# Acceptability of Integrated Community-Based HIV and Cervical Cancer Screening in Mayuge District, Uganda

Alex Mezei, MD[1]; Jessica Trawin, MPH[2]; Beth Payne, PhD[3]; Angeli Rawat, PhD, MPH[2]; Priscilla Naguti, BA[4]; Jackson Orem, PhD[4]; Melanie C.M. Murray, MD, PhD, FRCP(C)[2,5]; Carolyn Nakisige, PhD[4]; and Gina Ogilvie, MD, DrPH, MSc, FCFP[2]

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## ABSTRACT

**PURPOSE** To assess the acceptability of integrated screening for cervical cancer and HIV in the community setting.

**METHODS** We developed surveys for patients and community health workers (CHWs) who participated in the Advances in Screening and Prevention in Reproductive Cancers (ASPIRE) Mayuge trial that compared self-collected human papillomavirus testing at home versus community health meetings in Mayuge district, Uganda. Quantitative data were summarized using descriptive statistics. Open-ended questions were analyzed using an inductive approach with thematic content analysis.

**RESULTS** We conducted 102 patient surveys and 31 CHW surveys between June and August 2021. Ninety-nine percent of patients and 100% of CHWs indicated that they would find the addition of an HIV test to their self-collected cervical cancer test acceptable. The most frequently stated reasons in favor of adding an HIV test to the ASPIRE Mayuge cervical cancer screening pathways were time-saving, privacy, and support from other women and CHWs. The most frequently stated reasons against integrated screening were related to concerns about confidentiality, most often in reference to women's family members and other women in their village.

**CONCLUSION** Integrated community-based cervical cancer and HIV testing would be highly acceptable to both women and CHWs.

ACCOMPANYING CONTENT

Appendix

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## INTRODUCTION

In Uganda, HIV/AIDS and cervical cancer are two of the most preventable and urgent health issues faced by women. In 2020, the prevalence of HIV among women age 15-49 years was 6.8%, compared with 3.9% for men, and nearly two thirds of new HIV infections are in women.[1] Cervical cancer is the number one cause of cancer-related deaths for women in Uganda, with regional age-standardized incidence and mortality rates three to four times the global average.[2] Women living with HIV (WLWH) have an increased incidence of invasive cervical cancer, making it an AIDS-defining malignancy.[3,4]

Access to screening is vital to the eradication and control of both HIV and cervical cancer. There is a multifold increase in cervical cancer incidence rates in lower- and middle-income countries (LMICs) compared with higher-income countries,[2] likely because of the absence of organized screening programs in most LMICs. In Mayuge district, Uganda, <5% of women report having been screened for cervical cancer.[5] Among a group of WLWH who were engaged in HIV care in Uganda, uptake of cervical cancer screening was 30% in 2016.[6] Recent WHO guidelines on cervical cancer screening recommend routine screening with human papillomavirus (HPV) testing.[7] For HIV, screening is vital to identify people who need to be linked to treatment. In Uganda, in 2020, 90% of people living with HIV were on treatment and 82% were virally suppressed.[1] WHO recommends the establishment of community-based HIV testing services in HIV endemic settings.[8]

In 2020, WHO adopted the Global Strategy for Cervical Cancer elimination, which highlights the importance of integrating cervical cancer screening with other health care services like HIV.[9] In contexts where health resources are scarce, integrated screening programs could maximize limited resources. In addition, women face significant barriers in accessing screening for HIV and cervical cancer, such as embarrassment, lack of knowledge, and socioeconomic factors.[10-12] When studied independently, both community-based HIV screening and cervical cancer screening have demonstrated high rates of screening uptake.[13-17] In addition, multiple studies have indicated that integrating HIV and

## CONTEXT

**Key Objective**

Would women and community health workers (CHWs) in rural Uganda accept HIV testing if it was offered at the same visit as a self-collected human papillomavirus (HPV) test delivered at home or at a community health meeting?

**Knowledge Generated**

Ninety-nine percent of women and 100% of CHWs surveyed felt that community-based integrated screening for HIV and cervical cancer would be acceptable. Both women and CHWs found community-based integrated screening acceptable because of time-saving, money-saving, privacy, and better access to peer support/counseling. Concerns regarding confidentiality were the most common drawback.

**Relevance**

Offering HIV testing at the same visit as self-collected HPV testing in community settings could help reduce barriers women in rural Uganda face in accessing screening and contribute to reaching WHO elimination targets for HIV and cervical cancer.



cervical cancer care is acceptable in clinical settings.[18-20] The objective of this study was to assess the acceptability of integrating HIV screening into a cervical cancer screening program conducted in a community setting (ie, women's homes or community health meetings). In this article, integration is defined as offering testing for HIV at the same visit as cervical cancer screening. To the best of our knowledge, this is the first study to assess the acceptability of integrating HIV and cervical cancer screening in a community setting.

## METHODS

### Study Design

This was a cross-sectional substudy of the Advances in Screening and Prevention in Reproductive Cancers (ASPIRE) Mayuge trial.[21] Two surveys were developed to assess the acceptability of adding point-of-care HIV testing, delivered as a blood test or an oral swab, to a community-based cervical cancer screening program. One survey was delivered to women who had already been screened for cervical cancer through ASPIRE Mayuge, and the other to community health workers (CHWs) involved in the trial. Surveys were administered by research assistants (RAs), who were local CHWs who had not participated in earlier study activities.

### Setting and Population

ASPIRE Mayuge was a cluster randomized clinical trial to determine the most effective method of screening for cervical cancer in Mayuge District, Uganda.[21] Mayuge district consists of a mostly rural population dependent on subsistence farming.[22] Thirty-one villages within the district were randomly assigned to either door-to-door self-collected HPV testing or self-collected HPV testing at community health meetings. Women age 25-49 years with no history of hysterectomy or cervical cancer were eligible to participate in the trial. Screening was facilitated by CHWs who were working in the Ugandan primary care system and underwent extra training on cervical cancer screening. Screening for the sexually transmitted infections (STIs) Neisseria gonorrhea and Chlamydia trachomatis was offered at the same time as HPV testing, via an additional self-collected vaginal swab, with a goal of describing the relationship between HPV and STIs in this population.[21] All samples were transported by CHWs to a health care center for processing using GeneXpert point-of-care testing. CHWs followed up with women in person for positive test results. Women with STI were offered antibiotic treatment, and women with HPV were offered counseling and referral for visual inspection with acetic acid and thermocoagulation treatment. Full details are available in the study protocol.[21]

### Survey Development

The patient survey had sections on demographics, HIV testing history, attitudes toward integrated screening, and HIV knowledge. The provider survey had sections on demographics and attitudes toward integrated screening. We based the surveys on research toolkits developed by the WHO.[23,24] Modifications were made to reflect participants having already participating in the ASPIRE Mayuge trial and include questions about integration. Closed-ended questions were either answered with checkboxes or as yes/no questions with participants having the option to answer "yes, definitely," "maybe," "no, definitely not," "maybe," or "prefer not to answer." Some questions were open-ended to further explore attitudes toward integration, and answers were recorded verbatim. On the surveys, we distinguished between HIV testing via oral swabs and blood tests but did not specify how the tests would be processed or results would be followed up. We validated the surveys by having them reviewed by RAs and practicing survey delivery in training sessions.

### Recruitment Procedure

Women who participated in ASPIRE Mayuge were eligible to be recruited. We randomly selected three villages from each trial arm. RAs went to randomly selected women's homes and invited them to participate. The first 17 women from each village who agreed to participate were enrolled for a total of 51 women per arm. All CHWs who participated in the ASPIRE Mayuge trial were asked to participate. All participants were given a payment of 20,000 UGX (approximately $6.00 in US dollars).

### Sample Size

A power calculation was used to estimate a minimum required sample size of 85. This sample size ensures that a 95% CI estimate is within 10% of the true proportion of women who find adding an HIV test to cervical cancer screening is acceptable. We assumed a population proportion of 67% to be the threshold for high acceptability.[25]

### Data Collection

Data were collected by RAs between June and August 2021. Interviews occurred in either English or the local language of Lusoga. Interviews took place in a private space, either within a woman's home or an agreed upon meeting place. Consent forms were separated from the surveys, and only a personal identification number was recorded on the survey. RAs read questions on the basis of a script and recorded participant's answers on paper surveys. Open-ended questions were recorded as close to verbatim as possible. Responses were entered into the Research Electronic Data Capture database by a data manager.[26]

### Data Analysis

Survey results were exported to Microsoft Excel for analysis. Quantitative data were summarized using descriptive statistics in Microsoft Excel by A.M., with results compared on the basis of the screening location. Using thematic content analysis, data from open-ended questions were deductively open-coded using the grounded theory approach by A.R. The results from quantitative data and themes from open-ended questions were applied to the consolidated framework for implementation research (CFIR) and then segregated into domains and constructs. This framework was chosen to understand facilitators and barriers to implementing the intervention and to allow for comparability across settings.[27]

**TABLE 1.** Patient Characteristics

| Patient Characteristic | Arm 1 (n = 51) | Arm 2 (n = 51) | Total (N = 102) |
|---|---|---|---|
| Age at enrollment, years, mean (±SD) | 34.7 (6.9) | 33.7 (8.1) | 34.2(7.5) |
| Marital status, No. (%) | | | |
| Married | 45 (88.2) | 40 (78.4) | 85 (83.3) |
| Separated/divorced | 1 (2.0) | 1 (2.0) | 2 (2.0) |
| Single | 4 (7.8) | 6 (11.8) | 10 (9.8) |
| Widow | 0 (0.0) | 4 (7.8) | 4 (3.9) |
| Missing or declined to answer | 1 (2.0) | 4 (7.8) | 5 (4.9) |
| Education level, No. (%) | | | |
| None | 4 (7.8) | 7 (13.7) | 11 (10.8) |
| Primary (P1 to P7) | 22 (43.1) | 33 (64.7) | 55 (53.9) |
| O levels (S1 to S4) | 21 (41.2) | 10 (19.6) | 31 (30.4) |
| A levels (S5 to S6) | 2 (3.9) | 0 (0.0) | 2 (2.0) |
| Tertiary education/university | 2 (3.9) | 1 (2.0) | 3 (2.9) |
| Missing or declined to answer | 0 (0.0) | 0 (0.0) | 0 (0.0) |
| Pregnancy history, mean (±SD) | | | |
| Mean gravidity (No. of lifetime pregnancies) | 5.2 (2.6) | 5.4 (2.8) | 5.3 (2.7) |
| Mean No. of living children | 4.5 (2.1) | 4.6 (2.7) | 4.6 (2.4) |
| Mean age at first birth, years | 18.3 (3.2) | 17.0 (2.7) | 17.6 (2.9) |
| Other health histories, No. (%) | | | |
| HIV | 8 (15.7) | 9 (17.6) | 17 (16.7) |
| Tuberculosis | 0 (0.0) | 3 (5.9) | 3 (2.9) |
| Malaria | 44 (86.3) | 41 (80.4) | 85 (83.3) |
| Syphilis | 12 (23.5) | 5 (9.8) | 17 (16.7) |
| Chlamydia | 5 (9.8) | 0 (0.0) | 5 (4.9) |
| Gonorrhea | 0 (0.0) | 1 (2.0) | 1 (1.0) |
| Missing or declined to answer | 1 (2.0) | 3 (5.9) | 4 (3.9) |

Abbreviation: SD, standard deviation.

### Outcomes

The primary outcome of this study was the proportion of women who stated that they would agree to an HIV test at the same visit as their cervical cancer screening. Secondary outcomes included patient and provider attitudes toward integrated screening and patient's HIV knowledge.

### Ethical Approval Statement

Ethics approval for this study was granted by the University of British Columbia/Children's and Women's Health Centre of British Columbia Research Ethics Board (UBC C&W REB #H17-03332) and the Uganda Cancer Institute Research Ethics Committee (UCIREC REF-02-2018).

### Informed Consent Statement

All participants in this study provided informed consent.

## RESULTS

### Patient and Provider Characteristics

The following results fall within the individual domain: innovation recipients and innovation deliverers constructs of the CFIR framework. Baseline demographic data for patients and providers enrolled in this study are presented in Tables 1 and 2, respectively. We enrolled 17 women from each of three villages from each arm of the ASPIRE Mayuge study, for a total of 51 women from each arm. Women were on average age 34 years (standard deviation, 7.5). Among the women included in this study, four (3.9%) identified as being HIV-positive.

The provider surveys were administered to a total of 31 CHWs, one from each village in the ASPIRE Mayuge trial. All participants were female. The majority (90.3%) of CHWs had completed O levels as their highest level of education. All CHWs had previous work experience in cervical cancer and HIV.

Women's HIV status and previous experiences with HIV testing are presented in Table 3. Of the 102 women surveyed, all had been tested for HIV at least once with a blood test. The majority (88.2%) of these tests occurred at health care facilities.

### Patient Attitudes Toward Integrated Screening

The following results fall within the implementation process domain: innovation recipients construct of the CFIR framework. The results on women's attitudes toward adding an HIV test at the time of their self-collected HPV tests are presented in Table 4. All but one woman indicated that they would consent to an HIV test at the time of screening if it was offered as a self-collected oral swab, provider-collected oral swab, or provider-collected blood test. No women thought that being offered an HIV test would have prevented them from attending screening altogether.

Eighty-nine (87.3%) women preferred the idea of having HIV and HPV screening performed at one visit, as opposed to having it spread out over two visits. Women who participated in the home-based screening arm indicated a strong preference toward having their screening performed at home, whereas women who participated in the community health meeting–based screening arm indicated a preference for screening at community health meetings. Forty-eight (94.1%) women screened at home stated that they thought confidentiality would definitely be maintained, compared with 20 (39.2%) women screened at community health meetings.

**TABLE 2.** Provider Characteristics

| Provider Characteristic | CHWs (n = 31) |
|---|---|
| Age, years, mean (±SD) | 40.3 (11.4) |
| Education level, No. (%) | |
| None | 0 (0.0) |
| Primary (P1 to P7) | 1 (3.2) |
| O levels (S1 to S4) | 28 (90.3) |
| A levels (S5 to S6) | 1 (3.2) |
| Tertiary education/university | 1 (3.2) |
| Primary place of work, No. (%) | |
| Health care facility | 0 (0.0) |
| Community | 9 (29.0) |
| Both | 22 (71.0) |
| Previous experience in HIV/AIDS care,[a] No. (%) | |
| Any | 31 (100) |
| Training | 30 (96.8) |
| Clinical care | 13 (41.9) |
| Consultation | 28 (90.3) |
| Counseling | 4 (12.9) |
| HIV testing | 1 (3.2) |
| Home visits | 29 (93.5) |
| Other | 1 (3.2) |
| Previous experience in cervical cancer care,[b] No. (%) | |
| Any | 31 (100) |
| Training | 31 (100) |
| Vaccination | 1 (3.2) |
| Home-based screening | 16 (51.6) |
| Community meeting–based screening | 15 (48.4) |
| Counseling | 30 (96.8) |
| Home visits | 29 (93.5) |
| Other | 1 (3.2) |

Abbreviations: CHWs, community health workers; LEEP, loop electrosurgical excisional procedure; SD, standard deviation.
[a]CHWs were asked but did not report any involvement in drug dispensing or support group services.
[b]CHWs were asked but did not report any involvement in clinic-based screening, colposcopy/LEEP/biopsy, cryotherapy, treatment of invasive disease, or support group services.

**TABLE 3.** HIV History of Patient Participants

| HIV Status | Arm 1 (n = 51), No. (%) | Arm 2 (n = 51), No. (%) | Total (N = 102), No. (%) |
|---|---|---|---|
| HIV-positive | 2 (3.9) | 2 (3.9) | 4 (3.9) |
| HIV-negative | 49 (96.1) | 46 (90.2) | 95 (93.1) |
| Don't know/prefer not to answer | 0 (0.0) | 3 (5.9) | 3 (2.9) |
| HIV testing history | | | |
| Tested ever | 51 (100) | 51 (100) | 102 (100) |
| Tested more than once | 49 (96.1) | 43 (84.3) | 92 (90.2) |
| Location of the most recent HIV test | | | |
| Health care facility | 45 (88.2) | 45 (88.2) | 90 (88.2) |
| Home | 1 (2.0) | 2 (3.9) | 3 (2.9) |
| Community health meeting | 5 (9.8) | 4 (7.8) | 9 (8.8) |
| Reason for the most recent HIV test[a,b] | | | |
| Respondent wanted to know serostatus | 25 (49.0) | 35 (68.6) | 60 (58.8) |
| Concern over partner's past sexual behavior | 1 (2.0) | 2 (3.9) | 3 (2.9) |
| Symptoms potentially consistent with HIV/AIDS | 17 (33.3) | 6 (11.8) | 23 (22.5) |
| Hospitalization for another reason | 2 (2.0) | 5 (3.9) | 7 (2.9) |
| Screening as part of antenatal care | 6 (11.8) | 10 (19.6) | 16 (15.7) |
| Routine screening/testing | 17 (33.3) | 14 (27.5) | 31 (30.4) |
| Future plans—marriage | 1 (2.0) | 2 (3.9) | 3 (2.9) |
| Future plans—having children | 15 (29.4) | 12 (23.5) | 27 (26.5) |
| Future plans—planning for future | 8 (15.7) | 6 (11.8) | 14 (13.7) |
| Offered test at home | 1 (2.0) | 1 (2.0) | 1 (2.0) |
| Other | 0 (0.0) | 0 (0.0) | 0 (0.0) |

[a]Women were able to state multiple reasons for their most recent HIV test.
[b]No women reported getting tested for the following reasons: partner told respondent to get tested; partner ill or died of HIV/AIDS; child ill or died of HIV/AIDS; exposure—respondent's past sexual behavior; exposure—blood transfusion; exposure—taking care of people with HIV/AIDS; exposure—contaminated instrument; exposure—syringe exchange.

The results from thematic content analysis of women's attitudes toward integrated screening are presented in Appendix Tables A1 and A2. The most frequently cited reason in favor of integrated screening was time- and/or money-savings, with 47% of women bringing this up. Women screened at home were more likely to bring up privacy as a benefit, whereas women screened at community health meetings more often discussed the benefits of peer support and counseling. When women were asked what they would not like about integrated screening, women in both arms of the trial frequently discussed concerns about confidentiality, with 35% of respondents bringing this up. At home, this included women who raised concerns about violence with statements like "it may cause violence at home and end up with break up." At community health meetings, women were concerned about rumors spreading about positive results, with one woman stating, "since there are many people sometimes if you are positive others then start propaganda."

## CHW Attitudes Toward Integrated Screening

The following results fall within the implementation process domain: innovation deliverers construct of the CFIR framework. The results on CHW's attitudes toward offering an HIV test at the time of self-collected HPV and neisseria gonorrhea and chlamydia trachomatis testing are presented in Table 5. All CHWs stated that they would find offering an HIV test in addition to a self-collected HPV test acceptable. When asked whether they would prefer a blood test or an oral swab for HIV testing, 16 (51.6%) CHWs were in favor of a blood test and 15 (48.4%) were in favor of an oral swab.

The results from thematic content analysis of CHW's attitudes toward integrated screening are presented in Appendix Tables A3 and A4. When asked to name reasons integrated screening would be successful at home, 26 (83.9%) mentioned the benefits of women finding out the results immediately for multiple diseases, with statements like "it helps a woman to know her status in all diseases." CHWs also frequently brought up time- and/or money-savings, privacy, linkage to treatment, and opportunity for health education. The main concern was about confidentiality, which was brought up by all CHWs. CHWs also raised concern about household violence with one CHW stating "it can create violence to some families." Other drawbacks brought up included pain, women fearing knowing their status, distrust of CHWs, time, and concerns about test accuracy.

**TABLE 4.** Patient Attitudes Toward Integrated Screening

| Patient Attitude | Arm 1 (n = 51), No. (%) | Arm 2 (n = 51), No. (%) | Total (N = 102), No. (%) |
|---|---|---|---|
| No. of women who would consent to an HIV test at the cervical cancer screening visit | | | |
| Self-collected oral swab | 50 (98.0) | 51 (100) | 101 (99.0) |
| Provider-collected oral swab | 50 (98.0) | 51 (100) | 101 (99.0) |
| Provider-collected blood test | 50 (98.0) | 51 (100) | 101 (99.0) |
| Self-collected vaginal swab | 51 (100) | 51 (100) | 102 (100) |
| Preferences for one- or two-visit screening | | | |
| One visit | 50 (98.0) | 39 (76.5) | 89 (87.3) |
| Two visits | 1 (2.0) | 12 (23.5) | 13 (12.7) |
| Impact of being offered an HIV test at the time of cervical cancer screening | | | |
| Would still consent to screening | 51 (100) | 51 (100) | 102 (100) |
| Trust that confidentiality would be maintained with integrated screening | | | |
| Yes, definitely | 48 (94.1) | 20 (39.2) | 68 (66.7) |
| Maybe | 0 (0.0) | 20 (39.2) | 20 (19.6) |
| No, definitely not | 2 (3.9) | 4 (7.8) | 6 (5.9) |
| Don't know/prefer not to answer | 1 (2.0) | 7 (13.7) | 8 (7.8) |
| Preferred location for integrated screening | | | |
| Home | 31 (60.8) | 17 (33.3) | 48 (47.1) |
| Community health meeting | 1 (2.0) | 20 (39.2) | 21 (20.6) |
| Hospital | 19 (37.3) | 11 (21.6) | 30 (29.4) |
| Government community health center | 0 (0.0) | 3 (5.9) | 3 (2.9) |
| NGO community health center | 0 (0.0) | 0 (0.0) | 0 (0.0) |
| Don't know/prefer not to answer | 0 (0.0) | 0 (0.0) | 0 (0.0) |

Abbreviation: NGO, non-governmental organization.

When CHWs were asked what would make integrated screening successful at community health meetings, they discussed three main reasons: time- and/or money-savings (45.2% of respondents), benefits of peer support (45.2% of respondents), and increased confidence in health workers (19.4% of respondents). One CHW stated "women can be comfortable seeing other women being tested." The main drawback was felt to be concerns about confidentiality, which was brought up by all CHWs with statements like "there is no confidentiality because people are many." Other drawbacks included time, partners preventing travel to health meetings, distrust of CHWs, and women fearing knowing their status.

**TABLE 5.** Provider Attitudes Toward Integrated Screening

| Provider Attitude | CHWs (n = 31), No. (%) |
|---|---|
| No. agreeing to offer an HIV test at the cervical cancer screening visit | |
| If offered as an add-on to arm 1 | 31 (100) |
| If offered as an add-on to arm 2 | 31 (100) |
| Preference for the type of HIV test | |
| Blood test | 16 (51.6) |
| Oral swab | 15 (48.4) |
| No preference | 0 (0.0) |
| Don't know/prefer not to answer | 0 (0.0) |

Abbreviation: CHWs, community health workers.

### HIV and Cervical Cancer Knowledge

The following results fall within the implementation process domain: innovation recipients construct of the CFIR framework. The results on patient's knowledge of HIV and cervical cancer are presented in Table 6. Among the 102 women surveyed, 89 (87.3%) were aware that HIV is a treatable disease and 79 (77.5%) women were aware that HIV increases the risk of developing cervical cancer.

## DISCUSSION

Integrating care of HIV and cervical cancer is increasingly being recognized as a best practice in high burden settings to meet WHO elimination targets.[9,28] To our knowledge, this is the first study to assess the acceptability of integrated HIV and cervical cancer screening in a community setting. In addition, we could not identify other studies that coupled HIV testing with a self-collected HPV test. The finding that the addition of HIV testing to a self-collected HPV test, delivered either at home or at a community health meeting, was acceptable to 99% of women and 100% of CHWs demonstrates that this could be a viable method of integrated screening.

**TABLE 6.** HIV Knowledge Among Patients

| HIV Knowledge | Arm 1 (n = 51), No. (%) | Arm 2 (n = 51), No. (%) | Total (N = 102), No. (%) |
|---|---|---|---|
| Aware HIV is a treatable disease | | | |
| Yes | 49 (96.1) | 40 (78.4) | 89 (87.3) |
| No | 2 (3.9) | 10 (19.6) | 12 (11.8) |
| Prefer not to answer/don't know | 0 (0.0) | 1 (2.0) | 1 (1.0) |
| Able to identify the local HIV testing/treatment center | | | |
| Yes | 50 (98.0) | 51 (100) | 101 (99.0) |
| No | 1 (2.0) | 0 (0.0) | 1 (1.0) |
| Don't know | 0 (0.0) | 0 (0.0) | 0 (0.0) |
| Aware HIV increases risk of cervical cancer | | | |
| Yes | 43 (84.3) | 36 (70.6) | 79 (77.5) |
| No | 1 (2.0) | 0 (0.0) | 1 (1.0) |
| Don't know | 7 (13.7) | 15 (29.4) | 22 (21.6) |



When asked where women would prefer to have integrated screening, women who had their self-collected HPV test at home were most likely to say at home, whereas women who had their self-collected HPV test at a community health meeting were most likely to say at a community health meeting. This reflects that both methods were well received and that without having experienced both modalities of screening, women preferred what they have already experienced. The high rate of acceptability suggests that these screening methods may address some of the barriers these women faced in accessing care. Stigma and embarrassment are key factors that prevent women from accessing HIV and cervical cancer testing.[10,25,29] Women screened at home frequently cited privacy as a benefit of integrated screening, whereas women screened at community health meetings frequently cited the support and encouragement they would receive. In addition, convenience and cost of travel affect screening uptake, with other studies in Uganda emphasizing the importance of offering integrated screening to women from rural areas.[18] Consistent with these findings, the most frequently stated benefit of integrated screening was time- and money-savings.

Another barrier to screening is inadequate knowledge about HIV and cervical cancer because knowledge positively correlates with uptake of testing.[30,31] While women had a good understanding of local HIV resources, one in eight women were not aware that HIV is a treatable disease and nearly one in four were not aware that HIV increases the risk of cervical cancer. These knowledge gaps highlight the need for a multipronged approach that includes culturally appropriate education.

CHWs overwhelmingly felt that integrated screening would be acceptable in their communities. Reasons in favor were similar to their patients; however, they more frequently emphasized the desire of women to know their status on multiple diseases at once. A study that evaluated the perceptions of health care workers in Uganda on integrating HIV and cervical cancer screening found that commonly stated reasons in favor were enhanced knowledge/skills for care providers, economic benefits to the system, and minimizing wait times for women.[32] Our findings provide further evidence that integrated screening would be acceptable to health care providers in Uganda.

Drawbacks of integrated screening should be considered. Integrated screening could stretch health system capacity in contexts where resources are limited. While there is a lack of data on the cost-effectiveness of integrating HIV with noncommunicable diseases, consideration needs to be given to increased costs and time burden of multiple testing on health care providers.[33] In our study population, 100% had already been tested for HIV, indicating that there is not necessarily a service gap in this area. Finally, there is concern that stigma around HIV could lead to a decrease in cervical cancer screening uptake.[31,32] However, no women in our study felt that being offered an HIV test would have caused them to decline cervical cancer screening.

There are trade-offs that policymakers need to consider when designing programs involving self-collected testing. There is a trade-off between uptake and test sensitivity/specificity. Both self-collected HPV tests and HIV oral swabs have reduced sensitivity/specificity compared with provider-collected testing but increase uptake.[34-37] Our findings demonstrate acceptability toward both HIV blood tests and oral swabs, whereas other studies found a preference for oral swabs.[38] In addition, policymakers and researchers should consider whether other interventions warrant inclusion in an integrated screening program. Our results, coupled with demonstration projects that have successfully shown integration of HIV testing with other diseases,[15,39] suggest that more inclusive screening campaigns would be acceptable to patients and providers. However, this will have to be balanced against the risk of over-extending limited health resources.

There are several limitations to this study. We defined acceptability on the basis of survey responses in a study setting, which may not reflect screening uptake in a real-world

setting. We did not explore in our surveys how the STI testing that was offered at the same time as the self-collected HPV test could have affected women's attitudes toward integrated screening. Because of interruptions in the trial and travel schedules because of the COVID-19 pandemic, there were delays between the two arms of the ASPIRE Mayuge trial and subsequent survey collection. In addition, results from ASPIRE Mayuge are not yet published, so we were unable to discuss them in relation to the acceptability results from this study. Finally, there are several characteristics of the study population that might have made them more likely to accept integrated screening: all women included in this study had already agreed to cervical cancer screening, and all had previously been tested for HIV.

Our results imply that participants had concerns about the confidentiality of results. Only four women (3.9%) stated that they were HIV-positive, whereas 17 women (16.7%) indicated they were HIV-positive when the same women were asked in the ASPIRE Mayuge demographic survey.[21] This discrepancy suggests that women being interviewed did not feel comfortable in disclosing health information to RAs, compared with the CHWs who conducted the interviews in ASPIRE Mayuge. This lack of trust might have led women to not be fully transparent when answering other questions on the survey.

Despite being preventable, HIV and cervical cancer remain global epidemics. In this article, we demonstrated that a novel integrated screening approach would be highly acceptable to women in rural Uganda. These findings require further study through implementation projects and should be considered by policymakers when designing new screening programs.



## AFFILIATIONS

[1]Department of Medicine, University of British Columbia, Vancouver, BC, Canada
[2]Women's Health Research Institute, British Columbia Women's Hospital + Health Centre, Vancouver, BC, Canada
[3]School of Population and Public Health, University of British Columbia, Vancouver, BC, Canada
[4]Department of Reproductive Oncology, Uganda Cancer Institute, Kampala, Uganda
[5]Department of Medicine, Division of Infectious Diseases, University of British Columbia, Vancouver, BC, Canada

## CORRESPONDING AUTHOR

Alex Mezei, MD, UBC Department of Medicine, 2775 Laurel St, 10th Floor, Vancouver, BC V5Z 1M9, Canada; e-mail: alexmezei@alumni.ubc.ca.

## DISCLAIMER

C.I.H.R. played no role in or had authority over the study design; collection, management, analysis, and interpretation of data; writing of the report; or the decision to submit for publication.

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## AUTHOR CONTRIBUTIONS

**Conception and design:** Alex Mezei, Jessica Trawin, Beth Payne, Jackson Orem, Melanie C.M. Murray, Gina Ogilvie
**Administrative support:** Beth Payne, Priscilla Naguti, Carolyn Nakisige
**Provision of study materials or patients:** Priscilla Naguti, Carolyn Nakisige
**Collection and assembly of data:** Alex Mezei, Priscilla Naguti, Carolyn Nakisige, Gina Ogilvie
**Data analysis and interpretation:** Alex Mezei, Angeli Rawat, Gina Ogilvie
**Manuscript writing:** All authors
**Final approval of manuscript:** All authors
**Accountable for all aspects of the work:** All authors

## AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

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**Priscilla Naguti**
**Employment:** Baraka Pharmaceuticals
**Leadership:** Baraka Pharmaceuticals
**Stock and Other Ownership Interests:** Baraka Pharmaceuticals
**Honoraria:** Health Services Mbale
**Consulting or Advisory Role:** Baraka Pharmacy
**Speakers' Bureau:** Health Services Effort Mbale
**Research Funding:** Baraka Pharmacy
**Patents, Royalties, Other Intellectual Property:** My brother received royalties from Health Service Mbale
**Expert Testimony:** Baraka Pharmacy
**Travel, Accommodations, Expenses:** Ministry of Health Uganda
**Other Relationship:** Aspire Study

**Melanie C.M. Murray**
**Honoraria:** Merck, ViiV Healthcare, Gilead Sciences
**Consulting or Advisory Role:** Merck, Gilead Sciences, Merck
**Research Funding:** ViiV Healthcare

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## APPENDIX

**TABLE A1.** Reasons Why Patients Favor Integrated Screening

| Patient Reason | Arm 1 (n = 51), No. (%) | Arm 2 (n = 51), No. (%) | Total (N = 102), No. (%) |
|---|---|---|---|
| Desire to know HIV status in addition to cervical cancer | 6 (11.8) | 5 (9.8) | 11 (10.8) |
| Desire to self-collect | 1 (2.0) | 0 (0.0) | 1 (1.0) |
| Desire to start on treatment if positive | 2 (3.9) | 2 (3.9) | 4 (3.9) |
| Privacy | 15 (29.4) | 0 (0.0) | 15 (14.7) |
| Saves health workers time and/or money | 0 (0.0) | 2 (3.9) | 2 (2.0) |
| Support from other women and/or health workers | 0 (0.0) | 22 (43.1) | 22 (21.6) |
| Time- and/or money-savings | 27 (52.9) | 20 (39.2) | 47 (46.1) |

NOTE. Patients in arm 1 were asked to "name one thing you would like about screening for both HIV and cervical cancer in your home," whereas patients in arm 2 were asked to "name one thing you would like about screening for both HIV and cervical cancer at a community health meeting."

**TABLE A2.** Reasons Why Patients Oppose Integrated Screening

| Patient Reason | Arm 1 (n = 51), No. (%) | Arm 2 (n = 51), No. (%) | Total (N = 102), No. (%) |
|---|---|---|---|
| Belief that testing will give them the disease | 1 (2.0) | 0 (0.0) | 1 (1.0) |
| Causing stress from test results | 8 (15.7) | 1 (2.0) | 9 (8.8) |
| Concern about confidentiality | 13 (25.5) | 23 (45.1) | 36 (35.3) |
| Concern about family preventing screening | 0 (0.0) | 2 (3.9) | 2 (2.0) |
| Concern about test accuracy | 5 (9.8) | 0 (0.0) | 5 (4.9) |
| Declined to answer | 9 (17.6) | 9 (17.6) | 18 (17.6) |
| Delay between the test and results | 2 (3.9) | 0 (0.0) | 2 (2.0) |
| Distrust of CHWs | 2 (3.9) | 0 (0.0) | 2 (2.0) |
| Lack of access to immediate treatment | 1 (2.0) | 0 (0.0) | 1 (1.0) |
| Not enough time with health workers because of the number of women | 0 (0.0) | 1 (2.0) | 1 (1.0) |
| Perceived pain with multiple tests | 5 (9.8) | 3 (5.9) | 8 (7.8) |
| Time commitment with multiple tests | 5 (9.8) | 12 (23.5) | 17 (16.7) |

NOTE. Patients in arm 1 were asked to "name one thing you would not like about screening for both HIV and cervical cancer in your home," whereas patients in arm 2 were asked to "name one thing you would not like about screening for both HIV and cervical cancer at a community health meeting."
Abbreviation: CHW, community health worker.

**TABLE A3.** Reasons Why Providers Favor Integrated Screening

| | Home-Based Screening,[a] No. (%) | | | Health Meeting–Based Screening,[b] No. (%) | | |
|---|---|---|---|---|---|---|
| Provider Reason | Reason 1 (n = 31) | Reason 2 (n = 31) | Total (N = 62) | Reason 1 (n = 31) | Reason 2 (n = 31) | Total (N = 62) |
| Ability to know HIV status in addition to HPV | 17 (54.8) | 9 (29.0) | 26 (41.9) | 5 (16.1) | 4 (12.9) | 9 (14.5) |
| Ability to start on treatment if positive | 0 (0.0) | 6 (19.4) | 6 (9.7) | 3 (9.7) | 4 (12.9) | 7 (11.3) |
| Increased confidence in health care providers | 1 (3.2) | 0 (0.0) | 1 (1.6) | 1 (3.2) | 4 (12.9) | 5 (8.1) |
| Increased uptake of screening | 0 (0.0) | 0 (0.0) | 0 (0.0) | 1 (3.2) | 0 (0.0) | 1 (1.6) |
| Opportunity for health education | 1 (3.2) | 1 (3.2) | 2 (3.2) | 1 (3.2) | 5 (16.1) | 6 (9.7) |
| Privacy | 2 (6.5) | 6 (19.4) | 8 (12.9) | 3 (9.7) | 1 (3.2) | 4 (6.5) |
| Saves health workers' time and/or money | 0 (0.0) | 0 (0.0) | 0 (0.0) | 1 (3.2) | 2 (6.5) | 3 (4.8) |
| Support from other women and/or health workers | 0 (0.0) | 1 (3.2) | 1 (1.6) | 7 (22.6) | 6 (19.4) | 13 (21.0) |
| Time- and/or money-savings | 10 (32.3) | 8 (25.8) | 18 (29.0) | 9 (29.0) | 5 (16.1) | 14 (22.6) |

Abbreviations: CHWs, community health workers; HPV, human papillomavirus.

[a]CHWs were asked, "What are two reasons you think that offering screening for cervical cancer, gonorrhea/chlamydia, and HIV in one visit at home would be successful?"

[b]CHWs were asked, "What are two reasons you think that offering screening for cervical cancer, gonorrhea/chlamydia, and HIV in one visit at a community health meeting would be successful?"

**TABLE A4.** Reasons Why Providers Oppose Integrated Screening

| | Home-Based Screening, No. (%) | | | Health Meeting–Based Screening,[a] No. (%) | | |
|---|---|---|---|---|---|---|
| Provider Reason | Reason 1 (n = 31) | Reason 2 (n = 31) | Total (N = 62) | Reason 1 (n = 31) | Reason 2 (n = 31) | Total (N = 62) |
| Causing stress from test results | 1 (3.2) | 1 (3.2) | 2 (3.2) | 3 (9.7) | 0 (0.0) | 3 (4.8) |
| Concern about confidentiality | 18 (58.1) | 21 (67.7) | 39 (62.9) | 20 (64.5) | 17 (54.8) | 37 (59.7) |
| Concern about overwhelming women with too much information | 1 (3.2) | 0 (0.0) | 1 (1.6) | 0 (0.0) | 1 (3.2) | 1 (1.6) |
| Concern about partner preventing testing | 0 (0.0) | 1 (3.2) | 1 (1.6) | 2 (6.5) | 2 (6.5) | 4 (6.5) |
| Concern about test accuracy | 0 (0.0) | 1 (3.2) | 1 (1.6) | 0 (0.0) | 0 (0.0) | 0 (0.0) |
| Distractions at home | 3 (9.7) | 1 (3.2) | 4 (6.5) | 0 (0.0) | 0 (0.0) | 0 (0.0) |
| Distrust of CHWs | 2 (6.5) | 2 (6.5) | 4 (6.5) | 2 (6.5) | 1 (3.2) | 3 (4.8) |
| Lack of access to immediate treatment | 0 (0.0) | 2 (6.5) | 2 (3.2) | 0 (0.0) | 0 (0.0) | 0 (0.0) |
| Perceived pain with multiple tests | 2 (6.5) | 0 (0.0) | 2 (3.2) | 0 (0.0) | 2 (6.5) | 2 (3.2) |
| Time commitment with multiple tests | 4 (12.9) | 2 (6.5) | 6 (9.7) | 4 (12.9) | 8 (25.8) | 12 (19.4) |

Abbreviation: CHWs, community health workers.

[a]CHWs were asked, "What are two reasons you think that offering screening for cervical cancer, gonorrhea/chlamydia, and HIV in one visit at a community health meeting would not be successful?"