

—guidelines—

CERVICAL CANCER CLINICAL GUIDELINES



MINISTRY OF HEALTH
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Acknowledgment

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Foreword

The national cervical cancer committee of Belize is comprised of representatives from the government, non-governmental organizations, the private health sector, and the Belize Cancer Society.

The committee advocates with policy makers, and provides health information and education to target populations and the general public on the prevention and control of cervical cancer. The committee has also provided support to patients in need for specialized services locally and abroad.

Since the latter part of 2015, the committee embarked on the updating of the cervical cancer clinical guidelines and procedure manual, the development of a policy document, and an update of the national strategic plan.

The committee, through IPPF/WHR Member Association the Belize Family Life Association (BFLA), received technical assistance and financial support from partner agencies involved with cervical cancer prevention and control. These agencies are the IPPF/WHR, the Union for International Cancer Control (UICC) and Jhpiego.

The cervical cancer clinical guidelines were created in order to ensure that health workers from all sectors have a standardized approach to the prevention and control of cervical cancer.

Acronyms

ASR: Age-standardized rate

BFLA: The Belize Family Life Association

CCPC Strategic Plan: Cervical Cancer Prevention and Control Strategic Plan

CIN: Cervical intraepithelial neoplasia

CKC: Cold Knife Conization

ECC: Endocervical curettage

HLD: High-level Disinfection

IPPF/WHO: International Planned Parenthood Federation–Western Hemisphere Region

HPV: Human Papilloma Virus

Jhpiego: Johns Hopkins Program for International Education in Gynecology and Obstetrics

LEEP: Loop Electrosurgical Excision Procedure

MC: Male circumcision

M&E: Monitoring and evaluation

MOH: Ministry of Health

NGO: Non-governmental organization

SCJ: Cervical squamocolumnar junction

SS: Supportive Supervision

STI: Sexually Transmitted Infection

SVA: Single Visit Approach

QC: Quality control

QI: Quality improvement

VIA: Visual Inspection with Acetic Acid

VILI: Visual Inspection with Lugol's Iodine

WHO: World Health Organization

1. Summary of Cervical Cancer Prevention and Control Guidelines

Primary Prevention	Behavior Change ■ Health messages and sexuality education aimed at reducing higher risk sexual behaviors ■ Condom distribution HPV vaccination ■ School-based program targeting 10 year-old girls (within the 9–13 year age group)
Secondary Prevention	Screening (HIV-negative or unknown status) ■ Screening Methods: ■ VIA (where available) for women up to 49 years of age, or when the SCJ can be visualized; or ■ Pap smear for women 25 years of age or older. To be used in women 50 years of age or older if SCJ cannot be visualized. ■ Target population: Women 25 – 49 years of age. Note: no woman wishing to be screened will be denied services. ■ Screening Frequency: Every three years. Every woman should be screened at least once in their lifetime between 30 – 49 years of age. Efforts should be made to screen more women at least once in the target age group, rather than re-screening the same women repeatedly. Screening (HIV-positive) ■ Screening Methods: ■ VIA (where available) for women up to 49 years of age, or when the SCJ can be visualized; or ■ Pap smear for women 25 years of age or older. To be used in women 50 years of age or older if SCJ cannot be visualized. ■ Target population: Start screening in HIV-positive girls and women of any age, once known HIV-positive status and she has initiated sexual activity. ■ Screening Frequency: Yearly. Every woman should be screened at least in their lifetime between 25–49 years of age. Treatment of Cervical Pre-cancer ■ Cryotherapy for eligible lesions. When using VIA as the screening test, cryotherapy should be ideally done during the same visit as the screening – the single visit approach (SVA). ■ Loop Electrosurgical Excision Procedure (LEEP) for large lesions or those ineligible for cryotherapy. Can also be used for lesions eligible for cryotherapy. ■ Post-treatment: Follow-up in one year for re-screening
Tertiary care	■ Referral to gynaecologist oncologist for staging ■ Management according to stage ■ Palliative care

Screening algorithm for women in target population (** If the woman is HIV +, start screening at any age, once sexually active; if screening test is negative, re-screen in one year.)

Figure 1 | Screen for cervical cancer and treat pre-cancerous lesions

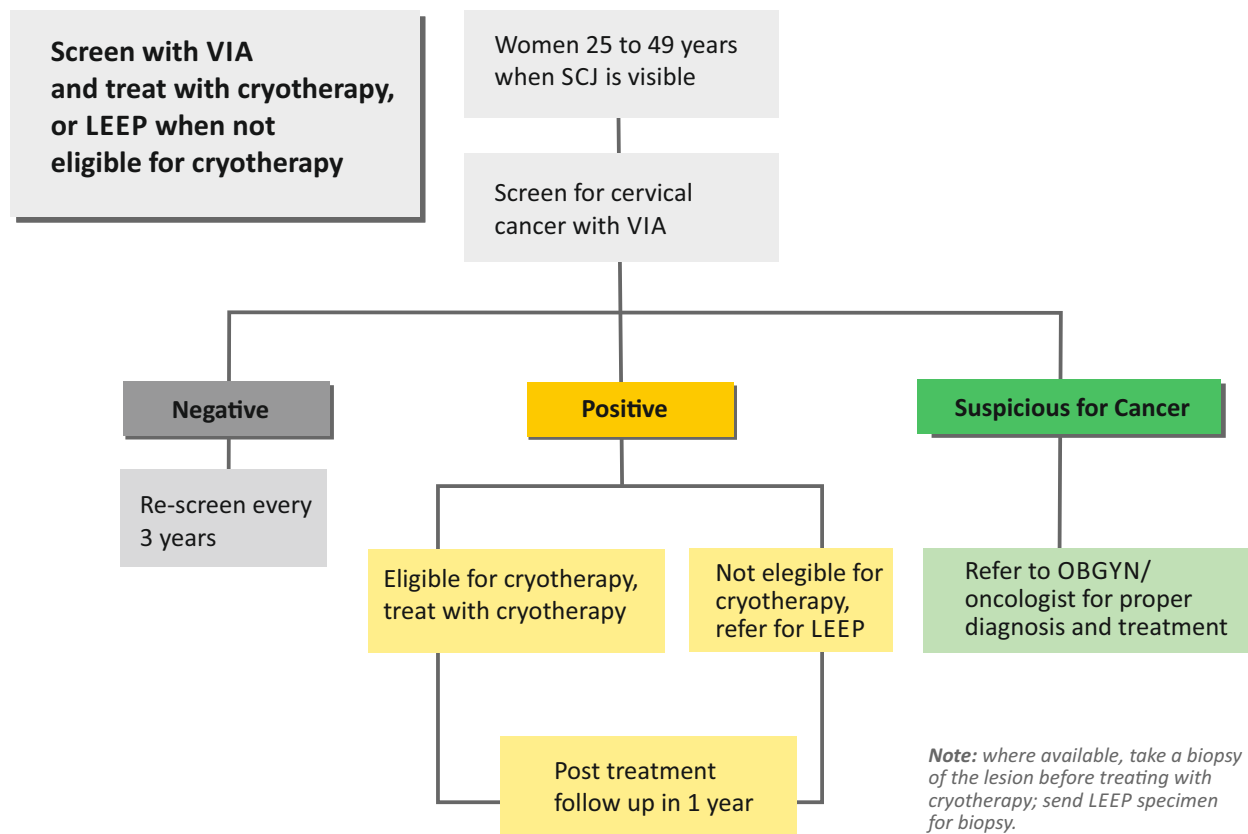


Figure 2 | Pap smear algorithm

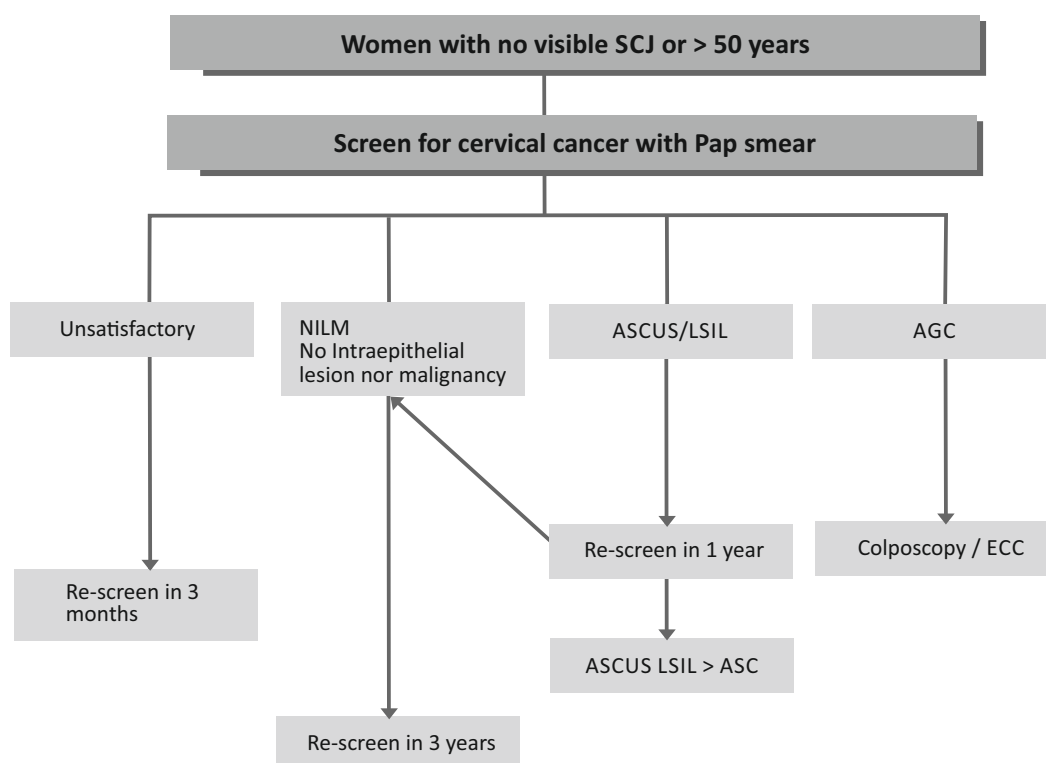
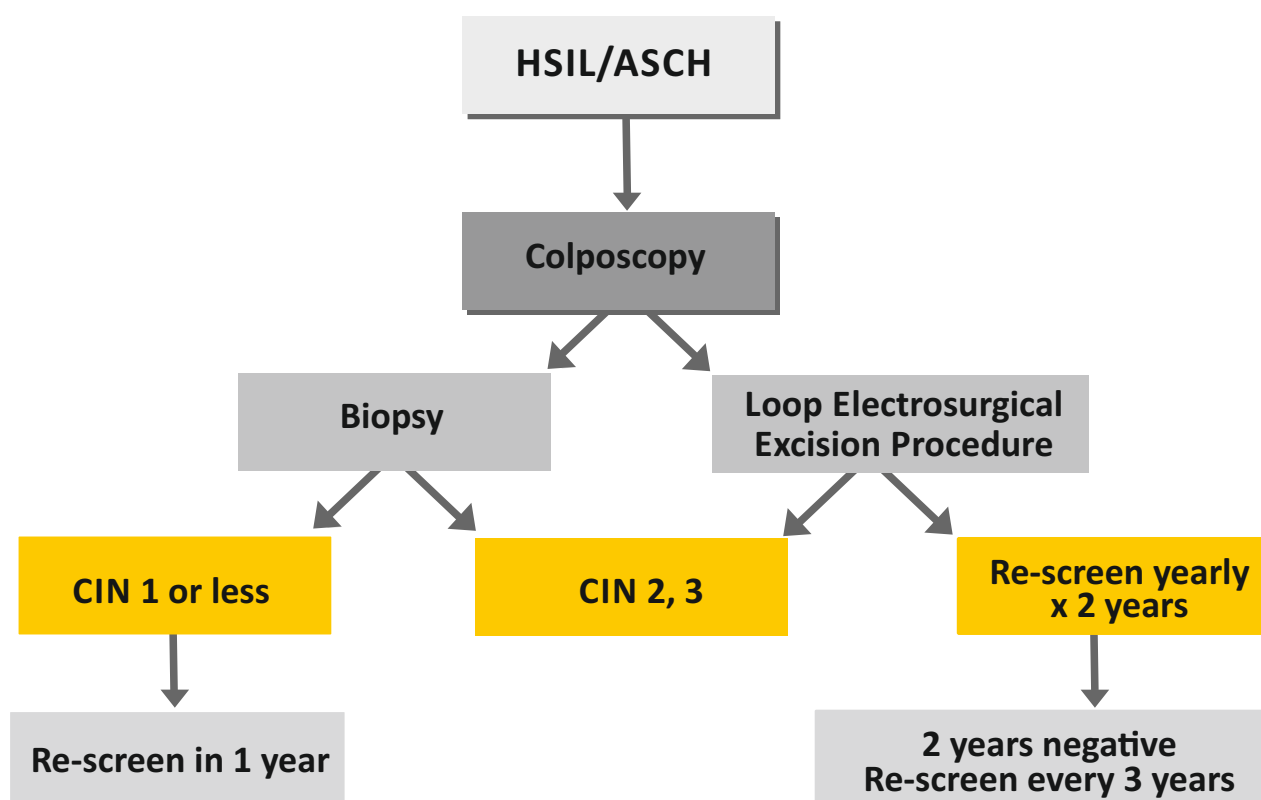


Figure 3 | Management of HSIL/ASCH



2. Background

Global Epidemiology of Cervical Cancer

Cervical cancer is the fourth most common cancer in women in the world, the second most common cancer in women in less developed countries, and the leading cause of cancer mortality among women in Belize (GLOBOCAN 2012). In 2012, there were an estimated 528,000 new cases resulting in 266,000 deaths. The large majority (around 85%) of the global burden occurs in the less developed regions (Figures 4 and 5). The trend of cervical cancer burden in less-developed countries is worsening, with estimates of burden increasing over time from the current 85% to an estimated 98% by 2030 (Ferlay 2008). Yet, when pre-cancerous lesions are detected and treated, cervical cancer is almost completely preventable with survival rates of nearly 100% (ACCP2004; Castilaw 2007)

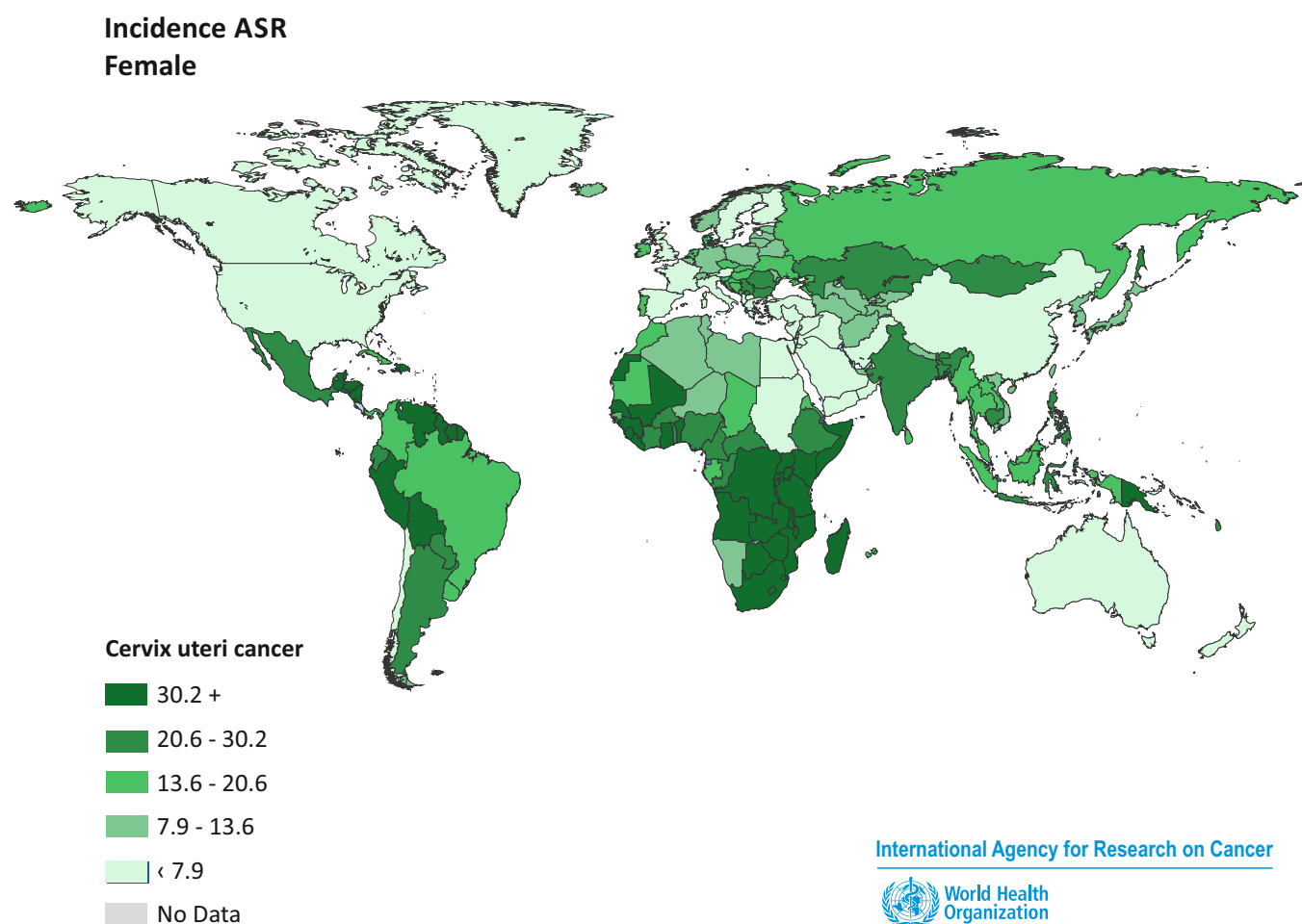
In high-income countries with high-quality, organized cervical cancer prevention programs, early diagnosis and treatment of pre-cancerous lesions has led to significant reductions in burden of disease, with the incidence of cervical cancer decreased by a remarkable 70–80%. These programs have been difficult to replicate in less developed countries due to lack of resources and the multi-step process involved. The process typically entails cytology screening or Pap smear, followed by a separate visit for colposcopy and confirmatory cervical biopsy if screen positive, histopathology

processing of specimen, and finally another visit for treatment for confirmed CIN2+. Replicating the success of cytology-based screening programs seen in many high-income countries has proven difficult in resource-poor countries. This is due to many reasons, including (ACCP 2007; Sankaranarayanan 2005, Anorlu 2008, WHO 2013B):

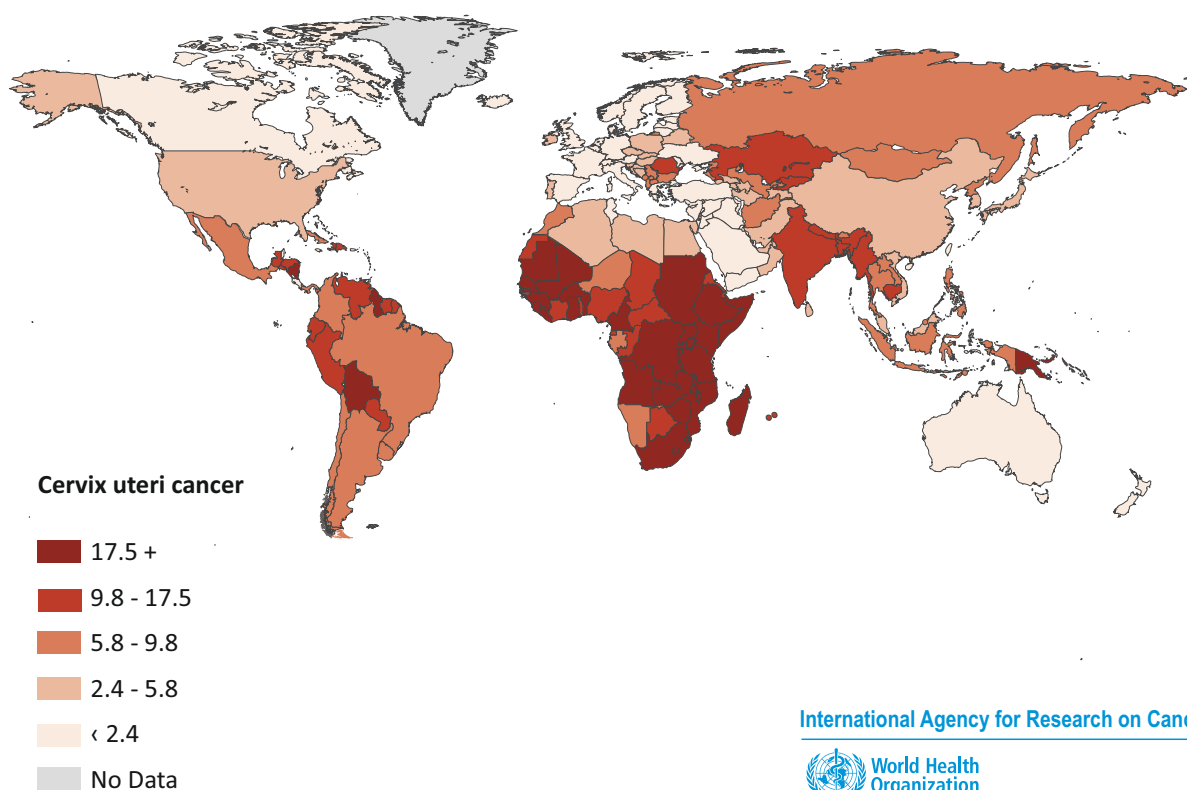
- competing health priorities such as HIV/AIDS, maternal mortality and malaria, among many others;
- substantial human resources, equipment and supplies required, often lacking in many countries;
- a multi-visit process for screening and treatment, if indicated; and
- other bottlenecks associated with long wait times for cytology or histopathology results; and referral to distant health facilities for further management, create barriers for women accessing services

Default rates are a significant problem in a multi-step process, with an attrition rate of 10–25% for each step not unusual, and reports of up to 50–80% of women not receiving recommended treatment due to loss to follow-up (ACCP 2004, Bingham 2003, Cronje 2004). Additionally, many of these settings lack a well-organized surveillance and recall system.

Figure 4 | Estimated age-standardized cervical cancer incidence rates



Source GLOBOCAN 2012"

Figure 5 | Estimated age-standardized cervical cancer mortality rates**Mortality ASR
Female**

Source GLOBOCAN 2012

Human Papilloma Virus (HPV)

Human papilloma virus (HPV) is highly transmissible and is the most common sexually transmitted infection (STI). It is known to cause over 99% of cases of cervical cancer, and current estimates suggest that the majority of sexually active individuals will get infected in some point of their lives (CDC 2012). Infection with some types of genital HPV can cause genital warts and abnormal tissue growth and other changes to cells within the cervix, which can sometimes lead to cervical cancer if left untreated. There are more than 100 genotypes of HPV, but only a small subset is considered oncogenic or high risk HPV and associated with cervical cancer. HPV types 16 and 18 are the most common types of HPV associated with cervical cancer with type 16 consistently being the most oncogenic independent of geographic location.

Persistent infection with High Risk HPV is the most important risk factor in developing pre-cancer and cancer. Important co-factors that increase the likelihood of HPV persistence are HIV infection and cigarette smoking (CDC 2012; ACOG 2016; WHO 2009; WHO 2013A). The peak time of HPV infection is shortly after an individual becomes sexually active, occurring most commonly in teenagers and women in their early twenties. Most young women have an effective immune response that will clear infection quickly, and as a result, most women in this group do not have persistent HPV infection (CDC 2012; ACOG 2013; ASCCP 2013)

Persistent HPV may progress to cervical intraepithelial neoplasia (CIN). When HPV is detected in women 30 years or older it most likely corresponds to persistent HPV with higher risk for more significant pre-cancerous lesions (CIN2+) that are less likely to regress spontaneously (about 50%). If left untreated, these pre-cancerous lesions can progress into invasive cervical cancer.

The progression from CIN2+ to invasive cervical cancer is relatively slow with an average of about 8–12 years. This prolonged period of the pre-cancerous stage offers excellent opportunities to detect the presence of pre-cancerous lesions and treat them to prevent progression to invasive cervical cancer (Holowaty 1999; ACOG 2013; ASCCP 2013; WHO 2014; WHO 2013B).

Cervical Cancer Burden in Belize

Cervical cancer is the second leading cause of cancer mortality among women in Belize, with an age-standardized rate (ASR) of 14.9 per 100,000 (GLOBOCAN 2012). Cervical cancer incidence and mortality rates in Belize are 1.5 and 1.7 times higher (respectively) than the Latin American and Caribbean (LAC) region's average; and 4.9 and 5.7 times higher incidence and mortality rate respectively when compared to North America (Table 1).

Table 1 | Cervical cancer incidence and mortality rate

Country/Region	Incidence Rate (per 100,000)	Mortality Rate (per 100,000)
Belize	32.7	14.9
LAC	21.2	8.7
North America	6.6	2.6

Source: GLOBOCAN 2012

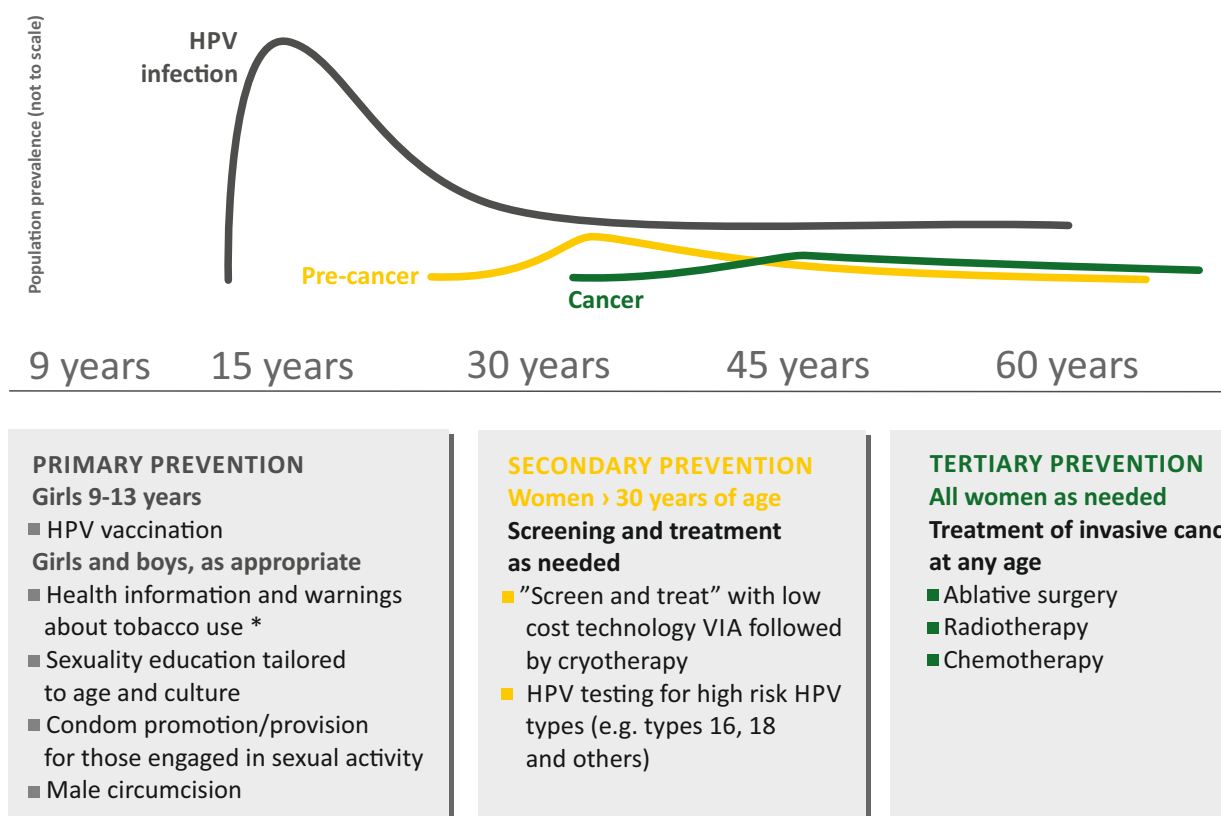
In 2013, the Epidemiology Unit at the Ministry of Health (MOH) issued a report on cancer in Belize. The report represents data from the years 2011–2012. A total of 266 cases of cancer were documented and reported by providers (public, private and NGO) with a standardized cancer rate of 59/100,000 population. Cervical cancer makes up one out of every four cases of cancer (23%). Sixty cases of cervical cancer were documented and reported; 68% of cases occurred in the age group of 15–49 years; Belize district had the highest and Corozal the lowest incidence rates with 25.98 and 4.75/100,000 respectively; the mean age at diagnosis/death is 45.5/47.4 respectively (minimum 28 and maximum 72) with a SD 13.478. The country's standardized cervical cancer rate was reported as 21.4/100,000 population (MOH, Epidemiology Unit, A. Andrewin. 2013).

¹ Report. Cancer data explorations and assessment exercise. 2013

3. Cervical Cancer Prevention and Control: A Continuum of Care

A comprehensive approach to cervical cancer prevention and control requires applying effective interventions along a continuum of care throughout the life cycle. This includes primary prevention, secondary prevention, and tertiary prevention, as well as palliative care, and all the activities that support these interventions (Figure 6).

Figure 6 | Continuum of care to prevent HPV infection and cervical cancer



3.1 Primary Prevention

Guidelines

Primary Prevention	Behavior Change ■ Health messages and sexuality education aimed at reducing higher risk sexual behaviors ■ Condom distribution HPV vaccination ■ School-based program targeting girls 10 years old (within the 9–13 year age group)
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Because nearly all cervical cancer cases are caused by HPV, primary prevention of cervical cancer means preventing genital HPV infection from occurring in the first place.

Complicating this task is that HPV is highly transmissible, and is the most common STI. The majority of sexually active individuals will become infected with HPV at some point in their lives, with the peak incidence of infection occurring shortly after an individual becomes sexually active (WHO 2009; WHO 2013B; ACOG 2016; Vaccarella 2006).

Prevention of HPV infection can be achieved through 1) Behavior change to reduce risk of exposure to HPV and 2) Biological mechanisms, such as HPV vaccination

1. Behavior change approaches to reduce risk of exposure to HPV

Abstinence, delayed onset of sexual activity, reduced number of sexual partners (and partners' partners), and correct, consistent condom use can all decrease the risk of HPV exposure.

Delaying sexual activity, limiting the number of sexual partners: Since HPV is a sexually transmitted infection, it is not unexpected that key behavioral risk factors which increase the risk of HPV infection are related to sexual behavior and include: 1) early age of first sexual intercourse 2) multiple sexual partners 3) partners with multiple sexual partners 4) lack of correct and consistent condom use (WHO 2014). Early age of first sexual intercourse, though, is a distinctly important risk factor. The changes occurring in the cervix around menarche (the physiological immaturity of the cervix), makes it particularly vulnerable to HPV infection. This vulnerability is believed to be due to relatively large areas of cervical ectopy with rapid metaplastic changes occurring at the SCJ, and these cells being particularly susceptible to HPV infection (Kahn 2002).

Correct and consistent condom use: Since HPV can infect areas beyond those covered by condoms, condom use provides only partial protection against HPV infection. Even that partial protection, though, is important, especially since condoms provide additional benefits, such as protection against HIV and other STIs, as well as prevention of unwanted pregnancy (WHO 2014).

Prevention of HIV and other STIs: The interaction of HIV and HPV infection has been discussed earlier. Since HPV is a sexually transmitted infection, any effort to reduce the risk of STIs will also decrease the risk of HPV infection.

Smoking cessation: Tobacco use is an important environmental risk factor for the development of cervical pre-cancer and cancer, though its role in the pathogenesis is not well understood. Some studies suggest a direct oncogenic effect of chemical carcinogens found in tobacco, while others suggest that smoking causes suppression of cell-mediated immunity against HPV infection, thus increasing the risk of cervical pre-cancer and cancer. This effect appears to be related to current users and is dose-dependent, such that the longer and heavier the tobacco use, the greater the risk of cervical disease (Gadducci 2011).

The impact of long-term oral contraceptive (OC) use on the risk of developing cervical cancer continues to be debated. However, among long-term, continuous users of OCs, the risk of cervical cancer appears increased; for OC use 5–9 years, 60% increase, for ≥ 10 years, double the risk. Cervical cancer risk decreases rapidly upon discontinuation of the OCs. Given the benefits of OCs, WHO and most providers do not recommend limiting the use of OCs (Gadducci 2011, WHO 2014).

2. HPV vaccination prior to exposure, i.e., before initiating sexual activity

Among the primary prevention approaches, HPV vaccination is the most effective and reliable method and holds the greatest promise for having a significant impact on cervical cancer rates. HPV vaccination does not treat HPV infection, pre-cancer or cancer. Its effectiveness is based on the principle of vaccination prior to exposure and infection with HPV. WHO, therefore, recommends vaccinating girls in the target age group of 9 – 13 years, in the hope of reaching them before sexual debut (CDC 2012; WHO 2009; WHO 2013A; ACOG 2014).

Two types of HPV vaccines currently exist: the bivalent vaccine (Cervarix), which protects against HPV 16 and 18; and the quadrivalent vaccine (Gardasil), which protects against HPV 6, 11, 16, and 18. HPV 6 and 11 are associated with the development of benign anogenital warts, but are not associated with the development of cervical cancer. Therefore, Gardasil protects against both cervical cancer and genital warts. Each of the vaccines is administered in three doses over a six-month period. WHO estimates current market prices for the vaccines run from less than USD 10 to more than USD 100 per dose, while the total start-up and operational costs to deliver the three doses are estimated at USD 7.20 per girl (CDC 2012; WHO 2009; WHO 2013A; ACOG 2014).

The cumulative evidence to date is that these two vaccines are effective in preventing over 95% of clinical disease (CIN2+) from HPV 16 and 18 for at least 5 years. The duration of protection following vaccination is unknown, but the study populations followed have not shown evidence of declining protection, either from clinical disease (CIN 2+) or antibody titers. The need for booster vaccination in the future has not been determined, but currently appears unnecessary. HIV-positive individuals can receive the HPV vaccine, but their immune response may be less in their HIV-negative counterparts. These vaccines also appear to provide limited cross-protection against other less common oncogenic HPV genotypes (CDC 2012; WHO 2009; WHO 2013A; ACOG 2014; CIDRZ 2013).

For further reading on HPV vaccination, see WHO Guidance Note (WHO 2013A).

Male circumcision (MC): MC has long been associated with reduced risk of cervical cancer in the wives of circumcised men. Further study is warranted, however, because a study in Uganda demonstrated that MC was associated with a lower incidence in men of multiple HR-HPV types and increased clearance of HR-HPVs as compared to controls (14.8% vs. 22.3%, respectively) (Gray 2010). Yet, MC was not associated with decreased incidence or increased clearance of HR-HPV in the female partners of circumcised men 24 months after the procedure, as compared to partners of men in the control group (Tobian 2011).

As outlined in the 2016 – 2020 Cervical Cancer Prevention and Control Strategic Plan (CCPC Strategic Plan), primary prevention through behavior change will focus efforts on a sustained education campaign, sexuality education implemented in schools, as well as promotion and distribution of condoms. The CCPC Strategic Plan also aims to introduce HPV vaccination using a school-based vaccination strategy and focusing on girls 10 years old, in the Standards 4 classes.

3.2 Secondary Prevention

Guidelines

Secondary Prevention

Screening (HIV-negative or unknown status)

■ Screening Methods:

- **VIA (where available)** for women up to 49 years of age, or when the SCJ can be visualized; or
- **Pap smear** for women 25 years of age or older. To be used in women 50 years of age or older if SCJ cannot be visualized.

- **Target population: Women 25 – 49 years of age.** **Note:** No woman wishing to be screened will be denied services.

- **Screening Frequency: Every three years.** Every woman should be screened at least once in their lifetime between 30 – 49 years of age. Efforts should be made to screen more women at least once in the target age group, rather than re-screening the same women repeatedly.

Screening (HIV-positive)

■ Screening Methods:

- **VIA (where available)** for women up to 49 years of age, or when the SCJ can be visualized; or
- **Pap smear** for women 25 years of age or older. To be used in women 50 years of age or older if SCJ cannot be visualized.

- **Target population:** Start screening in HIV-positive girls and women of any age, once her HIV-positive status is known and she has initiated sexual activity.

- **Screening Frequency: Yearly.** Every woman should be screened at least once in their lifetime between 25–49 years of age.

Treatment of Cervical Pre-cancer

- **Cryotherapy** for eligible lesions. When using VIA as the screening test, cryotherapy should ideally be done during the same visit as the screening – the **single visit approach (SVA)**.
- **LEEP** for large lesions or those ineligible for cryotherapy. Can also be used for lesions eligible for cryotherapy.
- **Post-treatment:** Follow-up in **one year** for **re-screening**

A successful secondary prevention pillar of a national cervical cancer prevention program requires the following elements to be present (WHO 2014):

- An accurate screening test
- Linkage to effective treatment
- High coverage (> 80%) of the population at highest risk for developing cervical cancer (target population)
- Effective linkages among all components of the program (primary prevention, secondary prevention, and tertiary care)
- Adequate resources (human, equipment, and supplies)
- Feasibility, acceptability, and cost-effectiveness

Effective screening can reduce the incidence of cervical cancer by detecting and treating pre-cancerous lesions before they progress to cancer, as well as identifying cervical cancer at an earlier, more treatable stage. However, an extremely accurate screening test is useless unless it is effectively linked with treatment.

3.2.1 Target Population and Screening Frequency

Screening women who are HIV-negative or of unknown status

- Target population is women who are **25 – 49 years of age**

Screening women who are HIV-positive

- Start screening in HIV-positive girls and women of **any age**, once HIV-positive status is known and she has initiated sexual activity.

VIA can be used in women until the SCJ cannot be visualized (generally for women 50 years of age or older, but this is variable).

Pap smear can be used in women of any age. Pap smear should be used in women 50 years of age or older if the SCJ cannot be visualized, as well as in any woman if the SCJ cannot be visualized.

Screening should not be denied to any woman who desires screening. However, women younger than the target age group (except those who are HIV-positive, see below), should be counseled about their risk and recommendations for screening, after informed consent has been obtained. This is also presents an excellent opportunity for providing information to reduce risk of HPV infection.

Women who have undergone a total hysterectomy (cervix removed) for benign reasons (e.g. fibroids) and has no prior history of CIN 2 or 3, or adenocarcinoma in situ, should not be screened. Any woman who requires screening and has had her cervix surgically removed (e.g. early stage cervical cancer), should have a Pap smear done of her vaginal cuff. VIA is not an appropriate screening method in this case.

Screening Frequency

In women who are HIV-negative or of unknown status:

- **Screen every three years** following a normal test. Every woman should be **screened at least once in their lifetime between 25 – 49 years of age.**

In women who are HIV-positive:

- **Screen yearly** following a normal test. Every woman should be **screened at least once in their lifetime between 25 – 49 years of age.**

Note: Efforts should be made to screen more women at least once in the target age group, rather than re-screening the same women repeatedly.

3.2.2 When to Screen

It is not harmful to perform a Pap smear or VIA during pregnancy, since treatment would need to be delayed until at least six weeks postpartum. However, it is preferable to screen when a woman is not pregnant and at least six weeks postpartum so treatment can be performed if a pre-cancerous lesion is detected.

Pap smear

Blood, discharge, and some lubricants may interfere with Pap smear specimen interpretation. Therefore, it is preferable to perform the Pap smear between menstrual bleeding patterns. If using a lubricant with the speculum examination, use a very small amount.

VIA

Unlike Pap smears, VIA can be performed any time during the menstrual cycle. However, if the woman is bleeding heavily, and the provider is confident it is menstrual bleeding and not due to cervical or other pathology, the woman should be asked to return for screening after her menstrual bleeding ends.

When to Stop Screening

Women older than 65 years of age after adequate negative prior screening results. Women with a history of CIN 2 or 3, or adenocarcinoma in situ should continue screening for 20 years following appropriate treatment.

3.2.3 Screening Tests: Overview

Characteristics of a good screening test (WHO 2014):

- Accurate: the result of the test is correct
- Reproducible: repeating the same test will give the same result
- Inexpensive: affordable to the health system and client
- Relatively easy: can be easily performed and can provide follow-up care for women with abnormal results
- Acceptable: both the client and the provider agree on screening
- Safe: the test and the management of screen-positive cases have minimal or no adverse effects
- Available: readily accessible to the entire target population

Screening tests currently available in Belize are VIA, Pap smear, and, on a limited basis, HPV DNA testing.

Visual inspection with acetic acid (VIA)

Visual inspection with acetic acid (VIA) is a low-cost, low-tech point-of-care approach to cervical cancer prevention that promotes linkage of screening with immediate treatment of pre-cancerous lesions, often with cryotherapy, in a single visit approach (SVA).

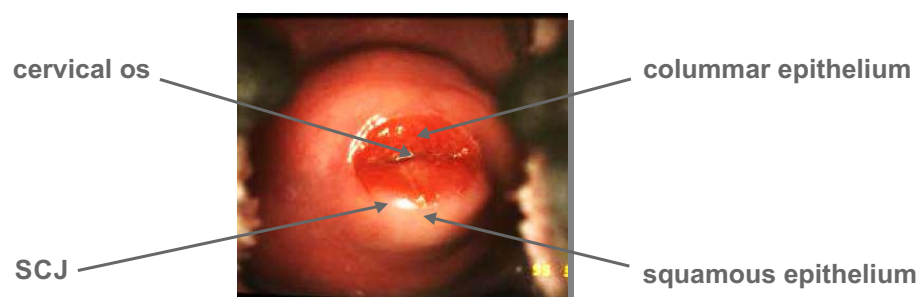
Linking screening with treatment in a SVA is programmatically important, as the SVA strategy minimizes the number of patients with abnormal screening results being lost to follow-up and not receiving appropriate treatment — a major cause for low program impact in developing countries. This linkage is not only clinically important — a safe, feasible, and acceptable alternative to cytology-based screening with comparable sensitivity — it is also cost-effective (Goldie 2005; Mandelblatt 2002; Sankaranarayanan 2007; Gaffikin 2003). In a cluster randomized trial in India, more than 31,000 women screened with VIA were compared to a similar number with no screening. Over seven years, VIA with cryotherapy of abnormal lesions was associated with a 24% reduction in development of cervical cancer and 35% reduction in deaths due to cervical cancer (Sankaranarayanan 2007). A recent review of published studies of VIA accuracy with histology as the standard and CIN 2 as the outcome measure found sensitivity 79–82%, specificity 91–92% with positive predictive value (PPV) 9–10% (Sauvaget 2011). VIA can also be task-shifted to non-physician health care providers, as evidenced by Jhpiego country program experience and findings from other international organizations (Jhpiego; WHO 2014; FIGO 2009).

Box 1 | Screen-and-Treat Approach

An alternative, and a WHO recommended approach, to the traditional screening-diagnosis-treatment (cytology followed by colposcopy/biopsy and then treatment based on the histopathology), is the screen-and-treat approach in which the treatment is based on the screening test result and treatment is provided soon, or ideally, immediately the positive screening test results (WHO 2013B). One example of screen-and-treat is VIA coupled with immediate cryotherapy in a **single-visit-approach (SVA)** for VIA-positive cases that are eligible for cryotherapy.

Pathophysiological Basis for VIA (IARC 2003)

When a provider looks at a cervix with a good bright white light — before application of the acetic acid — the squamous epithelium will normally appear pink and columnar epithelium appears red. This appearance is due to the reflection of light from the blood vessels in the underlying highly vascular stroma (deeper tissue) of the cervix. Since stratified non-keratinizing squamous epithelium is composed of multiple layers of cells, less light reaches the blood vessels to be reflected, thus creating the pink color. In contrast, the columnar epithelium consists of single layer of columnar cells, which allows the coloration of the vascular underlying stroma to be seen more clearly and appear red.

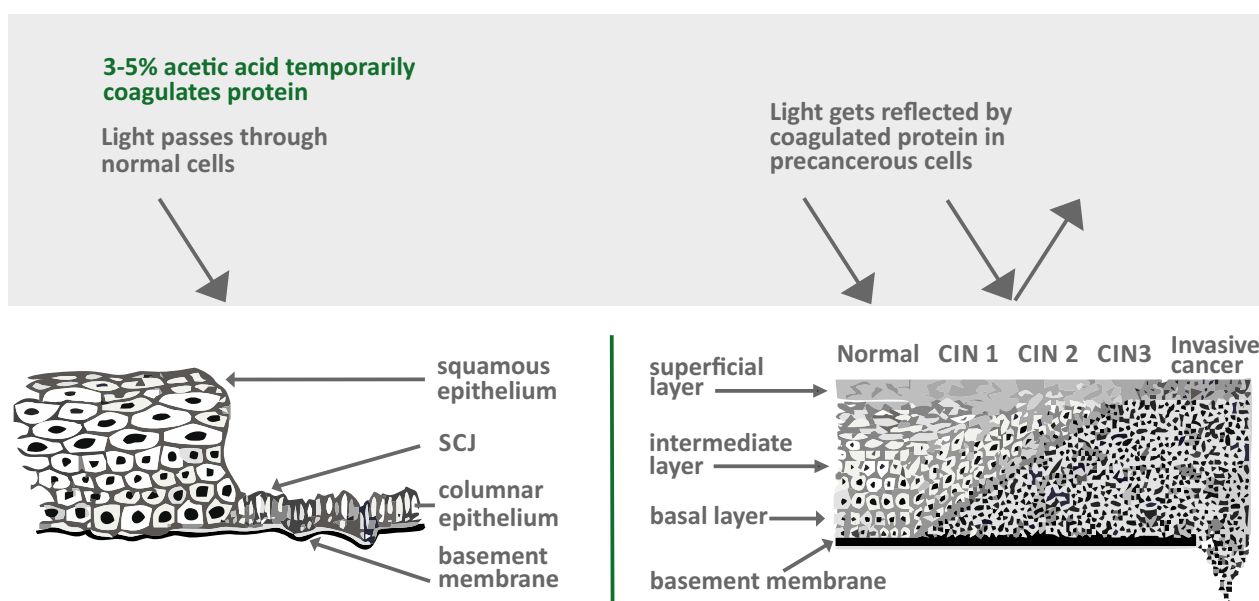
Figure 7 | Cervix with labeled areas

Source: Jhpiego

The area where the squamous epithelium meets the columnar epithelium is the squamocolumnar junction (SCJ), and the area where the vast majority of pre-cancerous lesions will develop (Figure 7). When 3–5% acetic acid is applied to the cervix, it causes reversible coagulation and precipitation of proteins within the cells. In a normal cervix, the cells in the superficial (or top layer of the epithelium) contain little protein. Abnormal epithelial cells, however, contain high levels of protein due to increased metabolic and nuclear activity. As a result, following application of acetic acid (Figure 8):

Normal epithelium -> little protein, little coagulation -> light is able to pass through the epithelium -> cervix continues to look pink

Abnormal epithelium (CIN) -> high levels of protein, much coagulation -> prevents light from passing through the epithelium -> acetowhitening occurs

Figure 8 | Illustration of Light Penetration and Reflection during VIA

While the acetowhite changes associated with pre-cancerous changes can appear rapidly, it can take at least one full minute for those changes to occur. In pre-cancerous lesions, the thick, dense, opaque acetowhite is confined to the transformation zone, near the SCJ. In cancer, it can involve the entire cervix. Almost all pre-cancerous and cancerous lesions develop in the transformation zone, close to the SCJ. Therefore, it is essential that the SCJ and transformation zone are seen in their entirety.

Not all acetowhitening is caused by CIN or early cancer. A number of other conditions, due to increased nuclear protein and metabolic activity, can cause acetowhite areas, such as:

- Immature squamous metaplasia – area near the SCJ where columnar epithelium is rapidly undergoing change to squamous epithelium
- Healing and regenerating epithelium (e.g., inflammation)
- Leukoplakia (hyperkeratosis) or condyloma (genital warts), though these tend to appear white even before application of the acetic acid

The acetowhite changes associated with pre-cancer and early cervical cancer are more dense, thick, and opaque with well demarcated margins from the surrounding normal epithelium (as if you can draw a line around the lesion). In contrast, the acetowhite changes associated with immature squamous epithelium and inflammation are pale, thin, often translucent, and patchy with ill-defined margins.

Acetowhite changes due to pre-cancer and early cervical cancer reverse much more slowly than immature squamous metaplasia and inflammation, with changes that may last 3–5 minutes following application of acetic acid, especially with more severe lesions. In contrast, acetowhite changes associated with immature squamous epithelium and inflammation tend to appear quickly, but also may quickly disappear, often within a minute. This underscores the importance of visualizing the cervix the entire time following application of acetic acid, and waiting at least one full minute by the clock before making a determination of the VIA reading.

Guideline: Classification of VIA Results

VIA results should be recorded using the following standardized categories:

- VIA-negative
- VIA-positive
 - Eligible for cryotherapy (see Box 2)
 - Large lesion, not eligible for cryotherapy
- Suspicious for cancer

Table 1 | Summary of VIA Test Results and Clinical Findings

VIA Result	Clinical Findings	Management
Negative	No acetowhite lesions; non-significant acetowhite findings include: ■ An acetowhite area far away from the transformation zone and SCJ ■ Faint acetowhite areas without a sharp outline ■ Streak-like acetowhite areas, including at the edge of the endocervix or along the SCJ ■ Dot-like pale areas in the endocervix Nabothian cysts, ectopy, polyps, and inflammation are also all considered VIA-negative findings.	■ Re-screen in three years if HIV-negative and unknown status ■ Re-screen in one year if HIV-positive
Positive	Thick, dense white lesion with distinct borders located within the transformation zone and close to or touching the SCJ 1. Eligible for cryotherapy 2. Large lesion, not eligible for cryotherapy	1. Treat with cryotherapy, ideally in single visit approach 2. Refer for LEEP
Suspicious for Cancer	Fungating, friable mass that bleeds easily when touched; visible ulcers; acetowhite cauliflower-like growths; highly atypical vessels	

VIA-negative

A VIA-negative result means the cervix appears smooth, pink, and uniform with no acetowhite lesions or with non-significant acetowhite areas as described in Table 1.

Nabothian cysts, polyps, ectopy, and inflammation are considered VIA-negative findings. Inflammation and regenerating epithelium may cause pale, translucent, and patchy acetowhite areas that do not have distinct margins, and tend to be diffuse/not restricted to the transformation zone.

Squamous metaplasia reacts to the acetic acid with a thin translucent acetowhite area that may cover the transformation zone near the SCJ. It is commonly mistaken by those early in the training as a VIA-positive finding, but it is a normal finding.

Openings around glands in the endocervix or in the transformation may appear as white dot-like areas. Columnar epithelium and the mucus overlying it may react slightly and become slightly white. All of these reactions are normal and considered VIA-negative.

VIA-positive

For clinical significance of possible lesions, consider:

- **Location:** significant lesions occur in the transformation zone, close to or touching the SCJ
- **Color and thickness:** significant lesions are white, dense (opaque), and thick (often raised above surrounding tissue)
- **Borders:** significant lesions have sharply demarcated/distinct borders (as if you could draw a line around them)

If the lesion has these characteristics, it is **VIA-positive**. The next step is to determine if the lesion is eligible for cryotherapy (see box below). On average, 85–90% of VIA-positive lesions should be eligible for cryotherapy. However, among HIV-positive women, who have a higher risk of large lesion (often two times, or more, the rate of their HIV-negative counterparts), approximately 70–80% of the VIA-positive lesions will be eligible for cryotherapy.

If the VIA-positive lesion is eligible for cryotherapy (see Box 2), the woman should be counseled regarding the findings, the importance of treatment, and the treatment options available (see section 6.8 for details of counseling for cryotherapy).

Suspicious for Cancer

A lesion is **suspicious for cancer** if it has the following characteristics:

- Fungating, friable mass that bleeds easily when touched
- Acetowhite cauliflower-like growths
- Highly atypical vessels
- Ulcers

Box 2 | Eligibility Criteria for Cryotherapy

- Not suspicious for cancer
- Client does not have severe cervicitis
- Can see the entire extent of the lesion; lesion does not extend into the endocervical canal
- Lesion occupies < 75% of the cervix
- Cryotip covers the lesion (or < 2 mm of lesion extends beyond edge of cryotip)
- No anatomical deformity of the cervix that prevents good application of cryotip
- Client is not pregnant
- Client is more than 6 weeks postpartum

Figure 9 | Examples of the VIA Classification

A



■ VIA-negative

B



■ VIA-positive, eligible for cryotherapy

C



■ VIA-positive, large lesion

D



■ Suspicious for Cancer

Photo Source (A and D): Jhpiego; Photo source (B and C): CIDRZ 2013

Note: If a VIA cannot be completed, there is no VIA result to be recorded and is described as indeterminate.

If inflammation is so obscuring that the VIA cannot be interpreted, the woman should be treated with antibiotics according to national guidelines and asked to return in two weeks for re-screening.

In menopausal women, if the SCJ cannot be seen in its entirety, VIA should not be conducted and the woman should have a Pap smear. A Pap smear cannot be properly taken if the acetic acid has already been applied to the cervix, since it can interfere with cytologic interpretation of the sample. Therefore, it is essential that the provider determine that the SCJ can be seen before proceeding with VIA.

If, however, the provider is **unsure** if the VIA is positive or negative, and cannot get an immediate second opinion, it is better to call the test VIA-positive and treat with immediate cryotherapy (if eligible for cryotherapy), rather than letting a potential VIA-positive case leave and miss treatment.

Concerns regarding over-treatment

Since VIA does not use confirmatory histopathology prior to treatment, there is a risk of over-treatment – women who are screen positive undergo cryotherapy but do not actually have cervical pre-cancer. WHO estimates that 1–2% of women in the general population have CIN 2+, and that this rate is estimated at 10% among HIV-positive women (WHO 2013B). These rates will vary by country and local context, but the underlying principal is the same: VIA-positive rates tend to run higher than this, often between 5–10%, with higher rates among HIV-positive women. As a result, a certain percentage of women will be receiving treatment who do not have pre-cancer or CIN2+ (false-positive cases), and are not at risk for developing cervical cancer. However, cryotherapy carries a very low risk of complications. The tradeoff with SVA or screen-and-treat is the benefit of improving the treatment rates of women with cervical pre-cancer (true positive cases) far outweighs the risk of slight over-treatment with a proven safe treatment. On the other hand, the multi-step process involving confirmatory histopathology risks losing women with cervical pre-cancer to follow-up and thus not receiving treatment.

Cytology (Pap smear)

Cytology-based screening involves taking a sample of cells from the entire transformation zone and either fixed on a slide at the facility (conventional Pap smear) or placed in a liquid transport medium (liquid-based cytology). The specimens are then sent to a laboratory where cytotechnologists examine the cells under the microscope. The results are classified according to the 2014 Bethesda System (see Annex 1).

It is essential that when collecting a pap smear specimen, that the entire transformation zone is sampled, the endocervix is sampled, and the specimen is gently and properly smeared on the slide and fixed with the appropriate fixative.

Box 3 | A Note about Cervical Pre-cancer Terminology

When Pap smear tests are used for screening, the cervical cytology results are usually reported using The Bethesda System terminology, which classifies squamous cervical epithelial cells according to their appearance. The following is a summary of this classification:
Interpretation/Result (for epithelial cells):

- A.** Negative for intraepithelial lesion or malignancy
Atypical squamous cells (ASC) Of undetermined significance (ASC-US)
Cannot exclude HSIL (ASC-H)
- B.** Low-grade squamous intraepithelial lesion (LSIL): encompassing HPV, mild dysplasia, and cervical intraepithelial neoplasia (CIN) 1
- C.** **High-grade** squamous intraepithelial lesion (HSIL): encompassing moderate and severe dysplasia, carcinoma in situ, CIN 2 and CIN 3
- D.** With features **suspicious for invasion** (if invasion is suspected)
Squamous cell carcinoma

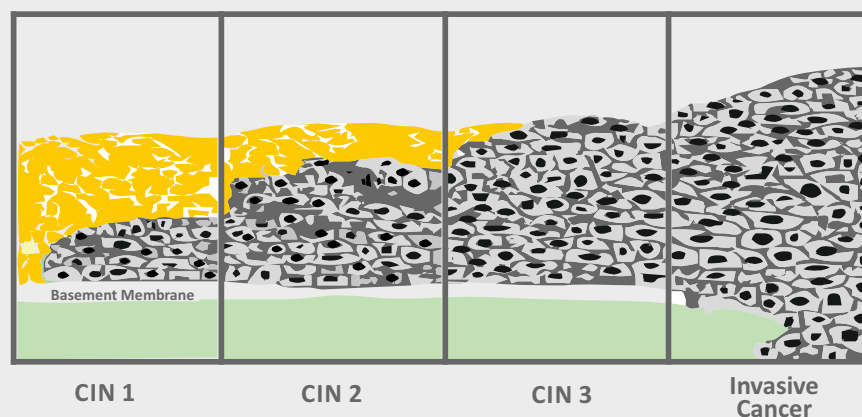
Box 3 | A Note about Cervical Pre-cancer Terminology (cont.)

The term **cervical intraepithelial neoplasia (CIN)** is often used interchangeably with cervical dysplasia, and the corresponding mild, moderate, and severe dysplasia histopathology classification (CDC 2012; ACOG 2013; WHO 2013B). However, CIN is the most commonly used terminology globally uses internationally agreed upon criterion for dividing cervical lesions into three grades based upon how many layers of the cervical epithelium are involved:

CIN 1: The abnormal cells are confined to the bottom third of the cervical epithelium.

CIN 2: The abnormal cells are confined to the bottom and middle third of the cervical epithelium

CIN 3: The abnormal cells involve all three layers (bottom, middle, and upper) of the cervical epithelium



CIN1 is considered a low-grade lesion, and CIN 2 and 3 collectively as high-grade lesions. This is clinically significant, because low-grade lesions tend to spontaneously regress, or clear without treatment, while high-grade lesions have a greater risk of progressing (see below for further discussion). As a result, CIN 1, or low-grade lesion, is not considered “precancerous” and CIN 2 and CIN 3 are considered precancerous. This is the reason when clinical studies are being compared where histopathology is used, they often refer to CIN 2+ lesions (detection or treatment), since these are considered cervical precancer.

When comparing CIN terminology with dysplasia terminology, CIN 1 corresponds to mild dysplasia, CIN 2 corresponds to moderate dysplasia, and CIN 3 corresponds with severe dysplasia and carcinoma in situ (CIS).

Table 2 | Classification and Management of Pap Smear Results

Pap smear result	Management
Negative	Re-screen in three years if HIV-negative or unknown status Re-screen in one year if HIV-positive
ASCUS	Re-screen in one year
LSIL	Re-screen in one year
HSIL, ASC-H, AGC, AIS	Refer for Colposcopy/Biopsy
Squamous Cell Carcinoma Adenocarcinoma	Refer for Colposcopy/Biopsy

Note: A woman with an abnormal Pap smear result should be managed within the Pap smear stream, i.e., she should not be referred for VIA following an abnormal Pap smear result.

HPV testing

HPV DNA testing for oncogenic or “high-risk” HPV subtypes shows significant promise for screening of women 30 years of age or older. The accumulating evidence of its accuracy, effectiveness, and reproducibility adds support for the use of HPV DNA testing as a primary cervical cancer screening tool. Clinician-collected HPV DNA testing has consistently demonstrated higher sensitivity to detect significant cervical disease (CIN 2+ or cancer) than VIA or cytology, along with good specificity. In addition, self-collection for HPV DNA testing shows only a slight decrease in accuracy, with sensitivities ranging from 80–86%, as compared to 92–98% for clinician-collected. Given the accuracy of HPV DNA testing, HPV-negative women are at an extremely low risk of developing cervical cancer in the 5–10 years following a negative test. As a result, the screening interval can be safely increased, to a minimum of five years, which adds to the cost-effectiveness of the test. A rapid HPV test has been developed but is not yet widely available, and feasibility and affordability remain significant barriers to widespread use of HPV DNA testing in low-resource settings (WHO 2013B).

Due to its accuracy and reproducibility, WHO recommends HPV testing over visual inspection methods or cytology, if resources are available. With HPV testing, WHO recommends using it either as a single test or sequential testing, as follows (WHO 2013B):

Single test: If HPV-positive, this indicates need for treatment. Visual inspection will still be necessary to determine if a woman can receive cryotherapy or requires LEEP. Even if no lesion is seen, the woman will still receive treatment (cryotherapy).

Sequential testing: If HPV-positive, screen with a second test (e.g. VIA) and treat only if the second test is positive.

3.2.4 Diagnostic Tests for Detection of Cervical Pre-cancer (WHO 2014)

A diagnostic test is sometimes used following a positive screening result e.g., with Pap smears, and is intended to aid in the detection of true pre-cancerous lesions (true-positive) from false-positive cases. However, diagnostic tests have significant cost and barrier implications. Diagnostic tests should not be required before treatment of pre-cancerous lesions, where the resources are not available or there are high rates of loss to follow-up.

Colposcopy, biopsy and endocervical curettage (ECC) are the most commonly used diagnostic tests for cervical pre-cancer, and require a high level of resources and training.

Colposcopy

Colposcopy is the examination of the cervix, vagina and vulva with an instrument that provides strong light and magnifies the field, allowing specific patterns in the epithelial (surface) layer and surrounding blood vessels to be examined.

Colposcopy is used on clients with positive screening results to verify the presence, extent, and type of pre-cancer or cancer, to guide biopsies of any abnormal appearing areas, and to help determine the most appropriate treatment.

Colposcopy is not a screening tool, nor a required step between screening and treatment.

Biopsy

Biopsy is the removal of a small sample or samples of abnormal tissue for microscopic examination to achieve a diagnosis. Biopsies can be taken from areas of the cervix that appear pre-cancerous by VIA examination, colposcopic examination, appear suspicious for cancer, or even random four-quadrant biopsies.

A biopsy is taken from each abnormal area, although random biopsies may be useful.

Biopsy is used to determine the degree of abnormality of the cell changes at the cervix and to rule out cancer. After examination, a biopsy is typically classified as:

- Normal;
- Cervical intraepithelial neoplasia (CIN); or
- Invasive carcinoma

Endocervical curettage (ECC)

ECC is a simple procedure that takes just a few minutes. Some surface cells are gently scraped from the endocervical canal with a special thin instrument or spatula, and the tissue is placed in a container with a fixative solution and sent to a laboratory for examination.

ECC is used in the following circumstances: 1) rare cases when the screening test suggests there may be a pre-cancer or cancer that is not visible with colposcopy, leading the provider to suspect that the lesion is hidden inside the cervical canal 2) if the squamocolumnar junction cannot be fully visualized in the face of an already suspected lesion 3) if the Pap smear revealed a glandular lesion, which usually arises from the columnar epithelium inside the canal 4) if screening and/or colposcopy were not adequate because the transformation zone was not seen in its entirety and cancer is suspected.

3.2.5 Outpatient Treatment Options for Pre-cancerous Lesions

Treatment of pre-cancerous lesions aims to destroy or remove areas of the cervix identified as pre-cancer. Treatment methods may be ablative (destroying abnormal tissues by freezing or burning) or excisional (surgically removing abnormal tissue). With ablative methods, no tissue specimen is obtained for further confirmatory histopathological examination. Hysterectomy is rarely an appropriate means to treat pre-cancer. Unless there are other compelling reasons to remove the uterus, hysterectomy should not be performed for pre-cancer.

Screening must be linked with treatment, such that women with cervical pre-cancer receive effective treatment. With task shifting, treatment can be provided by trained nurses, midwives, and doctors at polyclinics and health centers at primary care facilities. However, for suspected or confirmed invasive cancer, treatment requires specialist providers.

The choice of treatment for pre-cancerous lesions depends on the following (WHO 2014, WHO 2013B):

- Availability and accessibility of the treatment method
- Training and experience of the provider
- Cost
- Location and extent of the lesion
- Relative advantages and disadvantages of each approach

Cryotherapy and LEEP are the most commonly recommended outpatient treatment options for pre-cancerous lesions of the cervix (WHO 2014, WHO 2011, WHO 2012A, WHO 2013B, FIGO 2009). For screen-and-treat programs, WHO recommends cryotherapy as the first choice treatment for women who are screen test positive and eligible for cryotherapy. In women who have lesions not eligible for cryotherapy, WHO recommends loop electrosurgical excision procedure (LEEP), where available. WHO recommends against the use of cold knife conization in screen-and-treat programs (WHO 2013B).

Table 3 | Comparison of Cryotherapy and LEEP Outpatient Treatment Options

	Cryotherapy	LEEP
Cure rate*	85–95%	90–95%
Other resources needed	CO ₂ or N ₂ O gas and tanks Cryotherapy unit and tips	Electrosurgical unit and power Special instruments and supplies
Provider	Nurse or doctor	Generally reserved for doctor
Technical difficulty	Lowest	Intermediate
Complications	Lowest: generally minor	Intermediate: generally minor
Minor side effects	1–3%	1–5%
Anesthesia	No	Yes – local
Pathology specimen	No	Yes
Cost	Lowest	Intermediate
Patient Acceptability	High	High

*Cure rates (or effectiveness), noted in the above table, refers to a screen-negative result one year following treatment. Figures cited are based on studies in general populations. In HIV-positive women, the effectiveness is expected to be lower for all procedures (Abha 2011, Chirenje 2001, WHO 2011, WHO 2013B).

Box 4 | A Note about Terminology: Large Lesions

Pre-cancerous lesions that do not meet cryotherapy eligibility are often collectively referred to as *large lesions*. However, a number of categories of pre-cancerous lesions exist that do not meet cryotherapy eligibility. For ease of reference, throughout this reference manual, *large lesion* will refer to all of the following types of pre-cancerous lesions:

- Lesions covering > 75% of the cervix
- Lesions that extend into the endocervical canal and cannot be covered with the cryotherapy tip
- Lesions that cannot be completely covered by the cryotherapy tip
- An anatomic deformity of the cervix that prevents adequate application of the cryotherapy tip

For program success, it is essential to link screening with treatment that is safe, effective, acceptable, and feasible. Cryotherapy does this, and, in most low-resource settings, is the main treatment method for pre-cancerous lesions that meet cryotherapy eligibility criteria. It is the easiest and least costly method, with comparable effectiveness to LEEP when providers adhere to strict eligibility criteria. In addition, if one adheres to the eligibility criteria and uses the double-freeze technique, cure rates are 90% or higher (WHO 2011, WHO 2013B, Jhpiego). Pre-cancerous lesions that do not meet cryotherapy eligibility are often collectively referred to as “large lesions” (Box 1) but actually consist of a number of different types of pre-cancerous lesions: large pre-cancerous lesions (covering > 75% of the cervix), lesions extending into the endocervical canal, or where the cryotherapy tip cannot cover the entire lesion should be treated in an outpatient setting with LEEP, if available and accessible (WHO2011, WHO 2013B). In the general population, approximately 10–15% of pre-cancerous lesions will fall into the category of a large lesion, while the rate is significantly higher, in some settings twice as high or more, in women who are HIV-positive (ACCP 2003, Pfaendler 2008, Rema 2008, WHO 2012B).

During counseling, a woman should be provided with information on the treatment methods available so she can make an informed choice. **Consent** from the patient is needed prior to the procedure, and it **can be given verbally**.

Cryotherapy

Summary Guidelines for Cryotherapy

- Cryotherapy is the treatment of choice for pre-cancerous lesions that meet eligibility criteria
- Treatment is to be offered without requiring biopsy diagnosis (screen and treat) and in a single visit approach whenever feasible
- Only providers who have demonstrated clinical competencies in cryotherapy are permitted to perform the procedure
- Treat using a double-freeze (three minutes freeze, five minutes defrost, three minutes freeze) technique to achieve a 4–5 mm ice ball around the cryotip
- Follow-up screening one year following treatment
- If severe cervicitis is present, prescribe antibiotics per national guidelines and reschedule for cryotherapy treatment in two weeks
- Do not treat with cryotherapy during pregnancy. Reschedule the woman for when she is more than six weeks postpartum

Pathophysiological Basis for Cryotherapy

Cryotherapy is an ablative therapy that destroys the cervical pre-cancerous tissue by using special equipment to deliver compressed gas (carbon dioxide or nitrous oxide) to a cryotip applied to the cervix to freeze and destroy the abnormal tissue using a double-freeze technique: freeze for three minutes, thaw for five minutes, and refreeze for another three minutes. Cryotherapy destroys pre-cancerous cells through two mechanisms: direct cell injury and vascular stasis (Hoffman 2002). Direct cell injury occurs when intracellular ice forms, which requires very rapid freezing. Vascular stasis results in an indirect form of cellular injury, where the freezing damages the blood vessels supplying the cells and an ischemic, coagulative necrosis occurs over a period of approximately three days after initial injury (Hoffman 2002, Gage 1998).

These two mechanisms are governed by four key parameters during a single freeze-thaw cycle: freezing rate, minimum temperature achieved, hold time at minimum temperature, and thaw rate (Hoffman 2002, Gage 1998, Baust 2002):

- Faster freezing rates result in more cell death
- Colder minimum temperatures result in more cell death; however, the cold required for vascular stasis (-20 °C) appears to be warmer than for direct cell injury (-40 to -50 °C)
- Increasing the hold time at the minimum temperature increases cell death rate
- Slower thaw rate increases the destructive effects of cryotherapy

Repeating a freeze-thaw cycle increases overall tissue destruction, as each freeze-thaw cycle increases the thermal conductivity of the tissue for the next freeze. Therefore, each repeat of the freeze-thaw cycle freezes a larger volume of tissue (Gage 1998, Baust 2002).

WHO states that in low-resource settings, cryotherapy is the treatment of choice for eligible pre-cancerous lesions (WHO 2011, WHO 2013B).

Advantages

- Safety – very low complication rate
- Effective (>90% cure rate when using strict eligibility criteria and proper technique)
- Well-accepted and well-tolerated by women, usually with only mild discomfort during the procedure
- Inexpensive compared to other treatment options
- Can be performed by a wide range of health care providers (nurses, midwives, doctors)
- Does not require electricity or anesthesia
- Can be readily used in a single-visit approach

Disadvantages

- Cannot treat large lesions or those that extend into the endocervical canal
- It does not provide a tissue specimen for histopathology
- Requires a continuous supply of gas
- Cryotherapy units tend to breakdown if gas contains impurities/particulate matter
- Associated with temporary side-effects, such as cramping, watery discharge

Cryotherapy cure rates following one treatment range from 86–95%, with rates of 90% or more when strict eligibility criteria are used (ACCP 2003, ACCP 2011, FIGO 2009, WHO 2011). Jhpiego country programs using VIA report VIA-negative rates of approximately 95% one year following cryotherapy; however, because histologic examination was not performed before or after cryotherapy, actual “cure” rates cannot be verified (Jhpiego).

Studies and country experience have shown that a wide range of health care workers (nurses, midwives, and other clinicians) can be trained to perform cryotherapy competently (ACCP 2003, ACCP 2007, FIGO 2009). Cryotherapy is ideally suited to be linked with VIA screening in a SVA, without an intermediary diagnostic step of colposcopically directed biopsy, which is not considered necessary unless there is a suspicion of cervical cancer (ACCP 2007).

To maximize cryotherapy effectiveness, it is essential that cases are selected according to strict **eligibility criteria**:

- Not suspicious for cancer
- Client does not have severe cervicitis
- Can see the entire extent of the lesion; lesion does not extend into the endocervical canal
- Lesion occupies < 75% of the cervix
- Cryotip fully covers the lesion
- No anatomical deformity of the cervix (e.g. polyps, large nabothian cysts) that prevents good application of cryotip
- Client is not pregnant
- Client is more than six weeks postpartum

Figure 10 | Lesion Eligible for Cryotherapy (A) and Large Lesion, not Eligible for Cryotherapy (B)

A



B



Source: CIDRZ 2013

Cryotherapy requires special equipment and compressed gas (see **Annex 2** for a description of the equipment). See **Annex 3** for a Job Aid on the use of cryotherapy equipment; **Annex 4** for estimating VIA and cryotherapy equipment and supplies needs.

Loop Electrosurgical Excision Procedure (LEEP)

Summary Guidelines for Loop Electrosurgical Excision Procedure

- LEEP is primarily reserved for pre-cancerous lesions that are not eligible for cryotherapy
- LEEP should not be performed when cervicitis is present, the client is pregnant, or the client is less than six weeks postpartum
- LEEP is reserved for those who have demonstrated clinical competence in the procedure
- LEEP requires anesthesia and is to be performed only in settings that can handle potential urgent complications related to the procedure (e.g., heavy bleeding)
- The tissue excised during LEEP should be sent for histologic examination
- Follow-up screening in one year

LEEP uses a thin wire loop heated with electricity produced by special electrosurgical generators. The aim of LEEP is to remove pre-cancerous cervical lesions of the cervix and the transformation zone in their entirety. The excised tissue is sent for histopathology. As a result, LEEP can be used for both diagnosis and treatment. In skilled hands, LEEP is a relatively simple, safe, effective outpatient procedure for the excision of pre-cancerous lesions of the cervix, and typically takes approximately 10–15 minutes to perform.

Note: In some cases, LEEP may be used as a method of biopsy to **diagnose invasive cervical cancer**, where the intent is not to try to remove the entire suspicious lesion on the cervix, but merely to obtain a sample for histological examination. However, **extreme caution** must be used in these cases, because hemorrhage may occur, and only small biopsies should be performed.

Advantages of LEEP compared to cryotherapy

More effective on large lesions. The provider can adjust the loop size and technique in order to remove large lesions (with several passes if needed), tailoring the procedure to the size of the lesion on the ectocervix, as well as lesions that extend into the endocervical canal. This allows LEEP to be more effective than cryotherapy in treating large lesions, lesions that cannot be covered with the cryotherapy tip, and those that extend into the endocervical canal (WHO 2011).

Obtains tissue specimen for histologic examination. Allows determination of the lesion's severity and extent.

Disadvantages of LEEP compared to cryotherapy

Requires more resources. LEEP requires electricity, consumables, and more expensive specialized equipment and instruments.

Technically more difficult. While LEEP is safe and effective in skilled hands, the level of training required is greater than with cryotherapy. It is a procedure primarily reserved for physicians, though some settings are expanding it to non-physicians with reportedly good success.

Risk of complications slightly higher. When performed by competent providers, LEEP has a very low complication rate. However, the risks are slightly higher for LEEP compared to cryotherapy, particularly severe bleeding.

Should be performed in a facility with an operating theater. In rare case of severe post-procedure bleeding that cannot be adequately controlled in the office, access to an operating theater and anesthesia is necessary.

Requires anesthesia.

Often not available in a single-visit approach. Due to the additional requirements for LEEP, it is often not available as an immediate treatment option following a screening with a test positive result.

See **Annex 5** for a detailed description of LEEP equipment, instruments, and supplies.

Eligibility criteria for LEEP (see Box 5 below)

While LEEP can be used for both large and small (cryotherapy-eligible) lesions, in most low-resource settings, it is generally reserved for large pre-cancerous lesions. LEEP can be performed only by providers who have demonstrated clinical competence in performing LEEP, or under the direct supervision of a competent LEEP provider. LEEP requires local anesthesia and is to be performed only in settings that have a functioning operating theater to handle potential urgent complications related to the procedure (e.g. heavy bleeding).

Box 5 | Eligibility Criteria for LEEP

- Lesion is VIA-positive (or by visual inspection with Lugol's iodine [VILI] or colposcopy)
- Lesion is not suspicious for cancer (unless LEEP is being performed as a biopsy and not treatment)
- The full extent of the external lesion can be identified. If the lesion extends into the endocervical canal, attempts should be made to visualize its extent, and a multiple pass procedure should be utilized to get deeper into the endocervical canal.
- There is no evidence of pelvic infection, severe cervicitis, severe vaginal infection, anogenital ulcer, or a bleeding disorder
- The client is not pregnant (unless there is a concern for invasive cancer)
- The client is more than 12 weeks postpartum
- If the client is hypertensive, hypertension should be well-controlled, or use local anesthetic without epinephrine (similarly in women with cardiovascular disease)

See **Annex 6** for LEEP Job Aid

Expectations Following LEEP and Routine Self-care

LEEP has a low rate of complications, especially serious complications, when performed by a trained, competent provider. However, a small proportion of women will develop complications, which are generally minor (ACCP 2003; ACCP 2007; Charmot et al. 2010; Jacob et al. 2005; WHO 2014). It is important that women be counseled about potential complications, self-care, warning signs, what to expect, and what is normal. They should also be informed that providers have the knowledge and skills to manage these complications, or know when to refer appropriately.

Vaginal discharge, bleeding, and infection are the most common reported side effects or complications associated with LEEP. It is common to have a brown, grayish-black discharge, sometimes with some spotting lasting from a few days to 2–3 weeks. This is often followed by a thin, watery or non-purulent discharge for another 2–3 weeks as the cervix heals. These side effects usually resolve without intervention, and are not alarming.

It is important to note that HIV viral shedding appears increased during this time and up to 3–4 months (Wright 2001), though a recent study suggested that this may be less of a problem if the woman is on ART (Chung 2011).

Therefore, abstinence or condom use is strongly recommended during this time. It is recommended that women receive both verbal and written instructions. They should be advised of the following:

- Expect a grayish/black discharge, possibly with a small amount of bleeding, for a few days and up to two weeks. A small amount of discharge can last up to four weeks and is considered normal.
- Discharge that is yellow and malodorous, or associated with abdominal pain or fever, may be a sign of infection. If this occurs, the woman should be seen promptly.
- Heavy bleeding (heavier than a menstrual period) is not normal. If this occurs, the woman should be seen promptly.
- Do not have sex and do not put anything in vagina (douching, tampons, fingers) for six weeks after treatment. This helps prevent infection, prevent bleeding, and allows healing. In addition, the risk of HIV transmission appears increased during this time. Therefore, abstinence (or at least the use of condoms, if abstinence is not possible) is critically important during this time period. Further, condoms are recommended for 12 weeks following LEEP in order to reduce the risk of HIV transmission.
- Follow up in six weeks, if possible, and let the woman know when and how to get her pathology results if the tissue was sent for histological examination
- Repeat screening in one year

Potential LEEP Complications and their Management

More severe signs and symptoms should be evaluated for the occurrence of minor or severe complications related to treatment. The following are early and late warning signs of potential complications. Women should be counseled to look for and to seek care if any of these occur:

Early Warning Signs (usually within the first 2–4 weeks)

- Fever for more than two days
- Severe lower abdominal pain, especially if fever is present
- Foul-smelling or pus-colored discharge
- Bleeding heavier than heaviest days of menstrual bleeding, more than two days
- Bleeding with clots

Late Warning Signs (usually 1–3 months following the procedure)

- Later onset of lower abdominal pain with fever
- Severe menstrual cramping with minimal or no menstrual bleeding

Types of Complications

Infection

Cervicitis: A localized infection of the cervix, without evidence of upper reproductive tract infections (e.g. PID, endometritis, salpingitis). Rates are slightly higher for LEEP compared to cryotherapy, but still generally less than 5%. Program data have shown that less than 1% of women who have LEEP develop infection following the procedure. Cervicitis should be managed according to current national guidelines.

PID: An upper reproductive tract infection (e.g., PID, endometritis, salpingitis) that is a more serious complication than cervicitis and requires more intensive treatment. PID rates following cryotherapy and LEEP are equivalent, typically involving less than 1% of women treated. This should be managed with antibiotics according to national guidelines. Severe PID may require hospitalization for close monitoring and intravenous antibiotic therapy.

Bleeding

While the frequency and severity of prolonged or moderate to heavy bleeding that requires intervention following LEEP vary according to reports, in general, it occurs in less than 2% of LEEP cases. Most immediate post-LEEP bleeding can be managed through the use of proper coagulation using the ball electrode.

Rarely, bleeding is severe (immediate or delayed) and uncontrollable with the above measures. In these cases, bleeding can be controlled with: 1) suturing of the bleeding site—this can often be done in the clinic, but occasionally requires better anesthesia and visualization and must be done in the operating theater, or 2) packing for 24 hours (or for stabilization for transport).

Cervical Stenosis

Severe pain and cramping, associated with little or no menstrual bleeding, can occur following LEEP due to necrotic plug syndrome. This uncommon condition presents at least one month following the procedure and is thought to be due to extensive cauterization of the LEEP excisional crater near the endocervical canal, resulting in scarring and obstruction of the endocervical canal. This obstruction may be caused by a necrotic plug of tissue. This complication can usually be immediately and easily managed by passing a small probe (e.g., a small cotton tip applicator, endocervical cytology brush, or metal uterine sound) or with cervical dilation, to facilitate drainage of menstrual blood.

Fistula

Vesicovaginal or rectovaginal fistula is a very rare, late-appearing major complication following LEEP treatment. It occurs following inadvertent burning of the vagina overlying the bladder or rectum, with subsequent breakdown of that tissue creating a fistula. Women will present complaints of involuntary loss of urine or feces into their vagina (with or without pain) or signs of infection. Women with this condition require referral to an experienced gynaecologic surgeon for evaluation and treatment.

Obstetrical Complications

Preterm delivery risk following LEEP is a somewhat controversial and unresolved issue, with some evidence of increased risk (Jakkobsen 2009), while a recent study demonstrated no increased risk (Werner 2010). The difference in outcomes from the studies may be related to the amount of tissue removed during LEEP—the deeper the LEEP and more tissue removed, the higher the risk (Noehr 2009; Jakkobsen 2009). However, that there is more evidence that shows women who have LEEP performed two or more times are at an increased risk of preterm delivery. Infertility due to cervical stenosis or pregnancy loss due to cervical incompetence is rare following LEEP.

Cold Knife Conization (CKC)

CKC is the removal of a cone-shaped area from the cervix, including portions of the ectocervix and inner cervix endocervix. Due to greater risk of harms with CKC as compared to cryotherapy or LEEP, WHO recommends against the use of CKC as treatment in a screen-and-treat strategy (WHO 2013B).

However, in cases that cannot be treated by LEEP, or in the presence of suspected glandular pre-cancerous lesions or microinvasive cancer, CKC remains a treatment option. CKC is performed in a hospital, with the necessary infrastructure, equipment, supplies and trained providers. It should be performed only by health-care providers with surgical skill – such as gynecologists or surgeons trained to perform the procedure – and competence in recognizing and managing immediate complications, such as bleeding. The amount of tissue removed will depend on the size of the lesion and the likelihood of finding invasive cancer. The tissue removed is sent to the pathology laboratory for histopathological diagnosis and to ensure that the abnormal tissue has been completely removed. The procedure takes less than one hour and is performed under general or regional (spinal or epidural) anesthesia. The patient may be discharged from hospital the same or following day.

3.2.6 Infection Prevention in Secondary Prevention

Proper infection prevention (IP) is an essential component of providing cervical cancer prevention services. Good IP practices helps:

- Prevent the spread of HIV and other infections from one client to another, and between client and healthcare provider
- Build trust among clients and staff that the instruments and clinical area is clean and safe

Most infectious agents are transmitted by contact with blood and body fluids and most infections can be spread before symptoms are present. Therefore, it is essential that healthcare providers take universal precautions and treat all clients and patients as if they are infected. The following precautions should be used routinely by all healthcare providers:

- Wash hands before and after each client or patient contact — the single most practical procedure for preventing the spread of infection

- Wear gloves when touching anything wet — broken skin, mucous membranes, blood or other body fluids (secretions or excretions), soiled instruments, gloves, and medical waste
- Use physical barriers (plastic aprons) if splashes and spills of any body fluids (secretions or excretions) are anticipated. Plastic apron also protects the healthcare providers close from spillage of the acetic acid, which can stain clothes.
- Use safe work practices, such as safely passing sharp instruments; properly disposing of medical waste; and not recapping, breaking, or bending needles or disassembling needles and syringes prior to disposal

The **three basic steps** for processing instruments, surgical gloves and other reusable items are:

- **Decontamination**
- **Cleaning**, and either
- **Sterilization or high-level disinfection (HLD)**

Decontamination

Decontamination makes objects safer to handle by staff before cleaning. It is the first step in handling soiled surgical instruments and other items. It is important to decontaminate instruments and items that may have been in contact with blood or body fluids. Immediately after use, place instruments and other items in a 0.5% chlorine solution for **10 minutes**. This step rapidly inactivates HBV and HIV and makes items safer to handle. The 0.5% chlorine must be changed daily, or sooner if it becomes cloudy.

Cleaning

Cleaning is a crucial step in providing safe, infection-free equipment and instruments. A thorough cleaning with water and liquid soap or detergent physically removes organic material, such as blood and body fluids. Dried organic material can trap microorganisms in a residue that protects them against sterilization or HLD. Organic matter also can partially inactivate disinfectants, rendering them less effective.

Utility gloves should be worn while cleaning instruments and equipment. Discard gloves if torn or damaged; otherwise, clean and leave to dry at the end of the day for use the following day. In addition to wearing gloves, extreme care must be taken to prevent needle sticks or cuts.

Staff should wear protective glasses, plastic visors or goggles — if available — while cleaning instruments and other items. This protects staff from splashing contaminated water into their eyes.

Clean instruments with a brush (old toothbrushes work well) and soapy water. Give special attention to instruments with teeth, joints or screws where organic material can collect. After cleaning, rinse items thoroughly with water to remove detergent residue, which can interfere with chemical disinfection.

Practical Note: Soaking instruments in 0.5% chlorine solution for prolonged periods will lead to corrosive damage of the instruments, especially speculum. Many busy VIA clinics have found that it is difficult and not practical to accurately time how long individual instruments have been soaking in the 0.5% chlorine solution prior to washing and cleaning them — some much longer than 10 minutes, others shorter. Therefore, these clinics have opted to first place all instruments immediately after use in a bucket of soapy water to soak. As a batch, they are then cleaned, rinsed and decontaminated for 10 minutes in 0.5% chlorine solution, followed by rinsing again.

High-level Disinfection (HLD)

When sterilization is not possible or not suitable, HLD is the only acceptable alternative for the final step in processing instruments. High-level disinfection destroys all microorganisms, including viruses causing hepatitis B and AIDS, but does not reliably kill all bacterial endospores. High-level disinfection can be achieved by boiling in water, steaming or soaking in the chemical disinfectant (e.g. 2–4% glutaraldehyde or 0.55% OPA, both often referred to as Cidex) for 20 minutes. Because boiling and steaming require only inexpensive equipment, which is usually readily available, they are the preferred methods for small clinics or those located in remote areas. Regardless of the method selected, however, HLD is effective only when instruments and other items first thoroughly cleaned and rinsed before HLD.

Sterilization

Instruments and other items, such as needles or scalpels that come into direct contact with tissues beneath the skin, should be sterilized after first being decontaminated and thoroughly cleaned, rinsed, and dried. The sterilization process destroys all microorganisms, including bacterial endospores. Bacterial endospores are particularly difficult to kill because of their tough coating. (Bacteria that form endospores include clostridia tetani, which causes tetanus.) Sterilization can be achieved by either autoclave (high-pressure steam), or chemicals (“chemical sterilization” or “cold sterilization”).

HIGH-LEVEL DISINFECTION

High-level disinfection by boiling, steaming or using chemicals is acceptable for final processing of instruments used for VIA or cryotherapy. Surgical (metal) instruments should be steamed or boiled for 20 minutes and allowed to dry. Instruments can be soaked for 20 minutes in 2–4% glutaraldehyde or 0.55% OPA, thoroughly rinsed in boiled water or sterile water and air dried.

Note: 2–4% glutaraldehyde and 0.55% OPA must be used according to manufacturer's guidelines. The solution maintains its ability to HLD after poured into a separate container for approximately 14 days (sometimes 28 days), and maintains a shelf-life after opening of 90 days. However, check manufacturer's guidelines.

STERILIZATION

Instruments and surgical gloves can be sterilized by autoclaving. If necessary, metal instruments can be sterilized using dry heat.

Steam sterilization: 121°C (250°F) at 106 kPa (15 lb/in²) pressure for 20 minutes for unwrapped items; 30 minutes for wrapped items. Allow all items to dry thoroughly before removing.

Dry heat:

- 170°C (340°F) for 60 minutes (total cycle time — placing instruments in oven, heating to 170°C, timing for one hour and then cooling — is from two to 22 hours), or
- 160°C (320°F) for two hours (total cycle time is from three to 32 hours)

Note: Dry heat sterilization (170°C for 60 minutes) can be used only for metal instruments.

Storage of Instruments

Store instruments in a covered, sterilized tray. Store them for no more than 21 days; otherwise repeat autoclaving.

Hazardous Waste must be disposed of according to national guidelines.

For further reading on disinfection and sterilization guidelines, see CDC Guidelines for Disinfection and Sterilization in Healthcare Facilities (CDC 2008) and chapter 14 of the IARC online colposcopy manual (Sellors 2003), as well as WHO technical specifications: Cryosurgical equipment for the treatment of pre-cancerous lesions for cervical cancer prevention (WHO 2012A).

3.3 Tertiary Care

Tertiary care refers to the diagnosis and treatment of cervical cancer. Treatment consists of surgery and/or radiation therapy for early stages of cervical cancer, while more advanced stages of cervical cancer are generally treated with radiation and chemotherapy (WHO 2014). Palliative care refers to relief of the pain and suffering (both physical and psychological) associated with life-threatening cervical cancer (WHO 2013A). As a result, palliative care is complementary to treatment and seeks to provide not only pain relief, but also to provide emotional and spiritual support for women suffering from cervical cancer as well as their families.

3.3.1 Signs and Symptoms of Cervical Cancer

Table 4 | Symptoms of Invasive Cervical Cancer

Early	■ Vaginal discharge, sometimes foul-smelling ■ Irregular bleeding (of any pattern) in women of reproductive age ■ Postcoital spotting or bleeding ■ Postmenopausal spotting or bleeding
Advanced	In addition to the above symptoms: ■ Backache ■ Lower abdominal pain ■ Severe back pain ■ Urinary frequency and urgency ■ Weight loss ■ Decreased urine output (obstruction of the ureters, or renal failure) ■ Leakage of urine or feces through the vagina (due to fistulae) ■ Swelling of the lower limbs ■ Breathlessness (anemia or, rarely, lung metastases or effusion)

3.3.2 Evaluation and Management of Cervical Cancer

When a woman presents at the primary or secondary level facility with abnormal symptoms:

- Perform a pelvic examination and take a biopsy of any abnormality noted on the cervix
- In rare cases, if severe vaginal hemorrhaging is present, refer for evaluation and treatment
- If the result of the biopsy is invasive cervical cancer, refer to OBGYN for further tests and management
- At the hospital, first establish or reinforce a trusting relationship and rapport with the patient, take a full history, and perform a thorough examination to determine if there are any cervical lesions and note the presence of any indurations, swellings and other abnormalities in the cervix and the surrounding tissues and organs.
- Perform pregnancy and HIV tests before taking a biopsy of a cervical lesion
- If both tests are negative and a trained provider is available, take a biopsy and send the specimen to the laboratory for histopathological examination

If the woman is pregnant and/or is living with HIV, it is advisable to send her to the tertiary-level hospital to have the biopsy taken and, depending on results, have her treatment planned.

The histopathology of the biopsy specimen will confirm or rule out the diagnosis of cervical cancer, which is an essential step before more extensive examinations are done. If the biopsy is positive for cancer, the patient will again be referred, this time from the secondary- to the tertiary-level facility for further tests and investigations and determination of the most appropriate available treatment.

Biopsy results may also identify a few other possible diagnoses for women with similar symptoms. Other possibilities include infectious diseases, such as herpes, which can change the appearance of the cervix and be confused with early cervical cancers, or metastatic cancer from other sites, including from the lining of the uterus.

When a woman is diagnosed with cervical cancer:

- Gently explain the diagnosis to the woman, allowing time for her to reflect and understand the seriousness of her disease and ask questions
- Refer to nearest OBGYN

When a woman is discharged from hospital after treatment:

- Provide care and support to women who have been discharged from the hospital, either because treatment was successful or she is able to begin her recovery, or because treatment was not effective and she is returning home for palliative care
- Maintain communication with the specialists and conduct prescribed periodic follow-up examinations, identify and manage side-effects and complications secondary to the disease and/or treatment; and, if needed and possible, refer the patient back to the treatment facility
- If the patient is receiving palliative care, the primary and secondary care providers are her main medical support
- This medical support may include maintaining the patient free of pain and treating many of the common problems developed by patients who have been treated for cancer
- In cases of severe, intractable symptoms (e.g. pain, severe bleeding), refer back to the hospital for additional palliative treatment.

Other important actions include:

- Educating and training communities
- Training community health workers, which includes dispensing medicines for pain-relief
- Training staff who have recently joined the care team

- Instructing the patient's close family and friends on how to provide special care to prevent serious symptoms and treat these if they occur
- Establishing links between the patient and her family and faith-based or other assistance agencies that may provide broad nonmedical support, including donations of funds, food and nonmedical supplies, as well as:
 - Aiding the patient and her family as much as possible during the terminal stages of disease
 - Doing home visits during severe or terminal phases of the disease

Provider roles at the Tertiary-level include the following:

- Assess the stage of the woman's cancer using a complete physical examination and a series of tests. This will inform the best management for the patient including treatment and follow-up.
- Determine the best treatment(s) available for the patient at the facility, taking into account the availability of specialists and equipment
- Monitor the patient during and after treatments to determine the effect of the treatment on the cancer and to manage any side-effects
- Provide continuity of support for follow-up care for patients discharged to receive home-based palliative care

3.3.3 Cervical Cancer Staging

Table 5 | Investigations for staging and treatment for cervical cancer

Mandatory for staging	Supplementary for staging
■ Speculum, vaginal, and rectal examination ■ Intravenous pyelogram (IVP) or abdominal ultrasound	■ Cystoscopy ■ Proctoscopy ■ Cone biopsy ■ Endocervical curettage or smear ■ Chest X-ray ■ Skeletal X-ray or bone scan (if bone pain)

Additional tests

- Blood test: FBC, HB, (anemia can impact the effectiveness of radiotherapy), renal function, liver function, pregnancy, and HIV tests
- Computerized tomography (CT) scan or magnetic resonance imaging (MRI), if available, of the abdomen and pelvis; however, treatment can be planned in the absence of these procedures if they are not available, affordable or feasible

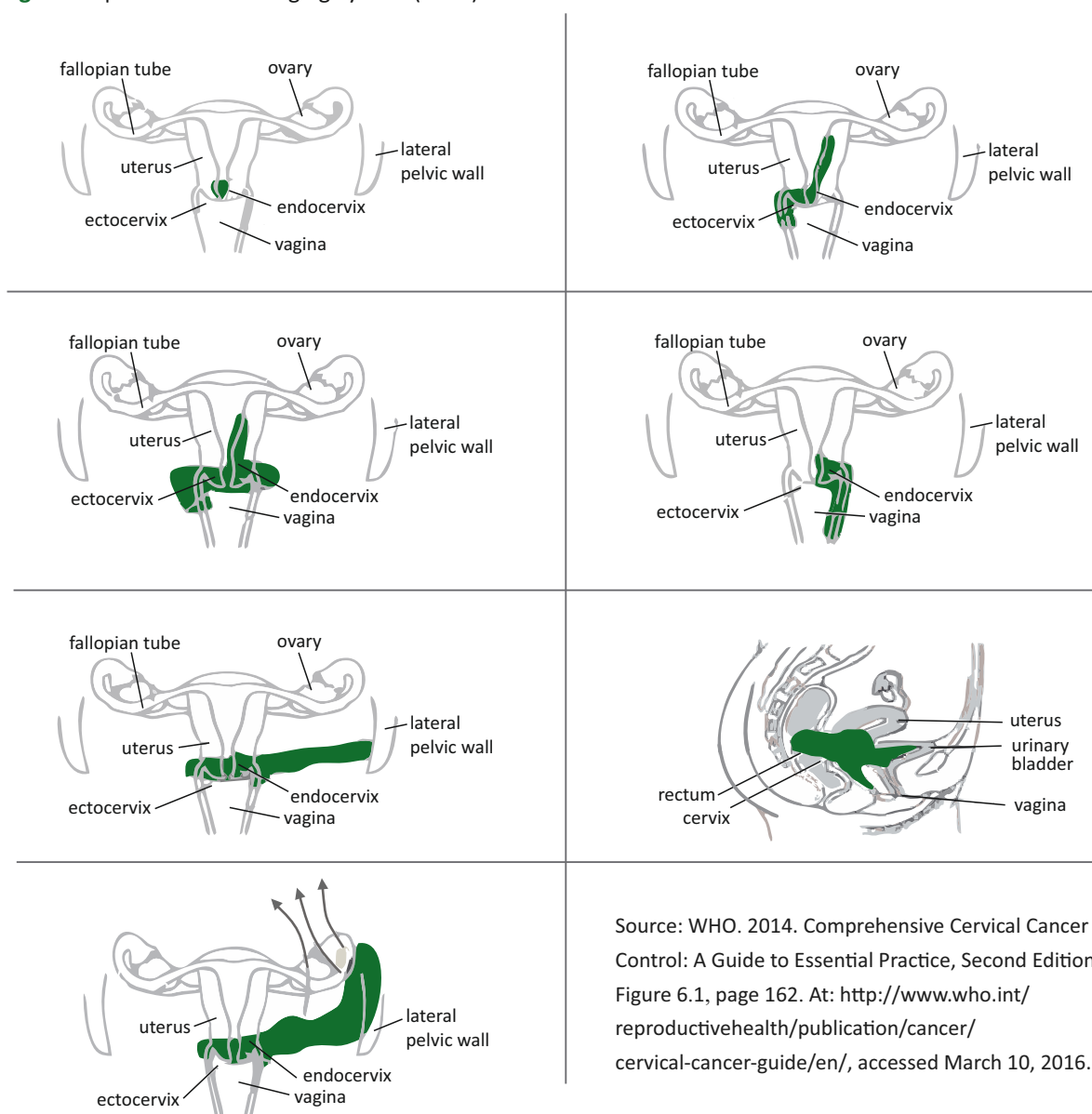
Document results. A descriptive diagram can be included and provided to all health-care providers who will be involved in the patient's care.

FIGO staging system (Figure 11)

The FIGO staging system (2009 revision) describes four progressively more advanced stages of cervical cancer, from stage I to stage IV.

- Stage I: The disease is confined to the cervix (includes sub stages IA1, IA2, IB1 and IB2)
- Stage II: Cancer has spread outside the cervix into the upper vagina or to the tissue beside the cervix (parametrium), but not to the sidewall(s) of the pelvis (includes sub stages IIA1, IIA2 and IIB)
- Stage III: Cancer has spread to the lower part of the vagina or all the way through the parametrium to the sidewall(s) of the pelvis (includes sub stages IIIA and IIIB)
- Stage IV: Cancer has spread to surrounding organs or distant tissue, such as the lungs and distant lymph nodes (includes sub stages IVA and IVB)

Figure 11 | Revised FIGO Staging System (2009)



3.3.4 Treatment of Invasive Cervical Cancer

- **Factors influencing cervical cancer prognosis** or five-year survival rates for women after completing the best treatment, include:
 - Early detection. The single most important predictor of long-term survival is the clinical stage of the disease when first diagnosed.
 - Access to treatment
 - Involvement of the lymph nodes (presence of cancer)
 - Presence of other chronic or acute diseases /conditions
 - General health and nutritional status, including presence of anemia
 - Degree of immunosuppression (e.g. HIV status)

Principles of Treatment

- Have a referral system in place
- Evidence-based therapeutic options
- The chosen treatment reduces the extent of the cancer, pain, and suffering
- Considerations for special situations (pregnancy and HIV-positive women)
- Treatment plan is individualized for the patient and defined by a multidisciplinary team

Patient's Informed Decision Making. Choosing whether to treat and when to start treatment is the patient's own decision. The patient, once fully informed, is the person who has the power to choose whether to be treated, which treatment she prefers (if she is given a choice), and when to start.

She will need to take into account:

- Her personal and family situation
- Her commitments at home
- The time needed for treatment
- Expected treatment effectiveness and side-effects
- Whether the treatment is included in her health insurance
- Any out-of-pocket costs for her and her family if not covered by health insurance
- The consequences of no treatment

Patient barriers to care should be assessed and addressed: information/understanding, financial, distance, and navigating the system.

Treatment Options

- Surgery, radiotherapy and chemotherapy (may be used in combination)
- The primary therapy may be surgery or radiotherapy with or without chemotherapy
- First line therapy or primary treatment is for curing of the disease
- Adjunctive therapy is to assist the primary treatment
- Secondary treatment is when another primary treatment is used
- Surgery is removal of tissue (through vagina or abdomen)
- Cone biopsy and simple hysterectomy remove less tissue
- Radical hysterectomy removes more tissue

Table 6 | Cervical Cancer Treatment according to Stage

Stage	Treatment	Comments
IA1	Conization or simple hysterectomy +/- bilateral salpingo-oophorectomy	Conservative surgery
IA2	Modified radical hysterectomy and pelvic lymph node dissection	Adjuvant chemoradiation if risk factors present (lymphovascular space involvement, positive margins, positive nodes)
IB1, IIA	Radical hysterectomy and pelvic lymph node dissection	Adjuvant chemoradiation if risk factors present (lymphovascular space involvement, positive margins, positive nodes)
IB2, IIB - IV	Combination of chemotherapy and radiation therapy with cisplatin	Neoadjuvant chemotherapy to bulky tumors prior to Adjuvant chemoradiation

Possible Side-effects and Complications of Cervical Cancer Surgery

These risks apply to all surgical interventions, but tend to be increased in cancer patients. They include:

- Risk of surgical site infection
- Bleeding
- Injury to the internal organs (e.g. bowel, bladder, ureter)
- Risk of thromboembolism. Developing clots in the deep veins of the legs, especially if the patient is kept in bed and relatively immobile for days after surgery. Perioperative preventive measures can prevent clots from forming in the first place, and early detection and treatment can prevent the clots that do form from dislodging and travelling to the lungs.

Side-effects of Radiation for Cervical Cancer

Radiotherapy also affects multiple systems, but only those directly exposed to radiation; in the case of cervical cancer this is usually the lower abdomen, including the urinary bladder, rectum, and regional bone marrow. Other possible side-effects include menopause, infertility, discomfort or pain with intercourse, and possible bowel or bladder changes. Fistula is a rare side effect.

Side-effects of Chemotherapy for Cervical Cancer

Chemotherapy treatments affect not only cancer cells, but also rapidly dividing cells in systems of the entire body: bone marrow, digestive system, urinary system, skin, and other organs lined by epithelia. This means that there is a risk of anemia, low white blood cell counts and infections, or bleeding from low platelet counts. Chemotherapy can also cause nausea and diarrhea or allergic reactions to the drug. These are usually very short-lived and do not imply increased risks.

Managing Cervical Cancer in Pregnant Women

Although rare, cancer of the cervix is sometimes diagnosed in pregnant women. Cervical cancer does not cross the placenta, so the fetus is only affected by the direct spread of a very large cervical tumor or by complications from the methods used for the evaluation and treatment of the cancer.

Counseling a pregnant woman with cervical cancer requires particular skill and sensitivity. The issues are a great deal more complex and include helping her decide if she wishes to attempt to preserve her pregnancy. It is helpful to involve a multidisciplinary team and the woman's support circle in order to create a management plan that meets all needs and takes into account the complexities of decision-making in this context.

Managing Cervical Cancer in Women Living with HIV

It is best for women living with HIV who have cervical cancer to be fully diagnosed, staged, and treated at a tertiary-level institution with the appropriate expertise and multidisciplinary teams.

Both radiotherapy and chemotherapy are immunosuppressive therapies and surgery that requires women to be relatively healthy in order to avoid complications such as postoperative sepsis, bleeding, or wound problems. Measure baseline CD4 count regardless of the extent of the cancer. CD4 counts will also be needed to monitor the patient's immune status throughout treatment. If the CD4 count is or becomes low during therapy, allow for recovery of her immune system.

Patient Follow Up Plan

There is no consensus on the best post-treatment surveillance. General recommendations include:

- **First two years: Every three months** — clinical visit with gynaecological examination including Pap smear
- **Next three years: Every six months** — clinical visit with gynaecological examination including Pap smear
- **Thereafter: Yearly** — clinical visit with gynaecological examination including Pap smear
- Chest x-ray and/or CT scan as clinically indicated, based on symptoms

3.3.5 Palliative Care

A comprehensive approach to palliative care

Palliative care for patients with long-lasting incurable diseases, including advanced cervical cancer, offers medical, emotional, social, and spiritual support. The palliative care team includes health professionals such as physicians and nurses, community health workers, and many family caregivers. Palliative care includes providing support at the community level to mobilize local resources and establish links to treatment centres.

What is palliative care?

Palliative care aims to improve the quality of life of patients and their families facing problems associated with life-threatening illnesses and conditions.

Palliative care can be provided by people in the community, by local health centers and hospitals, and is provided both in the home and at healthcare facilities or community-based institutions.

Palliative care is a basic human right, recognized under international human rights law.

At the time of diagnosis of advanced cancer, treatment takes priority and the role of palliative care, although present, is secondary. As the illness advances further, palliative care gradually takes precedence. Bereavement care with the extended family is part of the continuum of care after the patient dies.

Palliative care:

- Provides relief from pain and other distressing symptoms
- Affirms life and regards dying as a normal process
- Is intended neither to hasten nor to postpone death
- Integrates the physical, psychological, and spiritual aspects of care
- Gives the patient and her family as much control and decision-making power as they desire and are able to accept
- Offers a support system to help patients live as actively as possible until death
- Offers a support system to help the family cope during the patient's illness and in their bereavement
- Uses a team approach
- Enhances quality of life, and may also positively influence the course of the illness
- Is applicable early in the course of illness, in conjunction with other therapies that are intended to prolong life, such as surgery and radiotherapy

Essential components of palliative care

- Prevention and management of symptoms, pain relief, and psychosocial and spiritual support
- At the community level, palliative care needs to include all elements that will keep patients well nourished, clean, and as active as they wish to be
- The patient's family members also need to be trained in their roles, including how to obtain and use needed supplies to care for her
- At tertiary-level facilities, prevention and management of symptoms (palliative radiotherapy to reduce the size of the tumor, treatment for vaginal discharge, fistulae, vaginal bleeding, nutritional problems, bedsores, fever, and contractures)
- Family members and community workers should be trained in palliative care while the patient is still in the hospital (prevention and management of problems, how to offer the patient support in her daily activities, such as bathing, going to the toilet, and moving around)
- Home visits by HCW to provide support and advice and, if necessary, arrange for referral to the appropriate level facility

Team approach to palliative care

- All involved in the management of the patient should be a part of the palliative care team (specialist, medical officer, nurse, community volunteers, family members, nutritionist, counselor, others)
- The aim is to ensure the best quality of life and outcome for patients with advanced cervical cancer
- Family members and caregivers should be informed about who to call if needed

Family and palliative care

- The patient's family and other caregivers can be taught to provide home-based care
- Empower family members to participate in the decision-making and updates in changes in caregivers and treatment
- Guide family in best practices of palliative care
- For families facing meager resources, refer to community and faith-based and non-governmental organizations for support

4. Referral Networks and Mechanisms

Integrating health services or establishing linkages with other health services is an important consideration for any cervical cancer prevention program. A well-functioning referral network includes linkages between the VIA/cryotherapy clinic or pap smear clinic and other services, if not provided at the clinic. Examples of other clinics and services include: the gynaecology clinic, the Dysplasia/LEEP clinic, the oncology centre, HIV care and treatment, family planning, as well as laboratory, pharmacy, and radiology services.

Developing or Improving a Referral Network

Two-way communication is a hallmark of an effective and efficient referral network. This helps the client receive the appropriate medical care without unnecessary delays, which can have a large impact on outcomes. To develop or improve a referral network, it is essential to:

- Identify the services and facilities to include in the referral network
- Ensure the referral facilities are capable of providing quality referral services as identified for that facility
- Establish a communication system between the facilities using: forms/letters, telephone, health information system, e-mail, or other distant consultation
- Develop referral protocols and guidelines, develop standardized referral and counter-referral forms, and ensure dissemination of these standardized protocols, guidelines, and referral forms
- Monitor the referral network to ensure continuity and quality of care

Referral Pathway

Table 7 depicts the referral pathway for cervical cancer screening and treatment. Abnormal pap smears and VIA-positive cases are not eligible for cryotherapy, and suspect cancer cases are referred to the closest Regional Hospital where a Dysplasia Clinic should be located and functional. If further referral is needed (for management/treatment of more difficult cases), the Regional Hospital will refer to the National Referral Hospital, Karl Heusner Memorial Hospital in Belize City.

Table 8 | Referral Pathway

Satellite Clinics Rural HC	Polyclinics Urban HC	3 Community Hospitals	3 Regional Hospitals	1 National Referral Hospital
Some have GP or visiting GP + Nurse or only Nurses	GP's	General Practitioners	Basic specialties	Subspecialties
Referral pathway	→	→	→	→
Screening with pap smear and referral	Screening with VIA and treatment, and referral	Screening with VIA and treatment, pap smear and referral	Screening VIA and treatment, pap smear + treatment of pre-cancer and cancer lesions	Screening with VIA and treatment, pap smear and treatment of pre-cancer and cancer lesions
	Cryotherapy, biopsy	Cryotherapy, biopsy	Cryotherapy, Colposcopy, biopsy, LEEP, surgery	Colposcopy, LEEP, cone biopsy, cryotherapy, surgery, ECC

Referral Forms

It is important for a program to have standardized referral forms. Different forms may be needed depending on the referral request, and may include:

- Client name, age, sex, identification number, and contact information
- Date of initial evaluation
- Findings and reason for referral
- Referral facility
- Date scheduled to see consultant (**referring center schedules the appointment, not the client**)
- Name of provider making the referral

- Copy of the VIA form (or drawing of cervix) or Pap smear result
- HIV status

The provider gives a referral form to the client at the time of the initial evaluation. The referral form serves two purposes: 1) it reminds the client to attend the referral appointment 2) it gives the consultant the client's details and reason for referral. The client then presents the referral form upon arrival at her appointment.

Counter-Referral Forms

After the visit, the consultant should communicate the following to the provider who made the referral: findings, recommendations, and treatment (if any). This can be through various means of communication, but needs to include entry into the BHIS as well as on the counter-referral form.

To prevent loss to follow-up, the clinic should develop a mechanism to track referred clients so the clinic can actively follow-up on clients to determine if they made their referral appointments. This can take many forms, but should be active and not passive, (i.e., the clinic should not wait to hear from the client about the results of the referral or to just assume the client made the referral appointment). For example:

- A designated time interval referral list (weekly, every other week, or even monthly) can help track clients
- A list of referred clients and their contact information
- At the designated time intervals, the clinic:
 1. Contacts the client to see if she has completed the referral appointment
 2. Contacts the consultant for results of pending referrals as well as enabling the consultant to follow-up women who have not presented for their appointments

5. Ensuring Quality in the Program

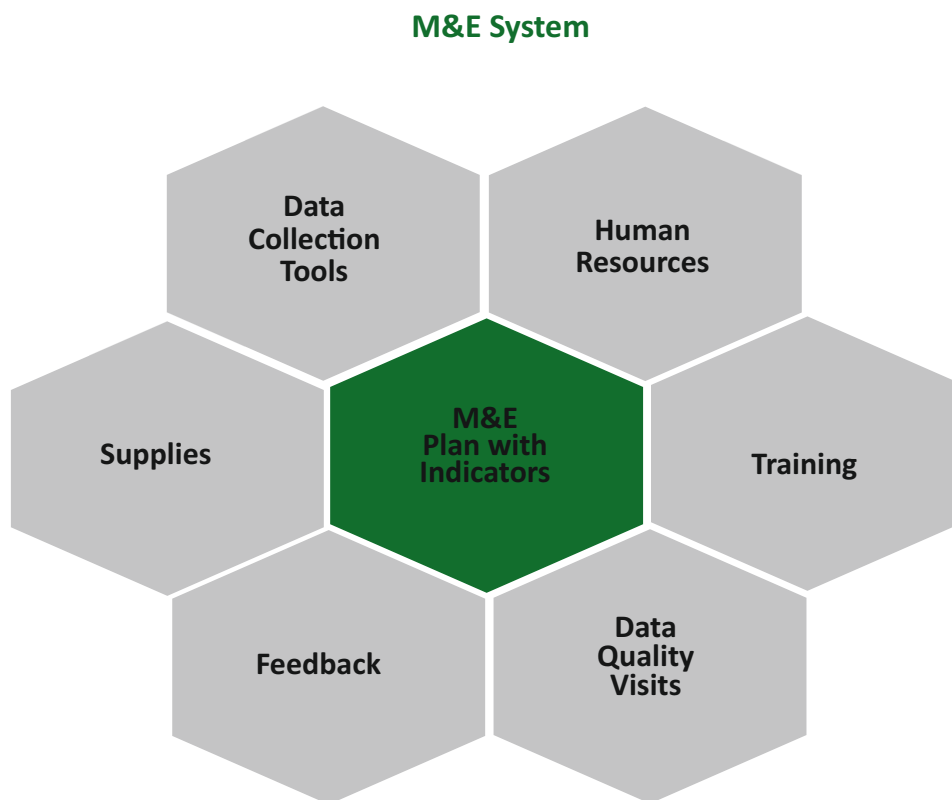
Evidence-based cervical cancer prevention policies and guidelines provide the overall programmatic framework essential to implementation of quality improvement and quality control (QI/QC) in a cervical screening program (WHO 2013C).

The QI/QC operational plan should be based on the following principles and guidance (WHO 2013C):

- The purpose of QI/QC is to ensure sustained high quality of care
- Measurable indicators must be clearly defined to facilitate assessment of program performance towards achieving the stated targets and goals
- A supportive supervision framework should be implemented. Supportive supervision focuses on improving performance of service delivery to meet expected standards.
- Practical guidance and tools must be developed for health-care providers and other stakeholders who play an active role in monitoring QI/QC

Proper monitoring and evaluation (M&E) is essential to ensuring quality in the program, since it allows a program to track progress, identify areas that are performing well, identify areas where a gap in quality exists and take corrective action, and identify activities that are performing well and should be further expanded. The cervical cancer prevention program's standard M&E core elements include: indicators, data collection tools, periodic supervisory (or monitoring) visits to clinics to assess data quality, analysis, and use and reporting tools (Figure 12).

Figure 12 | M&E System for Cervical Cancer Prevention and Control



5.1 Defining the Core Indicators

The Belize Cervical Cancer Prevention and Control Program adopts the five core indicators recommended by WHO (WHO 2013C):

- **Screening rate of the target population (women aged 25–49 years):** Percentage of women aged 25–49 years who have been screened for the first time with VIA in the previous 12-month period
- **Positivity rate:** Percentage of screened women aged 25–49 years with a positive VIA test result in the previous 12-month period
- **Treatment rate:** Percentage of VIA-positive women receiving treatment in the previous 12-month period
- **Coverage rate indicator:** Percentage of women aged 25–49 years who have been screened at least once between the ages of 25 and 49 years
- **Cervical cancer age-specific incidence**

5.2 Supportive Supervision

The supportive supervision (SS) visit is an essential component of QI/QC and improving quality of care. The objectives of the SS visit are to assess the quality of care at the facility, to make recommendations for improving care and to develop an action plan. During the SS visit, the trainer/supervisor* should use an SS tool as a guide to conduct the following tasks to achieve these objectives and document them:

- Assesses provider performance using the performance standards (based on the clinical skills checklists used during training)
 - Assesses provider performing VIA and cryotherapy, with clients (ideally) or in simulation
 - Conducts an image review exercise (flashcard or computer-based, as appropriate) with each provider
 - Assesses client-provider interaction
- Assesses facility readiness
- Reviews data management and the core indicators for the facility
- Meets before and after with the providers and supervisor of the facility to discuss the purpose of the performance support visit and the visit findings

***Note:** Trainer/supervisor refers to trainers, supervisors, or providers who have the knowledge, skills and attitudes who have been designated for the role of conducting the SS visit.

Timing of Supportive Supervision Visits

In an ideal arrangement, scheduled SS visits should occur as follows:

- First week post-training for transfer of learning and facility set-up
- Four-two weeks post training
- Every quarter for the first year
- Annually

Note: In order to better prioritize time and resources, the frequency of visits should be determined by how well sites are performing. Sites performing well require less frequent supervision, while underperforming sites require more intense supervision.

The checklist in Table 8 should be used when planning the supportive supervision visit. Sufficient time should be allocated for each SS visit, allowing a full day to conduct. The action plan that was developed from the previous visit should be reviewed prior to the visit, and again during the visit with the facility supervisor and designated staff. While it is not necessary, or feasible, to assess every provider at every SS visit, it is important to observe all aspects of service delivery – client registration, counseling, screening, treatment, infection prevention, facility readiness and documentation (including records and registers). This enables the trainer/supervisor to determine whether standards are being achieved. The SS visit also serves as an opportunity for trainer/supervisors to mentor and update VIA/cryotherapy providers and to work collaboratively with them to resolve any identified issues. During the SS visit and before its conclusion, the trainer/supervisor reviews

the findings of the visit with the facility supervisor and VIA/cryotherapy providers, and works collaboratively with them to develop an action plan to address areas of improvement. After the visit, the trainer/supervisor writes up the SS evaluation report and shares with the facility and appropriate district level officials.

Table 8 | Supportive Supervision Visit Planning Checklist

Activity	Checklist
Schedule visit with staff at facility to be visited	■ Consult with the staff of the facility to establish an agreeable date for the visit ■ Determine the amount of time the visit will take ■ Ensure that the schedule of the visiting (external) trainer/supervisor is cleared for the visit ■ The visiting trainer/supervisor should also inform staff at the facility of the aspects of the programme that will be reviewed (e.g. counselling, VIA, infection prevention) ■ Ensure that the day of the visit is a screening day and that women are scheduled to receive services
Ensure availability of all materials required	■ Print copies of the agreed program monitoring tools, including: ■ Data collection tools ■ Performance standards ■ QI/QC plans and checklists
Review previous SS visit reports prior to the visit	■ The visiting (external) trainer/supervisor should be familiar with the strengths and weaknesses in service provision previously identified at the facility
Schedule adequate time for the visit	■ Allow a full day to conduct the visit ■ There should be enough time to discuss the findings of the SS visit with the staff of the facility as well as time to review the facility's logbooks and/or computer database (to check whether they are available and up to date) ■ Time should also be set aside to discuss steps needed to address any identified gaps
Communication with facility staff regarding the visit	■ Prepare staff for the visit and let them know what will be reviewed that day ■ Schedule time at the end of the day for a discussion of the findings with the visiting trainer/supervisor
Update logbooks and/or computer databases	■ The person conducting the visit will want to review the data collected in the logbooks and/or computer databases ■ Ensure that these are up-to-date and, if possible, calculate the necessary indicators

Adopted from: Monitoring national cervical cancer prevention and control programmes: quality control and quality assurance for visual inspection (VIA)-based programmes (WHO 2013C).

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ANNEXES

Annex 1

Box I. The 2014 Bethesda System for Reporting Cervical Cytology

Specimen Type

Indicate: conventional test (Pap test), liquid-based preparation, or other.

Specimen Adequacy

Satisfactory for evaluation (describe presence or absence of endocervical/transformation zone component and any other quality indicators, e.g. partially obscuring blood, inflammation)

Unsatisfactory for evaluation (specify reason)

- Specimen rejected or not processed (specify reason)
- Specimen processed and examined, but unsatisfactory for evaluation of epithelial abnormality because of (specify reason)

General Categorization (Optional)

- Negative for intraepithelial lesion or malignancy
- Other: see *Interpretation/Result* (e.g. endometrial cells in a woman 45 years of age or older)
- Epithelial cell abnormality: see *Interpretation/Result* (specify "squamous" or "glandular" as appropriate)

Interpretation/Result

- Negative for intraepithelial lesion or malignancy (when there is no cellular evidence of neoplasia, state this in the General Categorization section, in the Interpretation/Result section, or both-whether or not there are organisms or other non-neoplastic findings)
 - Non-neoplastic findings (optional to report; list not inclusive)
 - Non-neoplastic cellular variations
 - Squamous metaplasia
 - Keratotic changes
 - Tubal metaplasia
 - Atrophy
 - Pregnancy associated changes
 - Reactive cellular changes associated with
 - Inflammation (includes typical repair)
 - Lymphocytic (follicular) cervicitis
 - Radiation
 - Intrauterine device
 - Glandular cell status posthysterectomy
 - Organisms
 - *Trichomonas vaginalis*
 - Fungal organisms morphologically consistent with *Candida species*
 - Shift in flora suggestive of bacterial vaginosis

- Organisms (cont.)
 - Bacteria morphologically consistent with *Actinomyces species*
 - Cellular changes consistent with herpes simplex virus
 - Cellular changes consistent with cytomegalovirus
- Other
 - Endometrial cells (in a woman 45 years of age or older) (specify if negative for squamous intraepithelial lesion)
- Epithelial cell abnormalities
 - Squamous cell
 - Atypical squamous cells (ACS)
 - Of undetermined significance (ASC-US)
 - Cannot exclude high-grade squamous intraepithelial lesion (HSIL) (ASC-H)
 - Low-grade squamous intraepithelial lesion (LSIL) (encompassing human papillomavirus/mild dysplasia/cervical intraepithelial neoplasia (CN) 1
 - High-grade squamous intraepithelial lesion (encompassing: moderate and severe dysplasia, carcinoma in situ; CIN 2, and CIN 3)
 - With feature suspicious for invasion (if invasion is suspected)
 - Squamous cell carcinoma
 - Glandular cell
 - Atypical
 - Endocervical cells (not otherwise specified or specify in comments)
 - Endometrial cells (not otherwise specified or specify in comments)
 - Glandular cells (not otherwise specified or specify in comments)
 - Atypical
 - Endocervical cells, favor neoplastic
 - Glandular cells, favor neoplastic
 - Endocervical adenocarcinoma in situ
 - Adenocarcinoma
 - Endocervical
 - Endometrial
 - Extrauterine
 - Not otherwise specified
- Other malignant neoplasms (specify)

Adjunctive Testing

Provide a brief description of the test method(s) and report the result so that is easily understood by the clinician.

Computer-Assisted Interpretation of Cervical Cytology

If case examined by an automated device, specify device and result.

Educational Notes and Comments Appended to Cytology Reports (Optional)

Suggestions should be concise and consistent with clinical follow-up guidelines published by professional organizations (references to relevant publications maybe included).

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Annex 2:

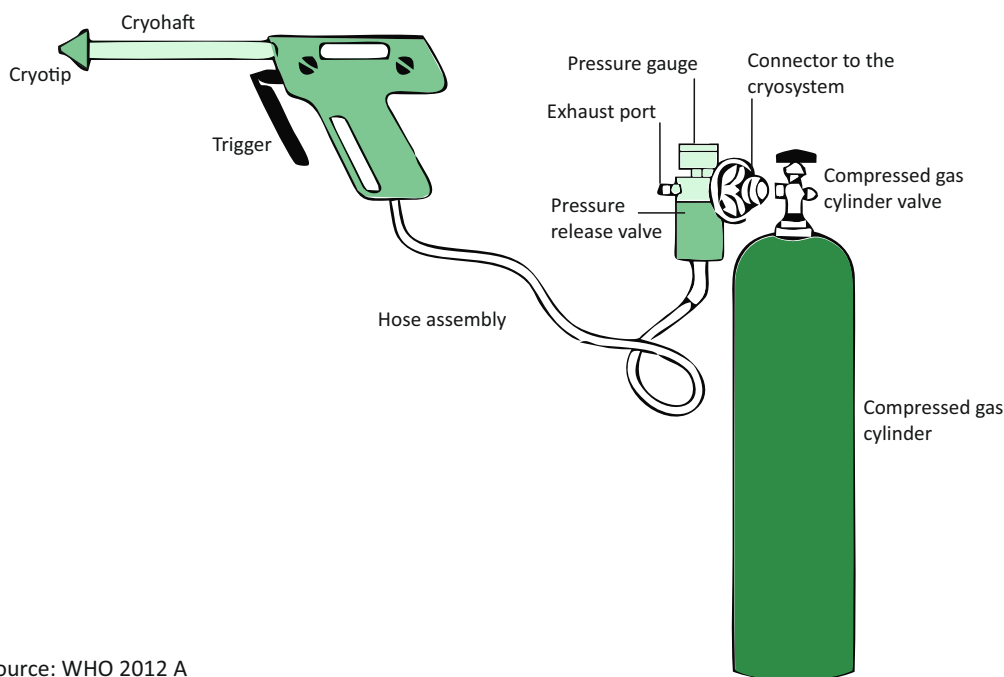
Cryotherapy Equipment

The following section provides an overview of the cryotherapy equipment. For more detailed information regarding the technical specifications of cryotherapy equipment, please see the WHO reference *WHO technical specifications: Cryosurgical equipment for the treatment of precancerous cervical lesion and the prevention of cervical cancer* (WHO 2012A).

Cryotherapy Unit

The cryotherapy unit (Fig A 1) refers to the equipment that enables high-pressure compressed gas to travel from the gas cylinder to the cervix via the cryoprobe and cryotip. It should be certified as capable of reaching and maintaining a cryotip temperature of at least -20°C and preferably -50°C (WHO 2012A).

Figure A 1 | Typical cryotherapy unit



Source: WHO 2012 A

The cryotherapy unit consists of:

- **Cryotip:** metal tip designed to fit up against and completely cover the precancerous lesions, and induces freezing of the cervix
- **Hand unit:** consists of the cryoshaft and cryogun
- **Cryoshaft:** long rigid tube that attaches the cryotip to the cryogun. The outer surface of the cryoshaft is insulated to prevent accidental freezing of any tissue it touches. Together, the cryotip and cryoshaft are sometimes called the cryoprobe.
- **Cryogun:** consists of a fiberglass handle (shaped like a gun), and freeze/thaw triggers. The cryogun controls the flow of gas from the cylinder and high-pressure hose into the cryoprobe.
- **High-pressure hose:** flexible hose connecting the connector/pressure gauge to the cryogun. This hose assembly conducts gas to the cryogun, as well as back to the exhaust port for venting of the gas.
- **Connector/pressure gauge assembly:** connects the gas cylinder to the high-pressure hose

The connector is made of metal and has specific fitting for type of gas and where the cylinder was made (e.g. British fittings, U.S. fittings). It is essential to know this when ordering the cryotherapy units. The pressure gauge indicates the pressure within the system as the gas leaves the cylinder. For safe and effective operating conditions, most pressure gauges have color-coded zones:

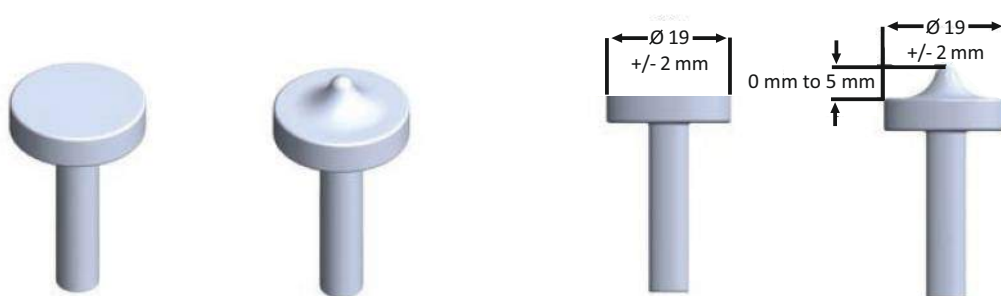
- **Red:** the pressure is too high, and it is unsafe to operate the equipment at this pressure. The cylinder needs to be cooled (if overheated) and/or gas released until pressure reading is in the green zone before operating the equipment.
- **Green:** safe to use
- **Yellow:** the pressure is too low for effective cryotherapy to be conducted. The cylinder should be exchanged for a full cylinder.
- **Pressure relief valve:** part of the connector/pressure gauge that is designed to protect the equipment, provider and client
- **Exhaust port:** vents gas from the cryotherapy unit. As a result, cryotherapy should only be conducted in well ventilated rooms.

Note: Due to the specific characteristics of the compressed gas, the cryotherapy unit is manufactured according to the gas that will be used. Therefore, when ordering the cryotherapy units, not only the cylinder fitting be specified, but the type of gas that will be used with it also needs to be specified.

Cryotherapy Tips

The WHO recommends cryotips that are round in shape and 19 +/- 2 mm in diameter (Figure A 2). The surface that contacts the cervix should be either flat or with a nipple-shaped small cone extension, not exceeding 5mm. In practice, the nipple-shaped cryotips are preferable, since they are easier to position on the cervix. For flexibility in treating lesions, especially in a woman with a wide transformation zone, two different sized cryotips should be considered: 19/20 mm and 25 mm (Jacob 2005). However, it is slightly more difficult to use the 25 mm cryotip, at least initially, and it may carry greater risk of accidental freezing of other tissue and potential complications. Therefore, if 25 mm cryotips will be used in a program, it is recommended that the provider become proficient in the use of the 19/20 mm cryotip first, before adding the 25 mm cryotip to the treatment options.

Figure A 2 | Illustration of recommended dimensions of cryotips



Source: WHO 2012A

Gas

WHO recommends using either carbon dioxide (CO²) or nitrous oxide (N₂O), the most commonly used and studied compressed gases for cryotherapy, and most cryotherapy equipment manufacturers offer either option (WHO 2013B). In settings where both gases are available, WHO recommends CO² over N₂O because it tends to be much less expensive (often ¼ the cost), more readily available, and has less ventilation requirements (WHO 2012A, WHO 2013B). However, the choice of gas for a cervical cancer prevention program needs to take the local setting into consideration.

Both N₂O and CO₂ reliably achieve at least -20 °C and closer to -50 °C, though N₂O tends to achieve colder minimum temperature at the cryotip and in the tissue than CO₂. However, it is important to note that current evidence suggests no difference in clinical outcomes between the gases (WHO 2011, WHO 2013B).

Gas Quality

Gases are available in many different grades, such as medical, food, and industrial. While medical-grade gases are more expensive than other grade gases, they are very high quality and free of any potentially impurities that can cause equipment blockage, malfunctioning, and breakdown. Therefore, the WHO recommends use of medical-grade gases if available and affordable. If medical-grade gases are not available, then food, beverage (for Co₂), or equivalent grades can be considered, though industrial-grade is discouraged (WHO 2012A).

Annex 3:

MedGyn Cryotherapy Unit – Job Aid

First use of the day

1. With master cylinder valve in closed position, tightly attach regulator of cryotherapy unit (cryogun/shaft) to CO₂ or N₂O cylinder.
2. While holding cryogun pointed toward ceiling, slowly turn master cylinder valve to open position.
3. Check pressure on pressure gauge
 - Green: approximately 40–74 kg/cm². Appropriate pressure to operate.
 - Yellow: below 40 kg/cm². Replace gas cylinder (see below).
 - Red: above 74 kg/cm². Unsafe to operate (see below).
4. Pressure in “green zone.”
5. Point cryogun to ceiling. Pull trigger halfway (one click) to check freeze function for one second, then all the way (second click) to check defrost for one second.
6. Screw high-level disinfected (HLD) cryotip onto end of probe.
7. 3-5-3 technique. Freeze three minutes – defrost five minutes – freeze three minutes.
8. Set timer for three minutes. Apply cryotip to cervix and pull trigger halfway (one click) to freeze. Watch as ice ball develops and freezes for three minutes.
 - Three minutes is a guideline. Most importantly, look for a 4–5 mm ice ball beyond the cryotip edges. Depending on gas pressure in cylinder, and other factors, freeze time may be more or less than three minutes.
9. After the freeze step, pull the trigger all the way (second click) and hold to defrost. Release trigger when the cryotip appears close to be frost-free. Wait for the cryotip to detach from the cervix.
10. Repeat steps 9 and 10.
11. Inspect cervix to ensure ice ball is present, covers appropriate area of cervix, and that there is no injury to surrounding tissues.
12. Remove cryogun from vagina and either hand to assistant or place on clean tray.
13. After caring for the patient, turn master cylinder valve to closed position, release pressure by pulling trigger to freeze (one click). When pressure reads zero, pull trigger all the way (second click) and release.
14. Wipe the cryogun and tip with alcohol, unscrew cryotip from end of probe, rinse in clean water and soak in cidex or 60–90% ethyl or isopropyl alcohol for 20 minutes for high-level disinfection (HLD).
15. Protect cryoshaft tip by putting on protective plastic sleeve or covering on cryoshaft when a cryotip is not in place.
16. At end of HLD, if using alcohol, simply remove and allow to air dry in HLD container. If using cidex, rinse thoroughly in clean water, tap all water out of cryotip, and air dry in HLD container.

Repeat use during clinic session

1. Screw HLD cryotip onto end of probe.
2. Turn master cylinder valve to open position.
3. Proceed with steps 7–16 as above.

At end of the day

1. Assuming steps 13–16 have been done, unscrew regulator of cryotherapy unit from CO₂ or N₂O cylinder and store in box with cryotips.
2. Ensure gas cylinder is in safe, cool place for storage.

Gauge in “Red Zone”

1. Do not operate — this could ruin cryotherapy unit or rupture hose and cause injury. Turn master cylinder valve to closed position, release pressure by pulling trigger to freeze (one click). When pressure reads zero, pull trigger all the way (second click) and release.
2. Unscrew regulator of cryotherapy unit from gas cylinder.
3. In well-ventilated area, ensure all is clear from tank. Turn master cylinder valve to slightly open position and vent large cylinder for 30 seconds, small (20 lb) cylinder for 15 seconds. Recheck pressure — if still red, repeat steps. If green, ready to operate. If still red after repeated ventings, do not use cylinder — return to manufacturer or gas company for further evaluation.
4. Note: If cylinder is warm to touch, do not use. Store in cool place or wrap in cool wet cloths to reduce temperature.

Gauge in “Yellow Zone”

1. Replace cylinder. Turn master cylinder valve to closed position, and release pressure by pulling trigger to freeze (one click). When pressure reads zero, pull trigger all the way (second click), and release.
2. Unscrew regulator of cryotherapy unit from gas cylinder.
3. Proceed with steps as outlined under “First use of the day.”

Annex 4

Estimating VIA and Cryotherapy Equipment and Supplies Needs

Estimates are based on the following assumptions:

- **VIA-positive rate of 5–10%**, with estimate based on VIA-positive rate of 10%
- **Eligible for cryotherapy rate of 85%** and that all women eligible for cryotherapy receive the treatment

Therefore, an estimated 10 of 100 women will be VIA-positive, and approximately nine of these women will receive cryotherapy. For ease of calculation, estimate 10 cryotherapy procedures per 100 women screened.

Note: VIA-positive rate will be higher among HIV-positive women than HIV-negative women (often two times higher). Cryotherapy-eligible rate for HIV-positive women who are VIA-positive will be lower than among their HIV-negative counterparts. List also does not account for wastage; therefore, one should adjust final estimations upwards.

List 1: VIA Non-Consumable Equipment and Supplies for Basic Start-Up

Note: In the list below, the quantity of supplies needed is based on seeing 10 clients per day or shift in one examination room. Amounts will need to be adjusted if a higher number of clients is seen per day, unless instruments can be properly processed without interrupting the client flow. Considerations for estimating the number of clients screened are based on expected client load, and are driven by a number of factors, including if the services are: 1) part of an integrated approach with other reproductive health services, 2) provided on dedicated days 3) provided via outreach or mobile services or 4) part of a mass campaign.

Non-Consumable Equipment/Supplies	Amount	Comments
Specula – Graves, metal bivalve specula (medium and large)	10 (8 medium, 2 large)	
Ring/sponge-holding forceps	10	If using wood kebab sticks (see consumable supplies below), the ring/sponge-holding forceps are not necessary
Kidney dishes	2	
Gynaecological examination table	1	Wipe down with 0.5% chlorine solution between clients
Macintosh or rubber sheet	2	
Goose-neck lamp (or other good light source such as torchlight)	1	
Instrument trays or trolleys	1	
Specimen cups (vinegar)	1	
Movable and adjustable stool	1	
Timer, clock, or watch	1	
Privacy screens	1	
Sheets and gowns	10	Alternatively, one can inform the community that women coming in for screening should bring their sarong or similar dress to provide cover

List 2: VIA Consumable Supplies

Consumable Supplies	Per 100 Women Screened	Comments
Clean, non-sterile examination gloves – box of 100: (Size: S, M, L – depends on providers) ■ Assume 4 gloves per client	4 boxes	
3–5% acetic acid (white vinegar) – 1 L bottle: ■ Assume 15 cc/client	1.5 L	
Roll of cotton wool to make cotton balls: ■ Assume 3 cotton balls/client	< 1	
If using ring/sponge-holding forceps (see non-consumable supplies above), the wooden kebab sticks are not necessary	300	If using wood kebab sticks (see consumable supplies), the ring/sponge-holding forceps are not necessary
Small cotton swabs	100	
Non-sterile gauze roll	< 1	
Batteries (size AA): ■ Assumes using torchlights and certain size torchlight	2	
Chlorine to make 0.5% solution: ■ Highly variable (solution changed daily and not as dependent upon number of clients screened)	2 L	
Condoms to retract vaginal walls that are lax	10	
Tongue depressors to retract vaginal walls that are lax	10	

List 3: CRYOTHERAPY: Non-Consumable Equipment and Supplies for Basic Start-Up**Note:** Amount of equipment and supplies needed for cryotherapy is in addition to those listed for VIA.

Non-Consumable Equipment/Supplies	Amount	Comments
Cryotherapy unit with three 19 mm cryotips with non-extended nipples (19 mm X 2 and 25 mm X 1)	2	
Gas cylinders (for nitrous oxide or carbon dioxide gas)	1	To avoid interruption in services if gas runs out, having two cylinders available is preferable to having only one
Additional specimen cup for alcohol with cotton balls (to wipe down/disinfect cryotherapy unit following use)	1	
High-level disinfected specimen cups (to store cryotips and for HLD of cryotips, if not autoclaving)	2	

List 4: CRYOTHERAPY Consumable Supplies**Note:** Amount of equipment and supplies needed for cryotherapy is in addition to those listed for VIA.

Estimates are based upon 10 out of the 100 women screened requiring cryotherapy treatment.

Consumable Supplies	Per 100 Women Screened
Carbon dioxide or nitrous oxide gas	20 lb cylinder will average 8–12 treatments, but this is highly variable and influenced by local conditions
Small cotton swabs	100
Wooden spatulas (tongue depressors): ■ For cryotherapy to retract lax vaginal walls, as needed	10
Condoms: ■ For cryotherapy to retract lax vaginal walls, as needed ■ Lubricated for post-cryotherapy self-care, if women not abstaining from sexual intercourse for 6 weeks	5 50
Sanitary pads	10
Batteries (size AA): ■ Assumes using torchlights and certain size torchlight	2
70–90% ethyl or isopropyl alcohol: ■ For disinfection of cryotherapy unit following use, and HLD of cryotips if not autoclaving ■ For HLD of cryotips, need to change solution weekly ■ Assume approximately 100 cc weekly	Variable – depends on use for HLD and a volume of cryotherapy cases per week

Annex 5: LEEP Equipment, Instruments, and Supplies

Note: The **details** about the LEEP electrosurgical unit, smoke evacuator, and filter **will vary depending on the manufacturer**. This will affect details of equipment set-up, current settings, use, care, and maintenance, **but many of the principles are the same**.

In addition to the VIA supplies, the following LEEP equipment and supplies are required:

Equipment

The LEEP electrosurgery unit (or “LEEP unit”) provides the power and different waveforms for cutting and coagulation. The LEEP unit has inputs for the dispersive pad and electrosurgery pen, and the unit will not function without these being properly attached. Most LEEP units also have a smoke evacuator and filter as part of the unit; if not, these are separate components. Even if the smoke evacuator is part of the LEEP unit, it often has a separate power switch and must be turned on before proceeding with LEEP.

The smoke evacuator has a filter that should be changed at an interval according to the manufacturer's specifications—some units have both external and internal filters. Suction tubing is connected from the smoke evacuator to the LEEP speculum tubing. The smoke evacuation system has a high flow rate and is essential in order to remove smoke during the procedure for satisfactory visualization, and to protect persons in the room from potential exposure to aerosolized HPV particles (see Figure A 3).

Figure A 3 | LEEP Units and Smoke Evacuators



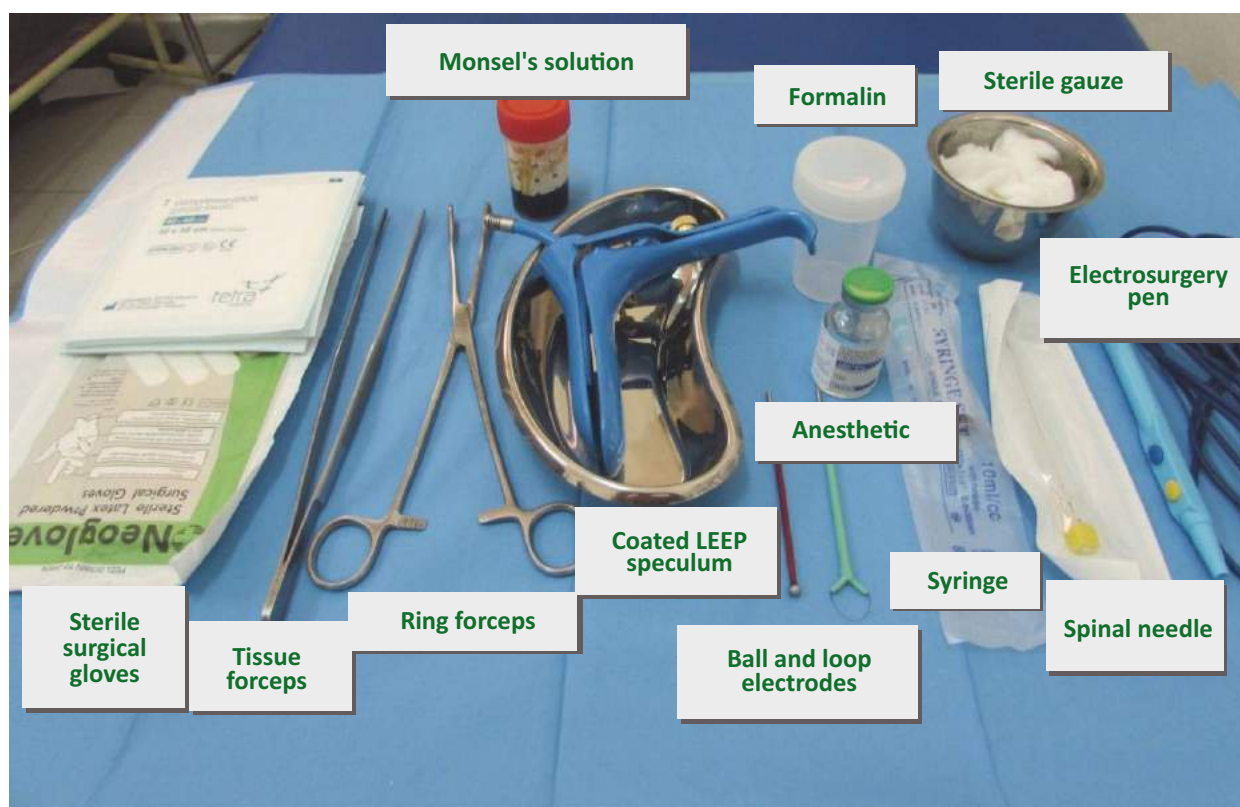
- **Large instrument trolley:** Ideally with two shelves
- **Examination table with stirrups:** The examination table should allow the provider to insert the speculum and visualize the cervix and be at a comfortable height to perform the procedure well. While this can be accomplished without a gynecological examination table with stirrups, it is more difficult to do so. The examination table in LEEP is more important than in VIA or cryotherapy.

- **Light:** Good-quality light is essential throughout the procedure. This can be accomplished with a quality gooseneck lamp or a torchlight held by an assistant.

Instruments (see Figure A 4)

- **LEEP speculum (medium and large):** The LEEP speculum is different from regular vaginal specula because it is coated with non-conductive material and has a metal tube that can be attached to tubing and a smoke evacuator. The coated speculum helps avoid conducting an electrical shock or injury if an activated loop or ball electrode inadvertently contacts the speculum. Alternatively, a regular metal speculum covered with a condom can be used, but since these specula rarely have an attachment for the smoke evacuator tube, an assistant will need to hold the tubing to keep a clear operative field. While inadvertent contact of a non-coated speculum (and not covered with a condom) with an activated loop or ball electrode will cause a painful shock, it rarely causes significant tissue damage because the energy is dispersed over a relatively large area of contact.
- Special coated/insulated (similar to LEEP speculum) **vaginal wall retractors**, wooden spatulas, or a condom/finger of a glove over the speculum can help improve visualization if the vaginal walls bulge into the operative field, as well as reduce the risk of inadvertent contact of an activated loop or ball electrode with the vagina.
- **Tenaculum:** Sometimes used to manipulate the cervix for better visualization and/or move the cervix away from the vaginal sidewall to protect it against inadvertent contact with the loop or ball electrode
- **Long tissue forceps and/or ring forceps:** Used to pick up excised LEEP specimen(s). Also used to apply cotton balls or gauze to the cervix during VIA/VILI, and during LEEP as noted below.
- **Long needle driver:** In the rare case that bleeding cannot be controlled with coagulation, it is important to be prepared to suture to achieve adequate hemostasis
- **Long surgical scissors:** To cut the suture

Figure A 4 | A Typical LEEP Instrument Tray with Necessary Instruments and Supplies

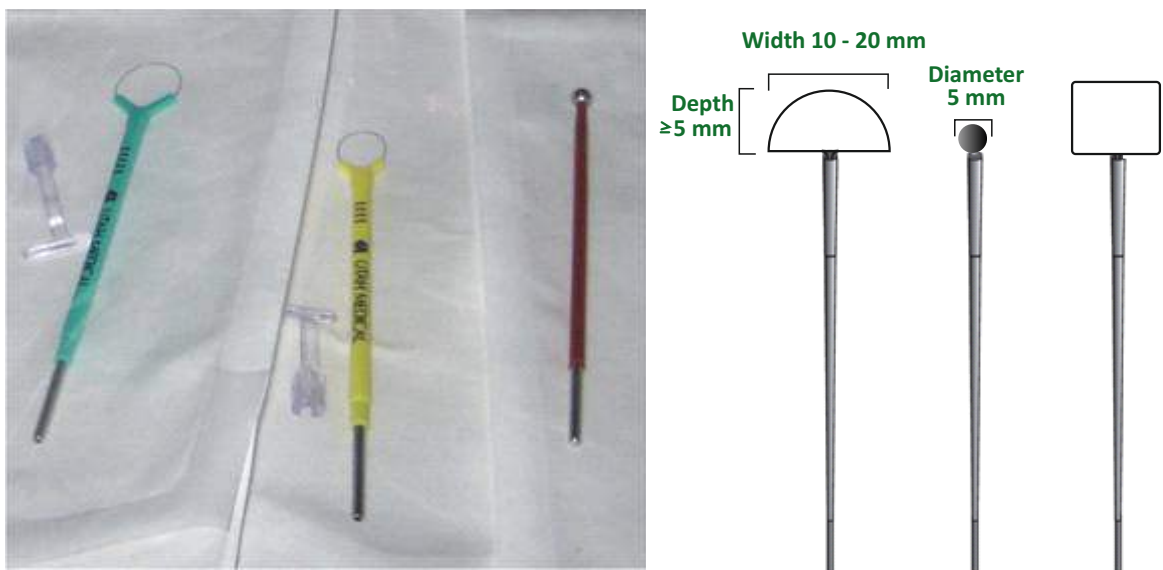


Supplies

These include disposable items, but can be reused multiple times if cleaned and processed properly and gently. While the loop and ball electrodes are meant for single use, in practical terms, they can be reused many times. Heat sterilization in separate packets can prolong the life of the loop and ball electrodes, whereas chemical sterilization tends to make the wires brittle and break in about four procedures.

- Loop and ball electrodes: available in varying sizes and configurations. (See Figure A 5)
 - Depth: should be at least 5 mm, but range from 5–15 mm
 - Width: recommended width of the loop electrodes includes 10 mm, 15 mm, and 20 mm

Figure A 5 | Loops and Ball Electrode



IMPORTANT

SPECIAL TIP: The most useful, versatile, and safe size loop is the **15 mm x 8–12 mm** (width x depth), especially early in your experience as a LEEP provider. The 15-mm loop can remove any size lesion, even very large ones, by utilizing multiple passes. Unless the LEEP provider has extensive experience, **larger loops increase the risk of injury or excessive bleeding** due to inadvertently removing too much tissue at once (e.g., larger and deeper tissue specimens excised, with greater problems with bleeding; more inadvertent injury to vaginal sidewall). The **10 mm x 10 mm loop** is useful for lesions that primarily extend into the **endocervical canal**. The 5 mm ball electrodes are used for coagulation. The required power settings for the different size loop electrodes and ball electrode are described in Table A1.

Table A1 | Power Settings for Loops and Ball Electrodes

Type/Size Loop and Ball Electrode	Power Setting
10 x 10 mm loop	30 watts – blended
15 x 5 mm loop	35 watts – blended
15 x 8 mm loop	35–40 watts – blended
15 x 12 mm loop	40 watts – blended
20 x 8 mm loop	45–50 watts – blended
20 x 12 mm loop	50 watts – blended
5 mm ball	35–40 watts – coagulation

Note: Most LEEP electrosurgical units come with settings recommended by the manufacturer. These are good baseline settings and can be adjusted according to provider experience and preference.

KEY POINT: When using the loop electrodes for excision, ensure that the power setting is blended and not pure cutting. The blended setting combines cutting and coagulation to help minimize bleeding during the excision.

- **Electrosurgery pen:** Electrosurgery pens hold the loop and ball electrodes and are connected to the LEEP unit. The pens will have either hand control (cut and coagulation buttons on the pen) or foot control (cut and coagulation pedals) to activate the electrodes. The operator must depress the button or foot pedal to activate the electrodes, but care must be taken not to inadvertently activate the electrode early, as this may lead to electrical burns of the patient if the electrode is touching the vaginal wall as the operator advances the electrode through the vagina to the cervix.
- **Dispersive (grounding) pad or plate:** For patient safety and optimal effect, a dispersive (grounding) pad or plate must be used to allow the electrical circuit to be completed. The dispersive pad should be placed on the thigh, or if a plate is used, under the buttocks. This contact must be maintained over a large area or the patient is at risk for suffering an electrical burn at the site. Most LEEP electrosurgical units have an internal system that monitors the circuitry. If a problem is encountered, the unit will alert the operator and prevents operation until the problem is corrected. In addition, the dispersive pad site should be dry and there should not be any fluids pooling underneath the patient. LEEP should not be performed around any flammable gases or liquids (such as those containing alcohol) or other flammable objects.
- **Suction tubing:** Attaches to the speculum and smoke evacuator to keep the operative area clear of smoke, and moves smoke to the external and internal filters
- **Local anesthetic:**
 - 1% or 2% lidocaine (or similar agent) with 1:100,000 to 1:200,000 epinephrine (see Special Tip below regarding dilution)

- **1% or 2% lidocaine (or similar agent) without epinephrine:** for those with contraindications for use of epinephrine
- **Spinal needles:** 22-, 25-, or 27- gauge, 3.5 inches long. These needles are used to inject the cervix with local anesthetic. The length of the needle is important in order to reach the cervix while maintaining good visualization. Needle extenders or dental syringes can also be used, if available. Of note, if the spinal needles are not good quality, the 25- or 27- gauge needles bend easily and make injection into the cervix difficult.
- **Syringes:** 5- and 10- mL
- **Needles:** 18- or 20 gauge for drawing up local anesthetic
- **Exam gloves:** Can use non-sterile gloves for practice; use sterile gloves for the procedure. Will need a range of sizes depending on the LEEP provider and assistant.
- **Wooden tongue depressors or spatula:** To act as a vaginal wall retractor or to help manipulate cervix
- **Condoms/finger of a glove:** When placed on the speculum and the tip cut, the condom/finger of a glove acts as a vaginal wall retractor. Non-lubricated work best (if available), since they do not slip down the speculum as much. If a coated LEEP speculum is not available, a condom can be used to prevent electrical shock from inadvertent contact of the loop/ball electrode with the speculum.
- **Large, tight cotton swabs or small gauze sponges:** For VIA/VILI, but mostly to maintain a clean field of vision. A clean field of vision is very important, especially following removal of the LEEP specimen. The bed or base from where the tissue was removed can bleed heavily at times. To accurately determine the exact area of bleeding and for the ball coagulation to work effectively, the bed of the LEEP biopsy must be as dry as possible. This requires firm pressure on the bed followed by a quick look. Large, firmly made cotton swabs or ring forceps/long tissue forceps with cotton balls or small squares of cut gauze work well. Loosely made cotton swabs do not work well in this situation, as they cannot apply the appropriate amount of pressure and the loose cotton will often stick and obscure the field. Coagulation does not work as effectively if it needs to traverse a small collection of blood; it works most effectively with a dry field and where it can “arc” across to the tissue.
- **3–5% acetic acid:** To perform VIA prior to the LEEP. Alternatively, Lugol's iodine can be used to identify the abnormal area to be excised.
- **Monsel's solution/paste:** To ensure hemostasis
- **Sterile kidney basin:** For surgical field. Alternatively, can use the cloth(s) the speculum and ring forceps were processed in as a sterile surgical field.
- **Drapes:** These are primarily to cover the woman's genital area as much as possible. They do not have to be sterile.
- **Gauze or vaginal pack:** For bleeding that is difficult to control following LEEP—to be used in place for 24 hours, or as a temporizing measure until the patient is taken to the operating theater
- **Condoms and sanitary pads:** Provided to the woman following the procedure
- **Suture-O or # 1-polysorb on a CT-needle (or similar suture and needle):** Needed only if bleeding does not stop with other measures.
- **Formalin and specimen cup (if specimen is to be sent for pathology)**
- **Cidex (2–4% glutaraldehyde):** For chemical high-level disinfection (HLD) or sterilization of loop and ball electrodes

Note: For the insulated instruments (speculum), once 2–4% glutaraldehyde is used for HLD or sterilization, the instrument should not be autoclaved in the future. Use of both techniques can lead to damage of the insulation, leading to increased risk of electrical shock or burn.

- Meat: for practice. Fresh, firm sausages, beef tongue, or chicken is preferable
- PVC tubing/pipe: For practice, to simulate a speculum and vaginal walls

SPECIAL TIP: Preparing Monsel's Paste

First, prepare glycerol starch.

Ingredients:

- Starch (30 g)
- Sterile water (30 mL)
- Glycerine (390 g)

Preparation:

- In a crucible, dissolve the starch in the sterile water
- Add the glycerine and shake or stir well
- Heat the crucible and its contents over a bunsen burner, mixing constantly with a spatula until the mixture becomes thick and swells

Note: Do not overheat the mixture to the point that it turns yellow.

Stir in a labeled container (Glycerol Starch; use by date) in a cool place for up to 1 year.

Next, prepare Monsel's paste.

Ingredients:

- Ferric sulfate base (15 g)
- Ferrous sulfate powder (a few grains)
- Sterile water (10 mL)
- Glycerol starch (12 g)

Preparation:

Note: The reaction during this preparation emits heat.

- Add a few grains of ferrous sulfate powder to 10 mL of sterile water in a glass beaker. Shake or stir well.
- Dissolve the ferric sulfate base in the solution by stirring with a glass rod. The solution should become crystal clear.
- Place the glycerol starch in a glass mortar and slowly add ferric sulfate solution to glycerol starch, constantly mixing to get a homogeneous mixture
- Place in a 25 mL brown glass bottle
- If a paste-like consistency is preferred (the color of mustard), allow enough evaporation to occur before securing the top. This may take 2–3 weeks, depending on the environment.
- Secure the top and store in a labeled container (Monsel's Paste; use by date) for up to six months
- If desired, sterile water can be added to the paste and stirred to thin it

SPECIAL TIP: Preparing Adrenaline with Lidocaine/Lignocaine Mixture

Many sites do not have lidocaine/lignocaine with epinephrine. In these cases, the provider should mix the adrenaline. This can safely be done by adhering to the following principles:

One ampoule of 1:1,000 adrenaline in 1 mL volume.

- This equals 1 mg adrenaline in 1 mL
- This equals adrenaline 1,000 µg/mL

If one ampoule is diluted to 10 mL: This equals adrenaline 0.1 mg/mL

- This equals adrenaline 100 µg/mL
- This is 1:10,000 adrenaline

If one ampoule is diluted to 100 mL:

- This equals adrenaline 0.01 mg/mL
- This equals adrenaline 10 µg/mL
- This is 1:100,000 adrenaline

1:200,000 adrenaline equals 5 µg/mL:

In order to achieve 1:200,000 adrenaline, use an insulin syringe to draw 0.1 mL from the ampoule of 1:1,000 adrenaline (this equals 100 µg; $0.1 \times 1,000 \mu\text{g}$) and add this to 20 mL vial of 1% lidocaine/lignocaine ($100 \mu\text{g}/20 \text{ mL} = 5 \mu\text{g/mL}$).

UPKEEP AND MAINTENANCE

Follow manufacturer's specifications for upkeep and maintenance of equipment. Appropriate infection prevention processes should be employed after each procedure (see Chapter 6: Infection Prevention for LEEP).

STORAGE

All equipment, instruments, and supplies should be stored securely. After sterilization, reusable instruments should be stored in sterile containers or packaging.

RE-STOCKING

It is critical to have sufficient instruments and supplies prior to performance of LEEP. One person should be designated as responsible for managing and tracking supplies, including developing a system to track the number/amount of each item and expiration dates (when applicable) and to re-order when necessary.

Annex 6:

LEEP Job Aid

Indications for Using LEEP

- Treatment of precancerous lesions determined by one of the following:
- Colposcopy or cervical biopsy
 - VIA-positive
 - VILI-positive
 - LEEP is generally reserved for **large precancerous lesions not eligible for cryotherapy**, but can be used for smaller, cryotherapy eligible lesions also
- **Biopsy, not treatment, of cervical lesions suspicious for cancer**

Eligibility Criteria for LEEP

- Lesion is **VIA-positive** (or by VILI or colposcopy/biopsy)
- **Lesion is not suspicious for cancer** (unless LEEP is being done as a biopsy and not treatment)
- **The full extent of the external lesion can be identified.** If the lesion extends into the endocervical canal, attempts should be made to visualize its extent, and a multiple pass procedure should be utilized to get deeper into the endocervical canal.
- **No evidence of PID, cervicitis, vaginal infection, anogenital ulcer, or a bleeding disorder**
- Client is **not pregnant**
- Client is **more than 12 weeks postpartum**
- **If client is hypertensive, hypertension should be well-controlled, and use local anesthetic without epinephrine (similarly in women with cardiovascular disease)**

Before LEEP

1. **Establish purpose of visit** - *Provider*
2. **Explain why the treatment is recommended and describe LEEP** - *Provider*
3. **Assess for risk factors to treatment** (including checking blood pressure), and based on history, ensure no contraindications exist for treatment- *Provider*
4. **Counsel regarding LEEP:** what to expect, potential complications, self-care, and follow-up - *Provider and Assistant*
5. Ask the woman if she has any questions and **obtain her consent** for treatment - *Provider and Assistant*
6. If not already done, **sanitize hands** with alcohol-based sanitizer, or wash hands thoroughly with soap and water and dry with clean, dry cloth or air dry - *Provider and Assistant*
7. **Check that LEEP equipment, instruments, supplies, light source, and power source are available and ready to use** – *Provider and Assistant*
8. Check that the woman **has recently emptied her bladder** (within 30 minutes), help her onto examining table, and drape her - *Assistant*

During LEEP

1. **Perform bimanual examination followed by VIA/VILI/ colposcopy.** Determine if the woman meets eligibility criteria for LEEP, or if some other management is more appropriate. **Determine size loop(s) needed, anticipated number of passes**, and ensure that loops and ball electrode are ready on the table. Remove speculum - *Provider*
2. **Attach suction tubing** to the coiled LEEP speculum (do not contaminate speculum blades) and place near edge of HLD/sterile tray or field. - *Assistant* (Alternatively, this step can be performed by the *Provider* during the next step, prior to performing abdominal and bimanual examination.)

3. **Attach dispersive (grounding) pad** to woman's thigh. - *Assistant*
4. Put on a new pair of **sterile examination gloves and arrange instalments and supplies on a high-level disinfected/sterile tray, kidney dish, or towel on the trolley**, if not already done. - *Provider or Assistant*
5. Gently **insert speculum** and fix blades in the open position, as wide as possible without creating discomfort. If necessary, use coated vaginal wall retractors, wooden spatulas, or a condom for better exposure and to protect the vaginal walls. - *Provider*
6. **Establish local anesthesia.** Do not use lignocaine with epinephrine if the woman has high blood pressure or cardiac disease. – *Provider*
7. **Insert appropriate-sized loop** in electrosurgery pen and **set on blended cutting** at appropriate power. Briefly depress button on pen or depress foot pedal to ensure that LEEP unit, including smoke evacuator, is working properly. - *Provider*
8. **Ensure adequate visualization and vaginal wall retraction.** - *Provider*
9. **Excise entire lesion and transformation zone. Orient loop correctly and just above starting point. Activate electrode and introduce the loop into the tissue**, providing directional guidance maintaining correct orientation throughout the procedure. **Excise 5 mm outside outer boundary of lesion and to a depth of at least 5 mm but not more than 10 mm. Maintain activated loop until loop exits the cervix tissue.** – *Provider*
10. **Remove specimen(s)** with long tissue forceps and place in appropriately marked specimen containers with formalin. – *Provider*
11. Apply pressure to cervix if necessary to control bleeding. **Perform additional passes if necessary. Once excisions are completed, remove loop and plane on sterile surgical field, along with long tissue forceps, for processing following the procedure.** - *Provider*
12. **Change** LEEP unit setting to coagulation and insert 5-mm ball electrode into electrosurgery pen. – *Provider*
13. **Achieve hemostasis.** Coagulate bleeding areas first. If no bleeding is present, start with the edges of the crater, **coagulate using the hall electrode** with proper technique (keeping area dry and arcing the current). - *Provider*
14. If adequate hemostasis is noted, coat the base of the excisional crater with Monsel's solution or paste). - *Provider*
15. **Remove ball electrode and place it, along with ring forceps /tissue forceps, if used, in basin/container for contaminated instruments.** Hand the electrosurgery pen to the assistant. - *Provider*
16. Gently **remove speculum. Wipe blood or Monsel's from blades** (discard in leak-proof container or plastic bag), **disconnect suction tubing** from speculum and hand tubing to assistant, and **place speculum in basin/container for contaminated instruments.** - *Provider*

AFTER LEEP

1. **Remove gloves, dispose properly, and put on new pair of nonsterile examination gloves.** - *Provider*
2. **Check to be sure woman is doing well** before helping her sit up, get down from table, and get dressed. - *Provider or Assistant*
3. **Turn off power to LEEP unit.** - *Provider or Assistant*
4. **Disinfect suction tubing, electrosurgery pen, light source, examination table or Macintosh cloth, and other contaminated surfaces** 60% - 90% alcohol or 0.5% chlorine solution. - *Provider or Assistant*
5. **Remove gloves and dispose of them in leak-proof container or plastic bag.** - *Provider or Assistant*
6. **Sanitize hands** with alcohol-based sanitizer, or wash hands thoroughly with soap and water and dry with a clean, dry cloth or air dry. - *Provider or Assistant*

Post-LEEP counseling

7. Advise the woman regarding post-treatment self-care, warning signs, and follow-up. Review post-LEEP instructions with the woman (including giving written instructions). - *Provider and Assistant*
 - **Self-care:**
 - Provide a sanitary pad
 - It is normal to have a brown, grayish-black discharge, sometimes with a small amount of spotting lasting from several days to two weeks following LEEP. This is often followed by thin, watery or non-purulent discharge for another couple of weeks while the cervix heals.
 - Do not put anything in the vagina for four weeks (no sexual intercourse, no tampons, no fingers). Provide condoms if she cannot abstain from sexual intercourse.
 - **Advise the woman to seek care immediately if any of the following early warning signs occur (usually within the first two to four weeks):**
 - Fever for more than two days
 - Severe lower abdominal pain, especially if fever is present
 - Foul-smelling or pus-colored discharge
 - Bleeding heavier than heaviest days of menstrual bleeding for more than two days
 - Bleeding with cloths
8. **Record treatment in her client card** and advise her to follow up in the clinic in six weeks. - *Provider*
9. **Process and sterilize loop and ball electrodes. Process and either HLD or sterilize LEEP speculum.** - *Provider and Assistant*
10. **Fill out appropriate pathology forms and process specimens.** - *Provider*
11. **Ensure LEEP set-up is ready for next procedure or stored properly** until the next clinic. - *Provider and Assistant*

