

PREVENTING  
*cervical cancer*  
WORLDWIDE

# Table of Contents

Preface .....	iv
Summary.....	v
Cervical Cancer: A Global Disease .....	1
Figure 1: New Cervical Cancer Cases Worldwide, 2002 Estimates .....	1
Figure 2: Cervical Cancer Incidence by Country, 2002 Estimates .....	2
Box 1: The Impact of Cervical Cancer on Women and Families .....	3
Understanding Cervical Cancer .....	3
Figure 3: How Cervical Cancer Develops.....	4
Figure 4: Management of Cervical Disease.....	5
Screening Approaches.....	5
Box 2: Women Lack Access to Prevention Services .....	6
Box 3: Explaining the Screening Test and Communicating Results.....	8
Treatment Approaches and Technologies .....	8
Table 1: Two Outpatient Treatment Options for Precancer.....	9
Box 4: Screen-and-Treat Approaches Help Reduce Visits to a Health Center.....	10
The Cost-Effectiveness of Prevention .....	11
Table 2: Selected Screening Strategies, Compared With No Screening, South Africa ...	11
Elements of a Successful Prevention Program .....	12
Box 5: The Need to Revise Screening Policies .....	13
Box 6: Mobile Clinics Address Education and Treatment Needs .....	14
Box 7: Working Through the Community to Address Negative Images .....	16
Looking Forward.....	16
Conclusions and Recommendations .....	18
Appendix: For More Information.....	20
References .....	22
Acknowledgments.....	24

# *Preface*

In 1999, with support from the Bill & Melinda Gates Foundation, five international agencies launched a major new effort to prevent cervical cancer worldwide. This group of organizations, the Alliance for Cervical Cancer Prevention (ACCP), works to clarify, promote, and implement strategies for preventing cervical cancer in developing countries.

Brought together by their capabilities and experience in global cervical cancer prevention, the five partner organizations include:

- ◆ EngenderHealth
- ◆ International Agency for Research on Cancer (IARC)
- ◆ JHPIEGO (a Johns Hopkins University affiliate)
- ◆ Pan American Health Organization (PAHO)
- ◆ PATH.

The ACCP works with developing country partners to assess innovative approaches to cervical cancer screening and treatment, improve service delivery systems, ensure that community perspectives and needs are incorporated into program design, and heighten awareness of cervical cancer and effective prevention strategies.

Alliance projects have been concentrated in regions where cervical cancer incidence and mortality are highest, including in sub-Saharan Africa, Latin America, and South Asia. More than 20 Alliance-funded research and demonstration projects have been implemented in 17 countries in these regions.

This report highlights the major findings, lessons, and recommendations from the Alliance's research and demonstration projects. More information about the Alliance, its projects, publications, and related sources of information is included in the Appendix of this report.

## Summary

Whether it is the two-hour walk to the nearest clinic, local myths, or poor health services, millions of women worldwide never undergo cervical cancer screening, and hundreds of thousands die prematurely without ever knowing why they were ill. In an effort to reduce illness and death from cervical cancer, organizations are working to break down barriers to detecting and treating the disease's early signs. To this end, the Alliance for Cervical Cancer Prevention (ACCP), a group of five international agencies, has assessed and promoted prevention approaches that are inexpensive, safe, and widely acceptable.

The numbers of cervical cancer deaths around the world underscore the demand for such programs. This preventable disease kills an estimated 274,000 women every year,<sup>1</sup> affecting the poorest and most vulnerable women and sending a ripple effect through families and communities that rely heavily on women's critical roles as providers and caregivers. Every year, some 83 percent of the world's new cases and 85 percent of all cervical cancer deaths occur in developing countries.<sup>2</sup> In most of these countries, cervical cancer is the leading cause of cancer deaths among women.

The disease results from the abnormal growth and division of cells at the opening of the uterus or womb—the area known as the cervix. The main underlying cause is the human papillomavirus (HPV), a sexually transmitted infection that is often without symptoms. No cure exists for HPV infection, and while it remains stable or becomes undetectable in most cases, HPV can lead to precancerous conditions that progress to cancer over time.

While women may contract HPV when they are young, cervical cancer is most likely to develop in women 35 years or older. If not detected and treated in its early stages, the disease is nearly always fatal. Prevention of HPV infection would sharply reduce cervical cancer rates. Therefore, an HPV vaccine, now in the late stages of development, would contribute greatly to preventing new cases of cervical cancer.

Traditionally, global efforts to prevent cervical cancer have focused on screening women for abnormal cervical tissue, treating the condition before it advances, and providing appropriate follow-up care. To date, screening efforts have relied largely on the Pap smear, a test that has long been used to detect abnormal cell changes. However, while the test has achieved tremendous success in industrialized countries that offer periodic, high-quality screening, Pap smear programs are complex and costly to run and have failed to reach a significant proportion of women in countries where health systems and infrastructure are poor.

The lack of effective screening and treatment strategies is a major reason for the sharply higher cervical cancer rates in developing countries. Without access to viable programs, women from poor communities generally seek care only when they develop symptoms and the cancer is advanced and difficult to treat. Health care providers can do little to save the women's lives at this stage, and even drugs for easing pain may be unavailable. Other barriers to prevention and treatment may include a lack of awareness of cervical cancer and of ways to prevent the disease, difficulty getting to clinics and hospitals, the need for multiple visits, and high costs associated with screening. In some communities, myths and misconceptions about the disease also pose barriers to prevention.

Despite the barriers, cervical cancer can be prevented at low cost. Health care providers can use relatively simple technologies to screen women for precancerous conditions and treat abnormal tissue early. ACCP's projects in sub-Saharan Africa, Latin America, and South Asia have studied screening and treatment approaches particularly for women in their 30s and 40s, with the understanding that many of these women may be screened only once or twice in their lifetimes.

Research has also focused on approaches that overcome logistical and social barriers and markedly increase women's access to prevention services. Among the most promising alternatives to the Pap smear are visual screening methods that require simple vinegar or iodine solutions and the eye of a trained health provider to spot abnormal tissue. Another alternative involves

testing women for the presence of HPV on their cervixes. While these approaches are still being evaluated, all have the potential to save more lives at lower cost than traditional approaches using Pap smears.

To be truly effective, however, cervical cancer prevention programs must link testing with appropriate treatment, including low-cost outpatient procedures. Relatively simple procedures can be used to either destroy or remove abnormal cervical tissue, depending on the severity, location, and size of the affected area.

Two such procedures are particularly appropriate in low-resource settings. Cryotherapy uses extremely low temperatures to destroy the abnormal tissue. The method needs no electricity and is effective even where physicians, health supplies, and infrastructure are severely limited.<sup>3</sup> Another method, loop electrosurgical excision procedure (LEEP), involves using a thin wire to remove the affected area. While LEEP requires more medical backup and equipment than cryotherapy, the procedure allows tissue to be removed for analysis, reducing the possibility that advanced cancer will go unnoticed.

Many developing countries have had cervical cancer prevention programs in place for some time but have

failed to reduce death rates from the disease. The ACCP's work provides new evidence on which to base program decisions and demonstrates promising approaches that have the potential to reduce cervical cancer even in the poorest countries. The ACCP's research has found that programs can safely and effectively screen and treat women in just one or two clinic visits, using low-cost techniques. In many settings, prevention programs can be integrated into routine health services, assuming adequate resources are available.

Good prevention programs for cervical cancer employ a number of key features. They use locally understood messages to increase awareness of the disease; reach a significant proportion of women in their 30s and 40s; motivate them to get tested at least once; make outpatient treatment widely available; arrange appropriate follow-up care; and evaluate impact. The ACCP provides practical program tools for achieving these goals in low-resource settings. Steps to prevent cervical cancer can form part of an overall strategy to improve women's health and to promote equity and a high quality of care through primary health care systems.

# Cervical Cancer: A Global Disease

Cervical cancer has a major impact on the lives of women worldwide, particularly those in developing countries. According to the latest global estimates, 493,000 new cases of cervical cancer occur each year among women, and 274,000 women die of the disease annually.<sup>4</sup> About 83 percent of new cases are in developing countries (see Figure 1), where screening programs are not well established or effective. In most of these countries, cervical cancer is the leading cause of cancer deaths among women.

## Regions and Countries Most Affected

The regions hardest hit by cervical cancer are among the world's poorest. Central and South America, the Caribbean, sub-Saharan Africa, parts of Oceania, and parts of Asia have the highest incidence rates—over 30 per 100,000 women (see Figure 2, page 2). These rates compare with no more than 10 per 100,000 women in North America and Europe.<sup>5</sup> Incidence rates are reported to be 69 per 100,000 in Tanzania, 55 per 100,000 in Bolivia, and 40 per 100,000 in Papua New Guinea. The highest absolute number of cases is reported in Asia. In India, an estimated 132,000 new cases, or more than one-fourth of the worldwide total, are reported annually.

Approximately 1.4 million women worldwide are living with cervical cancer.<sup>6</sup> This estimate reflects the accumulation of new cases each year and the fact that few women in developing countries receive treatment. Based on what is known about how the cancer develops, two to five times this many women, or up to 7 million worldwide, may have precancerous conditions that need to be identified and treated.

## Developing Countries Lack Effective Prevention Approaches

An important reason for the sharply higher incidence of cervical cancer in developing countries is the lack of effective screening programs to detect precancerous conditions and treat them before they progress to cancer. Cervical cancer prevention efforts worldwide have focused on screening women for the disease using a laboratory test called a Pap smear and destroying or removing precancerous cell tissue. Developed in the 1940s and named for inventor Dr. George Papanicolaou, Pap smear screening—followed by timely treatment

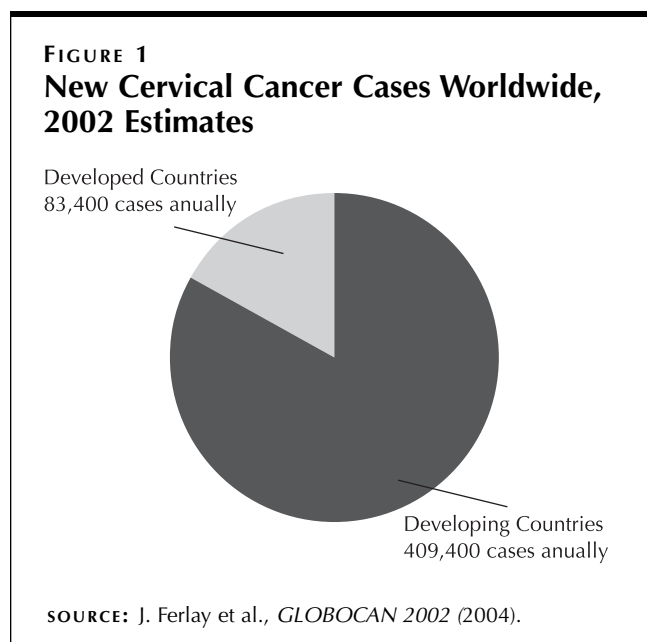
when necessary—has achieved impressive results in reducing cervical cancer in developed countries.

Where Pap smear screening is well organized and women are screened at regular intervals, cervical cancer incidence can be reduced dramatically. In Iceland, a national program for cervical cancer screening that was launched in 1960 reached almost all women in the country and resulted in an 80 percent decrease in cervical cancer deaths over a 20-year period.<sup>7</sup> In the United States, where coverage is less comprehensive, the cervical cancer death rate decreased by 70 percent in the 50 years after screening was introduced.<sup>8</sup> By contrast, only an estimated 5 percent of women in developing countries have had Pap smears in the last five years. Often, the necessary supplies, equipment, and trained technicians are lacking. Also, women who do have Pap smears may not receive their results or return for follow-up screening and treatment.

## Deaths From Cervical Cancer

If it is not detected and treated in a timely way, cervical cancer is nearly always fatal. In developing countries, mortality rates are reported at 11.2 per 100,000 women on average, almost three times the rate of developed countries.<sup>9</sup> Nearly 40 percent of cervical cancer deaths in developing countries occur in South Central Asia, a heavily populated region that includes India, Pakistan, and Bangladesh.

Deaths associated with cervical cancer are the most telling indicator of the disease's impact on women,



their families, and their communities (see Box 1). A mother’s death dramatically compromises the health of a family, especially the health of children. These deaths are avoidable, however. With timely screening and appropriate treatment, deaths from cervical cancer can be greatly reduced.

Current estimates of cervical cancer incidence and death rates are probably lower than actual rates because many women with the disease do not receive medical care and therefore are not included in cancer registries. Limitations of diagnostic facilities and their tendency not to reach older women (those with late-stage illness) or those unable to pay for services, present further challenges to developing accurate estimates. In addition, a lack of organized health information systems makes recording the number of women with cervical cancer problematic.

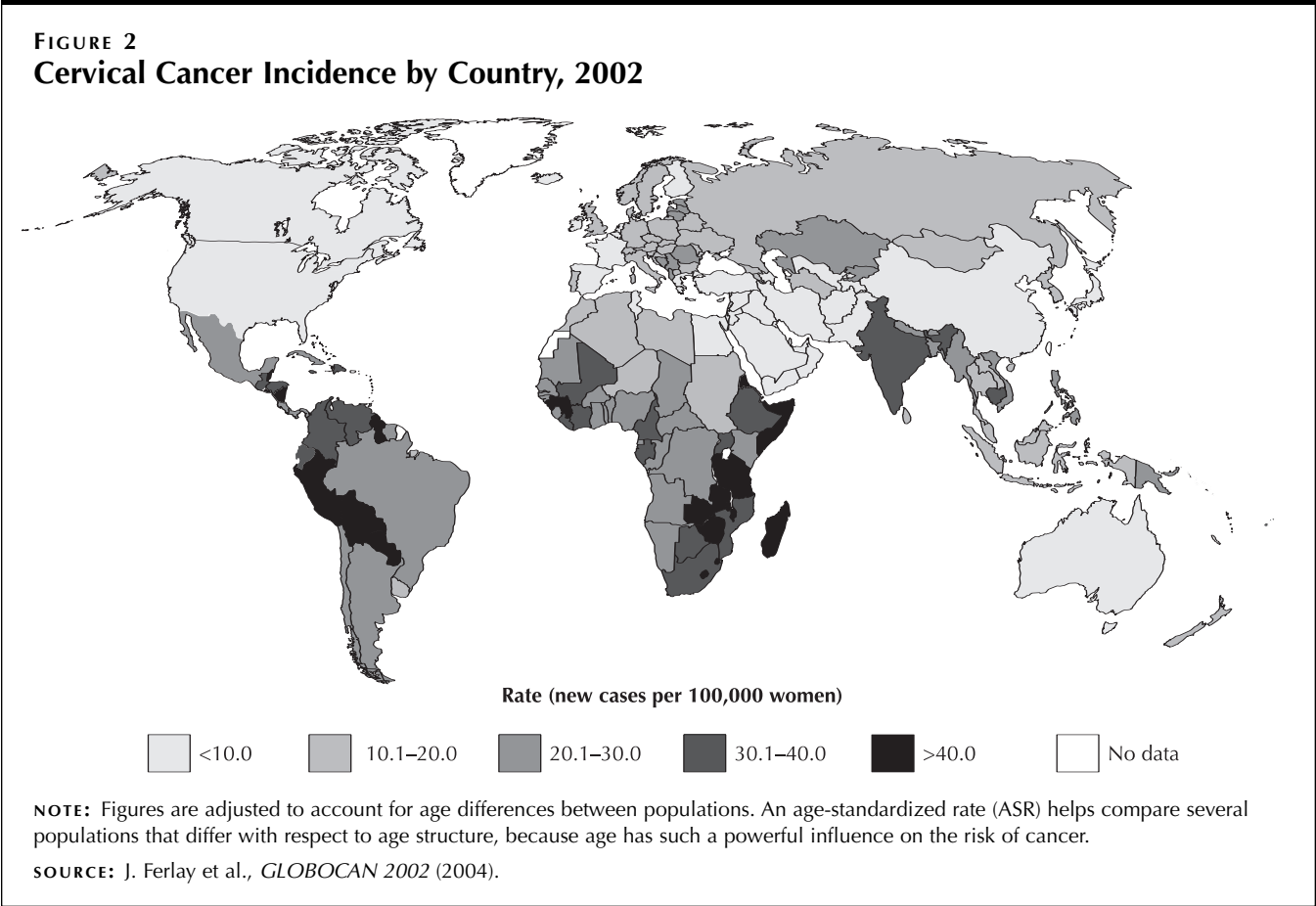
### Women 35 and Older Most Affected

About 80 percent to 90 percent of confirmed cervical cancer cases occur among women age 35 or older,

according to data from cancer registries in developing countries. Because cervical cancer progresses slowly from precancerous conditions to advanced cancer, the incidence of cancer in most countries is very low in women under age 25. Incidence increases at about ages 35 to 40 and reaches a maximum in women in their 50s and 60s.

Some studies using clinic data have suggested that the ages of women affected are shifting downward. However, these studies may suffer from sampling bias in that younger women tend to visit clinics more often than older women. Other data suggest that women with HIV are at a higher risk of developing precancerous conditions and have earlier progression to cancer than women who do not have HIV.

For the most part, prevention efforts focusing on younger women have had limited success. In Mexico, for example, nationwide Pap smear screening that began in the 1970s failed to reduce mortality over 15 years, in part because younger women in urban areas were repeatedly being screened, while older “at risk” women were not reached.<sup>10</sup>



# Understanding Cervical Cancer

## The Causes of Cervical Cancer

Cervical cancer results from the uncontrolled growth of severely abnormal cells in the cervix, the opening of the uterus or womb. The primary underlying cause is human papillomavirus (HPV), the most common sexually transmitted infection worldwide. HPV affects an

estimated 50 percent to 80 percent of sexually active women at least once in their lifetimes.<sup>11</sup> More than 50 known types of HPV can affect the genital area. Of these 50 types, six account for almost 80 percent of cervical cancer cases.<sup>12</sup>

Certain types of HPV can cause abnormal cell changes, called dysplasia. Most mild cases regress or do not progress, particularly in women under age 35. When the abnormalities persist over time and become severe, the cells develop into cancer cells (see Figure 3, page 4). Progression from HPV infection to cancer can

### BOX 1

#### The Impact of Cervical Cancer on Women and Families

Dawn is a 32-year-old Kenyan woman who walked for two hours to the nearest dispensary after a community worker told mourners at a funeral of the importance of cervical cancer screening.<sup>1</sup> When she was diagnosed with a precancerous lesion, Dawn lacked the 200 shillings (US\$2.50) she needed to get to the referral hospital much farther away in Busia. As the family's sole provider following her husband's recent death, she was also reluctant to leave her children. However, after working on a neighbor's farm for extra cash and buying and selling fish for a month, she had saved enough for the trip.

Cervical cancer can threaten the lives of women, create long-term problems for families, and challenge health care systems. The Kenyatta National Hospital in Nairobi, which has the country's only radiotherapy unit, receives more than 500 referrals for treatment every year. However, since financial and other constraints prevent many women from traveling to Nairobi, that figure probably represents only a small portion of the Kenyan women who actually need care.

While Dawn was able to receive treatment, the predicament she faced is common in developing countries, many of which lack the capacity and resources to diagnose and treat early signs of cervical cancer. In India, treatment and prevention are priorities of the National Cancer Control Program. However, with a lack of organized screening programs and with the sheer size of the Indian population, the country shoulders more than one-fourth of the world's burden of the disease.<sup>2</sup>

Pratibha, a 37-year-old woman in rural India, benefited from cervical screening, made possible by the Barshi Cervical Cancer Prevention Program at the Nargis Dutt Memorial Cancer Hospital. Although experiencing no symptoms, she was encouraged to participate in cervical screening through a community education event held by the program. Her cervical cancer was detected and treated.

Located in the economically deprived Osmanabad district in the western Indian state of Maharashtra, the hospital is collaborating with the Tata Memorial Centre in Mumbai (Bombay) and the France-based International Agency for Research on Cancer (IARC) in evaluating low-cost, low-tech screening techniques. Such approaches would overcome technical and financial constraints in low-resource settings in the developing world.

#### REFERENCES

<sup>1</sup> Alliance for Cervical Cancer Prevention (ACCP), *Women's Stories, Women's Lives: Experiences with Cervical Cancer Screening and Treatment* (Seattle: ACCP, 2004).

<sup>2</sup> Jacques Ferlay et al., *GLOBOCAN 2002: Cancer Incidence, Mortality and Prevalence Worldwide*, IARC CancerBase No. 5, version 2.0 (Lyon, France: IARC, 2004).



**FIGURE 3**  
**How Cervical Cancer Develops**

The lifetime risk of HPV infection can reach 80 percent, but only about 5 percent of infected women develop cervical cancer. Cervical disease may regress on its own or progress to cancer, depending on a number of factors.

HPV INFECTION	→ MILD CERVICAL DYSPLASIA*	↔ SEVERE DYSPLASIA*	→ CERVICAL CANCER
<p>Infection is extremely common among women of reproductive age. Most cases remain stable or become undetectable.</p> <p>A small percentage of cases lead to abnormal cell changes (within months or years of infection).</p>	<p>These abnormal cell changes are usually temporary and disappear over time.</p> <p>Some cases, however, progress to severe dysplasia.</p>	<p>The precursor to cervical cancer, severe dysplasia is far less common than mild dysplasia.</p> <p>Severe dysplasia can progress from mild dysplasia or, in some cases, directly from HPV infection.</p>	<p>Invasive cancer develops over many years and is most common among women in their 50s and 60s.</p>

\* Dysplasia refers to abnormal cell tissue on the cervix.

**SOURCE:** Adapted from Alliance for Cervical Cancer Prevention, "Natural History of Cervical Cancer: Even Infrequent Screening of Older Women Saves Lives," *Cervical Cancer Prevention Fact Sheet* (2003).

take up to 30 years; severe dysplasia can progress to cervical cancer over several years.<sup>13</sup>

Women generally contract HPV in their teens, 20s, or 30s, and cervical cancer can develop 20 years or more after HPV infection. There is currently no cure for HPV, though its consequences can be treated. While all women with cervical cancer have had HPV, less than 5 percent of women with HPV ultimately develop cervical cancer—even without screening and treatment.

Several factors may influence whether a woman with precancer is likely to develop cervical cancer. These include tobacco use; an impaired immune system, particularly related to HIV infection; and hormonal factors, including early age at first birth, use of hormonal contraceptives, and having many births. Other factors, such as early age at first intercourse and multiple sex partners, can indirectly heighten the risk of cervical cancer by increasing a woman's likelihood of contracting an HPV infection.

## The Pathway to Prevention

The pathway to preventing deaths from cervical cancer is simple and effective. Precancerous changes in cervical tissue can linger for years, but if they are identified and successfully treated early, the lesions will not develop into cervical cancer. Screening women for precancerous changes and treating the abnormal tissue seems to protect women from developing cervical cancer (see Figure 4).<sup>14</sup>

Preventing HPV infection in the first place, of course, would also contribute to reducing cervical cancer, but prevention is challenging. HPV is easily transmitted and generally does not produce any symptoms. While the genital warts caused by some types of HPV can be treated, no therapies can eliminate the underlying infection, and the virus can remain infectious for years. Condoms do not fully protect against infection because the virus can exist throughout the genital area and around the anus. Nonetheless, by using condoms regularly and having fewer sexual partners, women can protect themselves from HPV infection to some degree. HPV vaccines are in development and have strong potential to prevent primary infection and progressive disease.

**FIGURE 4**  
**Management of Cervical Disease**

Screening women for HPV infection or dysplasia and treating women with severe dysplasia are key to cancer prevention.

HPV INFECTION	MILD CERVICAL DYSPLASIA*	SEVERE DYSPLASIA*	CERVICAL CANCER
There is no treatment to eliminate HPV.	Mild dysplasia generally should be monitored rather than treated since most lesions do not progress to cancer.	Severe dysplasia should be treated, as a significant proportion of cases progress to cancer.	Treatment of invasive cancer is hospital-based, expensive, and often not effective.

\* Dysplasia refers to abnormal cell tissue on the cervix.

**SOURCE:** Adapted from Alliance for Cervical Cancer Prevention, "Natural History of Cervical Cancer: Even Infrequent Screening of Older Women Saves Lives," *Cervical Cancer Prevention Fact Sheet* (2003).

## Screening Approaches

### Pap Smear Screening: Important but Imperfect

Pap smear screening has been effective in preventing cervical cancer in places where the coverage and quality of services are high and where Pap tests are provided at regular intervals. The Pap smear is generally reliable in identifying women who do not have precancer. However, the test misses some women who do have abnormal cells. Studies have shown that only 20 percent to 50 percent of women with precancer are correctly identified.<sup>15</sup> Thus, Pap smear screening needs to be repeated over time to ensure that precancer cases are not missed.

In most developed countries, women are advised to have their first Pap smear soon after becoming sexually active and to repeat the test every one to three years. But in developing countries, most women have never had a Pap smear.

The procedure involves gently scraping cells from the cervix onto a glass slide and sending it to a laboratory where technicians have been trained to analyze cell structure. Results of the analysis usually are communicated to women within several weeks (although in many settings it takes longer or women never receive their results). Women with low-grade abnormalities are told to return for periodic follow-up smears. For women with severe abnormalities, clinicians may examine the cervix with a special magnifying scope called a colposcope, obtain a tissue sample so a diag-

nosis can be made, and then remove or destroy abnormal tissue on the cervix.

Although Pap smear screening is used in many developing countries, the procedure has had limited success. The minimum requirements for establishing an effective Pap smear screening effort include:

- ◆ Well-trained providers, including nurses, midwives, and physicians' assistants;
- ◆ Examination rooms and laboratories stocked with the necessary supplies and equipment;
- ◆ Linkages, including transportation, to reliable laboratories with appropriately trained technicians;
- ◆ Strategies for ensuring the quality of Pap smear samples and the accuracy of interpreting them;
- ◆ Proven systems for timely communication of Pap smear results to screened women; and
- ◆ Effective referral and follow-up systems for diagnosis and treatment of abnormalities.

Health care practitioners in low-resource settings often report a lack of these requirements, a situation that makes Pap smear programs ineffective. In many countries, Pap smears are either not available in primary care centers that most people visit, or they are offered for a fee to younger, relatively low-risk women. Older women at greatest risk tend to be unaware that cervical cancer is a preventable condition and that having a Pap smear is important.

Given the challenges of implementing high-quality Pap smear services in developing countries, there is growing interest in new approaches to screening for precancerous conditions. Since 1999, the Alliance for Cervical

## BOX 2

### Women Lack Access to Prevention Services

When a popular television program in Ghana aired information on cervical cancer, hundreds of women flocked to Ridge Hospital in Accra to receive cervical screening. Queues extended around the building and nurses were forced to turn away women and give them appointments for another day. The good news was that some 300 women a day wanted to learn whether or not they had cervical abnormalities. Health workers simply swabbed the cervix with vinegar, waited a minute, and used a light source to look for abnormal tissue. Prior to the television show, as few as five women would show up for screening daily.

Cervical cancer screening is not common in Ghana. Pap smears are available only at a few locations, and most women lack knowledge of their availability or purpose. To address the large unmet need for prevention services, JHPIEGO partnered with the health ministry and Ghana Health Services to evaluate the approach that links low-cost visual screening with “cryotherapy” (cold treatment) for those with abnormal cells.

The project, located at Ridge Hospital and at Amasaman Health Center in the Greater Accra Region, tested a single-visit approach that enabled providers to offer treatment for abnormalities during the same visit to women with positive test results. This approach reduces the number of visits a woman must make to the health center. At Ridge Hospital, the project tested women in 2001 and 2002, and roughly 13 percent had results indicating precancerous conditions. Women were tested between 2002 and 2003 at the Amasaman Health Center, and close to 6 percent tested positive. Most of the women chose to receive treatment during the same visit.<sup>1</sup>

The project also undertook outreach efforts to try to motivate women to get tested and to gain their husbands’ support. At Ridge Hospital, health workers encouraged women to return for one-year appointments, and a public health nurse visited women at their homes to remind them of the need for follow-up care. The project demonstrated that educational and counseling messages must be refined so that clients and male partners could better understand test results and the differences between cervical cancer and precancerous conditions. Also, strategies must be designed to increase the involvement of partners, who often have a significant impact on women’s decisions to seek treatment and follow-up care.

#### REFERENCE

<sup>1</sup> Amy Corneli et al., *A Qualitative Evaluation of the Acceptability and Feasibility of a Single Visit Approach to Cervical Cancer Prevention in Ghana* (Baltimore: JHPIEGO, 2004).

Cancer Prevention (ACCP) has studied alternative approaches to screening and treatment of precancerous disease in sub-Saharan Africa, Latin America, and South Asia. ACCP projects have aimed to reach women in their 30s and 40s and provide them with a screening test at least once in their lifetimes. Two major approaches of interest are visual screening and HPV testing.

### Visual Approaches to Screening

The ACCP and other researchers have been actively exploring the accuracy and acceptability of visual screening as a way to detect precancerous cervical disease and cancer. Visual screening relies only on the naked eye of a trained clinician and some basic clinic supplies.

Visual inspection with acetic acid (VIA) involves swabbing the cervix with an acetic acid (vinegar) solution and visual examination by a trained health provider.

Precancerous cells have different structure and absorption rates than normal cells, making the abnormal cells temporarily turn white when exposed to this solution.

Several studies that have examined the accuracy of the procedure have found it at least as reliable as the Pap smear at detecting severe dysplasia in women who have the disease.<sup>16</sup> It is less reliable than the Pap smear in ruling out women who do not have the disease, however. ACCP projects have tested the approach in more than 10 developing countries (see Box 2).

In an effort to increase the accuracy of visual screening, some approaches have used an iodine solution to stain abnormal cells. Visual inspection with Lugol’s iodine (VILI) is also known as Schiller’s test because it is similar in approach to the Schiller’s iodine test that was advocated and widely used in the 1930s before the development of Pap smears. Applying iodine to the cervix makes precancerous lesions appear as well-defined, thick, yellow- or brown-shaded areas. Recent data show that visual screening with Lugol’s iodine may have higher accuracy than screening with acetic acid.<sup>17</sup> Research will continue on this approach.

## Advantages and Disadvantages of Visual Screening

Both of these visual approaches, using vinegar or iodine solutions, have important advantages in low-resource settings. Both approaches are relatively simple and low-cost, and rely on little infrastructure. Non-physicians can perform the procedures, provided that they receive adequate training and supervision. Furthermore, results of the procedures are available immediately, making it possible, in principle, to offer treatment or referral options during the same visit.

One challenge to using visual approaches is training health providers to recognize the often-subtle characteristics of cell abnormalities, which can vary in size, thickness, and border definition. Thus, whether the procedures can be used for large-scale screening is still uncertain. To a great extent, this will be determined by the effectiveness of training and monitoring efforts. Visual approaches are also less effective for screening women in their 50s, because natural changes in these women's cervixes make observing abnormalities more difficult.

Another disadvantage includes the greater tendency of visual approaches (especially the use of vinegar) compared with Pap smears to incorrectly identify healthy women as having abnormal cell changes. Such false-positive results can result in overtreatment if treatment is available immediately after screening.

Studies are ongoing to confirm whether visual approaches can reduce the burden of disease, but the approaches are considered promising alternatives to Pap smears for identifying precancerous conditions in women in low-resource settings. As a result, some countries are moving forward with pilot programs.

## HPV Testing

Worldwide interest in HPV testing is growing, both as an add-on to Pap smear screening and as a screening tool on its own. At the same time, many questions remain about how HPV tests might be used because of uncertainty about which women with HPV might develop cancer (see Box 3, page 8).

While several laboratory-based approaches exist for detecting HPV in cervical samples, only one company—Digene Corporation—currently provides a U.S. Food and Drug Administration-approved commercial kit that detects high-risk HPV types. The corporation's most frequently used test, Hybrid Capture II (HC II), indicates whether a person is infected with one or more high-risk HPV types. The test is already being incorporated into some screening programs, generally in addition to existing Pap smear screening. The test's accuracy, objectivity, and its ability to produce consistent results make it a promising screening approach.

### HPV Test Holds Promise as a Screening Tool

Studies suggest that the HPV test detects more true-positive precancer cases among women in their 30s and 40s than the Pap smear and could potentially serve as a better primary screening method.<sup>18</sup> In some settings, the HPV test already informs clinicians about how to manage women whose Pap smears are "borderline" or who have been treated for severe abnormalities: Those women who test positive for high-risk HPV types are followed more closely than those who test negative.

At the same time, performing the HC II test requires fairly sophisticated and expensive laboratory technology, including a special computer. The process takes about six hours and uses molecular techniques to detect the presence of HPV in cell samples. These requirements currently make the use of HC II too costly and difficult to implement in most low-resource settings.<sup>19</sup>

Developing-country programs interested in incorporating HPV testing into cervical cancer prevention may have to wait for the development of HPV tests that are less expensive and easier to use. Efforts are currently underway to develop such a test, but widespread availability is some years off.

**BOX 3****Explaining the Screening Test and Communicating Results**

Cervical cancer and its association with sexual activity carries stigma in many parts of the world. Women may be reluctant to seek screening if they think the procedure is associated with a test for HIV or other sexually transmitted infection (STI). All cervical screening efforts (regardless of the screening approach used) need to address this concern by giving women accurate information about the purpose of screening. In particular, programs that plan to use HPV tests need to consider how women might react to positive test results that indicate infection with an STI.

Women who test positive for HPV, which in some regions will be over 70 percent of all women at some point in their lives, may experience great anxiety about developing cancer, despite being at very low risk. Although treatment is available for the genital warts caused by some types of HPV, there is currently no cure or treatment for HPV and there is no way to clearly predict which women will develop cancer.

A desire to avoid unnecessary client concern may leave providers grappling with difficult decisions about the level of detail they should use in describing the cervical screening tests to women. These issues must be carefully weighed and messages must be pretested with women in the target audience to ensure that the information is complete and culturally appropriate.

**Self-Collected Samples**

Several recent studies show that women can successfully use vaginal tampons or swabs to collect their own cervical specimens for use in an HPV test. This could be advantageous in countries where cultural and program barriers may limit the use of standard gynecological exams. A recent South African study evaluating the HC II test found self-collected cervical samples to be nearly as accurate as conventional Pap testing for detecting severe cervical disease in women ages 35 and older.<sup>20</sup> Still, for self-collection of cervical samples to work well, providers need to help women understand the optimal way to collect a sample.

## *Treatment Approaches and Technologies*

In most developed countries, treatment of precancerous cervical disease has shifted from inpatient surgery to less-invasive, outpatient approaches. Several factors, including increased knowledge about the disease and the availability of lower-cost, outpatient methods, have made it possible for practitioners to avoid the more-invasive procedures.

Lacking the newer outpatient approaches, clinicians in many developing countries still rely on invasive surgical methods to treat precancer. Inpatient surgery can involve the removal of part of the cervix or removal of the uterus (hysterectomy). These approaches can have

significant complications and side effects for women, in addition to being costly procedures that require a good deal of infrastructure.

Outpatient treatment for precancer has traditionally involved looking at the cervix through a special magnifying scope—a colposcope—to guide the removal of tissue for diagnosis and treatment of the affected area. These instruments, however, are expensive (costing at least US\$3,000), require substantial training to use, and are not readily available in many developing countries. Identifying and validating alternatives may greatly improve the management of precancerous disease in developing countries.

**Treatment Options for Precancerous Disease**

Relatively simple, outpatient procedures can be used to destroy or remove precancerous tissue. The specific treatment depends on the severity, size, and location of the affected area. Of the various methods that exist for destroying abnormal tissue, cryotherapy may be the most promising for developing countries.

Cryotherapy involves holding a low-temperature probe against the cervix to freeze abnormal cells. It is relatively simple and inexpensive, does not require electricity, and is up to 95 percent effective in treating severe abnormalities (see Table 1).<sup>21</sup> Cryotherapy is less effective in curing lesions that are larger than the tip of the probe or those that extend into the cervical canal. Alternative treatment plans are needed for women with these types of lesions.

Studies show that cryotherapy is a safe procedure with very little risk of major complications.<sup>22</sup> Severe bleeding and pelvic inflammatory disease, two of the most serious potential complications, are extremely rare in women who undergo the procedure. There is also no evidence that cryotherapy has any harmful effects on women’s fertility or pregnancies—important considerations when treating women of reproductive age. Thus, offering cryotherapy to women with precancerous tissue in the same visit—the single-visit approach—may be a rational and cost-effective approach in some settings (see Box 4, page 10).<sup>23</sup>

Other treatment methods remove cervical tissue to make the affected area available for analysis. This approach reduces the possibility of overlooking advanced cancer, assuming pathology services are available to examine tissue. A common outpatient procedure for removing tissue is loop electrosurgical excision procedure (LEEP). LEEP uses a thin electric wire to remove the affected area. It is 90 percent to 95 percent effective in treating severe abnormalities, but LEEP is more burdensome than cryotherapy in terms of equipment needs and side effects (see Table 1). The equipment required includes surgical tables, sterilization equipment, and a smoke evacuator. Because LEEP is somewhat complex, it is often made available at central referral sites, while cryotherapy is more widely available in outlying areas.

Regardless of whether cryotherapy or LEEP is performed, women need clear, accurate information about temporary discomforts, such as minor pain and cramping, and the need to return for care if indications of a serious complication arise after treatment.

High levels of staff expertise and follow up can enhance the safety and effectiveness of cryotherapy or LEEP. Since abnormalities can recur in up to 10 percent of cases with either of these treatment techniques, following up three or six months after treatment, then annually for up to five years, is often recommended.

## Treatment of Invasive Cancer

At a minimum, cervical cancer prevention programs must make some surgical treatment available (for removal of part of the cervix or a hysterectomy) for cases of early cancer. Facilities unable to offer these services need to refer women to appropriate hospitals. Once the disease has spread beyond the cervix, extensive pelvic surgery, radiation, or both may cure the disease, although success in the more-advanced stages is less likely. For women with untreatable conditions, palliative care must be available.

ACCP programs have made an effort to support women with cancer, particularly in the areas of transportation, treatment costs, and temporary housing.<sup>24</sup> ACCP projects in Ghana, Thailand, South Africa, Peru, and El Salvador provided women with free transportation to treatment centers, in some cases, paying for public transportation. Where treatment options do exist, cost remains a major barrier to patients. ACCP projects in Ghana, Thailand, Peru, India, and the West Africa sites have therefore provided subsidies for cancer treatment—an option that new programs need to consider. Because women often have to relocate far from home in order to receive treatment, many ACCP projects have linked with local organizations to find temporary housing for women.

**TABLE 1**  
**Two Outpatient Treatment Options for Precancer**

	<b>Cryotherapy (freezing)</b>	<b>LEEP (excision)</b>
Effectiveness in eliminating precancerous tissue	86%-95%	90%-95%
Potential side effects	Watery discharge	Bleeding, infection
Anesthesia required	No	Yes
Tissue sample obtained	No	Yes
Power required	No	Yes
Cost	Relatively low	Relatively high

**SOURCES:** Adapted from Alliance for Cervical Cancer Prevention (ACCP), “Effectiveness, Safety, and Acceptability of Cryotherapy: A Systematic Literature Review” (2003); ACCP, “Treating Precancerous Cervical Lesions” (2004); and A. Bishop et al., “Cervical Cancer: Evolving Prevention Strategies for Developing Countries” (1995).

## Care for Women With Advanced Cancer

Cervical cancer prevention programs must be prepared to address the needs of patients with advanced cancer who have low chances of survival. In sub-Saharan Africa, more than half of women seeking treatment have advanced cancer. In many regions, treatments such as hysterectomy, radiotherapy, or chemotherapy are not available. Home-based, palliative care to relieve pain and suffering may be the only realistic option.

Palliative care is the active, total care of patients whose disease is not responsive to curative treatment or for whom treatment is not available. Controlling pain and other symptoms, and addressing emotional, psychological, social, and spiritual needs, are all part of palliative care; the overall goal is to achieve the best possible quality of life for patients and their families.

There are often major barriers to providing palliative care. These barriers include the absence of national health policies on cancer pain relief and a lack of training for health care providers. Many countries impose restrictions on drugs that control severe pain, often because of concerns about the legality of certain drugs that are classified as narcotics. International narcotic regulations have resulted in shortages or prohibitive pricing of opiates in some regions. Some of these regulations may unnecessarily restrict access to these drugs in cases where the benefits—such as reducing cancer pain—outweigh the risks of misuse or addiction.

In developing countries, the vast majority of women with terminal cancer are cared for at home. Therefore, it generally makes sense for programs to support families who are providing care, rather than invest in hospital-based care or special hospices that reach only a

### BOX 4

#### Screen-and-Treat Approaches Help Reduce Visits to a Health Center

Traditional screening and treatment approaches can require three or more visits to a health center. However, returning for multiple visits poses challenges to women and their families. Challenges may include the need for child care, transportation, and time away from work. Consequently, many women do not return to obtain test results or receive treatment.

Researchers are investigating approaches to managing precancerous conditions that minimize the number of times a woman needs to visit a health center. In the single-visit approach, a clinician offers immediate treatment to women with a positive, but not yet diagnostically confirmed, screening test result (usually after visual inspection). The ACCP's research in Thailand, Ghana, and other areas has shown that the approach has the potential to detect cervical cancer at an early stage when it can be treated successfully.<sup>1</sup> Screen-and-treat approaches involving two visits also offer a promising solution as they provide immediate test results during a woman's first visit so the importance of returning to a second appointment for treatment is clear.

In 2000, JHPIEGO collaborated with Thailand's Ministry of Public Health and other local partners on a project that combined visual inspection of the cervix with acetic acid followed by immediate cryotherapy treatment (when appropriate) or referral. Nurses received training in VIA and cryotherapy as part of village health center and hospital-based teams in four districts in the northeast province of Roi Et. Women were tested and if they required treatment, they were offered cryotherapy and counseling about the potential benefits, risks, and side effects of the treatment. More than 13 percent of women tested positive, close to 95 percent of them accepted immediate treatment, and less than 5 percent of those treated returned for any perceived problem.<sup>2</sup>

By reducing the number of visits a woman needs to make, the single-visit approach has many advantages, including:

- ◆ Eliminating the usual step of having to wait for a diagnosis and then return for treatment;
- ◆ Addressing the problem that many women fail to return for follow-up care;
- ◆ Reducing the need for extensive systems to track women; and
- ◆ Increasing program cost-effectiveness.

The approach remains controversial, however, because some women will be unnecessarily treated; this can overburden the health care system and cause needless anxiety among women. Health planners need to weigh these drawbacks against the benefits of offering comprehensive services in a single visit, thereby giving women access to the care they need.

#### REFERENCES

<sup>1</sup> Lynne Gaffikin et al., *Safety, Acceptability, and Feasibility of a Single Visit Approach to Cervical Cancer Prevention: Results from a Demonstration Project in Rural Thailand* (Baltimore: JHPIEGO, 2003).

<sup>2</sup> Gaffikin et al., *Safety, Acceptability, and Feasibility of a Single Visit Approach to Cervical Cancer Prevention*.

minority of those in need. Simple techniques for helping sick women to more easily eat, breathe, and change positions while lying down can be taught to relatives and caregivers. Health care workers who provide basic counseling and emotional support can vastly improve the comfort and well-being of the very ill, their family, or other caregivers.<sup>25</sup>

## The Cost-Effectiveness of Prevention

ACCP studies have provided new evidence on the cost-effectiveness of various strategies for detecting and treating the conditions that lead to cervical cancer. The results will help policymakers choose among alternative options for arresting the disease, given the resources they have available.

### Cervical Cancer Prevention Compared With Other Health Interventions

A number of health needs compete for available resources within any country. Where cervical cancer is a serious problem, other health problems affecting women and children are likely to be prevalent as well—problems such as high rates of maternal and infant deaths, nutritional deficiencies, and HIV and other infectious diseases.

A 1993 World Bank study found cervical cancer prevention using Pap smears to be moderately cost-effective, compared with other health interventions such as malaria treatment or polio vaccines; and very cost-effective, compared with other cancer control efforts.<sup>26</sup> The data showed that screening for and treating abnormal cervical tissue is far cheaper than the often futile, hospital-based treatment of advanced cancer. Still, the cost of offering Pap tests at regular intervals may be higher than many developing countries can afford. Thus, health programs need to consider the costs and effectiveness of alternative screening and treatment strategies.

### Cost-Effectiveness of Alternative Screening Strategies

ACCP research in South Africa looked at the cost-effectiveness of different strategies for screening, diagnosis, and treatment of cervical abnormalities. Researchers used a model to estimate cancer incidence, life expectancy, lifetime costs, and the costs of three different screening strategies: visual inspection, Pap tests, and HPV tests. The model showed that a single lifetime screen of women ages 35 to 40 would reduce the incidence of cervical cancer in South Africa by at least 26 percent (see Table 2). More frequent screening reduced incidence further.

The cheapest strategy was visual inspection, followed by treatment with cryotherapy for women who were suspected positive. The most effective strategy—

**TABLE 2**  
**Selected Screening Strategies, Compared With No Screening, South Africa**

Type and frequency of screening	Reduction in cervical cancer incidence (%)	Cost per year of life saved (\$ US)
One visit		
Visual inspection + cryotherapy	26	Cost saving*
HPV test + cryotherapy	32	14
Two visits		
HPV test	27	39
Pap smear	19	81
Three visits		
Pap smear	17	147

\*The costs of this strategy, compared with the benefits it provided, were more than recouped by the savings from not having to care for women with invasive cancer.

SOURCE: S.J. Goldie et al., "Policy Analysis of Cervical Cancer Screening Strategies in Low-Resource Settings" (2001).



in terms of lives saved—was use of a single lifetime HPV test, followed by cryotherapy for women who tested positive. (The model assumed that providers would not use an expensive colposcope to guide the treatment procedure.<sup>27</sup>)

Findings from the South Africa study illustrated that, for the poorest countries, a single lifetime screen with visual inspection, coupled with immediate treatment, may be the only affordable strategy. However, for countries with somewhat greater resources, using the HPV test could save even more lives. The cost-effectiveness of both of these screening strategies compares favorably with other public health interventions such as childhood immunizations and AIDS prevention programs.<sup>28</sup>

Further reinforcing these findings, ACCP researchers used data from Kenya, Peru, Thailand, South Africa, and India to develop a standard set of analyses to compare the costs and benefits of alternative screening strategies. The analysis showed that in all five countries, lifetime cancer risk was reduced by 25 percent to 35 percent with a single-lifetime screen (followed by cryotherapy for women who tested positive), using either a one-visit visual inspection or two-visit HPV testing of women ages 35 to 40. Although costs varied among countries, researchers identified a single-lifetime screening strategy in each country that would cost less per year of life saved than the country's per capita gross domestic product—an amount considered to be very cost-effective.<sup>29</sup>

## *Elements of a Successful Prevention Program*

A good prevention program for cervical cancer must reach a significant proportion of women at risk of the disease, effectively test these women, treat or manage those who test positive, ensure they are followed up, and monitor and evaluate program impact. The specific financial and technical inputs needed to start a program depend on the size of the population to be served, the screening approach used, and the existing health infrastructure. In any setting, however, ACCP research and experience show that several key elements contribute to program success.

## **Ensuring a Minimum Level of Services**

To be effective, a cervical cancer prevention program must include a package of education, screening, and precancer treatment services that reach the majority of women at risk of the disease. Implementing any one element in the package without the others will not have substantial impact (see Box 5). Educational efforts are needed to motivate women to seek screening, and screening services need to be followed by treatment services to ensure that any precancer that is identified is appropriately managed.

The progression of cervical cancer is an important guide for deciding when to initiate screening, how often to screen, and when to recommend treatment or follow-up evaluation.

- ◆ **When to initiate screening:** Cervical cancer most often develops in women after age 40. High-grade dysplasia is generally detectable up to 10 years before cancer develops, peaking around age 35. Therefore, where program resources are limited, screening initially should focus on women in their 30s and 40s.
- ◆ **How often to screen:** Screening can take place relatively infrequently and still have a significant impact on disease rates. Once-in-a-lifetime screening between ages 35 and 40 can reduce lifetime cancer risk by 25 percent to 35 percent. Adding two more screenings at five-year intervals (for example, at ages 35, 40, and 45) can reduce cancer risk further.<sup>30</sup> The emphasis of screening programs, therefore, should be on coverage of high-risk women rather than on frequency.
- ◆ **Whom to treat and follow up:** Because 70 percent of low-grade precancerous lesions regress on their own or do not progress to cancer, treatment should focus on women with high-grade lesions, with follow-up mechanisms in place for women with lower-grade lesions. About one-third of untreated high-grade lesions will progress to cancer within 10 years. Services should also include palliative care for women with advanced cancer.<sup>31</sup>

At a minimum, programs must be able to reach women at highest risk of developing cervical lesions with effective educational messages, screen those women at least once, and provide appropriate treatment or palliative care to those who need it (see Box 6, page 14). As a program matures, it can be expanded to

women up to age 60 and then to women younger than age 30, depending on the age groups most affected locally. Ideally, national policies should be put in place to guide the screening and treatment approaches appropriate for that setting.

## Integrating With Existing Services

Integrating cervical cancer prevention with other primary health care services can help increase the likelihood that women will come for screening and receive the necessary follow-up care. Integration will only succeed, however, if the existing services reach women ages 30 to 35 and older. Family planning programs may not be good candidates for integration because these programs often reach younger women. Programs that provide other maternal and child health services, treatment of hypertension, or other outpatient services may be more appropriate and convenient for older women at risk of cervical disease.

The degree to which cancer prevention and other health services should integrate depends on available resources and capacity. If integration results in overworked providers, because of a shortage of trained personnel and resources, program effectiveness will suffer.

Integrated services work best when provided by a large range or number of staff—nurses and doctors who already provide other health services and who can incorporate cervical cancer prevention into their routine practices. In some cases, services devoted solely to cervical screening can be offered effectively. These specialized services could be provided in a particular office of a clinic or through mobile outreach services that periodically visit villages or towns that lack access to health services.

## Training Providers

Program success depends on helping health care providers adopt a public-health approach to screening and treatment—reaching as many people as possible with a basic set of services—and giving providers the skills they need to provide high-quality services and counseling. In many settings, a shortage of doctors means that non-physicians need to be trained to provide screening services so that more women can be reached.

Experience from cervical cancer control efforts worldwide suggests that some policies in low-resource settings call for inappropriate service delivery approaches—for example, screening women every

### BOX 5

#### The Need to Revise Screening Policies

Even when 51-year-old Florence, from South Africa's Eastern Cape province, began experiencing abnormal vaginal bleeding and pain in her abdomen—symptoms of advanced cervical cancer—she delayed seeking care for months. Members of her Xhosa community typically turn to *sangomas* (traditional healers) as a first option. However, Florence's daughter had already lost a family member to the disease and was somewhat familiar with the dangers. Florence was eventually persuaded by her daughter to visit a clinic in distant Cape Town, where Florence was diagnosed with cancer and received a referral for radiation. Although fearful, Florence completed her treatment regime of radiotherapy.

Florence's story is a familiar one in South Africa, where cervical cancer is the most common cancer among women of African descent but the fourth most-common cancer among white women. The country's screening policies have largely failed. In the 1970s, the health department recommended the use of Pap smears only when the cervix looked abnormal—a course of action that held particular problems, since cervical abnormalities that can be observed without the help of a vinegar or iodine solution tend to indicate advanced cancer. Screening services suffered further in the 1980s, when officials determined that the country faced other, more urgent health challenges than cervical cancer. Today, services remain variable throughout the country. A policy to provide women over age 30 with three free Pap smears, 10 years apart, has not been successfully implemented.

Spurred by the failure of screening efforts, ACCP member EngenderHealth worked with the Women's Health Project at the University of Witwatersrand Medical School and the Women's Health Research Unit at the University of Cape Town's School of Public Health and Family Medicine to develop, test, and evaluate quality cervical screening in primary care services. The three-year project, which ran in three districts, focused on reaching the target community; setting up screening, treatment, and referral services; and establishing procedures for quality assurance.

The project saw an improvement in staff knowledge, attitudes, and practices. Still, missed opportunities to screen eligible women who visit clinics and difficulties in improving referrals remain key challenges. Competing health demands, the absence of a common political agenda, and bureaucratic inertia impeded efforts to achieve a unified approach.

Ongoing research—for example, on whether a single-lifetime screening, coupled with appropriate treatment, is likely to reduce deaths—could continue to shape policies and practices related to cervical cancer in developing countries like South Africa. Stronger political commitment and considerable resources will also be needed to reduce illness and death from cervical cancer.

year, screening younger women, or focusing treatment on advanced cancers. Widespread use of such practices drains program resources and does not have a major health impact, yet these practices are common and longstanding.

Training can help demonstrate why old practices have been misguided. Service providers can be presented with new information on the progression of cervical disease, on successful screening approaches, on the need to focus on women in their 30s and 40s, and on the need to treat precancerous conditions. Conveying this new information can provide a base of evidence upon which to change clinical policies and practices.

Steps are also needed to ensure that health care providers are offering high-quality services. If Pap smears are used, providers must be trained so that the smear samples are properly obtained and fixed onto a slide. If visual inspection is used, providers must learn to identify abnormal tissue and the appropriate action to take; sufficient practice with a trainer present is a critical part of this process. Regardless of the screening approach used, all service providers need training to communicate effectively and compassionately with the women seeking care. Supervision and monitoring are also critical parts of quality control.

#### **BOX 6**

### **Mobile Clinics Address Education and Treatment Needs**

Well-run cervical cancer prevention programs work to develop strategies to screen hard-to-reach women in underprivileged rural communities and urban settlements. Where existing screening services have failed, mobile units can work with community leaders to develop educational campaigns, provide sites for screening women in the critical age groups, keep track of patients, and motivate them to return for follow-up care.

A mobile program that emphasized education and outreach showed positive results in rural Thailand in the 1990s. Despite weeklong screening campaigns, including free Pap smears, a 1991 survey had found that only one in five women ages 18 to 65 in the Mae Sot District of the northern Tak Province had either heard of Pap smears or had ever been screened. To increase awareness and improve screening coverage, the program offered information and free Pap smears to women ages 25 to 60 in 54 villages. Using personal contact, health center workers and village health communicators invited women to the mobile clinic during screening campaigns in 1993 and 1996. Public health nurses, supervised by the project physician, collected the Pap smears and sent them to the local hospital.

Surveys conducted in the area showed that the proportion of women who had ever had a Pap smear soared from 20 percent in 1991 to 70 percent in 1997, and the mobile screening program became the service most commonly reported for Pap screening among Thai women.<sup>1</sup> An ACCP project in Roi Et province of Thailand showed that using mobile clinics to provide visual screening reached a large number of women, in some cases reaching three times as many women as hospital-based services. Four years after the project began, one-fourth of all eligible women in the province had received visual screening.<sup>2</sup>

In South Africa, health workers face the challenge that people move constantly in search of work and that many live in poor, informal settlements. Even where screening services are available, inadequate follow-up of patients contributes to failed prevention efforts. Estimates show that 60 percent to 80 percent of South African women who receive positive diagnoses never return for treatment.<sup>3</sup>

To try to reverse this trend, ACCP partner EngenderHealth collaborated with the South African National Cancer Association and others in the early 1990s to use a mobile clinic to provide services to a highly transient settlement population in Cape Town. The project, which provided women with cervical cancer prevention information and free Pap smears, tested the feasibility of providing diagnosis and treatment on site, with minimal delay.

The project found that education was an essential ingredient to the program's success and that women were more likely to undergo treatment when diagnoses and treatment were offered promptly and on the spot. When women with high-grade cancerous lesions were referred to a nearby clinic for treatment in the project's first phase, only 34 percent followed up. On the other hand, when women were offered on-site, same-visit treatment during the project's latter phase, the dropout rate was a mere 3 percent.

#### **REFERENCES**

<sup>1</sup> PATH, *Planning Appropriate Cervical Cancer Prevention Programs* (Seattle: PATH, 2000).

<sup>2</sup> Amy Kleine and Lynne Gaffikin, *Evaluation of Supply and Demand Factors Affecting Cervical Cancer Prevention Services in Roi Et Province, Thailand* (Baltimore: JHPIEGO, 2004).

<sup>3</sup> Eric Megevand et al., "Can Cervical Cancer Be Prevented by a See, Screen, and Treat Program? A Pilot Study," *American Journal of Obstetrics & Gynecology* 174, no. 3 (1996): 923-28.

## Meeting Women's Needs

Women at risk of cervical cancer need complete and accurate information so they can understand prevention options and become motivated to use screening services. Yet, in many countries, women's lack of awareness about cervical cancer is a major barrier to the use of screening services. Studies in Kenya and Nigeria, for example, found that only 10 percent to 15 percent of women knew about cervical cancer, and far fewer knew of ways to prevent it.<sup>32</sup>

Even if they know about the disease, women may be reluctant to undergo screening because of embarrassment about having a pelvic examination, fear of the procedure, or fear of cancer. Women often mistrust health care providers and have various family pressures that prevent them from seeking health care.

Cervical cancer programs therefore need to address the cultural, emotional, and practical barriers that influence whether or not women will use screening services. Program planners can take a number of steps to address women's needs:

- ◆ To motivate women to seek prevention services, program planners can involve women ages 35 to 50 in developing appropriate programs and easily understood messages. Focus group discussions and in-depth interviews can provide insight into women's needs and concerns. Program managers may also consider establishing advisory groups of women in the key age groups and other community members. Involving women who use the services in evaluating programs and informational messages is also important.
- ◆ To help health care providers establish a rapport with women, programs can train providers in interpersonal communication and counseling techniques. Counseling women before screening or treatment can help alleviate a woman's fears and help her understand the importance of returning for follow-up when screening results are abnormal.
- ◆ Programs should review internal policies and procedures to ensure that services are culturally appropriate, available in local languages, accessible in terms of cost and location, and confidential to protect women's privacy.

## Involving Communities

The most effective cervical cancer prevention services rely on the broad support of women and communities to ensure that projects respond to their needs, concerns, and beliefs. Involving women and communities in developing, implementing, and evaluating strategies and activities is key to the success of a prevention project.

The ACCP's experience shows that reaching out to communities is vital for encouraging eligible women to use cervical cancer prevention services. Strategies for involving communities include:

- ◆ Listening to the community and learning about cultural perceptions of cervical cancer, barriers to seeking screening, and characteristics of underserved women;
- ◆ Involving community stakeholders, such as women's and other organizations, local advisory groups, community health workers, and men in program development and implementation; and
- ◆ Responding to community needs through communication materials, outreach activities, and local action planning.

These strategies can increase and sustain the demand for services and improve the quality of services, which in turn can result in more women being screened and better compliance with treatment recommendations (see Box 7, page 16).

## Having Information Systems in Place

Experience suggests that, for maximum efficiency and impact, a health information system needs to be in place when program activities are launched. Women whose screening results suggest they have abnormal cervical tissue need to make one or more follow-up visits to a health care provider, if a single-visit approach is not used. Tracking these visits and contacting women to encourage them to return to a clinic require well-organized client records.

A well-functioning information system enables workers to recall women or refer them to another facility when necessary. It allows programs to track individuals' health information over time, including their screening results, referrals, and treatment outcomes. Ideally, information from facilities should be linked to regional or

national databases to allow health care administrators to monitor overall program performance and needs.

Where possible, cancer data should be reported to national cancer registries for monitoring of cervical cancer incidence rates. Where no such registry exists, however, researchers can collect data from a limited area first and gradually expand the reporting area. A cancer registry does not need to cover the entire population to generate enough data for monitoring disease patterns.

## Monitoring and Evaluating Programs

Monitoring and evaluating a prevention program's operations and impact are essential. The results can be used to help ensure appropriate delivery of services, assess coverage of the population, and correct problems and inefficiencies in program operations. Evaluation results can also be used to mobilize continued financial and political support for the program.

Because evaluation can be time-consuming and costly, programs need to develop monitoring and evaluation strategies that are feasible with available resources. Whenever possible, these strategies, along with mecha-

nisms for quickly relaying program data between sites, should be in place at the start of program activities.

Evaluation efforts of new programs should focus on ongoing activities, such as whether screening and treatment services are functioning and whether women are receiving the appropriate levels and quality of care. More-established programs can measure long-term impact, such as whether cervical cancer incidence is declining.<sup>33</sup>

## *Looking Forward*

Adequate research, planning, and advocacy are essential to bring about effective programs. However, given the competing health priorities and limited resources in developing countries, building a case for committing resources for cervical cancer prevention can be daunting. Since the disease is associated with sexual activity, some decisionmakers may be reluctant to broach a potentially controversial health topic. Yet, current research strongly suggests that providing screening and treatment services for precancer is critical from a public health, cost, and human rights perspective.

### BOX 7

#### **Working Through the Community to Address Negative Images**

Developing informational messages that address communities' deep-rooted concerns about gynecological problems is especially important, since negative attitudes and limited understanding of the concept of cervical cancer prevention often contribute to a woman's reluctance to seek screening.

Cancer and general gynecological care evoke powerful, negative images for many women. In South Africa, anxiety over the pelvic exam has spawned such references as "hanging the legs" or "surrendering" oneself. Some in Mexico see cervical cancer as the "rotting" or "devouring" of the womb.

In Peru's San Martín rainforest region, where only 23 percent of women with abnormal Pap smears in 1999 received follow-up diagnoses and treatment, women harbor many misconceptions about the disease.<sup>1</sup> "My neighbors have told me that you get cancer from lycra underwear . . . too much sex, and having a lot of children," says Gloria, 36. "But I think that if it's not inherited from my mother, it's God's punishment for something I must have done in the past."

ACCP projects aimed to address concerns that affect whether or not a woman seeks care. The Alliance's research suggests that women were more inclined to take advantage of screening and treatment services when the services were offered through women's groups, religious groups, or face-to-face visits by community health workers.

In Peru, community outreach was a key part of a project to screen women and offer prompt treatment at the primary care level. The project, a collaboration between PATH, the Pan American Health Organization (PAHO), and the Peruvian health ministry, worked with local women's and other groups to identify and train community facilitators to provide women with key information. Trained personnel and community leaders also monitored women's satisfaction with the services to provide ongoing feedback to health teams.

#### REFERENCE

<sup>1</sup> Pan American Health Organization (PAHO), Division of Disease Prevention and Control Program on Non-Communicable Disease, "Testing New Technologies in the Test-and-Treat Project, Peru: The TATI Intervention," accessed online at [www.paho.org/English/AD/DPC/NC/cctestingnewtech.pdf](http://www.paho.org/English/AD/DPC/NC/cctestingnewtech.pdf), on Oct. 13, 2004.

## The Need for Advocacy

In some countries, health officials and other policymakers have yet to make cervical cancer prevention a priority in the national health plan and budget. In other countries, existing prevention programs may be using approaches that recent research shows to be ineffective. Individuals and organizations advocating for new or improved initiatives to prevent cervical cancer need to build a case, underscoring the need for evidence-based approaches and the feasibility of implementing them. Advocates may include medical providers, health educators, community leaders, women's groups, and others.

Advocacy may take place on many levels. Within an organization, advocacy may be needed to bring about internal policy or procedural changes, such as persuading decisionmakers to change the target age of women being screened or the screening approach to be used. On a larger scale, an advocacy campaign might focus on persuading the Ministry of Health to support a new national prevention initiative or to strengthen existing services.

Advocates for new approaches to cervical cancer prevention may need to call attention to several major policy issues. In some countries, regulations restrict nurses and other mid-level health professionals from screening women, making treatment decisions, and providing treatment (with cryotherapy). Since there is a shortage of physicians and pathologists in many developing countries, increasing the coverage of services will require making reforms that allow nurses, midwives, and other mid-level professionals to be trained to provide the needed services. Policies may also need to be revised regarding the recommended age at which women should be screened and the frequency of screening. Gaining the support of health officials can help overcome the resistance that some physicians—particularly those trained to provide periodic Pap smears—may have to adopting new practices.<sup>34</sup>

Whether advocates are working for change at the national or local level, they must present their case to key decisionmakers, particularly in government. Even when nongovernmental organizations take the lead in educating women and providing screening, much of the infrastructure for cancer prevention, including laboratories and treatment facilities, functions through the government. Thus, government-supported health centers, clinics, and hospitals need official endorsement to ensure their success.

## The Need for Additional Research

Future research can help fill a number of gaps in cervical cancer prevention efforts. Development of an HPV vaccine would make one of the biggest impacts in the bid to reduce the deaths and illnesses associated with the disease. In the medium term, further research on techniques that would allow women to collect their own cervical specimens for use in HPV tests would help overcome some of the cultural and program barriers in some countries. In addition, further research on how HIV infection and women's ages may affect prevention approaches would provide program planners with valuable information.

## The Promise of HPV Vaccines

HPV vaccines hold great promise for cervical cancer prevention in the future. Some vaccines currently in development would prevent HPV infection, while others (therapeutic vaccines) would cause HPV to regress or would prevent cervical abnormalities from progressing in women already infected. If the vaccines that prevent HPV infection were given to adolescent women before they start having sex, these women could be protected from cervical cancer later in life.

While both preventive and therapeutic vaccines have been explored, preventive vaccines have shown the most promise and are now in late stages of development.<sup>35</sup> Vaccines for the two most carcinogenic HPV types (HPV 16 and 18, which account for 70 percent of cervical cancer cases<sup>36</sup>) may be available in developed countries within five years. In a controlled clinical trial, the HPV 16 vaccine proved to be 100 percent effective in protecting against that type of HPV infection and the associated precancerous disease.<sup>37</sup>

HPV immunization would offer a long-term solution to cervical cancer, especially where screening and treatment programs are not well organized. However, the vaccine's effect on cervical cancer rates would not be seen for years after introduction and it will be important to continue secondary prevention through

cervical screening and treatment. Further, the vaccine may not be available in all countries, and the distribution of HPV types vary from one region to another.<sup>38</sup> Preventing a majority of cervical cancer cases will require a vaccine that is effective against a combination of HPV types. One analysis suggests that a vaccine for HPV types 16 and 18—if it were 98 percent effective at preventing infection and administered to all adolescent females before they begin sexual activity—would reduce the burden of cervical cancer by 51 percent over a 40- to 50-year period.<sup>39</sup>

When a commercial vaccine does become available, immunization programs will need to address the challenge of “marketing” it so that parents of adolescent girls will approve of vaccination and young women will want to be vaccinated. One study in the United States found that a brief educational intervention with parents would significantly improve their acceptability of an HPV vaccine, if such a vaccine were available.<sup>40</sup> Other research shows that a woman’s attitude about receiving an HPV vaccine is affected by her own sexual behavior, her knowledge of HPV, her feelings about vaccinations in general, and her perception that others approve of vaccination.<sup>41</sup>

Given the challenges associated with introducing vaccines in developing countries and the long time-frame between the launch of the vaccine and an actual reduction in death rates, developing-country programs must continue cervical screening as a secondary prevention measure for some time. Nevertheless, a vaccine has the potential to sharply reduce the incidence of cervical cancer in the future.<sup>42</sup>

## *Conclusions and Recommendations*

### **ACCP Key Findings**

Research by the ACCP and others provides a base of evidence supporting new approaches to cervical cancer screening and treatment.<sup>43</sup> If carried out effectively, these approaches will ultimately lower the burden of disease from cervical cancer worldwide. The Alliance’s principal findings and conclusions serve as a guide for future efforts.<sup>44</sup> Key findings include:

- ◆ It is possible to implement organized cervical cancer prevention programs in low-resource settings that will reduce the burden of disease.
- ◆ The screen-and-treat approach to prevention, involving only one or two clinic visits, is safe and effective in low-resource settings.
- ◆ Visual inspection approaches and HPV tests hold great promise as alternatives to Pap smear screening and are cost-effective approaches to save women’s lives.
- ◆ Cryotherapy (freezing of abnormal cell tissue) and LEEP (using an electrosurgical wire to remove tissue) are safe and effective treatment methods for women with precancerous cervical disease. A range of health providers, including nonphysicians, can provide cryotherapy.
- ◆ Clinical trials in developing countries can be implemented to provide data on the impact on cervical cancer of various prevention methods.

ACCP studies evaluating the use of visual inspection approaches and HPV tests are nearing conclusion. These studies have already shown that screening strategies that use visual inspection or HPV testing followed by treatment with cryotherapy are safe, effective, and acceptable in low-resource settings. Within the next five years, ACCP studies will demonstrate the impact on cervical cancer rates of the new screening and treatment approaches, compared with conventional ways of treating the disease.

## Program and Policy Implications

All over the developing world, health care providers regularly see women with advanced, incurable cervical cancer. While many countries use scarce resources to provide surgery and radiation treatment to a very small proportion of these women, there is little they can do for most cancer patients but provide palliative care. This is particularly tragic given the relative ease with which the disease can be prevented.

At a minimum, programs must plan to achieve the goals listed below to reduce cervical cancer incidence and mortality:

- ◆ Increase awareness of cervical cancer and encourage women in their 30s and 40s to be screened.
- ◆ If resources permit, screen only once per lifetime, with the focus on screening women in their 30s and 40s, especially those between ages 35 and 40.
- ◆ Treat women with high-grade lesions, refer those with invasive cancer where possible, and provide palliative care for women with advanced cancer.
- ◆ Collect service delivery statistics that will allow for monitoring and evaluation of program activities and outputs.

Key activities for achieving these minimum program goals in low-resource settings include:

- ◆ Coordinating cervical cancer prevention services with health programs that offer related services and/or reach women in their 30s and 40s;
- ◆ Identifying and addressing bottlenecks in services, such as inadequate laboratory capabilities or information systems, before initiating a new program;
- ◆ Minimizing the number of visits a woman must make to the health center to receive appropriate care;
- ◆ Removing regulatory barriers that prevent the expansion of services, such as regulations that do not allow nurses, midwives, or other paramedical workers to provide screening services;
- ◆ Training providers at all levels in cervical cancer prevention, including counseling skills;
- ◆ Using innovative, culturally appropriate, and field-tested strategies to reach underserved older women; and
- ◆ Supporting pilot assessments and introduction programs for new screening and treatment approaches that may increase access to services and cut program costs.

Increased awareness of the impact of cervical cancer on women in developing countries and the feasibility of new prevention strategies has led to growing interest in addressing this preventable disease. Programs based on new approaches are being piloted and implemented worldwide, particularly in regions where cervical cancer rates are highest.

The potential for an effective HPV vaccine becoming available in the next five years brings additional hope to the field of cervical cancer prevention. Even with broad access to a vaccine, however, secondary prevention—screening women for precancerous conditions—will remain a necessary component of any comprehensive cancer control program. Continuing to strengthen programs based on evidence from the ACCP and other groups will help to reduce the burden of disease from cervical cancer worldwide.



## *Appendix: For More Information*

ACCP research findings, program guidelines, and other resources provide information and support for health programs that wish to undertake or strengthen a cervical cancer prevention program. A complete list of publications—fact sheets, presentations, planning guides, training materials, journal articles, and other reports—is available at the Alliance’s website: [www.alliance-cxca.org](http://www.alliance-cxca.org).

To request publications or receive notices about new publications, send an e-mail to [ccppubs@path.org](mailto:ccppubs@path.org), or write to:

ACCP c/o PATH  
1455 NW Leary Way  
Seattle, WA 98107 USA

### **ACCP Partner Websites**

These websites provide information about each of the Alliance partners, including their work to prevent cervical cancer:

EngenderHealth: [www.engenderhealth.org](http://www.engenderhealth.org)

International Agency for Research on Cancer:  
[www.iarc.fr](http://www.iarc.fr)

JHPIEGO: [www.jhpiego.org](http://www.jhpiego.org)

Pan American Health Organization: [www.paho.org](http://www.paho.org)

PATH: [www.path.org](http://www.path.org)

### **Selected ACCP Resources**

The following program guides and training tools can be obtained by contacting the ACCP at the address above, or online at [www.alliance-cxca.org](http://www.alliance-cxca.org).

#### **ACCP Publications**

“ACCP Strategies for Supporting Women With Cervical Cancer,” *Cervical Cancer Prevention Issues in Depth*, no. 2 (2004).

“Effectiveness, Safety, and Acceptability of Cryotherapy: A Systematic Literature Review,” *Cervical Cancer Prevention Issues in Depth*, no. 1 (2003).

“Improving Screening Coverage of Cervical Cancer Prevention Programs: A Focus on Communities,” *Cervical Cancer Prevention Issues in Depth*, no. 4 (2004).

“Investing in Cervical Cancer Prevention Worldwide,” *Cervical Cancer Prevention Issues in Depth*, no. 3 (2004).

*Planning and Implementing Cervical Cancer Prevention and Control Programs: A Manual for Managers* (2004).

*Women’s Stories, Women’s Lives: Experiences with Cervical Cancer Screening and Treatment* (2004).

#### **ACCP Partner Publications**

EngenderHealth, *COPE for Cervical Cancer Prevention Services: A Toolbook to Accompany the COPE Handbook* (New York: EngenderHealth, 2004).

EngenderHealth, *Men and Women Working Together to Prevent Cervical Cancer: Training Modules for Men Facilitator’s Manual* (New York: EngenderHealth, 2003).

Cristina Herdman and Jacqueline Sherris, *Planning Appropriate Cervical Cancer Control Programs*, 2d ed. (Seattle: PATH, 2000).

IARC Working Group on the Evaluation of Cancer-Preventative Strategies, *Cervix Cancer Screening, IARC Handbooks of Cancer Prevention*, Vol. 10 (Lyon, France: IARC, forthcoming).

JHPIEGO, *Visual Inspection for Cervical Cancer Prevention Training Tools: Reference Manual, Trainer Handbook, Participant Handbook, Flash Card Set and CD-ROM* (Baltimore: JHPIEGO).

Pan American Health Organization (PAHO), *A Situational Analysis of Cervical Cancer in Latin America & the Caribbean* (Washington, DC: PAHO, 2004).

PATH and EngenderHealth, *Palliative Care for Women With Cervical Cancer: A Field Manual* (Seattle: PATH and EngenderHealth, 2003).

PATH, PAHO, and the Peru Ministry of Health, *How Can We Prevent Cervical Cancer? A Guide for Community Facilitators* (Seattle: PATH, 2003).

Rengaswamy Sankaranarayanan and Ramani S. Wesley, *A Practical Manual on Visual Screening for Cervical Neoplasia* (Lyon, France: IARC, 2003).

John Sellors and Rengaswamy Sankaranarayanan, *Colposcopy and Treatment of Cervical Intraepithelial Neoplasia: A Beginner's Manual* (Lyon, France: IARC, 2003).

*Other ACCP partner publications are listed on the ACCP and partner websites.*

## Related Information Sources

### **International Union Against Cancer**

[www.uicc.org](http://www.uicc.org)

A list of organizations, online journals, and networks involved in cancer prevention.

### **CANCERLIT (National Cancer Institute's International Cancer Information Center)**

[www.cancer.gov/CancerInformation/cancerliterature](http://www.cancer.gov/CancerInformation/cancerliterature)

A bibliographic database containing more than 1.3 million citations and abstracts, drawn from over 4,000 different sources including biomedical journals, proceedings, books, and reports from 1963 to the present.

### **Cancer Mondial**

[www-dep.iarc.fr](http://www-dep.iarc.fr)

An online source of information on global cancer incidence, mortality, and survival data compiled by the International Agency for Research on Cancer from national cancer registries. This site also contains information on manuals, software, and training opportunities for cancer researchers.

### **Cervical Cancer E-Mail Discussion Group**

[www.path.org/resources/cxca\\_listserv.htm](http://www.path.org/resources/cxca_listserv.htm)

PATH has established a cervical cancer e-mail discussion group that allows individuals and groups worldwide to share information on issues pertaining to cervical cancer in low-resource settings. For more information, send an e-mail to [cxca@path.org](mailto:cxca@path.org).

### **OncoLink (University of Pennsylvania Cancer Center)**

[www.oncolink.com/index.cfm](http://www.oncolink.com/index.cfm)

The University of Pennsylvania Cancer Center's OncoLink website provides a range of information, including an overview of cervical cancer, summaries of recent U.S. meetings on cancer, and examples of provider and client information on Pap tests, colposcopy, and dysplasia treatment. The site is aimed at a U.S. audience, but much of the material (in particular the client-oriented material) could be readily adapted for use in other settings.

### **PUBMED Search: Cervical Cancer in Low-Resource Settings**

This search has been predefined. It contains the latest citations and abstracts from the PUBMED database.

### **Reproductive Health Outlook (RHO), Cervical Cancer Prevention**

[www.rho.org/html/cxca.htm](http://www.rho.org/html/cxca.htm)

PATH's RHO website provides current summaries of key issues, syntheses of important references and resources, and links to the best, in-depth reproductive health information on the Internet. The Cervical Cancer Prevention section provides lessons learned, key issues, program examples, an annotated bibliography, and more.

# References

- <sup>1</sup> Jacques Ferlay et al., *GLOBOCAN 2002: Cancer Incidence, Mortality and Prevalence Worldwide*, IARC CancerBase No. 5, version 2.0 (Lyon, France: IARC, 2004), accessed online at [www.depdb.iarc.fr/globocan/GLOBOframe.htm](http://www.depdb.iarc.fr/globocan/GLOBOframe.htm), on Sept. 30, 2004.
- <sup>2</sup> Ferlay et al., *GLOBOCAN 2002*.
- <sup>3</sup> Alliance for Cervical Cancer Prevention (ACCP), "Effectiveness, Safety, and Acceptability of Cryotherapy: A Systematic Literature Review," *Cervical Cancer Prevention Issues in Depth*, no. 1 (Seattle: ACCP, 2003).
- <sup>4</sup> Ferlay et al., *GLOBOCAN 2002*.
- <sup>5</sup> Ferlay et al., *GLOBOCAN 2002*. Incidence rates are adjusted to account for differences in age structure across countries.
- <sup>6</sup> Ferlay et al., *GLOBOCAN 2002*.
- <sup>7</sup> Esa Läärä, Nicholas E. Day, and Matti Hakama, "Trends in Mortality From Cervical Cancer in the Nordic Countries: Association With Organised Screening Programmes," *Lancet* 1, no. 8544 (1987): 1247-9.
- <sup>8</sup> Michael L. Hicks and M. Steven Piver, "How to Obtain an Accurate Pap Smear," *Medical Aspects of Human Sexuality* 25, no. 4 (1991): 36-43.
- <sup>9</sup> Ferlay et al., *GLOBOCAN 2002*. Mortality rates are adjusted to account for differences in age structure across countries.
- <sup>10</sup> Eduardo C. Lazcano-Ponce et al., "Cervical Cancer Screening in Developing Countries: Why Is it Ineffective? The Case of Mexico," *Archives of Medical Research* 30, no. 3 (1999): 240-50.
- <sup>11</sup> Laura A. Koutsky, "Epidemiology of Genital Human Papillomavirus Infection," *American Journal of Medicine* 102, no. 5A (1997): 3-8; and Christopher P. Crum, Derek W. Abbott, and Bradley J. Quade, "Cervical Cancer Screening: From the Papanicolaou Smear to the Vaccine Era," *Journal of Clinical Oncology* 21, 10 suppl. (2003): 224-30.
- <sup>12</sup> Crum, Abbott, and Quade, "Cervical Cancer Screening"; and Denise A. Galloway, "Papillomavirus Vaccines in Clinical Trials," *Lancet Infectious Diseases* 3, no. 8 (2003): 469-75.
- <sup>13</sup> ACCP, "Natural History of Cervical Cancer: Even Infrequent Screening of Older Women Saves Lives," *Cervical Cancer Prevention Fact Sheet* (Seattle: ACCP, 2003).
- <sup>14</sup> Jacqueline Sherris and Cristina Herdman, "Preventing Cervical Cancer in Low-Resource Settings," *Outlook* 18, no. 1 (2000).
- <sup>15</sup> Kavita Nanda et al., "Accuracy of the Papanicolaou Test in Screening for and Follow-Up of Cervical Cytologic Abnormalities: A Systematic Review," *Annals of Internal Medicine* 132, no. 10 (2000): 810-19; and Michael Fahey, Les Irwig, and Pierce Macaskill, "Meta-Analysis of Pap Test Accuracy," *American Journal of Epidemiology* 141, no. 7 (1995): 680-9.
- <sup>16</sup> ACCP, *Planning and Implementing Cervical Cancer Prevention and Control Programs: A Manual for Managers* (Seattle: ACCP, 2004).
- <sup>17</sup> Rengaswamy Sankaranarayanan et al., "Test Characteristics of Visual Inspection With 4% Acetic Acid (VIA) and Logol's Iodine (VILI) in Cervical Cancer Screening in Kerala, India," *International Journal of Cancer* 106, no. 3 (2003): 404-8;
- <sup>18</sup> Sankaranarayanan et al., "Test Characteristics of Visual Inspection With 4% Acetic Acid (VIA) and Logol's Iodine (VILI)"; and Mark Schiffman et al., "HPV DNA Testing in Cervical Cancer Screening: Results From Women in a High-Risk Province of Costa Rica," *Journal of the American Medical Association* 283, no. 1 (2000): 87-93.
- <sup>19</sup> ACCP, "HPV Testing: Promise and Challenges," *Cervical Cancer Prevention Fact Sheet* (Seattle: ACCP, 2003).
- <sup>20</sup> Thomas C. Wright Jr. et al., "HPV DNA Testing of Self-Collected Vaginal Samples Compared With Cytologic Screening to Detect Cervical Cancer," *Journal of the American Medical Association* 283, no. 1 (2000): 81-86.
- <sup>21</sup> Amie Bishop et al., "Cervical Cancer: Evolving Prevention Strategies for Developing Countries," *Reproductive Health Matters* 3, no. 6 (1995): 60-71.
- <sup>22</sup> ACCP, "Effectiveness, Safety, and Acceptability of Cryotherapy: A Systematic Literature Review," *Cervical Cancer Prevention Issues in Depth*, no. 1 (Seattle: ACCP, 2003).

- <sup>23</sup> Lynne Gaffikin, "Safety, Acceptability, and Feasibility of a Single-Visit Approach to Cervical Cancer Prevention in Rural Thailand: A Demonstration Project," *Lancet* 361, no. 9360 (2003): 814-20.
- <sup>24</sup> ACCP, "ACCP Strategies for Supporting Women With Cervical Cancer," *Cervical Cancer Prevention Issues in Depth*, no. 2 (Seattle: ACCP, 2004).
- <sup>25</sup> PATH and EngenderHealth, *Palliative Care for Women With Cervical Cancer: A Field Manual* (Seattle: PATH and EngenderHealth, 2003); and PATH, *Palliative Care for Women With Cervical Cancer: A Kenya Field Manual* (Seattle: PATH, 2004).
- <sup>26</sup> Dean T. Jamison, ed., *Disease Control Priorities in Developing Countries* (Oxford, England: Oxford University Press, 1993); and Christopher J.L. Murray and Alan D. Lopez, "Global and Regional Cause-of-Death Patterns in 1990," *Bulletin of the World Health Organization* 72, no. 3 (1994): 447-80.
- <sup>27</sup> Sue Goldie et al., "Policy Analysis of Cervical Cancer Screening Strategies in Low-Resource Settings," *Journal of the American Medical Association* 285, no. 24 (2001): 3107-15.
- <sup>28</sup> Sue Goldie, "Preventing Cervical Cancer in Developing Nations," *Risk in Perspective* 9, no. 3 (2001).
- <sup>29</sup> Sue Goldie and ACCP, "A Comprehensive Analysis of Cervical Cancer Screening in Peru, India, Kenya, Thailand, and South Africa," paper presented at the 21st International Papillomavirus Conference, Mexico City, February 2004.
- <sup>30</sup> Goldie and ACCP, "A Comprehensive Analysis of Cervical Cancer Screening."
- <sup>31</sup> ACCP, "ACCP Strategies for Supporting Women With Cervical Cancer."
- <sup>32</sup> PATH, "Assessing Health Need/Community Demand for Cervical Cancer Control: Results From a Study in Kenya," *Reproductive Health Reports* 1 (1996); and Ikeoluwapo O. Ajayi and Isaac F. Adewolfe, "Knowledge and Attitude of General Outpatient Attendants in Nigeria to Cervical Cancer," *Central African Journal of Medicine* 44, no. 2 (1998): 41-43.
- <sup>33</sup> ACCP, *Planning and Implementing Cervical Cancer Prevention and Control Programs: A Manual for Managers*.
- <sup>34</sup> ACCP, "Investing in Cervical Cancer Prevention Worldwide," *Cervical Cancer Prevention Issues in Depth*, no. 3 (Seattle: ACCP, 2004).
- <sup>35</sup> Katherine U. Jansen and Alan R. Shaw, "Human Papillomavirus Vaccines and Prevention of Cervical Cancer," *Annual Review of Medicine* 55 (2004): 319-31; Galloway, "Papillomavirus Vaccines in Clinical Trials"; and M. Saveria Campo, "Animal Models of Papillomavirus Pathogenesis," *Virus Research* 89, no. 2 (2002): 249-61.
- <sup>36</sup> Nubia Munoz et al., "Against Which Human Papillomavirus Types Shall We Vaccinate and Screen For? The International Perspective," *International Journal of Cancer* (forthcoming); and Laura A. Koutsky et al., "A Controlled Trial of a Human Papillomavirus Type 16 Vaccine," *New England Journal of Medicine* 347, no. 21 (2002): 1645-51.
- <sup>37</sup> Koutsky et al., "A Controlled Trial of a Human Papillomavirus Type 16 Vaccine."
- <sup>38</sup> Munoz et al., "Against Which Human Papillomavirus Types Shall We Vaccinate and Screen For?"
- <sup>39</sup> Sue J. Goldie et al., "A Comprehensive Natural History Model of HPV Infection and Cervical Cancer to Estimate the Clinical Impact of a Prophylactic HPV-16/18 Vaccine," *International Journal of Cancer* 106, no. 6 (2003): 896-904.
- <sup>40</sup> Kristin Davis et al., "Human Papillomavirus Vaccine Acceptability Among Parents of 10-to-15-Year-Old Adolescents," *Journal of Lower Genital Track Disease* 8, no. 3 (2004): 188-94.
- <sup>41</sup> Jessica A. Kahn et al., "Attitudes About Human Papillomavirus Vaccine in Young Women," *International Journal of STD & AIDS* 14, no. 5 (2003): 300-306.
- <sup>42</sup> Denise A. Galloway, "Is Vaccination Against Human Papillomavirus a Possibility?" *Lancet* 351, suppl. 3 (1998): 2224.
- <sup>43</sup> See also: The American College of Obstetricians and Gynecologists, "ACOG Statement of Policy: Cervical Cancer Prevention in Low Resource Settings," *American Journal of Obstetrics & Gynecology* 103, no. 3 (2004): 607-9.
- <sup>44</sup> ACCP, "Conclusions From ACCP Clinical Research in Developing Countries," *Cervical Cancer Prevention Fact Sheet* (Seattle: ACCP, 2004).

## Acknowledgments

Lori Ashford and Yvette Collymore of the Population Reference Bureau prepared this report in collaboration with Anne R. Boyd, Cristina Herdman, and Jacqueline Sherris of PATH. The report draws on a large body of research undertaken by the Alliance for Cervical Cancer Prevention over five years. Many thanks are due to the following reviewers: Irene Agurto, Paul Blumenthal, Janet Bradley, Dara Carr, Wendy Castro, Ilana Dzuba, Sue Goldie, Amy Kleine, Madina Kalembe Ondoma, Solomon Orero, Gordon Perkin, Nancy Yinger, and Siriporn Yongpanichkul.

PRB produced this report with funding from the Bill & Melinda Gates Foundation.

Design: Michelle Nigh  
Printing: Jarboe Printing

Copyright © 2004, Population Reference Bureau.

## **PRB** POPULATION REFERENCE BUREAU

1875 Connecticut Ave., NW, Suite 520  
Washington, DC 20009-5728 USA  
Tel.: 202-483-1100  
Fax: 202-328-3937  
E-mail: [popref@prb.org](mailto:popref@prb.org)  
Website: [www.prb.org](http://www.prb.org)



**PATH Alliance coordinating agency**  
1455 NW Leary Way  
Seattle, Washington 98107 USA  
Tel: 206-285-3500  
Email: [accp@path.org](mailto:accp@path.org)  
Website: [www.alliance-cxca.org](http://www.alliance-cxca.org)