14 Coordinated Training on Early Detection and Diagnosis of Breast Cancer Across Different Levels of Health Workers: An Example from Peru

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Abstract

As breast cancer rates increase worldwide, many low- and middle-income countries are seeking feasible strategies for providing screening and early detection programs, improving diagnostic imaging and pathology services, and ensuring basic treatment and palliative care. The limited availability of appropriately trained staff is a severe constraint on reaching rural and otherwise disadvantaged populations with essential breast health care. An innovative project in Peru, designed to bring breast cancer screening and early diagnostic services to women in a rural area of the country, illustrates many of the challenges and potential solutions for training various health workers, ensuring that they can acquire and maintain critical competencies and that the health system provides the infrastructure needed to support their performance. This chapter describes an iterative and collaborative process to develop curricula for four key functions: education about screening among women in the target age range, breast screening by clinical breast exam, a first diagnostic step using fine-needle aspiration biopsy, and supervision. Functions were matched with the type of health provider or community volunteer that was already in place in this rural context. Each curriculum defined learning goals and incorporated competency evaluation at the end, and special efforts were made to ensure that messages were consistent throughout the different curricula and followed national guidelines.

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Introduction

While breast cancer was not previously seen as a high priority health problem in low- and middle-income countries (LMICs), steadily rising incidence and mortality rates have moved it onto the agenda in recent years [1–3]. As countries begin to realize the implications of a projected increase in breast cancer deaths of more than 70 % between 2008 and 2030 [4], many are looking for feasible strategies to reduce the growing toll by providing screening and early detection programs, improving diagnostic imaging and pathology services, and ensuring basic treatment and palliative care. A clear limiting factor is the lack of availability of trained staff at all levels of care [5, 6] as well as the weak linkages between the levels to facilitate referral and ensure follow-up after initial diagnosis and treatment. Two of the most significant gaps identified are the lack of awareness in the community and the lack of culturally appropriate education about breast cancer and the benefits of early detection [7, 8].

Frontline health workers, whether based in primary care facilities or out in the communities, have critical roles to play, particularly in providing health education, conducting screening, and helping patients navigate the referral system [9]. In addition to screening, some types of tissue sampling and pathology analysis are needed before appropriate treatment can be determined. The interface between primary care workers and more specialized medical providers can be challenging to organize, especially in LMICs where pockets of specialists exist in urban areas offering sophisticated and technology-intensive care while rural areas are unable to draw upon such resources. In-service and preservice training must be carefully designed to reflect essential skills and the realities of the environment in which the trainees will function.

An innovative project in Peru, designed to bring breast cancer screening and early diagnostic services to women in a rural area of the country, illustrates many of the challenges and potential solutions for training various health workers, ensuring that they can acquire and maintain critical competencies and that the health system provides the infrastructure needed to support their performance.

Developing a Resource-Specific Strategy: The BHGI Approach

Healthcare providers and policymakers working in a limited-resource setting may be forced to make decisions contrary to their best medical knowledge. Despite knowing the optimal management for a given patient based on guidelines developed in wealthy countries, less-than-optimal solutions are offered to patients where diagnostic and/or treatment resources are lacking. The constraint of limited resources generates tension for the clinician who is unable to offer "gold standard" treatments to any or all of the patients. Does a clinician decide to treat ten patients with an older, less expensive chemotherapy regimen or to treat two patients with a newer, more efficacious but also more expensive regimen? Given these difficult resource allocation choices, it is important to ask questions about which resources commonly applied in resource-abundant countries are actually needed in limited resource settings, where patients commonly present with more advanced disease at diagnosis.

The guidelines development process for LMICs should offer practical solutions to the implausibility of applying breast cancer guidelines developed for high-resource countries to countries or regions within countries with more limited resources. Established in 2002, the Breast Health Global Initiative (BHGI) created an international health alliance to develop evidence-based guidelines for LMICs in order to improve breast health outcomes. BHGI held four Global Summits to address healthcare disparities (Seattle, Washington, 2002), evidence-based resource allocation (Bethesda, Maryland, 2005), guideline implementation (Budapest, Hungary, 2007), and optimizing outcome (Chicago, 2010) as related to breast cancer in LMICs. Modeled after the approach of the National Comprehensive Cancer Network (NCCN), BHGI developed and applied a consensus panel process, now formally endorsed

by the US Institute of Medicine, to create resource-sensitive guidelines for breast cancer early detection [10] diagnosis [11], treatment [12], and healthcare systems [13], as related to breast healthcare delivery in LMICs.

The BHGI Early Detection Panel in 2007 concluded that public education and awareness are the key first steps in down-staging disease, because early detection cannot be successful when the public is unaware or has adverse misconceptions about the value of early detection [10]. The approach and scope of any screening program will determine the success of an early detection program, as measured by cancer stage at diagnosis, and will also drive the resource allocation needed for cancer treatment. The effectiveness and efficiency of screening modalities—including screening mammography, clinical breast examination (CBE), and breast self-examination—were reviewed in the context of resource availability and population-based need. The debates in high-income countries that commonly focus on the efficacy vs. the costs and morbidity of screening mammography have little relevance in LMICs where mammography is unavailable, unaffordable, and impractical and where the majority of women are not diagnosed until their disease is already advanced. Social and cultural barriers to breast cancer early detection must be considered in any context where early detection programs are being established. The selection of appropriate resource-sensitive guidelines is critical in shaping the content of training curricula and assigning tasks to the right cadres of health personnel.

The Model of Care Selected in La Libertad

We applied the resource-specific strategy described in the BHGI guidelines to the context of Peru and developed a model of care to improve access and quality of breast cancer screening, diagnosis, and treatment services at lower levels of the health system. An important goal of this model was to ensure that women complete as much diagnostic evaluation as possible before they invest time and resources for traveling to a cancer hospital. This is particularly important in breast cancer screening, as a significant proportion of palpable masses can be recognized as benign changes through a simple diagnostic test.

We worked in partnership with national and regional leaders to ensure that the model was in line with national breast cancer guidelines. This model has been implemented in the Pacasmayo health network within the region of La Libertad in northern Peru and is based on the use of CBE performed at the local health facility, followed by referral of women with suspected masses to the local hospital for evaluation using fine-needle aspiration (FNA) biopsy. Women with a confirmed diagnosis can be referred for appropriate treatment (surgery, radiotherapy, systemic therapy) to a city located 2 h away by car (Trujillo), where a new regional cancer center has been established for the northern part of the country (IREN-Norte).

An important first step in any curriculum development is to define clearly and explicitly the essential functions that each trainee must be able to perform. We identified four functions necessary for implementing this model: education about screening among women in the target age range, breast screening by CBE, a first diagnostic step (FNA), and supervision. We then considered what type of health provider or community volunteer was already in place in this rural context who might take on each function.

Throughout Peru, community health promoters work in collaboration with the healthcare system to share information and educate community members on health-related topics. This organized group of volunteers was identified as being well suited to take on the role of promoting breast screening among women in the target age group.

Much of women's health care in Peru, including family planning, prenatal care, and cervical cancer screening, is performed by professional midwives. General doctors also play an important role—particularly in larger healthcare facilities—in providing screening services to women. These two categories of professionals were selected to perform screening with clinical breast exam at the local health facility and were oriented

to the diagnostic step of FNA, to which women identified with a mass would be referred.

The Peruvian regulatory framework requires that doctors perform certain types of diagnostic procedures, including FNA. Therefore, doctors at the local hospital were selected to perform the initial diagnostic step of FNA biopsy. At the regional cancer institute, a pathologist already had training and expertise in the reading of breast cytology. This existing capacity made it possible to implement FNA at the local hospital level, as the infrastructure for reading the results was already in place in a close-by city.

We had initially planned for clinical supervision of the midwives providing CBE to be the responsibility of breast cancer experts from the regional cancer institute, but it quickly became evident that the scope of their clinical responsibilities, and particularly their limited time and availability for travel, would make their direct supervision of CBE activities at the local level impossible. Instead, professional midwives located within the health network—with leadership abilities and interest in serving as supervisors—were selected to be trained in the use of the instruments and techniques for performing supportive supervision visits to midwives practicing CBE.

Curriculum Development and Implementation of the Training

An essential component of implementing this model has been the coordinated training for these four functions, both in process and content. Curriculum development was done collaboratively, and then training for each group was rolled out. We conducted the first round of trainings of health promoters, CBE providers, and FNA providers in June and July 2011 and the first training of supervisors in March 2012.

The development of each of the curricula shared a common process of defining learning objectives and technical competencies to be achieved, developing a preliminary draft of the training material, performing an initial validation of the drafted materials, compiling materials into a standardized format including a reference manual, a guide for participants, and a guide for trainers, and allowing for a broad review by experts contributing to the project. For each training curriculum, criteria for achieving competency were defined.

The training structure ensured that participants engaged actively with the material. This was accomplished through interactive dialogue with trainers, exercises where learners practiced their skills in a simulated environment, and participant demonstration of newly acquired clinical and supervisory skills in supervised settings.

The key messages were kept consistent throughout all four curricula, and references to the other curricula were included where they were relevant. For example, the messages for women and communities emphasized in the health promoters' curriculum were also described in the CBE training. This included an emphasis on women understanding what is normal for their own breasts, the specific signs and symptoms that signal the need for a clinical exam for women of any age, and the importance for women aged 40–59 to seek an annual clinical breast exam by a trained healthcare professional even if they do not have any symptoms or the self-examination is normal. The CBE training for midwives also incorporated an orientation about the FNA biopsy procedure that was consistent with the more detailed descriptions of the procedure used within the FNA training materials.

The courses were designed through an iterative process. For example, in the case of the clinical breast exam curriculum, the course was adapted from a curriculum previously developed for use in the Ukraine a decade earlier [14]. After it was translated into Spanish, it served as the starting point for the Peruvian course design. Peruvian breast experts at the national and regional level first came to an agreement on the basic learning objectives and competencies to be achieved in the training. Peruvian cancer experts then developed an initial set of slides based on the cancer epidemiology in Peru and their clinical experience. Following the first round of training, the training materials were compiled into a reference manual, a guide for participants, a

guide for trainers, and a standardized set of slides. This package of materials was then reviewed by clinical breast cancer experts at both the national and regional cancer institutes and was validated in three subsequent CBE trainings for midwives and general doctors.

The *community promotion curriculum* was designed to orient health promoters to the use of the community materials (an outreach flipchart and accompanying manual) and strategies for successfully conducting community education sessions on early detection of breast cancer. The manual divided the educational session into its various components: receiving and welcoming participants, self-introduction of participants, introducing the topic, gathering existing ideas and experiences on the topic, sharing "new" information, evaluating whether information shared was clear and understandable, commitments to action, and closing. The "new" information covered in the session was focused on the following topics: (1) knowing our breasts: recognizing normal and suspicious changes; (2) breast cancer: identifying risk factors (particularly age); and (3) importance of early detection and of an annual clinical breast exam.

Two experts from the Department of Health Promotion, Prevention, and Cancer Control at the national cancer institute (INEN) provided training to 13 community health promoters at the local hospital in the area of our intervention. The interactive training took place over a 2-day period. The final curriculum built on the initial training and added a verification list and knowledge exam to evaluate competency.

The *clinical breast exam curriculum*, designed for midwives and general doctors, includes a reference manual and guides for participants and trainers. The topics covered included: breast cancer fundamentals, the breast cancer prevention and control program in Peru, normal breast anatomy and breast anomalies, the CBE, the algorithm for diagnosis and management of women with positive findings, information recording, FNA biopsy, breast cancer treatments, and counseling. The clinical competencies and learning objectives included:

1. Talking to women about breast cancer screening and diagnosis
2. Performing CBEs, including visual exam and history taking
3. Interpreting the results of the CBE process (asking, seeing, and feeling)
4. Appropriately referring patients for further diagnosis
5. Accurately recording CBE results and referral information on health information system (HIS) forms

To demonstrate competency, participants were required to obtain a score of at least 85% on a knowledge exam and demonstrate competent performance of the CBE by performing all of the actions described in a validation checklist.

The facilitators of the CBE course were two breast specialists from the regional cancer institute supported by specialists from the national cancer institute. Participants attended a 2-day training consisting of scientific theory, practical application, and patient counseling with respect to CBE. Participants had the opportunity to practice what they had learned by carrying out CBE on silicon models, conducting practice counseling sessions, and reviewing images of clinical breast anomalies (Fig. 14.1). At the end of the first day, participants took a knowledge exam to demonstrate their understanding of CBE. The second day of training was practical and included each participant completing the CBE procedure on patients under the supervision of an instructor who used a checklist to comment on their progress.

The *FNA curriculum*, for doctors at the local hospital, was also organized into a reference manual and guides for participants and trainers. In addition to clinical and counseling skills, the course covered the rationale for use of FNA, its history, and its diagnostic accuracy. The learning objectives for the course were that participants be able to:

1. Talk to women about breast cancer screening and diagnosis
2. Explain who should have a FNA biopsy
3. Perform FNA biopsy and understand potential side effects or risks
4. Smear and fix a sample

Fig. 14.1 Midwife trainees practicing clinical breast exam on silicon models

5. Evaluate the adequacy of a sample
6. Provide care and referral, as needed
7. Use recommended infection prevention practices to protect the woman, healthcare provider, and other healthcare workers
8. Accurately record FNA biopsy results on HIS forms

An external expert in FNA biopsy facilitated the 2-day FNA training, which took place in conjunction with the first CBE course. Sessions specific to FNA were offered to three physicians from the local hospital in the Pacasmayo network. These sessions included lectures on the theoretical context of FNA, when to use FNA and making appropriate referrals, FNA procedures, and how to judge the adequacy of the sample. It also included practice of the FNA technique using animal liver as a tissue stand-in. On the second day of the training, participants had an opportunity to practice under the supervision of the instructor.

The topics covered in the *supervision curriculum* and course material included definitions of traditional supervision vs. supportive supervision, criteria for accreditation and competency, planning a supervision visit, aspects of a supervision visit (programmatic and clinical), recording of information, techniques to understand the root causes of problems identified, and the closing meeting to report back to health facility leadership (the final step in a supervision visit). This 2-day training was intended to ensure that local and regional supervisors had the necessary skills and understanding to enable oversight and constructive support to improve clinical skills and competencies of providers, thereby improving the quality of services in health facilities providing clinical breast exams. The first day of the course was classroom-based, and the second included the performance of a supervision visit with support from the facilitators.

The learning objectives were that the participants would be able to:

1. Plan a supervisory visit
2. Know the criteria to be able to accredit the clinical skills of health providers that offer the CBE
3. Know and be able to use the data collection instruments used within the prevention and control of breast cancer program
4. Recognize the strengths in the provision of the breast clinical exam, to be able to replicate them in other health facilities

5. Identify and address the weaknesses of the facilities providing clinical breast exam, seeking solutions that would allow providers and the health facility to work effectively
6. Develop a work plan to ensure that CBE is provided adequately in a health facility
7. Know the appropriate indicators for monitoring the breast cancer prevention and control program
8. Assess and ensure the accuracy, completeness, and quality of program data
9. Demonstrate skills for effective supervision, including the ability to provide positive and specific feedback during and after a monitoring visit

The first supervision training was conducted by a breast cancer specialist with support from staff experienced in supervising other cancer prevention activities. The seven trainees had different backgrounds and experience, but all of them were involved in cancer prevention activities.

Challenges and Potential Solutions Identified

Common challenges across all the training activities were the limited availability of breast cancer experts to lead the training and difficulties in scheduling training sessions due to competing activities and obligations. It quickly became apparent that it would not be feasible to rely on breast cancer specialists for all levels of training. Appropriate local cadres who could serve as master trainers were identified for each type of training.

Health Promoter Training

There were several challenges for the training of health promoters, but the one that created significant delays was the limited time availability of the trainers and trainees. Because it was recognized that having high-level experts on breast cancer involved in the training of promoters would not be a sustainable option, the project decided to train a cadre of master trainers from the lower levels of the health system including community health promoters and health personnel with responsibilities in health promotion. Second, the trainees were people from the community with limited or no training related to breast cancer, and some of them had very limited education. Facilitators of the health promotion training noted a lack of scientific understanding of breast cancer among community health workers and suggested that an orientation to the topic be included in future trainings. Finally, the community materials (a flipchart and manual for promoters) had not yet been printed at the time of the first training, and we received feedback from the participants that these materials would be a valuable aid when making presentations to their communities (Fig. 14.2).

Clinical Training for CBE and FNA

The experience developed in northern Peru is one of the very few population-based screening programs for breast cancer screening using CBE. As in the case of developing trainers for promoters, we will need a core group of regional master trainers for CBE and FNA. A broader group of well-trained master trainers with CBE experience will be essential for bringing this model successfully to scale. An important challenge for the clinical training was to have sufficient women for the hands-on practice, both for CBE and for FNA. Since mobilizing women to come in for screening is best done by community promoters, it is necessary to coordinate the schedules so that health promoters are trained and mobilized first, a few weeks prior to the clinical training for health providers. They can then invite women to be screened as part of the clinical practice component of the training. To make best use of the time during the training session, one of the key recommendations was to ensure that written material is provided to participants ahead of time. It was also proposed that the CBE training and the FNA training for physicians be provided on different days so that the FNA session would not be required to go into the evening hours.

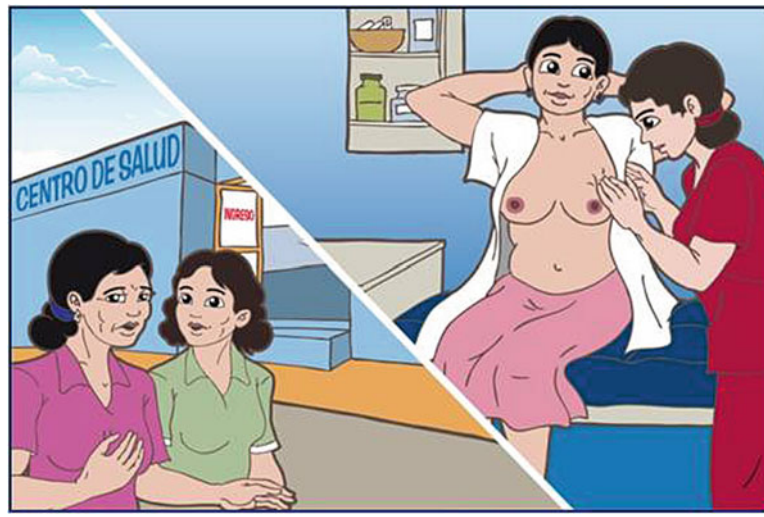

Fig. 14.2 Sample page from flipchart for community health promoters (Copyright 2011, Program for Appropriate Technology in Health (PATH). All rights reserved)

A challenge that has not yet been adequately addressed is the need for access to sufficient numbers of women with positive screening findings in a training environment to enable trainees to have hands-on practice and continuing education. While some breast abnormalities can be captured in pictures, important changes can only be identified through discussion with patients about their history, and others require the sensory experience of feeling the breast tissue. We are currently experimenting with the rotation of the trainees, each for 2 days, through the regional cancer institute to have direct experience with positive cases, but it is not clear whether this approach can be scalable to a national program. New strategies may need to be explored.

Supervision Training

Facilitators noted that participants demonstrated strong interest and dedication and performed well in the shared supervision visit. They also noted the commitment to and interest in the process on the part of the directors of the health facilities supervised. No challenges specific to the supervisory training were identified; some curriculum refinements are noted next.

Curriculum Refinements Made in Light of Experience

Experience from the first training sessions identified several ways in which future training can be improved. During the first trainings, it was possible to identify what parts of the materials were not clear enough for the trainees, where there was information irrelevant for work in the field, and what areas had insufficient information and needed to be expanded. As described previously, the training materials were refined and finalized after the completion of the first round of training sessions.

Health Promoter Training

Based on the recommendations that came out of the initial health promotion training, community materials were formalized. We also developed a training strategy to train a core group of master health promotion trainers within the health network. Materials for training master trainers were created to be able to standardize the process of training master trainers.

Clinical Training

In light of the initial training experiences, we consolidated and streamlined the material to put an emphasis on key messages. We shortened overview material considerably and reduced the number of slides that were used in presentations. The consolidated material included a stronger focus on the interactive components of the course. We developed and refined supporting materials for correctly recording breast cancer detection activities within the national information system. The training team noted that it would be helpful to have a complete materials list and standard set of slides for future trainings.

Supervision Training

Facilitators and participants agreed that, while the training was somewhat participatory, more time could be provided for group activities and interactive activities. Participants also identified suggestions for improving some of the forms used for recording the medical history and tracking of women referred for FNA. Facilitators also saw the need to further enhance the learning around how to conduct the closing meeting of a supervision visit. Participants expressed interest in further clinical information—particularly about FNA and common breast pathologies—and also requested a formal document recognizing their completed training as supervisors.

Incorporation into the Regional Health System

The initial plan considered the creation of special forms to capture detailed information from the patient breast health clinical history forms at the health facility level and then consolidate the information at the regional level. However, the regional ministry of health (GERESA) decided not to introduce any new specialized forms into the system. Previous experiences had shown them that a separate, parallel recording and reporting system creates additional burden on health workers and is not sustainable or efficient; often, health providers stop using the new forms or fill them insufficiently. Instead, they chose to use the existing HIS that records health worker daily activities to track breast health program indicators.

The HIS used by the Ministry of Health nationally in Peru records information for every provider encounter with a patient. Providers are usually very diligent in filling out the HIS forms because this information, which is entered into computers at the health center level, is used for tracking health worker productivity as well as targets for procedures set by the ministry at both national and regional levels. The coding of activities and findings from the CBE is done using the International Classification of Diseases. While this coding system is very extensive and complete, health workers are generally familiar with only a few commonly used codes. We saw that it was important to include an orientation to the codes that relate to breast health activities. We also encountered some challenges with the use of this system in that certain codes, such as FNA, had not been authorized within the HIS system and could not be tracked until they had been formally accepted and integrated into the national system. Once this approach was determined, the curriculum was reviewed again to be sure that terminology used in training was harmonized throughout with the terminology used in the HIS.

Discussion

Comparison with Training Elsewhere

This integrated approach to training health workers has not been described elsewhere to our knowledge, particularly in a limited-resource setting. In the Peru case, it has grown out of an integrated model of care that was designed to use different cadres of health workers to provide education and services related to breast cancer and its early detection. In those few LMICs that have recognized the difficulty of building a national screening program on mammography and have

initiated services based on CBE, the efforts have generally been focused on CBE itself or community awareness-raising without a broad system approach. As a result, training has usually been directed at a single type of health worker with little or no coordination between physician, nursing, and community health worker sectors.

The few reports on training community-level workers to do CBE used an approach similar to the one employed in Peru, with a 1 or 2 day curriculum that includes lectures, photos, and hands-on practice with breast models and women. In Iran, rural community health workers called *behvarzes* had a day of didactic material and a day of practice supervised by a gynecologist [15]. *Behvarzes* work out of "health houses" and receive periodic visits from a doctor at a nearby health center. It is not clear what referral system was in place for women with a positive CBE. In Nepal, female community health volunteers (FCHVs) went through a 1-day training that included lectures, a video of CBE, a live demonstration, a manual on CBE, and practice on two women (observed by a surgeon) [16]. Out of 90 trainees, 14 scored well on the posttest and were selected for a research project that involved screening 1,340 women (with parallel screening by the surgeon), where there was good agreement on visual abnormalities and slightly lower agreement on identifying lumps. A pilot program in India trained rural auxiliary nurse-midwives to do community education around breast awareness and breast self-exam (BSE) [17]. The training consisted of two half-days with lectures and videos, practice on breast models, role play, and provision of an illustrated booklet. Again, there is no mention of any provisions for referral of women who identify an abnormality during BSE.

A program developed by the International Society of Nurses in Cancer Care has addressed the issue of training of master trainers in its Train The Trainer (TTT) breast health program [18]. This 2-day international workshop was directed at nurses who already had basic knowledge and experience working in cancer and who were expected to return to their countries and establish similar training programs. It covered a broad range of knowledge (epidemiology, risk factors, screening, diagnosis, treatment, and survivorship) and had skills workshops covering CBE, BSE, and support group facilitation. It has been replicated in Turkey by participants in the original TTT program [19]. One challenge with international programs is that they address only one part of the system and cannot change the environment to which the trainees return.

Implications for Scaling Up Within Peru

This pilot program is very consistent with Peru's national cancer control strategy and with its strong emphasis on prevention and early detection. In 2011, an initiative was launched focusing on reduction of five leading cancers (breast, cervix, lung, prostate, and gastric) and was started in ten regions. The government has invested significant resources in this effort and is looking for innovative approaches to overcome the current inequitable distribution of services and to ensure that rural and poor urban populations can benefit from appropriate and effective services.

The government of Peru and the National Cancer Control Program are planning to expand the experience from the Pacasmayo health network to multiple other provinces and regions. By 2013, all the health facilities in the region where the project is currently operating are expected to be included, and for 2014 they expect to have community promotion, CBE, and FNA available in 10 out of the country's 26 regions. The experience with the current project has identified some issues that need to be addressed in order to make the expansion of activities possible:

- Developing enough master trainers in each region for each part of the intervention before initiating the clinical activities.
- Improving the capacity for reading FNA samples; currently, the number of pathologists with training in breast cytology is limited, and there is a need for further training.
- Using the national identification number to track each individual from screening to diagnosis to treatment through the HIS recording system, thereby allowing the monitoring of

women screened and the completion of care for those with positive findings.

A special Training Excellence Center for breast cancer is being established within the national cancer institute which can lead the effort to scale up the coordinated package of four curricula developed so far. This center will ensure that the content is kept up to date with scientific and policy advances, and will work on the development of a cadre of certified master trainers in all the regions of the country. The Training Excellence Center will also coordinate and oversee quality control during implementation.

Implications for Other LMICs

The findings of the Peru CBE project are highly relevant to early detection in other middle-income countries where the economic feasibility of early detection strategies must be weighed against competing priorities and economic realities such as the costs of providing reproductive health care, treating infectious diseases, or managing other chronic non-communicable diseases like cardiovascular disease or diabetes [20]. Where referral systems for cancer care are still poorly developed, as is the case in most LMICs, building these linkages into the design of training programs is especially critical. While the selection of particular cadres of health worker will vary by country, the principle of defining essential roles and functions and then matching them to the most appropriate cadre available is also widely applicable. For example, female community health workers are ideally placed to raise awareness about breast health and screening among women in their communities, once they have appropriate training. In settings where nurses or midwives are authorized to insert intrauterine devices or do other complex procedures, they could also be trained to do FNA and assess specimen adequacy, as long as a microscope is available to them and a pathologist with cytology training and a specimen transport system are within reach. Where cancer specialists are limited but general physicians are more widely available, as in Peru, it may be more acceptable for doctors to take on the responsibility for FNA. Given the challenges all countries face in releasing health workers for extended training, the Peru experience suggests that short, competency-based training is feasible and well accepted. Only longer-term follow-up will determine whether such training leads to effective practice and good retention of skills.

Conclusion

As countries with limited resources turn their attention to the growing problem of breast cancer, it is critical that they not take a piecemeal approach. Before they launch into training for one cadre of health worker or another, a careful assessment is needed of the critical functions that will be required to ensure that women have the knowledge they need about breast health and screening services, that health workers have the skills they need for early detection and initial diagnosis, and that basic cancer treatment is available for those who need it. Bringing such services as close to the community level as possible will reduce the barriers for women, and using the lowest level cadre possible will increase the feasibility, affordability, and acceptability of such services. Coordinating the content of training for each level of health worker will help ensure that clear and consistent messages are conveyed and that women are smoothly referred from one level to the next. Developing curricula in a collaborative and iterative fashion promotes broader support for the content and capitalizes on learning from experience. Ultimately, for such training to be successful, it is critical that a national authority be recognized with responsibility for updating the curricula as scientific understanding or policy changes, guiding rollout of the program and overseeing implementation to ensure that standards are maintained.

References

1. Parkin DM, Fernández LM. Use of statistics to assess the global burden of breast cancer. Breast J. 2006;12 Suppl 1:S70–80.

2. Forouzanfar MH, Foreman KJ, Delossantos AM, Lozano R, Lopez AD, Murray CJL, et al. Breast and cervical cancer in 187 countries between 1980 and 2010: a systematic analysis. Lancet. 2011;378(9801):1461–84.
3. Akarolo-Anthony SN, Ogundiran TO, Adebamowo CA. Emerging breast cancer epidemic: evidence from Africa. Breast Cancer Res. 2012;12 Suppl 4:S8.
4. Ferlay J, Shin HR, Bray F, Forman D, Mathers C, Parkin DM. GLOBOCAN 2008 v1.2, Cancer incidence and mortality worldwide: IARC CancerBase No. 10 (Internet). Lyon: International Agency for Research on Cancer; 2010. http://globocan.iarc.fr. Accessed 12 July 2012.
5. Shetty P. India faces growing breast cancer epidemic. Lancet. 2012;379(9820):992–3.
6. Bello M. Awareness is the first step in battle against breast cancer. Bull World Health Organ. 2012;90:164–5.
7. Shulman LN, Willett W, Sievers A, Knaul FM. Breast cancer in developing countries: opportunities for improved survival. J Oncol. 2010;2010:595167.
8. Anderson BO, Cazap E, El Saghir NS, Yip CH, Khaled HM, Otero IV, et al. Optimization of breast cancer management in low-resource and middle-resource countries: executive summary of the Breast Health Global Initiative consensus. Lancet Oncol. 2011;12:387–98.
9. Wadler BM, Judge CM, Prout M, Allen JD, Geller AC. Improving breast cancer control via the use of community health workers in South Africa: a critical review. J Oncol. 2011;pii:150423.
10. Yip CH, Smith RA, Anderson BO, Miller AB, Thomas DB, Ang ES, et al. Guideline implementation for breast healthcare in low- and middle-income countries: early detection resource allocation. Cancer. 2008;113 Suppl 8:2244–56.
11. Shyyan R, Sener SF, Anderson BO, Garrote LM, Hortobagyi GN, Ibarra Jr JA, et al. Guideline implementation for breast healthcare in low- and middle-income countries: diagnosis resource allocation. Cancer. 2008;113 Suppl 8:2257–68.
12. Eniu A, Carlson RW, El Saghir NS, Bines J, Bese NS, Vorobiof D, et al. Guideline implementation for breast healthcare in low- and middle-income countries: treatment resource allocation. Cancer. 2008;113 Suppl 8:2269–81.
13. Harford J, Azavedo E, Fischietto M. Breast health guideline implementation in low- and middle-income countries (LMCs): breast healthcare program resource allocation. Cancer. 2008;113 Suppl 8:2282–96.
14. Zotov V, Shyyan R. Introduction of breast cancer screening in Chernihiv Oblast in the Ukraine: report of a PATH Breast Cancer Assistance Program experience. Breast J. 2003;9 Suppl 2:S75–80.
15. Naderi T, Bahrampoor A. Determination of sensitivity and specificity of breast tumor diagnosis by primary health care providers (Behvarz) using clinical examination by obstetrician as a gold standard. J Obstet Gynaecol. 2003;29(2):59–62.
16. Hyoju SK, Agrawal CS, Pokhrel PK, Agrawal S. Transfer of clinical breast examination skills to female community health volunteers in Nepal. Asian Pac J Cancer Prev. 2011;12:3353–6.
17. Rao RS, Nair S, Nair NS, Kamath VG. Acceptability and effectiveness of a breast health awareness programme for rural women in India. Indian J Med Sci. 2005;59:398–402.
18. Meneses KD, Yarbro CH. An evaluation of the train the trainer international breast health and breast cancer education: lessons learned. J Cancer Educ. 2008; 23:267–71.
19. Karayurt O, Gursoy AA, Tasci S, Gundogdu F. Evaluation of the breast cancer train the trainer program for nurses in Turkey. J Cancer Educ. 2010; 25:324–8.
20. Yip CH, Cazap E, Anderson BO, Bright KL, Caleffi M, Cardoso F, et al. Breast cancer management in middle-resource countries (MRCs): consensus statement from the Breast Health Global Initiative. Breast. 2011;20 Suppl 2:S12–9.