

Guidelines for International Breast Health and Cancer Control–Implementation

Supplement to Cancer

Guideline Implementation for Breast Healthcare in Low- and Middle-Income Countries

Early Detection Resource Allocation

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A key determinant of breast cancer outcome in any population is the degree to which cancers are detected at early stages of disease. Populations in which cancers are detected at earlier stages have lower breast cancer mortality rates. The Breast Health Global Initiative (BHGI) held its third Global Summit in Budapest, Hungary in October 2007, bringing together internationally recognized experts to address the implementation of breast healthcare guidelines for early detection, diagnosis, and treatment in low- and middle-income countries (LMCs). A multidisciplinary panel of experts specifically addressed the implementation of BHGI guidelines for the early detection of disease as they related to resource allocation for public education and awareness, cancer detection methods, and evaluation goals. Public education and awareness are the key first steps, because early detection programs cannot be successful if the public is unaware of the value of early detection. 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 by the panel. Social and cultural barriers should be considered when early detection programs are being established, and the evaluation of early detection programs should include the use of well developed, methodologically sound process metrics to determine the effectiveness of program implementation. The approach and scope of any screening program will determine the success of any early detection program as measured by cancer stage at diagnosis and will drive the breadth of resource allocation needed for program implementation. *Cancer* 2008;113(8 suppl):2244–56. © 2008 American Cancer Society.

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Breast cancer is the most common cancer among women in most parts of the world and accounts for 23% of all female cancers. It is the second most common cancer overall, second to lung cancer; however, because of the relatively good prognosis for breast cancer when it is diagnosed early, it is the fifth most common cause of cancer death overall, with a mortality-to-incidence ratio of 0.35 in countries of all income levels. According to the GLOBOCAN (International Agency for Research on Cancer) 2002 estimates, there were 514,000 new cases of breast cancer in low- and middle-income countries (LMCs) compared with 636,000 cases in high-income countries. However, there were 221,000 deaths in LMCs compared with 190,000 deaths in high-income countries, making the mortality-to-incidence ratio much higher in LMCs compared with high-income countries (0.43 vs 0.30, respectively).¹

Incidence rates of breast cancer have increased in most countries and regions of the world in the past few decades. The most rapid rise in incidence is observed in low-income countries, where breast cancer risk historically has been considerably lower than in high-income countries. Increasing breast cancer incidence rates in low-income countries are widely considered the result of the 'Westernization' of lifestyles, an ill-defined surrogate for changes in patterns of childbearing, dietary habits, exposures to exogenous hormones, and possibly other factors similar to those of women in industrialized countries.¹ Studies of migrants from low-risk countries to high-risk countries (such as Japanese and Chinese migrants to the US) indicate that breast cancer incidence rates increase progressively in successive generations,² supporting the hypothesis that a 'Westernized' lifestyle is associated with an increased risk of breast cancer.³

Because the incidence of breast cancer in the world's poorest countries is low compared with rates in more developed nations, it has been argued, reasonably, that other causes of poor health, such as nutritional factors and communicable diseases, should receive higher priority for limited health resources than diseases like cancer.⁴ However, as a result of the rising incidence of breast cancer in developing countries, coupled with inadequate resources for early detection and treatment programs and the consequent disproportionately high fatality rates, breast cancer has become an important cause of premature death and suffering in these less developed parts of the world. Furthermore, it is projected that the incidence of breast cancer in developing countries will continue to increase with further 'Westernization'.⁵⁻⁷ These observations provide a compelling

argument that efforts should be undertaken to reduce morbidity and mortality from breast cancer in LMCs.

There is solid evidence that diagnosing breast cancer at an early stage will reduce breast cancer mortality rates, primarily through the initiation of effective therapy earlier in the disease's natural history.^{6,8,9} However, before any early detection program is implemented, facilities for adequate diagnosis and treatment must also be in place. Furthermore, it is well established that the success of interventions intended to detect breast cancer at an early stage greatly depends on awareness and sensitivity to the needs, beliefs, concerns, and unique circumstances of the target population.¹⁰

MATERIALS AND METHODS

In October 2002, a panel of breast cancer experts and advocates from around the world met at the first Breast Health Global Initiative (BHGI) Consensus Conference in Seattle, Washington to develop consensus guidelines for the early detection, diagnosis, and treatment of breast cancer in the setting of limited healthcare resources. The results of this first BHGI Global Summit were published in 2003 and describe general concepts for breast cancer early detection, diagnosis, and treatment in LMCs.^{8,11-13} In addition to providing fundamental principles for resource utilization in breast healthcare, the 2003 reports emphasized additional program elements that were viewed as necessary to the successful implementation of breast cancer programs, including a supportive environment for women to seek care at the first indication of symptoms and access to appropriate, affordable diagnostic tests and treatment.

The BHGI guidelines were expanded at the second BHGI Global Summit in Bethesda, Maryland, which was held in January 2005, and were published as a set of consensus statements in 2006.¹⁴⁻¹⁸ In that second set of reports, stratified guidelines for early detection were created according to a 4-tiered system, depending on the availability of resources. These are summarized as follows:

- **Basic level**—Basic-level resources are the core resources or fundamental services absolutely necessary for any breast healthcare system to function. Basic-level services typically are applied in a single clinical interaction. For example, at the basic level, imaging services likely would not be available, and there would be primary emphasis on obtaining a history of symptoms of breast cancer

and physical examination. This emphasis would be in the context of clinic visits for either breast problems or for other reasons.

- **Limited level**—At the limited-resource level are second-tier resources or services that are intended to produce major improvements in outcome, such as increased survival, and are attainable with limited financial means and modest infrastructure. Limited-level services may involve single or multiple clinical interactions. Examples may include targeted educational outreach to encourage women to seek medical evaluation of breast problems and diagnostic imaging, such as ultrasound and mammography, for suspicious breast lesions.
- **Enhanced level**—Third-tier resources or services that are optional but important are considered enhanced-level resources. At this level, enhanced resources should produce further improvements in outcome and should increase the number and quality of therapeutic options and patient choices. Examples include introduction of mammographic screening and image-guided biopsy.
- **Maximal level**—At the maximal level are high-level resources or services that may be used in some high-resource countries and/or recommended by breast care guidelines that do not adapt to resource constraints but that nonetheless should be considered a lower priority than those resources or services listed in the basic, limited, or enhanced categories on the basis of extreme cost and/or impracticality for broad use in a resource-limited environment. To be useful, maximal-level resources typically depend on the existence and functionality of all lower level resources. An example is the use of breast magnetic resonance imaging for screening among high-risk populations on the basis of known mutation carrier status or family history highly suggestive of an inherited risk of breast cancer.

The conclusions from the 2007 Global Summit held in Budapest, Hungary from October 1 through 4, 2007 were based on the same methodology as the 2 prior Summits, as described in the overview article of this compendium report.¹⁹ The objective of this third Global Summit was to address resource allocation, specifically focusing on guideline implementation in LMCs.

The recommendations from the 2005 Summit were to promote breast self-awareness and clinical breast examination (CBE) at the basic level, targeted outreach/education and encouraging CBE for at-risk groups at the limited level, opportunistic mammographic screening at the enhanced level, and popula-

tion-based mammographic screening at the maximal level.¹⁵

RESULTS

Public Education and Awareness (Figure 1, Column 1)

Public education is an important component of early detection. All programs must be sensitive to the culture and in the language of the region. Breast health awareness is a key element of interventions at all resource levels, and the value of early detection must be emphasized. The majority of women in countries with basic resources do not have access to mammography screening, and the goal of earlier detection at this level is to downstage symptomatic disease by teaching women the importance of seeking timely evaluation of breast symptoms, such as a palpable lump, asymmetric thickening, skin changes (erythema, peau d'orange, nipple excoriation, scaling), or spontaneous bloody or clear nipple discharge. Education should emphasize that survival is more favorable when breast cancer is diagnosed early. Many women fear mastectomy; in male-dominated societies, women may fear that they would lose their husband if they lost their breast.²⁰ Thus, the potential for breast-conservation surgery, when breast cancer is detected early, should be emphasized.

When defining a target group for breast health programs at any resource level, local planners should prioritize subsets of the population according to the number of cases of breast cancer likely to be detected per woman screened. For example, in most countries, targeting younger women, who have a lower risk of breast cancer than older women, would detect fewer cases of breast cancer per woman screened than targeting older women. (In addition, targeting younger women would lead to more unnecessary evaluations for benign breast conditions in already overloaded clinics.) At the basic level, education of frontline health staff should be a key component. All health staff (eg, physicians, nurses, midwives), and especially female staff who women may approach first, must be able to recognize the signs and symptoms of early as well as advanced breast cancer and must be able to refer patients for further diagnosis and treatment.

At the limited-resource level, targeted outreach education programs stressing increased awareness of breast symptoms and encouraging CBE for age groups at high risk can be implemented at the district or provincial level using healthcare providers in the field when resources are available. The public healthcare nurse or the local midwife can play an

Early Detection Resource Allocation and Process Metrics

Level of resources	Public Education and Awareness	Detection Methods	Evaluation Goal	Process Metrics
Basic	Development of culturally sensitive, linguistically appropriate local education programs for target populations to teach value of early detection, breast cancer risk factors and breast health awareness (education + self-examination)	Clinical history and CBE	Breast health awareness regarding value of early detection in improving breast cancer outcome	# Pts with documented H&P / # Pts evaluated <i>Description: The ratio of the number of patients who have a recorded history and physical examination within the target group to the number of patients who were clinically evaluated within the target group for a center or program providing organized breast healthcare.</i>
Limited	Culturally and linguistically appropriate targeted outreach/ education encouraging CBE for age groups at higher risk administered at district/provincial level using healthcare providers in the field	Diagnostic breast US +/- diagnostic mammography in women with positive CBE Mammographic screening of target group*	Downsizing of symptomatic disease	% Pts with CBE-detected abnormalities who undergo breast imaging for work-up
Enhanced	Regional awareness programs regarding breast health linked to general health and women's health programs	Mammographic screening every 2 years in women ages 50-69* Consider mammographic screening every 12-18 months in women ages 40-49*	Downsizing and/or downstaging of asymptomatic disease in women in highest yield target groups	% Pts age 50-69 who had screening mammogram within past 24 months
Maximal	National awareness campaigns regarding breast health using media	Consider annual mammographic screening in women ages 40 and older Other imaging technologies as appropriate for high-risk groups†	Downsizing and/or downstaging of asymptomatic disease in women in all risk groups	Maximal category process metrics determined based upon standards of care in high-income countries

FIGURE 1. Resource allocation and process metrics table for early detection for breast cancer. CBE indicates clinical breast examination; Pts, patients; H&P, history and physical; US, ultrasound; +/-, with or without. *Target group selection for mammographic screening should consider breast cancer demographics and resource constraints within the population. Please see text for complete discussion. †It has been demonstrated that breast magnetic resonance imaging is more sensitive than mammography in detecting tumors in asymptomatic women who have an inherited susceptibility to breast cancer. Note that the table stratification scheme implies incrementally increasing resource allocation at the basic, limited, and enhanced levels. Maximal level resources should not be targeted for implementation in LMCs, even though they may be used in same higher income settings.

important role in providing CBE. The training of healthcare providers in performing effective CBE is a key program component.^{21,22} Although there is a lack of data on the efficacy of CBE if performed by non-physicians as a screening modality in LMCs, it has the potential to detect tumors at a less advanced stage, particularly in areas where the majority of tumors are diagnosed at stage III or IV.

At the enhanced level, breast health education programs can become more sophisticated, are organized at a regional level, and are linked to general health and women's health programs (for example, linking to ongoing reproductive health and wellness campaigns). Local and regional programs, once in place, can be taken a step further in areas with a maximal level of resources to develop and implement national breast awareness campaigns using

national media to deliver the message concerning the importance of breast health.

Detection Methods (Figure 1, Column 2)

At the basic level, where mammography is not available, women should be strongly encouraged to seek care promptly when symptoms of possible breast cancer arise. Women with signs and symptoms of breast cancer should receive a thorough CBE by a well-trained health worker who then determines whether the woman should be referred for further diagnostic tests. At the limited-resource level, a diagnostic ultrasound with or without mammography should be carried out for women who have a positive CBE. In addition, mammographic screening of target groups can be considered. The target group would depend on the age-specific incidence rate of breast

cancer in a particular country and the cost-effectiveness of screening for breast cancer in each age group (Fig. 1).

Screening mammography currently is the gold standard for early detection of breast cancer,^{6,23} and regions in LMCs with enhanced resources should offer mammography to target populations, which should be determined taking into consideration age-specific incidence rates, longevity, available resources, the evidence currently available on the efficacy of screening at different ages, and other relevant local considerations. These factors should be considered to determine both an age to begin offering mammography screening and an upper age at which screening would no longer be offered. It is recognized that information on all of these factors will not be available in many areas. Although there may be exceptions, in the absence of such information, the preponderance of the evidence suggests that, in most countries, it would be reasonable to begin a breast cancer screening program by offering mammography every 2 years to women between ages 50 and 65 years. After adequate coverage of the initial target group is achieved, consideration can be given to applying additional resources to broaden the age groups targeted for screening. If mammography is offered to women ages 40 to 49 years, then it should be offered every 12 to 18 months, because the sojourn time (the period during which a tumor is asymptomatic but detectable with screening) appears to be shorter on average (1.7 years) in these young women compared with women aged >50 years (range, 2.6-3.8 years).²⁴ If women aged >65 years are screened, then it should be every 2 years. There is little evidence to support offering mammography to women aged <40 years. Other imaging techniques should also be considered as appropriate for high-risk groups. For example, it has been demonstrated that breast magnetic resonance imaging is more sensitive than mammography in the detection of breast cancer in women with a known or possible inherited susceptibility to breast cancer, although its availability is very limited in most countries.²⁵

Evaluation Goals

The object of the early detection programs described is to reduce the morbidity and mortality from breast cancer. Evaluation is a process that attempts to determine as systematically and as objectively as possible the relevance, effectiveness, and impact of programs based on predefined objectives (Fig. 1). Hence, planning for the evaluation and monitoring of an intervention should take place at the same time as planning the intervention.^{26,27} The ability to

perform rigorous evaluation studies is also a function of available resources; but even at the basic level, it is important to take steps to measure the impact of programs on desired results.

The goal at the basic level is to improve breast health awareness regarding the value of early detection in improving breast cancer outcomes and to reduce the frequency at which cancers are diagnosed at an advanced stage. At the limited level, the goal is to reduce the size of symptomatic tumors (downstaging of symptomatic disease). The goal at the enhanced and maximal levels is to downstage asymptomatic disease in screened women in the identified target groups.

DISCUSSION

Planning for breast cancer interventions should be based on a situational analysis that considers the demographics of the population, the overall and age-specific incidence rate of breast cancer, the average disease stage at diagnosis, and the resources available. The local culture, religion, taboos, and myths that may pose barriers to implementation need to be considered. Before any early detection program is implemented, sufficient infrastructure for diagnosis and treatment must be available and accessible.

One of the key strategies for LMCs is raising public awareness that early detection of breast cancer can save the lives of women through downsizing and downstaging of the disease at diagnosis. Health education should focus on the importance of early diagnosis and treatment, CBE, and mammography. Although mammographic screening is the gold standard for early detection of breast cancer,²⁸ the cost-effectiveness and quality assurance of such a program in LMCs should be considered.

Opportunistic Versus Organized Screening

Organized screening is distinguished from opportunistic screening primarily on the basis of how invitations to screening are extended. In organized screening, invitations are issued to women in a defined target population, and measures are instituted to facilitate their attendance at screening facilities. In opportunistic screening, invitations to screening are extended to individuals when they encounter healthcare providers for reasons unrelated to breast cancer.²⁹ Studies have demonstrated that opportunistic screening often is inefficient, because many women who are screened are not at high risk of breast cancer, many women in the population who should be screened are not, and those that do receive screening may be screened either too fre-

quently or too infrequently. Screening programs require some degree of organization to be successful; and, as the extent of the organization of the various elements of screening increases, so too does the impact of the program. However, in many low-resource settings, it may not be possible to introduce all elements of organized screening.^{6,30,31} Important screening program elements include:

- 1) an identifiable target group or population,
- 2) implementation measures available to guarantee high coverage and participation,
- 3) access to high-quality screening,
- 4) an effective referral system in place for diagnosis and treatment, and
- 5) measures in place to monitor and evaluate a program.

Quality Standards for Screening

There are multiple elements of quality assurance that are essential to the success of early detection programs, including education of personnel, requirements for and organization of quality-assurance activities, data systems, follow-up of diagnosed patients, site visits and accreditation, medical audits and feedback, program evaluation, and licensing and certification of mammography facilities.^{32,33}

Implementation of Screening

Successful screening programs benefit when there is formal organization of program elements, such as defining a specific target group and outreach with information regarding the importance and availability of screening. For breast cancer early detection programs, age is the only practical criteria that is useful to define target groups for population-based screening. Most other risk factors are not as strong as age, and none can be used to separate out sufficient numbers of women in the population at sufficiently high risk to warrant special efforts to preferentially screen them. In LMCs, the average age of women with breast cancer is 10 to 20 years younger than in the Western world.³⁴ However, this observation does not suggest that the incidence of breast cancer is higher in younger women in LMCs than in more developed countries. This age difference is primarily because of the differences in the age structures of the different populations, with relatively fewer older women in LMC populations. In addition, in at least some LMCs, increases in rates of breast cancer over time tend to occur to a greater extent in younger women than in older women, presumably because the more recent birth cohorts develop a more 'Wes-

tern' risk profile than older cohorts. It must be emphasized, however, that the actual incidence rates of breast cancer in young women in LMCs do not exceed those of more developed countries. Therefore, recommendations that early detection begin at a younger age in LMCs than in developed countries are not justified. In all countries, the lower the minimal age at screening, the higher the number of women who need to be screened to find 1 case of breast cancer, and the higher the program costs.

Starting with the most easily identifiable and reachable group at highest risk of breast cancer based on age, there should be a plan for a progressive increase in the outreach to other target groups as the level and effectiveness of public and professional education increases and as resources become available. Implementation steps should include organized pilot (demonstration) projects in a defined area and projects that urge primary care practitioners to use the opportunity of clinical contacts to offer screening to the target age group (opportunistic screening). Even at the limited level, if the primary healthcare center has a mechanism to identify patients, such as patient files, card index systems, or computerized listings, then women in the target group could be invited to screening using existing social services or midwife contacts who could issue these invitations in the course of their normal duties in the community.

Mammographic Screening

There is good evidence from randomized controlled trials (RCTs) that mammography screening is associated with a significant reduction in deaths from breast cancer.³⁵ Although inconsistent results from RCTs, especially with respect to age-specific benefits, have led to prolonged debates regarding the overall value of mammography and the value of mammography in specific age groups, RCTs provide consistent results when they are examined in terms of the fundamental goal of screening (ie, a consistent association with the reduction in the incidence rate of advanced disease²⁸) and the odds of dying from breast cancer.^{36,37} Treatment of breast cancer earlier in its natural history is associated with a lower risk of dying from breast cancer and a greater range of treatment options, including the opportunity for breast-conserving therapy. To be maximally effective, mammography screening programs must be of high technical quality and appropriately targeted, and examinations must be offered with sufficient frequency to minimize the opportunity for the development of cancers between screenings.³⁸

The identification of a target group for mammography screening in LMCs should be based on the burden of disease in the population, the potential to benefit from screening, and the available resources.³⁵ Program planners should be cautioned against relying only on the proportion of new cases or deaths in specific age groups, because the underlying rate of disease still may be so low that screening would be prohibitively expensive for very little gain. Rather, the potential benefit of a program of mammography screening is measured best by identifying a target group with a sufficiently high incidence rate of breast cancer and sufficient expected longevity. Screening in an age group with a very low rate of breast cancer will be very costly with very little overall benefit. Likewise, screening an age group with higher incidence but limited longevity also will be costly with very little overall benefit. There are no clear metrics for judging an acceptable balance of costs and benefits in this context, so selecting a target population should be done with careful consideration of the efficient and effective use of resources. In fact, when introducing mammography screening, a strong case can be made for initiating screening in a limited age group of women in which age-specific incidence rates indicate that the group is likely to be most productive and then, as the program gains experience, expanding the program to include additional age groups. Those responsible for screening programs should consider the age-specific incidence rates of breast cancer in their country, the available resources, and the most recent information regarding the effectiveness of screening in various age groups to determine the appropriate targets for mammography screening.

Breast Self-examination and Clinical Breast Examination

Most studies have demonstrated that breast cancers detected by breast self-examination (BSE) are smaller than those detected without screening and are more likely to be confined to the breast. Furthermore, survival after a diagnosis of breast cancer tends to be longer in women who practice BSE than among women who do not. However, although 2 observational studies on BSE provided evidence that this screening modality reduces breast cancer mortality,^{39,40} that finding was not confirmed in 2 randomized trials.^{41,42}

Indirect evidence for the effectiveness of CBE as a stand-alone test comes from randomized trials of breast cancer screening (combined CBE and mammography was compared either with a group that was not invited to screening or with a group that was offered CBE alone), from prospective trials of

CBE, and from observational studies in which detection rates of CBE and mammography offered to all women were compared. Those studies demonstrated that CBE is able to detect breast cancer in women who are asymptomatic (unaware of symptoms of breast cancer) at the time of screening. In the US and Canada, studies have demonstrated that adding CBE to modern mammography screening results in an increase in detection rates compared with mammography alone, particularly in detecting prevalent cases on the occasion of the first mammogram and in younger women.⁴³⁻⁴⁵ Overall, the existing data suggest that careful and competent CBE appears to be a promising means of averting some deaths from breast cancer and may be able to identify lesions early enough for the effective use of interventions.⁴²

However, currently, the evidence is not sufficiently conclusive to justify the recommendation for routine CBE in population-based screening programs. It is for this reason that several trials of CBE were initiated.^{46,47} In the Philippines CBE trial, 151,168 women between ages 35 years and 64 year who resided in 12 municipalities in Manila were offered CBE, and 92% agreed to participate in the study. However, that trial had to be terminated because of the low proportion of women who attended follow-up for diagnosis after the detection of an abnormality on CBE in the first screening round.⁴⁷

The Cairo Breast Screening Trial was designed to evaluate the role of CBE as a primary screening modality in the context of primary care. (In Egypt, breast cancer usually is diagnosed at an advanced stage.) In total, 4116 women ages 35 to 64 years were invited to attend a primary health center for CBE. High rates of breast cancer were observed: 8 per 1000 women at the first examination and approximately 2 per 1000 women among those who attended for rescreening. The initial high prevalence of advanced disease indicates that many women in the community do not seek medical attention until their breast cancer is advanced.⁴⁶ This observation indicates that community education to raise breast cancer awareness may contribute to earlier presentation of symptomatic disease.

The Mumbai trial is a community-based, cluster randomized controlled cohort study on screening for breast and cervical cancer by CBE and visual inspection of the cervix after application of 4% acetic acid. The trial involved 150,000 women ages 35 to 64 years. The preliminary results demonstrated that the average compliance was 71.4% for breast cancer screening, the compliance to diagnostic investigations was 73% among screen-positive women who

were referred for breast cancer, and the compliance to treatment completion was 95%. This trial demonstrated that a screening program for breast cancer using low-cost technology is feasible and acceptable in the Indian population.^{48,49}

In countries with limited resources, the World Health Organization supports the introduction of pilot or demonstration projects of CBE screening, but only under circumstances in which their impact can be evaluated fully.^{50,51} This also was the recommendation from the 2005 BHGI Summit.

Identification of Target Groups

In Western countries, the incidence of breast cancer increases proportionally with age (Fig. 2), whereas in LMCs, this is not always the case. Although the shape of the age-specific incidence curve varies in LMCs, in the majority of countries, it reaches a peak around ages 45 to 55 years and then decreases (Fig. 2).⁵² This higher incidence rate observed in young women most likely is not attributed to biologic, ethnic, or clinical features of breast cancer specific to the countries but most likely is a result of the societal, reproductive, and dietary changes associated with increased breast cancer risk that have taken place in the last 3 decades in LMCs. Risk factors for breast cancer have increased (later age at first pregnancy, later age at menopause), whereas protective factors have decreased (fewer number of children per woman, shorter breastfeeding durations, less physical exercises, later age at menarche). Today, women in LMCs aged 45 years are subject to more breast cancer risk factors than women aged 70 years because of the epoch in which they spent their life. This is what epidemiologists call a 'cohort effect'.^{53,54} It is likely that, as the women in the age groups with the highest breast cancer incidence rates get older, they will carry their increased risks with them; and, over time, the age-specific incidence curve will begin to approximate more closely the curve observed in Western countries.

To define target groups in a country or region according to age, age-specific breast cancer incidence, or mortality rates from a population-based registry can be useful in assessing which age groups should be targeted for screening. If current age-specific rates are not available, then hospital series data can be used together with the female age pyramid of the country to calculate an approximation of the age-specific incidences. When resources are limited, it is tempting to apply other risk factor criteria in addition to age to reduce further the size of the target group. However, information on other risk factors usually is not readily available in a population regis-

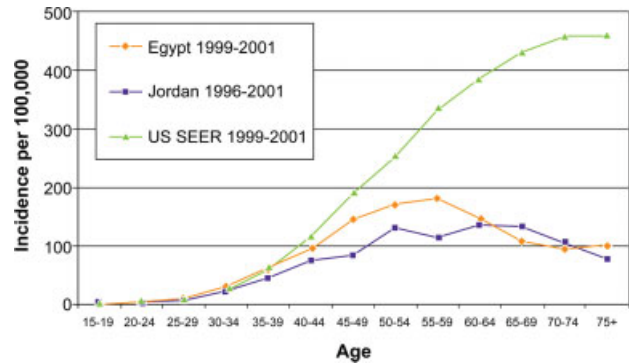


FIGURE 2. Annual age-specific incidence rates for invasive breast cancer from the Tanta population registry, the Amman population registry, and the US Surveillance, Epidemiology, and End Results (SEER) data. Adapted from Freedman LS, Edwards BK, Ries LAG, Young JL, eds. *Cancer Incidence in 4 Member Countries (Cyprus, Egypt, Israel, and Jordan) of the Middle East Cancer Consortium (MECC) Compared With US SEER*. NIH Pub. No. 06-5873. Bethesda, MD: National Cancer Institute, 2006.⁵²

ter, and individual risk factors do not distinguish sufficient numbers of women at sufficiently high risk to warrant the effort and expense of preferentially screening women based on risk.⁵⁵

Overcoming Barriers

Barriers to early detection of breast cancer often are at the level of the individual woman, including fear of cancer, fear of death, fear of mastectomy, lack of financial resources, placing family above their own needs, and requiring spouse and community consent for action. Even when screening services are available, various reasons have been cited to explain why women do not take advantage of screening opportunities offered to them.^{56,57} For some women in rural areas, it is simply a lack of awareness and information regarding breast cancer; but, for others, the fear of finding that a breast lump may be malignant results in a state of denial and nonaction. For a large number of women, especially in male-dominated societies that prevail in the LMCs, their greatest fear is that their husbands may neglect or abandon them. In recent years, several community-based organizations have piloted interventions that address specific barriers and constraints relating to the women survivors, their family, and other community members and healthcare providers. A systematic documentation of these projects and lessons learned can be used as best practice models with appropriate adaptation to local situations to expand current efforts to downstage breast cancers in the LMCs. Strong educational and outreach programs to reach both the

TABLE 1
Barriers to Awareness, Education, and Outreach Programs and Activities for Early Detection Programs for Breast Cancer

Type of Barrier	Examples
Taboos	"Putting aside" a family member diagnosed with breast cancer; "placing a curse" on individuals with breast cancer; "silencing" individuals with breast cancer
Myths	Having no pain means no breast cancer; believing breast cancer is a disease of "the old"
Religion	Religious leaders bless "traditional healers" over "western or modern" medicine; believing "It is God's will"
Communication	Graphics or pictorial representations of breasts may not be culturally appropriate; assuming print is the best medium in countries with high literacy rates
Decision-makers	Not identifying tribal and clan leaders who allow programs to happen; not identifying key family member(s) who make decisions for women related to their health
Awareness and educational materials, programs, and outreach activities	Importing and using inappropriate materials; assuming everyone knows English; assuming that what works "back home" will be successful here
Defining what constitutes knowledge	Discounting "local" knowledge for the most part as useless; defining the only reliable and valid knowledge as evidence-based
Complex changes	No understanding that complex change is a process that takes time and not an event; believing all changes that are being promoted are the best for the individuals being served
Funding agencies and organizations	Presuming that those receiving the funds will do "their bidding"; assuming funding from countries with high levels of resources is always wanted and welcomed
Local ways of learning	Overlooking local ways of learning (for example, singing, drama, story telling); judging local ways of learning as inappropriate in breast cancer education
Power	Knowing "for sure" who wields the power to ensure their programs will be successful; using power through a participatory process for the "common good" is sound practice
Countries and regions at war and/or in turbulent times	Obtaining funding sources is very difficult; perceiving breast cancer as a major problem is not likely

general population and targeted audiences are important,^{58,59} and health educators and the medical community need to appreciate the importance of tailoring educational outreach and communication so that it is culturally sensitive and linguistically appropriate.^{60,61} Although it is simple to acknowledge the importance of cultural sensitivity, in practice, it is much more complicated, because not only are there obvious barriers that may be more difficult to overcome than anticipated, but there are also hidden social and cultural barriers. Developing programs of this nature call for 'insider knowledge,' the experience and knowledge of the local community that needs to be taken into account, considered valuable, and blended well with 'outsider' expertise (experts from high-resource countries).⁶² Program planners are advised to seek collaborators with skills in sociology and anthropology to help with communications and to anticipate and identify barriers to participation (Table 1).⁶³

Strategic Health Communication Tools

Breast health education messages must be designed carefully to be effective. The critical factor in strategic message design is adapting health education messages to meet the unique needs and communication orientations of specific audiences.⁶⁴ Careful audience analysis is essential to identifying the salient consumer characteristics for guiding message design.⁶⁵ Involving women, their family members,

key members of their social networks, and community representatives can increase the support and social encouragement for paying attention to, accepting, and using health education messages.⁶⁶ Multiple messages can help to capture audience attention, reinforce message content, and illustrate key health education concepts. The use of vivid imagery in health communication interventions through the use of narrative and visual illustrations also can reinforce message content, especially to audiences with limited health literacy and problems with numeracy, which may make it difficult for them to understand statistics and numerical risk estimates.⁶⁷⁻⁷⁰ In addition to developing strategic messages that match the cultural orientations of at-risk consumers, it is critically important to determine the most effective communication channels for reaching targeted populations of consumers. The best communication channels to use are those that are close, familiar, and easily accessible for targeted audience member.⁶⁵ It is important to decide which sources are the best for delivering key messages to vulnerable populations who have their own unique media channels as well and social and professional communication networks.^{71,72} A critical juncture in communicating healthcare and health promotion information to vulnerable audiences is evaluating how well different communication strategies work to educate these targeted audiences about important health issues.

Process Metrics to Evaluate the Success of Implementation (Figure 1, Column 4)

At the basic level, a good clinical history and CBE should be able to detect breast lumps that require further diagnostic evaluation. At this level, the process metric is the ratio of the number of patients in the target group who have a recorded history and physical examination compared with the number of patients who were evaluated clinically within the target group at a center or program providing organized breast healthcare.

At the limited level, a diagnostic ultrasound with or without mammography is recommended for women with a positive CBE. The process metric is the percentage of patients with an abnormality detected on CBE who undergo breast imaging.

At the enhanced level, if, for example, the program initiates screening mammography by inviting women ages 50 to 65 years to have a mammogram every 2 years, then the process metric would be the percentage of women ages 50 to 65 years seen in that facility who had a screening mammogram within the past 24 months. At the maximal level, the process metric would be the proportion of women in the population who were screened according to the age-specific recommendations.

Conclusions

The 2 previous BHGI Early Detection Panels stressed the importance, where feasible, of diagnosing asymptomatic breast cancer and downstaging symptomatic disease. The current Panel has updated these data in terms of detection methods and presents evaluation goals within resource levels.

Mammography is the preferred technology for early detection of breast cancer where resources are sufficient. There is good evidence for this finding from RCTs; and, over time, knowledge has accumulated from both the trials and the evaluation of service screening data that more clearly address remaining uncertainties, including age-specific benefits. Although there has been enduring controversy over the efficacy of screening women aged <50 years, and experts disagree over whether or not mammography screening confers similar benefits in women aged <50 years and women aged >50 years, the preponderance of the evidence indicates that the most favorable results for women at any age occur when the screening interval is tailored to the sojourn time and that the effectiveness and efficiency of breast cancer screening improves as women get older.²⁴ The age-specific efficacy of screening, as noted above, is only 1 among several key factors that

should be considered when designating a target population for screening.

In LMCs with limited resources, population-based mammographic screening programs are not feasible. In these countries, women tend to present with breast cancers at late stages and with large tumors. The recommendation at the basic level is breast health awareness programs, which are believed to have a role in downsizing breast cancers at diagnosis and do not require expensive technology or expertise.⁷³ At the limited level, early detection by CBE conducted by trained health professionals is recommended, although the evidence for the efficacy of CBE in reducing mortality from breast cancer is limited, and any program of CBE must include a rigorous evaluation component. Randomized trials of CBE currently are underway and hopefully will clarify the usefulness of this recommendation. Two randomized trials of BSE have not demonstrated that this practice is efficacious in reducing mortality from breast cancer. It would be useful to conduct a trial to determine whether teaching women to practice BSE would be beneficial in downsizing and downstaging tumors at diagnosis in a setting in which women typically present with large and advanced-stage tumors. Even if women do not routinely practice BSE, BSE instruction may raise breast cancer awareness and contribute to earlier identification and reporting of symptoms. The importance of early identification and reporting of symptoms is relevant to women at all resource levels and is an important part of any breast cancer education program. A trial of the efficacy of adding BSE instruction to screening by CBE is underway in Yemen.

In countries with limited resources, it is recognized that treatment facilities may be inadequate and that programs for early detection may need to be coupled with programs to improve diagnostic and treatment capabilities. There is no advantage to detecting breast cancer early if the woman is unable to undergo definitive diagnosis and treatment. It also is recognized that, even if programs for early detection are available, there may be sociocultural barriers preventing the individual from accessing such services; thus, early detection programs also need to be coupled with education programs that are appropriate both culturally and linguistically for the region, using appropriate health communication tools that will inform women about the benefits of early detection.

Perhaps the most critical need is for carefully designed and conducted studies on barriers to early detection, including the development of a readily adaptable methodology for rapid ascertainment of individual, family, community, and health services-

related barriers. There is considerable variation in size at presentation of symptomatic disease throughout the world that currently is poorly understood. Although there are some studies on why women present late,⁷¹ additional studies to explore the fears of these women regarding 'Western' treatment are needed so that education programs can target these fears. It is more cost-effective to treat early breast cancer than to treat advanced disease.⁷⁴ Hence, investing in an early detection program that is sustainable should be considered by all health ministries in LMCs.

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