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Training for cervical cancer prevention programs in low-resource settings: Focus on visual inspection with acetic acid and cryotherapy

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Abstract The modern approach to cervical cancer prevention, characterized by use of cytology and multiple visits for diagnosis and treatment, has frequently proven challenging and unworkable in low-resource settings. Because of this, the Alliance for Cervical Cancer Prevention (ACCP) has made it a priority to investigate and assess alternative approaches, particularly the use of visual screening methods, such as visual inspection with acetic acid (VIA) and visual inspection with Lugol's iodine (VILI), for precancer and cancer detection and the use of cryotherapy as a precancer treatment method. As a result of ACCP experience in providing training to nurses and doctors in these techniques, it is now widely agreed that training should be competency based, combining both didactic and hands-on approaches, and should be done in a clinical setting that resembles the service-delivery conditions at the program site. This article reviews ACCP experiences and perceptions about the essentials of training in visual inspection and cryotherapy and presents some lessons learned with regard to training in these techniques in low-resource settings.

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1. Introduction

Developing effective training methods is essential to the implementation of any health care program.

Such training methods should be competency based, focused, practical, accessible, culturally appropriate, easy for the intended audience to understand, and feasible. This article reviews training experiences from cervical cancer prevention programs undertaken by members of the Alliance for Cervical Cancer Prevention (ACCP), focusing on the testing and treatment methods of visual inspection with acetic acid wash (VIA), visual

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inspection with Lugol's iodine (VILI), and cryotherapy. It is intended for those who wish to learn more about cervical cancer prevention training programs in low-resource settings in general and about ACCP experiences in particular.

The article deals with four discrete areas: (1) general principles of training, (2) training for VIA, (3) training for cryotherapy, and (4) training for quality assurance and supervision. It is not meant to be all-inclusive; it draws on the lessons learned by ACCP members and provides insights into various training experiences that may be useful to those who desire to implement comprehensive cervical cancer prevention programs in low-resource settings. Specifically, it may assist those who wish to provide training customized to a particular cervical cancer prevention approach.

Designing an effective training program can in itself be a time-consuming learning process. The five ACCP member organizations, EngenderHealth, International Agency for Research on Cancer (IARC), JHPIEGO, Pan American Health Organization (PAHO), and PATH have each designed and/or implemented a training intervention as part of their ACCP work. Each of the ACCP members has devised training packages, manuals, teaching supplements, and adjunctive aids that have been put into use in more than a dozen countries around the world, building on each other's work and adapting these tools to meet the needs of particular settings [1–6].

2. General objectives of training

The family planning experiences of several ACCP members demonstrate that at the onset of training, general and specific training objectives must be outlined for the trainees in either a training manual or an equivalent written format. Especially when the subject of training is a new approach such as VIA, training objectives provide trainees with an initial conceptual umbrella—what will be taught, what they are expected to learn, and how this will fit into the planned service-delivery program. Participants who are equipped with training objectives can formulate accurate ideas about what lies ahead of them and prepare themselves for the experience. In many ACCP programs, the concept of a cervical cancer prevention approach that is based on visual screening techniques and on services provided by nonphysicians was truly novel, and it was essential that the context of the research or program be specifically spelled out. Training objects allow each participant to create a

mental checklist that will lead them through the learning process, and participants can readily identify information and skills that are new to them and require extra attention. In addition, by the end of training, participants can reflect on their original objectives to help identify any knowledge gaps or obvious deficiencies throughout the course of their training.

In ACCP training experiences, an understanding of the disease process (e.g., natural history and pathophysiology) adequate for efficient functioning in the planned setting was emphasized and imparted to trainees; this was especially important for trainees starting with a weak foundation in anatomy or inadequate continuing education to reinforce earlier learning. For some trainees, particularly nurses working in rural settings, building this understanding required a didactic component presented in easy-to-understand language devoid of complex medical jargon. These trainees are also likely to be responsible for patient education and, in some cases, outreach, and reinforcing their basic knowledge about cervical cancer prepares them to properly provide education to clients of the cervical cancer prevention program. From the ACCP perspective, it is vital that participants both comprehend cervical cancer as a disease process and learn the clinical skills required to carry out examinations and procedures that are part of a prevention program.

In general, training can take many forms, but the two main types are: (1) theory-based didactic education and (2) hands-on competency-based skill acquisition. The ACCP experience has been that these methods of learning must be coupled together in a cervical cancer prevention training program. The knowledge base and clinical skills required of a health care provider who will eventually provide cervical cancer screening and treatment services should be strong enough that high-quality care will result. Thus, training should be academically accurate, yet practical.

ACCP training experiences have all taken place over a limited time period (i.e., a 5 to 10-day training course), so it has been essential to maximize all training efforts. Because the crux of a cervical cancer prevention program is provision of clinical interventions, in the form of medical tests and/or treatment, by health care workers, this training must take place in a clinical setting, where practical experience can occur, as well as at an educational center, which is the more usual venue for health education training. Such in-service training is always time-constrained in low-resource settings, where funds for staff training are limited and staff shortages make it difficult to release

existing staff for training—but adequate learning must be achieved to ensure that services are delivered with both competence and confidence. ACCP members have found that in-service training is more effective if it is undertaken in a facility where the service will eventually be provided. This allows trainees to more easily and reliably transfer the skills they are taught from a learning environment to their service environment. Within ACCP programs the length of training varied, but members agree that it should be between 5 and 10 days for clinicians, nurses, and midwives, depending on baseline skill levels (e.g., competency at speculum and pelvic exams, competency at finding and manipulating the cervix).

The aims of training overall were that a trainee would achieve both competency and confidence. Competency was defined as the attainment of knowledge and ability sufficient to perform a function to an acceptable level of an established standard without supervision. Specifically, it meant that trainees could demonstrate performance of all the “steps” of a procedure correctly and in the right order without prompting from a trainer. Extrapolating from lessons learned in reproductive health and family planning programs [7], ACCP members felt strongly that competency-based training would ensure that health care providers would be able to offer a high level of care to individuals in low-resource settings.

Once trainee competency is achieved, it can be assessed in a variety of ways. For example, in training provided by ACCP members, a standardized set of procedural steps was taught in sequence and subsequently used as the basis of evaluation. Such stepwise checklists are an easy and organized means of both teaching clinical procedures and assessing performance [1–6,8]. Another example of assessment revolved around review of images and postcourse assessments of accuracy in reviewing such photographs. At the end of training (and as a continuing exercise in quality assurance), trainees were given a standardized set of images to review and asked to assess whether any pathology was suspected on a given cervix and, if so, whether that patient represented by that cervical image would have been eligible for an offer of treatment. In JHPIEGO-organized courses, a score of 85% (stratified by negative, positive, and suspicious for cancer) was required as part of the successful completion of a training course.

As a result of their field experiences, several ACCP members recommend that training in clinical procedures, such as VIA and cryotherapy, should take place first with simulation models and then with hands-on clinical practice with clients who

have been informed that training is taking place. Because in many settings where ACCP projects took place neither a pelvic examination nor a speculum examination is routine, even for family planning or sexually transmitted infection services, proper training in performing such examinations can be useful as a means of upgrading provider skills. Not surprisingly, having several years of clinical nursing experience that includes some work in reproductive health or midwifery services is helpful to trainees, but it is by no means essential.

Another important aspect of any health intervention or disease prevention program is the necessary effort to control intervention-related infection. The risk of infection to a client is inherent in any invasive procedure, and the concomitant risk of a client infecting a health care worker is of equal concern. Therefore, ACCP members found that training in infection prevention was imperative to training in cervical cancer prevention, as it is in family-planning services. Protecting both clients and health care workers from communicable diseases and unsterile environments is key to preventing the spread of diseases. Safe work practices and safe work environments can be facilitated by taking certain personal safety precautions during patient encounters, properly disposing of or cleaning contaminated instruments, instituting environmental controls, and enforcing compliance with safety standards. Information about ways to prevent hazardous situations can be provided to trainees during training, and protocols should be in place for when pathogen exposure occurs or is suspected.

3. Training for VIA

To perform VIA successfully, it is essential to learn both its fundamental purpose and the specifics of the procedure. A comprehensive training course in VIA includes didactic elements that cover both of these areas. Providing *epidemiological facts* about the incidence of cervical cancer and the prevalence of precursor disease puts the training into a practical perspective. Trainees can gain a wider appreciation for cervical cancer prevention efforts and a deeper insight into the important role such efforts play in disease prevention. Understanding concepts in *pathophysiology* is essential to understanding cervical cancer and its etiology, the biological basis and natural history of the disease, and normal versus abnormal anatomy and physiology. Comprehending *how VIA actually works*, how VIA is performed, and the nature of the acetowhite

reaction is an obvious necessity in VIA training. Since the advent of VIA as an alternative to cytology, there has been more recent interest in the value of VILI as another practical visual test [9]. Although there is less overall experience in training for VILI-based services, all of the lessons learned for VIA apply to VILI-based training [2].

Client education about the screening process is the main type of counseling that is required during VIA, but a trainee must also know how to counsel a woman who is VIA-positive or who has cervical cancer. Once providers have been introduced to the concept of counseling and have completed initial training, actually counseling clients is the best way to practice. Training in counseling can take many forms: providing questions that a provider can ask clients, making suggestions about how to create a comforting environment for clients, introducing ways to improve communication among clients and health providers, and role-playing counseling encounters. Providing explanations about procedures, acknowledging the need to guarantee confidentiality and privacy, and supplying general advice about counseling techniques can all be useful as part of training. In the setting of VIA or VILI with the possibility of immediate offer of treatment (one option in a single-visit approach), it is important to train providers to counsel about the risks and benefits of the treatment method to be offered after counseling the woman about the meaning of a positive test.

The didactic aspects of VIA training listed above must be supplemented by clinical practice in these

techniques. Each trainee should be able to practice the VIA or VILI technique on an adequate number of women and ideally should be exposed to both test-positive and test-negative women. Learning to decipher the difference between normal and abnormal VIA results and then to take action, in terms of referring for or offering treatment, requires multiple clinical encounters. For some trainees, this may be the most difficult aspect of the training. In a brief survey of all ACCP members concerning their training experiences (Table 1), the challenge of training nurses to make these kinds of clinical judgments and act on them emerged as the most arduous part of the training for the trainer.

Visual aids play a crucial role in showing trainees the spectrum of cervical diseases and normal physiology that may be observed, as well as equipment and other program components that require visual recognition. As training becomes more decentralized or, increasingly, takes place among previously unscreened populations where there is neither a colposcopy program nor a population of women who are likely to test positive and who can be invited to participate in the training session, the chances of trainees seeing bona fide "positive" patients in the limited time available for training may be low. Photographs, digital images, and interactive CD-ROMs are valuable supplements to the learning process [10]. Images should be in color and easily accessible for real-time comparison. Bedside teaching aids, photo albums, and/or flash cards have been

Table 1 Visual inspection with acetic acid training experiences of Alliance for Cervical Cancer Prevention members

Training parameter	Organization			
	A	B	C	D
No. of physicians trained	0	119	30	3 (trainers)
No. of nonphysicians trained	7	47	130	43
<i>Time to competency, no. of cases</i>				
Physicians	NA	50	20	20
Nonphysicians	100 (50 positive cases)	300	100	30
Degree of difficulty in achieving competency (easy, moderate, hard)	Easy	Easy	Easy	Easy
Hardest aspect of training	"Getting trainees to 'see' what we wanted them to"	"Getting trainees to 'see' what we wanted them to"	"Making the judgment about whether the cervix was positive and/or eligible for treatment"	"Getting trainees to 'see' what we wanted them to" and having enough practice cases
<i>No. performed in projects</i>				
Physicians	2,940	<500	~1,000	NA
Nonphysicians	~16,300	~135,000	~68,000	1,900

Note. Data as of August 2003.

used as well [11,12]. In addition, similar to what has become an entrenched component of colposcopy training for proper documentation of any lesion, trainees can be taught to draw a cervical “map” that will remain part of a patient’s record. All ACCP training participants benefited from the use of such training tools and audiovisual aids and found they made the learning process more dynamic and enjoyable. With a diverse set of educational materials, participants seemed less likely to be overwhelmed or bored by a large amount of information. However, although photographs and other graphical aids were a useful and important complement to clinical experience, they cannot serve as substitutes for it.

ACCP members have studied whether such visual aids are valid as training adjuncts for VIA. In an article by Sellors et al. [13], the level of agreement among experts looking at a set of static photographs was 67% (kappa value, 0.57 for three categories of results), which is similar to that seen in other fields where subjective tests are compared among individuals. In a similar assessment in Thailand and Ghana of the agreement between individuals who were viewing either digital images of the cervix on a computer or projector, a “live cervix” (looking at the cervix of a patient), or a video image of that same cervix (displayed in real-time on a monitor), levels of agreement indicating that they were “seeing the same thing” and assessing it similarly were very high, approximating 80–90% [14]. At the same time, after approximately 10 days of training, trainees looking at digitized photographs of cervical images agreed with an expert assessment more than 60% of the time, indicating that the ability to assess images develops fairly quickly and that consistency in terms of agreement among peers is likely. In settings where no reference standard is likely to be routinely available, such agreement levels form a “consensus” standard and can be used as the basis for planned quality-assurance mechanisms, very similar to those used by cytologists.

One of the simplest and most valuable tools developed as a training aid in an ACCP project was a small, poster-sized chart of photographs showing cervixes washed either with vinegar or with iodine and in various states of health and disease (dysplasia and cancer). The chart also included a photograph of a cervix after cryotherapy [15,16]. Trainees were given copies of this tool to have in their clinics at the bedside. Interestingly, not only did the trainees use these charts as a training tool—comparing what they saw when they examined a patient with what they saw on the chart—but the charts became a useful patient education and

counseling tool. Trainees would show the woman where her cervix fit in the “scheme” of things on the “atlas.” Both providers and patients felt this to be a useful clinical tool.

4. Training for cryotherapy

ACCP members found that training in cryotherapy also requires both didactic teaching and hands-on practice of the clinical skills involved. The didactic elements of cryotherapy training are similar to those for VIA training: a detailed description of what cryotherapy is, an explanation of how the technique works as a treatment modality, and a list of the steps required when performing the procedure, processing the instruments, and carrying out preventive maintenance. The risks, benefits, and relative cost (compared to other locally available procedures) should be outlined, and elements of counseling specific to cryotherapy also should be introduced.

ACCP members found that health care providers quickly become familiar with the equipment and competent at performing cryotherapy. During training itself, models were used to allow trainees to practice cryotherapy technique without the need for patients who were test-positive. For example, in a few sites, tubes made of polyvinylchloride (PVC) with a diameter of approximately 3–3.5 cm were used to simulate the vaginal canal, and locally available sausages with a diameter of approximately 2–2.5 cm were used to simulate the cervix. The cryoprobe could then be placed through the simulated vagina and applied to the simulated cervix to approximate a real clinical experience with cryotherapy. This kind of approach has been useful in reducing the number of procedures required to achieve clinical competence in other settings [7,17]. Again, having exposure to an adequate number of patients was essential to gaining competency and confidence. ACCP-trained clinicians providing cryotherapy over the last several years have compiled a remarkable safety record, with serious complications only very rarely encountered [18–21].

Perhaps most importantly, all ACCP members found that it was “easy” to train general physicians and nurses in cryotherapy, especially in the technical or procedural aspects of the procedure (Table 2). However, several ACCP members felt that it was more of a challenge to help the nurses make a *judgment*, on the basis of protocol criteria, about who, among those with positive test results, was eligible for treatment. For nurses, making judg-

Table 2 Cryotherapy training experiences of Alliance for Cervical Cancer Prevention members

Training parameter	Organization			
	A	B	C	D
No. of physicians trained	0	119	30	15
No. of nonphysicians trained	5	47	120	4
<i>Time to competency, no. of cases</i>				
Physicians	Not available	2	2	2
Nonphysicians	5	2	4	4
Degree of difficulty in achieving competency (easy, moderate, hard)	Easy	Easy	Easy	Easy
Hardest aspect	“Keeping arms in proper position during procedure”	“Correcting previous notions about cryotherapy”	“Applying pressure to the cervix”	“Recognizing and utilizing eligibility criteria for cryotherapy”
<i>No. performed in projects</i>				
Physicians	NA	<300	NA	NA
Nonphysicians	949	~3500	~3000	40

Note. Data as of August 2003.

ments about who should be treated was a relatively new component of their clinical portfolio. Such judgments are routine for physicians, but for nurses, even nurses in developing countries who have a lot of patient–care responsibility, making therapeutic decisions was a new phenomenon and added another dimension to the training.

Posttraining assessments are also required to ensure that each health care provider has learned the cryotherapy technique correctly and that he/she is able to adequately perform cryotherapy according to the training standards. Assessments can take many forms, but they usually involve some kind of simulated clinical encounter that is evaluated by a master trainer who uses a checklist of steps that must be performed to pass the assessment. The importance of infection prevention should again be stressed and taught as part of cryotherapy training.

5. Training for quality assurance and supervision

To ensure success in any health program, quality-assurance mechanisms must be in place. Incorporating a quality-assurance module into general training for cervical cancer prevention allows the participants to understand the philosophy of quality assurance, its necessity and required components, and how quality assurance will affect their overall performance. The depth of information presented to the participants and trainers may vary, but the overall value of quality assurance and how to train people in quality assurance are core

concepts. Teaching providers to be effective supervisors is another required element of quality-assurance training.

Supplying information about quality assurance relates to the way(s) in which records are kept, information is documented, and programs are tracked. Educating providers about quality assurance before, during, and after their training (immediately after and with quality-assurance visits) allows for continual and more-advanced education. After any clinical teaching has occurred, assessments of a health care worker’s abilities and any deficiencies or weaknesses can take place to ensure that performance quality is high. Performing competency-based assessments (visual co-assessments of patients and/or independent assessments) are ways of providing continuing medical education and quality control. The use of visual aids can be a means of ongoing quality assurance too. Visual aids are useful for augmenting the clinical material that might be present during a quality-assurance visit. Trainers and providers alike should understand the necessity for ongoing teaching and assessments.

6. Conclusions

The five ACCP organizations have planned and implemented a range of cervical cancer prevention programs. Many of these have focused in one way or another on visual inspection and cryotherapy as central components of the approach being studied. As a result, a considerable amount of training experience has accrued, and the core lessons learned are presented here. Generally, it was felt

that training should be competency based, both didactic and hands on (practical), and based in a realistic clinical setting, if not the actual service-delivery site. There should be an emphasis on anatomy, physiology, and the etiology of cervical cancer at a level that is suitable for the selected trainees and that is eminently practical. A 5 to 10-day training course should be enough time for classroom teaching in these topics, extensive training in clinical skills and cervical assessments, and topics related to quality assurance.

ACCP experiences suggest several summary training-related recommendations for those engaging in cervical cancer prevention training. First, trainers should recognize that, if trainees are nurses, it is important not only to teach the technical aspects of procedures such as VIA and cryotherapy, but also to ensure that decision-making confidence is emphasized and given weight during the training. Second, if training is meant to be competency based, it should be long enough in duration to reach this goal. The ACCP experience has been that, for most trainees (whether doctors or nurses), a course of 5–10 days is adequate, but this depends on the trainees' skill level at baseline and the amount of clinical practice available during training. However, even competent trainees are unlikely to be highly *confident* in their new skills. Thus, according to the experiences of ACCP members who have provided VIA-based services in regular programs, new programs should allow for a period of time after training during which trainers will help with any needs for “transfer of learning” among trainees. That is, a trainer or quality-assurance officer should visit trainees 2–3 times within the first few months after training at their place of service in order to help them consolidate the skills they obtained in training and to let them gain confidence in service provision.

If VIA and cryotherapy are adopted by low-resource countries or regions as a component of their cervical cancer prevention programs, the ACCP's collective experience should be helpful in providing some guidance in training for such services. Indeed, the ACCP experience has shown that it is feasible to train midlevel providers in new skills essential for cervical cancer prevention in relatively short periods of time, in facilities with minimal equipment, using simple training equipment and materials, to an effective level of competency.

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