Implementing a Fee-for-Service Cervical Cancer Screening and Treatment Program in Cameroon: Challenges and Opportunities

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ABSTRACT

Background. Cervical cancer screening is one of the most effective cancer prevention strategies, but most women in Africa have never been screened. In 2007, the Cameroon Baptist Convention Health Services, a large faith-based health care system in Cameroon, initiated the Women’s Health Program (WHP) to address this disparity. The WHP provides fee-for-service cervical cancer screening using visual inspection with acetic acid enhanced by digital cervicography (VIA-DC), prioritizing care for women living with HIV/AIDS. They also provide clinical breast examination, family planning (FP) services, and treatment for reproductive tract infection (RTI). Here, we document the strengths and challenges of the WHP screening program and the unique aspects of the WHP model, including a fee-for-service payment system and the provision of other women’s health services.

Methods. We retrospectively reviewed WHP medical records from women who presented for cervical cancer screening from 2007–2014.

Results. In 8 years, WHP nurses screened 44,979 women for cervical cancer. The number of women screened increased nearly every year. The WHP is sustained primarily on fees-for-service, with external funding totaling about $20,000 annually. In 2014, of 12,191 women screened for cervical cancer, 99% received clinical breast exams, 19% received FP services, and 4.7% received treatment for RTIs. We document successes, challenges, solutions implemented, and recommendations for optimizing this screening model.

Conclusion. The WHP’s experience using a fee-for-service model for cervical cancer screening demonstrates that in Cameroon VIA-DC is acceptable, feasible, and scalable and can be nearly self-sustaining. Integrating other women’s health services enabled women to address additional health care needs.

Implication for Practice: The Cameroon Baptist Convention Health Services Women’s Health Program successfully implemented a nurse-led, fee-for-service cervical cancer screening program using visual inspection with acetic acid-enhanced by digital cervicography in the setting of a large faith-based health care system in Cameroon. It is potentially replicable in many African countries, where faith-based organizations provide a large portion of health care. The cost-recovery model and concept of offering multiple services in a single clinic rather than stand-alone “silo” cervical cancer screening could provide a model for other low- and middle-income countries planning to roll out a new, or make an existing, cervical cancer screening services accessible, comprehensive, and sustainable.

INTRODUCTION

Worldwide, invasive cervical cancer (ICC) is the second leading cause of cancer mortality among women [1]. In the past 5 decades, high-income countries have reduced the incidence and mortality of cervical cancer by approximately 80%, primarily through the implementation of cytologic screening programs (Pap smear) [2, 3]. In most African countries, the persistently high mortality rate for ICC is largely due to a paucity of medical infrastructure and funding needed to successfully implement effective population-based screening [4, 5].

Because most low-and-middle-income countries (LMICs) lack the resources, infrastructure, and personnel required for conventional cytologic screening, the World Health...
Organization (WHO) endorses the use of visual inspection with acetic acid (VIA) or alternative screening methods available in these settings [6]. In order to reduce loss to follow-up, WHO guidelines recommend pairing visual inspection methods with same-day cryotherapy treatment for eligible pre-cancers, a “screen-and-treat” approach [6]. Various countries in Africa are currently in the early stages of exploring the best strategies for successfully implementing VIA for cervical cancer screening and developing appropriate screening and treatment algorithms [7].

Most cervical cancer screening programs have been implemented with high levels of international funding under the umbrella of HIV/AIDS clinics across Africa [8–16]. There are a variety of benefits to this approach, as it ensures access to this high-risk population, increases likelihood of program sustainability, potentiates the existing health care programs, and requires fewer upfront costs compared with stand-alone cervical cancer screening programs [17]. The largest “screen-and-treat” program in Africa is the Cervical Cancer Prevention Program in Zambia (CCPPZ), which began in 2006 and, as of 2014, has screened over 200,000 women for cervical cancer using VIA enhanced with digital cervicography (VIA-DC) [15, 18].

Despite attempting program sustainability through pairing with existing infrastructure such as HIV/AIDS clinics, many LMICs have been unable to start or sustain large-scale cervical cancer screening programs due to lack of grants, donations, or other external funding [19]. WHO acknowledges that although programs can initially be based on support from external donors, they will never become self-sustaining without a mechanism for funding when the external support ends [20]. In Africa, lack of political will, pressing needs from other diseases, and the overwhelming need to provide medical care for illness in the face of minimal financial and personnel resources often preclude implementation of preventive health services, even though prevention would reduce long-term health care costs [21]. Women in developing countries may be willing to contribute to the cost of their care. A study of HIV-positive women in Nigeria showed that after education about cervical cancer, 94.5% of 400 participants expressed willingness to pay for the screening [22]. In a program in Kenya, in which women were asked to pay a small fee for screening, it did not appear to affect attendance to cervical cancer screening clinics [23]. And in Ghana, after a project-sponsored period during which VIA screening was provided free-of-charge, a subsequent fee of approximately $1 appeared to be acceptable to women [23]. Thus, a fee-for-service approach may be feasible for sustaining cervical cancer screening programs and other women’s health care needs in LMICs [23, 24]. The Cameroon Baptist Convention Health Services (CBCHS) is a nonprofit, faith-based health care organization that has provided medical services to millions of Cameroonians for over 50 years. In 1999, CBCHS initiated HIV services, now known as the AIDS Care and Prevention Program [25–27]. In 2007, in response to the large number of cervical cancer cases identified by CBCHS surgeons, the CBCHS founded the Women’s Health Program (WHP). Since its inception, the WHP cervical cancer screening initiative has provided cervical cancer screening for women in a country with the highest HIV prevalence in Western and Central Africa where ICC is the second leading cause of cancer mortality among women [1, 28]. The program is funded primarily through a fee-for-service model in which women are asked to pay for the screening and other services they receive.

The WHP also recognizes other health needs of women attending their clinics. For example, in Cameroon, breast cancer is the leading cause of cancer mortality [1], there is an unmet need for family planning (FP) services [29], and experts believe that up to 50% of female infertility may be caused by pelvic inflammatory disease [30]. Using an integrated model, the WHP provides additional women’s health services, including raising breast cancer awareness and promoting early detection though clinical breast exam (CBE), FP counseling and methods, and diagnosis and treatment of reproductive tract infections (RTI).

In this report, we document the strategies that have led to successful implementation of a nurse-led cervical cancer screening program using VIA-DC, describe programmatic challenges, make recommendations to optimize screening and treatment outcomes, and discuss the unique aspects of WHP model, including a fee-for-service payment system and the provision of other women’s health services.

METHODS

Health System and Infrastructure

The CBCHS facilities are an integrated health system for referral and support that consist of three tiers of service:

- **Tier 1—Primary Health Centers:** Approximately 50 small village clinics staffed by mother-child health aides and health promoters trained by CBCHS, but supported by their own villages.
- **Tier 2—Integrated Health Centers:** 26 community-based health centers staffed by CBCHS employees and administered by CBCHS.
- **Tier 3—Hospitals:** Seven hospitals staffed and administered by CBCHS.

WHP clinics are geographically distributed to provide services to a wide catchment area across four regions of Cameroon (Fig. 1). Services are offered in two settings:

- **Stationary Clinics:** Permanent clinics established in CBCHS integrated health centers or hospitals.
- **Outreach Clinics:** Temporary mobile clinics run out of primary health centers or integrated health centers in rural villages.

Data Management

WHP clinical data are collected on structured paper-based forms at the point-of-care and then sent to the CBCHS Regional Training Center in Mutengene for entry into a centralized electronic database [31]. In collaboration with data managers at CBCHS and the Department of Quantitative Health Sciences at the University of Massachusetts Medical School (UMMS), de-identified electronic medical records from March 2007 to December 2014 were retrieved and securely transferred to UMMS for data coding and analysis. Data from March 2007 through December 2013 did not include detailed information regarding CBE, FP, or RTI. In January 2014, the data collection forms were updated to capture these data. We performed a
secondary analysis of data from January 2014 to December 2014 in order to report information on these services.

Training for Nurses and Peer Educators
There are four major staff roles in the WHP clinics:

- **Peer Educators**: Promote awareness of cervical cancer screening and other women’s health services available at the WHP, provide education about cervical cancer screening, take medical history, set up exam rooms, and collect and clean used instruments.
- **Nurses**: Provide cervical cancer screening, cryotherapy, LEEPS, biopsy, referral of patients for further tests or treatment, and other women’s health services.
- **WHP Supervisor**: Provides training for nurses and peer educators, implements quality improvement efforts, manages WHP facilities.
- **Physician consultants**: Provide leadership and vision for WHP, input into medical records and database, recommend best practices, and help manage difficult cases, including radio/chemotherapy and histologic diagnosis.
- **Data clerks and managers**: Enter data, manage the database, and write reports.

Prior to launching the WHP in 2007, gynecologic oncologists from CCPPZ provided 2 weeks of onsite training in Cameroon for 11 nurses and 2 physicians [15]. Subsequently, the WHP supervisor spent 2 months with the CCPPZ in Zambia for further training. As of 2014, the WHP supervisor has trained an additional 14 nurses. The initial training includes observership and didactic classes on VIA-DC, cryotherapy, and loop electrosurgical excision procedure (LEEP). Nurses are required to show proficiency on a written exam and demonstrate competence in all aspects of VIA-DC procedures before beginning to screen women independently. The nurses are trained to perform biopsies and cryotherapy by observing and performing 15 satisfactory procedures under the supervision of an experienced nurse-trainer. Nurses certified to perform LEEP must perform 50 or more LEEPs under direct supervision of a trained clinician.

As other women’s health services are provided at the WHP, knowledge and skill requirements include proficiency in CBE, diagnosis and treatment of RTI, and provision of FP services. In addition to taking didactic training for all components of the WHP, new staff are apprenticed to more experienced staff at each clinic.

Recruitment of Women for Cervical Cancer Screening
Women are primarily recruited at CBCHS health care facilities or in established outreach locations. WHP nurses and peer educators also make periodic presentations to churches, social groups, and at markets and other community gatherings. They educate people on positive health-seeking behaviors, the importance of cervical cancer screening, the availability and efficacy of treatment options for precancerous lesions, and the other women’s health services available at the WHP. Women located near a stationary clinic are serviced at the location most convenient to them. To reach out to rural communities, after getting approval from the district medical officer, WHP nurses visit the “fon/chief” (village or district leader) to educate him on the services offered at the WHP clinics and obtain permission to hold an outreach clinic in his district. If the fon/chief agrees, the nurses work with a local primary clinic or integrated health center, if available, and with other community stakeholders to set dates, location, and other logistics for the outreach clinic, which may last up to 1 week. The nurses/peer educators make a pre-clinic visit to register women who want the services and sometimes collect a down payment to ensure the women attend their scheduled screening session(s). This also allows the nurses to plan how many staff and how much equipment, reagents, and supplies to bring.

Cervical Cancer Screening and Treatment Protocol
The WHP protocol for cervical cancer screening is modeled after the CCPPZ program in Zambia but has been adapted to meet the unique needs of the CBCHS system and patients in Cameroon [15, 32, 33]. The WHP offers cervical cancer
screening to HIV-positive women \( \geq 21 \) years old and to women with HIV-negative or unknown status if \( \geq 25 \) years old. Pregnant women are excluded from screening except when they present signs and symptoms suspicious for ICC.

At presentation, the peer educator/nurse obtains written consent from the patient to screen for cervical cancer, treat lesions with cryotherapy when indicated, and biopsy lesions that are suspicious for cancer. Demographic information and medical history, including cervical cancer risk factors and self-reported HIV status, are collected. A nurse then performs an exam of external and internal genitalia. Cervical cancer screening takes place during a speculum exam. Acetic acid is applied to the cervix for 2 minutes and is followed by visual inspection for lesions. Detection of distinct acetowhite epithelium, as outlined in WHO guidelines, is considered VIA-positive [6]. To confirm VIA, Lugol’s iodine is applied to the cervix and visual inspection is performed (VILI). Digital cervicographs are taken both before and after application of acetic acid (VIA-DC) and after Lugol’s iodine (VILI-DC) using an inexpensive digital camera with a macro-conversion lens, as previously described [34]. During the screening, the nurse shows the woman real-time inspection is performed (VILI). Digital cervicographs are taken both before and after application of acetic acid (VIA-DC) and after Lugol’s iodine (VILI-DC) using an inexpensive digital camera with a macro-conversion lens, as previously described [34]. During the screening, the nurse shows the woman real-time.

Results of VIA-DC and VILI-DC are separately classified as negative, positive, inadequate, or uncertain. Inadequate screens are those in which the visible ectocervix is completely negative for acetowhite changes, but the clinician could not visualize the entire transformation zone, most commonly because the squamocolumnar junction (SCJ) is beyond view up the endocervical canal. Women with inadequate screens are advised to return for follow-up in 1 year. Uncertain lesions include those with suspected cervicitis, severe atrophic changes, or other difficult-to-diagnose abnormalities. Women with cervicitis are first treated for infection then asked to return for VIA/VILI-DC after completing treatment. Women with difficult-to-diagnose abnormalities, such as severe atrophic changes, atypical squamous metaplasia covering a large ectropion, cervical fibroids, or other atypical cervical findings, are usually biopsied.

Women with VIA-/VILI-DC-positive screens are offered same-day treatment in keeping with WHO recommendations [6, 35]. Lesions that meet strict low-risk criteria are eligible for same-day cryotherapy. Lesions that are suspicious for cancer are biopsied. Lesions that are not suspicious for cancer but cover \( > 75\% \) of the transformation zone, extend beyond view in the endocervical canal, or are too large to be covered by the cryoprobe are treated with LEEP. LEEP procedures are performed by WHP nurses at CBCHS hospitals, where general surgery backup is available.

All biopsy and LEEP specimens are preserved in 10% formalin and sent for histopathology at Yaoundé Gyneco-Obstetric and Pediatric Hospital or at Buea Regional Hospital. The histology results are reported according to the Richart cervical intraepithelial neoplasia staging system [36]. Nurses communicate histopathologic results to clients and arrange for appropriate follow-up/referral for specialty care.

### Protocol for Other Women’s Health Services

In order to raise breast health awareness, promote early detection of breast cancer, and promote down staging of disease burden at diagnosis, the WHP provides CBE followed by breast ultrasound for women with a positive exam [37–39]. FP services are offered in accordance with WHO guidelines [40, 41]. RTI diagnosis and treatment are offered in accordance with WHO guidelines [42]. Our clinical database captures only the services that women who present for cervical cancer screening

### Table 1. Fees charged for screening and treatment services at WHP clinics in U.S. Dollars

<table>
<thead>
<tr>
<th>Service</th>
<th>Banso</th>
<th>Mbingo</th>
<th>Nkwen</th>
<th>Mutengene</th>
<th>Mboppi</th>
<th>Etoug-Ebe</th>
<th>Kumba</th>
<th>Outreach</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIA/VILI-DC</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Cryotherapy</td>
<td>50</td>
<td>25–42</td>
<td>42–50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td>LEEP(^b)</td>
<td>67</td>
<td>67</td>
<td>NA</td>
<td>84</td>
<td>84</td>
<td>100</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Clinical breast exam(^c)</td>
<td>No cost</td>
<td>No cost</td>
<td>No cost</td>
<td>No cost</td>
<td>No cost</td>
<td>No cost</td>
<td>No cost</td>
<td>No cost</td>
</tr>
<tr>
<td>Breast ultrasound</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>NA</td>
</tr>
<tr>
<td>Breast fine needle aspirate</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>RTI diagnosis</td>
<td>No cost</td>
<td>No cost</td>
<td>No cost</td>
<td>No cost</td>
<td>No cost</td>
<td>No cost</td>
<td>No cost</td>
<td>No cost</td>
</tr>
<tr>
<td>Family planning counseling</td>
<td>No cost</td>
<td>No cost</td>
<td>No cost</td>
<td>No cost</td>
<td>No cost</td>
<td>No cost</td>
<td>No cost</td>
<td>No cost</td>
</tr>
<tr>
<td>Family planning method(^e)</td>
<td>1–4</td>
<td>1–4</td>
<td>1–4</td>
<td>1–4</td>
<td>1–4</td>
<td>1–4</td>
<td>1–4</td>
<td>NA</td>
</tr>
</tbody>
</table>

\(^a\)Prices at outreach clinics were varied depending on the perceived financial status of women in the community.

\(^b\)Prices at outreach clinics were varied depending on the perceived financial status of women in the community.

\(^c\)Cost of LEEP included procedure and cost of review by pathologist.

\(^d\)No cost if patient is undergoing VIA-DC screening, otherwise approximately $2 fee.

\(^e\)Varies depending upon antibiotic regimen and requirement for partner treatment.

\(^e\)Varies depending upon method provided.

**Abbreviations:** LEEP, loop electrosurgical excision procedure; NA, services not available; RTI, reproductive tract infection; VIA, visual inspection with acetic acid; VILI-DC, visual inspection with Lugol’s iodine enhanced by digital cervicography.

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undergo; however, CBE, FP, and RTI treatment are administered to additional women.

**Fee-for-Service and Sustainability**
A fee is charged for most services provided by the WHP (Table 1). The fee is determined by a sliding scale based on the financial status of the community being served. However, the current practice for women who cannot afford to pay is to either screen and treat them at no or reduced charge or to ask them to pay later after the service is provided.

The CBCHS furnishes clinic space for the stationary WHP clinics in integrated health centers and hospitals at no charge, sterilization of equipment for a fee, and clinical support as needed. The WHP would not be sustainable without the infrastructure provided by CBCHS. Temporary WHP outreach clinic space is typically donated by the health center or community being served.

**Quality Improvement**
As part of quality improvement and program scale-up, all new WHP nurses are trained, supervised, and mentored by experienced WHP nurses until they demonstrate competency in VIA/VILI-DC, cryotherapy, biopsy, and other women’s health services. WHP nurses meet on a quarterly basis to review cervicographs and arrive at a consensus opinion on cervicograph quality, interpretation, and treatment/follow-up plans.

**RESULTS**

**Patient Population and VIA-DC Screening Results**
From March 2007 through December 2014, 46,048 women visited WHP clinics for cervical cancer screening. Of these women, 44,979 (97.7%) underwent screening with VIA-DC. The number of women screened at WHP clinics increased nearly every year (Fig. 2A), from 349 in 2007 to 12,191 in 2014. In 2012, the number screened decreased due to implementation of an human papillomavirus (HPV) vaccination demonstration project in WHP clinics, which temporarily altered the allocation of resources and effort of staff [43]. The dramatic increase in the number of women screened for cervical cancer was enabled by expanding WHP’s stationary clinics from one initial clinic in 2007 to seven total clinics by 2010 (Fig. 1).

Based on self-report, HIV-positive women comprised 11.0% of our screened sample. Of the remaining patients, 65.6% were HIV-negative and 23.5% were HIV-status unknown. In 2007, HIV-positive women comprised 44.1% of the women screened, because the initial screening targeted HIV clinics. However, the percentage of HIV-positive women fell to 19.8% in 2008 and stabilized between 5.3%–13.9% in the subsequent years, as the WHP promoted cervical cancer screening to women from the general population (Fig. 2B).

Of the 44,979 women screened, 66.8% were VIA-DC-negative, 9.0% were VIA-DC-positive, 22.0% were VIA-DC-inadequate, and 2.2% were VIA-DC-uncertain (Fig. 3). However, screening results varied over time. The percentage of women diagnosed as VIA-DC-negative varied inversely with the percentage diagnosed as VIA-DC inadequate, which peaked in 2011 at 39.2% when senior staff were pulled to work on the HPV vaccine project. The percentage of women diagnosed as VIA-DC-positive decreased from 19.2% in 2007 to 7.6% in 2014. The percentage of women diagnosed as VIA-DC-uncertain remained relatively stable.

Of the 4,042 total women who were VIA-DC positive, 754 (18.7%) received same-day cryotherapy (Fig. 3); however, we do not know what proportion of the 4,042 women who screened VIA-positive were eligible for cryotherapy by WHO criteria or how many women received cryotherapy at follow-up visits. As of 2014, over 500 LEEPs have been performed by WHP nurses without any adverse events reported.

**Other Women’s Health Services**
Of 12,390 women screened in 2014, nearly all women (99.4%) underwent CBE, and 98.3% had normal exams; 4.7% were treated or already on treatment for RTI, 18.6% were interested in learning more about safe and modern FP methods, and 2.9% were provided a method at the visit (Table 2).

**Program Sustainability**
To sustain the program, the WHP charges fees for all services offered, utilizes existing CBCHS infrastructure, and relies to a
limited extent on donations from external donors, private insti-
tutions, and individuals (approximately $20,000 per year). Over
$100,000 was collected in fees in 2014.

Table 3 summarizes challenges and lessons learned from the
implementation of cervical cancer screening using VIA-DC, pro-
grammatic improvements that have been implemented, and rec-
ommendations for further improvement at CBCHS, which could
be adopted by other LMICs running similar programs.

**DISCUSSION**

The WHP has successfully implemented the largest nurse-led
screen-and-treat cervical cancer screening program in Came-
eroon. The WHP screening program has two unique aspects: a
fee-for-service model for sustainability and simultaneous deliv-
er of other women’s health services for more comprehensive/
integrative health care. The funding model and concept of
offering multiple services in a single clinic rather than stand-
alone “silo” cervical cancer screenings should provide new
insight for other LMICs who plan to make an existing or new
cervical cancer screening program more accessible, sustainable,
and/or comprehensive.

The WHP’s nearly 8 years of experience clearly demonstra-
ates that VIA-DC is acceptable, feasible, scalable, and likely
sustainable, but has limitations. For example, we identified a
high rate of inadequate VIA-DC results (22.0%). The technique
has known limitations, particularly for older women, whose SCJ
has migrated into the endocervix; WHO recommends stopping
screening at age 50 years for this reason [44]. Furthermore, the
term “inadequate” is not a standard category in VIA programs.
For example, if the SCJ is not visible but the ectocervix is nor-
mal, even in the presence of minimally abnormal cytology [45],
it would be useful to determine optimal, low-
cost screening methods that offer a more specific diagnosis for
older women. Improved training can also affect outcomes. This
is demonstrated by the increase in inadequate results (39%)
when experienced nurses were pulled away from VIA-DC
screening clinics in 2011 in order to run the CBCHS HPV vacci-
nation program [43]. Upon return of these nurses to the clinic
in 2012, the inadequate rates fell to 22.0%. Inadequate rates
fell further, to 13.1% in 2014, upon additional training of WHP
nurses to better expose the endocervical canal.

The 2014 WHO cervical cancer screening guidelines include
multiple algorithms for HPV, VIA, and cytologic testing sequences
for low-resource settings [6]. WHP is exploring the possibility of
using HPV nucleic acid testing as a primary screen, followed by
VIA-DC of HPV-positive cases. However, the currently available
HPV diagnostic tools have significant limitations in low-resource
settings; they require either sending specimens to distant refer-
ence laboratories or running 30–90 specimens in a batch, making
same-day “screen-and-treat” strategies impractical. Furthermore,
cost of HPV testing is currently prohibitive, and requirement for
electricity and refrigeration increases infrastructure needs. Thus,
new rapid diagnostic tools are urgently needed for cervical can-
cer screening to be effective and robust in LMICs.

HIV-positive women have an increased risk for a positive
cervical cancer screen and for progression of precancerous
lesions to ICC; thus, knowledge of HIV status helps the WHP tri-
age patients for screening and treatment. The WHP relies pri-
marily on self-reported HIV status, and over 23% of women
screened by the WHP did not know their HIV status. Although
staff referred women who self-identified as HIV-negative or
unknown to trained HIV counselors for testing, they were
unable to confirm whether the women were actually tested. To

![Figure 3](http://theoncologist.alphamedpress.org/)

**Figure 3.** Women’s Health Program VIA-DC screening outcomes and cryotherapy reported by year. There were 44,979 women screened with VIA-DC from 2007–2014. (A): Screening outcomes were categorized as VIA-DC-positive, -negative, -inadequate, or -uncertain. (B): Number of women who underwent same-day cryotherapy for VIA-DC-positive lesions. (C): Tabulated frequency and rate of VIA-DC results by year; frequency of same-day cryotherapy by year. aMissing data include women whose screening year was not recorded. bData for inadequate category were not systematically collected until 2009.

Abbreviations: VIA-DC, visual inspection with acetic acid enhanced by digital cervicography.
overcome this, in 2015, the WHP began offering same-day HIV counseling and testing to women whose HIV status was unknown or who tested negative more than a year prior. HIV-positive women are then referred to the AIDS Care and Treatment Clinics.

Our experience has shown that, if cervical cancer control programs offer other women's health services like CBE, FP, or RTI treatment, they will be utilized. Although breast cancer screening with mammography is not feasible in most LMICs at this time, CBE is an effective way of increasing awareness about breast cancer and possibly down staging disease burden at diagnosis and requires few resources [46]. While only 19% and 4.7% of women screened for cervical cancer desired information about FP or needed treatment for RTI, respectively, the WHP provided these services to many other women who were not screened for cervical cancer (e.g., under age 25 and ineligible for cervical cancer screening). In 2015, the WHP had 8,058 FP visits, of which 4,345 were first visits and 3,185 were revisits.

### Table 2. Utilization of women’s health services by 12,390 women attending Women’s Health Program (WHP) clinics in 2014

<table>
<thead>
<tr>
<th>Category</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Breast health</strong></td>
<td></td>
</tr>
<tr>
<td>Underwent clinical breast exam</td>
<td>12,319 (99.4)</td>
</tr>
<tr>
<td>Finding:</td>
<td></td>
</tr>
<tr>
<td>Normal breast exam</td>
<td>12,108 (98.3)</td>
</tr>
<tr>
<td>Nipple retraction</td>
<td>9 (0.1)</td>
</tr>
<tr>
<td>Discoloration</td>
<td>3 (&lt;0.1)</td>
</tr>
<tr>
<td>Mastitis</td>
<td>5 (&lt;0.1)</td>
</tr>
<tr>
<td>Mass</td>
<td>73 (0.6)</td>
</tr>
<tr>
<td>Axillary lymphadenopathy</td>
<td>4 (&lt;0.1)</td>
</tr>
<tr>
<td>Nipple discharge</td>
<td>9 (0.1)</td>
</tr>
<tr>
<td>Other finding</td>
<td>25 (0.2)</td>
</tr>
<tr>
<td><strong>Management</strong></td>
<td></td>
</tr>
<tr>
<td>Referral for further evaluation</td>
<td>16</td>
</tr>
<tr>
<td>Referral for breast ultrasound</td>
<td>20</td>
</tr>
<tr>
<td>Referral for FNA</td>
<td>44</td>
</tr>
<tr>
<td><strong>Reproductive tract infections</strong></td>
<td>580 (4.7)</td>
</tr>
<tr>
<td>Received or currently on treatment for</td>
<td></td>
</tr>
<tr>
<td>reproductive tract infection</td>
<td></td>
</tr>
<tr>
<td>Candida</td>
<td>147 (25.3)</td>
</tr>
<tr>
<td>Trichomonas</td>
<td>89 (15.3)</td>
</tr>
<tr>
<td>Bacterial Vaginosis</td>
<td>51 (8.8)</td>
</tr>
<tr>
<td>Cervicitis</td>
<td>123 (21.2)</td>
</tr>
<tr>
<td>Pelvic inflammatory disease</td>
<td>159 (27.4)</td>
</tr>
<tr>
<td>Genital ulcer</td>
<td>4 (0.6)</td>
</tr>
<tr>
<td><strong>Family planning</strong></td>
<td>2308 (18.6)</td>
</tr>
<tr>
<td>Interest in learning more about safe/modern</td>
<td></td>
</tr>
<tr>
<td>family planning methods</td>
<td></td>
</tr>
<tr>
<td>Counseling</td>
<td>94</td>
</tr>
<tr>
<td>Male Condoms</td>
<td>13</td>
</tr>
<tr>
<td>Female condoms</td>
<td>5</td>
</tr>
<tr>
<td>Depo-provera</td>
<td>9</td>
</tr>
<tr>
<td>Oral contraceptive pill</td>
<td>14</td>
</tr>
<tr>
<td>Intrauterine device</td>
<td>171</td>
</tr>
<tr>
<td>Implant</td>
<td>47</td>
</tr>
<tr>
<td>Tubal Ligation</td>
<td>1</td>
</tr>
<tr>
<td>Vasectomy</td>
<td>1</td>
</tr>
<tr>
<td>Other family planning method</td>
<td>2</td>
</tr>
<tr>
<td>Calendar method</td>
<td>0</td>
</tr>
<tr>
<td>**Total number who presented for VIA-DC</td>
<td>12,390</td>
</tr>
<tr>
<td>screening in 2014**</td>
<td></td>
</tr>
</tbody>
</table>

In addition to cervical cancer screening, women’s health services, including clinical breast exams, family planning, and treatment of reproductive tract infections, are offered at WHP clinics.

Abbreviations: FNA, fine needle aspirate; VIA-DC, visual inspection with acetic acid enhanced by digital cervicography.
### Table 3. WHP cervical cancer prevention intervention: challenges, lessons learned, solutions implemented, and recommendations for additional improvement at Cameroon Baptist Convention Health Services, which could be adopted by other low-and-middle-income countries running similar programs

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Lessons learned</th>
<th>Solutions implemented</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of access to screening and treatment</td>
<td>Women in rural areas are underserved.</td>
<td>WHP created an outreach program using a renovat ed ambulance or local buildings to provide clinical services.</td>
<td>Provide all outreach clinics in local buildings where possible, as ambulance maintenance and operating costs are prohibitive.</td>
</tr>
<tr>
<td></td>
<td>High rate of VIA-DC inadequate results makes treatment deci sions more difficult.</td>
<td>WHP trained providers in techniques to fully visualize the cervix and transformation zone to reduce inadequate results.</td>
<td>If HPV testing is available and affordable, integrate it with VIA-DC: women who are both HPV-negative and VIA-DC-negative or inadequate should follow up in 3–5 years; HPV-positive and VIA-DC-negative women should follow up in 1 year or should be treated with cryotherapy.</td>
</tr>
<tr>
<td></td>
<td>A high proportion of women screened do not know their HIV status (23%).</td>
<td>WHP referred women who did not know their HIV status for counseling and testing but did not follow up to determine their HIV status.</td>
<td>Offer same-day rapid HIV testing that is integrated into WHP services so that appropriate clinical care can be provided based on current HIV status.</td>
</tr>
<tr>
<td>Lack of resources</td>
<td>Although many women and families are able to pay fees for screening and treatment of precancers, fees are a barrier to services for many poor patients.</td>
<td>When WHP recognized that fees were a barrier, women who could not afford to pay were screened and treated at no or reduced charge or asked to pay later.</td>
<td>Implement income-stratified fee-for-service program with safety net for women unable to pay. Determine whether your institution can subsidize fees and still be self-sustaining.</td>
</tr>
<tr>
<td></td>
<td>Cryotherapy is not always available: CO₂ gas is expensive and difficult to get, tanks are bulky and difficult to transport, and cryoguns malfunction and need to be repaired.</td>
<td>WHP acquired two thermal coagulation machines. Trained nurses treat with thermal coagulation instead of cryotherapy. Advantages include portability, uses commercial electricity or a portable generator, does not require expensive CO₂ gas and heavy tanks.</td>
<td>Convert to universal use of thermal coagulation instead of cryotherapy by acquiring more thermal coagulation machines and training more nurses in their use.</td>
</tr>
<tr>
<td></td>
<td>Women have health needs beyond cervical cancer screening.</td>
<td>WHP offers family planning services, treatment of reproductive tract infections, and breast cancer screening.</td>
<td>Systematically assess unmet family planning needs for all women of reproductive age who receive care through your institution and strive to provide same-day services.</td>
</tr>
<tr>
<td>Sensitizing spouses and communities in a culturally appropriate manner</td>
<td>Lack of understanding of the importance of detecting and treating precancers.</td>
<td>WHP nurses and knowledgeable peer educators conduct community sensitization campaigns prior to offering outreach clinics.</td>
<td>Expand education to all patients receiving care at health facilities, especially HIV-positive patients.</td>
</tr>
<tr>
<td></td>
<td>Barriers to same-day cryother apy include 4-week abstinence period, lack of funds to pay fees, and need to get spousal, family, or relatives’ approval.</td>
<td>Community and client sensitization includes information on treatment side effects, including the need for 4 weeks of abstinence.</td>
<td>Educate both men and women on the importance of cervical screening and treatment and the fees charged. Allow women to make a phone call from the clinic to discuss same-day treatment with their husband prior to being screened. Ensure that women with treatable precancer receive treatment regardless of ability to pay.</td>
</tr>
<tr>
<td>Follow-up data on the outcomes of treatment are lacking</td>
<td>Outcomes of treatment cannot be determined with the current medical record system in WHP clinics.</td>
<td>WHP developed follow-up forms, which were systematically implemented in 2013, and data were entered into a database linked to the enrollment data.</td>
<td>Obtain external funding to set up an appointment system and develop and implement active follow-up of women who need treatment or who have received treatment.</td>
</tr>
</tbody>
</table>

Abbreviations: HPV, human papillomavirus; VIA-DC, visual inspection with acetic acid enhanced by digital cervicography; WHP, Women’s Health Program.
and these data are not captured in the cervical cancer screening database. Through offering these additional services, the WHP has expanded its reach and role in the community and its public health impact. In 2015, Cameroon’s maternal mortality ratio was 590 per 100,000, 12th highest in the world [47]. Many of these deaths are preventable through FP, now commonly called “healthy timing and spacing of pregnancy.”

Currently, most cervical cancer screening services in African countries are wholly funded by donors and tend to operate as stand-alone projects with an uncertain future [7, 48]. While other program models may assume that screening in LMICs is only feasible if provided at no cost to the patient and therefore are primarily dependent on grants or donors, there is evidence to show that women and families in LMICs may be willing to pay a fee for these services [22, 23]. The WHP, despite charging fees, has experienced an increase in patient volume for cervical cancer screening nearly every year since its establishment in 2007. However, we have identified that fees are barriers to uptake of same-day treatment. Similarly, a recent report shows that nearly one fifth of patients presenting to a CBCHS surgical clinic with a treatable condition did not ultimately receive needed surgery, due in part to financial factors [49]. This challenge undermines the value of VIA-DC screening and is a significant shortcoming of the WHP that is being actively addressed. For example, WHP considered bundling the cost of treatment into the screening fees, as a strategy to eliminate the additional cost of treatment for women who require it, but this raised the cost of screening to a level that was a barrier to most women. Thus, an ongoing challenge is how to structure fees so that all women can afford to be screened, and those with indications for treatment can receive it regardless of ability to pay, while still generating enough income to sustain the program. In Banso, one of the seven WHP clinics, same-day cryotherapy rates increased from 6% to 52% between 2012–2013 through an increase in patient and provider education on the importance of treatment and having women pay later for the cost of treatment.

CONCLUSION

The WHP’s 8 years of experience using a fee-for-service model for cervical cancer screening clearly demonstrates that using VIA-DC in Cameroon is acceptable, feasible, and scalable. The fee-for-service payment system has allowed for a nearly self-sustaining program and may serve as a model for other LMICs that require a cost-recovery model to implement cervical cancer screening. Integration of other women’s health services into cervical cancer screening programs can facilitate access to more comprehensive care.

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AUTHOR CONTRIBUTIONS


DISCLOSURES

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