Operational considerations for increasing access to cervical cancer screening and treatment for women living with HIV

Report of the virtual meeting
9-11 May 2023

World Health Organization

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Foreword

Every two minutes in 2021, an adolescent girl or young woman acquired HIV, which doubled her risk of acquiring human papillomavirus (HPV) infection and increased her risk of developing cervical cancer. Meanwhile, the COVID-19 pandemic led to disruptions to key HIV and cancer prevention and treatment services, with millions of girls out of school and the world witnessing rising rates of teenage pregnancy and increases in gender-based violence. We, as Department directors, wish to underscore that the recovery response must be a shared one that spans the cancer, reproductive health and HIV teams, both at the World Health Organization and in national implementation.

The goal of this think-tank meeting was to identify approaches that are proving effective in boosting uptake of cervical cancer screening and treatment of cervical precancer lesions for women living with HIV. We are grateful to the 177 participants from 49 Member States, implementing partners, cervical cancer and HIV advocates, members of civil society and cancer survivors, and researchers who contributed to the in-depth discussions. We are especially grateful to the 10 Member State representatives who presented the case studies which are featured in this report, summarizing recent successes, challenges and lessons learned in programme delivery.

Why was the think-tank meeting so important? The world is approaching achievement of the 95–95–95 global targets for HIV diagnosis, treatment and viral load suppression. However, progress towards the 90–70–90 targets for cervical cancer elimination (that 90% of girls are fully vaccinated with the HPV vaccine by the age of 15, 70% of women are screened using a high performance test by the age of 35, and again by the age of 45, and 90% of women with precancer are treated and 90% of women with invasive cancer managed) vary by geographic setting and access to prevention tools. There is particular concern about achieving those targets with equity, since the six-fold higher risk of women living wth HIV developing cervical cancer weighs heavily against HIV health gains and underscores that those women require tailored screening services, irrespective of the national HIV burden.

This report describes how countries are advancing towards integrated healthcare approaches by harnessing the use of decentralized service delivery models that can increase coverage of cervical cancer screening and treatment.

Countries are adopting HPV DNA testing, as recommended by WHO, and are shifting from pilot projects to routine service delivery approaches. The scale-up of cervical cancer screening and treatment services is leveraging existing HIV testing platforms and data systems, and the new tool of self-collection for human papillomavirus DNA testing increases choice for women living with HIV. However, in many settings, visual inspection using acetic acid remains the main screening tool until additional investments and systems are established to sustain wide-scale HPV DNA testing. Thermal ablation has been widely adopted and allows for cost-effective decentralization of treatment services. Continued and growing funding will be critical for building the resilient services that are needed for early diagnosis and treatment.

People-centred care across the life course is especially important for girls and women who carry the double burden of HIV and cervical cancer. Providing them with HIV care and treatment, HPV vaccination and cervical cancer screening and treatment is essential to enable them to live healthy lives. During this think-tank meeting, women with lived experience of HIV and cervical cancer championed the need for an accelerated expansion of services and for building awareness and advocacy. They encouraged programme leaders to codesign culturally safe and trusted services by learning from communities and to work alongside civil society organizations which are active in HIV and cancer work to promote a united message on cervical cancer prevention.

The integration of cervical cancer screening and treatment with existing HIV services, sexual and reproductive health or sexually transmitted infection clinics, and primary health care was emphasized as a way to streamline service access. This could include aligning follow-up visits for women with positive screening outcomes with their HIV treatment visits as well as ensuring that women who screen positive receive the timely treatment they need.

The think-tank meeting highlighted our commitment to work closely with Member States, programme implementers, partners and donors to focus on implementing WHO guidelines in order to facilitate the transition to high-performance screening and treatment tools, while scaling up services and improving access. Sustained commitment, enabling policies and integrated services will accelerate progress towards eliminating cervical cancer as a public health problem.

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1. Introduction

1.1 Background

Invasive cervical cancer is the fourth most common cancer among women globally and a leading cause of cancer-related death in women living in low- and middle-income countries *(1)*. In 2022, there were 662,301 incident cases of invasive cervical cancer and 348,874 associated deaths globally *(1)*. The high incidence and mortality from a largely preventable cancer is a consequence of the limited access to Human papillomavirus (HPV) vaccination, routine cervical cancer screening and treatment of cervical precancerous lesions *(2-4)*, and the impact of human immunodeficiency virus (HIV) *(5)* in these settings. In November 2020, the World Health Organization (WHO) launched a global strategy to eliminate cervical cancer as a public health problem. The strategy is aimed at reducing the annual incidence of cervical cancer to under four cases per 100 000 women *(6)* (Table 1). The WHO's triple-intervention strategy to achieve elimination rests on three pillars: 90% of girls are fully vaccinated with the HPV vaccine by age 15 years; 70% of women are screened with a high-performance test twice between ages 35 and 45 years; and 90% of women with cervical precancer or cancer are treated or managed.

Table 1. Roadmap for cervical cancer elimination with a focus on women living with HIV

2013
- WHO Global action plan for the prevention and control of noncommunicable diseases 2013–2020

2016
- Political Declaration on Ending AIDS
- UNAIDS for the first time includes cervical cancer indicators for women living with HIV

2017
- Global Fund recognizes HPV-HIV coinfection and permits country coordinating mechanisms to include grants for cervical cancer programming in country proposals

2018
- WHO Director-General, Dr. Tedros Ghebreyesus, issues a call to action for the elimination of cervical cancer globally

2019
- Member States take a formal decision tasking WHO with developing a global strategy on cervical cancer
- WHO releases guidelines on the use of thermal ablation for cervical pre-cancer lesions

2020
- Launch of the WHO Global strategy to accelerate the elimination of cervical cancer as a public health problem

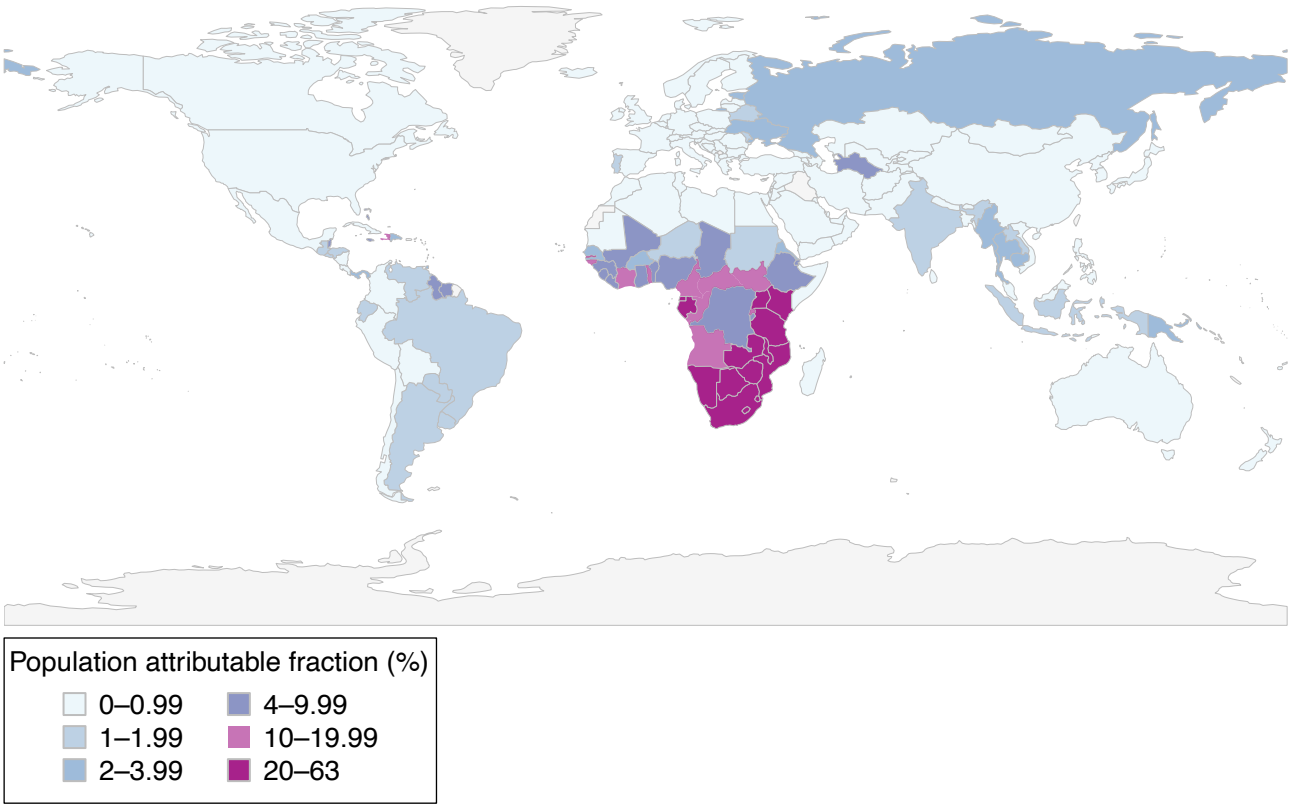
2021
- The UN General Assembly (74th meeting) adopts the Political Declaration on HIV and AIDS: Ending inequalities and getting on track to end AIDS by 2030
- The Joint United Nations Programme on HIV/AIDS releases the Global AIDS Strategy 2021–2026 which focuses on addressing inequalities
- WHO publishes the updated Consolidated guidelines on HIV prevention, testing, treatment, service delivery and monitoring: recommendations for a public health approach
- WHO publishes guideline for screening and treatment of cervical pre-cancer lesions for cervical cancer prevention, 2nd Ed
- WHO releases cervical cancer country profiles and a Framework for Monitoring the Implementation of the WHO Global Strategy to Accelerate the Elimination of Cervical Cancer as a Public Health Problem

2022
- WHO publishes the Global health sector strategies on HIV, viral hepatitis and sexually transmitted infections for the period 2022–2030
- WHO releases Consolidated guidelines on person-centred HIV strategic information: strengthening routine data for impact
- The International Agency for Research on Cancer publishes Handbooks of Cancer Prevention Volume 18: Cervical cancer screening

Women living with HIV have a two-fold increased risk of acquiring high-risk HPV infection, a two-fold decreased likelihood of high-risk HPV clearance *(7)*, and a six-fold increased risk of cervical cancer *(5)*, compared to women without HIV. Of the estimated 20 million women living with HIV globally in 2022 *(8)*, 80% resided in sub-Saharan Africa, the region with the highest incidence of cervical cancer and the lowest proportion of women reporting having been screened for cervical cancer in their lifetime or having received the HPV vaccine *(3, 4)*. A significant proportion of invasive cervical cancers detected in sub-Saharan Africa can be attributed to HIV (Fig. 1) *(5)*.

Recent modelling has emphasized the critical importance of frequent cervical cancer screening among women living with HIV in high HIV prevalence settings to achieve cervical cancer elimination *(9)*. The modelling found that, WHO's triple-intervention strategy could lead to cervical cancer elimination in South Africa below the threshold of less than 4 cervical cancer cases per 100 000 woman years by 2120, but was insufficient to eliminate cervical cancer among women living with HIV. The addition of three-yearly screening among women living with HIV, as recommend by WHO, substantially reduced incidence and approached the elimination threshold *(9)*.

Figure 1. Population attributable fraction of women with cervical cancer living with HIV, 2018



Adapted from (5)

Current WHO guidelines for cervical cancer screening and treatment of cervical precancerous lesions and for HIV prevention and management recommend offering women living with HIV cervical cancer screening as part of a standard package of HIV care *(10, 11)*. WHO recommends using HPV-DNA detection as the primary screening test rather than visual inspection using acetic acid (VIA) or cytology in screening and treatment approaches among both the general population of women and women living with HIV. Given the high proportion of women living with HIV who are likely to screen positive with HPV-DNA tests, current guidelines recommend triage of HPV-DNA-positive women living with HIV *(10)* and that women who screen-triage positive for cervical precancer or cancer are treated or managed adequately. Screening registries and call-and-recall efforts should be used to encourage women to return for triage, treatment and follow-up, and strong links for cross-referral between HIV and cervical cancer services should be established at all levels of the health system *(11)*.

Globally in 2022, approximately 82% of women and girls living with HIV aged 15 years and older were receiving antiretroviral therapy (ART) through clinic or community-based services *(8)*. This existing HIV care infrastructure provides an important opportunity to offer cervical cancer screening and treatment with regular follow-up *(12)*. There is some early, though limited, evidence suggesting that women living with HIV in sub-Saharan Africa are almost twice as likely to report having had a cervical cancer screening event in their lifetime, compared to women in the general population in that same setting*(13)*. Integration of cervical cancer screening and treatment services with HIV services has been reported to be feasible and acceptable to women *(12)*, while the use of existing health infrastructure and funding, and comprehensive staff training and supervision, community engagement and digital technology have been credited with facilitating access. However, reported barriers include high loss to follow-up for further management of women who screen positive, limited human-resources, and logistical and supply chain management difficulties.

The recent publication of WHO's new Global health sector strategies on HIV, viral hepatitis, and sexually transmitted infections for 2022–2030 *(14)*, the WHO flagship initiative to eliminate cervical cancer, and the new guidelines for screening and treatment of cervical precancer lesions for cervical cancer among women in the general population and women living with HIV in 2021 *(10)* provide momentum for addressing the interplay between cervical cancer and HIV. The integration of these programmes and a strong understanding of current efforts to build and scale up cervical cancer screening and treatment for women living with HIV is warranted.

1.2 Meeting objectives

In May 2023, WHO held a virtual consultation meeting with participants from national ministries of health, United Nations agencies, global partners and programme implementers with the aim of sharing best practices and approaches to cervical cancer screening and treatment for women living with HIV.

The specific objectives of the meeting were to: (i) describe current models of service delivery for cervical cancer screening and treatment for women living with HIV, including interventions to increase cervical cancer screening and treatment uptake and follow-up; (ii) discuss opportunities and challenges associated with those models; and (iii) identify persistent knowledge gaps in the implementation of screening and treatment services among women living with HIV.

1.3 Meeting attendance

Meeting participants included 177 individuals representing 49 countries from all six WHO regions. Representation was greatest from countries with a high prevalence of HIV in women and where cervical cancer screening and treatment services were being implemented for women living with HIV using various service delivery approaches. Those approaches involve either (i) cervical cancer screening (and treatment) in HIV clinics or wherever women living with HIV access HIV services; or (ii) the referral of women living with HIV to other services for cervical cancer screening and/or treatment. For each country, one representative from the HIV programme and one representative from the cancer control programme were invited to attend. Other participants represented the WHO Regional Offices, national ministry of health officials, HIV and cervical cancer programme managers, programme implementers, cervical cancer or HIV advocates, members of civil society and cancer survivors, and researchers working in the field of cervical cancer screening and treatment (a full list of participants appears in the Appendix). The meeting's organizing committee included representatives from WHO headquarters, WHO Regional Offices, the Joint United Nations Programme on HIV/AIDS, and programme implementers.

1.4 Meeting format

The meeting was held in a virtual format over three days. The first day of the meeting included dedicated sessions on the current WHO recommendations for cervical cancer screening and treatment for women living with HIV; perspectives from the community of women living with HIV; current tools for cervical cancer screening and treatment; and considerations on the collection of routine data to monitor progress towards reducing cervical cancer incidence and ultimately eliminating cervical cancer as a public health problem.

On the second day of the meeting, detailed case studies were presented from 10 countries in the African Region, the Region of the Americas and the Western Pacific Region, describing their approaches to cervical cancer screening and treatment for women living with HIV, along with their challenges, solutions and lessons learned.

Dedicated breakout sessions on key themes linked to cervical cancer screening and treatment were held on the third day of the meeting to identify evidence gaps and potential solutions from meeting participants.

This report summarizes the discussions during the meeting along four major themes:

- operational considerations that could aid the transition to and/or the introduction of HPV-DNA as a primary screening test for women living with HIV;
- how self-collection might enhance screening access for women living with HIV;
- strategies to increase retention of women living with HIV in the screening-triage-treatment care cascade; and
- implementing and scaling up routine monitoring of women living with HIV over time, and the integration of data systems.

Approaches that could boost public awareness, demand and community engagement from the perspective of women living with HIV are considered across all four themes, given the important roles of communities in achieving effective cervical cancer screening and treatment programmes. The successes, challenges and evidence gaps under each theme are also synthesized in this report.

2. Summary of meeting discussion

2.1 Models of service delivery for cervical cancer screening and treatment

Ten case studies from selected countries in the African Region, the Region of the Americas and the Western Pacific Region described diverse approaches to cervical cancer screening and treatment for women living with HIV. The organization of cervical cancer screening and treatment services varied by setting. In places with high HIV prevalence and dedicated HIV programmes, cervical cancer screening was more likely to be integrated in HIV clinics, whereas in settings with lower HIV prevalence, the screening services were more likely to be integrated in maternal and child health, reproductive health or family planning clinics, and were available to all women irrespective of HIV status.

Although VIA was the most widely used screening modality, HPV-DNA based screening with VIA triage of HPV-positive women was being introduced in a majority of countries represented at the meeting. In some settings, a combination of partial genotyping (HPV16, 18, 45) and VIA was being used to triage HPV-positive women. Self-collection was being piloted in some countries, while a few were introducing it at scale.

Meeting participants heard of examples of both centralized and decentralized approaches to HPV-DNA testing. In a centralized model, samples collected at clinics were transported through an existing referral system to a centralized laboratory for testing. Decentralized approaches used "hub-and-spoke" models, in which "hub" sites provided on-site HPV testing, using a near point-of-care test for samples collected at the clinic. Samples were also collected at "spoke" sites, such as clinics with lower patient numbers, and then transported to the "hub" site for testing. The choice of model depended on geographical access, total numbers of women living with HIV attending clinics, platform availability, and available resources.

Thermal ablation was commonly used for treatment of cervical precancerous lesions. Women who were ineligible for ablation were referred elsewhere for a procedure known as large loop excision of the transformation zone (LLETZ) *(10)*. In some settings, LLETZ services were decentralized. In all settings, incremental increases in screening coverage were reported, although further scale-up requires overcoming some challenges, which are detailed below.

2.2 Operational considerations in transition to or introduction of HPV-DNA-based screening

WHO recommends using HPV-DNA detection as the primary screening test, rather than VIA or cytology, in screening and treatment approaches among both the general population of women and women living with HIV *(10)*. HPV-DNA tests allow for integrating cervical cancer screening with existing HIV services and with sexually transmitted infection, sexual and reproductive health, and maternal and child health services *(15)*. To date, however, uptake of HPV testing in primary screening has been low due to the high cost of HPV tests, issues related to access and/or readiness of laboratory infrastructure, and procurement constraints. Discussions highlighted the role of policy in creating a supportive environment for implementing and scaling up HPV-DNA based testing, along with challenges and opportunities related to the existence of laboratory infrastructure, and to pricing and financing.

Integration of laboratory systems

The leveraging of existing laboratory systems and infrastructure and the establishment of guidelines on multidisease testing were emphasized as opportunities for increasing system efficiencies and for cost savings *(16)*. Potential areas for laboratory integration include HIV viral load testing (for HIV disease monitoring), tuberculosis, viral hepatitis, early infant HIV diagnosis, and testing for other sexually transmitted infections.

Countries with experience in the integration of diagnostic test platforms underscored the need for integration from a systems perspective, including considerations related to staffing, sample collection, communication of results, linkage to care, and laboratory information management systems. An enabling policy environment for integration was recommended. This may include the updating of guidelines and support for multidisciplinary and cross-team working. For example, policies supporting differentiated service delivery through community-based models of care open opportunities to increase coverage of cervical cancer screening through the use of self-collection approaches.

An early challenge encountered when introducing HPV-DNA testing pertained to ownership in systems that were accustomed to vertical programming and to the de-prioritization of HPV testing on shared platforms with limited capacity and competing demand for HIV or TB services. Examples of strategies to overcome that challenge included acquiring a machine with higher

capacity or organizing dedicated time for HPV testing (and accepting that this could affect turnaround times for test results) (Box 2.1).

In contrast, in settings where integrated test platforms are not utilized to their full capacity, there is an opportunity to expand HPV-DNA testing. Numerous studies have documented the use of multidisease testing devices in integrated laboratory networks, with available capacity ranging from 45% to 74% *(17, 18)*. A recent HPV implementation pilot study in Kenya demonstrated an increase in utilization from 40% before the pilot to mean utilization of 73% during the pilot study *(19)*.

Harnessing the experience of HIV teams that are agile in adding new elements to their service delivery model was raised as another potential opportunity during the introduction of HPV-DNA tests. HIV viral load monitoring coverage is reported to be high in settings with innovative models of service delivery for the decentralization of HIV treatment and care, such as the "hub-and-spoke" approach, which offer opportunities for expanding HPV-DNA screening services.

Box 2.1. Experiences with the introduction of HPV-DNA testing in Uganda

VIA is currently the mainstay of the cervical cancer screening programme in Uganda, due to the high cost of HPV-DNA testing and infrastructure, and resource constraints that hinder its scale-up. However, HPV-DNA testing has been introduced in settings where existing laboratory infrastructure is used for testing and monitoring other diseases and infections (e.g., HIV viral load and tuberculosis). Self-collection at clinics has been introduced as the main modality for HPV sample collection and has been found to be highly acceptable among women and health-care workers.

A switch from cryotherapy to thermal ablation has been adopted due to operational complexities associated with cryotherapy. In 2023, more than 850 thermal ablation units and 44 portable loop electrosurgical excision procedure or LLETZ devices were deployed at high-burden health facilities countrywide. Cervical cancer screening has been integrated with general clinical services, particularly at HIV care and maternal and child health units.

During the pilot introduction of HPV-DNA testing in 2018–2019, women living with HIV who attended routine HIV services were assessed for eligibility for screening, using a cervical cancer eligibility logbook, with a screening interval of three years. At the ART clinic, women were shown how to self-collect a vaginal sample and health facility staff delivered samples to the laboratory on the same day. Depending on the workload and capacity of the GeneXpert testing platform, samples were processed and results returned to the ART clinic within three days. Health-care staff then notified the women to collect their results, with priority given to HPV-positive women who were scheduled for VIA triage and/or follow-up treatment. This approach minimized delays and made it easier to track samples.

This model made it feasible for women to take a test and receive the results on the same day, though that required intensive efforts since health-care workers often had competing tasks and priorities. Other challenges encountered included the limited capacity of the GeneXpert platform when used for multidisease testing. HPV testing was often deprioritized due to competing priorities, including for HIV viral load or tuberculosis. Also affecting turnaround time were instrument breakdowns and limited staff time. Solutions for these challenges included scheduling dedicated GeneXpert capacity for HPV-DNA testing on a number of days per week and obtaining higher-capacity machines (16 modular) for facilities with high test volumes.

To counteract difficulties linking women to care after screening, stickers were placed on files and mobile phone airtime credit was provided to ART clinics so that HPV-positive women could be prioritized for follow-up. Automated SMS notifications were also piloted to both women and clinicians, prompting them to follow up on their results once they were available.

This pilot introduction of a HPV-DNA self-sampling and testing approach demonstrated the feasibility and acceptability of this model among both women and health-care staff. HPV-DNA testing is being scaled up over the next two years to facilities with the highest patient volumes.

Pricing and financing

The price range for commercially available HPV-DNA tests is broad and these tests were considered to be more expensive to implement compared to VIA. Coordinated or pooled procurement and price negotiation skills were lacking in settings with a very high dual burden of cervical cancer and HIV, such as in the African Region.

Meeting participants discussed the need for countries to build ownership within their HIV programmes in order to harness their purchasing power when large volumes of tests have to be bought. There was recognition that country-led negotiations can achieve some price reductions, but improved transparency on the individual elements that contribute to the overall cost of HPV-based screening programmes could also strengthen negotiating positions. Globally negotiated prices for HPV testing have been made available to various procuring entities *(20)*.

Participants highlighted that costing tools are available for countries to prepare costed cervical cancer screening plans and explore the budgetary implications of different scale-up scenarios. Experience using the WHO Cervical Cancer Prevention and Control Costing (C4P) tool was shared. The tool has been developed specifically to assist low- and middle-income countries in planning and

costing cervical cancer control strategies, including HPV vaccination and cervical cancer screening and treatment *(21)*. Meeting participants also felt there needed to be clearer communication to policy-makers that fewer lifetime screening events were needed for HPV-DNA-based primary screening, given that higher negative predictive value permits a longer interval between screenings, making it more cost-effective in the long term despite the initial investment cost *(22)*.

Pricing and financing constraints have delayed the transition to HPV testing modalities. Countries lacking adequate financing to support the transition to HPV-DNA testing may rely on lower-cost options to maintain high screening volumes in the interim.

2.3 The role of self-collection in enhancing screening access for women living with HIV

HPV self-collection (also referred to as self-sampling) is a swab-based toolkit which women can use alone or under guidance of a health professional. It therefore offers an additional option to both women and service delivery providers where HPV-DNA tests are available as part of the national programme *(23)*. The diagnostic accuracy of HPV-DNA polymerase chain reaction-based tests has been shown to be similar for self-collected and clinician-collected samples *(24, 25)*.

Differentiated service delivery for HIV care *(26)* is a client-centred approach that simplifies and adapts HIV services by reducing the number of required visits to fixed-site clinics and by moving services out of clinics and into communities. Self-collection as part of cervical cancer screening presents an important opportunity to enhance differentiated service delivery, thereby reducing costs to both the health-care system and patients, and sustaining or improving clinical treatment outcomes.

Discussions on the topic of self-collection for women living with HIV touched on three main themes: acceptability among women; operational considerations for introduction; and opportunities for integration as part of routine HIV care.

Acceptability among women

As a sampling strategy, self-collection was reported to be preferred to clinician-collected sampling. Women reported it to be more acceptable, easy to collect and less painful compared to VIA speculum examination. However, given that it is a new strategy for widespread programme implementation, programme managers felt that there was a need to sensitize communities about self-collection, its role within the cervical cancer screening programme and its benefits to women.

Detailed information on how to correctly take and return the sample should be provided. In addition, infrastructure should be in place to collect and transport samples and communicate the test results to women who may not be attending an HIV clinic. Women who screen negative for cervical pre-cancer should be given reassurance and encouraged to return for their next screening (the screening interval will depend on the screening test used). Referral systems should be in place for women who screen positive for pre-cancer (see Section 2.4). The engagement and participation of communities in generating demand, rolling-out self-collection and ensuring linkage to care was strongly emphasized (Box 2.2). It was suggested that where self-collection is available at clinics, healthcare providers should allow time to explain the self-collection procedure to women. .

Operational considerations for self-collection in cervical cancer screening

Dedicated resources for scaling up self-collection approaches were discussed, including the technical documents and job aids, logistics and human resources; strong supply chains; and laboratory optimization for HPV-DNA testing. Meeting participants felt that there was a need for clear and simple instructions which women can use, a standard operating procedure and job aids for health-care providers who counsel women.

Various country programmes now use information brochures on self-collection. The brochures are pictorial and can be translated into different languages and adapted to different scenarios (see Box 2.2).

While experiences of facility-based self-collection are more mature, the availability of temperature-stable flocked swabs opens new opportunities for community-based screening and for improving access in hard-to-reach settings, without compromising sample quality. Recent data demonstrate that the vaginal sample remains stable at room temperature for up to two weeks, which permits the batching of samples and facilitates outreach campaigns (see Box 2.2). In order to optimize linkage to follow-up and treatment when using this approach, meeting particpants highlighted the importance of planning the quantity of tests needed and synchronizing the turn-around-times for results with strategies to communicate the results to women, provide treatment of precancers and address referrals for further follow-up.

Enabling policy environment

National cervical cancer screening policies and strategies that incorporate HPV self-collection will facilitate its implementation. Programme and implementation documents and tools could specify the cadres of staff that are needed to distribute and receive self-collected samples from women, along with the training that should be undertaken. This type of policy could enable the integration of HPV-DNA screening as part of community health worker packages for HIV care.

Box 2.2 Self-collection in practice––experiences from Program Rose in Malaysia

When Malaysia's cervical cancer screening programme began its transition from cytology to HPV-DNA-based screening with the option of self-collection, Program ROSE (https://www.programrose.org) was established to provide cervical cancer screening in communities.

The components of Program ROSE include self-sampling, HPV-DNA testing and linkage to care through the use of digital technology. Underlying this is a web-based digital platform (Canscreen), which serves as a live registry that enables the cervical cancer screening cycle of each woman to be tracked. Women can register and have personalized communication set up on their mobile phones. Together with a self-collection device, health-care workers can provide cervical cancer screening to women in a variety settings. The visits require about 15 minutes and include familiarizing the women with the screening process, self-collection and registration on the mobile device. The system is used to communicate test results to women via text messages and link women who screen positive to follow-up services (i.e., colposcopy). Anonymized data can be used to monitor key indicators to continuously improve aspects of the programme, such as screening coverage and follow-up rates.

Self-collection was reported to be highly acceptable among the public. The service delivery model was extended from primary clinics and hospitals to community-based screening, using local champions at mosques, temples, churches and more remote settings. The availability of temperature-stable flocked swabs, which remain stable for up to two weeks, allowed for batching of samples for community-based services and hard- to-reach settings, without compromising on sample quality. For example, a team of volunteers has been able to access indigenous populations by boat or four-wheel-drive vehicle to offer them screening, return the swabs to a central laboratory and then deliver the results to patients via mobile phone. In this example, women who require care are navigated to a local colposcopist for treatment.

To date, the programme has engaged with 29 government hospitals, and 90 health-care professionals and more than 500 volunteers have been engaged to educate women about self-sampling. Between 2019–2022, approximately 23 000 women were screened and 91% of screen-positive women were linked to care. Program ROSE is an example of how HPV testing can be scaled up in a community setting by using self-sampling for HPV testing, along with a secure digital registry. A central feature of Program ROSE is its work in educating communities on self-care and building trust in health-care interventions.

2.4 Strategies for retention of women living with HIV in the screening-triage-treatment pathway

Creating awareness and demand among women for screening

Meeting participants cited several challenges to service uptake, including low levels of awareness about HPV and cervical cancer, and about the aims and benefits of cervical cancer screening for prevention. This may result in low demand for services. Studies have also reported a range of other challenges, including: low risk perceptions about cervical cancer; fears of test results; concerns that cervical screening is painful; lack of access to screening services; high cost of screening services; and low partner acceptance of the service *(27)*.

Several solutions were discussed. They centred on community education to create awareness and boost demand for cervical cancer screening services, the meangingful engagement in the triage-and-treat pathway of women living with HIV who have lived experience of cervical cancer, and the creation of women-centred services.

To address public awareness of cervical cancer and screening for prevention, meeting participants felt that education on cervical cancer, HPV infection and the role of cervical cancer screening should be aimed also at younger age groups. There was agreement that information can be provided readily during HPV vaccination campaigns and can be integrated into sex education health lessons within school curricula. Education prior to a first screening event was felt to be important for empowering women to make informed decisions about their health.

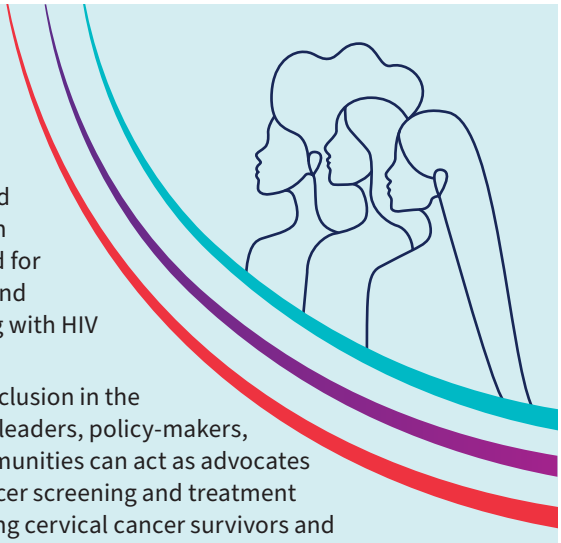
For women living with HIV who are of screening age, screening programmes could invest in awareness campaigns so that women understand the importance of screening, the aims of the screening programme, and what to expect during and after the screening visit. In some settings, male partners may be influential in their female partners' decisions to participate in a cervical cancer screening and treatment programme. Education targeting men and boys to support women's health and provide positive role models to others was therefore also suggested. In addition, it is essential to build the capacity of health-care providers and community health workers to understand cervical cancer screening and treatment guidance, address potential misconceptions, so that they can act as trusted sources for community education. This could be achieved through the inclusion of information and updates to pre-service education and curricula for clinicians and nurses.

Women living with HIV expressed a desire for choice on when and how to be screened for cervical cancer. Since awareness of cervical cancer can be low in some settings, health-care providers should provide comprehensive information for women to make informed decisions about cervical cancer screening. Emphasis was placed on ensuring that health-care providers are fully trained and aware of the higher risk of cervical cancer among women living with HIV, and of the aims and benefits of screening for prevention of cervical cancer, so that they can convey the importance of cervical cancer screening to women in clear language. It was suggested that a health-care worker checklist of key issues be developed for sharing with women during routine HIV clinic visits.

Meeting participants agreed that women living with cervical cancer, survivors and those with lived experience should be involved in the development of national cancer control plans and HIV strategies and should have a role in cervical cancer screening and treatment services.

Targeted multimedia messaging that encourages testing for HIV and cervical cancer (e.g., through radio broadcasts, telenovellas, etc.) in positive terms and language can be effective for increasing demand for screening services. Materials and messaging should be cocreated and codesigned with support groups and organizations of women living with HIV and/or women living with cervical cancer.

Given the influential role of male partners in some settings, their inclusion in the messaging may also increase awareness and demand. Community leaders, policy-makers, influencers (e.g., spouses of political leaders) and faith-based communities can act as advocates to raise public awareness and increase engagement in cervical cancer screening and treatment programmes within communities of women living with HIV, including cervical cancer survivors and family members.



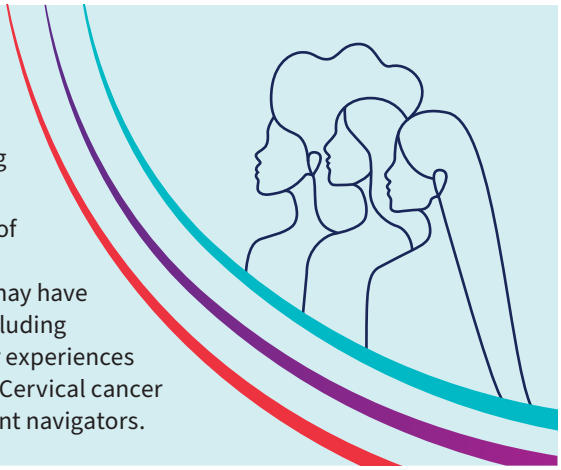
Women's engagement in the triage-treatment pathway

Where HPV-DNA tests are used as primary screening tests, current guidelines recommend triage of HPV-positive women living with HIV *(10)*, which in most cases requires attendance at a health-care facility. In some settings, screening is provided at no-cost, but follow-up of screen-positive women in triage and/or treatment of cervical precancer and cancer may require financial support. Complex arrangements are often also required to facilitate access to follow-up services. Cost of treatment of precancers and perceived downstream costs of diagnosis and treatment of cervical precancer and invasive cancer are reported to be barriers for women along the care pathway following a positive screening test. Participants highlighted the need to reduce out-of-pocket expenses, for example through the inclusion of screening and treatment of cervical precancers in universal health coverage and insurance schemes. They noted that some national health insurance schemes cover cancer treatment only.

Meeting participants spoke of the importance of using research and working with community-based organizations to understand the preferences of women and their communities when navigating the cervical cancer screening and treatment cascade. While noting that navigation processes should be led by the system, the group also acknowledged the important contributions which partnerships with nongovernmental organizations can make in terms of peer navigation, which has been shown to be effective in the HIV care pathway *(28)*. The inclusion of women living with HIV with lived experience and survivors of cervical cancer to help women understand the screening-triage and treatment pathway has been reported to have a positive impact on increasing retention *(29)*. Such partnerships can extend the coverage of screening, triage and treatment approaches to under-served communities by using different community care models. Examples include mobile clinics with teams that can conduct thermal ablation or support referral to LLETZ and communicate to women their test results and information on their next steps. While some participants reported that relationships with civil society organizations were at an informal level only, others felt that the formalization of collaboration and detailed planning for working alongside cervical cancer programmes were essential components of scale-up plans.

Meeting participants highlighted the need to recognize the psychological burden which an HIV diagnosis places on women. It was recommended that any cervical cancer screening programme include a component on mental health care and emotional support, unless this was already integrated in an existing HIV programme.

Strategies should be informed by a comprehensive understanding of women's perspectives, including the psychosocial impact of an HPV-positive test result, especially on women living with HIV who may have additional health concerns. Peer networks and support groups, including women who have navigated the screening pathway, can share their experiences and help ensure that other women are not alone on their journeys. Cervical cancer screening policies should also ensure the provision of trained patient navigators.



Health systems and the need for woman-centred services

While coverage of screening among women living with HIV is increasing due to the adoption of integrated cervical cancer screening programmes in HIV care, the proportions of HPV-DNA-positive women who undergo triage and of treatment-eligible women who undergo treatment for cervical precancer remain uncertain.

Initial reports indicate challenges in same-day triage and/or treatment, since the HPV-DNA test result may not be returned during a client visit *(19, 30)*. Despite the fact that women have regular appointments in HIV care, these may not be optimally utilized to include return of test result, undertake triage or treatment of HPV-positive women (Fig. 2). An optimal strategy would be a single visit that combines HPV-DNA screening with rapid test results when women receive their routine HIV care. Meeting participants proposed aligning the cervical cancer screening and/or triage visits with routine ART management and HIV care as a systems-based solution. A well-established appointment system supported by comprehensive data collection and reporting (including integration of laboratory results and feedback mechanisms to both the clinic and patients) is an important retention tool. The integration of HPV-DNA sample referral into existing HIV and tuberculosis networks can improve efficiencies and offers the potential to enhance sample processing and communication of test results within a functioning laboratory information management system *(16)*.

Current HIV guidelines recommend HIV viral load testing for monitoring the response to ART every 12 months *(11)*. The estimated 76% of women living with HIV globally who achieve HIV viral suppression may receive health services either at facilities or through community programmes. The visit schedule is an opportunity to offer cervical cancer screening and triage where indicated. Once women are engaged in cervical cancer screening, innovative methods are needed to send reminders, and navigation systems need to be established to ensure linkage to care. Women scheduled for either screening, triage or treatment could be prioritized to avoid long waiting times for multiple services on the same day. Bringing services closer to women through community-based approaches could also be considered. An integrated health work force in HIV care can ensure patient navigation, support and adherence for cervical cancer screening and treatment. Meeting participants also indicated a need for point-of-care modalities, and for newer technologies that allow for screening and treating women living with HIV in single visits.

Figure 2. The cervical cancer screening-triage-treatment cascade

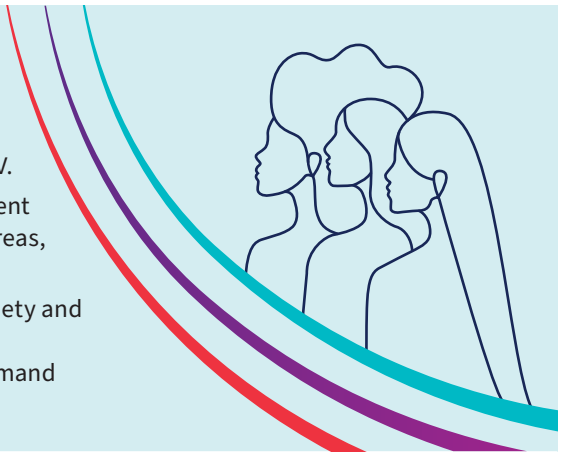
	Factors associated with retention in care
Number of women living with HIV of cervical cancer screening age	• Women aware of their HIV diagnosis • Women have access to and attend routine HIV services
Number of women living with HIV screened for cervical cancer	• Community awareness of and demand for cervical cancer screening • Self-collection for HPV-DNA testing available • Availability of cervical cancer screening services at facility or community entry point
Number of women living with HIV screened and receive test result	• Location of sample collection where used, e.g. at clinic or at home/in the community • Integrating HPV sample referral into existing lab networks • Consistency of turnaround time to test result • Communication of results, M-Health strategies
Number of women living with HIV with screen positive test requiring triage	• Screening test used (i.e. screen positivity may vary according to screening test used; HPV-DNA, VIA or cytology)
Number of women living with HIV undergoing triage	• On-site availability of triage at point of screening/integration in HIV care • Linkage mechanisms for community screening and triage • Capacity of health-care provider for adequate follow-up • Economic considerations, affordability
Number of women living with HIV screen-triage positive	• Triage test used
Number of women living with HIV undergoing treatment for precancer	• Adequate communication of diagnosis and referral to treatment • Costs to woman (out of pocket payment, transport) • Availability of ablative treatment devices • Women with lesions ineligible for ablative treatment are linked to care • Task shifting (decentralization of LLETZ/LEEP)

Patient navigators, who may include nurses involved in HIV care and representatives from civil society organizations, can complement the work of health-care providers.

The importance of peer support was emphasized, especially in settings where there is stigma or discrimination associated with HIV.

The use of different community care models, community engagement and support groups can also facilitate access for women in rural areas, including by assisting with transport.

National and global stakeholders, implementers, donors, civil society and members of the community of women living with HIV should work together to commit resources, provide training and create demand for patient navigators and peer support groups.



Ablative treatment of cervical precancer, including cryotherapy and thermal ablation, can be feasibly integrated with HIV care. With supportive policies, health-care providers can be trained to provide treatment using hand-held, portable, battery-chargeable treatment tools, and receive regular refresher training and monitoring to ensure quality. For women who are ineligible for ablative treatment (due to suspicion of invasive or glandular disease, or the transformation zone not being fully visible or accessible) *(31)*, referral for a LLETZ procedure is required. This will likely entail a longer journey for women and requires trained personnel (e.g., a gynaecologist) who may not be available every day. These challenges can make loss to follow-up more likely (Box 2.3).

Cervical precancer recurrence following treatment is more common among WLHIV compared to women without HIV due to HIV-associated immunosuppression and the occurrence of larger multifocal lesions at presentation *(32)*. It is therefore important to have robust patient navigation systems to ensure linkage to care and follow-up for frequent monitoring of cervical precancer recurrence. Investment in technologies for managing precancerous lesions and innovative strategies for monitoring women for cervical lesion recurrence are needed.

While not the focus of the think-tank meeting, participants acknowledged the critical need to refer women who have been identified with invasive cervical cancer to services for confirmatory diagnosis, management and palliative care. As screening programmes are scaled-up, larger numbers of cases of previously undiagnosed cervical cancer are likely to be detected. Access to invasive cancer treatment and care may also be limited in many settings, leading to poor outcomes for women with invasive disease.

Box 2.3 Examples of approaches to improve linkage to care and reduce loss to follow-up in the cervical cancer screening and treatment cascade

Integration of HPV-DNA testing with HIV care is feasible, but more work is needed on linkages in the care continuum to strengthen the screening-triage-treatment cascade. A major challenge for retaining women living with HIV in the screening and treatment cascade is the need for triage of HPV-positive women, which often requires an additional clinic visit.

Community-based sampling approaches have longer turnaround times because of the need to deliver the sample to a laboratory (where limited capacity on multiplex test platforms can cause further delays). Demonstration studies have reported high coverage of cervical cancer screening among women living with HIV, although the proportion of screen-positive women who underwent VIA triage ranged from 10% to 79% *(19, 30, 33)*. Key factors influencing the completion of a triage test included long turnaround times for HPV-DNA test results; lost or unreturned screening test results; and a reliance on community health workers, patient navigators and/or information systems to inform women of their test result and refer them to VIA in cases where same-day testing was not possible.

In Kenya, an integrated service delivery model was used to offer cervical cancer screening and treatment within facilities providing HIV services. This approach made use of existing human resources, sample referral networks and reporting platforms. Those included the laboratory management and information system which is used for HIV and TB reporting; communication methods like reminder calls and automated text messages through the USHAURI platform; and the alignment of screening and treatment visits with ART visit schedules. Success in increasing access to cervical cancer screening and treatment for WLHIV was achieved through the use of a community-based strategy including community health volunteers for demand generation, self-sampling, health education and peer educators.

Initial programme data have shown that, once women are linked to VIA triage, it is feasible to treat them on the same day as VIA triage (using thermal ablation, if eligible), with treatment linkage rates varying between 73% and 96% *(19, 30, 33)*. For women requiring LLETZ, examples of decentralized approaches to LLETZ were described. In Zambia, the establishment of decentralized LLETZ treatment centres was found to increase treatment rates. Between 2020 and 2023, the number of clinics providing LLETZ increased from 43 to 113 and the proportion of women undergoing treatment increased from 70% to 82%. Task shifting is underway from gynaecologists to medical licentiates and clinical officers who are skilled in LLETZ, and is being supported through a clinical mentorship programme.

Similarly in Rwanda, decentralization of treatment of precancerous lesions to primary health care centres was supported by the involvement of nurses and midwives from Women Cancer Early Detection clinics and from HIV clinics in some health facilities. Electronic patient-tracking systems are also used for follow-up and to ensure service provision across the continuum of care care, resulting in a greater proportion of screen-positive women undergoing follow-up and treatment where indicated.

2.5 Implementing routine monitoring systems for cervical cancer screening and treatment for women living with HIV

In working towards the goal of cervical cancer elimination, the collection, analysis and use of data are crucial at every level, from patient care to national programme management, and global monitoring. These monitoring systems exist in HIV management *(34)*, but are not yet well-established for cervical cancer screening and treatment. Meeting participants discussed key innovations that can be used to implement and scale up routine monitoring of women living with HIV and facilitate the integration of data systems. Five main topics were discussed: the use of data from patient charts; interoperable data systems; the use of unique identifiers to link data for different diseases; the conduct of national data workshops; and the harmonization of monitoring indicators.

Established data systems for HIV management allow health-care providers to track HIV indicators in real-time. Including the monitoring of cervical cancer screening and treatment in HIV data systems as recommended in the WHO *Consolidated guidelines on person-centred HIV strategic information: strengthening routine data for impact* can simplify and streamline the process for collecting, reviewing and reporting data on cervical cancer screening outcomes among women living with HIV *(34)*. This enables the identification of women who may benefit from screening, follow-up of screen-positive women and the indication of women who require follow-up for triage and treatment, where necessary. Data can be collected from paper-based patient charts or electronic charts, where available, and can be entered in a data system by the health-care provider or a data manager. Ideally, the latter should meet weekly to review entered data. Central level data quality review informs national programmatic decisions and priorities. Challenges have

been encountered, however. Data entry and monitoring are often the responsibility of one staff member and may be interrupted if that person is unavailable. Ensuring adequate human resources and system backups are key for health information functionality.

Timely and accurate data are important for improving health outcomes of patients and for evaluating progress at facility, sub-national and national levels. Furthermore, electronic health information systems can be used to automate and align follow up appointments for several conditions. As part of HIV management, an online audit tool is used in some settings to track HIV management services. These tools could also be used for service provision of cervical cancer screening, triage and treatment.

Interoperability is important for any digital system and linkage for chronic conditions, including HIV and cervical cancer. Patient registers or electronic medical records for individuals receiving ART can serve as the main source of information about who should be screened for cervical cancer. In many situations, cervical cancer screening may occur at a different health facility from the one where treatment of cervical precancerous lesions is provided. Therefore, laboratory, pharmacy and medical records from other services (e.g., cancer services) may need to be compiled and linked to assess follow up and treatment outcomes.

In settings with several donors, stakeholders and implementing partners, differing indicators and parallel data systems can create challenges with data integration. Better harmonization of data collection and data systems, reducing manual data entry and processing, and reducing data redundancies and/or overlapping data was suggested *(35)*. Ensuring data privacy and security is key to protect health information, as is enabling access to data for different end users, including patients themselves.

Box 2.4 Electronic systems for tracking screening and treatment outcomes

In Rwanda, an electronic patient tracking system was introduced to follow up women and ensure service provision across continuum of care. The system uses an android mobile application (mUzima) which can be used on off-line tablets at health centres, with data synchronized to a national OpenMRS server. Women can be tracked through the screening-triage-treatment pathway within OpenMRS.

Although the HPV testing platform was not yet linked to the cervical cancer screening electronic medical record (EMR) or to existing hospital or health centre systems, patient health passport or client card allows for monitoring of progress om the cervical cancer screening programme.

Patients now have a health passport or client card, which allows for monitoring of progress in the cervical cancer screening programme. Screening coverage increased from 15% in 2017 to 45% in 2022. Off-line access to the EMR via tablets is proving very useful in settings with limited internet access. System linkages also enable connections between health centres and district hospitals, and they facilitate tracking the numbers of women undergoing screening, results delivery, triage, treatment and follow-up.

Consultation sheets enable clinicians to anticipate the expected number of patients and plan clinic services accordingly, while missed-visit reports allow reminders to be sent to non-attendees. There is also the option of generating reports to the health management information system. This allows for women with confirmed cervical cancer to be linked to the cancer registry DHIS2 oncology tracker and for the use of CanReg5 software for advanced analysis and reporting. Work is ongoing to harmonize EMRs through health information exchanges, including: HIV EMR; primary care EMR; HPV testing platform and HPV immunization tracker; the incorporation of cervical images into EMR; and establishing SMS reminders and notifications to women who are engaged in the screening-triage-treatment pathway.

In El Salvador, established HIV surveillance and monitoring systems and prevention services for key populations include follow-up of key indicators that can be disaggregated and analysed. The HIV data system contains individual-level data for HIV management, while a separate data system exists for cancer. The two systems are joined using a unique identifier (the National ID, or documento de identidad). Dashboards are available and include indicators at international, national, department and hospital levels. Dashboard indicators are being used by health-care providers at facility level for patient management and at national level for programme monitoring and evaluation.

A capacity building workshop on strategic information from the HIV programme was organized for providers involved in the HIV programme from five regions of the country. Data from health centres were presented and health-care providers could assess how programmes were working at the facility level. Challenges that were raised included the collection of data on cervical cancer screening and treatment in different systems. These were addressed through data triangulation using national identifiers which allowed for linkages between different data systems to assess patient outcomes. Such data workshops can aid in the multi-level data review, identify gaps and support the development of joint solutions.

3. Conclusion and the way forward

This meeting on Operational considerations for increasing access to cervical cancer screening and treatment for women living with HIV provided an opportunity to share experiences, insights and lessons from the implementation of cervical cancer screening and treatment programmes in settings with varying prevalence of HIV among women and where different models of service delivery are being used. Although VIA is still the most common screening modality in many low- and middle-income countries, early experiences with the introduction of HPV-DNA testing, including use of a self-collection approach, demonstrate that HPV-DNA testing is acceptable to women and health-care workers and offers a cost-effective approach to secondary prevention.

Integration of cervical cancer screening, triage and treatment in HIV services provides opportunities to increase access and uptake of cervical cancer screening and treatment among women living with HIV. Existing infrastructure––including human resources, established referral networks, integrated laboratory testing, using multiplex testing and reporting and electronic medical records platforms––can be harnessed to achieve efficiencies for health systems and for women.

The alignment of cervical cancer screening, triage and treatment visits with ART visit schedules would facilitate access to care and decrease waiting times for women. Innovations in ART delivery, including differentiated service delivery and community-based models of care, provide opportunities to offer HPV self-collection to women who may attend clinics infrequently. Tracking and data systems for HIV care could be extended to integrate data on cervical cancer screening and treatment for women living with HIV to monitor progress towards achievement of cervical cancer elimination goals.

Going forward, some challenges were identified. There is still limited evidence of scale-up and programme-level implementation of HPV-DNA testing in primary screening in low- and middle-income country settings. High costs as well as infrastructure and resource constraints have been cited as barriers to the scale-up of HPV testing. Self-collection is an effective approach to increase access and uptake of screening and has the potential to serve hard-to-reach communities. However, the precise logistics of sample delivery and collection and of returning test results remain uncertain. More evidence is needed on strategies to roll out community-based self-collection and linking women to follow-on care. It may be possible to utilize innovations employed in community outreach and delivery of HIV care and provision of ART, but that will require investment and resources to establish a coordinated approach.

The triage of HPV-positive women living with HIV can lead to loss to follow-up when triage is conducted during another visit or at a different clinic. Peer navigators and community-based models, including HIV support groups, can be mobilized to facilitate linkage to care. Alignment of the screening and triage visits with routine ART dispensing and HIV care may be offered as a systems-based solution.

Despite these challenges, cervical cancer screening coverage is reported to be increasing among women living with HIV *(13)*. As countries introduce and scale-up cervical cancer screening and treatment, it is important for national policies to adopt WHO guidelines; have a transition and/or scale-up plan for HPV-based test introduction *(15)*; secure sustainable investments for continued screening and treatment; and document challenges and lessons learned.

Engagement and participation of civil society, in particular the community of women living with HIV and women with lived experience of cervical cancer, are vital for harnessing community participation for demand generation, rolling-out self-sampling, linkage to care, and health education.

As cervical cancer screening and treatment programmes are scaled up, considerations both for women living with HIV and women in the general population are needed to maximize efficiency, increase coverage and reduce suffering from cervical cancer. Monitoring progress of the long-term outcomes of cervical cancer screening, triage and treatment programmes on cervical cancer incidence and mortality will be crucial in the path to achieve cervical cancer elimination.

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Appendix: List of meeting participants

Name	Country	Organization
Abousselham Loubna	Morocco	Ministry of Health
Agallo Sally	Kenya	National Empowerment Network of People living with HIV/AIDS in Kenya (NEPHAK)
Agboyibor Kouamivi	Congo	WHO
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Al Hinai Fatma	Oman	Ministry of Health
Al-Alawi Kamila	Oman	WHO
Almonte Maribel	Switzerland	WHO
Almuqbil Maha	Saudi Arabia	Ministry of Health
Alrehily Sanaa	Saudi Arabia	Ministry of Health
Anne Malick	Senegal	Ministère de la Santé et de l'Action Sociale
Aryal Kabita	Nepal	Ministry of Health and Population
Augustin Gatera	Rwanda	WHO
Auste Carmen	Philippines	Cancer Warriors Foundation
Avalos Verónica	El Salvador	Ministerio de salud
Awori Ruth	Uganda	Uganda Network of Young People living with HIV/AIDS
Baghaki Azadeh	Switzerland	Unitaid
Barbajosa Alejandro	United States of America	PAHO
Birhanu Frehiwot	Malawi	Clinton Health Access Initiative
Boren Rita	United States of America	PAHO
Bosomtwi Mame-Yaa	Switzerland	WHO
Bustinduy Amaya	United Kingdom	London School of Hygiene & Tropical Medicine
Camel Claudia	Guatemala	Ministerio salud

Name	Country	Organization
Carew Sallay	Sierra Leone	Reproductive Health and Family Planning
Castro de Anderson Cecilia	United States of America	PAHO
Catalano Patricia	United States of America	PAHO
Chacon Andrea	El Salvador	Ministerio de Salud
Chan Polin	India	WHO
Chanza Harriet	Malawi	WHO
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