Breast cancer management in low resource countries (LRCs): Consensus statement from the Breast Health Global Initiative


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abstract

The Breast Health Global Initiative (BHGI) brought together international breast cancer experts to discuss breast cancer in low resource countries (LRCs) and identify common concerns reviewed in this consensus statement. There continues to be a lack of public and health care professionals’ awareness of the importance of early detection of breast cancer. Mastectomy continues to be the most common treatment for breast cancer; and a lack of surgeons and anesthesia services was identified as a contributing factor in delayed surgical therapy in LRCs. Where available, radiation therapy is still more likely to be used for palliation rather than for curative treatment. Tumor receptor status is often suboptimally performed due to lack of advanced pathology services and variable quality control of tissue handling and processing. Regional pathology services can be a cost-effective approach and can serve as reference, training and research centers. Limited availability of medical oncologists in LRCs often results in non-specialist providing chemotherapeutic services, which requires additional supervision and training. Palliative care is an emerging field in LRCs that requires investment in training and infrastructure development. A commitment and investment in the development of breast cancer care services by LRC governments and health authorities remains a critical need in LRCs.

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Introduction

What is a low resource country?

The World Health Organization (WHO) describes a “low-resource scenario” as one where the infrastructure and human resources for cancer prevention or control are non-existent or very limited in quantity, quality and accessibility. The 2009 World Bank report lists “low-income countries” as those that have a per capita gross national income (GNI) of $995 or less; and lower-middle income countries as those that have a GNI of $996–$3945. Health care services in low income countries are often limited, and alternative medicine is commonly used. Low income countries share an economic status but differ in their social, political and cultural barriers to health care. Some may suffer from political or social instability or excessive bureaucracy, while others may have large, remote, rural populations, limiting access to centralized health care. Communicable diseases and malnutrition are a major cause of morbidity and mortality, and life expectancy is typically less than 60 years of age. While cancer may not be recognized as one of the primary health care concerns by the population or governments of these countries, it is becoming a leading cause of death for people older than 15 years of age.

What do we know about breast cancer in low resource countries?

In 2008, an estimated 636,000 incident cases of breast cancer were diagnosed in high resource countries while 514,000 cases were diagnosed in low- and middle resource countries, where it has now become the commonest female cancer. Breast cancer incidence rates vary widely across the world, from 19.3 per 100,000 women per year in Eastern Africa to 89.9 per 100,000 women per year in Western Europe. By 2020, it is estimated that 70% of all breast cancer cases worldwide will be in low and middle resource countries. Factors associated with increased breast cancer incidence include increased life expectancy, reduction in competing risk of mortality from infectious diseases, and change in reproductive and lifestyle patterns.

In low resource countries (LRCs), lower life expectancy contributes to the general perception that breast cancer is more frequent in younger age groups. However, breast cancer rates among young women in LRCs are in fact not higher than those in developed countries as has been reported by Akarolo-Anthony et al. for Africa, Autier et al. for European countries, as well as global reports. When life expectancy is less than 60 years of age, fewer women will live to develop breast cancer, leading to lower breast cancer incidence than in countries with higher life expectancy. As life expectancy increases, breast cancer incidence also increases. Changes in reproductive patterns which occur as a result of economic development and new lifestyle choices, lead to smaller numbers of children per family, later age at first pregnancy and shorter lifetime breastfeeding duration, which are all factors that contribute to increased breast cancer risk. Correspondingly, LRCs are reporting a rise in breast cancer incidence rates. There is also a substantial difference in breast cancer survival rates between low resource and higher resource countries. Breast cancer 5-year survival rates remain as low as 19% in some low income countries in Africa (The Gambia) whereas it is upwards of 80% in North America. These lower breast cancer survival rates are associated with lack of early detection programs, advanced stage of disease at presentation, lack of functional diagnostic and treatment facilities and limited availability of professional care.

Late presentation/diagnosis of breast cancer is common in LRCs, where more than 70% of patients present with advanced disease. Delayed presentation has been associated with: 1) low levels of community and health professionals’ awareness of breast cancer, 2) barriers to access to appropriate treatment, 3) difficulties in navigating health care systems, 4) ineffectual health care systems, 5) high prevalence of alternative health belief models, and 6) absence of detection programs.

Most LRCs lack the necessary health care system infrastructure to support multidisciplinary breast cancer care. The Breast Health Global Initiative (BHGI) implementation guidelines previously outlined the basic support system resources needed to implement a breast cancer control program. LRCs often lack adequate health care financing programs, requiring patients and their families to cover health care costs through out-of-pocket expenses. This contributes to treatment delays, while the family rallies resources, or prohibits access to treatment.

In LRCs, the combination of late presentation of breast cancer, low 5-year survival rates, poor health care system infrastructure and lack of health care financing resources contribute to population perception that treatments for breast cancer are ineffective or unavailable, thereby causing more delay in diagnosis and treatment. Breast cancer programs thus face a dual challenge: they must build capacity for treating new patients presenting with early-stage disease at the same time that they must continue to treat patients with advanced breast cancers utilizing the limited resources available for systemic treatments, which are known to have minimal effectiveness against late-stage disease.

Besides the challenge of limited treatment capacities, breast cancer control programs in LRCs are hampered by a lack of reliable data on breast cancer incidence, mortality, survival, and stage of presentation. Most LRCs lack regional and/or national cancer registries, resulting in only rough estimates of breast cancer incidence rates. Although tertiary care centers may create institutional databases and registries that can be useful for some purposes, the statistics that such institution-based registries generate tend to be biased by pattern of presentation, type of institution, and available resources, among other factors. LRCs often lack periodic population census and vital statistics, including proper mortality registries, making population-based statistics difficult to provide with any accuracy. This paucity of representative data prevents an adequate understanding of the prevalence, outcome and public health burden of breast cancer, and also hampers public policy response to the growing cancer epidemic.

The purpose of this consensus review is to summarize issues and obstacles to breast cancer detection, diagnosis and treatment in LRCs and to present systematic approaches for program implementation in these challenging health care environments. The framework for implementation is provided by the evidence-based, resource-stratified guidelines previously developed through the BHGI. This 2010 Consensus Statement, developed by the BHGI Low Resource Scenario Consensus Panel, is based on the presentations at the 4th BHGI Global Summit meeting, held in association with the SLACOM-Sociedad Latinoamericana y del Caribe de Oncología Médica, in Chicago, Illinois, USA, June 9–11, 2010. BHGI methods for guideline and consensus development have been previously described. A companion consensus statement for middle resource countries and a consensus statement on problem solving strategies in low and middle resource countries were also developed based on the BHGI 2010 Global Summit.

Consensus observations

Community awareness

What is the level of knowledge about breast cancer, staging and treatment in LRCs?

Despite dramatic recent increases in cancer morbidity and mortality in LRCs, public awareness of the problem is frequently
What are the sources for health information in LRCs?

Health information about breast cancer in LRCs is obtained from the mass media, health workers, folk knowledge/wisdom. Populations in LRCs often receive mixed messages about breast cancer incidence, treatment and curability from these sources. Development and propagation of clear, articulate, and correct information about breast cancer is an urgent need in LRCs. Many individuals are capable of delivering such messages, including community health workers, volunteers, religious leaders, civic leaders and medical professionals. Program planners should identify community-based breast health information educators and initiate collaborations with them. In many LRC settings, the health decision is often ultimately dictated by husbands, parents, in-laws, or village leaders or any combinations of these other than the woman with breast cancer. This suggests a critical need to target these population groups when building breast cancer awareness programs that are aimed at increasing earlier diagnosis of breast cancer and improving treatment decision-making.

What is the role of advocacy in LRCs?

LRCs differ in their specific resource limitations, social barriers and prevalence of competing illnesses which frames how breast cancer advocacy can and should be implemented in each country. Advocacy groups in LRCs are generally small grassroots organizations with limited funding and limited training in breast cancer and advocacy techniques. In contrast, advocacy efforts in higher income countries are often carried out by well trained, well-resourced dynamic organizations that have been generally successful in contributing to improvements in breast cancer treatment and research. It is unclear if the advocacy methods successful in high resource countries can be translated to other cultures and social scenarios. Advocacy efforts in low resource settings can begin by addressing factors related to low levels of breast cancer awareness in their populations by identifying and addressing local social and cultural barriers. While not as common a focus for advocacy in LRCs as in middle resource countries (MRCs), advocacy that engages local leaders and medical professionals. Program planners should identify community-based breast health information educators and initiate collaborations with them. In many LRC settings, the health decision is often ultimately dictated by husbands, parents, in-laws, or village leaders or any combinations of these other than the woman with breast cancer. This suggests a critical need to target these population groups when building breast cancer awareness programs that are aimed at increasing earlier diagnosis of breast cancer and improving treatment decision-making.

How is tissue sampling performed in LRCs?

In low resource settings, pathological diagnosis may, by necessity, be done utilizing available tissue sampling methods. Fine needle aspiration cytology (FNAC) and core needle biopsy are the two common tissue sampling procedures that may be available. FNAC is a simple, inexpensive, quick and easily repeatable technique for which resource materials are widely available in LRCs. It is most useful when there is a clinically palpable tumor. However, hormone testing validity is dependent on tissue handling and processing and can lead to false negative tests if quality control is not available. Barriers to pathology services in LRCs include limited financial resources, limited equipment, potential tissue handling and processing quality issues, and a low number of appropriately trained pathologists and technologists. For example, in Ghana, the current number of pathologists represents less than 10% of the population-based estimated need for such services in the country. In Laos, there are only 2 pathologists for the entire population of 5–6 million. The lack of investment by health systems in training new pathologists: 1) limits the number of new pathologists, 2) provides no relief to the overburdened existing pathology staff and 3) contributes to the migration of health care workers to higher resource countries (so-called 'brain drain').

How are the pathology service requirements in LRCs?

There remains a critical lack of pathology services in LRCs. Histopathology is a required minimum resource for diagnosis of breast cancer, regardless of the environment. In order to optimize systemic management, advanced pathology procedures are needed. These include testing for estrogen receptor (ER), progesterone receptor (PR), and HER2/neu status. However, hormone testing validity is dependent on tissue handling and processing and can lead to false negative tests if quality control is not available.

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In many LRCs, the tumor’s HR status is not routinely determined. The reported rates of HR positive cancers vary widely in LRCs, ranging from as low as 18% to as high as 60%59–65 and this may be due to multiple factors. Factors responsible for the prevalence of different receptor types of breast cancer include population demographics, such as ER positive cancers occurring more frequently in the older population, and prevalence of exogenous estrogenic exposures including hormone replacement therapy (HRT) and environmental pollutants.10,66

A study in Egypt found differences in ER status between urban and rural populations in Egypt, which the authors posited may be related to different exposures to exogenous and endogenous sex hormones and age distribution.59–60 A 15-years study of ER status in Malaysia found that ethnicity and grade were independent factors that influence ER positive rates.60–61 A study in Africa found ER status associated with grade but not stage of disease, and found ER positivity rates to be similar to Western studies, suggesting earlier reported high ER negative cancers in Africa may be an artifact of poor tissue sampling and processing that results in high HR negative rates.59 A large prospective study in East Africa found that ER/PR positivity was not associated with stage of disease but was associated with tumor grade (more so for PR than for ER).61 Cost-benefit analyses suggest that every effort should be made to determine HR status, even in LRCs.61

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How is quality control for pathology managed in LRCs?

Quality control and assurance for pathology services are poorly developed in LRCs.68 Problems with poor preparation and fixation of tissue samples can result in the inability to apply advanced immunohistochemical and molecular biology techniques or to obtain reliable and consistent results.59 This may contribute to the misidentification and high reported rates of HR negative cancers.59–61 HR assessment from needle biopsies was found to be more reliable than mastectomy specimens from the same patients in two independent studies (one in the Philippines and one in Australia), possibly due to the fact that smaller needle biopsy samples were put into fixatives more quickly and were penetrated by fixative more effectively due to their smaller size.69,70

Surgical treatment

How is surgical removal of the primary tumor best performed?

Surgical treatment remains the most widely available treatment modality for breast cancer in LRCs and mastectomy is the most common surgical treatment option. (Table 2).71 It is often deployed whenever the patient is deemed operable because late-stage presentation/diagnosis is the norm and lack of radiation therapy services, good quality diagnostic oncology services and noncompliant patients make breast conservation surgery of limited value.23 Nevertheless, even for surgical mastectomy, careful patient selection is critical because the procedure is not indicated for patients with metastatic disease in whom significant morbidity and mortality may be associated. There are few quality control or assurance programs for surgical treatments in most LRCs and mastectomies are sometimes incorrectly and improperly done, contributing to poor outcome. These poor outcomes feed into local distrust of the value of medical treatment for breast cancer in LRCs. Preoperative systemic therapy followed by mastectomy has been recommended for carefully selected patients with advanced breast cancer who are deemed likely to benefit from it based on adequate clinical response.72 Breast conservation treatment is often reserved for the very small proportion of patients who present with early breast cancer in centers with adequate diagnostic oncology and radiation facilities.

What anesthesia services are available in LRCs?

General anesthesia is the most commonly employed anesthesia technique for breast surgery. In LRCs, there is a lack of physician-anesthetists, and anesthesia is often provided by trained clinical officers, physician assistants or nurses. Limitation in the availability of physician-anesthetists contributes to limited access to good
Radiation therapy

What role does radiation therapy play in LRCs?

Radiation therapy, as an adjunct to treatment of curable breast cancer, reduces incidence of loco-regional relapse and improves overall survival. In carefully selected patients in LRCs, radiation treatment can be combined with breast conservation therapy but this option is not widely available. Patients with advanced breast cancer require radiotherapy for palliation and symptom control of locally advanced and metastatic disease (Table 2).

What radiation equipment is available in LRCs?

The selection of radiation equipment depends on facility requirements and the ability to procure and maintain the equipment. Linear accelerator (linac) machines have higher facility requirements than Co60 machines, such as a reliable source of electricity and water, a well-ventilated area and a thicker shielding bunker to protect workers and patients from the emitted radiation. In contrast, Co60 machines are more difficult to procure and maintain because of international concerns about shipping and onsite security of radioactive materials. Nevertheless, Co60 machines are generally cheaper, more simple to operate and less expensive to maintain compared to linac machines. Newer generation Co60 machines are more complex and expensive than older models, making them less available and less practical for use in low resource settings.

The International Atomic Energy Agency (IAEA) inventory of radiotherapy machines in 34 low income countries (representing 946 million people) identified 93 radiotherapy centers with a total of 39 linac machines and 96 Co60 machines. Three countries, Vietnam, Bangladesh and Uzbekistan, accounted for 43% of these radiotherapy centers. IAEA estimates that worldwide, an additional 5000–7000 radiotherapy machines are needed to adequately care for the current needs of cancer patients, but this figure may be even higher considering the projected increase in incidence of cancer in future.

Systemic therapy

What role does systemic therapy play in LRCs?

The application of chemotherapy, endocrine therapy, and/or biological therapy in the adjuvant or neo-adjuvant treatment of primary breast cancer substantially decreases the risk of recurrence and increases overall survival. The selection of optimal systemic therapy is a complex process that depends on a number of factors: the risk of recurrence; available chemotherapy, endocrine therapy, and biological agents; determination of HR status; presence or absence of HER2 over-expression or amplification; likelihood that the systemic therapies will improve outcome and by approximately how much; and potential toxicity experienced with different treatment options and a health care program's ability to manage toxicity.

In LRCs, combination chemotherapy based on old but effective regimes like cyclophosphamide, methotrexate and 5-fluorouracil (CMF) provide cheap systemic treatment opportunities. Use of anthracyclines increases benefit but at the price of increased toxicity and need for more pre-treatment investigations which may not be widely available. In patients with metastatic disease, optimal treatment is the sequential use of endocrine therapy if the tumor is HR positive in addition but not concurrently with combination chemotherapy and use of the latter alone if tumor is HR negative. Most patients in LRCs cannot afford HER2 targeted agents if the tumor is HER2 positive; in such situations preference may be given to anthracycline-based chemotherapy. Guidelines for the optimal selection of therapy have been published. In addition, recommended options for therapy in countries with limited resources have been described in earlier BHGI publications. Selection of therapy depends strongly on the agents available to the treatment team, the expertise of the treatment team, and the systems in place to manage the potential toxicities of the various therapies.

Who should administer systemic therapy in LRCs?

Health care providers overseeing systemic anticancer therapy need proper training, even if they are utilizing the least toxic drug...
regimens. Systemic therapy administration and management requires multidisciplinary teams that include physicians, pharmacists and nurses, as well as laboratory technicians and social workers, all of whom should receive proper training. Poorly managed systemic treatment can reduce patient adherence and erode community confidence in the effectiveness of breast cancer treatment. Important components of training include: appropriate patient selection for systemic therapy; appropriate drug selection criteria; management of side effects or toxicities; and patient education strategies. Systemic therapy also requires laboratory and pharmacy facilities and personnel to monitor blood counts and blood chemistry, compound medications, and provide infusions, as well as the resources to manage expected and/or serious toxicities. Quality assurance programs and professional training for laboratory and support services, are needed to ensure safe and effective administration of systemic therapy.

Palliative care

What role does palliative care play in LRCs?

Palliative care is of critical importance in LRCs where a high percentage of patients present with advanced disease. More than 80% of cancer patients will require palliative care. Clinical and programmatic guidelines in palliative care that specially address LMICs have been published. WHO programmatic guidelines emphasize the need for: 1) access to affordable opioids, 2) trained and available personnel for palliative care, and 3) the development of effective home care programs—home care being the preferential approach to palliative care in LRCs. Several middle resource countries have adopted national palliative care policies and national health plans that include palliative care. These countries include Chile, Uganda, South Africa, Mongolia, and Georgia. Among LRCs, barriers to palliative care include lack of knowledge by practitioners of the correct use of opioids, fear of punishment for inappropriate use, or concern that patients may become addicted. These barriers can be addressed through education.

Home palliative care programs have been shown to be feasible and cost-effective in LRCs, including Malaysia, Jordan, Nepal, India, Bangladesh and Albania. The Sarawak Palliative Care Program in Malaysia showed that home-based care can be ensured, even in remote rural regions, by primary health care center nurses if good communication with the central hospital Palliative Care system is ensured. The Jordan Demonstration Project at King Hussein Cancer Center (KHCC) resulted in: 1) changes to regulations governing opioid prescription to facilitate effective pain management; 2) an increase in the national opioid quota and consumption; 3) interactive bedside training courses; and 4) identification of “champions”, or community leaders for palliative care advocacy. Barriers to palliative care identified in the Jordan study included lack of awareness among health staff, fear of the use of opioids, lack of professional health care providers, lack of immediate release morphine, and the 3-day limit on morphine prescriptions in that country.

Consensus recommendations

Several key points in breast cancer incidence, awareness, detection, diagnosis, treatment and palliation warrant specific emphasis, in addressing breast cancer care in LRCs. Understanding the burden of breast cancer is an important first step toward building effective and sustainable breast cancer control programs. Representative data on breast cancer incidence, mortality, survival, stage of presentation, and available diagnosis and treatment capacities are needed to help health care decision-makers recognize the prevalence and public health burden of breast cancer in their communities. These core components set the foundation for the development and expansion of breast cancer care programs.

A focus on breast cancer as a treatable disease is important in LRCs, to encourage women to present with earlier stages of disease and not wait for late-stage disease development. As more women become breast cancer survivors in a community, knowledge of breast cancer and the level of confidence in successful and appropriate medical intervention increases. The importance of early detection of breast cancer should become part of the community agenda. Breast cancer awareness educators can inform patients about the available resources to detect and treat breast cancer and coordinate with public health policymakers and health care system administrators.

Identifying barriers to early detection and treatment is another critical component of breast cancer control programs. Barriers include system barriers (such as lack of infrastructure, insufficient training of staff, and logistical barriers), financial barriers (such as expense of drugs and diagnostic and radiotherapy equipment) and environmental or patient barriers (such as lack of transportation or knowledge about appropriate and successful treatment). Development of strategies to overcome barriers should involve both community and public health leaders. Outreach to rural communities should include training local medical professionals or volunteers; a strategy that has been successful in increasing early detection in a number of pilot programs in different regions of the world.

Pathology and surgery service capacity can be barriers to care. The choice of tissue sampling techniques (FNAC, core biopsy, or surgical biopsy) largely depends on local availability of equipment, expertise and costs. Fine needle aspiration cytology (FNAC) may ameliorate the problems of inadequate pathology services in LRCs. Breast surgery (mastectomy rather than breast conservation surgery) is the primary treatment for breast cancer in LRCs. Surgical anesthesia services are often overlooked as a critical component of breast cancer patient services, despite their necessity in surgical treatment. A lack of physician-anesthesiists can delay treatment and result in poorer outcomes. Axillary staging remains a key aspect of assessing likelihood of systemic metastases and guides treatment decisions. In low resource settings, complete level I/II axillary dissection is performed in the vast majority of cases. Sentinel lymph node biopsy (SLNB) requires special surgical expertise, hospital equipment, and resources that are generally unavailable in low resource settings. SLNB may become increasingly important as more cancers are diagnosed at earlier stages.

Breast ultrasound (US) is an effective tool that can increase diagnostic capacity in breast disease and can be used as an adjunct to other diagnostic maneuvers that characterize lesions in the breast and axillary lymph nodes. US-guided needle (FNA and/or core) biopsy of breast masses or abnormal-appearing lymph nodes can assure more accurate needle placement, which in turn may lead to more accurate pathology results and reduced complications. However, the effectiveness of diagnostic breast US is highly dependent on the skill and training of the technician and on the quality of the US equipment. Newer digital US machines are smaller, have higher frequency (15 MHz versus 7.5 MHz) and greater depth of focus, thereby increasing their efficacy for breast examination, but they may be more expensive.

Identifying tumor type informs treatment options. Identifying the type of tumor informs treatment decisions. Tests for tumor markers (ER, PR, and HER2) require a certain level of quality control in the laboratory, as the hormone receptors can be destroyed by poor tissue handling or processing. The choice of treatment may be limited by both the pathology services available to determine tumor type and receptor status and the drugs available to treat different tumor types.
Basic pathology services require trained medical and laboratory staff, and adequate facilities for quality control of tissue sampling and processing that are often in short supply in low resource settings. Shared, centralized laboratories and/or collaborative partnerships within as well as between countries have been shown to improve capacity in underdeveloped or remote health care communities.

Sentinel lymph node biopsy (SLNB) is a technique that can be considered as an alternative to complete axillary lymph node dissection for small tumors if adequate infrastructure is available. Because patients in LRCs present with rather advanced disease, standard level I and II axillary dissection remains the gold standard for axillary staging and treatment. SLNB requires appropriate surgical expertise, and hospital equipment and resources that are available in only few urban centers in LRCs.

Radiotherapy is not widely available in low resource settings, but should be a realistic goal of cancer control programs. When post-operative radiotherapy is not available, breast conservative surgery is not recommended; instead mastectomy remains the surgical treatment of choice. Postoperative radiotherapy used in locally advanced cases can reduce relapse and increase survival rates. Radiotherapy can also provide palliation for locally advanced and metastatic disease.

Preoperative treatment with chemotherapy or hormone therapy is recommended for locally advanced breast cancer. The choice of drugs depends on their cost and availability, the expertise required to administer the drugs, and the facility and logistical support to ensure patient compliance with the treatment regimen. In most low-resource settings, systemic therapy consists of inexpensive, more readily available chemotherapy. Some of these drugs are more toxic than others and require special training to administer safely. Trained medical oncologists are rarely available and chemotherapy is more often administered by primary care physicians, surgeons, or other health care professionals for whom continuing education and training are required.

Palliative care should be recognized as an important part of breast cancer treatment in low resource settings needs to occur at the national, regional and local level. Palliative care is not restricted to pain management by opioids; it includes radiotherapy, management of treatment side effects, and other breast cancer therapies—uses that need to be recognized by health care administrators and policymakers.

Training is a critical need in LRCs. While there currently many training programs in LRCs which have been graduating specialists; low levels of funding, suboptimal infrastructure and brain drain have hampered their effectiveness. Professional education and training abroad can change participants' knowledge and skill level but health systems at home should be developed to accommodate the new skills of the returning workers to prevent their emigration back to countries with higher resources. For example, in the Ghana–Norway collaborative project, a new facility and new equipment awaited the newly trained technicians and pathologists. This was combined with in-country accreditation certificates. Brain drain can be reduced and staff retention obtained by developing local training opportunities, careful participant selection criteria for training abroad, and optimal but shorter duration of training.

Summary

The BHGI Consensus Working Group confirmed many previous observations and recommendations as well as identified new areas for future focus, collaboration, and research. There is a continuing need for reliable standardized data on breast cancer incidence and mortality, tumor type, and risk factors. There continues to be a debate regarding the advantages and disadvantages of different biopsy methodologies (FNAC, core needle biopsy, surgical biopsy) as well as sentinel lymph node biopsy as an alternative to complete axillary lymph node dissection in low resource settings. An aspect of surgical treatment brought to the forefront was that of the lack of available anesthesia in low resource settings. Breast cancer screening methodology continues to emphasize CBE as an effective strategy in low resource settings with a continued debate on the value of breast ultrasound as a screening tool. Radiation equipment, in general, continues to be an issue in low resource countries. Cobalt machines are considered a good option, though the advantages and disadvantages continue to be discussed, including the need for manufacturers to address the growing need for lower cost and easier maintenance for equipment used in low resource settings. Hormone receptor testing continues to be considered critical for breast cancer management while at the same time remains a difficult area for consensus. Standardization of testing, training of pathologists and technicians and collaborative efforts between low resource countries and middle and high resource countries can help bridge this gap. The Working Group confirmed the continued need to recognize, improve, and expand palliative care in low resource settings to include not only joint pain relief (opioids) but also management of symptoms. Training is an ongoing need and development of training models that can be translated into other languages and cultural settings continues to be of interest. In addition, the group identified areas for future collaborative efforts, including the need for training programs, development of centers of excellence within countries or regions to share resources, expertise and provide needed training.

Contributors statement

The manuscript draft was based on the BHGI 2010 Summit Working Group consensus meeting and outline review, and Day 1 panel discussion and presentations. Working Group members contributed sections according to their expertise. NES incorporated sections into the main manuscript and CAA reviewed the manuscript as co-chair of the working group. All authors reviewed the draft and provided comments or substantive revisions that were incorporated into the final version as per the consensus process previously described.

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Appendix


References
