ __ DON'T KNOW YEAR=-8 REFUSED YEAR= -9	
327	Is **[NAME]** still alive?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	YES, DK, REFUSED → 330 IF MULTIPLE BIRTH ASK 327-334 FOR EACH CHILD.
328	How old was **[NAME]** when he/she died? KEY '0' IF CHILD WAS LESS THAN ONE YEAR OLD.	YEARS ____ DON'T KNOW = -8 REFUSED = -9	>0, DK, REF → 332
329	How old was **[NAME]** in months when he/she died? KEY '0' IF LESS THAN ONE MONTH OLD.	MONTHS _____ DON'T KNOW = -8 REFUSED = -9	ALL→ 332
330	Is **[NAME]** living with you?	YES = 1 NO = 2	NO → 332
331	Please select **[NAME]** that lives with you. SELECT 'NOT LISTED IN HOUSEHOLD' IF CHILD IS NOT LISTED HERE.	[LIST OF CHILDREN IN HOUSEHOLD] NOT LISTED IN HOUSEHOLD = 96	

NO	QUESTIONS	CODING CATEGORIES	SKIPS
332	Did you ever breastfeed **[NAME]**?	YES = 1 NO, NEVER BREASTFED = 2 NO, CHILD NOT ALIVE = 3 DON'T KNOW = -8 REFUSED = -9	NO, NOT ALIVE, DK, REFUSED → 334
333	For how long did you breastfeed **[NAME]**? ONLY ONE OPTION MAY BE SELECTED. FOR EXAMPLE, ANSWER ONLY IN WEEKS OR IN MONTHS. CODE '00' IF LESS THAN 1 WEEK.	WEEKS ___ MONTHS ___ STILL BREASTFEEDING = 96 DON'T KNOW = -8 REFUSED = -9	
334	Thank you for the information regarding **[NAME]**. DID THE RESPONDENT HAVE MORE THAN ONE CHILD (I.E. TWINS, TRIPLETS)?	YES = 1 NO = 2	YES → RETURN TO 327 FOR MULTIPLES
Interviewer says: "I will now ask about current pregnancies. As I explained to you at the beginning, your answers will be kept between us. If you don't understand a question, please stop me. You can refuse to answer a question if you don't want to."			
335	Are you pregnant now?	YES = 1 NO = 2 DON'T KNOW/UNSURE = -8 REFUSED = -9	YES -> NEXT MODULE NO, DK, REFUSED → 336
Interviewer says: "I will now ask you about family planning."			
336	Are you or your partner currently doing something or using any method to delay or avoid getting pregnant?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED → 338
337	Which method are you or your partner using? SELECT ALL THAT APPLY.	FEMALE STERILIZATION = A MALE STERILIZATION = B PILL = C IUD/"COIL" = D INJECTIONS = E IMPLANT = F CONDOM = G FEMALE CONDOM = H RHYTHM/NATURAL METHODS = I WITHDRAWAL = J NOT HAVING SEX = K OTHER = X SPECIFY: _____ DON'T KNOW = Y REFUSED = Z	ALL → NEXT MODULE

NO	QUESTIONS	CODING CATEGORIES	SKIPS
338	Can you tell me why you are not using a method to prevent pregnancy? SELECT ALL THAT APPLY.	NOT MARRIED/NO PARTNER = A NOT HAVING SEX = B INFREQUENT SEX = C MENOPAUSAL/HYSTERECTOMY = D (PARTNER) CANNOT GET PREGNANT = E NOT MENSTRUATED SINCE LAST BIRTH = F BREASTFEEDING = G UP TO GOD = H RESPONDENT OPPOSED = I HUSBAND/PARTNER OPPOSED = J RELIGION PROHIBITS= K KNOWS NO METHOD = L KNOWS NO SOURCE = M SIDE EFFECTS/HEALTH CONCERNS = N LACK OF ACCESS/TOO FAR = O COSTS TOO MUCH = P PREFERRED METHOD NOT AVAILABLE = Q NO METHOD AVAILABLE = R INCONVENIENT TO USE = S INTERFERES WITH BODY'S NORMAL PROCESSES = T OTHER = X SPECIFY: _____ DON'T KNOW = Y REFUSED = Z	

MODULE 4: CHILDREN

THE HOUSEHOLD SCHEDULE NOTED THAT [NAME OF PARTICIPANT] WILL FILL OUT THE CHILDREN'S MODULE FOR [NUMBER OF CHILDREN].

I am going to ask you a number of questions about your child/children regarding their health and where they get their health services. We will ask you about these children:

LIST OF HOUSEHOLD MEMBERS FOR DISPLAY ONLY, DO NOT SELECT

[LIST OF CHILDREN]

As I explained to you at the beginning, your answers will be kept between us. If you don't understand a question, please stop me. You can refuse to answer a question if you don't want to.

Now I am going to ask you questions for **[NAME]**.

THE CHILD NAMED **[NAME]** WAS LISTED WITH LINE NUMBER [INSERT HH LINE NUMBER] IN THE HOUSEHOLD LISTING.

401	How old is **[NAME]** in years? KEY '0' IF CHILD IS LESS THAN ONE YEAR OLD AT PRESENT.	YEARS ___ DON'T KNOW =-8 REFUSED = -9	AGE CANNOT BE GREATER THAN 14 YEARS.
402	How old is **[NAME]** in months?	MONTHS ___ DON'T KNOW =-8 REFUSED = -9	

NO	QUESTIONS	CODING CATEGORIES	SKIPS
403	Is **[NAME]** a boy or girl?	BOY = 1 GIRL = 2 DON'T KNOW = -8 REFUSED = -9	
404	Is **[NAME]** enrolled in school?	YES = 1 NO, CURRENTLY NOT IN SCHOOL = 2 NO, TOO YOUNG TO BE IN SCHOOL = 3 DON'T KNOW = -8 REFUSED = -9	NO, TOO YOUNG, DK, REFUSED → 409
405	What is the highest level of school **[NAME]** has attended: nursery, primary or secondary?	NURSERY = 1 PRIMARY = 2 SECONDARY = 3 DON'T KNOW = -8 REFUSED = -9	DK, REF → 407
406	What class/grade is **[NAME]** in now?	CLASS/GRADE ____ DON'T KNOW = -8 REFUSED = -9	
407	Was **[NAME]** enrolled in school during the previous school year?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REF → 409
408	What class/grade was **[NAME]** during the previous school year?	CLASS/GRADE ____ DON'T KNOW = -8 REFUSED = -9	
409	Is **[NAME]** circumcised? Circumcision is the complete removal of the foreskin from the penis. I have a picture to show you what a completely circumcised penis looks like.	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REF →411 SKIP IF FEMALE CHILD. ELECTRONIC AID IF DON'T KNOW.
410	Who circumcised **[NAME]**?	DOCTOR, CLINICAL OFFICER, OR NURSE = 1 TRADITIONAL PRACTITIONER / CIRCUMCISER =2 MIDWIFE = 3 OTHER = 96 SPECIFY: _____ DON'T KNOW = -8 REFUSED=-9	SKIP IF FEMALE CHILD. ALL→ 412
411	Why is **[NAME]** not circumcised? SELECT ALL THAT APPLY.	I DON'T KNOW WHERE TO CIRCUMCISE HIM FROM = A COST = B CHILD TOO YOUNG = C PLANNED IN THE FUTURE = D LACK OF INFORMATION ON IMPORTANCE OF CIRCUMCISION = E OTHER: SPECIFY = X DON'T KNOW = Y REFUSED = Z	SKIP IF FEMALE CHILD
412	Has **[NAME]** ever been tested for HIV?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	YES→ 414 DK, REFUSED → 436

NO	QUESTIONS	CODING CATEGORIES	SKIPS
413	Why has **[NAME]** never been tested for HIV? SELECT ALL THAT APPLY.	DON'T KNOW WHERE TO TEST = A TEST COSTS TOO MUCH = B TRANSPORT COSTS TOO MUCH = C TOO FAR AWAY = D AFRAID OTHERS WILL KNOW ABOUT TEST RESULTS = E DON'T NEED TEST/LOW RISK = F DID NOT RECEIVE PERMISSION FROM SPOUSE/FAMILY = G AFRAID SPOUSE/PARTNER/ FAMILY WILL KNOW RESULTS = H DON'T WANT TO KNOW CHILD HAS HIV = I CANNOT GET TREATMENT FOR HIV = J TEST KITS NOT AVAILABLE = K RELIGIOUS REASONS = L OTHER = X SPECIFY: _____ DON'T KNOW = Y REFUSED = Z	ALL → 436
414	What month and year was **[NAME]**'s last HIV test done?	MONTH __ __ DON'T KNOW MONTH = -8 REFUSED MONTH = -9 YEAR _____ DON'T KNOW YEAR = -8 REFUSED YEAR = -9	DATE RESTRAINTS
415	What was **[NAME]**'s last HIV test result?	POSITIVE = 1 NEGATIVE = 2 UNKNOWN/INDETERMINATE = 3 DID NOT RECEIVE RESULTS = 4 DON'T KNOW = -8 REFUSED = -9	NEG, UNK/INDET, DID NOT RECEIVE, DK, REFUSED → 436
416	What was the month and year of **[NAME]**'s first HIV-positive test result? Please give your best guess. This will be the very first HIV positive test result that you have received. PROBE TO VERIFY DATE.	MONTH __ __ DON'T KNOW MONTH = -8 REFUSED MONTH = -9 YEAR _____ DON'T KNOW YEAR = -8 REFUSED YEAR = -9	
417	Has **[NAME]** ever received HIV medical care from a doctor, clinical officer, or nurse?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	YES → 419 DK, REFUSED → 422

NO	QUESTIONS	CODING CATEGORIES	SKIPS
418	What is the main reason why **[NAME]** has never seen a doctor, clinical officer, or nurse for HIV medical care?	FACILITY IS TOO FAR AWAY = 1 I DON'T KNOW WHERE TO GET HIV MEDICAL CARE FOR CHILD = 2 COST OF CARE = 3 COST OF TRANSPORT = 4 I DON'T THINK CHILD NEEDS IT, HE/SHE IS NOT SICK = 5 I FEAR PEOPLE WILL KNOW THAT CHILD HAS HIV IF I TAKE HIM/HER TO A CLINIC = 6 RELIGIOUS REASONS = 7 CHILD IS TAKING TRADITIONAL MEDICINE = 8 OTHER = 96 SPECIFY: _____ DON'T KNOW = -8 REFUSED = -9	ALL→ 422
419	What month and year did **[NAME]** first see a doctor, clinical officer, or nurse for HIV medical care? PROBE TO VERIFY DATE.	MONTH _____ DON'T KNOW MONTH = -8 REFUSED MONTH= -9 YEAR _____ DON'T KNOW YEAR =-8 REFUSED YEAR = -9	
420	What month and year did **[NAME]** last see a doctor, clinical officer, or nurse for HIV medical care?	MONTH _____ DON'T KNOW MONTH = -8 REFUSED MONTH= -9 YEAR _____ DON'T KNOW YEAR =-8 REFUSED YEAR = -9	IF <7 MONTHS, DK, REFUSED, MISSING DATE → KIDCD4
421	What is the main reason for **[NAME]** not seeing a doctor, clinical officer, or nurse for HIV medical care for more than 3 months?	FACILITY IS TOO FAR AWAY = 1 I DON'T KNOW WHERE TO GET HIV MEDICAL CARE FOR CHILD = 2 COST OF CARE = 3 COST OF TRANSPORT = 4 I DON'T THINK CHILD NEEDS IT, HE/SHE IS NOT SICK = 5 I FEAR PEOPLE WILL KNOW THAT CHILD HAS HIV IF I TAKE HIM/HER TO A CLINIC = 6 RELIGIOUS REASONS = 7 CHILD IS TAKING TRADITIONAL MEDICINE = 8 NO APPOINTMENT SCHEDULED/ DID NOT MISS MOST RECENT APPOINTMENT= 9 OTHER = 96 SPECIFY: _____ DON'T KNOW = -8 REFUSED = -9	
422	Has **[NAME]** ever taken ARVs, that is, antiretroviral medications to treat his/her HIV infection?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	YES → 424 DK, REFUSED → 428 ELECTRONIC AID IF DON'T KNOW

NO	QUESTIONS	CODING CATEGORIES	SKIPS
423	What is the main reason **[NAME]** has never taken ARVs?	CHILD IS NOT ELIGIBLE FOR TREATMENT=1 HEALTH CARE PROVIDER DID NOT PRESCRIBE = 2 HIV MEDICINES NOT AVAILABLE = 3 DO NOT THINK CHILD NEEDS IT, HE/SHE IS NOT SICK = 4 COST OF MEDICATIONS = 5 COST OF TRANSPORT = 6 RELIGIOUS REASONS = 7 CHILD IS TAKING TRADITIONAL MEDICATIONS = 8 OTHER = 96 SPECIFY: _____ DON'T KNOW = -8 REFUSED = -9	ALL → 428
424	What month and year did **[NAME]** first start taking ARVs? PROBE TO VERIFY DATE.	MONTH = ___ DON'T KNOW MONTH = -8 REFUSED MONTH = -9 YEAR = ___ DON'T KNOW YEAR = -8 REFUSED YEAR = -9	
425	Is **[NAME]** currently taking ARVs, that is, antiretroviral medications? By currently, I mean that **[NAME]** may have missed some doses but **[NAME]** is still taking ARVs.	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	YES→ 427 DK, REFUSED → 428
426	Can you tell me the main reason why **[NAME]** is not currently taking ARVs?	I HAVE TROUBLE GIVING CHILD A TABLET EVERYDAY = 1 CHILD HAD SIDE EFFECTS/ RASH = 2 FACILITY/PHARMACY TOO FAR AWAY TO GET MEDICATION REGULARLY = 3 COST OF MEDICATIONS = 4 COST OF TRANSPORT = 5 CHILD IS HEALTHY/, HE/SHE IS NOT SICK = 6 FACILITY WAS OUT OF STOCK = 7 RELIGIOUS REASONS= 8 CHILD IS TAKING TRADITIONAL MEDICATIONS = 9 OTHER =96 SPECIFY: _____ DON'T KNOW = -8 REFUSED = -9	ALL→ 428
427	People sometimes forget to take all their ARVs every day. In the last 30 days, how many days has **[NAME]** missed taking any ARV pills? CODE '00' IF NONE.	DAYS _____ DON'T KNOW = -8 REFUSED = -9	

NO	QUESTIONS	CODING CATEGORIES	SKIPS
428	Did **[NAME]** ever have a viral load test? This is a test that measures how much HIV is in the blood.	YES= 1 NO= 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED → 430
429	When did **[NAME]** last have a viral load test?	MONTH _____ DON'T KNOW MONTH = -8 REFUSED MONTH = -9 YEAR _____ DON'T KNOW YEAR = -8 REFUSED YEAR = -9	
430	In the last 12 months, how often did a doctor, clinical officer or nurse weigh **[NAME]**?	EVERY VISIT = 1 SOME VISITS = 2 NEVER = 3 DON'T KNOW = -8 REFUSED = -9	
431	In the last 12 months, were you told by a doctor, clinical officer, or nurse that **[NAME]** was underweight or had a low weight?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED - 9	NO, DK, REFUSED→ 433
432	Was **[NAME]** given a nutritional supplement or referred for a nutritional consult or both?	NO, NEVER GIVEN SUPPLEMENT/ REFERRED = 1 YES, GIVEN SUPPLEMENT = 2 YES, REFERRED = 3 BOTH GIVEN SUPPLEMENT AND REFERRED = 4 DON'T KNOW = -8 REFUSED = -9	
433	Is **[NAME]** currently taking Septrin or cotrimoxazole? Septrin or cotrimoxazole is a medicine recommended for people with HIV, even if they have not started treatment for HIV. It helps prevent certain infections, but it is not treatment for HIV. By currently, I mean that **[NAME]** may have missed some doses but is still taking Septrin or cotrimoxazole.	YES = 1 NO = 2 I DON'T KNOW WHAT IT IS = 3 REFUSED = -9	ELECTRONIC AID IF DON'T KNOW
434	At the last HIV medical care visit, did a doctor, clinical officer or nurse, ask if **[NAME]** had the following tuberculosis or TB symptoms: READ ALL RESPONSES. SELECT ALL THAT APPLY	PERSISTENT COUGH = A FEVER = B NIGHT SWEATS = C WEIGHT LOSS = D DON'T KNOW = Y REFUSED = Z	SKIP IF NOT IN HIV CARE
435	At the last HIV medical care visit, did a doctor, clinical officer, or nurse, ask if **[NAME]** had contact with someone who had TB?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	SKIP IF NOT IN HIV CARE

NO	QUESTIONS	CODING CATEGORIES	SKIPS
436	Has **[NAME]** ever visited a clinic for tuberculosis for TB diagnosis or treatment?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED → NEXT MODULE
437	Was **[NAME]** tested for HIV at the TB clinic?	YES = 1 NO, WAS NOT TESTED FOR HIV = 2 NO, WAS ALREADY HIV POSITIVE = 3 DON'T KNOW = -8 REFUSED = -9	
438	Have you ever been told by a doctor, clinical officer or nurse that **[NAME]** had TB?	YES = 1 NO=2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED→ NEXT MODULE
439	What month and year did a doctor, clinical officer, or nurse diagnose **[NAME]** with TB? RECORD THE MOST RECENT TIME IF DIAGNOSED WITH TB MORE THAN ONCE.	MONTH __ __ DON'T KNOW MONTH = -8 REFUSED MONTH = -9 YEAR __ __ __ __ DON'T KNOW YEAR = -8 REFUSED YEAR = -9	
440	Was **[NAME]** ever treated for TB?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED→ NEXT MODULE
441	The last time **[NAME]** was treated for TB, did **[NAME]** complete at least 6 months of treatment?	YES = 1 NO, THE MEDICINE WAS STOPPED IN LESS THAN 6 MONTHS = 2 CHILD IS STILL ON TREATMENT = 3 DON'T KNOW = -8 REFUSED = -9	
442	Thank you for the information about **[NAME]**. DOES THE RESPONDENT HAVE ANOTHER CHILD AGED 0-14 YEARS?	YES = 1 NO = 2	YES → RETURN TO 401

MODULE 5: MALE CIRCUMCISION – ONLY FOR MALE RESPONDENTS AGE 15 and ABOVE

Interviewer says: "I will be asking a few questions about circumcision. Circumcision is the complete removal of the foreskin from the penis. I have a picture to show you what a completely circumcised penis looks like. As I explained to you at the beginning, your answers will be kept between us. If you don't understand a question, please stop me. You can refuse to answer a question if you don't want to."			ELECTRONIC AID IF DON'T KNOW.
501	Some men are uncomfortable talking about circumcision, but it is important for us to have this information. Some men are circumcised. Are you circumcised?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED=9	YES, DK, REF → NEXT MODULE

NO	QUESTIONS	CODING CATEGORIES	SKIPS
502	Are you planning to be circumcised?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED= -9	ALL → NEXT MODULE
503	How old were you when you were circumcised? Please give your best guess. IF LESS THAN ONE YEAR, CODE '00'.	AGE IN YEARS ___ DON'T KNOW = -8 REFUSED= -9	
504	Who did the circumcision?	DOCTOR, CLINICAL OFFICER, OR NURSE = 1 TRADITIONAL PRACTITIONER / CIRCUMCISER =2 MIDWIFE = 3 OTHER = 96 SPECIFY: _____ DON'T KNOW = -8 REFUSED= -9	

MODULE 6: SEXUAL ACTIVITY

Interviewer says: "In this part of the interview, I will be asking questions about your sexual relationships and practices. These questions will help us have a better understanding of how they may affect your life and risk for HIV.

As I explained to you at the beginning, your answers will be kept between us. If you don't understand a question, please stop me. You can refuse to answer a question if you don't want to."

601	How old were you when you had vaginal sex for the very first time? Vaginal sex is when a penis enters a vagina.	AGE IN YEARS _ _ NEVER HAD VAGINAL SEX = 96 DON'T KNOW = -8 REFUSED = -9	IF NEVER HAD VAGINAL SEX → NEXT MODULE
602	People often have sex with different people over their lifetime. In total, with how many different people have you had sex in the last 12 months? IF NONE CODE '00'. IF NUMBER OF PARTNERS IS GREATER THAN 100, WRITE ' 100'.	NUMBER OF SEXUAL PARTNERS IN LAST 12 MONTHS __ __ __ DON'T KNOW = -8 REFUSED = -9	IF 00 PARTNERS IN LAST 12 MONTHS →NEXT MODULE

Interviewer says: "Now I would like to ask you some questions about the people you have had sex with in the last 12 months. Let me assure you again that your answers are completely confidential and will not be told to anyone. I will first ask you about the most recent person you had sex with."

ASK ONLY ABOUT THE LAST 3 PERSONS THE PARTICIPANT HAS HAD SEX WITH.

603	Does the person you had sex with live in this household?	YES = 1 NO = 2	NO→ 605
604	Please select the name below from the household membership list. Please identify the person you had sex with.	[LIST OF PERSONS FROM HOUSEHOLD]] NOT LISTED IN HOUSEHOLD = 96	LISTED → 606

NO	QUESTIONS	CODING CATEGORIES	SKIPS
605	I would like to ask you for the initials of this person so I can keep track. They do not have to be the actual initials of this person.	INITIALS ___ ___	
606	What is your relationship with (INITIALS)?	HUSBAND/WIFE = 1 LIVE-IN PARTNER = 2 PARTNER, NOT LIVING WITH RESPONDENT = 3 EX-SPOUSE/EX-PARTNER = 4 FRIEND/ACQUAINTANCE = 5 SEX WORKER = 6 SEX WORKER CLIENT =7 STRANGER = 8 OTHER = 96 SPECIFY: _____ DON'T KNOW = -8 REFUSED = -9	
607	Is (INITIALS) male or female?	MALE = 1 FEMALE = 2 DON'T KNOW = -8 REFUSED = -9	
608	How old is (INITIALS)? Please give your best guess.	AGE IN YEARS ___ DON'T KNOW = -8 REFUSED = -9	
609	The last time you had sex with (INITIALS) was a condom used?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	
610	Did you enter into a sexual relationship with (INITIALS) because (INITIALS) provided you with or you expected that (INITIALS) would provide you gifts, help you to pay for things, or help you in other ways?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED→ 612 SKIP IF SEX WORKER OR CLIENT
611	In the last 12 months, what have you received from (INITIALS)? READ RESPONSES ALOUD. SELECT ALL THAT APPLY.	DID NOT RECEIVE ANYTHING = A MONEY = B FOOD = C SCHOOL FEES = D EMPLOYMENT = E GIFTS/FAVORS = F TRANSPORT = G SHELTER/RENT = H PROTECTION = I OTHER = X SPECIFY: _____ DON'T KNOW = Y REFUSED = Z	SKIP IF SPOUSE, LIVE-IN PARTNER, SEX WORKER OR CLIENT
612	Do you expect to have sex with (INITIALS) again?	YES =1 NO =2 DON'T KNOW = -8 REFUSED = -9	

NO	QUESTIONS	CODING CATEGORIES	SKIPS
613	Does (INITIALS) know your HIV status? HIV status could mean you are HIV negative or HIV positive.	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	
614	Have you ever taken an HIV test with (INITIALS)?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	YES, DK, REFUSED → 616
615	What is the main reason you have never tested for HIV with (INITIALS) as a couple? READ RESPONSES ALOUD.	NOT A PARTNER OR COUPLE = 1 NEVER DISCUSSED = 2 WE ARE NOT AT RISK FOR HIV = 3 PARTNER REFUSED = 4 I REFUSED = 5 WE KNOW OUR STATUS = 6 OTHER = 96 SPECIFY: _____ DON'T KNOW = -8 REFUSED = -9	
616	What is the HIV status of (INITIALS)? READ RESPONSES ALOUD	I THINK HE/SHE IS POSITIVE = 1 HE/SHE TOLD ME HE/SHE IS POSITIVE = 2 HE/SHE IS POSITIVE, TESTED TOGETHER = 3 I THINK HE/SHE IS NEGATIVE = 4 HE/SHE TOLD ME HE/SHE IS NEGATIVE = 5 HE/SHE IS NEGATIVE, TESTED TOGETHER=6 DON'T KNOW STATUS = 7 REFUSED = -9	
617	DOES THE RESPONDENT HAVE ANOTHER PARTNER IN THE LAST 12 MONTHS? I will now ask you about the person you have had sex with pervious to (INITIALS).	YES = 1 NO = 2	YES → 603
618	People have sex in different ways. Some have vaginal sex. Some have anal sex. Anal sex is when a penis enters a person's anus. Have you ever had anal sex?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED → 621 NEVER VAGINAL OR ANAL SEX → NEXT MODULE
619	How old were you when you had anal sex for the very first time?	AGE IN YEARS _ _ DON'T KNOW = -8 REFUSED = -9	
620	What is the gender of the person(s) with whom you have had anal sex?	FEMALE = 1 MALE = 2 BOTH MALE AND FEMALE = 3 REFUSED = -9	
621	How old was the person you first had vaginal or anal sex with? Please give your best guess.	AGE IN YEARS ____ DON'T KNOW = -8 REFUSED = -9	

NO	QUESTIONS	CODING CATEGORIES	SKIPS
MODULE 7: HIV TESTING			
Interviewer says: "I would now like to ask you some questions about HIV testing. As I explained to you at the beginning, your answers will be kept between us. If you don't understand a question, please stop me. You can refuse to answer a question if you don't want to."			
701	Have you ever tested for HIV?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	YES → 703 DK, REFUSED → NEXT MODULE CONSTRAINT IF REPORTED TESTING
702	Why have you never been tested for HIV? SELECT ALL THAT APPLY.	DON'T KNOW WHERE TO TEST = A TEST COSTS TOO MUCH = B TRANSPORT COSTS TOO MUCH = C TOO FAR AWAY = D AFRAID OTHERS WILL KNOW ABOUT TEST RESULTS = E DON'T NEED TEST/LOW RISK = F DID NOT RECEIVE PERMISSION FROM SPOUSE/FAMILY = G AFRAID SPOUSE/PARTNER/ FAMILY WILL KNOW RESULTS = H DON'T WANT TO KNOW I HAVE HIV = I CANNOT GET TREATMENT FOR HIV = J TEST KITS NOT AVAILABLE = K RELIGIOUS REASONS = L OTHER = X SPECIFY: _____ DON'T KNOW = Y REFUSED = Z	ALL -> NEXT MODULE
703	What month and year was your last HIV test?	MONTHS ____ ____ DON'T KNOW MONTH= -8 REFUSED MONTH= -9 YEAR ___ DON'T KNOW YEAR = -8 REFUSED YEAR= -9	
704	Where was the last test done?	VCT FACILITY = 1 MOBILE VCT = 2 AT HOME = 3 HEALTH CLINIC / FACIITY = 4 HOSPITAL OUTPATIENT CLINIC = 5 TB CLINIC = 6 STI CLINIC = 7 HOSPITAL INPATIENT WARDS = 8 BLOOD DONATING CENTER = 9 ANC CLINIC = 10 OTHER = 96 SPECIFY: _____ DON'T KNOW = -8 REFUSED = -9	

NO	QUESTIONS	CODING CATEGORIES	SKIPS
705	What was the result of that HIV test?	POSITIVE = 1 NEGATIVE = 2 UNCERTAIN/INDETERMINATE = 3 DID NOT RECEIVE THE RESULT = 4 DON'T KNOW = -8 REFUSED = -9	NEG, UNCERTAIN/IND, NO RESULT, DK, REF →708
706	What was the month and year of your first HIV-positive test result? Please give your best guess. This will be the very first HIV positive test result that you have received. PROBE TO VERIFY DATE.	MONTH ___ ___ DON'T KNOW MONTH = -8 REFUSED MONTH = -9 YEAR _____ DON'T KNOW YEAR = -8 REFUSED YEAR = -9	
707	Of the following people, who have you told that you are HIV-positive? SELECT ALL THAT APPLY.	NO ONE = A SPOUSE/SEX PARTNER = B DOCTOR = C FRIEND = D FAMILY MEMBER = E OTHER = X SPECIFY: _____ DON'T KNOW = Y REFUSED = Z	NO ONE, DK OR REFUSED → NEXT QUESTION
708	If an HIV self-test kit were available in this country, would you use it?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	
709	If you tested yourself and found that you had HIV, what would you do? SELECT ALL THAT APPLY.	NOTHING = A TELL A SEX PARTNER = B TELL OTHER FAMILY MEMBER = C TELL A FRIEND = D GO TO A HEALTH FACILITY = E OTHER = X SPECIFY: _____ DON'T KNOW = Y REFUSED = Z	ALL → NEXT MODULE
Interviewer says: "Now I would like to ask you questions about your experiences with health care providers."			HIV NEGATIVE → NEXT MODULE
710	In the last 12 months, when you sought health care in a facility where your HIV status is not known, did you feel you needed to hide your HIV status?	YES = 1 NO, NO NEED TO HIDE = 2 NO, DID NOT ATTEND HEALTH FACILITY IN LAST 12 MONTHS =3 DON'T KNOW = -8 REFUSED = -9	
711	In the last 12 months, have you been denied health services including dental care, because of your HIV status?	YES = 1 NO = 2 NO ONE KNOWS MY STATUS = 3 DON'T KNOW = -8 REFUSED = -9	

NO	QUESTIONS	CODING CATEGORIES	SKIPS
MODULE 8: HIV STATUS, CARE, AND TREATMENT			
Interviewer says: "Now I'm going to ask you more about your experience with HIV support, care, and treatment. As I explained to you at the beginning, your answers will be kept between us. If you don't understand a question, please stop me. You can refuse to answer a question if you don't want to."			HIV NEGATIVE → NEXT MODULE
801	After learning you had HIV, have you ever received HIV medical care from a doctor, clinical officer, or nurse?	YES = 1 NO = 2 DON' T KNOW = -8 REFUSED = -9	YES → 803 DK, REFUSED → 822
802	What is the main reason why you have never received HIV medical care from a doctor, clinical officer, or nurse?	FACILITY IS TOO FAR AWAY = 1 I DON'T KNOW WHERE TO GET HIV MEDICAL CARE = 2 COST OF CARE = 3 COST OF TRANSPORT = 4 I DO NOT NEED IT/I FEEL HEALTHY/NOT SICK = 5 I FEAR PEOPLE WILL KNOW THAT I HAVE HIV IF I GO TO A CLINIC = 6 RELIGIOUS REASONS = 7 I'M TAKING TRADITIONAL MEDICINE= 8 DO NOT TRUST THE STAFF/ QUALITY OF CARE = 9 OTHER = 96 SPECIFY: _____ DON'T KNOW = -8 REFUSED = -9	SKIP TO 807
803	What month and year did you first see a doctor, clinical officer, or nurse for HIV medical care? PROBE TO VERIFY DATE.	MONTH _____ DON'T KNOW MONTH = -8 REFUSED MONTH = -9 YEAR _____ DON'T KNOW YEAR = -8 REFUSED YEAR = -9	
804	What month and year did you last see a doctor, clinical officer, or nurse for HIV medical care?	MONTH _____ DON'T KNOW MONTH = -8 REFUSED MONTH= -9 YEAR __ __ __ __ DON'T KNOW YEAR = -8 REFUSED = -9	IF <7 MONTHS, DK, REFUSED → 806

NO	QUESTIONS	CODING CATEGORIES	SKIPS
805	What is the main reason for not seeing a doctor, clinical officer, or nurse for HIV medical care for more than 6 months?	THE FACILITY IS TOO FAR AWAY = 1 I DON'T KNOW WHERE TO GET HIV MEDICAL CARE = 2 COST OF CARE = 3 COST OF TRANSPORT = 4 I DO NOT NEED IT/I FEEL HEALTHY/NOT SICK = 5 I FEAR PEOPLE WILL KNOW THAT I HAVE HIV IF I GO TO A CLINIC = 6 I'M TAKING TRADITIONAL MEDICINE= 7 RELIGIOUS REASONS = 8 NO APPOINTMENT SCHEDULED/ DID NOT MISS MOST RECENT APPOINTMENT = 9 OTHER = 96 SPECIFY: _____ DON'T KNOW = -8 REFUSED = -9	
806	At your last HIV care visit, approximately how long did it take you to travel from your home (or workplace) one-way?	LESS THAN ONE HOUR = 1 ONE TO TWO HOURS = 2 MORE THAN TWO HOURS = 3 DON'T KNOW = -8 REFUSED = -9	
807	Have you <u>ever</u> taken ARVs, that is, antiretroviral medications to treat HIV infection?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	YES →809 DK, REFUSED → 817
808	What is the main reason you have never taken ARVs?	NOT ELIGIBLE FOR TREATMENT=1 HEALTH CARE PROVIDER DID NOT PRESCRIBE = 2 HIV MEDICINES NOT AVAILABLE = 3 I FEEL HEALTHY/NOT SICK = 3 COST OF MEDICATIONS = 4 COST OF TRANSPORT = 5 RELIGIOUS REASONS = 6 TAKING TRADITIONAL MEDICATIONS = 7 NOT ATTENDING HIV CLINIC = 8 OTHER = 96 SPECIFY: _____ DON'T KNOW = -8 REFUSED = -9	ALL → 817
809	What month and year did you <u>first</u> start taking ARVs? PROBE TO VERIFY DATE.	MONTH ____ DON'T KNOW MONTH = -8 REFUSED MONTH = -9 YEAR ____ DON'T KNOW YEAR = -8 REFUSED YEAR = -9	
810	Are you <u>currently</u> taking ARVs, that is, antiretroviral medications? By currently, I mean that you may have missed some doses but you are still taking ARVs.	YES = 1 NO=2 DON'T KNOW = -8 REFUSED = -9	YES→ 812 DK, REFUSED → 817

NO	QUESTIONS	CODING CATEGORIES	SKIPS
811	Can you tell me the main reason why you are not currently taking ARVs?	I HAVE TROUBLE TAKING A TABLET EVERYDAY = 1 I HAD SIDE EFFECTS = 2 FACILITY TOO FAR AWAY FOR ME TO GET MEDICINE REGULARLY = 3 COST OF MEDICATIONS = 4 COST OF TRANSPORT = 5 I FEEL HEALTHY/NOT SICK =6 FACILITY WAS OUT OF STOCK = 7 RELIGIOUS REASONS = 8 TAKING TRADITIONAL MEDICATIONS = 9 OTHER=96 SPECIFY: _____ DON' T KNOW = -8 REFUSED = -9	ALL → 817
812	People sometimes forget to take all of their ARVs every day. In the last 30 days, how many days have you missed taking any of your ARV pills? CODE '00' IF NONE.	NUMBER OF DAYS _____ DON'T KNOW = -8 REFUSED = -9	
813	At what health facility are you currently receiving your ART drugs?	DISTRICT; NAME OF HEALTH FACILITY	
814	At what health facility did you first start receiving your ART drugs?	DISTRICT; NAME OF HEALTH FACILITY	
815	If you had a choice, how often would you like to go to the health facility to pick your ARV drugs?	MONTHLY = 1 QUARTERLY = 2 SEMI ANNUALLY = 3 OTHER = 96 SPECIFY: _____	
816	Did you ever have a viral load test? This is a test that measures how much HIV is in your blood.	YES= 1 NO= 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED → 819
817	When did you last have a viral load test?	MONTH___ DON'T KNOW MONTH = -8 REFUSED MONTH = -9 YEAR ___ DON'T KNOW YEAR = -8 REFUSED YEAR = -9	IN HIV CARE OR TREATMENT ONLY.
818	Were you told the result of your last viral load test?	YES= 1 NO= 2 DON'T KNOW = -8 REFUSED = -9	IN HIV CARE OR TREATMENT ONLY.
819	While receiving HIV care, has a healthcare provider or outreach worker spoken to you about family planning methods or contraceptives?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	IN HIV CARE ONLY.
Interviewer says: "Now I will ask you about HIV care and tuberculosis or TB."			SKIP TO 822 IF NOT IN HIV CARE.

NO	QUESTIONS	CODING CATEGORIES	SKIPS
820	At your last HIV medical care visit, were you asked if you had any of the following TB symptoms? READ THE RESPONSES ALOUD. SELECT ALL THAT APPLY.	PERSISTENT COUGH = A FEVER = B NIGHT SWEATS = C WEIGHT LOSS = D DON'T KNOW = Y REFUSED = Z	
821	In the last 12 months, have you experienced any of the following TB symptoms: cough, fever, night sweats, or weight loss?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	
822	Have you ever attended a support group for people living with HIV?	YES= 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED→ NEXT MODULE
823	In the last 12 months, how often did you attend a support group? CODE '00' IF NONE.	WEEKLY = 1 MONTHLY = 2 ONCE EVERY 3 MONTHS =3 ___ LESS THAN QUARTERLY = 4 DON'T KNOW = -8 REFUSED = -9	
MODULE 9: TUBERCULOSIS AND OTHER HEALTH ISSUES			
Interviewer says: "Now we will ask you about tuberculosis or TB. As I explained to you at the beginning, your answers will be kept between us. If you don't understand a question, please stop me. You can refuse to answer a question if you don't want to."			
901	Can tuberculosis or TB be cured?	YES = 1 NO = 2 DON'T KNOW = 3 REFUSED = -9	
902	Can TB be cured in people living with HIV?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	
903	Have you ever visited clinic for TB diagnosis or treatment?	YES = 1 NO=2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED → NEXT MODULE IF MALE, SKIP TO 910 IF FEMALE
904	Have you ever been told by a doctor, clinical officer, or nurse that you had TB?	YES = 1 NO=2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED → 909
905	What month and year did a doctor, clinical officer or nurse tell you that you have (had) TB? RECORD THE MOST RECENT TIME IF DIAGNOSED WITH TB MORE THAN ONCE.	MONTH __ __ DON'T KNOW MONTH = -8 REFUSED MONTH = -9 YEAR __ __ __ __ DON'T KNOW YEAR = -8 REFUSED YEAR = -9	
906	Were you ever treated for TB?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED → 909

NO	QUESTIONS	CODING CATEGORIES	SKIPS
907	Are you currently on treatment for TB?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	YES, DK, REFUSED → 909
908	The last time you were treated for TB, did you complete at least 6 months of treatment?	YES = 1 NO =2 DON'T KNOW = -8 REFUSED = -9	
909	Were you tested for HIV at the TB clinic?	YES = 1 NO, WAS NOT TESTED FOR HIV =2 NO, ALREADY HIV POSITIVE = 3 DON'T KNOW = -8 REFUSED = -9	
Interviewer says: "Now I'm going to ask you about tests a health care provider can do to check for cervical cancer. The cervix connects the uterus to the vagina. The tests a health care provider can do to check for cervical cancer are called a Pap smear, HPV test, and VIA test. **For a Pap smear and HPV test, a healthcare provider puts a small stick inside the vagina to wipe the cervix and sends the sample to the laboratory. For a VIA test, a healthcare worker puts vinegar on the cervix and looks to see if the cervix changes color."**			SKIP TO NEXT MODULE IF MALE
910	Have you ever been tested for cervical cancer?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED → NEXT MODULE ELECTRONIC AID IF DON'T KNOW.
911	What month and year was your last test for cervical cancer?	MONTH _____ DON'T KNOW MONTH = -8 REFUSED = -9 YEAR _____ DON'T KNOW YEAR = -8 REFUSED YEAR = -9	
912	What was the result of your last test for cervical cancer?	NORMAL/NEGATIVE = 1 ABNORMAL/POSITIVE = 2 SUSPECT CANCER = 3 UNCLEAR/INCONCLUSIVE = 4 DID NOT RECEIVE RESULTS = 5 DON'T KNOW = -8 REFUSED = -9	NORMAL, UNCLEAR, DID NOT RECEIVE, DK, REFUSED→NEXT MODULE
913	Did you receive treatment after your last test for cervical cancer? Did you receive treatment on the same day or on a different day?	YES, I WAS TREATED ON THE SAME DAY = 1 YES, I RECEIVED TREATMENT ON A DIFFERENT DAY = 2 NO = 3 REFUSED = -8 DON'T KNOW = -9	

MODULE 10: GENDER NORMS

Interviewer says: "Now I would like to ask you question on attitudes and decision-making in your home. As I explained to you at the beginning, your answers will be kept between us. If you don't understand a question, please stop me. You can refuse to answer a question if you don't want to."

NO	QUESTIONS	CODING CATEGORIES	SKIPS
1001	Who usually makes decisions about healthcare for yourself: you, your (spouse/partner), you and your (spouse/partner) together, or someone else?	I DO = 1 SPOUSE/PARTNER = 2 WE BOTH DO = 3 SOMEONE ELSE = 4 DON'T KNOW = -8 REFUSED = -9	SKIP IF NOT MARRIED/LIVING TOGETHER
1002	Who generally decides about how the money you receive is spent: you, your (spouse/partner), you and your (spouse/partner) together, or someone else?	I DO = 1 SPOUSE/PARTNER = 2 WE BOTH DO = 3 SOMEONE ELSE = 4 DON'T KNOW = -8 REFUSED = -9	SKIP IF NOT MARRIED/LIVING TOGETHER
	You mentioned earlier that you have sold sex for money. Thank you for sharing your personal experiences with me. If you want to talk further about these experiences, I can refer you to a place that can provide you with help. **FILL OUT REFERRAL FORM FOR CHILDREN AND WOMEN IDENTIFIED AS TRAFFICKED OR ENGAGED IN SEX WORK. FILL OUT SUMMARY OF REFERRED TRAFFICKED INDIVIDUALS. PROVIDE PARTICIPANT WITH LIST OF ORGANIZATIONS, IF NOT ALREADY GIVEN.**		SKIP IF NEVER SOLD SEX
	OPTIONAL MODULE E: ATTITUDES ABOUT HIV TREATMENT AND PREVENTION		
	Interviewer says: "As I explained to you at the beginning, your answers will be kept between us. If you don't understand a question, please stop me. You can refuse to answer a question if you don't want to."		
	IMPORTANCE OF UNIVERSAL TREATMENT		
E1	To what extent do you agree with the following statement: I would not want to start treatment now when I am feeling healthy because only people who are very sick need to take ARVs. Do you strongly agree, agree, disagree, or strongly disagree?	STRONGLY AGREE = 1 AGREE = 2 DISAGREE = 3 STRONGLY DISAGREE = 4 DON'T KNOW = -8 REFUSED = -9	
	TREATMENT OPTIMISM **(Source: Yeatman S, Dovel K, Conroy A, Namadingo H. (2013) HIV treatment optimism and its predictors among young adults in southern Malawi. AIDS Care 2013; 25 (8): 1018-1025j.)**		SKIP IF NOT HIV POSITIVE
E2	To what extent do you agree with the following statements: I believe that ARVs can make people with HIV less likely to spread the virus. Do you strongly agree, agree, disagree, or strongly disagree?	STRONGLY AGREE = 1 AGREE = 2 DISAGREE = 3 STRONGLY DISAGREE = 4 DON'T KNOW = -8 REFUSED = -9	

APPENDIX G EARLY ADOLESCENT QUESTIONNAIRE

THIS QUESTIONNAIRE IS ADMINISTERED TO ELIGIBLE YOUNG ADOLESCENTS AGED BETWEEN 10-14 YEARS AFTER INFORMED PARENTAL/GUARDIAN CONSENT AND MINOR ASSENT.

NO.	QUESTIONS	CODING CATEGORIES	SKIPS
MODULE 1: SOCIO-DEMOGRAPHIC CHARACTERISTICS			
Interviewer says: "I am going to ask you some background information about your age and education."			
101	Are you enrolled in school?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	IF NO, DK, REFUSED → 107
102	During the last school week, did you miss any school days for any reason?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED → 105
103	Why did you miss school?	I HAVE BEEN SICK = 1 I DON'T FEEL SAFE TRAVELING TO SCHOOL = 2 I DON'T FEEL SAFE WHILE IN SCHOOL = 3 I DON'T LIKE SCHOOL = 4 I HAVE TO LOOK AFTER MY FAMILY= 5 THERE'S NOT ENOUGH MONEY TO SEND ME TO SCHOOL = 6 SCHOOL IS TOO FAR AWAY = 7 I HAVE TO WORK = 8 I HAVE A CHILD OR I AM PREGNANT (GIRLS ONLY) = 9 I MISSED TOO MUCH SCHOOL BECAUSE OF MY PERIOD (MENSTRUATION) (GIRLS ONLY) = 10 OTHER = 96 SPECIFY: _____ DON'T KNOW = -8 REFUSED = -9	
104	What is the highest level of school you attended: nursery, primary or secondary?	NURSERY = 1 PRIMARY = 2 SECONDARY = 3 DON'T KNOW = -8 REFUSED = -9	
105	What class/grade are you in now?	CLASS/GRADE ___ DON'T KNOW = -8 REFUSED = -9	
106	What class/grade were you in last year?	CLASS/GRADE ___ DON'T KNOW = -8 REFUSED = -9	ALL → 201

NO.	QUESTIONS	CODING CATEGORIES	SKIPS
107	Why do you NOT go to school?	I HAVE BEEN SICK = 1 I DON'T FEEL SAFE TRAVELING TO SCHOOL = 2 I DON'T FEEL SAFE WHILE IN SCHOOL = 3 I DON'T LIKE SCHOOL = 4 I HAVE TO LOOK AFTER MY FAMILY= 5 THERE'S NOT ENOUGH MONEY TO SEND ME TO SCHOOL = 6 SCHOOL IS TOO FAR AWAY = 7 I HAVE TO WORK = 8 I HAVE A CHILD OR I AM PREGNANT (GIRLS ONLY) = 9 I MISSED TOO MUCH SCHOOL BECAUSE OF MY PERIOD (MENSTRUATION) (GIRLS ONLY) = 10 OTHER = 96 SPECIFY: _____ DON'T KNOW = -8 REFUSED = -9	
108	Have you ever attended school?	YES = 1 NO = 2 DON'T KNOW =-8 REFUSED = -9	NO, DK, REFUSED → 201
109	When was the last time you regularly attended school? Would you say it was less than a year ago or more than a year ago?	LESS THAN 1 YEAR = 1 1 YEAR OR LONGER = 2 DON'T KNOW =-8 REFUSED = -9	
110	What is the highest class/grade that you have completed?	CLASS/GRADE ___ DON'T KNOW = -8 REFUSED = -9	
MODULE 2: HIV PREVENTION INTERVENTIONS			
INTERVIEWER SAYS: "NOW I WILL ASK YOU SOME QUESTIONS ABOUT HIV PREVENTION. REMEMBER, THERE ARE NO RIGHT OR WRONG ANSWERS. AS I EXPLAINED TO YOU AT THE BEGINNING, YOUR ANSWERS WILL BE KEPT BETWEEN US. IF YOU DON'T UNDERSTAND A QUESTION, PLEASE STOP ME. YOU CAN REFUSE TO ANSWER A QUESTION IF YOU DON'T WANT TO."			
201	Have you ***ever*** heard of HIV?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED → 206

NO.	QUESTIONS	CODING CATEGORIES	SKIPS
202	From where have you heard about HIV? PROBE: Anywhere else? RECORD ALL MENTIONED	SCHOOLS/TEACHERS = A PARENTS/GUARDIAN/FAMILY = B FRIENDS = C RELIGIOUS LEADERS = D INTERNET = E MOBILE PHONE = F HEALTH PROVIDERS/DOCTORS/ NURSES/CLINICAL OFFICERS = G TELEVISION/FILM = H RADIO = I COMMUNITY HEALTH WORKERS = J OTHER = X SPECIFY: _____ DON'T KNOW = Y REFUSED = Z	
203	Have you ever discussed HIV with your parents or guardian?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	
204	Have you taken part in any of the following HIV prevention programs? SHOW CHILD LOGO FOR EACH PROGRAM READ RESPONSES ALOUD. SELECT ALL THAT APPLY	HEALTH CLUBS = A REPRODUCTIVE HEALTH & BCC/ IEC = B CONDOM PROMOTION= C OTHER = X SPECIFY: _____ DON'T KNOW = Y REFUSED = Z	"DON'T KNOW", "REFUSED" CANNOT BE SELECTED WITH ANY OTHER CATEGORY
205	Do you know what a condom is?	YES = 1 NO = 2 REFUSED = -9	NO, DK, REFUSED → NEXT MODULE
206	Do you know where to get a condom?	YES = 1 NO = 2 REFUSED = -9	NO, REFUSED → 201 DK → NEXT MODULE
207	Where can a person go to get a condom? SELECT ALL THAT APPLY	CLINIC/HOSPITAL = A KIOSK/SHOP = B PHARMACY = C LOCAL FREE DISPENSER = D FRIENDS/PEERS = E BOYFRIEND/GIRLFRIEND = F OTHER = X SPECIFY: _____ DON'T KNOW = Y REFUSED = Z	
208	If you wanted to, could you yourself get a condom?	YES = 1 NO = 2 DON'T KNOW = 3 REFUSED = -9	YES, DK, REFUSED → 201
209	Why is it not easy for you to get a condom? SELECT ALL THAT APPLY	TOO FAR = A COSTS TOO MUCH = B DO NOT WANT OTHERS TO KNOW = C OTHER = X SPECIFY: _____ DON'T KNOW = Y REFUSED = Z	

NO.	QUESTIONS	CODING CATEGORIES	SKIPS
210	Have you ever seen a male condom demonstration? By a condom demonstration, I mean someone like a nurse, peer educator, or another trained adult showed you how a male condom is correctly used.	YES = 1 NO = 2 DON'T KNOW = 3 REFUSED = -9	

MODULE 3: SEXUAL BEHAVIOR

Interviewer says: "The next questions ask about sexual behavior. As I explained to you at the beginning, your answers will be kept between us. If you don't understand a question, please stop me. You can refuse to answer a question if you don't want to. There is no right or wrong answer. Your responses will not be linked to you in any way or shared with anyone, including your parents."

PLEASE LOOK OUT FOR SIGNS OF DISTRESS IN CHILD WHEN ASKING THE FOLLOWING SEXUAL BEHAVIOR QUESTIONS. IF THE CHILD SEEMS DISTRESSED, ASK CHILD IF HE/SHE WANTS TO STOP THE INTERVIEW.

301	Do you know what sex is?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	IF AGE <13 & RESPONSE = NO, DK, REFUSED → MODULE 5
302	Have you ever had vaginal, anal, or oral sex? Vaginal sex is when a penis enters a vagina. Anal sex is when a penis enters an anus. Oral sex is when a person puts his/her mouth on the penis or vagina of another person. SELECT ALL THAT APPLY.	NEVER HAD SEX = A VAGINAL = B ANAL = C ORAL = D DON'T KNOW = Y REFUSED = Z	NEVER, DK, REFUSED → 314
303	How old were you when you had sex for the first time?	AGE IN YEARS __ __ DON'T KNOW = -8 REFUSED = -9	
304	The first time you had sex, was it because you wanted to or because you were forced?	WANTED TO = 1 FORCED = 2 DON'T KNOW = -8 REFUSED = -9	WANTED, DK, REFUSED → 306
305	The first time you had sex, were you physically forced or were you pressured into having sex through harassment, threats, or tricks?	PHYSICALLY FORCED= 1 PRESSURED = 2 DON'T KNOW = -8 REFUSED = -9	ALL → 307
306	What was the main reason that you had sex for the first time?	IT JUST HAPPENED = 1 MY FRIENDS PRESSURED ME TO HAVE SEX = 2 TO SHOW MY LOVE/TO FEEL LOVED = 3 I WANTED TO HAVE SEX = 4 MY BOYFRIEND/GIRLFRIEND WANTED TO HAVE SEX = 5 FOR MONEY / GIFTS = 6 I WANTED TO HAVE A BABY = 7 OTHER= 96 SPECIFY: _____ DON'T KNOW = -8 REFUSED = -9	

NO.	QUESTIONS	CODING CATEGORIES	SKIPS
307	How old was the person you first had sex with? Please give your best guess.	AGE IN YEARS ____ DON'T KNOW = -8 REFUSED = -9	
308	The first time you had sex, was a condom used?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	SKIP IF DON'T KNOW WHAT CONDOM IS SKIP IF FIRST SEX WAS FORCED
309	In total, how many different people have you had sex with? Please give your best guess.	NUMBER OF PARTNERS __ __ DON'T KNOW = -8 REFUSED = -9	CONSTRAINT CANNOT BE '0'
310	The last time you had sex was a condom used?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	SKIP IF DON'T KNOW WHAT CONDOM IS SKIP IF FIRST SEX WAS FORCED AND TOTAL NUMBER OF PARTNERS = 1
311	How often do you use a condom during sex?	ALWAYS = 1 SOMETIMES = 2 NEVER = 3 DON'T REMEMBER = 4 DON'T KNOW = -8 REFUSED = -9	SKIP IF DON'T KNOW WHAT CONDOM IS SKIP IF FIRST SEX WAS FORCED AND TOTAL NUMBER OF PARTNERS = 1
312	Have you ever had sex with someone because he/she provided you with, or you expected that he/she would provide you with gifts, help you to pay for thing, or help you in other ways such as giving you food or paying for school fees?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	
313	Have you ever been pregnant?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	GIRLS ONLY
314	Have you ever talked with a parent or guardian about sex?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	

MODULE 4: SOCIAL NORMS, SELF-EFFICACY AND ASSERTIVENESS

Interviewer says: "Now I would like to ask you some questions about the future. As I explained to you at the beginning, your answers will be kept between us. If you don't understand a question, please stop me. You can refuse to answer a question if you don't want to."

401	Do you think all, many, some, a few, or none of your friends are having sex?	ALL = 1 MOST = 2 SOME = 3 A FEW = 4 NONE = 5 DON'T KNOW/DON'T KNOW WHAT SEX IS = -8 REFUSED = -9	SKIP IF 301 = NO, DK, REFUSED

NO.	QUESTIONS	CODING CATEGORIES	SKIPS
402	Do you feel pressured by your boyfriend/girlfriend to have sex?	YES = 1 NO = 2 DON'T HAVE BOYFRIEND/ GIRLFRIEND=3 DON'T KNOW = -8 REFUSED = -9	SKIP IF 301 = NO, DK, REFUSED
403	Do you feel pressured by your friends to have sex?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	SKIP IF 301 = NO, DK, REFUSED
404	If you did not want to have sex with someone, could you tell them that you do not want to have sex with them?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	SKIP IF 301 = NO, DK, REFUSED
MODULE 5: HIV RISK PERCEPTION			
Interviewer says: "Now I would like to ask you some questions about HIV Risk Prevention. Please answer them to the best of your ability. Remember that there are no right or wrong answers. As I explained to you at the beginning, your answers will be kept between us. If you don't understand a question, please stop me. You can refuse to answer a question if you don't want to."			
501	How likely do you think it is for you to get HIV?	VERY LIKELY = 1 SOMEWHAT LIKELY = 2 NOT LIKELY = 3 I ALREADY HAVE HIV = 4 DON'T KNOW = -8 REFUSED = -9	IF NOT LIKELY → 503 IF I ALREADY HAVE HIV, DK, REFUSED → NEXT MODULE SKIP IF 201 =NO, DK, REFUSED
502	What is the main reason you think you are likely to get HIV?	I HAVE HAD SEX WITHOUT A CONDOM = 1 I HAVE OR HAD MANY BOY/GIRL FRIENDS = 2 I HAVE HAD BLOOD TRANSFUSIONS = 3 MY MOTHER/FATHER/CLOSE RELATIVE HAS HIV = 4 I DON'T TRUST MY BOY/ GIRLFRIEND = 5 I AM SICK = 6 MY BOY/GIRL FRIEND IS SICK OR HAS DIED= 7 I DESERVE IT/I AM A BAD PERSON = 8 OTHER = 96 SPECIFY: _____ DON'T KNOW = -8 REFUSED = -9	SKIP IF 201 =NO, DK, REFUSED ALL → NEXT MODULE

NO.	QUESTIONS	CODING CATEGORIES	SKIPS
503	What is the main reason you think you are not likely to get HIV?	I AM ABSTINENT =1 I WILL WAIT UNTIL MARRIAGE TO HAVE SEX=2 I ALWAYS USE CONDOMS=3 I TRUST MY PARTNER=4 I HAVE ONLY ONE PARTNER=5 I GO TO CHURCH =6 I AM A GOOD PERSON =7 OTHER = 96 SPECIFY: _____ DON'T KNOW = -8 REFUSED = -9	SKIP IF 201 = NO, DK, REFUSED
MODULE 6: HIV KNOWLEDGE			
Interviewer says: "Now I would like to ask you some questions about what you know about some things related to HIV. As I explained to you at the beginning, your answers will be kept between us. If you don't understand a question, please stop me. You can refuse to answer a question if you don't want to."			SKIP TO NEXT MODULE IF 201 = NO, DK, REF
601	Can a person reduce their chance of getting HIV by not having sex?	YES = 1 NO = 2 DON'T KNOW = 3 REFUSED = -9	
602	Can a person reduce their chance of getting HIV by using condoms when having sex?	YES = 1 NO = 2 DON'T KNOW = 3 REFUSED = -9	
603	Can a healthy-looking person have HIV or AIDS?	YES = 1 NO = 2 DON'T KNOW = 3 REFUSED = -9	
604	Can a mother with HIV or AIDS pass HIV to her unborn baby?	YES = 1 NO = 2 DON'T KNOW = 3 REFUSED = -9	
605	Are there medicines that people with HIV or AIDS can take to help them live longer?	YES = 1 NO = 2 DON'T KNOW = 3 REFUSED = -9	
606	Can male circumcision help prevent HIV infection? Circumcision is the removal of the foreskin from a penis.	YES = 1 NO = 2 DON'T KNOW = 3 REFUSED = -9	
607	ARVs are medicines to treat the HIV infection. Can ARVs make people with HIV less likely to spread the virus?	YES = 1 NO = 2 DON'T KNOW = 3 REFUSED = -9	
608	Can ARVs rid HIV from an HIV-positive person's body?	YES = 1 NO = 2 DON'T KNOW = 3 REFUSED = -9	

NO.	QUESTIONS	CODING CATEGORIES	SKIPS
MODULE 7: HIV TESTING			
Interviewer says: "I would now like to ask you some questions about HIV testing. As I explained to you at the beginning, your answers will be kept between us. If you don't understand a question, please stop me. You can refuse to answer a question if you don't want to."			**SKIP TO NEXT MODULE IF 201 = NO, DK, REF**
701	To what extent do you agree with the following statement: Everyone should be tested for HIV. Do you strongly agree, agree, disagree, or strongly disagree?	STRONGLY AGREE = 1 AGREE = 2 DISAGREE = 3 STRONGLY DISAGREE = 4 DON'T KNOW = -8 REFUSED = -9	
702	To what extent do you agree with the following statement: Only persons who think they might have HIV should get an HIV test. Do you strongly agree, agree, disagree, or strongly disagree?	STRONGLY AGREE = 1 AGREE = 2 DISAGREE = 3 STRONGLY DISAGREE = 4 DON'T KNOW = -8 REFUSED = -9	
703	Have you ever been tested for HIV?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED → NEXT MODULE
704	Did you receive the results of any of your HIV tests?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED → NEXT MODULE
705	What was the result of that HIV test? SOME PARTICIPANTS MAY REPORT BEING TESTED MORE THAN ONCE. IF THEY REPORT GETTING A POSITIVE RESULT AND ANOTHER RESULT (i.e., A PREVIOUS NEGATIVE RESULT), SELECT POSITIVE.	HIV POSITIVE = 1 HIV NEGATIVE = 2 UNKNOWN/DON'T KNOW = 3 REFUSED = -9	HIV NEGATIVE, UNKNOWN, REFUSED → NEXT MODULE
706	Are you currently on treatment for HIV?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	
MODULE 8: HIV STIGMA			
Interviewer says: "Now I would like to ask you some more question about HIV attitudes. As I explained to you at the beginning, your answers will be kept between us. If you don't understand a question, please stop me. You can refuse to answer a question if you don't want to. Please remember your answers will not be shared with anyone including your parents."			SKIP TO NEXT MODULE IF (201 = NO, DK, REFUSED) OR (705 = HIV POSITIVE) OR (501 = I ALREADY HAVE HIV)
801	Would you be willing to share food with someone who has HIV?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	
802	Would you be friends with someone who has HIV?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	

NO.	QUESTIONS	CODING CATEGORIES	SKIPS
803	Would you be comfortable to have a teacher who has HIV?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	
MODULE 9: ALCOHOL AND DRUGS			
Interviewer says: "I would like to ask you some questions about alcohol and drugs or substances that you may have taken that were not given to you by doctor. As I explained to you at the beginning, your answers will be kept between us. If you don't understand a question, please stop me. You can refuse to answer a question if you don't want to. Your answers will not be told to anyone, even your parents."			
901	Have you ever had alcohol, for example beer?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED → 903 SHOW GRAPHIC OF COMMON ALCOHOLIC BEVERAGES.
902	During the past 1 month, on how many days did you have at least one drink containing alcohol?	NUMBER OF DAYS ___ DON'T KNOW = -8 REFUSED = -9	MAX = 31
903	Have you ever tried drugs such as Marijuana, Cocaine, Glue, Petrol, or others?	YES = 1 NO = 2 DON'T KNOW = -8 REFUSED = -9	NO, DK, REFUSED → 801
904	What drugs have you ever tried? DO NOT READ RESPONSES. PROBE FOR MULTIPLE RESPONSES.	MARIJUANA = A COCAINE= B GLUE = C PETROL = D OTHER = X SPECIFY: _____ DON'T KNOW = Y REFUSED = Z	
MODULE 10: PARENTAL SUPPORT			
Interviewer says: "Now I would like to ask you some questions about parental support. As I explained to you at the beginning, your answers will be kept between us. If you don't understand a question, please stop me. You can refuse to answer a question if you don't want to. Remember, these answers will not be shared with anyone including your parents."			
1001	Do your parents/guardians understand your problems and worries?	ALWAYS = 1 MOST OF THE TIME = 2 SOMETIMES = 3 RARELY = 4 NEVER = 5 DON'T KNOW = -8 REFUSED = -9	
1002	Do your parents/guardians really know what you were doing with your free time when you were not at school or work?	ALWAYS = 1 MOST OF THE TIME = 2 SOMETIMES = 3 RARELY = 4 NEVER = 5 DON'T KNOW = -8 REFUSED = -9	
Interviewer says: "This is the end of the survey. Thank you very much for your time and for your responses."			

APPENDIX H SURVEY CONSENT FORMS

Flesch-Kincaid: 7.4

What language do you prefer for our discussion today?

___ English ___French ___Kinyarwanda

Title of Survey: This survey is called the Rwanda Population-based HIV Impact Assessment (RPHIA)

Interviewer reads:

Hello. My name is_____. I would like to invite you to take part in this survey about HIV in Rwanda. The Ministry of Health is leading this survey and is conducting it with the United States Centers for Disease Control and Prevention and ICAP at Columbia University.

Purpose of survey

HIV is the virus that causes AIDS. AIDS is a very serious illness. This survey will help us know how many people in Rwanda have HIV and need health services. We expect about 30,000 men, women, and children over 10 years of age from 11,000 households throughout Rwanda to take part in the survey. If you take part, your taking part will help the Ministry of Health improve HIV services in the country. The survey will also help us to estimate the number of people in Rwanda that are living with Hepatitis B (HBV) and/or Hepatitis C (HCV) as well as better understand behaviors that put people at risk of acquiring those diseases. Hepatitis B and hepatitis C are liver infections that can cause serious illnesses if left untreated.

This form might have some words in it that are not familiar to you. Please ask me to explain anything that you do not understand.

Survey procedures

If you join this survey, we will ask you questions and your answers will be kept between us. In the household interview, we would like to ask you some questions about the people who live here and some of the things you have or own. After the household interview, we will invite you and others living in your household to take part in individual interviews. The questions will be about your age, what kind of work you do, whether you have had any experience with health services, and your social and sexual behavior. The interview will take about 45 minutes.

The information is collected on this tablet. The information is stored securely and can only be accessed by selected survey staff. The interview will take place in private, here in your house, or an acceptable nearby private area of your choosing.

We will ask each person to give permission to take part before joining the survey. Survey procedures also include blood draw, HIV testing, and storage of that blood for future testing if you agree to this. In addition, participants may have the opportunity to receive HBV and HCV testing. The testing and counseling will take about 45 minutes. If a household member does not take part in the study, he/she may still request HIV testing and counselling, if supplies are available.

Compensation

Taking part in this survey is voluntary. You will be given 3,000 RWF as compensation for your time.

Alternatives to taking part

You can decide not to take part in this survey; your taking part in this household interview is entirely voluntary. Your decision to take part or not take part will not affect your health care. You can leave the survey at any time for any reason. If you decide to leave the survey, no more information will be collected from you. However, you will not be able to take back the information that has already been collected and shared.

Costs for being in the survey

There is no cost to you for being in the household interview, except for your time.

Right to refuse or withdraw

Your taking part in this household interview is entirely voluntary. If you choose to take part in the interview, you may change your mind at any time and stop taking part. If you decide not to take part, it will not affect your healthcare in any way.

Risks

The risks of taking part in the household interview are small. You may feel uncomfortable about some of the questions we will ask. You can refuse to answer any question. We will do everything we can to keep your information private. As with all surveys, there is a chance that some could find out that you participated in the survey. We are doing everything we can to minimize this risk.

As with all surveys, there is a chance that confidentiality could be compromised. We will do everything we can to minimize this risk.

Benefits

There may be no direct benefit to you, but your taking part in the survey is the chance to learn more about your health today. Additionally, the information you provide to us will be used to improve healthcare services in Rwanda.

Confidentiality and access to your health information

We will do everything we can to keep your answers private. The information we collect from you will be identified by a number and not by your name. Your name will not appear when we share survey findings. The information we collect during the survey will not be released outside of the survey groups listed unless there is an issue of safety.

The following individuals and/or agencies will be able to look at your interview records to help oversee the conduct of this survey:

[INTERVIEWER: INDICATE THE FOLLOWING INFORMATION TO THE PARTICIPANT- DO NOT READ ALOUD]

- Staff members from the Institutional Review Boards or Ethics Committees overseeing the conduct of this survey to ensure that we are protecting your rights as a person taking part in a survey, including:
  - The Rwanda National Ethics Committee (RNEC)
  - The Centers for Disease Control and Prevention (CDC; Atlanta, GA, USA)
  - Columbia University Medical Center
  - Westat (a statistical survey research organization)
- The U.S. Office of Human Research Protections and other government agencies that oversee the safety of human subjects to ensure we are protecting your rights as a person taking part in this survey
- Selected survey staff and survey monitors.

[INTERVIEWER: READ FROM HERE]

This survey has received approval from the Rwanda Scientific and Ethics Committee (SEC), The Centers for Disease Control and Prevention, and the Institutional Review Board of Columbia University Medical Center, and of WESTAT.

Who should you contact if you have questions?

If you would like to have more information about the study, you may contact:

[INTERVIEWER: INDICATE THE FOLLOWING INFORMATION TO THE PARTICIPANT- DO NOT READ ALOUD]

Dr. Sabin Nsanzimana
Rwanda Biomedical Center, IHDPC/HIV/AIDS/STIs & OBBIs
Tel: +250 (0) 78 8752475
Email: sabin.nsanzimana@rbc.gov.rw

For questions about the process of agreeing to take part in this study or for more information about your rights as someone taking part in this study, you may contact:

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Dr. David Tumusiime
Rwanda National Ethics Committee, Ministry of Health
Tel: +250 (0) 788749398

Dr. Jean-Baptiste Mazarati
Rwanda National Ethics Committee, Ministry of Health
Tel: +250 (0) 78 8309807
Email: jbaptiste.mazarati@rbc.gov.rw

If you decide to leave the study, no more information will be collected from you. However, you will not be able to take back the information that has already been collected and shared.

Do you want to ask me anything about the survey?

Consent Statement

Any questions that I had have been answered satisfactorily. I agree to take part in the household interview. I have been offered a copy of this consent form.

Do you agree to do the household interview? '

YES' means that you agree to do the interview. 'NO' means that you will NOT do the interview. ___Yes _____No

Head of household signature or mark_____ Date: __/__/__

Printed name of head of household_____

Household Listing ID number _____

[For participants who cannot read and/or write]

Witness signature or Mark _____ Date: __/__/__

Printed name of witness_____

Signature of person obtaining consent_____ Date: __/__/__

Printed name of person obtaining consent_____

Survey staff RPHIA ID number _____

Flesch-Kincaid Level: 7.0

What language do you prefer for our discussion today?

___ English ___French ___Kinyarwanda

Title of Survey: This survey is called the **Rwanda Population-based HIV Impact Assessment (RPHIA)**

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Hello. My name is_____. I would like to invite you to take part in this survey about HIV in Rwanda. The Ministry of Health is leading this survey and is conducting it with the United States Centers for Disease Control and Prevention and ICAP at Columbia University.

Purpose of survey

HIV is the virus that causes AIDS. AIDS is a very serious illness. This survey will help us know how many people in Rwanda have HIV and need health services. We expect about 30,000 men, women, and children over 10 years of age from 11,000 households throughout Rwanda to take part in the survey. If you take part, your taking part will help the Ministry of Health improve HIV services in the country. The survey will also help us to estimate the number of people in Rwanda that are living with hepatitis B and/or hepatitis C as well as better understand behaviors that put people at risk of acquiring those diseases. Hepatitis B and hepatitis C are liver infections that can cause serious illnesses if left untreated.

This form might have some words in it that are not familiar to you. Please ask me to explain anything that you do not understand.

Survey Procedures

If you join this survey, we will ask you questions and your answers will be kept between us. The questions will be about your age, what kind of work you do, whether you have had any experience with health services, and your social and sexual behavior. The interview will take about 45 minutes.

The information is collected on this tablet. The information is stored securely and can only be accessed by selected survey staff. The interview will take place in private, here in your house, or an acceptable nearby private area of your choosing.

Survey procedures also include blood draw, HIV testing, and storage of that blood for future testing if you agree to this. Participants may have the opportunity to receive hepatitis B and C testing. The testing and counseling will take about 45 minutes.

If you agree to the HIV testing and hepatitis B and C testing, a survey staff member who has been trained to draw blood, will take about 14 milliliters (about a tablespoonful) of blood from your arm into two tubes. If it is not possible to take blood from your arm, then we will try to take a few drops of blood from your finger. We will give you the results of your HIV and hepatitis B tests and provide counseling on the same day. The hepatitis C test has to be done in a laboratory, so you will receive the results 8-12 weeks later, at the health facility of your choice.

If you have any positive results, we will give you a referral form and information so that you can consult with a doctor or nurse to learn more about the tests results and your health at a health facility of your preference.

If you test positive for HIV, we will send your blood to a laboratory to measure your viral load. Viral load is the amount of HIV in your blood. The results will be sent to a health facility of your choosing in about 8 to 12 weeks. You will be able to talk to a nurse or doctor at that facility about your viral load. Some of your blood will be sent to a laboratory out of the country for some additional tests related to HIV. If we have test results that might help guide your treatment, and if you

have given us your contact information, we will contact you to tell you how you and your doctor or nurse may get these results.

Additionally, we will ask you to take part in possible future research if you want to. If you agree, your contact information will be retained by approved researchers and you may be contacted for a period of up to three years and invited to take part in future research, if you still want to. If you do not agree to take part in future research, you can still continue to take part in the survey today.

We would also like your consent to store your leftover blood for future research tests. These tests may be about HIV or other health issues important for the health of people living in Rwanda. This sample will be stored for at least five years. The sample will not have your name on it and so we will not be able to tell you the results of the future research tests. Your leftover blood will not be sold or used for commercial purposes. If you do not agree to long-term storage of your blood samples, you can still take part in the survey today and we will destroy your blood samples after survey-related testing has been completed.

Compensation

Taking part in the survey is voluntary. Your time for taking part will be compensated with 3,000 RWF.

Alternatives to taking part

You can decide not to take part in this survey. You can leave the survey at any time for any reason. If you decide to leave the survey, no more information will be collected from you. However, you will not be able to take back the information that has already been collected and shared.

Costs for being in the survey

There is no cost to you for being in the survey, apart from your time.

Right to refuse or withdraw

Your taking part in this survey is entirely voluntary. If you choose to take part in the survey, you may change your mind at any time and stop taking part. If you decide not to take part, it will not affect your healthcare in any way.

Risks

The risks involved with taking part in the survey are small. You may feel uncomfortable about some of the questions we will ask. You can refuse to answer any question. The risks to you from having your blood drawn are also very small. They include brief pain from the needle stick, bruising, lightheadedness, bleeding and, rarely, infection where the needle enters the skin. The survey staff member who will take your blood has received training on how to draw blood. If you experience any discomfort or any of the symptoms mentioned above, please let us know, especially if there is any bleeding or swelling.

Learning that you have HIV may cause some emotional distress. You will receive counseling on how to cope with learning that you have HIV. If you test HIV positive, we will help you identify where to go and explain the options available for care and treatment. Care and treatment is available at government facilities free of charge.

As with all surveys, there is a chance that confidentiality could be compromised. We will do everything we can to minimize this risk.

Benefits

The main benefit for you to be in the survey is the chance to learn more about your health today. Some people who take part will test HIV positive. If you test HIV positive, the benefit is that you will learn your HIV-positive status and where to go for HIV services. HIV care and treatment provided by the Ministry of Health is free. If you already know you have HIV and are not on treatment, you will get information to help your doctor or nurse determine if you are ready to start treatment. If you already know that you are HIV positive and you are on HIV treatment, the viral load tests can help your nurse or doctor judge how well your treatment is working. If you test HIV negative, you will learn about what you can do to stay HIV negative. Your taking part in this survey could help us learn more about HIV in Rwanda. It can also help us learn about how HIV prevention and treatment programs are working in the country. Your taking part is important, and you are invited to participate even if you already know that you are HIV negative or positive.

You might also be selected for hepatitis B and/or hepatitis C testing. If tested, you will learn about your hepatitis B or hepatitis C infection status, will receive counseling messages and referred to a health facility for further care.

Confidentiality and access to your health information

We will do everything we can to keep your taking part in the survey and your answers private. The information we collect from you will be identified by a number and not by your name. The information entered into the tablet will be identified only by the number. Your name will not appear when we share survey results. The information we collect during the survey will not be released outside of the survey groups listed unless there is an issue of safety.

The following individuals and/or agencies will be able to look at your interview records to help oversee the conduct of this survey:

[INTERVIEWER: INDICATE THE FOLLOWING INFORMATION TO THE PARTICIPANT- DO NOT READ ALOUD]

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  - The Rwanda National Ethics Committee (RNEC)
  - The Centers for Disease Control and Prevention (CDC; Atlanta, USA)
  - Columbia University Medical Center
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- The U.S. Office of Human Research Protections and other government agencies that oversee the safety of human subjects to ensure we are protecting your rights as a person in a survey.
- Selected survey staff and survey monitors.

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Dr. Jean-Baptiste Mazarati
Rwanda National Ethics Committee, Ministry of Health
Tel: +250 (0) 78 8309807
Email: jbaptiste.mazarati@rbc.gov.rw

Do you want to ask me anything about the survey?

Consent Statement

Any questions that I had were answered satisfactorily. I agree to take part in this survey. I have been offered a copy of this consent form.

1. Do you agree to take part in the survey interview? 'YES' means that you agree to take part in the survey interview. 'NO' means that you will NOT take part in the survey interview.

   _____Yes _____No

(If "Yes", proceed to the next question)

2. Do you agree to give blood for testing? 'YES' means that you agree to give blood for testing. 'NO' means that you will NOT give blood for testing.

   _____Yes _____No

(If "Yes", proceed to the next question)

3. Do you agree to be contacted for future research? 'YES' means that you agree to be contacted for future research. 'NO' means that you don't want to be contacted for future research.

_____Yes _____No

4. Do you agree to have your leftover blood stored? 'YES' means that you agree to have these blood samples stored. 'NO' means that you do not agree to have these blood samples stored.

_____Yes _____No

[Tablet summary statement]

To confirm, you have agreed to <INSERT ALL OPTIONS MARKED YES: INTERVIEW, BLOOD TESTING, FUTURE RESEARCH, BLOOD STORAGE>, is this correct? _____Yes _____No

Participant signature or mark_____ Date: ___/___/___

Printed name of participant_____

[For participants who cannot read and/or write]

Signature of witness_____ Date: ___/___/___

Printed name of witness_____

Signature of person obtaining consent_____ Date: ___/___/___

Printed name of person obtaining consent_____

Survey staff RPHIA ID number _____

Flesch-Kincaid Level: 8.4

What language do you prefer for our discussion today?

___ English ___French ___Kinyarwanda

Title of Survey: This survey is called the **Rwanda Population-based HIV Impact Assessment (RPHIA)**

Interviewer reads:

Hello. My name is_____. I would like to invite your child to take part in this survey about HIV in Rwanda. The Ministry of Health is leading this survey and is conducting it with the United States Centers for Disease Control and Prevention and ICAP at Columbia University.

Now I would like to ask you to let _____ take part in the survey.

Purpose of survey

HIV is the virus that causes AIDS. AIDS is a very serious illness. This survey will help us know how many people in Rwanda have HIV and need health services. We expect about 30,000 men, women, and children over 10 years of age from 11,000 households throughout Rwanda to take part in the survey. The survey will also help us to estimate the number of people in Rwanda that are living with hepatitis B and/or hepatitis C as well as better understand behaviors that put people at risk of acquiring those diseases. Hepatitis B and hepatitis C are liver infections that can cause serious illnesses if left untreated.

If your child takes part, he/she will help the Ministry of Health improve HIV services in the country.

Survey procedures

[For children ages 10-11 years old]

If both you and your child agree for him/her to join the survey, we will ask your child some questions. The interview will be conducted in private with only the child and a survey staff member. The interview will include questions about education, HIV prevention and treatment, social behavior, and violence. Your child's answers will not be shared with you. It will take about 45 minutes.

We would like to test your child for HIV, whether your child is sexually active or not. We are testing children for HIV, regardless of the parent's HIV status. Some children will also be selected to receive hepatitis B and C testing, whether they are sexually active or not. It is possible that your child will be tested for hepatitis B and C as well. We will test selected children regardless of their parent or guardian's HIV or hepatitis B and C status.

A survey staff member, who has been trained to draw blood, will take about 14 milliliters (about a tablespoonful) of blood from your child's arm into two tubes. If it is not possible to take blood from your child's arm, then we will try to take a few drops of blood from your child's finger and then perform the tests for HIV and hepatitis B here in your home. We will give you the results of these tests and provide counseling about the results on the same day as the test. The hepatitis C test has to be conducted in a laboratory, so you will receive the results about 8-12 weeks later, at the health facility of your choice.

We will also discuss with you how to share the results with your child if you decide to discuss the results with him/her. If you would like, we can discuss the test results together with your child. The entire testing and counseling session will take about 45 minutes.

If your child tests positive for HIV, we will send his/her blood to a laboratory for other tests. One of these tests will be to measure his/her viral load. Viral load is the amount of HIV in the blood. If you provide us with the name of a health facility, we can send your child's viral load results there in about 8 to 12 weeks from now. Some of your child's blood may be sent to a laboratory out of the country for some additional tests related to HIV because there are no laboratories in Rwanda that can do the tests. If we have test results that might guide your child's care or treatment, we will contact you to tell you how you and your child's doctor or nurse may get these results.

We would like to ask your permission to store your child's leftover blood for future research tests. These tests may be about HIV, or other health issues important for the health of people living in Rwanda. This sample will be stored for at least five years. The sample will not have your child's name on it and so we will not be able to tell you the results of the future research tests. Your child's leftover blood samples will not be sold or used for commercial purposes. If you do not agree to long term storage of your child's blood samples, your child can still take part in the survey. We will destroy your child's blood samples after survey-related testing has been completed.

Additionally, we would like to ask your permission for your child to take part in possible future research if he/she wants to. If you and your child agree, your child's contact information will be retained by approved researchers and you may be contacted for a period of up to three years and your child invited to take part in future research, if he/she still wants to. If you or your child do not agree for your child to take part in future research, your child can still continue to take part in the survey today.

[Children 12-17 years old]

If both you and your child agree for him/her to join the survey, we will ask your child some questions. The interview will be conducted in private with only the child and a survey staff member. The interview questions will be the same as the ones that we ask adults who agree to take part in the survey. The questions will be about what kind of work they do, whether they have had any experience with health services, and their social and sexual behaviors. Your child's answers will not be shared with you. It will take about 45 minutes.

We would like to test your child for HIV. We are testing children for HIV, regardless of the parent's HIV status. Some children will also be selected to receive hepatitis B and C testing, whether they are sexually active or not. It is possible that your child will be tested for hepatitis B and C as well. We will test selected children ages regardless of their parent or guardian's HIV or hepatitis B and C status.

A survey staff member, who has been trained to draw blood, will take about 14 milliliters (about a tablespoonful) of blood from your child's arm into two tubes. If it is not possible to take blood from your child's arm, then we will try to take a few drops of blood from your child's finger and then perform the tests for HIV and hepatitis B here in your home. We will give your child the results of these tests and provide counseling about the results on the same day as the test. The hepatitis C test has to be conducted done in a laboratory, so your child will receive the results later, at the health facility of his/her choice.

For all children who test positive for HIV, we will also send his/her blood to a laboratory for additional tests. One of these tests is to measure his/her viral load. Viral load is the amount of HIV in the blood. If he/she provides us with the name of a health facility, we can send his/her viral load results there in about 8 to 12 weeks from now. Some of your child's blood will be sent to a laboratory out of the country for some additional tests related to HIV because there are no laboratories in Rwanda that can do the tests. If we have test results that might guide your child's care or treatment, we will contact him/her to tell him/her how he/she and a doctor or nurse at the preferred health facility may get these results.

We would like to ask your permission to store your child's leftover blood for future research tests. These tests may be about HIV, or other health issues important for the health of people living in Rwanda. This sample will be stored for at least five years. The sample will not have your child's name on it and so we will not be able to tell you the results of the

future research tests. Your child's leftover blood samples will not be sold or used for commercial purposes. If you do not agree to long term storage of your child's blood samples, your child can still take part in the survey. We will destroy your child's blood samples after survey-related testing has been completed.

Additionally, we would like to ask your permission for your child to take part in possible future research if he/she wants to. If you and your child agree, your child's contact information will be retained by approved researchers and your childmay be contacted for a period of up to three years and invited to take part in future research, if he/she still wants to. If you or your child do not agree to take part in future research, your child can still continue to take part in the survey today.

Compensation

Taking part in the survey is voluntary. Your child's time for taking part will be compensated with 3,000 RWF.

Alternatives to taking part

Your child can decide not to take part in this survey. Your child can leave the survey at any time for any reason. If your child decides to leave the survey, no more information will be collected from him/her. However, your child will not be able to take back the information that has already been collected and shared.

Costs for being in the survey

There is no cost to you or your child for being in the survey, apart from their time.

Use of survey findings

The overall survey findings, which will not contain any personal information that would identify you or your child, will be shared with the Government of Rwanda. This information will be used to improve healthcare for the people of Rwanda. Finally, the findings will be shared with international partners to assist in the delivery of health services all over the world.

Right to refuse and or withdraw

It is your decision about whether you will allow us to invite your child to join the survey. Your child does not have to be in the survey or give blood. You or your child may stop taking part at any time. If your child is in the age group interviewed and does not want to answer some of the questions he/she may skip them and move to the next question. If your child does not take part, it will not affect your child's healthcare in any way.

Risks

During the interview, your child may feel uncomfortable answering some of the questions. We do not wish this to happen, and your child does not have to answer questions he/she feels are too personal or that make them feel uncomfortable.

The risks to your child from having his/her blood drawn are very small. They include brief pain from the needle stick, bruising, lightheadedness, bleeding, and rarely, infection where the needle enters the skin. The survey staff member who will take his/her blood has received training on how to draw blood. If he/she has any discomfort or any of the symptoms we've mentioned above, please let us know, and especially if there is any bleeding or swelling.

As with all surveys, there is a chance that confidentiality could be compromised. We will do everything we can to minimize this risk.

[For children 10-11]

You may learn that your child is HIV positive. Learning that your child has HIV may cause you some emotional and/or psychological distress. You will decide when and where to give your child the test results. We will provide you with counseling on how to cope with learning that your child has HIV. If your child tests HIV positive, we will help you identify where to go and explain the options available for care and treatment. Care and treatment is available at government facilities free of charge.

[For children 12-17]

Your child may learn that he/she is HIV positive. Learning that he/she has HIV may cause some emotional and/or psychological distress. He/she will receive counseling on how to cope with learning that he/she has HIV. If he/she tests HIV positive, we will help identify where to go and explain the options available for care and treatment. Care and treatment is available at government facilities free of charge.

Benefits

The main benefit for your child by taking part in the survey is the chance to learn more about his/her health today. Some people who take part will test HIV positive. If your child tests HIV positive, the benefit is that you or your child will learn where to go for HIV services. HIV care and treatment provided by the Ministry of Health is free. If you or your child already know he/she has HIV and is not on treatment, you or your child will get information to help his/her doctor or nurse determine if your child is ready to start treatment. If you or your child already know he/she is HIV positive and on HIV treatment, the viral load tests can help your child's nurse or doctor judge how well the treatment is working. If your child tests HIV negative, you or your child will learn about how he/she can stay HIV negative. Your child's taking part in this survey could help us learn more about HIV in Rwanda. It can also help us learn about how HIV prevention and treatment programs are working in the country. Your child's taking part is important, and invited to participate even if you or your child already know he/she is HIV negative or positive.

Your child might also be selected for hepatitis B and/or hepatitis C testing. If tested, you or your child will learn about his/her hepatitis B or hepatitis C infection status, will receive counseling messages, and referred to a health facility for further care.

Confidentiality and access to your health information

We will do everything we can to keep your child's taking part in the survey and his/her answers private. The information we collect from your child will be identified by a number and not by his/her name. The information entered into the tablet will be identified only by the number. His/her name will not appear when we share survey results. The information we collect during the survey will not be released outside of the survey groups listed unless there is an issue of safety.

Anyone in the household under 18 years of age, who reports having experienced violence, whether they participated in the survey or not, will be provided with a referral to their local healthcare facility or the free Isange One Stop Centre, which offers services for all forms of violence, and to police where necessary.

The following individuals and/or agencies will be able to look at your child's interview records to help oversee the conduct of this survey:

[INTERVIEWER: INDICATE THE FOLLOWING INFORMATION TO THE PARTICIPANT- DO NOT READ ALOUD]

- Staff members from the Institutional Review Boards or Ethics Committees overseeing the conduct of this survey to ensure that we are protecting your child's rights as a person taking part in a survey, including: The Rwanda National Ethics Committee (RNEC)
    - The Centers for Disease Control and Prevention (CDC; Atlanta, GA, USA)
    - Columbia University Medical Center
    - Westat (a statistical survey research organization)
- The U.S. Office of Human Research Protections and other government agencies that oversee the safety of human subjects to ensure we are protecting your child's rights as a person taking part in this survey.
- Selected survey staff and survey monitors.

[INTERVIEWER: READ FROM HERE]

This survey has received approval from the Rwanda Scientific and Ethics Committee (SEC), the Centers for Disease Control and Prevention, and the Institutional Review Board of Columbia University Medical Center, and of WESTAT.

Who should you contact if you have questions?

If you would like to have more information about the study, you may contact:

[INTERVIEWER: INDICATE THE FOLLOWING INFORMATION TO THE PARTICIPANT- DO NOT READ ALOUD]

Dr. Sabin Nsanzimana
Rwanda Biomedical Center, IHDPC/HIV/AIDS/STIs & OBBIs
Tel: +250 (0) 78 8752475
Email: sabin.nsanzimana@rbc.gov.rw

For questions about the process of agreeing to take part in this study or for more information about your child's rights as someone taking part in this study, you may contact:

[INTERVIEWER: INDICATE THE FOLLOWING INFORMATION TO THE PARTICIPANT- DO NOT READ ALOUD]

Dr. David Tumusiime
Rwanda National Ethics Committee, Ministry of Health
Tel: +250 (0) 788749398

Dr. Jean-Baptiste Mazarati
Rwanda National Ethics Committee, Ministry of Health
Tel: +250 (0) 78 8309807
Email: jbaptiste.mazarati@rbc.gov.rw

Do you want to ask me anything about the survey e.g.:

- The interview?
- Drawing blood for HIV testing or hepatitis B and C testing?
- Testing in the laboratory?
- Storage of blood for future research testing?

Consent Statement

Any questions that I had were answered satisfactorily. I agree to let this child take part in this survey. I have been offered a copy of this consent form.

1. Do you agree that we can approach this child to ask that he/she do the interview? 'YES' means that you give your permission to have the survey staff ask this child to take part in the interview. 'NO' means that you will NOT give permission for this child to be interviewed.

_____Yes _____No

(If "Yes," proceed to the next question)

2. Do you agree that we can approach this child to give blood for HIV testing and related testing? 'YES' means that you give your permission to have the trained survey staff to ask this child to collect a sample of his/her blood for HIV and related testing. 'NO' means that this child will NOT give blood for HIV testing and related testing.

_____Yes _____No

(If "Yes," proceed to the next question)

3. Do you agree to allow us to ask this child to have his/her leftover blood stored for future research? 'YES' means that you give permission for us to ask this child to allow us store leftover blood samples for future research. 'NO' means that this child's blood samples will NOT be stored for future research.

_____Yes _____No

4. Do you agree to allow us to ask this child to retain his/her contact information for future research? 'YES' means that you give permission for us to ask this child to allow us to retain his/her contact information for future research. 'NO' means that this child's contact information will NOT be retained for future research.

_____Yes _____No

[Tablet summary statement]

To confirm, you have agreed to <INSERT ALL OPTIONS MARKED YES: APPROACH CHILD FOR INTERVIEW, APPROACH CHILD FOR BLOOD TESTING, CHILD INTERVIEW, CHILD BLOOD TEST, APPROACH CHILD FOR BLOOD STORAGE, CHILD BLOOD STORAGE, APPROACH CHILD FOR STORAGE CONTACT INFORMATION, CHILD CONTACT INFORMATION STORAGE>, is this correct? _____Yes _____No

Parent/guardian signature or mark_____ Date: __/__/__

Printed name of parent/guardian_____

[For participants who cannot read and/or write]

Signature of witness_____ Date: __/__/__

Printed name of witness_____

Signature of person obtaining consent_____ Date: __/__/__

Printed name of person obtaining consent_____

Survey staff ID number _____

Child's name (print) _____

Child's participant ID number _____

Flesch-Kincaid Level: 6.2

What language do you prefer for our discussion today?

___English ___French ___Kinyarwanda

Title of Survey: This survey is called the **Rwanda Population-based HIV Impact Assessment (RPHIA)**

Interviewer reads:

Hello. My name is_____. I would like to invite you to take part in a survey. Surveys help us learn new things. As a part of this survey, we are asking people questions about themselves and also giving people a chance to learn if they have HIV and hepatitis B and C. We are also asking people if we can keep some of their blood for future testing.

This form talks about our survey and the choice that you have to take part in it. We want you to ask us any questions that you have. You can ask questions any time.

Why are we doing this survey?

We are doing this survey to help us learn more about the health of children in Rwanda. We plan to ask thousands of children like you to join this survey. A survey is a way to learn about something by interviewing and testing many people. We would like to invite you to join this survey. **[Exclude for emancipated minor]**

Your parent/guardian said it was okay for us to ask you to join.

This form might have some words that you may not have heard before. Please ask me to explain anything that you do not understand.

What would happen if you join this survey?

- If you decide to join the survey, here is what would happen:
- We will ask you questions about your age, what you know about HIV, and whether you have experience with behavior that may put you at risk of HIV and other diseases.
- The interview will take place in private here in your house or a nearby private area around your house.
- The interview will take about 45 minutes.
- After we ask you the questions, if you have agreed, we will take some of your blood to test for HIV, and to store for future research tests. Some participants may be selected for hepatitis B and C testing.
- We will use a needle to take about 14 milliliters (about a tablespoonful) of blood from your arm into two tubes. If it is not possible to take blood from your arm, then we will try to take a few drops of blood from your finger.
- **[For children 10-11 years]** Then we will test your blood for HIV and hepatitis B here in your home and provide your parents with the results and counselling the same day. The hepatitis C test has to be done in a laboratory, so your parents will receive the results later, at the health facility of their choice.
- **[For children 12-17 years]** Then we will test your blood for HIV and hepatitis B here in your home and provide you with the results and counselling the same day. The hepatitis C test has to be done in a laboratory, so you will receive the results 8 to 12 weeks later, at the health facility of your choice.
- It will take about 45 minutes to do the test and to talk to you about the results.
- If you test positive for HIV, we will send your blood to the National Reference Laboratory (NRL) in Kigali to measure the amount of HIV in your blood. Some of your blood will be sent to a laboratory out of the country for some additional tests related to HIV because there are no laboratories in Rwanda that can do these tests.

- You may be eligible to take part in future studies related to health in Rwanda. We are asking for your permission to contact you in the next three years if such an opportunity occurs. To do this, approved researchers will be able to request access to your contact information. If we contact you, we will give you details about the new study and ask you to sign a separate assent/consent form at that time. You may decide at that time that you do not want to take part in that study. If you do not wish to be contacted about future studies, it does not affect your taking part in this survey.
- We will ask you if we can store some of your blood for future testing. These tests will help us learn about the health of people in Rwanda. This sample will be stored for at least five years. Your leftover blood will not be used for anything other than these tests. Your blood will not be sold. If you do not agree to future storage and testing of your blood, we will destroy your blood after survey-related testing has finished and you can still receive your test results and conduct the survey interview.

Could bad things happen if you join this survey?

You may feel uncomfortable answering some of the questions we will ask. You can refuse to answer any question at any time and you can stop at any time if you wish.

The needle may hurt when it is put into your arm. This pain will go away quickly. Sometimes the needle can leave a bruise on the skin. You might bleed a little or feel a little dizzy. Rarely, an infection might occur where the needle enters the skin. We may have to try more than one time in order to get the right amount of blood. We will do our best to make it as painless as possible.

You may learn that you have HIV. Learning that you have HIV may cause you to feel worried. We will talk to you and try to make you feel better to help you with this. We will not tell anyone else what we talk about, but there is a small chance other people might find out. As with all survey, there is a chance that confidentiality could be compromised. We will do everything we can to minimize this risk.

Could the survey help me?

[For children 10-11 years]

Being in the survey may help you by learning whether or not you have HIV. We would give your results to your parent/guardian and you can talk to him/her about your test result. If your parent wants us to tell you about your test results, we will talk with you about them and answer any questions that you might have about them. If you are HIV positive, we will tell your parent/guardian where to take you for your medical care and the Government of Rwanda will pay for your care. We hope to learn about HIV health care needs in this survey. We hope it will help other children in Rwanda in the future. You might also be selected for hepatitis B and/or hepatitis C testing. If tested, you will learn about your hepatitis B or hepatitis C infection status, will receive counseling messages and will be referred to a health facility for further care.

[For children 12-17 years]

Being in the survey may help you by learning whether or not you have HIV. We will give you the results of your HIV test and provide counseling to you. We will discuss with you how to share these results with your parent/guardian, if you decide to do so. If you test positive for HIV, you will learn about it and you will learn where to go for care and treatment of HIV. Care and treatment provided by the Government of Rwanda is free. Your taking part in this survey will help us learn more about HIV in Rwanda. You might also be selected for hepatitis B and/or hepatitis C testing. If tested, you will learn about your hepatitis B or hepatitis C infection status, will receive counseling messages and will be referred to a health facility for further care.

Compensation

Taking part in the survey is voluntary. Your time for taking part will be compensated with 3,000 RWF.

Alternatives to taking part

You can leave the survey at any time for any reason. If you decide to leave the survey, no more information will be collected from you. However, you will not be able to take back the information that has already been collected and shared.

Costs for being in the survey

There is no cost to you for being in the survey, apart from your time.

Use of survey findings

The overall survey findings, which will not contain any personal information that would identify you, will be shared with the Government of Rwanda. This information will be used to improve the healthcare for the people of Rwanda. The findings will also be shared with international partners to assist in the delivery of health services all over the world.

What else should you know about this survey?

If you don't want to be in the survey, you don't have to be. Nobody will get upset with you if you do not want to join the survey.

It is also OK to say 'Yes' and change your mind later. You can stop being in the survey at any time. If you want to stop, please tell us.

Confidentiality

[For children 12-17]

We will do everything we can to keep your test results confidential. The blood we collect from you will be identified by a number, not by your name. Besides you, no one else will know your test results except the people working on the survey and people you decide to tell.

[For children 10-11]

We will do everything we can to keep your test results confidential. The blood we collect from you will be identified by a number, not by your name. Besides you and your guardian/parent, no one else will know your test results except the people working on the survey.

The information we collect during the survey will not be released outside of the survey groups listed unless there is an issue of safety. The following individuals and/or agencies will be able to look at your interview records to help oversee the conduct of this survey:

[INTERVIEWER: INDICATE THE FOLLOWING INFORMATION TO THE PARTICIPANT- DO NOT READ ALOUD]

- Staff members from the Institutional Review Boards or Ethics Committees overseeing the conduct of this survey to ensure that we are protecting your rights as a person taking part in a survey, including:
  - The Rwanda National Ethics Committee (RNEC)
  - The Centers for Disease Control and Prevention (CDC; Atlanta, USA)
  - Columbia University Medical Center
  - Westat (a statistical survey research organization)

- The U.S. Office of Human Research Protections and other government agencies that oversee the safety of human subjects to ensure we are protecting your rights as a person taking part in this survey.
- Selected survey staff and survey monitors.

[INTERVIEWER: READ FROM HERE]

This survey has received approval from the Rwanda Scientific and Ethics Committee (SEC), the Centers for Disease Control and Prevention, and the Institutional Review Board of Columbia University Medical Center and of WESTAT.

Is there anything else?

If you want to take part in the survey after we finish talking now, please write your name below. We will write our name too. This shows we talked about the survey and that you want to take part.

Whom should you contact if you have questions?

If you would like to have more information about the study, you may contact:

[INTERVIEWER: INDICATE THE FOLLOWING INFORMATION TO THE PARTICIPANT- DO NOT READ ALOUD]

Dr. Sabin Nsanzimana
Rwanda Biomedical Center, IHDPC/HIV/AIDS/STIs & OBBIs
Tel: +250 (0) 78 8752475
Email: sabin.nsanzimana@rbc.gov.rw

For questions about the process of agreeing to take part in this study or for more information about your rights as someone taking part in this study, you may contact:

[INTERVIEWER: INDICATE THE FOLLOWING INFORMATION TO THE PARTICIPANT- DO NOT READ ALOUD]

Dr. David Tumusiime
Rwanda National Ethics Committee, Ministry of Health
Tel: +250 (0) 788749398;

Dr. Jean-Baptiste Mazarati
Rwanda National Ethics Committee, Ministry of Health
Tel: +250 (0) 78 8309807
Email: jbaptiste.mazarati@rbc.gov.rw

Do you want to ask me anything about:

- The interview?
- Taking your blood for HIV or hepatitis B and C testing?
- Testing in the laboratory?
- Storage of blood for future research testing?

Assent statement

Any questions that I had were answered satisfactorily. I agree to be in this survey. I have been offered a copy of this consent form.

1. Do you agree to do the interview? 'YES' means that you agree to do the interview. 'NO' means that you will NOT do the interview.

_____Yes _____No

(If "Yes," proceed to the next question)

2. **[For children 10-11]** Do you agree to give blood for testing and have your parent/guardian receive your result? 'YES' means that you agree to give blood for testing. 'NO' means that you will NOT give blood for testing.

_____Yes _____No

(If "Yes," proceed to the next question)

3. **[For children 12-17]** Do you agree to give blood for testing? 'YES' means that you agree to give blood for testing. 'NO' means that you will NOT give blood for testing.

_____Yes _____No

(If "Yes," proceed to the next question)

4. Do you agree to have your leftover blood stored? 'YES' means that you agree to have these blood samples stored. 'NO' means that these blood samples will NOT be stored.

_____Yes _____No

5. Do agree to be contacted in the future? 'YES' means that you agree to be contacted in the future if a study opportunity arises. 'NO' means that you will NOT be contacted about future studies.

_____Yes _____No

[Tablet summary statement]

To confirm, you have agreed to <INSERT ALL OPTIONS MARKED YES: INTERVIEW, BLOOD TESTING AND RESULT TO PARENT (10-14YEARS), BLOOD TESTING AND RESULT TO YOU (15-17 YEARS), CHILD INTERVIEW, FUTURE RESEARCH, BLOOD STORAGE>, is this correct? _____Yes _____No

Child's signature or mark_____ Date: ___/___/___

Printed name of child _____

Child's participant ID number _____

Printed name of parent/guardian_____

[For participants or parents/guardians who cannot read and/or write]

Signature of witness_____ Date: __/__/__

Printed name of witness_____

Signature of person obtaining consent_____ Date: __/__/__

Printed name of person obtaining consent_____

Survey staff ID number _____

Flesch-Kincaid Level: 6.7

What language do you prefer for our discussion today?

___English ___French ___Kinyarwanda

Title of Survey: This survey is called the **Rwanda Population-based HIV Impact Assessment (RPHIA)**

Interviewer reads:

Hello. My name is_____. I would like to invite your child to take part in this survey about HIV in Rwanda. The Ministry of Health is leading this survey and is conducting it with the United States Centers for Disease Control and Prevention and ICAP at Columbia University.

Now I would like to ask you to let _____ take part in the survey.

Purpose of the survey

This survey will help us learn more about the health of children in Rwanda. We plan to ask thousands of children like him/her to join this survey. We would like to invite him/her to join the survey too. His/her taking part will help the Ministry of Health make health services better in the country.

Why are we doing this survey?

We are doing this survey to help us learn more about the health of children ages 10-17 in Rwanda. A survey is a way to learn about something by interviewing and testing many people. We would like to invite your child to join this survey.

This form might have some words that you may not have heard before. Please ask me to explain anything that you do not understand.

What would happen if _____ joins this survey?

- If you decide to let this child join the survey, here is what would happen:
- We will ask him/her questions about his/her age, what he/she knows about HIV, and whether he/she has experience with behavior that may put them at risk of HIV and other diseases. Your child's answers will not be shared with you.
- The interview will take place in private here in your house or an area around your house.
- The interview will take about 45 minutes.
- After we ask him/her the questions, if he/she has agreed, we will take some of his/her blood to test for HIV and to store for future research studies. Some children are also being selected to receive hepatitis B and C testing, so it is possible that the child will be tested for hepatitis B and C as well.
- We will use a needle to take about 14 milliliters (about a tablespoonful) of blood from his/her arm into two tubes. If it is not possible to take blood from his/her arm, then we will try to take a few drops of blood from his/her finger. Then we will test his/her blood for HIV and hepatitis B here in your home.
- **[Children 10-11 years]** It will take about 30 minutes to do the test and to talk to you about the results. We will give you the results of these tests and provide counseling about the results on the same day as the test. The hepatitis C test has to be conducted in a laboratory, so you will receive the results 8 to 12 weeks later, at the health facility of your choice.

- **[Children 12-17 years]** We will give your child the results of these tests and provide counseling about the results on the same day as the test. The hepatitis C test has to be conducted in a laboratory, so he/she will receive the results 8 to 12 weeks later, at the health facility of his/her choice. It will take about 30 minutes to do the test and to talk to him/her about the results.
- If he/she tests positive for HIV, we will send his/her blood to the National Reference Laboratory (NRL) in Kigali to measure the amount of HIV in his/her blood. Some of his/her blood will be sent to a laboratory out of the country for some additional tests related to HIV because there are no laboratories in Rwanda that can do these tests.
- We will ask him/her if we can store some of his/her blood for future testing. These tests will help us learn about the health of people in Rwanda. This sample will be stored for at least five years. His/her leftover blood will not be used for anything other than these tests. This blood will not be sold. If you do not agree to future storage and testing of his/her blood, your child can still take part in the survey today. After survey related testing and informing you of the result, we will destroy his/her blood sample.
- He/she may be eligible to take part in future studies related to health in Rwanda. We are asking for both your permission and his/her permission to contact you or him/her in the next three years if such an opportunity occurs. In order to do this, approved researchers will be able to request access to your contact information. If we contact you or him/her, we will provide details about the new study and ask you or him/her to sign a separate assent/consent form at that time. You or he/she may decide at that time not to take part in that study. If you or he/she do not wish to be contacted about future studies, it does not affect your taking part in this survey.

Could bad things happen if he/she joins this survey?

He/she may feel uncomfortable answering some of the questions we will ask. He/she can refuse to answer any question and we will skip that question.

The needle may hurt when it is put into and taken out of his/her arm. This pain will go away quickly. Sometimes the needle can leave a bruise on the skin. He/she might bleed a little or feel a little dizzy afterwards. Rarely, an infection might occur where the needle enters the skin. We may have to try more than one time in order to get the right amount of blood. We will do our best to make it as painless as possible.

We will test for HIV, and you or he/she may learn that he/she has HIV. Learning that he/she has HIV may cause you or him/her to feel worried. We will talk to you or him/her and try to make you and him/her feel better. We will not tell anyone else what we talk about but there is a small chance other people might find out.

[For children 10-11 years]

You may learn that this child is HIV positive. Learning that he/she has HIV may cause you some emotional and/or psychological distress. You will decide when and where to give your child the test results. We will provide you with counseling on how to cope with learning that this child has HIV. If he/she tests HIV positive, we will help you identify where to go and explain the options available for care and treatment. Care and treatment is available at government facilities free of charge.

[For children 12-17 years]

The child may learn that he/she is HIV positive. Learning that he/she has HIV may cause some emotional and/or psychological distress. He/she will receive counseling on how to cope with learning that he/she has HIV. If he/she tests HIV positive, we will help identify where to go and explain the options available for care and treatment. Care and treatment is available at government facilities free of charge.

As with all surveys, there is a chance that confidentiality could be compromised. We are doing everything we can to minimize this risk.

Could the survey help him/her?

The main benefit for your child by taking part in the survey is the chance to learn more about his/her health today. Some people who take part will test HIV positive. If your child tests HIV positive, the benefit is that you or he/she will learn where to go for HIV services. HIV care and treatment provided by the Ministry of Health is free. If you or your child already know he/she has HIV and is not on treatment, you or your child will get information to help his/her doctor or nurse determine if he/she is ready to start treatment. If you or your child already know your he/she is HIV positive and on HIV treatment, the viral load tests can help his/her nurse or doctor judge how well the treatment is working. If your child tests HIV negative, you or your child will learn about what he/she can do to stay HIV negative. Your child's taking part in this survey could help us learn more about HIV in Rwanda. It can also help us learn about how HIV prevention and treatment programs are working in the country. Your child's taking part is important, and invited to participate even if you or your child already know he/she is HIV negative or positive.

Your child might also be selected for hepatitis B and/or hepatitis C testing. If your child is tested for hepatitis B or hepatitis C, you or your child will learn about his/her hepatitis B or hepatitis C infection status, will receive counseling messages, and referred to a health facility for further care.

Compensation

Taking part in the survey is voluntary. Your child's time for taking part will be compensated with 3,000 RWF.

Alternatives to taking part

The child can decide not to take part in this survey. The child can leave the survey at any time for any reason. If this child decides to leave the survey, no more information will be collected from him/her. However, we will not be able to take back the information that has already been collected and shared.

Costs for being in the survey

There is no cost to you or to him/her for being in the survey, apart from your and his/her time.

Use of survey findings

The overall survey findings, which will not contain any personal information that would identify you or your child, will be shared with the Government of Rwanda. This information will be used to improve health care for the people of Rwanda. Finally, the findings will be shared with international partners to assist in the delivery of health services all over the world.

What else should you know about this survey?

If you do not want this child to be in the survey, he/she does not have to be. Also, if he/she does not want to be in the survey, he/she does not have to be. Nobody will get upset with you or him/her if he/she doesn't join the survey.

It is also OK to say 'Yes' and change your mind later. You can stop him/her being in the survey at any time. If you want to stop, please tell us.

Confidentiality and Access to Health Information

[For children 10-11]

We will do everything we can to keep his/her test results confidential. The blood we collect from him/her will be identified by a number, not by his/her name. Besides you and him/her, no one else will know his/her test results except the people working on the survey**.**

[For children 12-17]

We will do everything we can to keep his/her test results confidential. The blood we collect from him/her will be identified by a number, not by his/her name. Besides him/her, no one else will know his/her test results except the people working on the survey and people he/she decides to tell**.**

We will not tell other people that he/she is in this survey and will not share information about him/her with anyone who does not work in the survey. Any information about him/her will have a number on it instead of his/her name. The information we collect during the survey will not be released outside of the survey groups listed unless there is an issue of safety.

Regardless of eligibility, participants who report having experienced violence will be provided with a referral to their local healthcare facility or the free Isange One Stop Centre, which offers services for all forms of violence, and to police where necessary.

The following individuals and/or agencies will be able to look at your child's interview records to help oversee the conduct of this survey:

[INTERVIEWER: INDICATE THE FOLLOWING INFORMATION TO THE PARTICIPANT- DO NOT READ ALOUD]

- Staff members from the Institutional Review Boards or Ethics Committees overseeing the conduct of this survey to ensure that we are protecting your child's rights as a participant, including:
  - Rwanda National Ethics Committee (RNEC)
  - The Centers for Disease Control and Prevention (CDC; Atlanta, USA)
  - Columbia University Medical Center
  - Westat (a statistical survey research organization)
- The U.S. Office of Human Research Protections and other government agencies that oversee the safety of human subjects to ensure we are protecting your child's rights as a participant in this survey.
- Selected survey staff and survey monitors.

[INTERVIEWER: READ FROM HERE]

This survey has received approval from the Rwanda Scientific and Ethics Committee (SEC), The Centers for Disease Control and Prevention, and the Institutional Review Board of Columbia University Medical Center, and of WESTAT.

Is there anything else?

If you want this child to take part in this survey after we finish talking now, please write your name below. We will write our name too. This shows we talked about the survey and that you allow _____to take part.

Whom should you contact if you have questions?

If you would like more information about the study, you may contact:

[INTERVIEWER: INDICATE THE FOLLOWING INFORMATION TO THE PARTICIPANT- DO NOT READ ALOUD]

Dr. Sabin Nsanzimana
Rwanda Biomedical Center, IHDPC/HIV/AIDS/STIs&OBBIs
Tel: +250 (0) 78 8752475
Email: sabin.nsanzimana@rbc.gov.rw

For questions about the process of your child agreeing to take part in this study or for more information about your child's rights as someone taking part in this study, you may contact:

[INTERVIEWER: INDICATE THE FOLLOWING INFORMATION TO THE PARTICIPANT- DO NOT READ ALOUD]

Dr. David Tumusiime
Rwanda National Ethics Committee, Ministry of Health
Tel: +250 (0) 788749398;

Dr. Jean-Baptiste Mazarati
Rwanda National Ethics Committee, Ministry of Health
Tel: +250 (0) 78 8309807
Email: jbaptiste.mazarati@rbc.gov.rw

Do you want to ask me anything about the survey e.g.:

- The interview?
- Drawing blood for HIV testing or hepatitis B and C testing?
- Testing in the laboratory?
- Storage of blood for future research testing?

Consent statement

Any questions that I had were answered satisfactorily. I agree for this child to be in this survey. I have been offered a copy of this consent form.

1. Do you agree that we can approach this child to ask that he/she do the interview? 'YES' means that you give this permission to have the survey staff ask this child to take part in the interview. 'NO' means that you will NOT give permission for this child to be interviewed.

_____Yes _____No

(If "Yes" proceed to the next question)

2. Do you agree that we can approach this child to give blood for HIV testing and related testing? 'YES' means that you give this permission to have the trained survey staff to ask this child to collect a sample of this child's blood for HIV and related testing. 'NO' means that this child will NOT give blood for HIV testing and related testing.

_____Yes _____No

(If "Yes" proceed to the next question)

3. |Do you agree to allow us to ask this child to have his/her leftover blood stored for future research? 'YES' means that you give permission for us to ask this child to allow us store leftover blood samples for future research. 'NO' means that this child's blood samples will NOT be stored for future research.

_____Yes _____No

4. Do you agree to allow us to ask this child if he/she can be contacted in the future? 'YES' means that you give permission for us to ask this child to be contacted in the future if a study opportunity arises. 'NO' means that your child will NOT be contacted about future studies.

_____Yes _____No

[Tablet summary statement]

To confirm, you have agreed to <INSERT ALL OPTIONS MARKED YES: APPROACH CHILD FOR INTERVIEW, APPROACH CHILD FOR BLOOD TESTING, CHILD INTERVIEW, CHILD BLOOD TEST, APPROACH CHILD FOR BLOOD STORAGE, CHILD BLOOD STORAGE>, is this correct? _____Yes _____No

Emancipated minor signature or mark_____ Date: __/__/__

Printed name of Emancipated minor _____

Emancipated minor ID number _____

[For participants or parents/guardians who cannot read and/or write]

Signature of witness_____ Date: __/__/__

Printed name of witness_____

Signature of person obtaining consent_____ Date: __/__/__

Printed name of person obtaining consent_____

Survey staff ID number _____

Study title: Rwanda Population Based HIV Impact Assessment (RPHIA)

What language do you prefer for our discussion today?

___ English ___French ___Kinyarwanda

Purpose of consent

Your child had a positive HIV test today. We have provided you with a referral form so that you and your child can take to a health clinic and seek HIV treatment and care. We would like to help you and your child in accessing the health care that your child needs. If you agree, we might be able to provide your contact information and your child's HIV results to health care workers or counselors from a trained social service organization. This counselor will contact you to talk to you and your child about HIV and help you and your child go for HIV care. Anyone who is provided with you and your child's details will be experienced in providing support to people living with HIV and will be trained in maintaining confidentiality.

What do you have to do if you agree to take part?

If you agree for your child's information to be shared, and to be contacted, we will provide your name, phone number (if you provided it to us) and your address to those health care workers to provide you with support. The health care worker can contact you by SMS, phone or in person.

What about confidentiality?

Your child's HIV test results and your child's contact information will not be shared with any other parties aside from what was specified in the other consent forms, and with this support organization. They will also do their utmost to maintain your child's confidentiality. However, we cannot guarantee complete confidentiality.

What are the potential risks?

As with all surveys, there is a chance that confidentiality could be compromised. We are doing everything we can to minimize this risk.

What are the potential benefits?

A health care worker or counselor will assist you in accessing the health care needed by your child.

Whom should you contact if you have questions?

If you would like to have more information about the survey, you may contact:

[INTERVIEWER: INDICATE ADDRESS OF POC DO NOT READ ALOUD]

Dr. Sabin Nsanzimana
Rwanda Biomedical Center, IHDPC/HIV/AIDS/STIs & OBBIs
Tel: +250 (0) 78 8752475
Email: sabin.nsanzimana@rbc.gov.rw

Whom should you contact if you have questions?

For questions about the process of agreeing to take part in this survey, to share your information, and to be contacted, or for more information about your child's rights as someone taking part in this survey, you may contact:

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Dr. Jean-Baptiste Mazarati
Rwanda National Ethics Committee, Ministry of Health
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Email: jbaptiste.mazarati@rbc.gov.rw

Do you want to ask me anything about the survey?

Consent Statement

Any questions that I had were answered satisfactorily. I have been offered a copy of this consent form.

1. Do you agree to share your child's contact information? 'YES' means that you agree for your information to be shared. 'NO' means that you do not agree for your information to be shared.

_____Yes _____No

2. If yes, do you agree to be contacted by?

SMS _____Yes _____No

Phone call _____Yes _____No

In person _____Yes _____No

Parent/guardian signature or mark_____ Date: __/__/__

Printed name of parent/guardian_____

Parent/guardian's Participant ID number _____

Child's Participant ID number _____

Signature of person obtaining consent_____ Date: __/__/__

Printed name of person obtaining consent_____

Survey staff ID number _____

Study title: Rwanda Population-based HIV Impact Assessment (RPHIA)

What language do you prefer for our discussion today?

___ English ___French ___Kinyarwanda

Purpose of consent

You had a positive HIV test today. We have provided you with a referral form to bring to a health clinic and seek HIV treatment and care. We would like to help you in accessing the healthcare that you need. If you agree, we may be able to provide your contact information and HIV test results to healthcare workers or counselors from a trained social service organization. This counselor will contact you to talk to you about HIV and help you go for HIV care. Anyone who is provided with your details will be experienced in providing support to people living with HIV and will be trained in maintaining confidentiality.

What do you have to do if you agree to take part?

If you agree for your information to be shared and to be contacted, we will provide your name, phone number (if you provided it to us), and your address to those healthcare providers to provide you with support. The healthcare worker can contact you by SMS, phone, or in person.

What about confidentiality?

Your HIV test results and your contact information will not be shared with any other parties aside from what was specified in the other consent forms, and with this support organization. They will also do their utmost to maintain your confidentiality. However, we cannot guarantee complete confidentiality.

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What are the potential benefits?

A healthcare worker or counselor will assist you in accessing the healthcare that you need.

Whom should you contact if you have questions?

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Do you want to ask me anything about the survey?

Consent Statement

Any questions that I had were answered satisfactorily. I have been offered a copy of this consent form.

1. Do you agree to share your contact information? 'YES' means that you agree for your information to be shared. 'NO' means that you do not agree for your information to be shared.

_____Yes _____No

2. If Yes, do you agree to be contacted by?

SMS _____Yes _____No

Phone call _____Yes _____No

In person _____Yes _____No

Participant signature or mark _____ Date: __/__/__

Printed name of participant_____

Signature of person obtaining consent_____ Date: __/__/__

Printed name of person obtaining consent_____

Survey staff ID number _____

Rwanda Population-based HIV Impact Assessment
RPHIA 2018-2019

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