MINISTRY OF HEALTH

KenPHIA
KENYA POPULATION-BASED HIV IMPACT ASSESSMENT
wakati ni sasa

NASCOP

KENPHIA 2018 PRELIMINARY REPORT

Driver Mohammed Tarabi checks the team vehicle prior to crossing the Chalbi desert basin en route to a cluster in Marsabit County in February 2019

Kenya Population-based HIV Impact Assessment (KENPHIA) 2018

National AIDS and STI Control Programme (NASCOP),

Ministry of Health, Kenya

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Recommended Citation

National AIDS and STI Control Programme (NASCOP), Preliminary KENPHIA 2018 Report. Nairobi: NASCOP; 2020.

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ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
ANC	Antenatal Care
ART	Antiretroviral Therapy
ARV	Antiretroviral
CAP/CTM	Cobas AmpliPrep/Cobas TaqMan Analyzer
CDC	U.S. Centers for Disease Control and Prevention
CHAID	Chi-square Automatic Interaction Detector
CI	Confidence Interval
CoG	Council of Governors
DACC	Data Analysis and Advisory Committee
DBS	Dried Blood Spot
DNA	Deoxyribonucleic Acid
EIA	Enzyme Immunoassay
EID	Early Infant Diagnosis
GF	Global Fund to Fight AIDS, Tuberculosis and Malaria
HIV	Human Immunodeficiency Virus
IRB	Institutional Review Board
KAIS	Kenya AIDS Indicator Survey
KEMRI	Kenya Medical Research Institute
KENPHIA	Kenya Population-based HIV Impact Assessment
KNBS	Kenya National Bureau of Statistics
LAg	Limiting Antigen
LASSO	Least Absolute Shrinkage and Selection Operator
MC	Male Circumcision
MDRI	Mean Duration of Recent Infection
mL	Milliliter
NACC	National AIDS Control Council
NASCOP	National AIDS and STI Control Programme
NCPD	National Council for Population and Development
NESC	National Executive Steering Committee
NHRL	National HIV Reference Laboratory
PCR	Polymerase Chain Reaction
PEPFAR	U.S. President's Emergency Plan for AIDS Relief
PFR	Proportion False Recent
PHIA	Population-based HIV Impact Assessment
PLHIV	People Living with HIV
PMTCT	Prevention of Mother-to-Child Transmission
POC	Point of Care
RNA	Ribonucleic Acid
STI	Sexually Transmitted Infection
T	Time Cutoff
UHC	Universal Health Coverage
UNAIDS	Joint United Nations Programme on HIV/ AIDS
USA	United States of America
USAID	United States Agency for International Development
VL	Viral Load
VLS	Viral Load Suppression
VMMC	Voluntary Medical Male Circumcision
WHO	World Health Organization

FOREWORD

Kenya is strongly committed to the Joint United Nations Programme on HIV/AIDS (UNAIDS) 90-90-90 targets for ending the AIDS epidemic, where by 2020, 90% of all persons living with HIV should know their HIV status; 90% of all persons diagnosed with HIV should receive antiretroviral therapy (ART); and 90% of all persons receiving ART should have suppressed viral loads. In the last two decades, the Government of Kenya and development partners have invested significantly in the HIV response. As a result, we have witnessed tremendous progress over the past decade in reductions in the annual number of new HIV infections and AIDS-related deaths, resulting in improved quality of life for people living with HIV. This progress is attributed to many factors—among them, an excellent partnership with bilateral and multilateral agencies, a multisectoral response with a strong health sector leadership, as well as strong political commitment. We are grateful to H.E., the First Lady of the Republic of Kenya, Margaret Kenyatta, for her *Beyond Zero* campaign that has increased awareness and created high level political visibility and ownership of the AIDS response.

However, we still have a long way to go!

That is why KENPHIA 2018 is so timely, as it will define the next phase of the HIV response. From the preliminary results of this survey, it is clear that we need to invest more political, financial and technical resources to attain the first UNAIDS 90-90-90 target: 90% awareness of status among HIV-positive persons. We are committed as a government to continue the path towards HIV epidemic control as a means of achieving universal health coverage (UHC). As we move forward towards UHC, our commitment shall be that every Kenyan will get the opportunity to be tested for HIV, and that every HIV-positive Kenyan will get access to immediate treatment. Furthermore—and without leaving anyone behind—we commit to ensure that every Kenyan has access to HIV prevention services that they need, while respecting the rights of everyone.

I will ensure that the Ministry of Health disseminates these findings widely and encourage all Kenyans and National and County health management teams to utilize these results to ensure maximum impact.

Sicily Kariuki, EGH
Cabinet Secretary
Ministry of Health

It is with great pleasure that we provide the preliminary findings of KENPHIA 2018 whose results will catalyze policy action at National level. KENPHIA is also the first, amongst a series of HIV surveys, that provides data at the County levels, which aligns perfectly with the objectives of devolution as per Kenya's 2010 constitution. I therefore take this opportunity to encourage County governments to use the County-level data provided in this survey for planning of HIV health service delivery and in updating their County HIV strategic plans. Given the trove of knowledge that KENPHIA 2018 will provide, the Ministry of Health also affirms its intention to take advantage of the demographic and health data generated by this survey to answer relevant questions that will enable the country to plan for universal health access as per the Big Four Agenda spearheaded by The President of the Republic of Kenya.

Dr. Rashid A. Aman
Chief Administrative Secretary
Ministry of Health

The Ministry of Health is proud to have supported KENPHIA with the human resources for health to enable data collection and mobilized resources to help the survey procure some of the necessary supplies and equipment to ensure a successful survey. We are pleased the outcome of this survey will influence policy change and ensure mainstreaming of HIV programs for Kenya.

Susan N. Mochache, CBS
Principal Secretary
Ministry of Health

As the Director General of the Ministry of Health, I commit to translate the findings of this survey into concrete and implementable strategic plans and policies that will enhance our HIV control response. I also urge all counties and HIV implementing agencies to continue with this exemplary partnership to redefine the HIV response and engage communities appropriately as we enter the next phase of controlling the HIV epidemic.

Dr. Wekesa Masasabi
Acting Director General Health
Ministry of Health

ACKNOWLEDGMENTS AND APPRECIATIONS

The Ministry of Health acknowledges the scientific, strategic, and technical leadership provided by the Principal Investigators, Dr. Peter Cherutich, Dr. Kigen Bartilol, Dr. Kevin M. De Cock, and Dr. Jessica Justman.

The various planning organs of the KENPHIA through the National Executive Steering Committee under the leadership of the former Director of Medical Services, Dr. Jackson Kioko, the Acting Director General of Health, Dr. Wekesa Masasabi, Head-National AIDS and STI Control Programme, Dr. Catherine Ngugi, the KENPHIA Secretariat under the commendable coordination of Dr. Joyce Wamicwe, the Data Analysis and Advisory Committee chaired by Dr. Peter Cherutich and the KENPHIA Technical Working Group and Technical Sub-Committees drawn from relevant survey partner institutions.

The support, engagement and participation by all survey collaborating institutions listed below:

- Ministry of Health
  - National AIDS & STI Control Programme (NASCOP)
  - National Public Health Laboratories
  - National AIDS Control Council (NACC)
  - Kenya Medical Research Institute (KEMRI)
- Ministry of Planning and Devolution
  - Kenya National Bureau of Statistics (KNBS)
  - National Council for Population and Development (NCPD)
- Council of Governors (CoG)
- 47 County Governments
- Global Fund
- Associations for People Living with HIV
- National Empowerment Network of People Living with HIV/AIDS in Kenya (NEPHAK)
- United Nations (UN) Family
- Westat (a statistical research organization)
- U.S. President's Emergency Plan for AIDS Relief (PEPFAR) Kenya Coordinating Office
- United States Centers for Disease Control and Prevention (CDC)
- ICAP at Columbia University

The operational support from the CoG through the Chief Executive Officer Mrs. Jacqueline Mogeni and the mobilization of the 47 County Governments through the County Executive Committee Members for Health, County Directors for Health, County AIDS and STI Coordination Officers and County Medical Laboratory Coordinators.

The 14 community mobilization coordination officers, 1600 community mobilizers, 5 regional coordination supervisory teams, 50 field data collection teams, 6 roving satellite laboratory teams and the central laboratory team who worked tirelessly to collect high quality data.

Kenyans from all walks of life across the country who participated in this survey.

Lastly, we wish to acknowledge the strategic partner, ICAP at Columbia University who made this survey possible through the financial support from PEPFAR and the Global Fund; and for the unequivocal technical support of the CDC.

IV KEY MESSAGES

The Ministry of Health acknowledges the gradual decline in the number of annual new adult HIV infections to 36,000 in 2018. KENPHIA measured important National and County HIV-related indicators, including incidence and prevalence of HIV, and progress toward 90-90-90 goals that will guide policy and funding priorities.

Dr. Pacifica Onyancha
Ag Director Directorate of Medical Services/Preventive and Promotive Health
Ministry of Health

This survey found marked gender disparity in HIV prevalence among adults, with prevalence twice as high among women compared to men. Among adolescents and young people aged 20-34 years, the prevalence of HIV was three times as high among women compared to men. Further, the findings demonstrate a gap towards attaining the first UNAIDS 90 target for HIV diagnoses with 79.5% of people living with HIV aware of their status, as well as a 7.9% unmet need for treatment of HIV-positive pregnant women. This highlights the need to improve awareness, further scale-up prevention and treatment programs to enhance HIV testing and effective treatment for all pregnant HIV-positive women attending maternal & child health services. NASCOP, together with National and County health delivery stakeholders will utilize these data to improve HIV services for all Kenyans.

Dr. Catherine Ngugi
Head National AIDS and STI Control Programme
Ministry of Health

This survey was conducted with the highest level of scientific integrity and fidelity to the protocol and I am delighted and privileged to have been a KENPHIA Principal Investigator. My joy will be complete when this work will influence HIV policy in Kenya and help us move closer to HIV elimination.

Dr. Peter Cherutich
Principal Investigator
Ministry of Health

It has been an exciting journey serving as a Principal Investigator and now presenting KENPHIA's preliminary results. These early results will give us a score card on current HIV programs and allow for development of informed, holistic and quality-driven HIV policies for all Kenyans.

Dr. Kigen Bartilol
Principal Investigator
Ministry of Health

KENPHIA documents the important accomplishment of 72% of adults living with HIV in Kenya having HIV viral load suppression (VLS). Those who sustain VLS on stable ART pose very low risk of HIV transmission. CDC is proud to have been part of the many years of collaboration with the Ministry of Health in fighting the HIV epidemic.

Dr. Kevin M. De Cock
Principal Investigator
CDC Kenya

It is with great pleasure that we present the KENPHIA preliminary results adding to 12 other PHIA surveys in sub-Saharan Africa, to give a detailed portrait of HIV response programs and their impact in turning the tide against the disease. We look forward to using KENPHIA data to identify new priorities and implementing data-driven priorities in the fight against HIV.

Dr. Jessica Justman
Principal Investigator
ICAP at Columbia University

V EXECUTIVE SUMMARY

Kenya Population-based HIV Impact Assessment (KENPHIA) 2018 survey is a National household HIV survey that is part of a multicountry PHIA survey assessment being conducted in 13 other sub-Saharan countries in Africa. KENPHIA provides key information for health policy makers and implementers on the size of the HIV epidemic, the impact that recent and ongoing HIV programming are having on the epidemic and a gap-assessment of key areas requiring further focus in the fight against HIV. KENPHIA 2018 is one among several National surveillance data sources, including the antenatal surveillance in pregnant women from 1990 to 2011, the Kenya Demographic Health Surveys (2003, 2009, and 2014) and the Kenya AIDS Indicator Surveys (KAIS 2007 and 2012). KENPHIA 2018 builds upon the previous KAIS surveys and adds some additional unique features that allow it to better assess the impact of HIV programs. The key elements of survey design and differences between KAIS and KENPHIAs are presented in the summary infographic below.

Infographic 1: Descriptive comparison of KENPHIA and KAIS

KAIS 2012	PARAMETER	KENPHIA 2018
Give estimates for persons aged 15-64 years for the below: • HIV Incidence - National • HIV Prevalence - National & regional (10 NASCOP regions) • Former North Eastern Province (Mandera, Wajir and Garissa counties excluded from data collection)	Primary objectives	Give estimates for persons aged 15-64 years for the below: • HIV Incidence - National • HIV Prevalence - National & County (47 counties) • Prevalence of HIV viral suppression - National
• 18 months–64 years	Target population	• 0–64 years
• Total: 15,966	Achieved survey size (blood draws)	• Total: 35,610
• Electronic questionnaires on portable notebook computers running TAPHIK Software	Mode of data Collection	• Electronic questionnaires on tablets running ODK
English, Kiswahili and 11 local languages used to collect: • Household questionnaire • Separate female and male questionnaires for 15-64 years • Child questionnaire for 10-14 years	Questionnaires and interviews	English, Kiswahili and 14 local languages used to collect: • Household questionnaire • Separate female and male questionnaires for 15-64 years • Child questionnaire for 10-14 years
• Central HIV testing • CD4+ T cell counts • HIV Viral load • HIV recent infection • HIV ARV drug detection	Blood tests done	• HIV • HIV early infant diagnostic testing • Syphilis • Hepatitis B virus • HIV viral load • HIV recent infection • HIV ARV drug detection • HIV drug resistance
• Home-based testing for HIV offered as service • Referrals given to collect all other clinically-relevant test results at a later date	Return of test results	• Home-based/point of care testing for HIV • Referrals given to collect all other clinically relevant test results at a later date

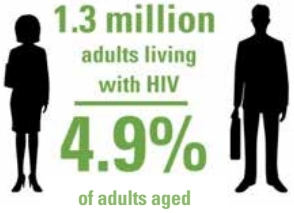
Infographic 2: Executive Summary: Summary of KENPHIA Results

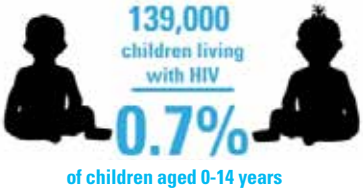
HIV INCIDENCE

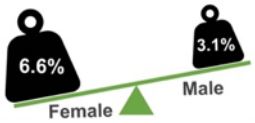
36,000
adults infected annually

0.14%
of adults aged 15-64 years annually get infected with HIV

HIV PREVALENCE



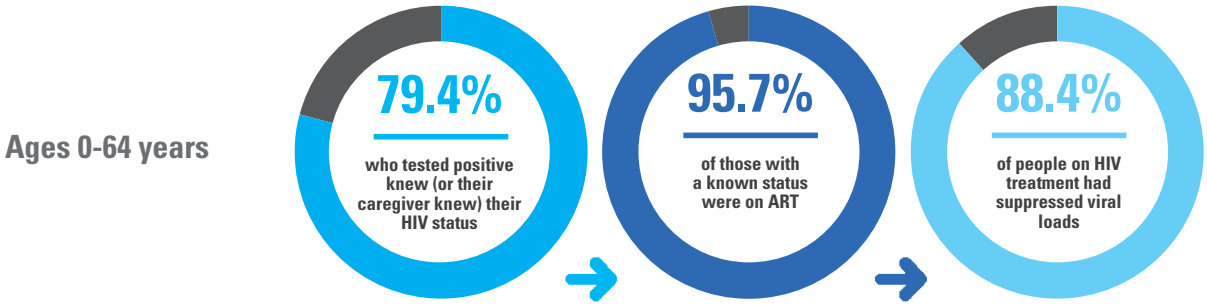


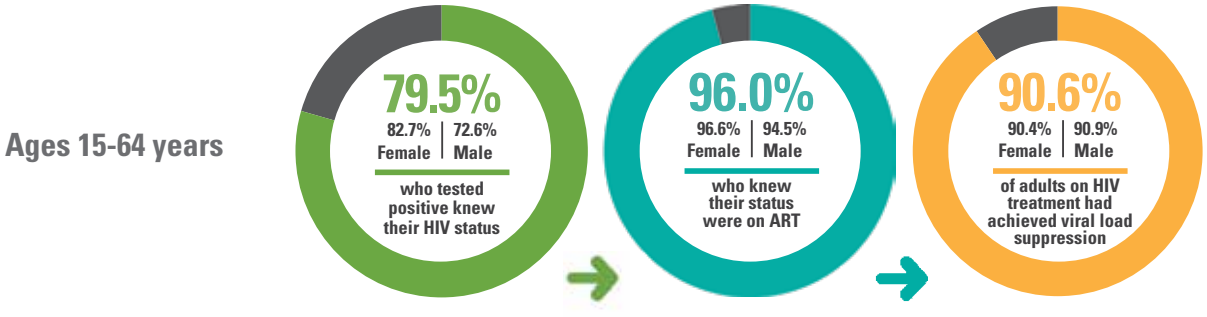


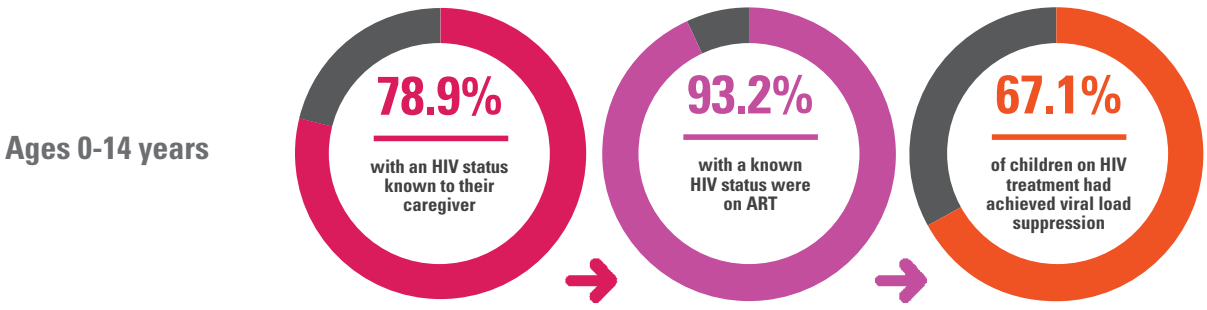
Double the proportion of women compared to men are living with HIV

UNAIDS 90-90-90 TARGETS

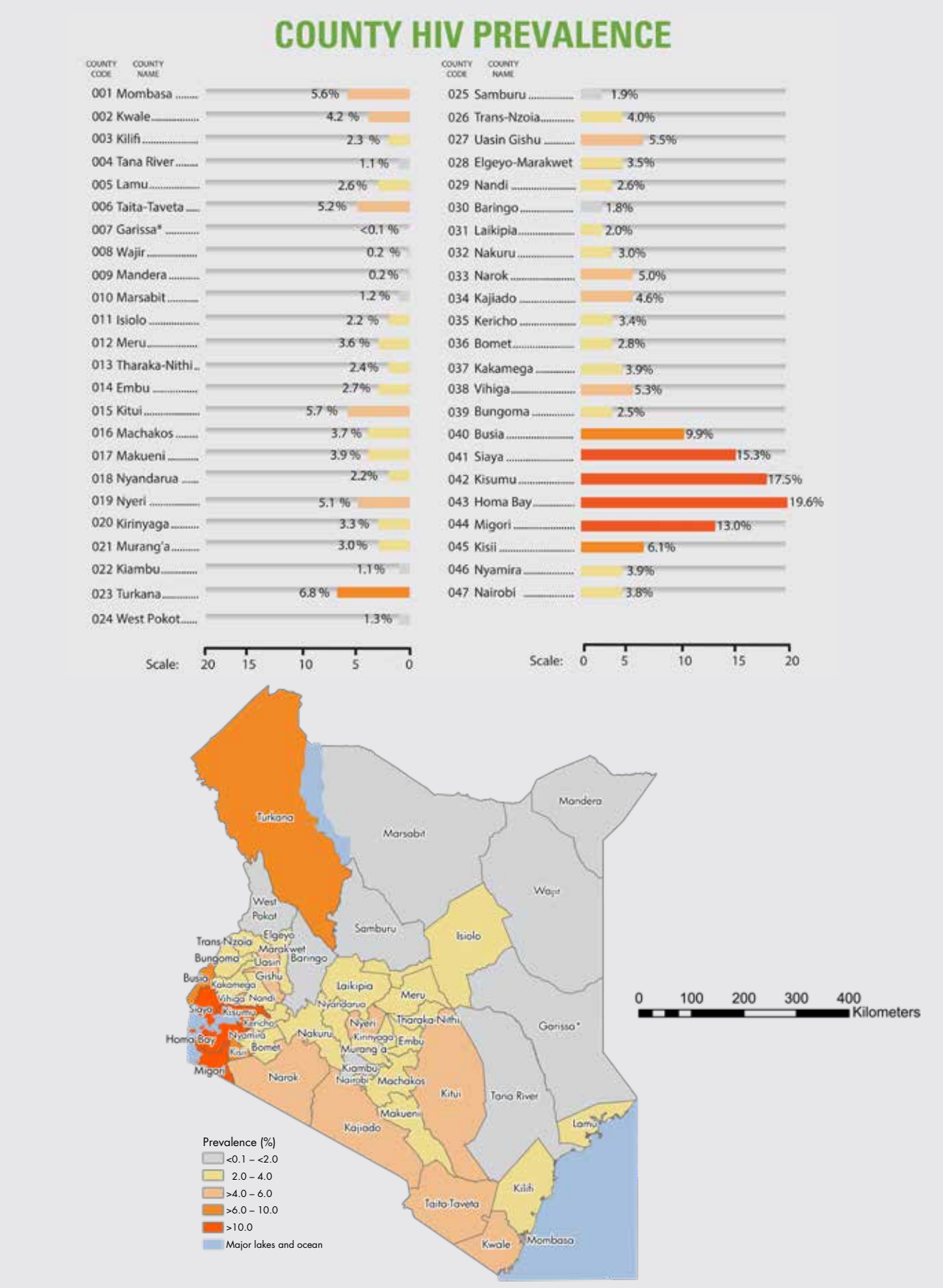
Kenya's performance among people living with HIV based upon self- or caregiver-reported knowledge of HIV status and antiretroviral therapy (ART), adjusted for laboratory detection of antiretrovirals (ARVs) in blood







Infographic 2: Executive Summary: Summary of KENPHIA Results (continued)



** Garissa had no HIV-positive persons identified, thus is represented as having an HIV prevalence <0.1%.*

VI KEY FINDINGS

Table 1: Key findings: National HIV incidence, HIV prevalence and viral load suppression in people living with HIV

HIV Indicator	Female	95% CI	Male	95% CI	Total	95% CI
Annual Incidence (%)						
15-49 years	0.15	0.00-0.31	0.15	0.02-0.28	0.15	0.06-0.24
15-64 years	0.15	0.01-0.29	0.13	0.02-0.24	0.14	0.06-0.23
Prevalence (%)						
0-14 years	0.7	0.2-1.1	0.8	0.4-1.1	0.7	0.4-1.0
10-19 years	1.0	0.6-1.4	0.9	0.5-1.4	0.9	0.6-1.3
15-49 years	6.2	5.7-6.8	2.7	2.4-3.1	4.5	4.1-4.9
15-64 years	6.6	6.0-7.1	3.1	2.7-3.5	4.9	4.5-5.3
Viral Load Suppression (%)						
0-14 years	(53.5)	31.7-75.4	(43.8)	21.0-66.6	48.3	30.9-65.7
10-19 years	(70.9)	53.2-88.5	(52.0)	21.8-82.1	61.4	43.8-79.1
15-49 years	72.8	69.3-76.3	60.6	53.6-67.7	69.2	65.9-72.4
15-64 years	74.6	71.5-77.6	65.1	58.8-71.4	71.6	68.8-74.4

Description: Incidence measurement based on mean duration of recent infection of 130 days with time cutoff=1.0 year and residual proportion false recent =0.00. Viral load suppression is defined as HIV RNA <1,000 copies per milliliter (mL) of plasma among HIV-positive persons; 95% CI: the confidence interval indicates a range of values that most likely encompasses the true value. Parentheses () indicate an estimate that is based on 25-49 persons observations and should be interpreted with caution.

HIV incidence

The annual incidence of HIV among adults in Kenya was 0.14% (95% confidence interval [CI]: 0.06-0.23%): 0.15% (95% CI: 0.01-0.29%) among women and 0.13% (95% CI: 0.02%-0.24%) among men. This corresponds to an estimated 36,000 (95% CI: 16,000-56,000) new infections per year among adults (Table 1).

HIV prevalence in adults

The prevalence of HIV among adults in Kenya was 4.9% (95% CI: 4.5%-5.3%). This translates to approximately 1.3 million (95% CI: 1.2-1.4 million) adults living with HIV in Kenya. HIV prevalence was twice as high among women at 6.6% (95% CI: 6.0%-7.1%), compared to men at 3.1% (95% CI: 2.7%-3.5%) (Table 1).

HIV prevalence in children

HIV prevalence among children was 0.7% (95% CI: 0.4%-1.0%) which translates to approximately 139,000 (95% CI: 84,000-194,000) children living with HIV in Kenya. There was no difference between girls and boys: HIV prevalence was 0.7% (95% CI: 0.2%-1.1%) among girls and 0.8% (95% CI: 0.4%-1.1%) among boys (Table 1).

Viral load suppression prevalence

The prevalence of viral load suppression (VLS) among all HIV-positive adults in Kenya was 71.6% (95% CI: 68.8%-74.4%). Men had markedly lower prevalence of VLS at 65.1% (95% CI: 58.8%-71.4%) compared to women at 74.6% (95 CI: 71.5%-77.6%). The prevalence of VLS in children was 48.3% (95% CI: 30.9%-65.7%), with no significant difference observed between boys and girls, with boys at 43.8% (95% CI: 21.0%-66.6%) and girls at 53.5% (95% CI: 31.7%-75.4%) (Table 1). Note, these findings of VLS among people living with HIV were regardless of knowledge of HIV status or use of antiretroviral (ARV) therapy (ART).

Elizabeth Kariuki, Sarah Lekisaat and Saphina Lekasuyan, field data collectors, attend the launch in Nairobi on the 5th of June 2018

Linus Ndiege and Daniel Onyango in a cluster in Siaya County in June 2018

01 INTRODUCTION

The Kenya Population-based HIV Impact Assessment (KENPHIA) was a cross-sectional household survey undertaken to describe the HIV epidemic in Kenya. KENPHIA had three primary objectives:

1. To estimate the National incidence of human immunodeficiency virus (HIV) infection
2. To determine the National prevalence of viral load (VL) suppression (VLS) among persons living with HIV
3. To assess the prevalence of HIV, nationally and by County

KENPHIA also measured National coverage of HIV services and key HIV-related risk and prevention behaviors using a nationally representative sample of adults and children.

Kenya has the fifth-largest number of persons living with HIV in the world, and HIV continues to be a leading cause of adult morbidity and mortality.[1,2] In order to understand the magnitude of the HIV epidemic, Kenya carried out a Demographic and Health Survey with HIV testing in 2003, followed by a Kenya AIDS Indicator Survey (KAIS) in 2007, leading the field in this type of nationwide assessment. The follow-up 2012 KAIS estimated the National HIV prevalence among adults (defined as those aged 15-64 years) to be 5.6%, which was a significant decline from KAIS 2007, which found a prevalence of 7.1%.[3,4] The HIV incidence rate in 2012 was estimated to be 0.5%. Kenya has marked regional heterogeneity in HIV prevalence, with prevalence ranging from over 20% in some counties to less than 1% in others. According to the National AIDS Control Council (NACC) 2018 HIV estimates, almost half of persons living with HIV in Kenya are located in Kisumu, Siaya, Homa Bay, and Migori counties in western Kenya and Nairobi County.[5]

National surveys such as KAIS, and now, KENPHIA provide important insights into progress toward HIV epidemic control. Kenya, in close partnership with the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) and the Global Fund to Fight AIDS, Tuberculosis and Malaria has an aggressive program of HIV testing and treatment.[6] In 2016, Kenya adopted "Test and Treat"—a strategy under which those diagnosed with HIV start antiretroviral therapy (ART) as soon as possible. Today, ART is available at a range of facilities throughout the country, from large referral hospitals to small dispensaries. This preliminary report provides important data on the impact of HIV programming in Kenya and will allow us to tailor our strategies to the specific needs of an area or population. These results provide information on National and Country progress towards epidemic control and Kenya's progress toward the UNAIDS 90-90-90 targets.

KENYA HAS THE FIFTH-LARGEST NUMBER OF PERSONS LIVING WITH HIV IN THE WORLD

Director of Medical Services, Dr. Jackson Kioko, U.S. Ambassador, Robert Godec, Chief Administrative Secretary for Health, Dr. Rashid Aman and National AIDS Control Council CEO, Dr. Nduku Kilonzo launching the KENPHIA in Nairobi on 5th June 2018

Dignitaries flagging off the KENPHIA escorted by outrider motorcycles during the launch of the survey in Nairobi on 5th June 2018

02 METHODS

KENPHIA 2018 was a cross-sectional, household-based survey conducted among persons aged 0-64 years in 800 clusters, based on the National Sample Survey and Evaluation Programme, version V, sampling framework developed by the Kenya National Bureau of Statistics (KNBS). Cluster listing updates were conducted six months prior to data collection to facilitate household selection. Survey data collection was conducted from June 2018 to February 2019. The survey targeted 34,610 persons of whom 27,897 were adults aged 15-64 years, and 6,713 were children aged 0-14 years (Figure 1). Adults aged 18-64 years in all sampled households who provided informed consent, adolescents aged 15-17 years whose parents or guardians provided permission, and children aged 0-14 years (in every third sampled household whose parents or guardians provided permission) were enrolled. Adolescents aged 10-17 years were also asked for assent after permission was granted by their parents or guardians. Ethical approval was received from Kenya Medical Research Institute (KEMRI), Columbia University and the United States Centers for Disease Control and Prevention (CDC) institutional review boards (IRB).

County Departments of Health led engagement meetings to sensitize stakeholders to the survey in each of the 47 counties. Survey implementation was preceded by community mobilization teams who sensitized selected communities prior to data collection. Fifty data collection teams (each consisting of a team leader, four home-based testing counsellors/interviewers, and two laboratory technologists) visited selected households in each cluster. Using a tablet with Open Data Kit computer-assisted personal interviewing software, the field data collection teams obtained informed consent, then administered the household, the adult (to those aged 15-64 years) or the young adolescent (to those aged 10-14 years) questionnaires to eligible participants within selected households. Blood was drawn from eligible and consenting participants aged 18 months to 64 years and tested in accordance with the Kenya National HIV Testing Services Guidelines[7] using Determine™ HIV-1/2 (Abbott Molecular, Inc. Des Plaines, Illinois, United States) and First Response™ HIV 1-2.0 (Premier Medical Corporation, Mumbai, India) HIV rapid test kits. Rapid test results were provided to participants in the household. Blood draw and testing were also conducted for infants aged 0-17 months using Determine™ HIV rapid test to screen for exposure to HIV at the household. Specimens from infants with a reactive field test result or whose mother's HIV status was positive or unknown at the time of household testing for early infant diagnostic (EID) testing using GeneXpert's Xpert® HIV-1 Qual (Cepheid, Sunnyvale, California, United States) at the satellite laboratory as well as DNA polymerase chain reaction (PCR) confirmatory testing using Cobas AmpliPrep/Cobas TaqMan (CAP/CTM) HIV-1 Qualitative Test, v2.0 assay (Roche Diagnostics, Branchburg, New Jersey, United States) at the National HIV Reference Laboratory (NHRL). EID results were returned to the infant's guardian at the household. Participants newly diagnosed with HIV were referred to the facility of their choice to initiate ART.

Whole blood specimens collected in the household were transported to satellite laboratories in EDTA tubes on cold packs. At the satellite laboratories, the first fifty tests from each tester and a fraction of negative specimens were subjected to quality assurance testing using the National HIV rapid testing algorithm and confirmatory testing to ascertain the accuracy of results issued in the field. In addition, all HIV-positive specimens were confirmed with the Geenius™ HIV-1/2 supplemental assay (Bio-Rad Laboratories, Redmond, Washington, United States). Within 24 hours of blood draw, dried blood spot (DBS) cards and plasma aliquots were prepared in the satellite laboratory and frozen at -20° C. These specimens were archived at the central laboratory at -80° C for additional testing.

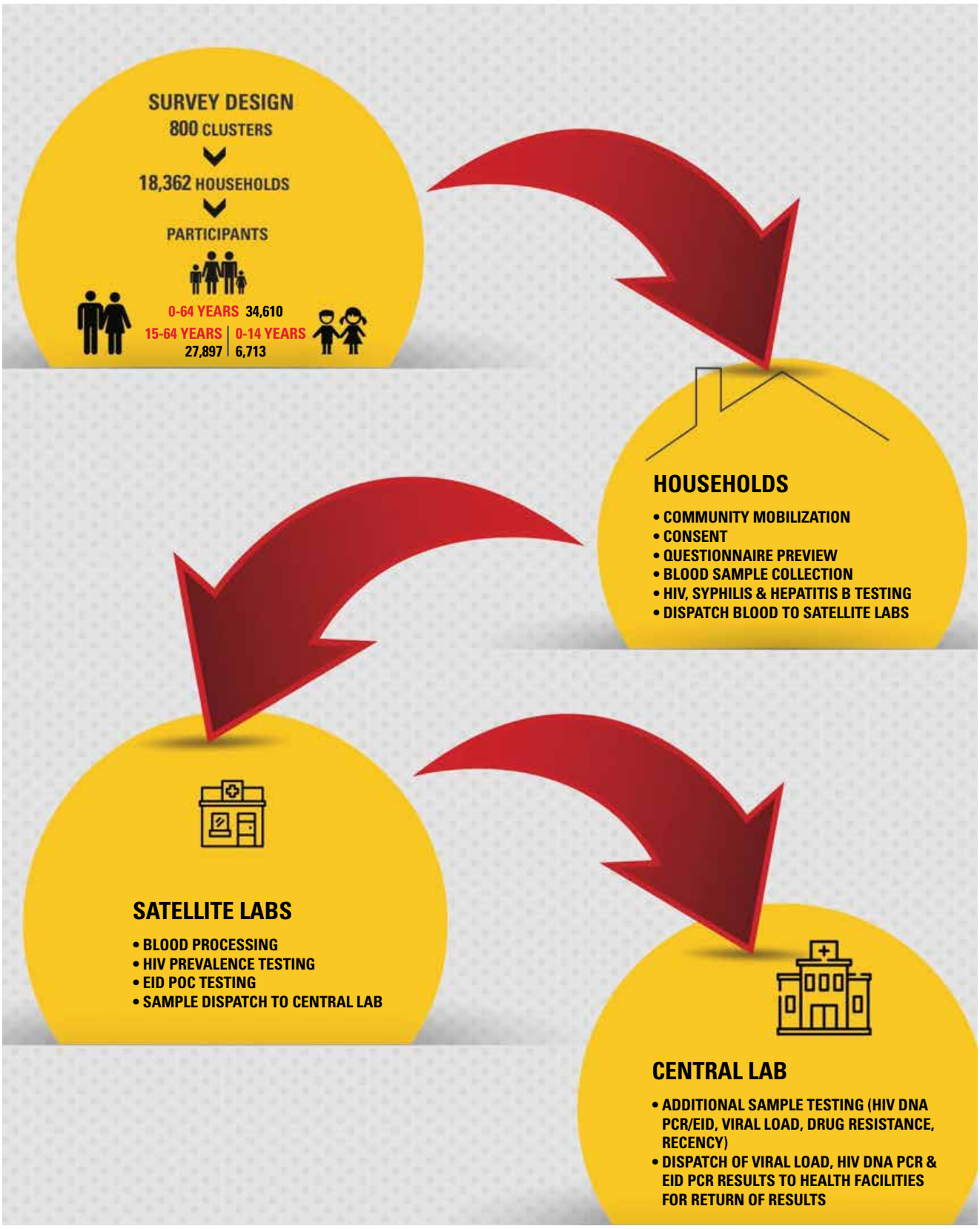
Specimens were transported weekly to the NHRL where samples from HIV-positive participants were subjected to HIV VL testing using the automated Roche CAP/CTM HIV-1 RNA quantitation test (Roche Diagnostics, Mannheim, Germany). Viral load results were dispatched

to health facilities designated by survey participants. Additionally, all available HIV-positive samples were tested for recency of HIV infection at the NHRL using either the Sedia HIV-1 Limiting Antigen (LAg)-Avidity Enzyme Immunoassay (EIA) (Sedia Biosciences, Portland, Oregon, United States), or the Maxim HIV-1 LAg-Avidity EIA (Maxim Biomedical; Bethesda, Maryland, United States). The recency infection testing algorithm distinguishes between recent (<1 year) and longer-term infection.[8] Specimens were also tested by the Division of Clinical Pharmacology of the Department of Medicine at the University of Cape Town in South Africa for the presence of antiretroviral (ARV) medications. Detection of ARVs is considered indicative of participant use of ART at the time of blood collection. Laboratory detection of ARVs was then incorporated into incidence calculations and used to adjust self-reported knowledge of HIV-positive status and ART use. Specimens with evidence of recent infection as well as a sample of specimens with long-term infection will also undergo HIV drug resistance testing.

After data cleaning, survey base weights were calculated for all estimates and adjusted for individual interview and HIV testing nonresponse. Weighting was further applied by age group, sex and relevant variables using the standard PHIA (Population-based HIV Impact Assessment) statistical approaches (least absolute shrinkage and selection operator (LASSO) regression, chi-square automatic interaction detector (CHAID), and jackknife resampling)[9] using SAS (SAS Institute Inc., Cary, North Carolina, United States), R (R Foundation for Statistical Computing, Vienna, Austria) and SI-CHAID statistical software. The resulting weights were then post-stratified[10] to the 2018 KNBS population estimates and normalized.

Data collectors; Francis Lowana and Saphina Lekasuyan, and KENPHIA Project Director Dr. Duncan Chege heading to a household to collect data in Alale, West Pokot in January 2019

Figure 1: Summary of survey field and laboratory procedures



EID = early infant diagnosis; POC = point of care; PCR = polymerase chain reaction.
Note: Community mobilization occurs at National, regional and community levels in advance of the household visit. Also, one additional laboratory procedure, detection of antiretrovirals, was performed by the Division of Clinical Pharmacology of the Department of Medicine at the University of Cape Town in South Africa.

03 RESULTS

3.1 Response Rates and Laboratory Quality Performance

3.1.1 Response Rates

The KENPHIA was conducted across the 47 counties of Kenya covering 798 clusters composed of 16,918 households. A total of 33,071 adolescents and adults were interviewed, and 35,610 adults and children gave blood samples. Nationally, the household response rate was 92.8%, the individual interview response rate was 91.1%, and 83.4% of eligible respondents provided blood. This translates to an overall National survey response rate of 77.4% (the product of the household and the blood draw response rates), while County-level response rates ranged from 57.3% in Mombasa County to 93.2% in Busia County (Table 2).

Community mobilizer Martin Kamunya in Gathaithi cluster in Karatina, Nyeri County in September 2018

Table 2: Summary of National and County survey response rates

County Code	County	Survey Response Rate (%)	County Code	County	Survey Response Rate (%)	County Code	County	Survey Response Rate (%)
	National	**77.4**	016	Machakos	77.6	032	Nakuru	71.4
001	Mombasa	57.3	017	Makueni	78.6	033	Narok	71.6
002	Kwale	57.8	018	Nyandarua	68.3	034	Kajiado	69.3
003	Kilifi	60.5	019	Nyeri	78.7	035	Kericho	70.5
004	Tana River	82.1	020	Kirinyaga	81.9	036	Bomet	82.0
005	Lamu	64.2	021	Murang'a	81.5	037	Kakamega	80.1
006	Taita-Taveta	83.5	022	Kiambu	63.9	038	Vihiga	80.1
007	Garissa	81.2	023	Turkana	81.9	039	Bungoma	84.2
008	Wajir	79.7	024	West Pokot	92.6	040	Busia	93.2
009	Mandera	76.4	025	Samburu	81.4	041	Siaya	76.8
010	Marsabit	72.6	026	Trans-Nzoia	82.2	042	Kisumu	70.2
011	Isiolo	73.6	027	Uasin Gishu	86.9	043	Homa Bay	85.2
012	Meru	82.9	028	Elgeyo-Marakwet	92.2	044	Migori	88.2
013	Tharaka-Nithi	89.3	029	Nandi	86.4	045	Kisii	87.3
014	Embu	84.2	030	Baringo	76.7	016	Nyamira	86.1
015	Kitui	75.9	031	Laikipia	71.4	047	Nairobi	61.0

The survey response rate is the product of the household and the blood draw response rates.

3.1.2 Laboratory Quality Performance

KENPHIA's laboratory methods and procedures met the expected performance and quality indicators. All batches of HIV rapid test kits utilized in the field passed lot-to-lot validation. In addition, quality control tests were run every two weeks by each tester to ensure kit viability under field conditions. All testers underwent and passed competency testing conducted at the beginning of the survey and within six months of survey implementation at all testing levels including household, satellite, and central laboratories. Blood samples collected in the survey were of high quality with 0.06% hemolysis and 0.02% clotting observed which is below the standard threshold of 2.0%. Cold chain was maintained with 99.8% of collected samples achieving an arm-to-freezer time of less than 24 hours.

Dr. Kevin De Cock (CDC, Kenya Country Director) visits the National HIV Reference Laboratory in Nairobi on November 29th 2018

3.2 HIV Incidence

HIV incidence is a measure of the frequency with which new cases of HIV occur in a population over time. Incidence can provide important information on the status of the HIV epidemic and measure the impact of the National HIV program.

The annual incidence of HIV among adults (those aged 15-64 years) in Kenya was 0.14% (95% confidence interval [CI]: 0.06-0.23): 0.15% (95% CI: 0.01-0.29%) among women and 0.13% (95% CI: 0.02%-0.24%) among men (Table 3). This corresponds to 36,000 (95% CI: 16,000-56,000) new cases of HIV infection per year in Kenya among adults (Table 1).

Table 3: Incidence of HIV among adults aged 15-64 years

HIV Indicator	Female	95% CI	Male	95% CI	Total	95% CI
Annual Incidence (%)						
15-49 years	0.15	0.00-0.31	0.15	0.02-0.28	0.15	0.06-0.24
15-64 years	0.15	0.01-0.29	0.13	0.02-0.24	0.14	0.06-0.23

A laboratory-based algorithm was used to distinguish recent (recent on HIV-1 LAg avidity and viral load of ≥1000 RNA copies per mL) from long-term infection. Incidence estimates were based on mean duration of recent infection (MDRI) of 130 days with a time cutoff (T)=1.0 year and residual proportion false recent (PFR)=0.00; 95% CI: the confidence interval indicates a range of values that most likely encompasses the true value.

Regional Supervisor Esther Sankale and Community Mobilization Advisor Esther Muigai compare notes after conducting household spot check in Maua, Meru County in August 2018

Estimation of HIV Incidence: KENPHIA used blood test results to determine whether HIV-positive persons were infected with HIV within a window of approximately 130 days prior to sample collection. Specifically, a laboratory-based incidence testing algorithm was used to distinguish recent (based on HIV-1 LAg avidity assay, viral load of ≥1000 RNA copies per mL, and no detectable ARVs in blood) from long-term infection. A specialized estimator was then used to convert the number of persons infected during this recent infection window into a standardized annual incidence rate.

3.3 HIV Prevalence

3.3.1 Geographic distribution of HIV among adults 15-64 years

Table 4: National and County HIV prevalence of adults aged 15-64 years

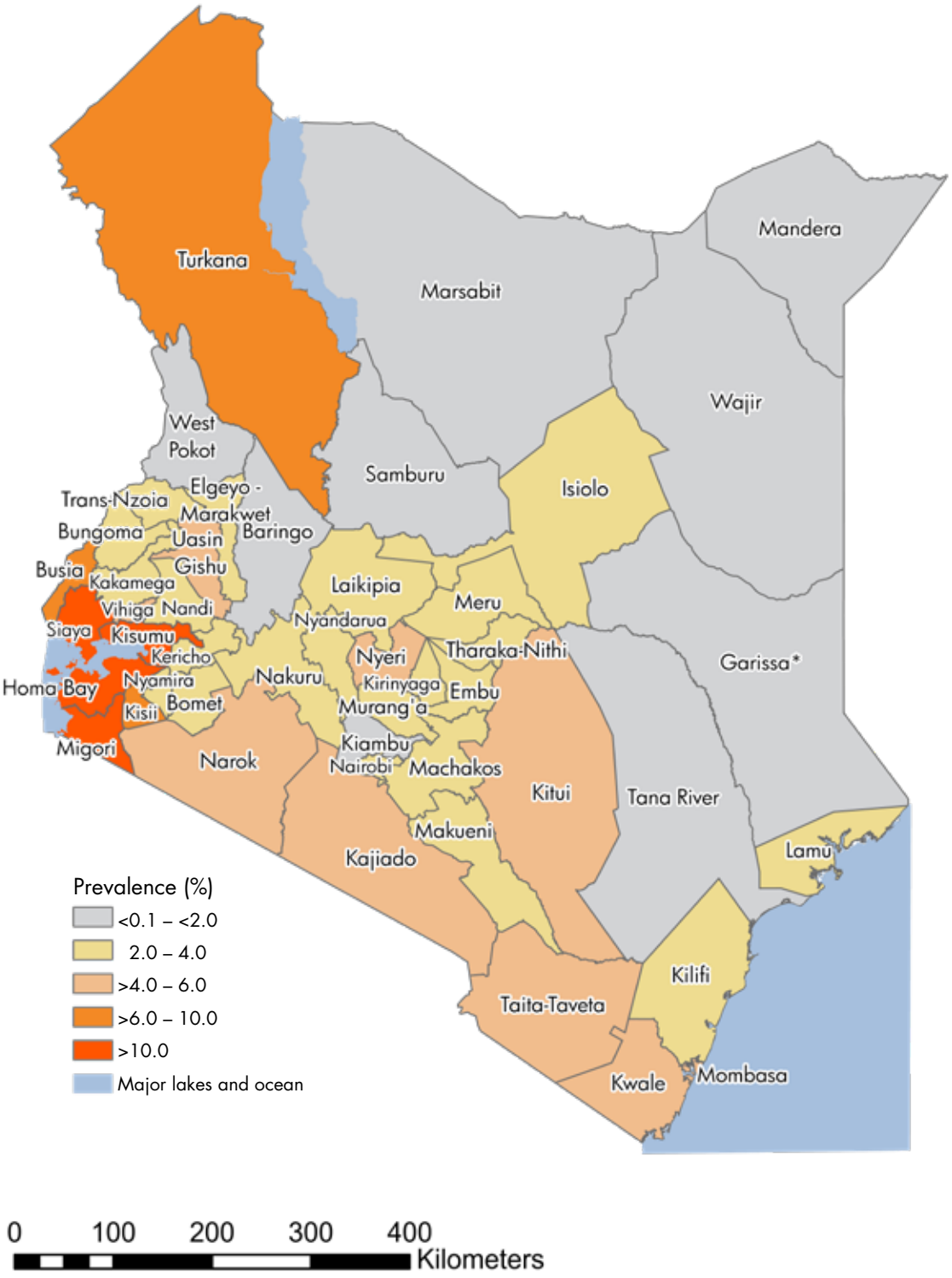
County Code	County/ Strata	HIV Prevalence (%)	95% CI
	National	**4.9**	**4.5-5.3**
	Urban	**4.7**	**4.1-5.3**
	Rural	**5.0**	**4.5-5.5**
001	Mombasa	5.6	3.7-7.5
002	Kwale	4.2	2.4-5.9
003	Kilifi	2.3	0.2-4.5
004	Tana River	1.1	0.1-2.0
005	Lamu	2.6	0.7-4.5
006	Taita-Taveta	5.2	2.0-8.5
007	Garissa*	<0.1	-
008	Wajir	0.2	0.0-0.6
009	Mandera	0.2	0.0-0.7
010	Marsabit	1.2	0.0-2.7
011	Isiolo	2.2	0.6-3.9
012	Meru	3.6	1.7-5.5
013	Tharaka-Nithi	2.4	1.2-3.6
014	Embu	2.7	0.4-5.1
015	Kitui	5.7	2.9-8.5
016	Machakos	3.7	2.5-4.9
017	Makueni	3.9	2.8-4.9
018	Nyandarua	2.2	0.2-4.1
019	Nyeri	5.1	2.8-7.4
020	Kirinyaga	3.3	1.4-5.3
021	Murang'a	3.0	0.9-5.2
022	Kiambu	1.1	0.0-2.2
023	Turkana	6.8	3.2-10.5
024	West Pokot	1.3	0.2-2.4
025	Samburu	1.9	0.7-3.1
026	Trans-Nzoia	4.0	2.8-5.2
027	Uasin Gishu	5.5	3.1-7.9
028	Elgeyo-Marakwet	3.5	1.0-6.1
029	Nandi	2.6	1.1-4.1
030	Baringo	1.8	0.6-3.0
031	Laikipia	2.0	0.0-4.4
032	Nakuru	3.0	0.9-5.1
033	Narok	5.0	2.3-7.7
034	Kajiado	4.6	3.1-6.0
035	Kericho	3.4	1.7-5.1
036	Bomet	2.8	0.5-5.1
037	Kakamega	3.9	1.9-5.9
038	Vihiga	5.3	2.3-8.2
039	Bungoma	2.5	1.3-3.8
040	Busia	9.9	5.9-13.9
041	Siaya	15.3	12.2-18.3
042	Kisumu	17.5	13.6-21.3
043	Homa Bay	19.6	15.9-23.3
044	Migori	13.0	9.0-17.0
045	Kisii	6.1	3.1-9.1
046	Nyamira	3.9	2.0-5.8
047	Nairobi	3.8	2.2-5.4

95% confidence interval (CI): This interval indicates the range of values that most likely encompasses the true value.
**Garissa had no HIV-positive persons identified, thus is represented as having an HIV prevalence <0.1%.*

The National HIV prevalence among adults was 4.9% (95% CI: 4.5%-5.3%). This translates to 1.3 million (95% CI: 1.2-1.4 million) adults living with HIV in Kenya. The HIV prevalence was 4.7% (95% CI: 4.1%-5.3%) in urban and 5.0% (95% CI: 4.5%-5.5%) in rural areas (Table 4).

HIV prevalence varied across the country. The top five high-prevalence counties were Homa Bay: 19.6% (95% CI: 15.9%-23.3%), Kisumu: 17.5% (95% CI: 13.6%-21.3%), Siaya: 15.3% (95% CI: 12.2%-18.3%), Migori: 13.0% (95% CI: 9.0%-17.0%), and Busia: 9.9 (95% CI: 5.9%-13.9%); while prevalence was lowest (<2.0%) in nine counties (Samburu, Tana River, Garissa, Wajir, Mandera, Marsabit, Kiambu, West Pokot, and Baringo), (Table 4, Figure 2).

Figure 2: County HIV prevalence of adults aged 15-64 years



** Garissa had no HIV-positive persons identified, thus is represented as having an HIV prevalence <0.1%.*

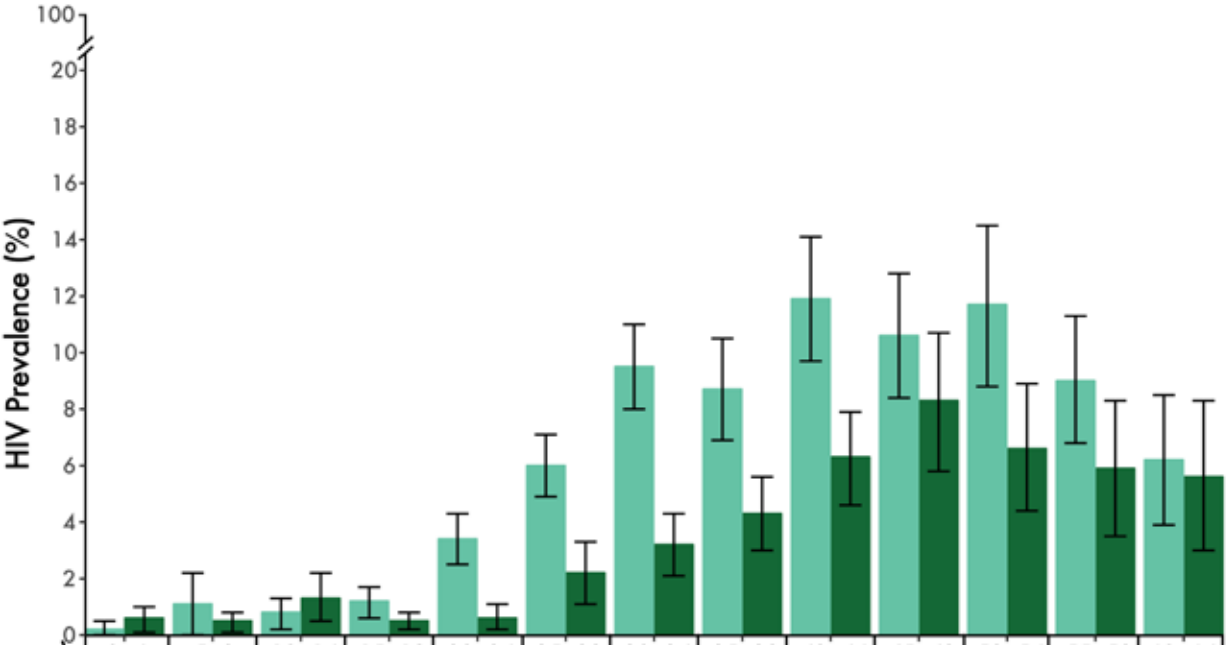
3.3.2 HIV Prevalence by Sex and Age

There were marked differences in HIV prevalence between women and men (Table 1), which was twice as high among women at 6.6% (95% CI: 6.0%-7.1%) compared to men at 3.1% (95% CI: 2.7%-3.5%). For both sexes combined, HIV prevalence peaked among adults aged 45-49 years (9.4%, 95% CI: 7.8%-11.1%). However, among adults, HIV prevalence was consistently higher among women than men across all the age groups. Prevalence among women peaked at 11.9% (95% CI: 9.7%-14.1%) at ages 40-44 years and 11.7% (95% CI: 8.8%-14.5%) in the 50-54 year age group. Prevalence among men peaked at 8.3% (95% CI: 5.8%-10.7%) among those aged 45-49 years. Generally, the prevalence in women aged 20-34 years was more than three times higher than that in men of the same age group. The prevalence among men in urban areas was 2.7% (95% CI: 2.1%-3.4%) and in rural areas was 3.4% (95% CI: 2.9%-3.9%). The prevalence among women in urban areas was 6.7% (95% CI: 5.7%-7.6%) and in rural areas was 6.5% (95% CI: 5.8%-7.3%).

The overall HIV prevalence among children was 0.7% (95% CI: 0.4%-1.0%) which translates to 139,000 (95% CI: 84,000-194,000) children living with HIV in Kenya. HIV prevalence among children ranged between 0.4% (95% CI: 0.1%-0.6%) among children aged 0-4 years to 1.1% (95% CI: 0.5%-1.6%) among young adolescents aged 10-14 years (Figure 3). There was no difference between girls and boys aged 0-14 years, with an HIV prevalence of 0.7% (95% CI: 0.2%-1.1%) among girls and 0.8% (95% CI: 0.4%-1.1%) among boys (Table 1).

Laboratory Technologist Elyn Nzia preparing dry blood spot specimen at the Nairobi Satellite lab in November 2018

Figure 3: Prevalence of HIV among persons aged 0-64 years by age and sex



Ages (years)	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64
Female	0.2	1.1	0.8	1.2	3.4	6.0	9.5	8.7	11.9	10.6	11.7	9.0	6.2
Male	0.6	0.5	1.3	0.5	0.6	2.2	3.2	4.3	6.3	8.3	6.6	5.9	5.6
Total	0.4	0.8	1.1	0.8	2.0	4.2	6.5	6.6	9.1	9.4	9.2	7.5	5.9

Bar graph above depicts National prevalence disaggregated by age and sex.

Error bars represent the 95% confidence interval (CI).

The 95% CI indicates a range of values that most likely encompasses the true value.

3.4 Population-Level Prevalence of HIV Viral Load Suppression (VLS) in People Living with HIV

Viral load suppression (VLS), defined as having <1,000 viral copies per milliliter (mL) of plasma for KENPHIA, is a key indicator of treatment success in HIV-positive persons. Persons living with HIV who achieve VLS suppression have a very low risk of transmitting the virus. The survey was designed to estimate prevalence of VLS nationally as well as for counties with an HIV prevalence greater than 2.2% among adults (ages 15-64 years). Results are presented for counties with at least 25 adults living with HIV identified during the survey.[11] Nationally, the prevalence of VLS among HIV-positive adults was 71.6% (95% CI: 68.8%-74.4%), while among children (ages 0–14 years) living with HIV VLS prevalence was markedly lower at 48.3% (95% CI: 30.9%-65.7%) (Table 5, Figure 4). Note, findings of VLS among people living with HIV were regardless of knowledge of HIV status or use of ART.

3.4.1 County Viral Load Suppression Prevalence Among Adults Living with HIV in Kenya

The County VLS prevalence among adults ranged from 84.0% (95% CI: 71.7%-96.3%) in Machakos County to 39.7% (95% CI: 26.0%-53.3%) in Turkana County (Table 5).

3.4.2 Prevalence of Viral Load Suppression by Age and Sex

The prevalence of VLS among people living with HIV aged 0–64 years was generally higher among girls and women compared to boys and men across all the age groups. Among adults, women had a VLS of 74.6% (95% CI: 71.5%-77.6%) while men had 65.1% (95% CI: 58.8%-71.4%) (Table 1). The highest VLS prevalence was achieved among adults aged 55-64 years at 83.6% (95% CI: 75.8%–91.4%). There was a decreased prevalence of VLS with decreasing age, with the lowest amongst children aged 0-14 years: 48.3% (95% CI 30.9%-65.7%) (Figure 4).

Table 5: Prevalence of viral load suppression among adults aged 15-64 years

County	N	VLS Prevalence (%)	95% CI
Mombasa	29	(69.4)	46.9-91.8
Meru	27	(49.5)	23.5-75.5
Kitui	45	(68.1)	57.6-78.6
Machakos	38	(84.0)	71.7-96.3
Nyeri	27	(77.4)	57.9-96.9
Turkana	39	(39.7)	26.0-53.3
Uasin Gishu	35	(66.0)	53.4-78.6
Nandi	34	(52.2)	37.0-67.4
Narok	29	(48.7)	23.4-74.0
Kericho	25	(44.7)	20.8-68.5
Kakamega	26	(61.4)	38.1-84.7
Vihiga	33	(81.4)	68.9-93.9
Busia	67	81.2	73.8-88.5
Siaya	116	78.7	66.6-90.7
Kisumu	134	83.2	75.5-90.9
Homa Bay	170	83.8	77.8-89.9
Migori	139	76.8	67.9-85.6
Kisii	46	(60.2)	49.9-70.5
Nyamira	26	(68.4)	41.9-94.8
Nairobi	53	72.8	61.5-84.1
National§	**1523**	**71.6**	**68.8-74.4**

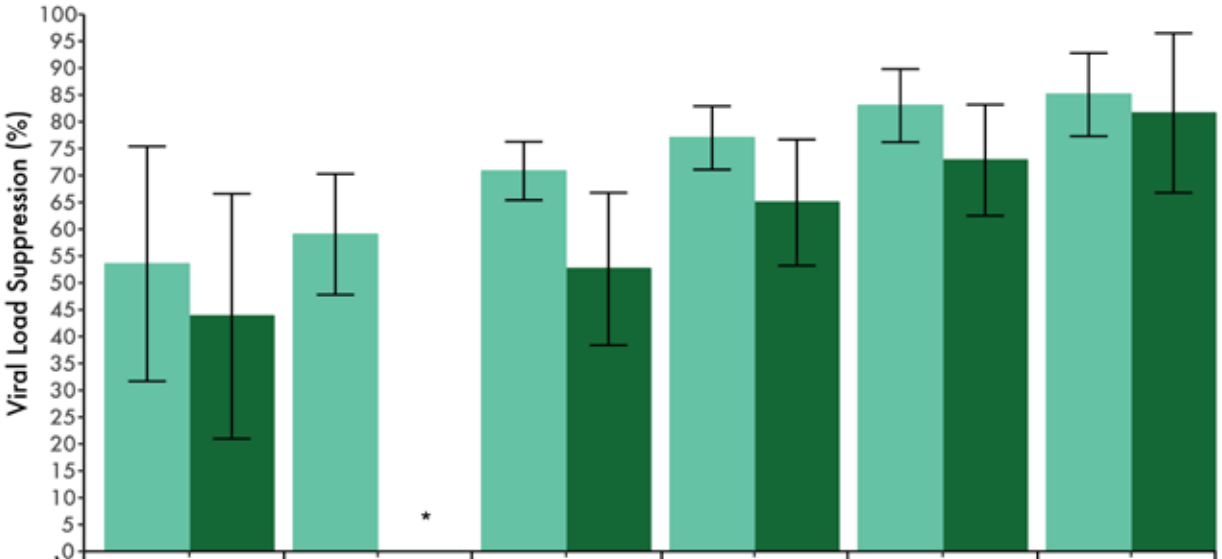
Results are presented for counties with at least 25 adults living with HIV identified during the survey.

N is number of HIV-positive participants tested for viral load. Viral load suppression is defined as HIV RNA <1,000 copies per mL of plasma among HIV-positive persons; 95% CI: the confidence interval indicates a range of values that most likely encompasses the true value.

Parentheses () indicate an estimate that is based on 25-49 persons observations and should be interpreted with caution.

§Includes results from participants in all the 47 counties.

Figure 4: Viral load suppression prevalence in persons aged 0-64 years by age and sex



Ages (years)	0–14	15–24	25–34	35–44	45–54	55–64
Female	(53.5)	59.0	70.8	77.0	83.0	85.1
Male	(43.8)	*	52.6	65.0	72.8	81.6
Total	48.3	56.4	66.4	73.1	78.9	83.6

** Indicates that there were <25 men aged 15-24 years of age, and therefore it is not appropriate to estimate the prevalence of VLS for this age group. Parentheses () indicate an estimate that is based on 25-49 persons observations and should be interpreted with caution.*

I Error bars represent the 95% confidence interval (CI). The 95% CI indicates a range of values that most likely encompasses the true value.

3.5 Achievement of the UNAIDS 90-90-90 Targets among Persons Living with HIV

Ensuring that all persons living with HIV know their HIV-positive status, are on treatment and have VLS are key objectives of the National HIV program. By 2020, 90% of all persons living with HIV should know their status; 90% of all persons diagnosed with HIV should receive antiretroviral therapy (ART); and 90% of all persons receiving ART should have VLS.[12]

3.5.1 Knowledge of HIV-positive status

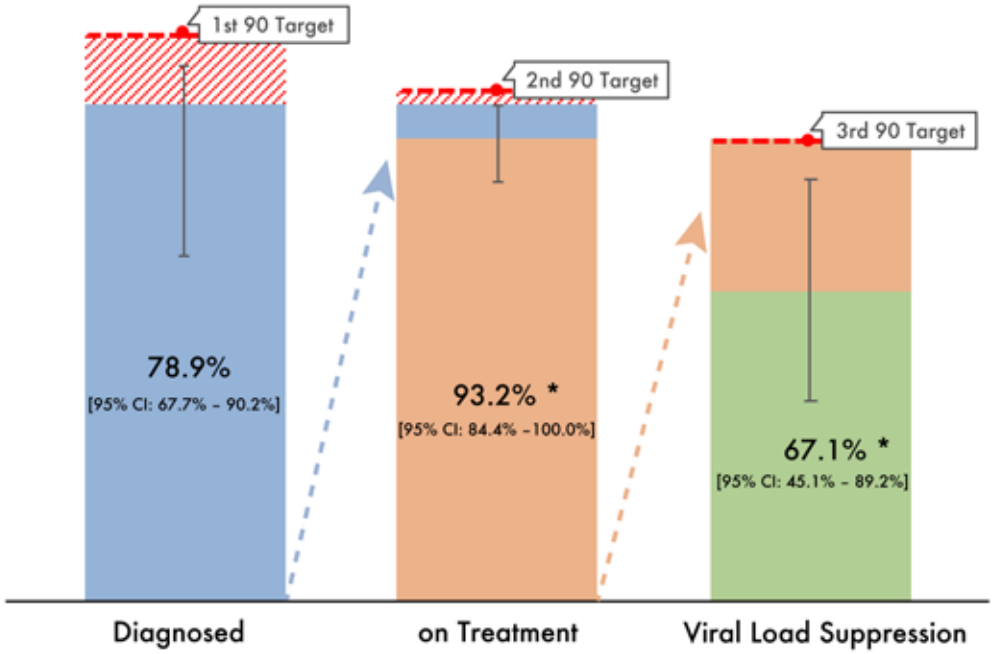
Among adults (ages 15-64 years) who tested HIV positive in the survey, 79.5% (95% CI: 77.0%–82.0%) knew their HIV-positive status, based on self-report and the detection of ARVs in blood: 82.7 (95% CI: 79.9%- 85.5%) among women and 72.6% (95% CI: 67.2%-77.9%) among men. Among HIV-positive children (ages 0-14 years), 78.9% (95% CI: 67.7%-90.2%) had a known HIV-positive status, based on parent-guardian report and the detection of ARVs in blood (Figure 5).

3.5.2 On Treatment

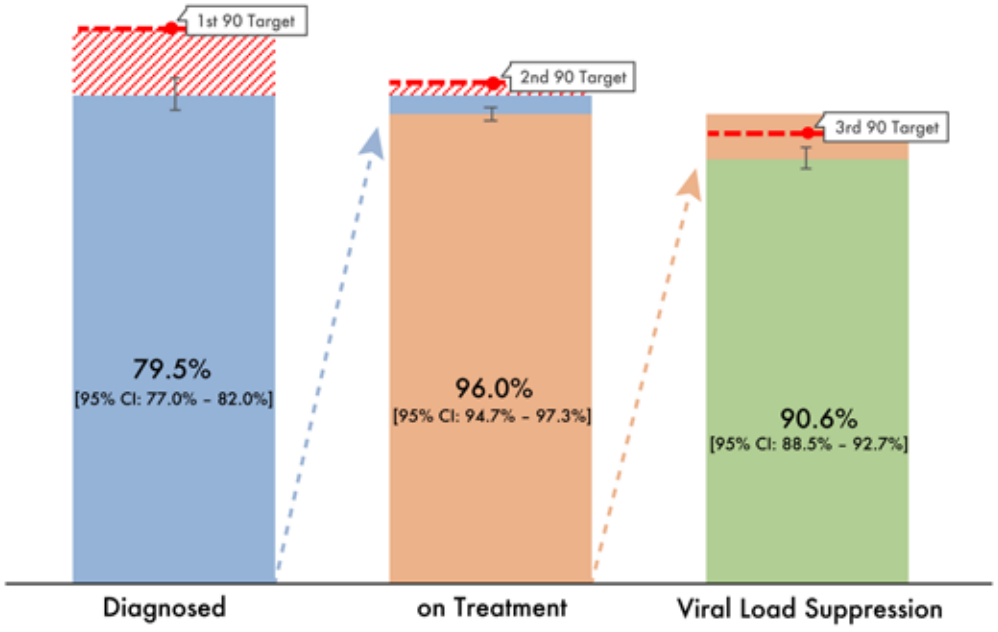
Among adults living with HIV who knew their HIV-positive status, 96.0% (95% CI: 94.7%-97.3%) were on ART, based upon self-report and the detection of ARVs in blood: 96.6% (95% CI: 95.1%0-98.1%) among women and 94.5% (95% CI: 91.8%-97.2%) among men. Among children, 93.2% (95% CI: 84.4%-100.0%) of those who were known to be HIV positive were also on ART, based upon parent-guardian report and detectable ARVs in blood (note, this estimate was based on few (25-49) children and should be interpreted with caution (Figure 5).

Figure 5: 90-90-90 cascade among persons living with HIV aged 0-64 years disaggregated by age and sex

Children aged 0–14 years



Adults aged 15–64 years



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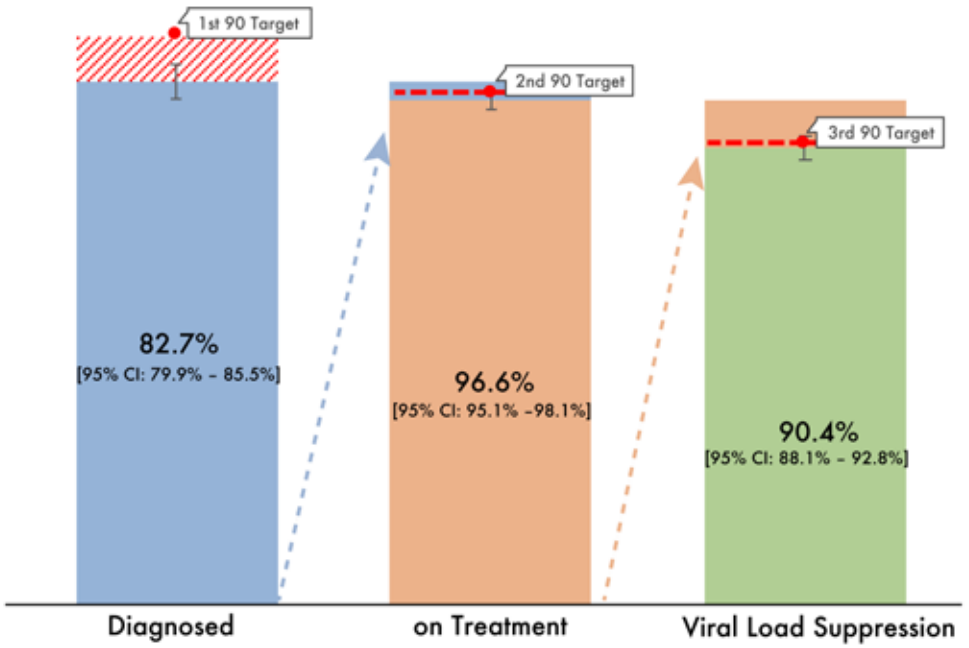
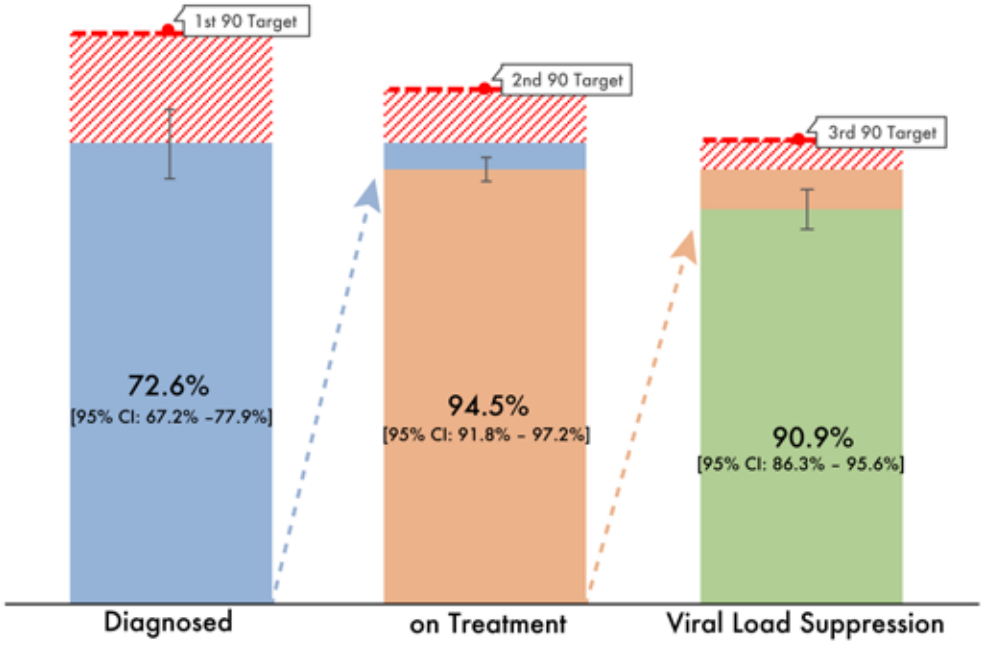
**Indicates that this was based on 25-49 children and should be interpreted with caution.*
95% CI: the confidence interval indicates a range of values that most likely encompasses the true value.
Note: the 90-90-90 targets are that 90% of all people living with HIV should be aware of their status, 90% of those who are aware of their HIV-positive status should be on antiretroviral therapy (ART) (81% of the overall population of people living with HIV) and that 90% of those who are on ART should have viral load suppression (73% of the overall population of people living with HIV). Inset numbers represent conditional proportions.

Women living with HIV



Men living with HIV



Legend

- Population-level targets
- Gap to population-level targets
- People living with HIV diagnosed
- People living with HIV on treatment (based on self-report and ARV drug detection data)
- People living with HIV on treatment (based on self-report and ARV drug detection data) and viral load suppression
- 95% confidence interval (CI)

3.5.3 HIV Viral Load Suppression

Among adults living with HIV on ART, 90.6% (95% CI: 88.5%-92.7%) had achieved VLS: 90.4% (95% CI: 88.1%-92.8%) of women and 90.9% (95% CI: 86.3%-95.6%) of men. The survey also revealed that among children living with HIV on ART, 67.1% (95% CI: 45.1%–89.2%) had suppressed viral loads—however, this estimate was based on few (25-49) children and should be interpreted with caution (Figure 5).

3.5.4 Overall Population ART Coverage

In order to understand HIV control within the population, it is also important to assess progress by including all persons identified as HIV positive by survey HIV testing (producing a population coverage 90-90-90 cascade).

As reported in section 3.5.1-3.5.2, 79.5% of all the adults who tested HIV positive in KENPHIA were aware of their HIV-positive status prior to the survey, of whom 96.0% were on ART. This translates to 76.3% of all adults living with HIV on ART. This, therefore, means that almost one in four adults living with HIV in Kenya were not on ART.

Among children living with HIV, 78.9% who tested HIV-positive in KENPHIA had known HIV-positive status prior to the survey of whom, 93.2% were on ART. This translates to one in four children living with HIV not on ART.

3.6 Prevention of Mother-to-Child Transmission (PMTCT) of HIV

Kenya aims to eliminate mother-to-child transmission (eMTCT) of HIV by 2021.[13] To achieve this, targets of 90% antenatal care (ANC) attendance, 90% HIV testing among pregnant women, and 90% ART use among HIV-positive pregnant women were set to be reached by 2019.

3.6.1 Antenatal care

ANC is the most critical platform for providing the interventions needed for PMTCT, which reduce risk of death for HIV-positive mothers and their babies. Among women aged 15-49 years who delivered within the three years preceding the survey, 97.3% reported having attended at least one ANC visit for their most recent birth.

However, the target of 90% ANC attendance was not achieved in five counties (Mandera, Wajir, Garissa, Samburu, and Marsabit) (Figure 6).

3.6.2 Self-reported HIV testing and ART status among pregnant women

The HIV testing process is key in reducing mother-to-child transmission. Provider-initiated testing and counseling is offered at all first ANC visits and periodically on subsequent visits according to National guidelines.[7] Among women aged 15-49 years who gave birth within the 12 months preceding the survey and attended ANC, 96.0% knew their HIV status (92.4% reported an HIV-negative status and 3.6% reported an HIV-positive status and 4.0% reported an unknown status (either not tested or tested but had not received results). Among the pregnant women who reported that they tested or were already aware that they were HIV positive at ANC, 92.1% reported receiving ART during their pregnancy.

Figure 6: Antenatal clinic attendance among women aged 15-49 years whose most recent pregnancy was within the past three years preceding the survey

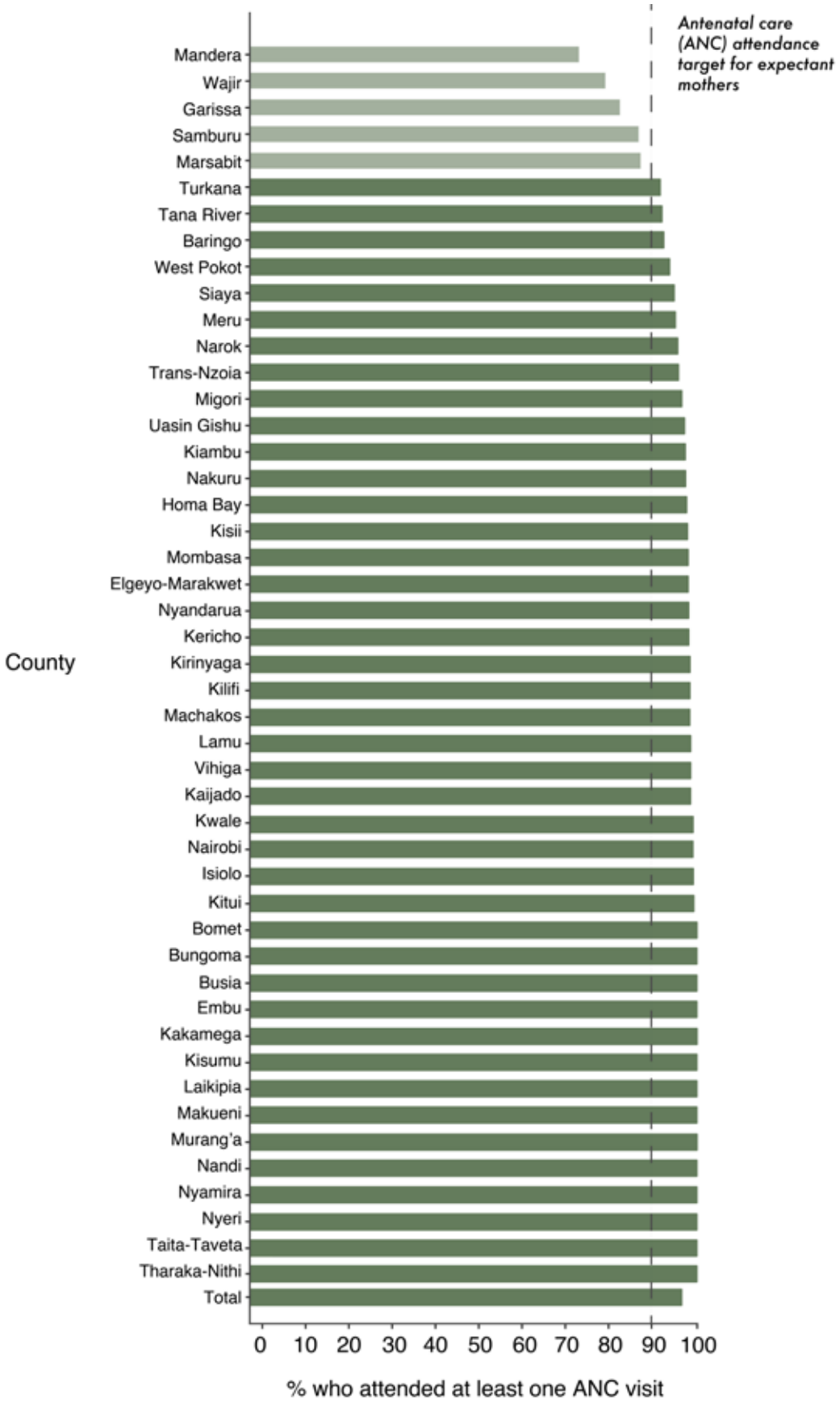
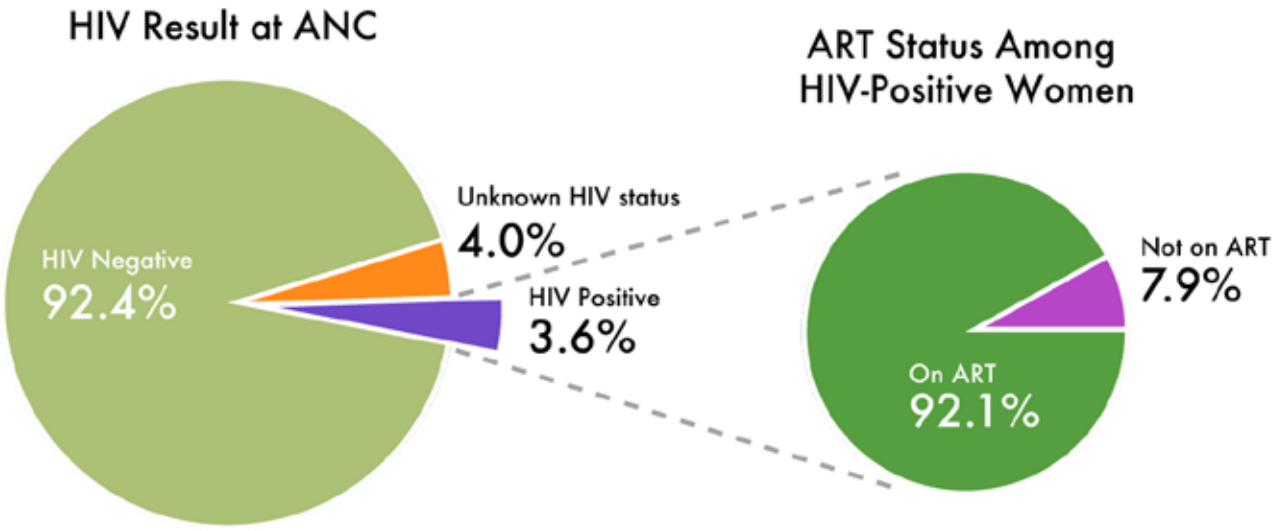


Figure 7: Self-reported HIV testing and antiretroviral therapy (ART) use during antenatal care (ANC) among mothers who delivered in the 12 months preceding the survey



Data collectors Joyce Njeri, Martin Miriti, Celestino Muthee, and Isaac Leteipa at Mutanthara cluster in Tharaka-Nithi County in July 2018

3.7 Prevalence of Male Circumcision

Medical male circumcision (MC) reduces risk of acquiring HIV heterosexually by 60-66%.[14,15] In Kenya, MC is practiced culturally in the majority of the counties, with the exception of Turkana, Siaya, Kisumu, Homa Bay and Migori Counties, the last four of which also have the highest adult HIV prevalence.[3] In addition to the five culturally non-circumcising counties, the voluntary medical male circumcision (VMMC) program also focuses on the eight other culturally circumcising counties with non-circumcising subgroups (Table 6). Since 2008, Kenya has provided VMMC as a component of its HIV prevention program using a phased approach. The program initially prioritized VMMC services for men aged 15 years or older and later, in 2015, refocused services to men aged 15-29 years to maximize its public health impact.

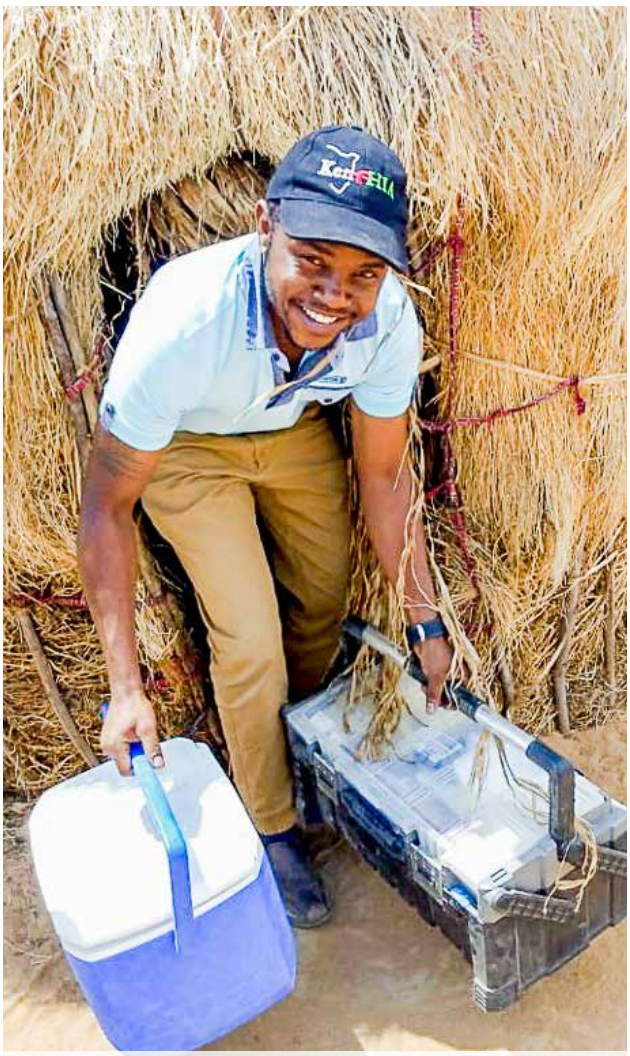
Table 6: Prevalence of male circumcision among men aged 15-64 years

	Medical circumcision (%)	Non-medical circumcision (%)	TOTAL (%)	Uncircumcised (%)	Unknown (%)
National (47 Counties)	54.5	37.2	91.7	7.9	0.4
Culturally non-circumcising counties					
Turkana	49.5	6.9	56.4	43.6	0.0
Kisumu	46.7	6.6	53.3	44.6	2.2
Siaya	55.5	5.7	61.2	38.7	0.1
Homa Bay	56.4	2.7	59.1	40.0	0.9
Migori	42.3	24.4	66.7	32.6	0.7
Culturally circumcising with non-circumcising sub-groups					
Mombasa	61.5	34.2	95.8	3.0	1.2
Marsabit	48.4	49.3	97.7	2.3	0.0
West Pokot	35.6	57.1	92.7	7.3	0.0
Nandi	16.2	74.4	90.5	9.4	0.1
Nakuru	46.8	45.6	92.5	7.5	0.0
Kericho	42.6	53.5	96.1	3.5	0.4
Busia	63.3	18.3	81.6	18.4	0.0
Nairobi	67.7	26.4	94.1	4.9	1.0
Survey HIV test results					
HIV positive	41.2	30.4	71.7	27.1	1.2
HIV negative	54.4	37.5	91.9	7.7	0.4
Not tested	58.6	36.7	95.3	3.8	0.9
Age groups (years)					
Total 15-24	63.2	27.2	90.4	9.3	0.3
Total 15-49	56.9	34.9	91.7	7.8	0.5
Total 25-49	52.5	40.2	92.7	6.8	0.6
Total 50-64	36.0	55.3	91.3	8.3	0.4

Description: Table presents self-reported MC status data among men aged 15-64 years.

Nationally, 91.7% of men aged 15-64 years self-reported to be circumcised (note, this and the following estimates include both those with medical and non-medical MC). HIV prevalence was more than four times higher among uncircumcised men at 10.3% (95% CI: 8.3%-12.4%) compared to circumcised men at 2.5% (95% CI: 2.1%-2.9%). Among those who tested HIV positive in the survey, 71.7% self-reported being circumcised, while among those who tested HIV negative, 91.9% self-reported to be circumcised (including non-medical MC) (Table 6).

In the thirteen VMMC priority counties, the overall MC prevalence (including non-medical MC) was 83.2% (Table 7). The five culturally non-circumcising counties reported prevalences ranging from 53.3% to 66.7% (Table 6), while the eight culturally circumcising counties reported MC rates from 81.6% to 97.7% (Table 6). Overall, the prevalence of MC in the 13 VMMC priority counties was higher among those aged 20-29 years (89.6%) compared to those aged 30-64 years (79.4%) (Table 7).



Laboratory Technologist Henry Makau in Malka Dende cluster in Tana River County in July 2018

Table 7: Prevalence of male circumcision in 13 VMMC priority counties disaggregated by age

Age groups (years)	Medical circumcision (%)	Non-medical circumcision (%)	TOTAL (%)	Uncircumcised (%)	Unknown (%)
15-19	65.3	15.3	80.5	18.9	0.5
20-29	59.6	30.0	89.6	9.6	0.8
30-64	43.8	35.6	79.4	19.9	0.6
15-49	55.9	28.2	84.2	15.1	0.7
15-64	53.3	29.9	83.2	16.1	0.7

The 13 priority counties are Busia, Homa Bay, Kericho, Kisumu, Marsabit, Migori, Mombasa, Nairobi, Nakuru, Nandi, Siaya, Turkana, and West Pokot.

04 DISSEMINATION OF FINAL RESULTS

This report summarizes key preliminary findings from KENPHIA 2018. The final KENPHIA 2018 report, anticipated for release in early 2020, will offer a more in-depth analysis of the status of HIV in Kenya through a comprehensive analysis of all indicators included in the KENPHIA 2018 questionnaires and results from biomarker testing in order to address the following survey objectives:

- Prevalence of HIV-related risk behavior, knowledge, and attitudes
- Behavioral and demographic determinants of HIV incidence and prevalence
- National prevalence of syphilis
- National prevalence of hepatitis B virus infection

The final KENPHIA 2018 report and complete dataset will be released to the public and institutional stakeholders through a series of dissemination events and will be available through the Government of Kenya partners and online at:

- www.nascop.or.ke/KENPHIA
- www.health.go.ke
- www.knbs.or.ke and at
- phia-data.icap.columbia.edu.

HIV activist James Kamau, NEPHAK CEO Nelson Otuoma, MoH Principal Investigators Dr.Kigen Bartilol and Dr. Peter Cherutich, CDC Co-Investigator Peter Young and ICAP Principal Investigator Jessica Justman at the KENPHIA launch media dissemination briefing on 5th June 2018

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The PHIA Project is a multicountry project funded by PEPFAR to conduct National HIV-focused surveys that describe the status of the HIV epidemic. Results will measure important National and regional HIV-related parameters, including progress toward UNAIDS 90-90-90 targets and will guide policy and funding priorities. ICAP at Columbia University is implementing the PHIA Project in close collaboration with CDC and other partners.

See phia.icap.columbia.edu for more details.

Regional Laboratory Supervisor: Cosmus Ndara conducting household spot checks in Itiva Nguu cluster in Kitui County

Attribution of support:
This survey has been supported by the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) through the United States Centers for Disease Control and Prevention (CDC) under the terms of Cooperative Agreement #U2GGH001226. Additional support was provided by United States Agency for International Development (USAID) and the Global Fund to Fight AIDS, TB and Malaria.

Disclaimer: The findings and conclusions are those of the authors and do not necessarily represent the official position of the funding agencies.

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