

# TANZANIA BREAST HEALTH CARE ASSESSMENT 2017

An Assessment of Breast Cancer  
Early Detection, Diagnosis and  
Treatment in Tanzania



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## **AN ASSESSMENT OF BREAST CANCER EARLY DETECTION, DIAGNOSIS AND TREATMENT IN TANZANIA**

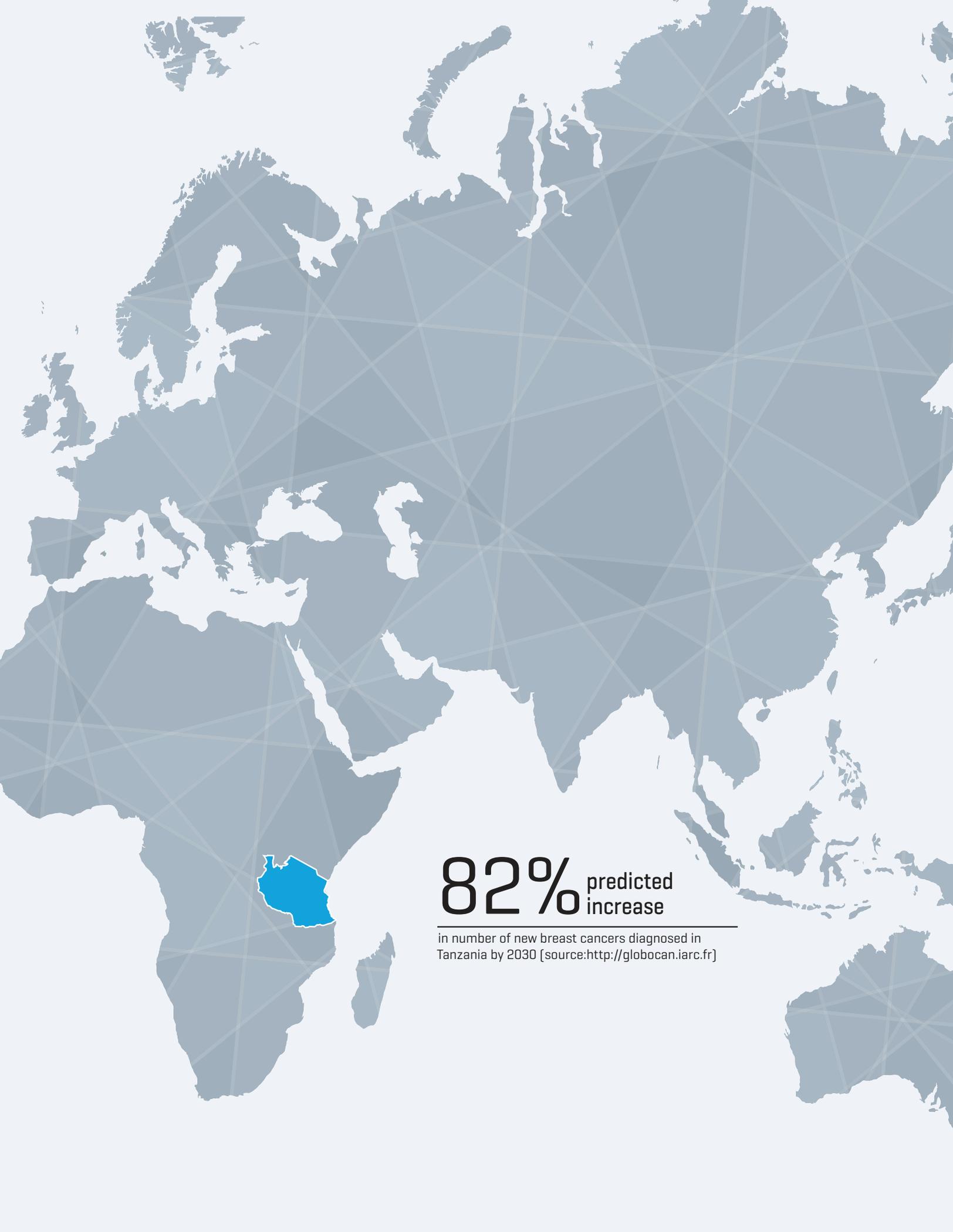
*A report carried out on behalf of the Ministry of Health, Community Development,  
Gender, Elderly and Children of the United Republic of Tanzania*



THE UNITED REPUBLIC OF TANZANIA  
Ministry of Health, Community Development,  
Gender, Elderly and Children



**BREAST  
CANCER**  
**INITIATIVE 2.5**  
Making breast health a global priority



**82%** predicted  
increase

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in number of new breast cancers diagnosed in  
Tanzania by 2030 [source:<http://globocan.iarc.fr>]

# Executive Summary

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**Background:** Following cervical cancer, breast cancer is the second most common cancer and second leading cause of cancer mortality among women in Tanzania.<sup>1,2</sup> The lifetime risk for developing breast cancer in Tanzania is approximately 1 in 20<sup>3</sup>, and approximately half of all women diagnosed with breast cancer in Tanzania will die of the disease.

At the invitation of the Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC) of Tanzania, Susan G. Komen partnered with a multidisciplinary team of breast cancer experts from the University of Washington, Fred Hutchinson Cancer Research Center, WEMA (a Tanzanian women's health organization) and the Ocean Road Cancer Institute to conduct a baseline assessment of breast health care in Tanzania. The assessment sought to:

- Review existing breast health care capacity;
- Identify the relative strengths and weaknesses of the health system; and
- Prioritize actionable items to advance breast cancer care in Tanzania.

**Methods:** In June–July 2016, a baseline assessment of breast cancer healthcare services at the primary, district, regional, zonal and national levels, was conducted through data collection, interviews and site visits to facilities in Dar es Salaam, Mbeya, Moshi and Mwanza. Tools and strategies used for the assessment were developed for Breast Cancer Initiative 2.5 (BCI2.5), a global campaign to reduce disparities in breast cancer outcomes. The data informed a resource-appropriate phased implementation plan to improve breast cancer early detection, diagnosis and treatment in Tanzania.

**Key findings:** Political support is strong and clinicians throughout the system are committed to improving breast cancer care in Tanzania. However, a number of key challenges impede availability and access to care. These challenges result in fragmented, unclear and inefficient clinical pathways for women with breast health concerns and create significant delays in detection, diagnosis and treatment. As a result, approximately 80% of women diagnosed with breast cancer in Tanzania are diagnosed at advanced stages (III or IV), when treatment is less effective and outcomes are poor.

Furthermore, protocols and guidelines for breast cancer early detection, diagnosis and treatment are not standardized. An inefficient and hierarchical referral system

adds delays and costs and increases rates of attrition. Economic issues—both at institutional and at individual levels—also present significant barriers to care. While health care for women diagnosed with breast cancer is free of charge, women are still expected to pay for essential services and commodities.

With respect to human resources, the shortage of pathologists is particularly noteworthy. Pathology is critical to determining the presence of cancer, the extent of the disease and tumor characteristics as well as planning treatment and assessing treatment effectiveness. Other personnel shortages include radiologists skilled in breast ultrasound, specialized breast surgeons (there are none in Tanzania) and medical oncologists. Finally, at the primary and district levels, health care workers are in need of additional training in breast health education, clinical breast examination and appropriate referral when abnormalities are found.

## SUMMARY OF RECOMMENDATIONS

Successful breast cancer control demands integrating early detection programs with accurate diagnosis and timely, accessible and effective treatments. Addressing any of these components in isolation will not improve breast cancer outcomes. Based on the findings of this situation analysis, the assessment team recommends that the government of Tanzania consider a resource-stratified, phased implementation approach to breast cancer detection, diagnosis and treatment.

**Prerequisites:** Standardized guidelines, protocols and trained health care workforce.

**Phase 1:** Systematic triage and diagnosis of palpable breast disease.

**Phase 2:** Resource-adapted stage-appropriate treatment planning.

**Phase 3:** Scaling up of targeted education interventions for public and health care staff and clinical breast examination (CBE) to promote the downstaging of clinically detectable disease.

**Phase 4:** Systematic upgrading of image-based diagnostic systems (technology and training) for management of non-palpable disease as a prerequisite to image-based (mammographic) screening.

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1 GLOBOCAN 2012 v1.0, Cancer Incidence and Mortality Worldwide: IARC CancerBase No. 11. Available from: <http://globocan.iarc.fr>, accessed on 26/9/2016 Ferlay, J. et al 2013.

2 Ngoma, T.A. & Mtango, D. (2002) The management of cancer patients at the Ocean Road Cancer Institute: Fifteen years' experience. Tanzania Health Research Bulletin 4, 11–18.

3 Parkin, D.M. (2003) Cancer in Africa: Epidemiology and Prevention. IARC Publications No. 153.

While ambitious, the assessment team believes that these recommendations are feasible and can be achieved if each step is adequately resourced and fully implemented. A summary of the recommendations follows:

1. Strengthen processes to ensure an effective continuum of care for the patient, including appropriate referral protocols and patient tracking.
2. Develop standardized guidelines and protocols for all aspects of breast health care in the Tanzania health system.
3. Develop a breast health/breast cancer curriculum that covers breast cancer risk factors, signs and symptoms, the role of primary health care providers, as well as specialized services including pathology, surgery and medical and radiation oncology.
4. Develop early detection and treatment guidelines that reflect resource-stratified approaches to breast cancer care, relevant to Tanzania.
5. Train health care workers in implementing standardized protocols and guidelines.
6. Prioritize the detection, treatment and diagnosis of **symptomatic** breast cancer (cancers that are detectable without the use of mammography). The introduction of screening mammography is **not advised**, until systems for the management of symptomatic disease are well established and functioning.
7. Leverage existing resources and relevant strategies employed for maternal child health or infectious disease platforms to increase access to breast health care.
8. Create opportunities for national and regional knowledge and resource exchange by linking with ministries of health in the region to share information, current research and implementation strategies.

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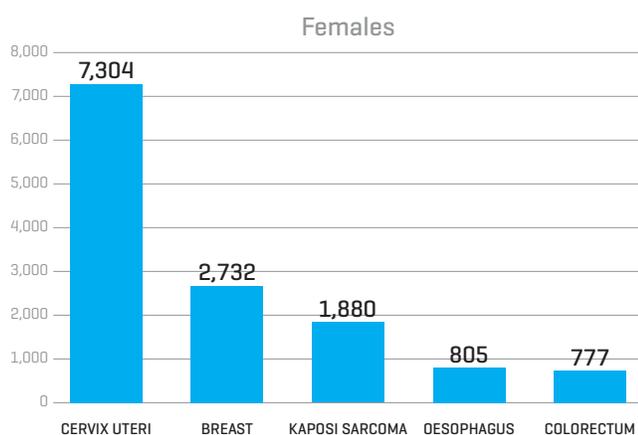
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# I. Background

Breast cancer is the most common cause of cancer death among women worldwide, representing 25–35% of all female cancer cases.<sup>1</sup> While breast cancer incidence rates are higher in high-income countries than in low- and middle-income countries (LMICs), case-fatality rates are disproportionately higher in LMICs, due to limited capacity to implement prevention, early detection and treatment programs. In Tanzania, breast cancer represents 14.4% of new cancers among women. The age-standardized breast cancer incidence in Tanzania is 19.4/100,000 women and the age-standardized breast cancer mortality rate is 9.7/100,000. This translates to a mortality-to-incidence ratio (MIR) of 0.5, indicating that half of all women diagnosed with breast cancer in Tanzania will die of the disease. The numbers of new breast cancers are projected to increase from 2,732 in 2012, to 4,961 cases in 2030, an increase of 82%. Projections for breast cancer deaths follow the same pattern, with an increase of 80% in breast cancer deaths by 2030.<sup>4</sup>

**Figure 1: Number of cancer cases, Tanzania, 2012.**



Source: WHO Cancer Country Profile, 2014: [http://www.who.int/cancer/country-profiles/tza\\_en.pdf?ua=1](http://www.who.int/cancer/country-profiles/tza_en.pdf?ua=1)

Currently, approximately 80% of women diagnosed with breast cancer are diagnosed at advanced stages of disease and have limited access to early detection, diagnosis and treatment services. Consensus findings from a variety of retrospective studies point to late stage at diagnosis, with the majority of patients presenting with

stage III or IV disease. A recent prospective study based at Muhimbili National Hospital (MNH) and Tumaini Hospital collected data on tumor stage, type and nodal status from 348 women, aged 28 to 79 years old with stage I-III breast cancer undergoing modified radical mastectomy. Patients with stage IV were excluded. The majority of patients (83.7%) presented with stage III disease and 16.3% with stage II.<sup>5</sup> Other studies have reported similar stage distributions: 5.2% with stage II disease, 57% with stage III and 37.5% with stage IV;<sup>6</sup> and 32.1% with stage III and 57.8% with stage IV<sup>7</sup> (see Table 2).

**Table 1: Breast cancer and health economic demographics in Tanzania<sup>8</sup>**

United Republic of Tanzania	
Total population	51,822,621
Breast cancer incidence per 100,000 [age-standardized rate]	19.40
Breast cancer incidence per 100,000 [crude rate]	11.50
Breast cancer incidence per 100,000 [cumulative risk]	2.12
Breast cancer mortality per 100,000 [age-standardized rate]	9.70
Breast cancer mortality per 100,000 [crude rate]	5.70
Breast cancer mortality per 100,000 [cumulative risk]	1.07
Disability-Adjusted Life-Years per 100,000 [age-standardized rate]	385.97
Disability-Adjusted Life-Years per 100,000 [crude rate]	57.06
Female life expectancy at birth	65.75
Gross National Income per capita, Atlas method [current US\$]	920
Health expenditure per capita [current US\$]	49.32
Health expenditure, total [% of GDP]	7.31
Years life lost due to breast cancer per 100,000 [age-standardized rate]	367.60

4 GLOBOCAN 2012. International Agency for Research on Cancer. [http://globocan.iarc.fr/old/burden.asp?selection\\_pop=1938346&selection\\_cancer=3152&Text-c=Breast&pYear=3&type=0&window=1&submit=%C2%A0Execute%C2%A0](http://globocan.iarc.fr/old/burden.asp?selection_pop=1938346&selection_cancer=3152&Text-c=Breast&pYear=3&type=0&window=1&submit=%C2%A0Execute%C2%A0)

5 Mwakigonja, A. R., H. Rabel, N. A. Mbembati and L. E. Lema (2016). "The pattern of prognostic and risk indicators among women with breast cancer undergoing modified radical mastectomy in Dar es Salaam, Tanzania." *Infect Agent Cancer* **11**: 28.

6 Mbonde, M. P., H. Amir, N. A. Mbembati, R. Holland, R. Schwartz-Albiez and J. N. Kitinya (1998). "Characterisation of benign lesions and carcinomas of the female breast in a sub-Saharan African population." *Pathol Res Pract* **194**(9): 623–629.

7 Burson, A. M., A. S. Soliman, T. A. Ngoma, J. Mwaiselage, P. Ogweyo, M. S. Eissa, S. Dey and S. D. Merajver (2010). "Clinical and epidemiologic profile of breast cancer in Tanzania." *Breast Dis* **31**(1): 33–41.

8 GLOBOCAN, The World Bank, and the Institute for Health Metrics and Evaluation (IHME) as summarized in the BCI2.5 Global Breast Cancer Health Analytics Map (GloBAM) (<http://globam.fredhutch.org/>).

A number of retrospective studies have evaluated estrogen receptor [ER] staining in archival blocks. The proportion of ER positive [ER+] tumors diagnosed range from 33% to 48% [see Table 2]. The proportion of ER+ breast cancers has important implications for treatment planning, since ER+ tumors respond well to endocrine therapy such as tamoxifen, which is ineffective in ER negative [-] tumors.

**Table 2: Stage distribution and proportion of estrogen receptor positive tumors in Tanzania**

Hospital [year]	N	Age/Stage Distribution	Percentage ER + tumors	Reference
Muhimbili National Hospital	60	Unavailable	ER+: 33%	[Mbonde, Amir et al. 2000] **9
Bugando Medical Center [2003-2010]	69 [Case series]	Mean Age 51 Stage II: 26.3% Stage III: 31.6% Stage IV: 31.6%	ER+: 47.8% PR+: 68.1%	[Amadori, Serra et al. 2014] <sup>10</sup>
ORCI and Muhimbili National Hospital [2007-2009]	57 [Case series]	Stage I: 1% Stage II: 9.2% Stage III: 32.1% Stage IV: 57.8%	ER+/PR+: 43.1% ER+/PR-: 7.7%Z	[Burson, Soliman et al. 2010] <sup>7</sup>
Bugando Medical Centre [Unknown ]	52 [Random selection]*	Mean Age: 49 Stage I/II: 19.2% Stage III/IV: 80.8%	ER+: 32.7% PR+: 42.3% HER2+: 23.1%	[Rambau, Masalu et al. 2014] <sup>11</sup>

\*All patients given adjuvant hormonal therapy with ER testing

## REQUEST FOR ASSISTANCE

Given the growing burden of breast cancer in Tanzania, the Ministry of Health, Community Development, Gender, Elderly and Children [MoHCDGEC] requested support from Susan G. Komen to conduct a baseline assessment of breast health care in Tanzania. This is in keeping with the government's commitment to improve prevention and management of non-communicable diseases as part of its current Health Sector Strategic Plan [HSSP IV, 2015-2020].



- 9 Mbonde, M. P., H. Amir, R. Schwartz-Albiez, L. A. Akslen and J. N. Kitinya [2000]. "Expression of estrogen and progesterone receptors in carcinomas of the female breast in Tanzania." *Oncol Rep* 7(2): 277-283.
- 10 Amadori, D., P. Serra, S. Bravaccini, A. Farolfi, M. Puccetti, E. Carretta, L. Medri, O. Nanni, M. M. Tumedei, J. Kahima and N. Masalu [2014]. "Differences in biological features of breast cancer between Caucasian [Italian] and African [Tanzanian] populations." *Breast Cancer Res Treat* 145(1): 177-183.
- 11 Rambau, P., N. Masalu, K. Jackson, P. Chalya, P. Serra and S. Bravaccini [2014]. "Triple negative breast cancer in a poor resource setting in North-Western Tanzania: a preliminary study of 52 patients." *BMC Res Notes* 7: 399.

## II. Assessment Methodology

Susan G. Komen partnered with a multidisciplinary team of breast cancer experts from the University of Washington, Fred Hutchinson Cancer Research Center (FHCRC), WEMA [a Tanzanian women's health organization] and the Ocean Road Cancer Institute (ORCI) in Dar es Salaam to carry out the assessment. Tools and strategies used for this assessment were developed for Breast Cancer Initiative 2.5 (BCI2.5),<sup>12</sup> a global campaign to reduce disparities in breast cancer outcomes. The assessment sought to review capacities of existing services, identify the relative strengths and weaknesses of the health system and document the gaps, priority areas and potential actionable recommendations for building capacity within the Tanzanian health care system to improve detection, diagnosis and treatment of breast cancer.

The assessment was implemented in three phases:

**1. Planning phase:** In April 2016, University of Washington and WEMA representatives met with the Focal Person for Reproductive Cancers within the MoHCDGEC to review the proposed assessment methodology, and to better understand the Ministry's goals and objectives with regard to the assessment. The Ministry requested that the team focus its efforts on examining [1] available treatment and facilities for breast cancer care and [2] the patient journey through the health system with respect to breast cancer. Based on input from the Ministry, the assessment plan was revised, and sites were selected. A review of relevant literature was also conducted.

**2. Pre-visit data collection and preliminary analysis:** In June-July 2016, with approval from the MoHCDGEC, preliminary data were collected during site visits to primary, district, regional and national healthcare facilities in Dar es Salaam, Mbeya, Moshi and Mwanza [see Table 3]. Two surveys, developed for BCI2.5 to assess breast cancer health care delivery, were administered by trained personnel from WEMA. The first—the Breast Health Care Assessment Questionnaire—was administered at the district, regional, zonal and national level facilities. It assessed breast cancer screening practices; programs to educate women about the importance of breast cancer early detection, and the availability of breast cancer

surgery, pathology, radiation treatment and systemic therapy services in target hospitals. The questionnaires were developed in alignment with the Breast Health Global Initiative (BHGI) resource-stratified evidence-based guidelines for breast cancer early detection,<sup>13</sup> diagnosis and pathology,<sup>14</sup> treatment,<sup>15</sup> healthcare systems,<sup>16</sup> and palliative care.<sup>17</sup> The second survey—the patient targeted Referral Process Evaluation questionnaire—assessed patient experiences with breast cancer screening, referral and treatment. Twenty-nine women were interviewed at 14 different institutions. The questionnaires are presented in Appendix II, and were approved by the Fred Hutchinson IRB and by the MoHCDGEC.

Table 3 lists the sites visited by WEMA interviewers, where they met with hospital staff and cancer specialists. Interviewees' responses were directly entered via an internet based interface into a REDCap database—a secure, web-based data collection tool hosted by FHCRC. Standardized reports were generated for each site.

**3. In-country assessment visit:** In July 2016, a multidisciplinary team [see p.22] of international and Tanzanian clinicians, researchers and public health professionals convened in Tanzania to meet with MoHCDGEC representatives, patients, advocates and clinicians and conduct site visits at facilities in Dar es Salaam, Mwanza and Moshi [see Table 3 and Figure 1]. All members visited the Ocean Road Cancer Institute (ORCI) and then split into two teams to visit the remaining sites before reconvening in Moshi to review and consolidate findings. The site visits were essential to understanding the existing operational, human resource and infrastructure capacity, clinical pathways, patient tracking and referral practices—including interactions both within institutions and between institutions—as well as facilitators and barriers to seeking care [e.g., sociocultural, structural, financial] at the institutional and patient level.

### LIMITATIONS OF THE ASSESSMENT

While the combined approach of pre-visit questionnaires and follow-up visits was effective for evaluating capacity at the specific sites that were targeted, the sample

<sup>12</sup> BCI2.5: [www.bci25.org](http://www.bci25.org)

<sup>13</sup> Smith, R. A., M. Caleffi, U. S. Albert, T. H. Chen, S. W. Duffy, D. Franceschi and L. Nystrom [2006]. "Breast cancer in limited-resource countries: early detection and access to care." *Breast J* 12 Suppl 1: S16-26.

<sup>14</sup> Shyyan, R., S. Masood, R. A. Badwe, K. M. Errico, L. Liberman, V. Ozmen, H. Stalsberg, H. Vargas and L. Vass [2006]. "Breast cancer in limited-resource countries: diagnosis and pathology." *Breast J* 12 Suppl 1: S27-37.

<sup>15</sup> Eniu, A., R. W. Carlson, Z. Aziz, J. Bines, G. N. Hortobagyi, N. S. Bese, R. R. Love, B. Vikram, A. Kurkure, B. O. Anderson, T. Global Summit and P. Allocation of Resources [2006]. "Breast cancer in limited-resource countries: treatment and allocation of resources." *Breast J* 12 Suppl 1: S38-53.

<sup>16</sup> Anderson, B. O., C. H. Yip, S. D. Ramsey, R. Bengoa, S. Braun, M. Fitch, M. Groot, H. Sancho-Garnier, V. D. Tsu, S. Global Summit Health Care and P. Public Policy [2006]. "Breast cancer in limited-resource countries: health care systems and public policy." *Breast J* 12 Suppl 1: S54-69.

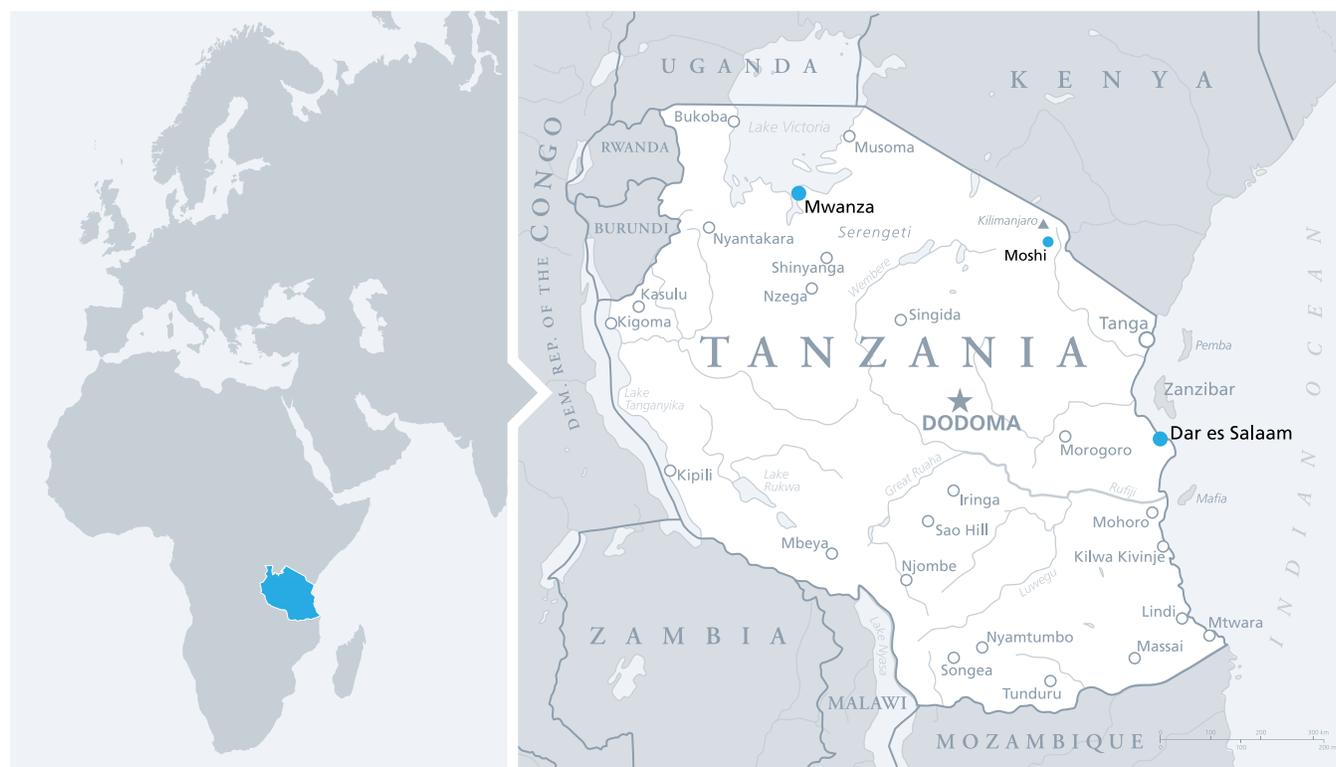
<sup>17</sup> Distelhorst SR, et al. Optimisation of the continuum of supportive and palliative care for patients with breast cancer care in low- and middle-income countries: executive summary of the Breast Health Global Initiative, 2014. *The Lancet Oncology*, 16(3): e137-e147, March 2015.

was limited as it was not possible to visit facilities in all regions, or all facilities in a single region. In addition, the assessment focused only on the Tanzania Mainland. Given these limitations, as well as Tanzania's cultural and geographic diversity, the findings from this assessment may not be representative of similar levels of care in all

regions. Furthermore, the team's visits were short in duration and not all key medical personnel were available for interviews. Of note, only a partially completed questionnaire is available from Mbeya Zonal Referral Hospital, and no in-person site visit was performed.

**Table 3: Assessment interview respondents and site visits**

Site	Level	Survey Respondents (May 2016)	In-Person Interviews (July 2016)
Aga Khan Hospital, Dar es Salaam	Private	Oncologist, Pathologist, Pharmacist	Surgeon, Radiologist, Oncologist
Bugando Medical Center, Mwanza	National	Cancer registry administrator, Medical doctor, Medical oncologist, Nurse, Pharmacist, Radiologist [2], Surgeon	Director/Surgeon, Surgeon, Radiologist, Oncologist, Pathologist
Muhimbili National Hospital Dar es Salaam	National	Endocrinologist, Medical oncologist [3], Nurse [2], Nutritionist, Pathologist [2], Pharmacist, Radiologist, Surgeons [2]	Medical oncologists [3], Nurses [2], Pathologists [2], Surgeons [4]
Ocean Road Cancer Institute	National	Medical oncologist [4], Medical record administrator, Nurse [3], Radiation oncologist	Medical/radiation oncologists [6], Nurses [6], Medical record administrator, MOH representative
Kilimanjaro Christian Medical Center, Moshi	Zonal	Administrator, Cancer registry administrator, Medical oncologist, Nurse [4], Pathologist, Pharmacist, Radiologist, Surgeon	Administrator, Cancer Registry Administrator, Medical Oncologist, Nurse [4], Pathologist, Pharmacist, Radiologist [2], Surgeon
Mbeya Zonal Referral Hospital	Zonal	One respondent, role unknown	N/A
Mawenzi Regional Hospital, Moshi	Regional	Medical doctor [2], Nurse, Pharmacist, Radiologist [2], Surgeon	Medical Doctors [2], Surgeon
Sekou Toure Regional Hospital	Regional	Medical doctor [2], Medical record administrator, Pharmacist	Director/surgeon, Medical doctors [3], Medical record administrator, Nurse [2], Pharmacist
Magomeni Clinic, Dar es Salaam	Primary	N/A	Director, Nurse [2]
Buzuruga Clinic, Mwanza	Primary	N/A	Director, Nurse [1]

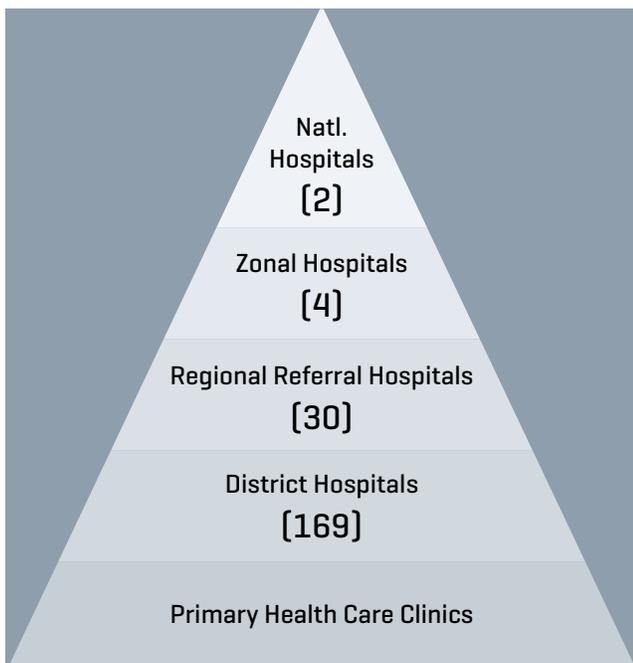


# III. Key Findings

## TANZANIA’S EXISTING HEALTH SYSTEM

Tanzania’s health and social welfare services are provided from community level up through progressively higher levels of care [see Figure 2: Tanzania Mainland Health System]. In addition to the two public national hospitals and four zonal hospitals, Tanzania has 30 regional referral hospitals and 169 district hospitals. Due to constraints in human resources and in supplies of key health commodities, not all services perform as intended. Geographic distance to services is also a significant barrier to timely care, especially for rural populations. Nevertheless, important strengths exist within the system providing opportunities for improvement and further development.

**Figure 2: Tanzanian health care structure**



## STRENGTHS OF THE CURRENT SYSTEM

The team noted a number of important strengths within Tanzania’s health system that can be leveraged to improve breast cancer early detection, diagnosis and treatment.

**Political commitment:** Leadership at the Ministerial level is an essential prerequisite to implementing reforms. The Mainland Government of Tanzania has demonstrated a strong commitment to non-communicable disease prevention and treatment, with a focus on cancers. In 1996, it established the Ocean Road Cancer Institute, and in 2013, it issued a National Cancer Control Strategy,

2013–2022.<sup>1</sup> Since then, considerable progress has been made in several areas—including expanding coverage of cervical cancer screening and treatment for pre-invasive cervical lesions. These efforts provide a critical platform for strengthening breast cancer early detection and care. The Ministry, in collaboration with international partners, has also supported advances in pediatric cancer care.

**Infrastructure:** Several public-private partnerships are currently underway to strengthen cancer care at the Zonal level. Kilimanjaro Christian Medical Center (KCMC), with international support through the Foundation for Cancer Care in Tanzania (FCCT), has begun construction of a new cancer care wing, with plans to include the full range of diagnostic, surgical and treatment services, including radiation therapy. Similarly, important investments are being made at the Bugando Medical Center (BMC) where a Cobalt<sup>60</sup> radiation therapy unit has been installed but is not yet commissioned. Two vaults have been constructed for linear accelerators (LINACs) and two used LINACs have been delivered, although the cost of installing and maintaining the LINAC machines has proven prohibitive and they remain in boxes.

**Human resources:** Tanzania has 58 registered radiologists and 30 registered pathologists. The team met with several cancer specialists who are motivated, well-trained and committed to improving cancer care within their facilities and nationally [e.g., KCMC has a South Africa-trained medical and radiation oncologist leading the effort to introduce comprehensive cancer care at KCMC]; however, the country needs additional cancer specialists in surgery, radiology, oncology and pathology—where shortages currently impede provision of high-quality care. As is the case throughout much of sub-Saharan Africa, human resource shortages in the health care sector in Tanzania are significant, with more than half of all health worker positions unfilled.

**Investments in communicable diseases:** The majority of health-related investments in Tanzania have targeted infectious diseases, such as HIV, tuberculosis and maternal and child health. These investments have strengthened the health system and could be leveraged to improve breast cancer-related care. Important progress has been made, for instance, in supply chain management and delivery of critical commodities, diagnostic and treatment capacity, record-keeping and patient tracking, health information systems development, community- and home-based care, outreach and education, engagement of traditional healers and other key community leaders and palliative care. To

<sup>1</sup> [www.orci.or.tz/about\\_us.php](http://www.orci.or.tz/about_us.php)

augment breast health care, patient-held cards similar to those used for communicable diseases and maternal and child health could be introduced to track visits, diagnostic procedures and treatment. Home-based care models used for people with HIV also could potentially be adapted for patients with late-stage breast cancer.

**Survivorship and breast cancer awareness:** Several organizations have pursued efforts to raise awareness about breast cancer locally and nationally. These include the Medical Women’s Association of Tanzania [MEWATA] and the Tanzania Breast Cancer Foundation [TBCF], led by breast cancer survivors. These groups can serve as key partners in government efforts to raise awareness about the importance of breast cancer early detection and supporting women going through diagnosis and treatment. It will be important, however, that these organizations align with the government’s recommended guidelines to ensure that they are appropriate for available resources.

## OPERATIONAL, FINANCIAL AND STRUCTURAL GAPS

### Operational gaps

Despite advances in addressing communicable diseases, the assessment identified several key challenges that contribute to fragmented, unclear and inefficient clinical pathways for women with breast health concerns, resulting in significant delays at every stage of the detection, diagnostic and treatment process.

- The existing referral system creates inefficiencies in the system and hinders women from accessing timely and appropriate care. Currently, women are required to proceed through each level of the health care system [see Figure 2] and may be financially penalized for skipping steps that provide redundant services even when it is clear that necessary diagnostic and treatment capacity to address a breast health concern is available only at higher-level facilities [i.e., zonal or national facility]. With each referral to a new facility, the risk of falling out of care grows, as both the cost and time required increase. This is especially burdensome for rural residents. As a result, it is likely that many women do not receive the care they need, receive only partial care, or receive care too late, when the cancer is very advanced.
- At this time there is no national cancer registry or method of patient tracking from diagnosis to final outcome. This results in patients being lost to care and prevents accurate assessment of the burden or impact of interventions.

### Financial gaps

Economic issues—at the institutional and at individual levels—present significant barriers to care.

**Institutional level:** Tanzania’s health sector is largely funded through bilateral and multilateral donor sources. Funding levels are inadequate, especially in the areas of non-communicable diseases which include cancers. While the government allocates funds for personnel, equipment and commodities, shortages in all categories are common. In some cases, shortages are not just due to financial shortfalls, but also to breaks in the supply chain. The result is that health care institutions are left to fill gaps by any means possible, including passing costs to patients.

**Individual level:** While cancer care is free to patients with a confirmed cancer diagnosis, there can be significant expenses associated with the pre-diagnostic phase as well as treatment. These out-of-pocket costs to patients are often prohibitive, leading to partial or ineffective care or no care at all. In addition to the costs for clinical and laboratory services, costs of travel and housing, loss of work and childcare needs all contribute to making care inaccessible for many women.

As part of the assessment, data were collected from 29 women seeking breast cancer-related care at a variety of facilities. Of these, 18 women said that financial constraints contributed to delays in seeking care, while 12 could not afford the recommended treatment. Seven had access to insurance, while the remainder used savings, sold personal items or borrowed money for their care. [see Table 4]

### Structural gaps

A number of structural gaps were identified including shortages of equipment and other key commodities, a lack of trained health care professionals across all levels and a lack of standardized protocols including those encompassing referral guidelines. These gaps lead to significant delays for women seeking appropriate and timely early detection, diagnosis and treatment.

**Supply and equipment shortages:** Shortages in key commodities pose additional challenges. Although shortages are common throughout the health care system, those relevant to breast cancer diagnosis and treatment are significant, for example:

- Supplies and reagents required for performing diagnostic pathology tests essential in determining the presence of cancer, extent of the disease and tumor characteristics in order to prescribe appropriate and effective treatment, are often unavailable even when appropriate technology and facilities are present.
- At the zonal and national levels, shortages in chemotherapy drugs and morphine for pain control are common, resulting in patients paying out of pocket and/or failing to complete the recommended treatment, which seriously limits therapeutic benefit.

**Lack of health care workers trained in breast health, pathology and cancer:** In the context of breast cancer care, the shortage of pathologists is particularly noteworthy. Performing pathology evaluations is critical to diagnosing cancer, ascertaining hormone receptor status, planning treatment and assessing treatment effectiveness, and is thus essential to breast cancer care. Other personnel shortages noted included radiologists skilled in breast ultrasound, specialized breast surgeons [there are none in Tanzania] and medical oncologists. In addition, at the primary and district levels, health care workers need additional training in breast health education, clinical breast examination and appropriate referral when abnormalities are found.

**Lack of standardized protocols:** Across all facilities, protocols for breast cancer early detection, diagnosis and treatment did not appear to be standardized. For example, the Breast Imaging Reporting and Data System [BI-RADS] is inconsistently used where breast imaging is performed.<sup>2</sup> Another significant gap in protocols is handling of pathology samples. Surgery often occur be-

fore biopsy of the suspected tumor and tissue are often discarded. This practice while common in sub-Saharan African countries, is a significant obstacle to improving breast cancer outcomes, because evaluation of tissue is critical for determining the underlying cancer biology, necessary for planning appropriate adjuvant drug and/or radiation therapies. Development of clear guidelines and standards, appropriate to all levels of care is encouraged.

**Lack of efficient referral system and guidelines:** A more efficient referral system with clear guidelines and protocols is needed. This will allow women to access the care that they need at the appropriate institution, without having to be referred through each level of the health care system, which contributes to substantial delays in receiving care. According to the results of the same survey of 29 women noted above, responses indicate that women visited an average of three hospitals [range: 2 to 6] over an average period of 7.9 months before being seen at the facility at which they were interviewed [see Table 4]. “Mary’s Story”<sup>3</sup> illustrates some of the challenges that women face in accessing care.

## MARY’S STORY

Mary is a 55-year-old widow and mother of two. She is a farmer in a rural district in the north. While bathing, Mary found a lump in her breast. She first went to her primary health clinic, where she was told it was probably an infection and was given antibiotics. When the lump persisted, Mary went back to the clinic and was told to go to the district hospital. There, she was told she should go to the regional referral hospital, where her doctor reassured her that nothing was wrong. Mary insisted that she wanted the lump removed, so two months later, she had surgery.

The tissue was excised and thrown away, with reassurances again that she should not worry. Three months later, she began to develop pain. She kept returning to the hospital until, nearly six months after the surgery, she was given an injection for pain and referred to the zonal hospital for evaluation. At the zonal hospital, Mary underwent a series of tests but did not get the results for another five months as it took time for her to find enough money to cover the private laboratory costs. Mary was told then that she had breast cancer. She had surgery to remove her breast and was referred to ORCI for further treatment.

The travel costs to Dar es Salaam were very expensive, but she was able to collect contributions from family members to make the trip. At ORCI, she was told to go to Muhimbili National Hospital for further diagnostic evaluation. Once there, she was told that she needed to get the tissue sample from the zonal hospital where she was treated. Because that was not possible due to the costs involved, she returned to ORCI, where she was told to purchase 12 cycles of chemotherapy. Each cycle cost 750,000 Tsh—about \$345—and she could only afford six cycles. Mary was also told she should have radiation, but the backlog meant that she would have to wait three months for her first treatment. She decided against it and returned home after her sixth treatment.

<sup>2</sup> BI-RADS uses standardized terminology to characterize findings, where each term corresponds to likelihood of malignancy and subsequently informs management. Using a standardized system for breast imaging interpretation can reduce unnecessary interventions to evaluate palpable findings and subsequently improve resource allocation, particularly in low-resource settings.<sup>2</sup>

<sup>3</sup> Mary’s Story is drawn from interviews with breast cancer survivors and current patients in Dar es Salaam, Tanzania. Mary is not her real name.

**Table 4: Data collected from 29 women with breast cancer in 14 institutions in Tanzania\*\***

Metric	Freq./Average
Time between first symptoms and seeking care	1.8 years
System delay—time to see a doctor who provided appropriate care [e.g., detection, diagnosis, or surgery] for breast health concerns	7.9 months
Wait time to receive surgery at zonal/national level hospitals (N=25)	7 weeks [range 1 week–6 months]
Wait time to receive chemotherapy after diagnosis	10 weeks [2 weeks–6 months]
Wait time to receive radiation therapy	10 weeks [range 4 weeks–6 months]
Number of hospitals/centers visited before arriving at the center where they were interviewed	3 hospitals [range 2–6]
Payment options*	
Public Health Insurance	7
Out-of-pocket [savings, loans, sale of personal items]	22

\*18 women said financial constraints contributed to delay in seeking care, and 12 couldn't afford treatment

\*\*Patient-targeted Referral Process Evaluation questionnaire

## CURRENT CAPACITY AND GAPS IN BREAST HEALTH AND CANCER CARE BY HEALTH CARE LEVEL

**Primary health care level:** The team visited two primary health care clinics

- Magomeni Clinic, Dar es Salaam,
- Buzuruga Clinic, Mwanza and TPC, Moshi

Based on site visits and interviews with current and former patients, primary health care services are very limited in their ability to address breast health concerns. While some health care providers [primarily midwives and assistant medical officers] reported conducting CBE, especially as part of obstetric and gynecologic care, others noted that CBE is usually not performed unless the woman reports a problem. A variety of sources reported that many health workers at this level mistakenly diagnose breast lumps as cysts, abscesses or mastitis and prescribe antibiotics, instead of sending women for diagnostic work-up. This indicates a need for additional training of health care providers on signs and symptoms of breast cancer. Further diagnostic work-up, such as ultrasound, is not available at this level, and women are typically referred to the district level for additional assessment. However, district-level health facilities, are equally unlikely to have any capacity to perform this assessment. Tables 5 and 6 summarize these findings.

**District health care level:** Based on interviews with providers and patients, breast health services appear to be essentially non-existent at the district level, with the exception of clinical breast exams. These are carried out

as part of gynecological care, or when women present with breast symptoms. Therefore, women referred to the district level for breast health concerns typically need to continue on to a higher level of care, adding additional expenses and logistical burdens. The team visited one district hospital, which receives an additional annual operating budget from the TPC sugarcane company to provide healthcare for its workers and their families. For this reason, it was likely not representative of district facilities in the country at large. This facility, however, provided an example of what could be feasible with additional resources—for example, ultrasound exams using appropriate frequencies for breast tissue imaging and guiding FNA sampling, with tissue samples being sent to KCMC for analysis.

**Regional referral hospitals:** The team visited two regional referral hospitals:

- Sekou Toure Regional Hospital, Mwanza
- Mawenzi Referral Hospital, Moshi.

Staff at both facilities confirmed that CBE is performed for early detection, although usually only when women present with symptoms.

Neither screening nor diagnostic mammography is available at either institution. Both facilities have the capacity for ultrasound breast imaging. FNA sampling is performed at Mawenzi Hospital, but not at Sekou Toure. Neither facility has the capacity for tissue analysis. FNA samples taken at Mawenzi are sent to KCMC for cytological evaluation, but results from the diagnostic process are rarely returned.<sup>4</sup>

Both facilities have limited breast surgery capacity, with surgery being performed by general surgeons. Our review

<sup>4</sup> It was unclear whether patients received adequate education from their providers about what the next step in the clinical pathway should be if the pathology result was benign vs. malignant. Further, no radiology-pathology concordance was performed. Radiology-pathology concordance is a critical quality assessment step to confirm that the pathology results match the ultrasound findings and limits false-negative or false-positive pathology results from influencing patient care.

based on informal interviews with surgical staff suggested that while some surgeons are versed in standard surgical technique for modified radical mastectomy, others are not. This lack of training is important as inadequate surgical resection increases the risk of local recurrence in the breast or on the chest wall.

Surgically excised tissues are not routinely sent for pathology analysis. When excisional biopsies are performed and surgical pathology is requested, tissue samples are sent either to the appropriate zonal hospital for pathological analysis, or to private laboratories. Patients are responsible for collecting the pathology report, which is usually an out-of-pocket expense, and for bringing their pathology results to the next step in their clinical pathway.

Costs to travel to and access treatment at higher-level hospitals can also be high, and it is likely that a significant proportion of patients choose not to pursue care at that point.

**Zonal hospitals:** The team visited three of the four designated zonal hospitals in Tanzania:

- The Bugando Medical Center, a public-private hospital, Mwanza
- Kilimanjaro Christian Medical Center (KCMC), a public-private hospital, Moshi
- Muhimbili National Hospital, Dar es Salaam
- Mbeya Zonal Referral Hospital,

Both KCMC and Bugando have plans to increase capacity in oncology services. While questionnaire data was collected from the Mbeya Zonal Referral Hospital, which serves the Southern Zone, only one respondent (role unknown) completed part of the questionnaire, and the assessment team did not visit this site.

- **Bugando Medical Center (BMC), Mwanza.** At BMC, general surgeons perform about 40 modified radical mastectomies per month; however, procedures are not standardized, with some, but not all surgeons performing standard axillary node clearance, including removal of level I and II axillary nodes. Although the majority of patients present with locally advanced disease, few patients are provided with neoadjuvant treatment. BMC has two pathologists. Blocks are sometimes sent to India to assess receptor status. Two donated, refurbished LINAC machines are on the premises but remain in their boxes due to installation and maintenance costs. Their current CT scanner is not functional. Morphine shortages are common. Each of these limitations contributes to patients either having inadequate tissue diagnosis or undergoing incomplete multidisciplinary cancer treatment.
- **Kilimanjaro Christian Medical Centre (KCMC), Moshi.** KCMC has recently hired a new South Africa-trained

oncologist. Construction is underway for a cancer care service unit, with support from international partners. Three radiologists and seven radiographers comprise a radiology department, which uses BI-RADS. Ultrasound-guided FNA biopsy is performed, with analysis carried out on site. While a mammography machine is on the premises, it was not functioning at the time of the team's visit. Breast cancer surgery takes place at KCMC, but as in other sites, surgeons have not received specialized training in breast cancer surgery. Chemotherapy is available, but shortages are common, with patients often having to purchase drugs from private pharmacies. Radiation therapy is not available, although installation of one Cobalt<sup>60</sup> and two LINACs are planned for 2018. Most pathology services, including immunohistochemistry (IHC), are contracted out to a private laboratory in Moshi, as the cost of reagents makes it impossible to provide services at the hospital. A palliative care nurse is on staff, but the nurse's work is hampered by morphine shortages. A new electronic records system has been donated and is being installed. A hospital-based cancer registry is maintained.

**National Hospitals:** The team visited the three main national facilities:

- Ocean Road Cancer Institute, Dar es Salaam
- Muhimbili National Hospital, Dar es Salaam
- Aga Khan Hospital (a private facility), Dar es Salaam
- **Ocean Road Cancer Institute (ORCI), Dar es Salaam.** An additional constraint to breast and other cancer care is that ORCI is not a comprehensive cancer center. While it provides chemotherapy and radiotherapy to patients, it must rely on MNH for diagnostic and surgical services, where demand far exceeds capacity. This creates major challenges with continuity of care, with patients frequently being referred back and forth between the two facilities and enduring long wait times and high out-of-pocket expenses. By the time patients arrive at ORCI, they typically have locally advanced or metastatic cancer due to a combination of delay in seeking diagnosis, and/or extensive time spent navigating the referral system.  
While ultrasound imaging and FNA sampling are available, tissue samples must be sent to MNH or a private laboratory for pathology analysis. The wait time for results can be significant and costs are high. About 10 breast ultrasounds are performed each week. No standardized radiology grading system (e.g., BI-RADS) is used, and images are not stored for future reference—and may not even be printed due to paper shortages. When metastatic cancer is suspected on clinical grounds, bone and liver scans and chest x-rays can be performed. More advanced imaging such as CT

scanning, which is considered standard in higher-resource settings, is unavailable at Ocean Road requiring patients to visit outside facilities for imaging. Chemotherapy is available, although drug shortages are common, and patients may have to purchase therapies from private pharmacies. Infusions are provided in a chemotherapy unit, rather than on the wards. Two Cobalt<sup>60</sup> units are available, and a bunker has been built for a LINAC machine. Wait times for radiation therapy for breast cancer can be as long as six months. Brachytherapy is also available.

- **Muhimbili National Hospital (MNH), Dar es Salaam.** MNH serves as both a Zonal facility for the Coastal Zone as well as a national referral hospital and university teaching hospital, with a 1500-bed capacity. It partners with ORCI to provide radio and chemotherapy. Although it provides highly specialized care, it is overcrowded with long wait times for critical services such as surgery and pathology evaluation. MNH has two mammography machines, but at the time of the assessment, only one was functional. About 1000 diagnostic mammograms are performed annually. Ultrasound imaging is available (three of eight radiologists interpret breast imaging although none have received specialized breast imaging training) and BI-RADS is not used consistently.

Diagnostic pathology services are available. However, immunohistochemical evaluation of hormone receptors and measurement of HER2 is unavailable; patients are referred to private laboratories, at significant expense. Wait times for surgery at MNH are long, although a fast-track option is available for those who can pay. Surgeons generally perform modified radical mastectomies. Breast-conserving surgery is not performed. All cancer patients are referred to ORCI for chemotherapy and radiation, as needed.

- **Aga Khan Hospital (AGH), Dar es Salaam.** AGH is a private, 75-bed, tertiary care hospital with highly specialized staff. It provides comprehensive cancer care, including mammography, radiology, surgery, pathology, radiation and systemic therapy on a fee-for-service basis. Most Tanzanians consider services at Aga Khan unaffordable; however, AGH does host monthly breast cancer detection camps, providing free screening, ultrasound-guided FNA and pathology evaluation to the general public. About 50 to 100 patients are screened during each camp session, which generally yields one breast cancer case. For those patients identified through these camps, further diagnostic evaluation and treatment is covered through a welfare fund.



**Table 5: Current distribution of breast health services**

Service	Primary	District	Regional Referral	Zonal	National	Comments
Clinical Breast Exam (CBE)	✓	✓	✓	✓	✓	Generally only performed if patient presents with symptoms; low awareness of breast cancer symptoms among health workers & patients may prevent its routine use at primary and district levels.
Ultrasound (U/S) imaging	✗	✗	✓	✓	✓	U/S imaging is available in some facilities, and could be made more widely available at regional referral hospitals if obstetric U/S units are adapted for breast tissue and providers are trained. BI-RADS not routinely used. U/S-guided FNA and sampling only performed at zonal and national levels.
Mammography imaging	✗	✗	✗	✓	✓	Only available at zonal and national levels. BI-RADS used inconsistently
Pathology	✗	✗	✓	✓	✓	Limited pathology services. Shortage of pathologists in Tanzania. Inconsistent handling of tissue samples. At regional referral and zonal levels, testing often referred to private labs as government capacity is low. Histology capacity is low; reagent shortages common. IHC capacity potentially exists but reagents too expensive for public system and in short supply.
Surgery	✗	✗	✓	✓	✓	No breast surgeon specialists work in the country. Mastectomies performed by general surgeons at zonal or national level and in rare cases at a regional level. Surgical techniques not standardized between or within institutions and may vary significantly among surgeons.
Chemotherapy	✗	✗	✗	✓	✓	Chemotherapy drugs are available at KCMC, BMC and at the national level. While possible to purchase drugs directly from certain pharmacies, concerns were raised about drug purity from non-governmental sources.
Radiation therapy	✗	✗	✗	✗	✓	Available only at ORCI and Aga Khan. BMC and KCMC intend to add radiation therapy in next two years. Wait times for RT at ORCI are long.
Palliative care	✗	✗	✓	✓	✓	Chronic shortages of morphine. No home-based care available.
Psychosocial/ supportive care	✗	✗	✗	✓	✓	Social workers available in limited numbers at zonal and national levels. Primarily focused on finding financial support for patients. Limited external support comes from breast cancer survivor advocates from Tanzania Breast Cancer Foundation.
Patient Navigation	✗	✗	✗	✗	✗	No patient navigation services exist at any level.

**Table 6: Overview of breast health services available at a sample of hospitals in Tanzania**

Hospital	Level	CBE	Diagnostic mammography	Ultrasound	Tissue sampling	Pathology/ Cytology	Surgery	Chemotherapy	Radiotherapy
Sekou Toure Hospital	Regional	Yes	No	Yes	No	No	Yes	No	No
Mawenzi Referral Hospital	Regional	Yes	No	Yes	Yes	No	Yes	No	No
Bugando Medical Center (BMC)	Zonal	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No <sup>A</sup>
Kilimanjaro Christian Medical Centre (KCMC)	Zonal	Yes	No <sup>B</sup>	Yes	Yes	Yes <sup>C</sup>	Yes	Yes	No <sup>D</sup>
Muhimbili National Hospital	National	Yes	Yes <sup>E</sup>	Yes	Yes	Yes <sup>C</sup>	Yes	No	No
ORCI	National	Yes	No	Yes	Yes	No <sup>F</sup>	No	Yes	Yes
Aga Khan Hospital	Private, National	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

A. LINACs on site, but non-functional; B. Mammography machine available, but non-functional; C. Most services are contracted out to private labs; D. Planned for 2018; E. One of two functional; F. Tissues usually sent to MNH

## IV. Recommendations

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### **Improving Cancer Care in Tanzania: A Resource-Stratified, Phased Approach to Implementation**

Integrating early detection programs with accessible, timely and effective diagnosis and treatment is essential to improving outcomes and reducing breast cancer mortality. In isolation, these components will not have the desired impact. Collectively, however, they can improve breast cancer survival because treatment is most successful when breast cancer is detected early, accurately diagnosed in a timely manner and followed by accessible, appropriate and effective treatment—surgery in combination with radiation and systemic therapy.

This comprehensive multidisciplinary approach requires integrating less specialized care at primary district, and regional levels so that the largest proportion of people needing care can better access services at lower levels, removing bottlenecks in care at higher levels. Specialized care such as radiation therapy can be centralized at higher levels [i.e., Zonal and National]. Ultimately, this approach saves time and money, reduces the burden on higher level institutions and increases access to care for women.

In addition to the specific recommendations for each level of service, we present the following overarching recommendations which are not site specific but aimed at the health system as a whole:

1. Strengthen the continuum of care, including improving patient-tracking and completing early detection and treatment guidelines and referral protocols that reflect resource-stratified approaches. While this point is mentioned throughout the recommendations, it is important to emphasize that the current fragmentation of services is a significant barrier to appropriate breast cancer detection and management.
2. Train health care professions on standards of care and guidelines for early detection, diagnosis and treatment of breast cancer. Strengthen pre-service medical education by developing a breast health or breast cancer-specific curriculum that covers general information about breast cancer risk factors, signs and symptoms, the role of primary health care providers and optimal referral algorithms, as well as more specialized pre-service training in pathology, surgery and medical and radiation oncology.
3. Leverage existing resources, to the extent possible, to improve the overall cancer care environment. A number of important external investments are being made in cancer care in Tanzania, such as Duke University and the University of Minnesota's investments in KCMC, Queen's University of Canada's efforts to strengthen cervical cancer screening and treatment and breast cancer early detection, and bilateral investments in women's health care. As has already been mentioned, existing investments in HIV and in cervical cancer also may provide useful platforms for expanding and strengthening breast cancer early detection and care. Efforts of the government to coordinate both inputs from various institutions as well as cross-sectoral programs with multiple partners could be further advanced by strengthening mechanisms to track and coordinate the inputs to ensure they are in alignment with the governments objectives. As implementation of the phased approach is considered, it is critical that clinical pathways for women needing services are well-defined and feasible for patients and health workers alike. Harmonizing data management and improving communication and record-sharing between and among different services and health care levels is also crucial, so that the burden does not fall exclusively on women to track their care.
4. Create opportunities for national and regional knowledge and resource exchange. Tanzania is certainly not the only country in sub-Saharan or East Africa to grapple with how to improve breast cancer early detection, diagnosis and treatment. Linking with ministries of health in the region to share information, current research and implementation strategies would be useful, as would identifying common areas for research and regional collaboration. Further, developing national or regional societies for specialized areas [surgery, pathology, medical oncology, radiation oncology, etc.], also could be useful. Finally, exploring the feasibility and benefits of regional bulk purchasing of equipment, drugs and other key commodities may lead to important advances in access and affordability that could be passed on to patients.

## RESOURCE-STRATIFIED IMPLEMENTATION PHASES

Breast cancer control plans should be appropriate to the level of resources available, effectively target and address gaps in the existing health care system. Interventions should consider the breast health care continuum from detection to treatment rather than focusing on one aspect of care in isolation. Based on the findings of this situation analysis, the assessment team recommends that the government of Tanzania consider a resource-stratified, phased implementation approach to breast cancer detection, diagnosis and treatment.

The breast health care system must have the capacity to effectively manage all clinically detectable (palpable) breast cancers first, before any screening program—mammographic or clinical—which detects tumors that are too small to palpate is implemented. This is because only a health system that has the infrastructure and capacity to diagnose and manage **symptomatic** breast cancers, will be able manage the increase in numbers of asymptomatic (i.e., screen-detected) cancers.

Furthermore, tracking systems and scientifically valid and feasible system indicators ideally should be in place before any new strategy is implemented to assess the program's effectiveness and to establish whether changes to the health care system have been effectively implemented.

Finally, as a prerequisite, protocols and guidelines for early detection, referral, diagnosis and treatment of breast cancer should be standardized and health care professionals educated in accordance with the guidelines. The recommended phases are as follows:

- **Prerequisites:** Standardized guidelines, protocols and trained health care workforce.
- **Phase 1:** Systematic triage and diagnosis of palpable breast disease.
- **Phase 2:** Resource-adapted stage-appropriate treatment planning.
- **Phase 3:** Scaling up of targeted education interventions for public and health care staff and clinical breast examination (CBE) to promote the downstaging of clinically detectable disease.
- **Phase 4:** Systematic upgrading of image-based diagnostic systems (technology and training) for management of non-palpable disease as a prerequisite to image-based (mammographic) screening

Table 7 provides a brief summary of the current situation and suggested objectives for each phase. For additional clinical background on all components of the breast cancer care continuum as well as points for consider-

ation by policymakers, refer to the Knowledge Summaries for Breast Cancer Control found on the BCI2.5 web site ([www.bci25.org](http://www.bci25.org)).

The prerequisites and recommendations to reach these objectives are presented below, both by phase and health care system level. A summary table of these recommendations can be found in **Table 8**.

## PREREQUISITES: STANDARDIZED GUIDELINES, PROTOCOLS AND TRAINED HEALTH CARE WORKFORCE.

Training and guideline implementation and review is a continuing process across all levels and phases. Institutions at each level should continue to strengthen breast cancer management through adherence to best practices outlined in standardized guidelines and protocols, and provide on-going training to the health care workforce. In addition, the health service as a whole should continually develop and strengthen communication across services and facilities to improve the continuum of care.

## PHASE 1: SYSTEMATIC TRIAGE AND DIAGNOSIS OF PALPABLE BREAST DISEASE.

### Primary and district levels

1. Train health care workers in implementing standardized protocols and guidelines developed during the prerequisite phase
2. **Strengthen detection and triage** of palpable disease through training of health care workers.
3. Develop and display **educational materials** for women at clinics to raise awareness that breast abnormalities should be evaluated by a health care worker. Display these materials at primary and district health care levels.
4. Introduce and use a patient-held **Breast Health Card** that records date of first patient contact, diagnostic findings and all treatment received. This can be modelled on existing cards such as those used for vaccination schedules for children and cervical cancer screening, and used by the patient in the same way as other health cards. The card would record all diagnostic findings, treatment received and location of care, and would be used as the patient progresses through all levels of the health care system
5. **Breast imaging using ultrasound** at the district level can be considered if obstetric ultrasound is already present and used routinely, can be adapted to appropriate frequency (linear transducer >7.5 MHz) for breast tissue and training can be provided.

**Table 7: Objectives for improving breast health care within the Tanzania health care system**

Level	Primary & District	Regional Referral	Zonal	National
Current Status	<p>No routine CBE.</p> <p>Lack of patient information.</p> <p>Lack of health worker information, knowledge and skills re: breast cancer.</p> <p>Complicated and inefficient referral process.</p> <p>Poor understanding of clinical pathways for breast cancer.</p>	<p>Ultrasound available but little or no capacity in ultrasound-guided FNA sampling or analysis.</p> <p>Limited surgical capacity.</p> <p>No capacity in diagnostic mammography.</p> <p>No patient education.</p> <p>Poorly developed clinical pathways for breast cancer.</p> <p>Insufficient or non-existent patient tracking between institutions.</p>	<p>FNA sampling and pathology established.</p> <p>Ultrasound imaging available but BI-RADS inconsistently used.</p> <p>No or inconsistent availability of diagnostic mammography.</p> <p>Surgery performed but not standardized.</p> <p>Limited pathology services—no IHC.</p> <p>Chemotherapy available but shortages common.</p> <p>Neoadjuvant therapy uncommon.</p> <p>CT scanning available, breakdowns common.</p> <p>No radiation therapy, but plans to add underway.</p> <p>Palliative care staff available but frequent shortages of morphine.</p> <p>Cancer registries in place in some institutions but not all.</p>	<p>Fragmented care, with diagnosis and surgery at MHN and treatment at ORCI.</p> <p>Overcrowding and long wait times common for surgery, pathology, radiation therapy.</p> <p>Diagnostic mammography available although breakdowns are common.</p> <p>Breast conservation surgery rarely performed.</p> <p>Ultrasound imaging available but BI-RADS not used, images not stored.</p> <p>2 Cobalt60 machines;</p> <p>Palliative care available but morphine shortages common.</p> <p>No patient navigation.</p>
Phase 1 Objectives	<p>Identify palpable disease, ensuring that self- or clinician-detected masses are evaluated based on patient history and CBE and proper referral is made.</p>	<p>Strengthen capacity to make differential diagnoses through clinical assessment.</p> <p>Strengthen tissue sampling capacity and management of pathology results.</p>	<p>Strengthen capacity to conduct cancer diagnosis and management in each of the four Zonal Hospitals.</p>	<p>Routinely conduct TNM staging to distinguish early, locally advanced and metastatic cases.</p> <p>Perform estrogen receptor IHC to determine potential benefit from endocrine therapy (oral tamoxifen/aromatase inhibitors).</p> <p>Conduct case-specific treatment planning (curative vs. palliative).</p>
Phase 2 Objectives	<p>Identify palpable disease, ensuring that self- or clinician-detected masses are evaluated based on patient history and CBE and proper referral is made.</p>	<p>Strengthen capacity to make differential diagnoses through clinical assessment.</p> <p>Strengthen tissue sampling and management of pathology results.</p>	<p>Continue to strengthen capacity to conduct cancer diagnosis and management in each of the four Zonal Hospitals.</p>	<p>Expand capacity of ORCI so that it functions as comprehensive cancer center, providing full range of diagnostic, surgical, systemic therapy, radiation therapy and supportive care services.</p>
Phase 3 Objectives	<p>Support roll-out of clinical CBE to downstage clinically detectable disease.</p> <p>Identify palpable disease, ensuring that self- or clinician-detected masses are evaluated based on patient history, CBE, ultrasound imaging where possible and proper referral is made.</p>	<p>Expand capacity to serve as referral site for potential cases identified via systematic CBE.</p> <p>Strengthen capacity to make differential diagnoses through clinical assessment.</p> <p>Strengthen tissue sampling and management of pathology results.</p>	<p>Continue to strengthen capacity to conduct cancer diagnosis and management in each of the four Zonal Hospitals.</p>	<p>Expand capacity of ORCI so that it functions as comprehensive cancer center, providing full range of diagnostic, surgical, systemic therapy, radiation therapy and supportive care services.</p>
Phase 4 Objectives	<p>Support roll-out of clinical CBE and mammography screening where feasible to downstage clinically detectable and non-palpable disease.</p> <p>Identify palpable disease, ensuring that self- or clinician-detected masses are evaluated based on patient history, CBE, ultrasound imaging where possible and proper referral is made.</p>	<p>Expand capacity to serve as referral site for potential cases identified through systematic CBE and image-based screening.</p> <p>Strengthen capacity to make differential diagnoses through clinical and image-based assessment.</p> <p>Strengthen tissue sampling &amp; management of pathology results.</p>	<p>Continue to strengthen capacity to conduct cancer diagnosis and management in each of the four Zonal Hospitals.</p>	<p>Expand capacity of ORCI so that it functions as comprehensive cancer center, providing full range of diagnostic, surgical, systemic therapy, radiation therapy and supportive care services.</p>



### Regional referral hospital level

1. Train health care workers in implementing standardized protocols and guidelines developed during the prerequisite phase
2. **Strengthen breast cancer diagnostic capacity** so that differential diagnoses can be made. This requires:
  - a. Increasing capacity in **CBE**.
  - b. Adapt obstetric ultrasound units for breast imaging. Provide appropriate training to personnel.
  - c. Introduce **tissue sampling such as ultrasound guided FNA** and tissue quality assessment.
3. **Ensure that breast pathological evaluation can be performed on all tissue samples** at laboratories, either at private facilities, or at the corresponding zonal facility.
  - a. Particular attention should be paid to ensuring that tissue samples are of good quality and are prepared, stored and transported properly so that results are reliable.
  - b. Analysis should include cancer (TNM) staging and estrogen-receptor status.
  - c. Results should be recorded on the proposed patient's Breast Health Card and communicated to the referring doctor at the regional level, who can determine the next steps in the patient's care.

### Zonal and national levels

A key goal at the zonal and national levels is to **improve access and affordability of cancer treatment**, as well as strengthen capacity to provide cancer diagnosis and staging to distinguish early, locally advanced and metastatic cases for differential diagnosis. Recommendations include the following:

1. **Train** health care workers in implementing standardized protocols and guidelines developed during the prerequisite phase.
2. **Strengthen diagnostic capacity** to enable treatment planning based on pathology results. This requires establishing the capacity to **stage cancers** using the TNM system to distinguish between early cancers, locally advanced cancers and metastatic cases. Immunohistochemistry (IHC) testing to determine **hormone receptor status** is recommended and, if resources are available, HER2 protein over-expression. With appropriate pathology testing, neoadjuvant chemotherapy or biologic therapy such as trastuzumab/Herceptin®, could be considered.
3. **Expand surgical capacity**, and specifically, capacity to perform standardized modified radical mastectomy with proper tissue preparation and analysis. Given several of the zonal hospitals are linked to medical schools, there is also an opportunity to develop more specialized training on breast surgery during pre-service education.
4. **Expand access to systemic therapy** by dispensing **chemotherapy** at the zonal level. This requires that supplies of chemotherapy drugs be maintained and dispensed free of charge to patients so that cost is not a barrier to completing treatment.
5. **Expand access to hormonal therapies at regional and district levels**. For patients whose tumors are ER+, surgery could be provided at the regional or zonal level and subsequent tamoxifen treatment could be provided at the district or even primary care level. Tamoxifen is an inexpensive, widely available oral medication and theoretically could be administered post-surgery at lower levels of the health care system closer to the patient's home, reducing pressure on the higher levels of the health care system and making it more accessible to patients.
6. **Increase radiation therapy capacity** by moving ahead with current plans to add radiotherapy service at MBC and KCMC, but with several caveats. First, current literature suggests that while megavoltage linear accelerators (LINACs) offer some advantages, primarily for dosimetric reasons, cobalt teletherapy technology is generally easier to operate and maintain in settings with limited resources, given power supply, maintenance and training requirements. A useful summary

of the comparative advantages of and key differences between the two approaches are found in Page et al.<sup>5</sup> In either case, however, facilities installing radiation therapy capacity must also ensure that an adequate number of trained engineers are available to maintain the units. At this point in Tanzania, there is very little, if any, excess capacity.

7. **Improve access to palliative care.** Access to morphine for pain control is integral to palliation and is considered a human right.<sup>6</sup> Addressing morphine shortages and supply chain challenges at all relevant levels of Tanzania's health care system is essential.

#### National level

1. Add diagnostic and surgery capacity at ORCI so that it functions as a true **comprehensive cancer institute**. The current system in which diagnostic and surgical services are housed at MNH, with ORCI providing treatment, is causing serious fragmentation of services and an over-burdening of services at MNH. This results in a costly and burdensome clinical pathway for patients who eventually reach ORCI.
2. Build in-house **pathology capacity** to stage cancers using the TNM system and an ability to conduct immunohistochemistry (IHC) testing to determine hormone receptor status and HER2 Testing.

For both zonal and national levels, the team recommends that **patient navigation** be added as a service to support patients and their families going through treatment. In addition, partnerships across facilities—whether public, private or a combination—could be useful in securing favorable pricing in bulk for key commodities. Similarly, partnerships could be established for the purposes of training and knowledge and skills exchange, as could the establishment of national specialized societies or associations.

## PHASE 2: RESOURCE-ADAPTED STAGE-APPROPRIATE TREATMENT PLANNING.

Phase 2 emphasizes continued strengthening of stage-appropriate treatment strategies based on early detection and diagnosis of palpable disease and continued upgrading of pathology capacity. Indeed, progress towards Phase 2 services require adequate pathology be in place to determine tumor characteristics and guide treatment.

#### Primary and district levels

1. Strengthen capacity to routinely perform **CBE to identify palpable disease**.
2. Strengthen **record-keeping and patient tracking**.
3. Provide **decentralized endocrine therapy** to women with ER+ tumors.
4. **Decentralize palliation and home-based supportive care** for patients with metastatic disease. Models of home-based care for people with HIV could potentially be applicable to these patients.

#### Regional referral hospital level

1. Increase capacity at the regional referral hospitals to make differential diagnoses, including standardizing the use of **ultrasound** for breast imaging and for guiding **tissue-sampling** such as FNA.
2. **Ensure adequate pain control and palliative care**.

#### Zonal level

1. Further **consolidate and strengthen cancer diagnosis and treatment** at the zonal level and national levels, with particular focus on improved access to and quality of **pathology, diagnostic imaging [ultrasound and mammography using BI-RADS] surgery, chemotherapy and radiation therapy services**.
2. Initiate or improve hospital-based cancer registries.
3. Investigate feasibility of initiating patient navigation services and strengthening patient support.

#### National level

1. Continue upgrading diagnostic and surgical services.
2. Initiate and strengthen patient navigation services.
3. Initiate planning for national cancer registry.
4. Develop national guidelines for increasing capacity for widespread use of CBE in preparation for Phase 3, if appropriate.

5 Page BR et al. Cobalt, LINAC, or Other: What is the Best Solution for Radiation Therapy in Developing Countries? *International Journal of Radiation Therapy*, 89(3): 476-480, 2014.

6 Distelhorst SR, et al. Optimisation of the continuum of supportive and palliative care for patients with breast cancer in low-income and middle-income countries: executive summary of the Breast Health Global Initiative, 2014. *The Lancet Oncology*, 16(3): e137-e147, March 2015.

## PHASE 3: SCALING UP OF TARGETED EDUCATION INTERVENTIONS FOR PUBLIC AND HEALTH CARE STAFF AND CLINICAL BREAST EXAMINATION (CBE) TO PROMOTE THE DOWNSTAGING OF CLINICALLY DETECTABLE DISEASE.

Phase 3 marks the shift from improving detection and management of existing palpable disease to initiating active CBE to downstage clinically detectable disease, properly refer and track patients and ensure appropriate diagnostic and treatment services at regional referral, zonal and national levels.

### Primary and district levels

1. Strengthen capacity to **conduct outreach and public awareness** about breast cancer at primary and district level facilities i.e., emphasizing the importance of **early detection** among women 40 to 65 years old, with a focus on women in urban and peri-urban settings where access to further diagnosis and treatment is more likely.
2. **Train health workers** to reinforce clinical skills (CBE, medical history-taking, ultrasound imaging), key counseling and information messages, record-keeping and referral protocols.
3. **Train health workers** to refer target population for image based screening in preparation for Phase 4, if appropriate.

### Regional referral hospital level

1. Engage in breast cancer **outreach and education**, including additional **health worker training** on CBE and referral protocols, ultrasound-guided FNA biopsy sampling and differential diagnosis.
2. Train health workers to refer target population for image-based screening in preparation for Phase 4, if appropriate.

### Zonal and national levels

1. Continue strengthening and expanding service capacity in all areas to ensure that supply can meet demand of new cases identified through CBE.
2. Improve hospital based cancer registries.
3. Strengthen patient support services.
4. Engage relevant organizations such as TBCF and ME-WATA in conducting outreach to coordinate and align public health messages on screening with government guidelines.

5. In partnership with the Ministry, zonal and national institutions establish systematic, national mammography screening program guidelines with well-defined age and geographic coverage targets and referral algorithms. This program should also include clear quality control and evaluation metrics for mammography screening performance, in preparation for Phase 4.

## PHASE 4: SYSTEMATIC UPGRADING OF IMAGE-BASED DIAGNOSTIC SYSTEMS (TECHNOLOGY AND TRAINING) FOR MANAGEMENT OF NON-PALPABLE DISEASE AS A PREREQUISITE TO IMAGE-BASED (MAMMOGRAPHIC) SCREENING

Phase 4 represents a shift towards opportunistic and systematic image-based screening to detect non-palpable disease, along with continued strengthening of all other aspects of diagnosis, treatment and care and support throughout the health system. This phase assumes that the health system overall will have the capacity to address increasing numbers of breast cancer cases that will be identified through CBE and mammography screening, achieved via implementing Phases 1, 2 and 3.

### Primary and district levels

Continue strengthening services addressed in Phases 1-3.

### Regional referral hospital level

Introduce **mammography screening** at the regional referral hospital level. This assumes that diagnostic imaging, pathology services and referral for surgery and specialized treatment are established and functioning.

### Zonal and national levels

1. Introduce mammography screening program, which includes training of health care workers, in line with established guidelines.
2. Continue to improve hospital-based cancer registries.
3. Continue to improve and expand patient support, palliative care and survivorship services.
4. Increase use of breast conserving surgery (lumpectomies) as downstaging progresses and surgical and radiation therapy capacity expands at zonal and national levels.

**Table 8: Summary of recommendations for resource-stratified breast cancer program implementation guidelines for Tanzania**

Training and guideline implementation and review is a continuing process across all levels and phases. Institutions at each level should continue to strengthen breast cancer management through adherence to best practices outlined in standardized guidelines and protocols, and provide on-going training to the health care workforce. In addition, the health service as a whole should continually develop and strengthen communication across services and facilities to improve the continuum of care.

Primary & District	
Phase 1: Systematic triage and diagnosis of palpable breast disease.	<p>Train health care workers in implementing standardized protocols and guidelines developed during the prerequisite phase</p> <p>Strengthen detection and triage of palpable disease through training of health care workers.</p> <p>Develop and display educational materials for women to raise awareness that breast abnormalities should be evaluated by a health care worker. Display these materials at primary and district health care levels.</p> <p>Introduce use of patient-held Breast Health Card to record date of first patient contact, diagnostic findings and all treatments received from first point of contact.</p> <p>Breast imaging using ultrasound at district level can be considered if:</p> <ul style="list-style-type: none"> <li>Obstetric ultrasound is used routinely</li> <li>Ultrasound units can be adapted to appropriate frequency for breast tissue; and</li> <li>Training can be provided.</li> </ul>
Phase 2: Resource-adapted stage-appropriate treatment planning.	<p>Strengthen capacity to routinely perform CBE to identify palpable disease.</p> <p>Strengthen record-keeping and patient tracking.</p> <p>Provide decentralized endocrine therapy to women with ER+ tumors.</p> <p>Consider adapting HIV-related home-based care model to provide palliation/pain control.</p>
Phase 3: Scaling up of targeted education interventions for public and health care staff and clinical breast examination (CBE) to promote the downstaging of clinically detectable disease.	<p>Strengthen capacity to conduct outreach and public awareness about breast cancer.</p> <p>Train health workers to reinforce clinical skills (CBE, medical history-taking, ultrasound imaging), key counseling and information messages, record-keeping and referral protocols.</p> <p>Train health workers to refer target population for image based screening in preparation for Phase 4, if appropriate.</p>
Phase 4: Systematic upgrading of image-based diagnostic systems [technology and training] for management of non-palpable disease as a prerequisite to image-based [mammographic] screening	<p>Continue strengthening services addressed in Phases 1-3.</p>
Regional Referral	
Phase 1: Systematic triage and diagnosis of palpable breast disease.	<p>Train health care workers in implementing standardized protocols and guidelines developed during the prerequisite phase</p> <p>Adapt obstetric ultrasound units for breast imaging. Provide appropriate training.</p> <p>Introduce tissue sampling such as ultrasound guided FNA and tissue quality assessment.</p> <p>Pathological evaluation should include cancer staging and estrogen receptor staining either at private labs or the appropriate zonal facility.</p> <p>Record pathology results on Breast Health Card and communicate results to the Regional Referral hospital.</p>
Phase 2: Resource-adapted stage-appropriate treatment planning.	<p>Increase capacity to make differential diagnoses, including use of ultrasound for breast imaging and for guiding tissue-sampling such as FNA.</p> <p>Ensure adequate pain control and palliative care.</p>
Phase 3: Scaling up of targeted education interventions for public and health care staff and clinical breast examination (CBE) to promote the downstaging of clinically detectable disease.	<p>Engage in breast cancer outreach and education, including additional health worker training on CBE and referral protocols, ultrasound-guided FNA biopsy sampling and differential diagnosis.</p> <p>Train health workers to refer target population for image-based screening in preparation for Phase 4, if appropriate.</p>
Phase 4: Systematic upgrading of image-based diagnostic systems [technology and training] for management of non-palpable disease as a prerequisite to image-based [mammographic] screening	<p>Introduce mammography screening capacity, if diagnostic imaging, pathology services and referral for surgery and specialized treatment are established and functioning .</p>

## Zonal

Phase 1: Systematic triage and diagnosis of palpable breast disease.	<p>Train all health care workers in implementing standardized protocols and guidelines developed during the prerequisite phase.</p> <p>Strengthen diagnostic capacity to enable treatment planning based on pathology results. Routine determination of TNM staging and ER testing is recommended.</p> <p>Expand surgical capacity to provide modified radical mastectomy.</p> <p>Expand access to systemic therapy by dispensing chemotherapy at the zonal level, at no cost to patients.</p> <p>Increase radiation therapy capacity.</p> <p>Expand access to hormonal therapies at regional and district levels. Post-surgery, for patients with ER+ tumors, subsequent tamoxifen treatment could be provided at the district or even primary care level.</p> <p>Improve supportive/palliative care, including adequate pain control.</p>
Phase 2: Resource-adapted stage-appropriate treatment planning.	<p>Initiate or improve hospital-based cancer registries.</p> <p>Consolidate and strengthen cancer diagnosis and treatment at the zonal level, focusing on improved access to and quality of pathology, diagnostic imaging surgery, chemotherapy and radiation therapy services.</p> <p>Investigate feasibility of initiating patient navigation services and patient support.</p>
Phase 3: Scaling up of targeted education interventions for public and health care staff and clinical breast examination (CBE) to promote the downstaging of clinically detectable disease.	<p>Continue strengthening and expanding service capacity in all areas to ensure that supply can meet demand of new cases identified through CBE.</p>
Phase 4: Systematic upgrading of image-based diagnostic systems [technology and training] for management of non-palpable disease as a prerequisite to image-based [mammographic] screening	<p>Introduce mammography screening program, which includes training of health care workers, in line with established guidelines.</p> <p>Continue to improve hospital-based cancer registries.</p> <p>Continue to improve and expand patient support, palliative care and survivorship services.</p> <p>Increase use of breast conserving surgery [lumpectomies] as downstaging progresses, and surgical and radiation therapy capacity expands.</p>

## National

Phase 1: Systematic triage and diagnosis of palpable breast disease.	<p>Train health care workers in implementing standardized protocols and guidelines developed during the prerequisite phase.</p> <p>Add surgery and diagnostic capacity at ORCI – including immunohistochemistry – so that it functions as a true comprehensive cancer institute.</p> <p>Identify opportunities for partnerships.</p> <p>Consider bulk purchasing of key commodities with in collaboration with AGH, MNH, Zonal facilities.</p> <p>Increase supportive services for families and patients by developing patient navigation.</p>
Phase 2: Resource-adapted stage-appropriate treatment planning.	<p>Continue upgrading diagnostic and surgical services.</p> <p>Initiate and strengthen patient navigation services.</p> <p>Initiate planning for national cancer registry.</p> <p>Develop national guidelines for increasing capacity for widespread use of CBE in preparation for Phase 3, if appropriate.</p>
Phase 3: Scaling up of targeted education interventions for public and health care staff and clinical breast examination (CBE) to promote the downstaging of clinically detectable disease.	<p>Continue to upgrade capacity to ensure that services can meet the increased demand of new cases identified through CBE.</p> <p>Improve hospital-based cancer registries.</p> <p>Strengthen patient support services.</p> <p>Develop national breast cancer screening program guidelines in preparation for Phase 4.</p> <p>Engage relevant organizations such as TBCF and MEWATA in conducting outreach to coordinate and align public health messages on screening with government guidelines.</p>
Phase 4: Systematic upgrading of image-based diagnostic systems [technology and training] for management of non-palpable disease as a prerequisite to image-based [mammographic] screening	<p>Introduce mammography screening program, which includes training of health care workers, in line with established guidelines.</p> <p>Continue to improve hospital-based cancer registries.</p> <p>Continue to improve and expand patient support, palliative care and survivorship services.</p> <p>Increase use of breast conserving surgery [lumpectomies] as downstaging progresses and surgical and radiation therapy capacity expands.</p>

## V. Conclusion

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The recommendations presented here are grounded in a comprehensive effort over the last decade to identify resource-stratified guidelines for breast cancer that are applicable in a range of settings. The suggested resource-stratified phased implementation plan for Tanzania, which reflects these guidelines, is the result of a comprehensive assessment of current capacity at a variety of health care levels and geographies within the country. While ambitious, the assessment team believes that the recommendations put forth can be feasibly implemented if the phasing is undertaken carefully and resourced adequately.

As described earlier, the diagnosis and treatment of women with symptomatic disease should be prioritized before embarking on any level of mammographic screening. Given the current system's limited capacity to adequately address women presenting with symptoms, the addition of women with non-clinically detected, or asymptomatic tumors (detected via mammography), would place significant additional significant burden on the healthcare system.

Timeframes for each phase have not been provided as achievements during each phase will depend on the timing and availability of resources, including the ability to leverage existing resources.



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Susan G. Komen

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### Suggested Citation

Tanzania Breast Health Care Assessment 2017: An assessment of breast cancer early detection, diagnosis and treatment in Tanzania. Breast Cancer Initiative 2.5 [BCI2.5]; Seattle, WA, USA 2017.

### Acknowledgements

We would like to acknowledge the support and coordination provided by the Ministry of Health, Community Development, Gender, Elderly and Children of the United Republic of Tanzania. We thank all of the health care professionals, cancer survivors and advocates who responded to the questionnaires and who contributed their time during the on-site visits. We also want to recognize the contributions of the following institutions: Breast Health Global Initiative at Fred Hutchinson Cancer Research Center, Pink Ribbon Red Ribbon, University of Washington, Women's Empowerment Cancer Advocacy Network [WE CAN] and Women's Health Equity through Mobile Approaches [WEMA].



**Photo Credit:** Carolyn Taylor

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February 2017

# Appendices

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# Appendix I: BCI2.5 Cancer referral center assessment reports: Site visit summaries

## Aga Khan Hospital, Dar es Salaam

### OVERVIEW

Aga Khan Hospital is a tertiary-level hospital and is a private institution with highly specialized staff and technical equipment. It is currently expanding from 75 beds to 175 beds. Aga Khan Hospital partners with a number of organizations to improve delivery of breast health care, including Ocean Road Cancer Institute, Aga Khan University, University of Alabama, Hubert Kairuki University, and Tanzania Pentecostal Church.

Aga Khan Hospital provides on-site radiology, surgery, pathology, radiation and systemic therapy to its patients on a fee for service basis. Patients services are paid for in several ways, including employer and privately funded insurance, out-of-pocket, or in a minority of cases provided free of charge by Aga Khan [see below]. They currently do not accept National Health Insurance.

Aga Khan organizes a series of “breast cancer camps” each month providing free breast cancer screening, ultrasound-guided FNA and pathological evaluation to the general public. Approximately 50-100 patients are screened and on average one patient is diagnosed with breast cancer per camp. Diagnosis, surgery and treatment are covered by a welfare fund for those patients who cannot afford treatment.

**Table 1:** Overview of services provided at Aga Khan Hospital

Service	Status
Mammographic screening of women without breast symptoms	Mammographic services are available; however, most women present with palpable masses
CBE screening	Well established [see above for description of camps]
Breast cancer detection—CBE	Well established
Breast cancer detection—ultrasound	Well established
Breast cancer detection—mammography	Well established
Ultrasound breast sampling—FNA	Well established
Ultrasound breast sampling—core needle biopsy	Well established
Ultrasound breast sampling	Not available
Pathology	Well established (fulltime histopathologist, ER and HER2 staining, TNM staging, margin status and LVI reported routinely)
Breast surgery	Well established
Radiation therapy	Unavailable [patients are referred to Aga Khan- Nairobi or to ORCI as necessary. The center has no plans to develop radiotherapy capacity]
Chemotherapy	Supply chain is well established
Endocrine therapy [e.g., tamoxifen, aromatase inhibitors]	Well established
Biological therapy [e.g. trastuzumab]	Well established
Multidisciplinary care	Well established
Psychosocial support for cancer patients and family members [individual or group]	Partially developed
Palliative care/pain management	Well established
Rehabilitation of cancer patients	Well established
Follow-up of cancer patients	Well established
Medical record keeping	Well established [electronic and paper]
Cancer registry	Well established
Physician training in breast health care	Partially developed
Patient education/outreach	Well established [provides written material on treatment, early detection, symptom control etc.]

## EARLY DETECTION

Public education and awareness is a necessary component to any early detection program. Aga Khan Hospital promotes local and regional awareness programs to promote breast health awareness. While there are some national awareness campaigns, one staff member reported that despite these efforts, many women who present are not aware of the disease and are usually in late stages. Myths and traditional beliefs also hinder women from seeking care when the disease is at earlier stages.

## DETECTION AND DIAGNOSIS (IMAGING & WORKUP)

Aga Khan Hospital has 3 radiologists and uses BI-RADS as a breast imaging reporting standard.

**Table 2: Breast cancer early detection methods**

Method	Available
Clinical history and CBE	Yes
Diagnostic breast ultrasound in women with positive CBE	Yes
Diagnostic mammography in women with positive CBE	Yes
Mammographic screening of target group	Yes
Mammographic screening every 2 years in women ages 50-69	Yes
Mammographic screening every 12-18 months in women ages 40-49	Yes
Annual mammographic screening in women ages 40 and older	Yes
Other imaging technologies as appropriate for high-risk groups	Yes

The Hospital reports that >75% of women undergo biopsy/FNA under imaging guidance and <25% are referred to surgery.

**Table 3: Breast cancer diagnostic methods**

Method	Available
Medical history & physical examination	Yes
Clinical Breast Exam	Yes
Tissue sampling for cancer diagnosis [cytologic or histologic] prior to initiation of treatment	Yes
Ultrasound-guided FNAB of sonographically suspicious axillary nodes	Yes
Sentinel lymph node (SLN) biopsy with blue dye	No [institution has capacity, but it is not part of standard treatment]
Image-guided breast sampling	Yes

Method	Available
Preoperative needle localization under mammography and/or ultrasound guidance	No
SLN biopsy using radiotracer	No
Diagnostic breast ultrasound	Yes
Plain chest & skeletal radiography	Yes
Liver ultrasound	Yes
Blood chemistry profile	Yes
Complete blood count	Yes
Diagnostic mammography	Yes
Specimen radiography	Yes
Bone scan, CT scan	Yes
Cardiac function monitoring	Yes
PET scan	No
Breast MRI	No
BRCA 1/2 testing	No [samples are sent to South Africa for analysis]
Mammographic double reading	No

## SURGICAL THERAPY

**Table 4: Surgical treatment of breast cancer**

Surgery	Available
<b>Early stage cancer</b>	
Modified radical mastectomy	Yes
Breast conserving surgery	No [no access to radiotherapy]
Sentinel lymph node (SLN) biopsy with blue dye	Yes
Sentinel lymph node biopsy using radiotracer	No
Breast reconstruction surgery	No [refer to Aga Khan-Nairobi]
<b>Locally advanced cancer</b>	
Modified radical mastectomy	Yes
Breast conserving surgery	No
Sentinel lymph node biopsy using radiotracer	Yes
Breast reconstruction surgery	No [refer to Aga Khan-Nairobi]
<b>Metastatic, recurrent cancer</b>	
Total mastectomy for ipsilateral breast tumor recurrence after breast conserving surgery	No Data

## SYSTEMIC TREATMENT

**Table 5: Systemic Therapy**

WHO Essential Medicines List	Available
Doxorubicin	Yes
Cyclophosphamide	Yes
Paclitaxel	Yes
Docetaxel	Yes
Methotrexate	Yes
5-fluorouracil	Yes
Trastuzumab	Yes
Carboplatin	Yes
Capecitabine	Yes
Vinorelbine	Yes
Gemcitabine	Yes
Tamoxifen	Yes
Anastrozole (or other aromatase inhibitor—Letrozole and/or Exemestane)	Yes

Supply of these medications is subject to disruptions—patients must purchase medicines outside of the institution, often presenting barriers to their treatment.

## Bugando Medical Centre, Mwanza

### OVERVIEW

Bugando Medical Centre is a tertiary-level institution. The Centre has 900 beds, over 900 employees, and is the referral center for tertiary specialist care for 6 regions in Tanzania: Mwanza, Mara, Kagera, Shinyanga, Tabora, and Kigoma. It aims to be a center for excellence in health care provision, research, and teaching. Bugando Medical Centre receives funding from a combination of both government, private, and faith-based sources. The institute also partners with a number of organizations to improve delivery of breast health care, including The Women Affected by Cancer Group, the Medical Women Association of Tanzania (MEWATA), Ocean Road Cancer Institute, groups from India, Australia, and the US—including Duke and Cornell universities.

Patient services are paid for in a wide variety of ways, including through government, employer, and privately funded insurance, out-of-pocket, and at times provided free of charge by Bugando Medical Centre.

**Table 1: Overview of services provided at the Bugando Medical Centre**

Service	Status
Mammographic screening of women without breast symptoms	No [majority of women self-refer]
CBE screening	No
Breast cancer detection—CBE	Yes
Breast cancer detection—ultrasound	Yes
Breast cancer detection—mammography	Yes
Ultrasound breast sampling—FNA	Yes
Ultrasound breast sampling—core needle biopsy	No
Pathology	Yes [However, no ER testing available]
Breast surgery	Yes
Radiation therapy for symptom control (i.e., bone metastases)	Cobalt machine installed—waiting for certification from IAEA. Three vaults built for LINAC, but no plans to install due to the expense of installation and service contracts.
Chemotherapy	Yes
Endocrine therapy (e.g., tamoxifen, aromatase inhibitors)	Yes
Biological therapy (e.g. trastuzumab)	Yes [HER2 testing is not usually requested]
Palliative care/pain management	Morphine shortages pose a barrier
Follow-up of cancer patients	No
Medical record keeping	Yes
Cancer registry	Yes for cervical cancer, but not for breast

### DETECTION AND DIAGNOSIS (IMAGING & WORKUP)

The Centre has 2 radiologists, and uses BI-RADS as a breast imaging reporting standard.

Early detection methods are operating at a basic and limited level, but it is unclear whether diagnostic mammography is used for women with a suspicious finding in CBE.

**Table 2: Radiology Capacity**

Capacity	Availability
Mammogram machine	Yes
Ultrasound machines	Yes
X-ray	Yes
Bone Scan	No
MRI	No
CT-scan	Yes [currently not functioning]
Radiologists	1 consultant radiologist, 2 specialist radiologists, and 7 radiographers
BI-RADS	Yes
Image archiving at center	

**Table 3: Breast cancer diagnostic methods**

Method	Available
Medical history & physical examination	Yes
Clinical Breast Exam	Yes
Tissue sampling for cancer diagnosis [cytologic or histologic] prior to initiation of treatment	Yes
Ultrasound-guided FNAB of sonographically suspicious axillary nodes	Yes
Sentinel lymph node [SLN] biopsy with blue dye	No
Image guided breast sampling	Yes
Preoperative needle localization under mammography and/or ultrasound guidance	No
SLN biopsy using radiotracer	No
Diagnostic breast ultrasound	Yes
Plain chest & skeletal radiography	Yes
Liver ultrasound	Yes
Blood chemistry profile	Yes
Complete blood count	Yes
Diagnostic mammography	Yes
Specimen radiography	No
Bone scan	No
CT scan	Yes [while no functioning scanner is available, patients are referred to the university when necessary]
Cardiac function monitoring	Unknown
PET scan	No
MIBI scan, breast MRI	No
BRCA 1/2 testing	No
Mammographic double reading	No

## PATHOLOGY

There are 2 pathologists at Bugando. In some cases, tumor blocks are sent to India for analysis.

**Table 4: Overview of available pathology services**

Method	Availability
Pathology diagnosis obtained for every breast lesion by any available sampling procedure	Yes
Pathology report containing appropriate diagnostic and prognostic/predictive information to include tumor size, lymph node status, histologic type and tumor grade	Yes
Determination and reporting of TNM stage	No
Determination of ER status by immunohistochemistry	No
Determination of margin status	Unknown
Determination of DCIS content	Unknown
Determination of the presence of lymphovascular invasion	Unknown
Frozen section or touch prep SLN analysis	No
Measurement of HER2 overexpression or gene amplification	No
Determination of PR status by IHC	No
IHC staining of sentinel nodes for cytokeratin to detect micro-metastases	No
Pathology double reading	No
Gene profiling tests	No

## SURGICAL THERAPY

Bugando has five general surgeons on staff. While some surgeons perform complete axillary node clearance others do not—there are no standardized institutional guidelines on the matter. Approximately 40 cases are seen per month.

**Table 5: Surgical treatment of breast cancer**

Surgery	Available
<b>Early stage cancer</b>	
Modified radical mastectomy	Yes
Breast conserving surgery	Rarely
Sentinel lymph node [SLN] biopsy with blue dye	No
Sentinel lymph node biopsy using radiotracer	No
Breast reconstruction surgery	No
<b>Locally advanced cancer</b>	
Modified radical mastectomy	Yes
Breast conserving surgery	No
Sentinel lymph node biopsy using radiotracer	No
Breast reconstruction surgery	No
<b>Metastatic, recurrent cancer</b>	
Total mastectomy for ipsilateral breast tumor recurrence after breast conserving surgery	Yes

## RADIATION THERAPY

**Table 6: Radiation Capacity.**

Capacity	Number
Cobalt60	Installed, but not yet commissioned—IAEA will perform a site visit
LINAC	Vaults built, machines available (donated), but installation costs and service contract costs are a barrier to their installation
Simulation	No

**Table 7: Radiation treatment by disease stage**

Treatment	Available
Stage I	
Breast-conserving whole-breast irradiation as part of breast-conserving therapy	No
Stage II	
Postmastectomy irradiation of chest wall and regional nodes for high-risk cases	Planned
Breast-conserving whole-breast irradiation as part of breast-conserving therapy	No
Locally advanced	
Postmastectomy irradiation of chest wall and regional nodes	Planned
Breast-conserving whole-breast irradiation as part of breast-conserving therapy	No
Metastatic and recurrent	
Palliative radiation therapy	Planned

## SYSTEMIC TREATMENT

**Table 8: Systemic Therapy**

WHO Essential Medicines List	Available*
Doxorubicin	Yes
Cyclophosphamide	Yes
Paclitaxel	Yes
Docetaxel	Yes
Methotrexate	Yes
5-fluorouracil	Yes
Trastuzumab	No
Carboplatin	Yes
Capecitabine	Yes
Vinorelbine	No
Gemcitabine	Yes
Tamoxifen	Yes
Anastrozole (or other aromatase inhibitor—Letrozole and/or Exemestane)	Yes

Supply of these medications is subject to disruptions—

patients are required to purchase them outside of the institution, often presenting barriers to their treatment.

## Kilimanjaro Christian Medical Center

### OVERVIEW

The Kilimanjaro Christian Medical Center (KCMC) in Moshi was first opened in 1971 and accommodates 500–800 in-patients with 1300 staff. It is a referral hospital for over 15 million people in northern Tanzania. KCMC is a tertiary-level, faith-based institution with highly specialized staff and technical equipment. It is funded by both the Tanzania government and private institutions and partners with a number of organizations to improve delivery of breast health care, including Pink Ribbon Red Ribbon, the Italian Medical Oncology Association, and Duke University.

Patient services are paid for in several ways, including government, employer, and privately funded insurance, patient out-of-pocket expenses. In some cases treatment is provided free of charge by the Center.

**Table 1: Overview of services provided at Kilimanjaro Christian Medical Center**

Service	Status
Mammographic screening of women without breast symptoms	No
CBE screening	Yes
Breast cancer detection—CBE	Yes
Breast cancer detection—ultrasound	Yes
Breast cancer detection—mammography	Yes
Ultrasound breast sampling—FNA	Yes
Ultrasound breast sampling—core needle biopsy	No
Pathology	Yes [however, the cost to patient is prohibitive, and the cost of reagents limit service. The center utilizes private Lancet Laboratories which provide IHC on a fee-for-service basis]
Breast surgery	Well established
Radiation therapy for symptom control [i.e., bone metastases]	Not currently addressed [plan to expand radiation therapy with the addition of LINAC over the next 2 years]
Chemotherapy	Yes [medicines are scarce and the onus falls on the patients to purchase in majority of cases]
Endocrine therapy [e.g., tamoxifen, aromatase inhibitors]	Yes [see above]

Service	Status
Biological therapy (e.g. trastuzumab)	Yes [see above]
Palliative care/pain management	There is a palliative care nurse and team establishing a number of initiatives such as in-home care for patients. However, as in other centers, morphine shortages have a detrimental effect on patient care.
Follow-up of cancer patients	Yes [cancer registry is in place—record quality is good for in-patients, but not for out-patients, who are often referred from other centers]
Medical record keeping	Yes [paper based, but in the process of moving towards electronic medical record system]
Cancer registry	Well established [founded in 1998 and currently applying for IARC accreditation]

## DETECTION AND DIAGNOSIS (IMAGING & WORKUP)

**Table 2: Radiology Capacity**

Capacity	Availability
Mammogram machine	Yes
Ultrasound machines	Yes
X-ray	Yes
Bone scan	No
MRI	No
CT-scan	No
Radiologists	1 consultant radiologist, 2 specialist radiologists, and 7 radiographers
BI-RADS	Yes
Image archiving at center	Unknown

**Table 3: Breast cancer diagnostic methods**

Method	Available
Medical history & physical examination	Yes
Clinical Breast Exam	Yes
Tissue sampling for cancer diagnosis [cytologic or histologic] prior to initiation of treatment	Yes
Ultrasound-guided FNAB of sonographically suspicious axillary nodes	Yes
Sentinel lymph node [SLN] biopsy with blue dye	No
Image guided breast sampling	No
Preoperative needle localization under mammography and/or ultrasound guidance	No
SLN biopsy using radiotracer	No
Diagnostic breast ultrasound	Yes

Method	Available
Plain chest & skeletal radiography	Yes
Liver ultrasound	Yes
Blood chemistry profile	Yes
Complete blood count	Yes
Diagnostic mammography	No
Specimen radiography	No
Bone scan	No
CT scan	No
Cardiac function monitoring	No
PET scan	No
MIBI scan, breast MRI	No
BRCA 1/2 testing	No
Mammographic double reading	No

## PATHOLOGY

There are 4 technicians and 1 pathologist at KCMC.

**Table 4: Overview of available pathology services**

Method	Availability Of Services
Pathology diagnosis obtained for every breast lesion by any available sampling procedure	Yes
Pathology report containing appropriate diagnostic and prognostic/predictive information to include tumor size, lymph node status, histologic type and tumor grade	Yes
Determination and reporting of TNM stage	Yes [not always performed]
Determination of ER status by immunohistochemistry	Service available but not routine; cost of reagents is prohibitive. KCMC also uses the services of a private lab—Lancet Laboratories—on a fee-for-service basis
Determination of margin status	Yes
Determination of DCIS content	No
Determination of the presence of lymphovascular invasion	No
Frozen section or touch prep SLN analysis	No
Measurement of HER2 overexpression or gene amplification	No
Determination of PR status by IHC	No
IHC staining of sentinel nodes for cytokeratin to detect micro-metastases	No
Pathology double reading	No
Gene profiling tests	No

## SURGICAL THERAPY

Surgery	Available
Early stage cancer	
Modified radical mastectomy	Yes
Breast conserving surgery	No [no access to radiotherapy]
Sentinel lymph node [SLN] biopsy with blue dye	
Sentinel lymph node biopsy using radiotracer	No
Breast reconstruction surgery	No
Locally advanced cancer	
Modified radical mastectomy	Yes
Breast conserving surgery	No [no access to radiotherapy]
Sentinel lymph node biopsy using radiotracer	
Breast reconstruction surgery	No
Metastatic, recurrent cancer	
Total mastectomy for ipsilateral breast tumor recurrence after breast conserving surgery	Yes

## RADIATION THERAPY

KCMC is planning on increasing capacity for radiotherapy provision. Both Co60 and LINAC installation are planned in the next 2 years.

## SYSTEMIC TREATMENT

**Table 6: Systemic Therapy**

WHO Essential Medicines List	Available
Doxorubicin	Yes
Cyclophosphamide	Yes
Paclitaxel	Yes
Docetaxel	Yes
Methotrexate	Yes
5-fluorouracil	Yes
Trastuzumab	Yes
Carboplatin	Yes
Capecitabine	Yes
Vinorelbine	Yes
Gemcitabine	Yes
Tamoxifen	Yes
Anastrozole [or other aromatase inhibitor—Letrozole and/or Exemestane]	Yes

Supply of these medications is subject to disruptions—patients must purchase medicines outside of the institution, often presenting barriers to their treatment.

# Mawenzi Referral Hospital, Moshi

## OVERVIEW

Mawenzi Referral Hospital is a regional level hospital funded by the Government of Tanzania. It serves 1.7 million people. The hospital partners with a number of organizations to improve delivery of breast health care, including religious groups, and international research institutions/universities. Cancer support/advocacy groups do not appear to play a role.

Patients services are paid for by the government or out-of-pocket payments by patients and in some cases via private or employer funded insurance.

**Table 1: Overview of services provided at Mawenzi Hospital**

Service	Status
Mammographic screening of women without breast symptoms	No
CBE screening	Yes
Breast cancer detection—CBE	Yes
Breast cancer detection—ultrasound	Yes.
Breast cancer detection—mammography	No
Ultrasound breast sampling—FNA	No
Ultrasound breast sampling—Core needle biopsy	No
Palpation guided biopsy	Yes
Pathology	No [biopsies are sent for analysis to KCMC]
Breast surgery	Yes
Radiation therapy for symptom control [i.e., bone metastases]	No
Chemotherapy	No
Endocrine therapy [e.g., tamoxifen, aromatase inhibitors]	No
Biological therapy [e.g. trastuzumab]	No
Palliative care/pain management	Yes [lack of access to morphine prevents effective pain management]
Follow-up of cancer patients	No
Medical record keeping	Yes [for in-patients] Results of biopsies sent to KCMC for analysis are not shared with source hospital
Cancer registry	No

## DETECTION AND DIAGNOSIS (IMAGING & WORKUP)

**Table 2: Radiology Capacity.**

Capacity	Availability
Mammogram machine	No
Ultrasound machines	Yes
X-ray	1 [Used for chest X rays]
Bone Scan	No
MRI	No
CT-scan	No
BI-RADS	Not used
Image archiving at center	No [images—when available—are given to patients]

**Table 3: Breast cancer diagnostic methods**

Method	Available
Medical history & physical examination	Yes
Clinical Breast Exam	Yes
Tissue sampling for cancer diagnosis [cytologic or histologic] prior to initiation of treatment	Yes
Ultrasound-guided FNAB of sonographically suspicious axillary nodes	No
Sentinel lymph node [SLN] biopsy with blue dye	No
Image guided breast sampling	No
Preoperative needle localization under mammography and/or ultrasound guidance	No
SLN biopsy using radiotracer	No
Diagnostic breast ultrasound	Yes
Plain chest & skeletal radiography	Yes
Liver ultrasound	Yes
Blood chemistry profile	Yes
Complete blood count	Yes
Diagnostic mammography	No
Specimen radiography	No
Cardiac function monitoring	No
PET scan	No
Mammographic double reading	No

## PATHOLOGY, CHEMOTHERAPY AND RADIOTHERAPY

None of these services are available at this hospital

## SURGICAL THERAPY

Patients are usually referred to zonal referral hospitals for surgery. The hospital performs approximately 5 mastectomies per year. The surgeon performs gross removal of the nodes but not complete axillary node dissection

**Table 4: Surgical treatment of breast cancer**

Surgery	Available
<b>Early stage cancer</b>	
Modified radical mastectomy	Yes
Breast conserving surgery	No
Sentinel lymph node [SLN] biopsy with blue dye	No
Sentinel lymph node biopsy using radiotracer	No
Breast reconstruction surgery	No
<b>Locally advanced cancer</b>	
Modified radical mastectomy	Yes
Breast conserving surgery	No
Sentinel lymph node biopsy using radiotracer	No
Breast reconstruction surgery	No
<b>Metastatic, recurrent cancer</b>	
Total mastectomy for ipsilateral breast tumor recurrence after breast conserving surgery	No

## Mbeya Zonal Referral Hospital, Mbeya

Note: Only one incomplete questionnaire was received from this institution, and no in-person site visit was performed. As a result, data presented in Table 1 are based solely on questionnaire data.

## OVERVIEW

Mbeya Zonal Referral Hospital [MZRH] serves approximately 8 million people in six regions—Katavi, Njombe, Rukwa, Ruvuma, Iringa and Mbeya. MZRH has 20 departments including surgery, radiology and pathology. Similar to other referral hospitals, patient services are partially funded by the government and either private or employer funded health insurance, and partially through out-of-pocket payments from patients.

**Table 1: Overview of services provided at MZRH Hospital**

Service	Status
Mammographic screening of women without breast symptoms	Yes
CBE screening	Unknown
Breast cancer detection—CBE	Yes
Breast cancer detection—ultrasound	Yes
Breast cancer detection—mammography	Yes
Ultrasound breast sampling—FNA	Yes
Ultrasound breast sampling—core needle biopsy	No

Service	Status
Pathology	Yes
Breast surgery	Yes
Radiation therapy for symptom control [i.e., bone metastases]	No
Chemotherapy	No
Endocrine therapy [e.g., tamoxifen, aromatase inhibitors]	Partial
Biological therapy [e.g. trastuzumab]	Unknown
Palliative care/pain management	Yes
Follow-up of cancer patients	Yes
Medical record keeping	Well established. The institution uses a unified medical record number, and maintains electronic medical records.
Hospital based cancer registry	Yes.
Patient education/outreach	The institution provides a variety of information about the importance of early detection of breast cancer, treatment side effects and information about how to access breast cancer support groups. Patient navigators are available at the institution.

## Muhimbili National Hospital (MNH), Dar es Salaam

### OVERVIEW

The Muhimbili National Hospital (MNH) is National Referral Hospital and University Teaching Hospital. It is a 1,500 bed facility serving 1,000 to 1,200 outpatients weekly, and admitting 1,000 to 1,200 inpatients weekly. MNH is a tertiary-level hospital and is publically-funded institution with highly specialized staff and technical equipment It also provides palliative care.

Patient services are partially funded by the government and either private or employer funded health insurance, and partially through out-of-pocket payments from patients. MNH partners with a number of national and international organizations to improve delivery of breast health care, including the Ocean Road Cancer Institute, the Foundation for Cancer Care in Tanzania (FCCT), DI-FAEM, Tanzania Pentecostal church as well as Duke University and Minnesota University from the United States.

**Table 1:** Overview of services provided at MNH Hospital

Service	Status
Mammographic screening of women without breast symptoms	No
CBE screening	Yes
Breast cancer detection—CBE	Yes
Breast cancer detection—ultrasound	Yes [images are not saved, printed image are not saved with files]
Breast cancer detection—mammography	Yes
Ultrasound breast sampling—FNA	Yes
Ultrasound breast sampling—core needle biopsy	No
Pathology	Yes
Breast surgery	Yes
Radiation therapy for symptom control [i.e., bone metastases]	No
Chemotherapy	Yes
Endocrine therapy [e.g., tamoxifen, aromatase inhibitors]	Yes
Biological therapy [e.g. trastuzumab]	No
Palliative care/pain management	Yes [shortage of morphine is a barrier to effective care]
Follow-up of cancer patients	Unknown
Patient education/outreach	Developing materials

### DETECTION AND DIAGNOSIS (IMAGING & WORKUP)

**Table 2:** Radiology Capacity.

Capacity	Availability
Mammogram machine	2 [only 1 functioning]
Ultrasound machines	3 with a linear transducers suitable for breast imaging; liver ultrasounds carried out routinely on all breast cancer patients
X-ray	1 [used for chest X rays]
Bone Scan	Yes
MRI	Yes [1.5 Siemens MRI with a breast coil, which has never been used; no training on interpreting breast MRI]
CT-scan	2 scanners [one is a 1-year old dual-energy 128-slice CT scanner]
Radiologists	8 [only 3 have sufficient training to interpret breast imaging]
BI-RADS	Yes [not all radiologists use this system]
Image archiving at center	No [images—when available—are given to patients, no server capacity to store digital images longer than 2 weeks]

There are approximately 1,040 mammograms performed per year, >90% of which are for diagnostic purposes [symptomatic women]. They do not have the capacity to sample an abnormal finding on mammography unless there is an ultrasound correlate. Every year a group of breast imagers from Lourdes [New York] visit Muhimbili Hospital to provide breast imaging training and help determine priorities for the Muhimbili radiology department.

**Table 3: Breast cancer diagnostic methods**

Method	Available
Medical history & physical examination	Yes
Clinical Breast Exam	Yes
Tissue sampling for cancer diagnosis [cytologic or histologic] prior to initiation of treatment	Yes
Ultrasound-guided FNAB of sonographically suspicious axillary nodes	Yes
Sentinel lymph node [SLN] biopsy with blue dye	No
Image guided breast sampling	Yes
Preoperative needle localization under mammography and/or ultrasound guidance	No
SLN biopsy using radiotracer	No
Diagnostic breast ultrasound	Yes
Plain chest & skeletal radiography	Yes
Liver ultrasound	Yes
Blood chemistry profile	
Complete blood count	
Diagnostic mammography	Yes
Specimen radiography	No
Bone scan	Yes
CT scan	Yes
Cardiac function monitoring	Unknown
PET scan	No
Breast MRI	Yes—but not in use
BRCA 1/2 testing	No
Mammographic double reading	No

## PATHOLOGY

There are 2 pathologists at MNH, and 1 technician.

**Table 4: Overview of available pathology services**

Method	Available
Pathology diagnosis obtained for every breast lesion by any available sampling procedure	Yes
Pathology report containing appropriate diagnostic and prognostic/predictive information to include tumor size, lymph node status, histologic type and tumor grade	Yes
Determination and reporting of TNM stage	Yes

Method	Available
Determination of ER status by immunohistochemistry	Yes [however it is rarely performed]
Determination of margin status	Yes
Determination of DCIS content	Yes
Determination of the presence of lymphovascular invasion	Yes
Frozen section or touch prep SLN analysis	No
Measurement of HER2 overexpression or gene amplification	No
Determination of PR status by IHC	No
IHC staining of sentinel nodes for cytokeratin to detect micro-metastases	No
Pathology double reading	No
Gene profiling tests	No

## SURGICAL THERAPY

**Table 5: Surgical treatment of breast cancer**

Surgery	Available
<b>Early stage cancer</b>	
Modified radical mastectomy	Yes
Breast conserving surgery	Rarely
Sentinel lymph node [SLN] biopsy with blue dye	No
Sentinel lymph node biopsy using radiotracer	No
Breast reconstruction surgery	No
<b>Locally advanced cancer</b>	
Modified radical mastectomy	Yes
Breast conserving surgery	No
Sentinel lymph node biopsy using radiotracer	No
Breast reconstruction surgery	No
<b>Metastatic, recurrent cancer</b>	
Total mastectomy for ipsilateral breast tumor recurrence after breast conserving surgery	Yes

## RADIATION THERAPY

There were no data available for radiation therapy at MNH

## SYSTEMIC TREATMENT

**Table 6: Systemic Therapy**

WHO Essential Medicines List	Available
Doxorubicin	Yes
Cyclophosphamide	Yes
Paclitaxel	Yes
Docetaxel	No
Methotrexate	Yes
5-fluorouracil	Yes

WHO Essential Medicines List	Available
Trastuzumab	No
Carboplatin	No
Capecitabine	No
Vinorelbine	No
Gemcitabine	No
Tamoxifen	Yes
Anastrozole (or other aromatase inhibitor—Letrozole and/or Exemestane)	Yes

Supply of these medications is subject to disruptions—patients must purchase medicines outside of the institution, often presenting barriers to their treatment.

## Ocean Road Cancer Institute (ORCI), Dar es Salaam

### OVERVIEW

The Ocean Road Cancer Institute (ORCI) is a breast care facility specializing in breast cancer diagnosis and treatment and receives funding from the government. The institute also receives assistance from international organizations such as IAEA, WHO, IARC, UICC, INCTR, US NCI, IAHP, ICAP Columbia University, University of Nebraska, and the University of Copenhagen. In collaboration with the Tanzanian Ministry of Health and Social Welfare, ORCI developed a National Cancer Control Strategy (NCCS) to develop and implement a comprehensive and coordinated national response to cancer in Tanzania. Tanzania was chosen by IAEA/PACT as a pilot model demonstration site (PMDS) in Africa.

ORCI partners with a number of external organizations to improve delivery of breast health care, including cancer support/advocacy groups, religious groups, national foundations/organizations, and domestic health institutions. These include: the Tanzanian Breast Cancer Foundation, churches which assist with cancer palliation, Union of survivors of breast cancer, NHIF, KCMC, SIDA/DANIDA, IAEA, MEWATA, and Muhimbili.

**Table 1: Overview of services provided at ORCI**

Service	Status*
Mammographic screening of women without breast symptoms	No
CBE screening	Established [operates screening clinics with CBE and ultrasound for suspicious lumps]
Breast cancer detection—CBE	Yes

Service	Status*
Breast cancer detection—ultrasound	Yes [images are not saved, and printed image not saved with files]
Breast cancer detection—mammography	No
Ultrasound breast sampling—FNA	Yes
Ultrasound breast sampling—core needle biopsy	No
Pathology	Not available—carried out at MNH
Breast surgery	Not available
Radiation therapy	2 Co60 units; 1 LINAC bunker built
Chemotherapy	Available [irregular supply presents barriers to treatment]
Endocrine therapy [e.g., tamoxifen, aromatase inhibitors]	Available [not consistently available; lack of accessibility to ER testing (cost) means that women may not be prescribed appropriate therapies]
Biological therapy [e.g. trastuzumab]	Available [but rarely prescribed given absence of routine HER2 staining and the lack of drugs such as trastuzumab]
Psychosocial support for cancer patients and family members (individual or group)	Partially developed
Palliative care/pain management	Well established [shortages of morphine and fentanyl patches prevent effective care of women with metastatic disease]
Rehabilitation of cancer patients	Not addressed
Follow-up of cancer patients	Not systematic
Medical record keeping	Well established [medical record continuity across institutions is not well established, surgical reports and/or pathology records are held in other centers [e.g. MNH] and the onus is on the patient to transfer the records to ORCI]
Cancer registry	Well established
Patient education/outreach	Partially developed [some printed materials for patient education, but usually kept in the clinic. A breast screening clinic is run by ORCI and sees a number of patients for CBE and ultrasound screening]

## DETECTION AND DIAGNOSIS (IMAGING & WORKUP)

The center has 2 radiologists and uses BI-RADS as a breast imaging reporting standard.

Early detection methods are operating partially at a limited level, providing diagnostic ultrasound for women with a positive CBE. It is unclear whether diagnostic mammography is offered to women with positive CBE.

**Table 2: Breast cancer early detection methods**

Method	Available
Clinical history and CBE	Yes
Diagnostic breast ultrasound in women with positive CBE	Yes
Diagnostic mammography in women with positive CBE	No
Mammographic screening of target group	No
Mammographic screening every 2 years in women ages 50-69	No
Mammographic screening every 12-18 months in women ages 40-49	No
Annual mammographic screening in women ages 40 and older	No
Other imaging technologies as appropriate for high-risk groups	No

In an average week a physician screens about 78 women and detects 11 lumps. Of those 11 lumps 9 receive ultrasound for further evaluation and 2 receive an FNA. The patients recommended for FNAs (without intervening ultrasound) receive FNA under palpation-guidance by the pathologist. Women recommended for ultrasound receive an ultrasound-guided FNA if a suspicious lump is found.

**Table 3: Breast cancer diagnostic methods**

Method	Available
Medical history & physical examination	Yes
Clinical Breast Exam	Yes
Tissue sampling for cancer diagnosis (cytologic or histologic) prior to initiation of treatment	Yes
Ultrasound-guided FNAB of sonographically suspicious axillary nodes	Yes
Sentinel lymph node (SLN) biopsy with blue dye	No
Image guided breast sampling	No
Preoperative needle localization under mammography and/or Ultrasound guidance	No
SLN biopsy using radiotracer	No
Diagnostic breast ultrasound	Yes
Plain chest & skeletal radiography	Yes
Liver ultrasound	Yes
Blood chemistry profile	Yes

Method	Available
Complete blood count	Yes
Diagnostic mammography	No
Specimen radiography	No
Bone scan	Yes
CT scan	No
Cardiac function monitoring	No
PET scan	No
MIBI scan, breast MRI	No
BRCA 1/2 testing	No
Mammographic double reading	No

## SURGICAL THERAPY AND PATHOLOGY

Breast surgery and pathology are not performed at ORCI, and are typically carried out at zonal referral hospitals [surgery] and at MNH [pathology]

## RADIATION THERAPY

There are 13 radiologists at ORCI. The Institute has 1 Cobalt-60 unit and plans to install a LINAC in 2017/2018. Radiation therapy operates at a limited level providing postmastectomy radiation to the chest wall and regional nodes for high-risk locally-advanced patients and those with metastatic and recurrent disease. Palliative care is also offered.

**Table 4: Radiation Capacity**

Capacity	Number
Cobalt60	1
LINAC	Planned for 2017/8
Radiologists	13
Simulation	No

**Table 5: Radiation treatment by disease stage**

Treatment	Available
<b>Stage I</b>	
Breast-conserving whole-breast irradiation as part of breast-conserving therapy	No
<b>Stage II</b>	
Postmastectomy irradiation of chest wall and regional nodes for high-risk cases	Yes
Breast-conserving whole-breast irradiation as part of breast-conserving therapy	No
<b>Locally advanced</b>	
Postmastectomy irradiation of chest wall and regional nodes	Yes
Breast-conserving whole-breast irradiation as part of breast-conserving therapy	No
<b>Metastatic and recurrent</b>	

Treatment	Available
Palliative radiation therapy	Yes

## Systemic Treatment

**Table 6: Systemic Therapy**

WHO Essential Medicines List	Available
Doxorubicin	Yes
Cyclophosphamide	Yes
Paclitaxel	Yes
Docetaxel	Yes
Methotrexate	Yes
5-fluorouracil	Yes
Trastuzumab	Yes
Carboplatin	Yes
Capecitabine	Yes
Vinorelbine	Yes
Gemcitabine	Yes
Tamoxifen	Yes
Anastrozole (or other aromatase inhibitor—Letrozole and/or Exemestane)	Yes

Supply of these medications is subject to disruptions—patients must purchase medicines outside of ORCI, often presenting barriers to their treatment.

# Sekou Toure Regional Hospital, Mwanza

## OVERVIEW

Sekou Toure Regional Hospital is publicly funded by the government of Tanzania. The hospital partners with a number of organizations to improve delivery of breast health care, including religious groups, national educational/research organizations including the KCMC Institute, and local industries (TPC Ltd), and (unidentified) foreign research institutions/universities. Cancer support/advocacy groups did not appear to play a role. Patients services are paid for either by the government, private or employer funded insurance, and in many cases via out-of-pocket payments by patients.

**Table 1: Overview of services provided at Sekou Toure Hospital**

Service	Available
Mammographic screening of women without breast symptoms	No

Service	Available
CBE screening	Well established (breast CBE & cervical screening carried out at the same time)
Breast cancer detection CBE	Well established
Breast cancer detection—ultrasound	Well established
Breast cancer detection—mammography	No
Ultrasound breast sampling—FNA	No
Ultrasound breast sampling—Core needle biopsy	No
Ultrasound breast sampling—Not available	Excisional biopsies
Pathology	No (pathology samples are sent to Bugando)
Breast surgery	Yes.
Radiation therapy	No (refer to ORCI)
Chemotherapy	No (refer to Bugando)
Endocrine therapy (tamoxifen, aromatase inhibitors)	No (refer to Bugando)
Biological therapy (e.g. trastuzumab)	No
Psychosocial support for cancer patients and family members (individual or group)	Not addressed
Palliative care/pain management	While palliation is available, the shortage of morphine and fentanyl patches prevents effective care of women with metastatic disease.
Rehabilitation of cancer patients	Not addressed
Follow-up of cancer patients	Not addressed
Medical record keeping	Yes (paper-based for patients seen at this Sekou Toure)
Cancer registry	No
Patient education/outreach	Yes (runs a screening clinic, provides women with information on BSE)

**Table 2: Breast cancer diagnostic methods**

Method	Available
Medical history & physical examination	Yes
Clinical Breast Exam	Yes
Tissue sampling for cancer diagnosis (cytologic or histologic) prior to initiation of treatment	Yes
Ultrasound-guided FNAB of sonographically suspicious axillary nodes	No
Sentinel lymph node (SLN) biopsy with blue dye	No
Image guided breast sampling	No
Preoperative needle localization under mammography and/or ultrasound guidance	No
SLN biopsy using radiotracer	No
Diagnostic breast ultrasound	Yes

Method	Available
Plain chest & skeletal radiography	Yes
Liver ultrasound	Yes
Blood chemistry profile	No
Complete blood count	No
Diagnostic mammography	No
Specimen radiography	No
Bone scan, CT scan	No
Cardiac function monitoring	No
PET scan	No
MIBI scan, breast MRI	No
BRCA 1/2 testing	No
Mammographic double reading	No

## SURGICAL THERAPY

**Table 3: Surgical treatment of breast cancer**

Surgery	Available
<b>Early stage cancer</b>	
Modified radical mastectomy	Yes
Breast conserving surgery	No
Sentinel lymph node (SLN) biopsy with blue dye	No
Sentinel lymph node biopsy using radiotracer	No
Breast reconstruction surgery	No
<b>Locally advanced cancer</b>	
Modified radical mastectomy	Yes
Breast conserving surgery	No
Sentinel lymph node biopsy using radiotracer	No
Breast reconstruction surgery	No
<b>Metastatic, recurrent cancer</b>	
Total mastectomy for ipsilateral breast tumor recurrence after breast conserving surgery	Yes

## PATHOLOGY

Biopsy samples are sent to Bugando hospital for analysis.

## RADIATION THERAPY

Radiation therapy is unavailable at Sekou Toure Hospital. Patients are referred to ORCI for treatment.

## SYSTEMIC TREATMENT

Systemic therapy is not available—patients are referred to Bugando Hospital for treatment.

# Appendix II: Data collection tools

## REFERRAL PROCESS EVALUATION QUESTIONNAIRE This form can be downloaded at [www.bci25.org](http://www.bci25.org)

Enter name of hospital, Date \_\_\_\_\_

Question	Response options and Comments
1 Are you here today you see a doctor regarding a concern with your breast/s?	Yes No If no, stop the interview and thank the woman for their time
2 How old are you?	years
3 How far away do you live from this hospital?	Km/miles
4 How long did it take to get here?	Hours/days
5 What reason are you attending this hospital?	Screening To speak to a doctor about concerns about my breasts Diagnosis Surgery Treatment with medication Treatment with radiation
6 Is this your first visit to this hospital for your current health problem?	Yes No If Yes, go to question 8
7 If No, how many visits have you made here before today?	
8 For your current health problem is this the first time you have seen a doctor?	Yes No If yes Skip to question 12
9 If no, how many doctors have you seen before today?	
10 Were they at different locations/ hospitals?	Yes No If no, Skip to question 12
11 If Yes, how many hospitals or clinics did you visit before you came here?	
12 When did you first notice any changes to your breast – such as a small lump, redness, for example	Weeks/Months/Years
13 When did you first visit a doctor to talk about this change?	Weeks/Months/Years
14 Have you had surgery?	Yes No
15 If yes, how long was it between seeing the doctor and having surgery	Weeks/Months/Years
16 Have you had chemotherapy?	Yes No
17 If yes, how long between seeing the doctor and starting chemotherapy	Weeks/Months/Years
18 Before your current health issue, did a doctor or nurse ever examine your breasts?	Yes No
19 Before your current health issue, did you ever see or hear any information about the importance of being aware of changes to your breast?	Yes No
20 Before your current health concern/issue, did anyone ever speak with you about the importance of examining your breasts for lumps or for changes in your breasts?	Yes No
21 Before your current health concern/issue, did anyone ever show you how to examine your breasts for lumps or for changes in your breasts?	Yes No

# THE BREAST HEALTH CARE ASSESSMENT QUESTIONNAIRE

Thank you for taking the time to complete this questionnaire.

An online version is also available at <https://cdsweb07.fhcrc.org/redcap/surveys/?s=AR4JPHXE4W>

Please read the instructions to each section carefully—some sections may not apply to you.

If unsure of the correct answer to questions, please select 'don't know'.

Completed questionnaires can be emailed to [info@bci25.org](mailto:info@bci25.org)

Institution: \_\_\_\_\_  
 \_\_\_\_\_  
 City: \_\_\_\_\_  
 Country: \_\_\_\_\_  
 Date: \_\_\_/\_\_\_/\_\_\_\_ (dd/mm/yyyy)

When complete, please estimate how long it took you or your team to complete the questionnaire

	Select
Under 15 minutes	<input type="checkbox"/>
15-30 minutes	<input type="checkbox"/>
30-45 minutes	<input type="checkbox"/>
45-60 minutes	<input type="checkbox"/>
Over 60 minutes	<input type="checkbox"/>
Don't Know	<input type="checkbox"/>

## 1. RESPONDENT DEMOGRAPHICS

To be completed by all respondents.

1.1 Please rank your core functions in the institution where you work. [If you select more than one answer, please rank your answers in the order of frequency with 1 being the most frequent, 2 being the second most frequent, etc.].

	Rank
1.1.1. Policy	<input type="checkbox"/>
1.1.2. Administrative	<input type="checkbox"/>
1.1.3. Finance	<input type="checkbox"/>
1.1.4. Imaging [Radiology]	<input type="checkbox"/>
1.1.5. Pathology	<input type="checkbox"/>
1.1.6. Surgery	<input type="checkbox"/>
1.1.7. Radiation therapy	<input type="checkbox"/>
1.1.8. Medical oncology	<input type="checkbox"/>
1.1.9. Nurse	<input type="checkbox"/>
1.1.10. Pharmacist	<input type="checkbox"/>
1.1.11. Other [Specify]	<input type="checkbox"/>

1.2. Number of years performing these functions: \_\_\_\_\_

1.3. Number of years at current institution: \_\_\_\_\_

1.4. Age: \_\_\_\_\_

1.5. Sex      Male  Female

## 2. INSTITUTION: GENERAL

To be completed by all respondents.

### 2.1 What best describes your facility (please select only one option)

	Select one
2.1.1. Primary care facility – provides primary health care to patients who come to the facility with any undiagnosed symptom, or health concern. The services provided at the primary care facility do not have distinct specialties.	<input type="checkbox"/>
2.1.2. Provincial or Secondary-level hospital – highly differentiated by function with five to ten clinical specialties, including internal medicine, obstetrics-gynecology, pediatrics and general surgery.	<input type="checkbox"/>
2.1.3. Tertiary-level hospital - highly specialized staff and technical equipment. Clinical services are highly differentiated by function; might have teaching activities.	<input type="checkbox"/>
2.1.4. Cancer care/breast care facility- specialized in cancer or breast cancer diagnosis and treatment.	<input type="checkbox"/>
2.1.5. Outpatient clinic/Imaging center – detection and diagnosis of breast cancer.	<input type="checkbox"/>
2.1.6. Palliative care facility – provides medical care that focuses on reducing the severity of disease symptoms, rather than a cure or reverse progression of the disease itself. The goal is to prevent and relieve suffering and to improve quality of life for cancer patients.	<input type="checkbox"/>

### 2.2. What best describes the funding status of your facility?

	Select one
2.2.1. Public - Government funded	<input type="checkbox"/>
2.2.2. Private (for profit) – No government funding	<input type="checkbox"/>
2.2.3. Mixed – government and private funding	<input type="checkbox"/>
2.2.4. Not-for-profit	<input type="checkbox"/>
2.2.5. Mission/faith-based	<input type="checkbox"/>
2.2.6. Foreign aid	<input type="checkbox"/>
2.2.7. Other (specify):	<input type="checkbox"/>

2.4. Please rank in order of importance the primary source of payment for patient services. [If you select more than one answer, please rank your answers in the order of frequency with 1 being the most frequent, 2 being the second most frequent, etc.]

	Rank
2.3.1. Government/public insurance (free for all patients)	<input type="checkbox"/>
2.3.2. Employer funded health insurance	<input type="checkbox"/>
2.3.3. Private Insurance (patients purchase private health insurance)	<input type="checkbox"/>
2.3.4. Patient/Family pays 100% of the cost (out of pocket expense)	<input type="checkbox"/>
2.3.5. Patient/Family pays the majority of the cost (more than 50%)	<input type="checkbox"/>
2.3.6. Patient/Family pays some of the cost (less than 50%)	<input type="checkbox"/>
2.3.7. Institution provides service free of charge	<input type="checkbox"/>

2.8. To improve delivery of breast health care at your facility, do you partner with any of the following?

	No	Yes	Don't Know
	(0)	(1)	(9)
2.4.1. Cancer support/advocacy groups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4.2. Religious groups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	No	Yes	Don't Know
2.4.3. National Foundations/organizations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4.4. National Universities/educational or research institutions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4.5. Other domestic health institutions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4.6. Industry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4.7. Foreign governments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4.8. International Universities/educational or research institutions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4.9. International organizations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4.10. Other (specify):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

For those above which you indicated “yes” please list the partners below:

2.5. Using the following scale how do you assess the breast cancer/breast health care services provided by your institution, given the available resources?

[0] Not addressed: these services are not provided in my institution

[1] Partially developed but does not meet demand/needs

[2] Well established: All the required services or activities are available and reach most of the target population

	Not addressed [0]	Partially developed [1]	Well estab- lished [2]	Don't know [9]
2.5.1. Breast cancer screening of asymptomatic women	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5.2. Breast cancer early detection by clinical breast examination	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5.3. Breast imaging for screening (i.e. mammogram, ultrasound)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5.4. Breast imaging for diagnosis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5.5. Pathology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5.6. Breast surgery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5.7. Radiation therapy for symptom control (i.e., bone metastases)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5.8. Chemotherapy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5.9. Endocrine therapy (e.g., tamoxifen, aromatase inhibitors)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5.10. Biological therapy (e.g. trastuzumab)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5.11. Multidisciplinary care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5.12. Psychosocial support for cancer patients and family members (individual or group)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5.13. Palliative care/pain management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5.14. Rehabilitation of cancer patients	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5.15. Follow-up of cancer patients	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5.16. Medical record keeping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5.17. Cancer registry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5.18. Physician training in breast health care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Not addressed	Partially developed	Well established	Don't know
2.5.19. Patient education/outreach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2.6. How many women attend your facility/week for breast health concerns/cancer care? \_\_\_\_\_

2.7. How many new cases of breast cancer does your institution see monthly? \_\_\_\_\_

2.8. What percentage of women do not return after their initial consultation? \_\_\_\_\_

### 3. PATIENT DATA, RECORDS AND TRACKING

To be completed by all respondents

3.1. What is the estimated distribution of cancer stage among the breast cancer patients in your facility?

	Percentage
3.1.1. DCIS [Stage 0]	____ %
3.1.2. Early stage [Stage I or II]	____ %
3.1.3. Locally advanced [stage III ]	____ %
3.1.4. Metastatic [Stage IV]	____ %

3.2. Please answer the following regarding the status and maintenance of medical records, and systems to manage records.

	No	Yes	Don't know
	[0]	[1]	[9]
3.2.1. Does your institution have a system for management of pathology records?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2.2. Does your institution have a system for management of surgery records?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2.3. Does your institution have a system for tracking patients from diagnosis to final outcome?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2.4. Does your institution have a system for following patients after a diagnosis of metastatic breast cancer?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2.5. Are patient medical records maintained by your institution?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2.5.1 If Yes, are they electronic?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2.5.2 If Yes, are they paper?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2.5.3 If No, are records held/maintained by patients?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2.6. Do patient records contain their TNM staging?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2.7. Does your institution utilize a unified medical record for each patient that is used throughout institution?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2.8. Is record keeping adequate to perform patient care?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.3. The following asks a series of questions about the presence of cancer registries in your institution, region and country.

	No	Yes	Don't know
	[0]	[1]	[9]
3.3.1. Is there a population-based cancer registry in your country?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3.2. Is there a population-based cancer registry in your region?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3.3. Is there a hospital-based cancer registry in your institution?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3.4. If yes, which of the following data do you collect?			

	No	Yes	Don't know
3.3.4.1. Personal identification (Name, age, sex, registration number)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3.4.2. Demographic (address ethnicity)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3.4.3. Tumor data (Incidence date, basis of diagnosis Topography [site] Morphology [histology] Behaviour, Source of information)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3.4.4 The tumor and its investigations (Certainty of diagnosis; Method of first detection; Clinical extent of disease before treatment; Surgical-cum-pathological extent of disease before treatment; TNM system; Site[s] of distant metastases; Multiple primaries; Laterality)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3.4.5 Treatment (Initial treatment)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3.4.6 Follow-up (Date of last contact; Status at last contact [alive, dead, emigrated, unknown]; Date of death; Cause of death; Place of death)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**3.4. Are any of the following educational materials, support systems and information at time of breast cancer diagnosis are made available to patients at your institution?**

	No	Yes	Don't Know
	[0]	[1]	[9]
3.4.1. The patient is given information about their tumor stage at diagnosis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.2. The patient is given information about their treatment plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.3. The patient is given information about their prognosis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.4. The patient is given information about management of side effects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.5. The institution has written materials about early detection of breast cancer available to patients	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.6. The institution has written materials about diagnosis and treatment of breast cancer available to patients	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.7. The institution has a breast cancer education video available to patients	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.8. There are patient navigators at the institution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.9. The institution has information on management of treatment side effects available to patients	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.10. The institution provides supportive/palliative care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.11. The institution provides psychosocial support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.12. The institution provides support groups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.13. The institution provides transportation for patients	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.14. The institution provides temporary housing for travelling patients	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.15. The institution provides assistance in finding financial support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.16. The institution provides information about or access to breast cancer support groups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.17. The institution provides information about or access to national breast cancer advocacy groups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.18. The institution provides information about or access to civil society engagement in cancer control planning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.19. The institution provides information about or access to patient/survivor engagement in cancer control planning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.20. Others (specify):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.5. Are any of the following programs or campaigns present in your community/region?

	No	Yes	Don't Know
	[0]	[1]	[9]
3.5.1. Local education programs to promote awareness among women of breast cancer risk factors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.5.2. Local education programs to promote awareness among women of the importance of breast cancer early detection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.5.3. Local education programs to promote breast health awareness [education and self-exam]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.5.4. Outreach/education encouraging CBE for age groups at high risk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.5.5. Regional awareness programs regarding breast health linked to general health and women's health programs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.5.6. National awareness campaigns regarding breast health using media	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.6. In your opinion, how common is it for breast cancer patients you see to seek care from alternative providers such as traditional healers, or use alternative therapies such as herbal or other supplements?

Not common	Somewhat common	Very Common	Don't know
[0]	[1]	[2]	[9]
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional comments:

#### 4. DETECTION AND DIAGNOSIS (IMAGING & WORKUP)

THIS SECTION IS TO BE COMPLETED ONLY IF YOU WORK IN DETECTION, IMAGING & WORKUP

4.1. How many radiologists are there in your Institution? \_\_\_\_\_ Don't Know

4.2. How is breast imaging reported in your institution?

	Select one
4.2.1. BI-RADS	<input type="checkbox"/>
4.2.2. Other (specify):	<input type="checkbox"/>

4.3 Which of the following methods of breast cancer early detection are available in your institution?

	No	Yes	Don't know
	[0]	[1]	[9]
4.3.1. Clinical history and CBE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.3.2. Diagnostic breast ultrasound in women with positive CBE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.3.3. Diagnostic mammography in women with positive CBE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.3.4. Mammographic screening of target group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.3.5. Mammographic screening every 2 years in women ages 50-69	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.3.6. Mammographic screening every 12-18 months in women ages 40-49	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.3.7. Annual mammographic screening in women ages 40 and older	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.3.8. Other imaging technologies as appropriate for high-risk groups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### 4.4. Which of the following methods of breast cancer diagnosis are available in your institution?

	No	Yes	Don't know
	(0)	(1)	(9)
4.4.1. Medical history & physical examination	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4.2. Clinical Breast Exam	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4.3. Tissue sampling for cancer diagnosis [cytologic or histologic] prior to initiation of treatment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4.4. Ultrasound-guided FNAB of sonographically suspicious axillary nodes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4.5. Sentinel lymph node [SLN] biopsy with blue dye	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4.6. Image guided breast sampling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4.7. Preoperative needle localization under mammography and/or Ultrasound guidance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4.8. SLN biopsy using radiotracer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4.9. Diagnostic breast ultrasound	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4.10. Plain chest & skeletal radiography	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4.11. Liver Ultrasound	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4.12. Blood chemistry profile	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4.13. Complete blood count	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4.14. Diagnostic mammography	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4.15. Specimen radiography	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4.16. Bone scan, CT scan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4.17. Cardiac function monitoring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4.18. PET scan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4.19. MIBI scan, breast MRI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4.20. BRCA 1/2 testing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4.21. Mammographic double reading	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### 4.5. How do you sample masses that are only seen on an imaging test but cannot be felt by the clinician?

	None	<25%	25-50%	50- 75%	>75%	Don't know
	(0)	(1)	(2)	(3)	(4)	(9)
4.5.1. Biopsy/FNA under imaging guidance	<input type="checkbox"/>					
4.5.2. Refer to surgery	<input type="checkbox"/>					
4.5.3. Send to clinician	<input type="checkbox"/>					
4.5.4. Unable to sample lesions only seen on imaging	<input type="checkbox"/>					
4.5.5. Other [specify]:	<input type="checkbox"/>					

Additional comments:

## 5. PATHOLOGY

To be completed by all CLINICAL respondents

5.1 How many pathologists are at your institution? \_\_\_\_\_ Don't Know

5.2 How many pathology technicians are at your institution? \_\_\_\_\_ Don't Know

5.3 Which of the following items are included on a pathology report from your institution, or are performed at your institution?

	No	Yes	Don't know
	[0]	[1]	[9]
5.3.1. Pathology diagnosis obtained for every breast lesion by any available sampling procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.3.2. Pathology report containing appropriate diagnostic and prognostic/predictive information to include tumor size, lymph node status, histologic type and tumor grade	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.3.3. Determination and reporting of TNM stage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.3.4. Determination of ER status by immuno-histochemistry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.3.5. Determination of margin status	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.3.6. Determination of DCIS content	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.3.7. Determination of the presence of lymphovascular invasion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.3.8. Frozen section or touch prep SLN analysis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.3.9. Measurement of HER2 overexpression or gene amplification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.3.10. Determination of PR status by IHC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.3.11. IHC staining of sentinel nodes for cytokeratin to detect micro-metastases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.3.12. Pathology double reading	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.3.13. Gene profiling tests	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5.4. Tissue diagnosis of breast abnormality can be obtained in several ways. What methods are used to obtain initial tissue diagnoses among breast cancer patients in your facility.

	No	Yes	Don't know
	[0]	[1]	[9]
5.4.1. Fine needle aspiration (cytology)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.4.2. Core needle tissue biopsy (histology)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.4.3. Surgical biopsy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.4.4. Mastectomy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5.5. Does your institution have a standard process or protocol for fixing tissue?

No	Yes	Don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5.6. Where are your pathology slides reviewed by a pathologist? [Select all that apply]

	No	Yes	Don't know
	[0]	[1]	[9]
5.6.1. At our institution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	No	Yes	Don't know
5.6.2. In country partner laboratory [not in institution]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.6.3. Sent Abroad/International Services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.6.4. Telepathology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.6.5. Service not available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.6.6. Other [specify]:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5.7. On average, how long does it take to receive a pathology report?

5.7.1. Up to one week	<input type="checkbox"/>
5.7.2. Longer than one week but less than one month	<input type="checkbox"/>
5.7.3. Longer than one month but less than 3 months	<input type="checkbox"/>
5.7.4. Longer than 3 months	<input type="checkbox"/>

5.8. What percent of breast tumors receive a formal pathology report?

None	Less than 25%	25-50%	51-75%	Over 75%	Don't know
[0]	[1]	[2]	[3]	[4]	[5]
<input type="checkbox"/>					

Additional comments:

## 6. SURGICAL THERAPY

COMPLETE THIS SECTION ONLY IF YOU WORK IN SURGERY

6.1. Which of the following procedures are performed at your institution?

	No	Yes	Don't know
	[0]	[1]	[9]
6.1.1 For early stage cancer what surgery is performed at your institution?			
6.1.1.1 Modified radical mastectomy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.1.1.2 Breast conserving surgery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.1.1.3 Sentinel lymph node [SLN] biopsy with blue dye	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.1.1.4 Sentinel lymph node biopsy using radiotracer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.1.1.5 Breast reconstruction surgery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.1.2. For locally advanced cancer what surgery is performed at your institution?			
6.1.2.1. Modified radical mastectomy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.1.2.2. Breast conserving surgery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sentinel lymph node [SLN] biopsy with blue dye [MISSING]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.1.2.3. Sentinel lymph node biopsy using radiotracer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	No	Yes	Don't know
6.1.2.4. Breast reconstruction surgery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.1.3. For metastatic, recurrent cancer what surgery is performed at your institution?			
6.1.3.1. Total mastectomy for ipsilateral breast tumor recurrence after breast conserving surgery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6.2 Please estimate the percentage of patients seen at your institution with the following

	None	Percent	Don't know
	[0]	[1]	[9]
6.2.1. Patients with a mass detected by radiological screening but with no clinical symptoms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.2.2. A mass in the breast < 2cm without palpable lymph node involvement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.2.3. A palpable breast mass 2-5 cm in diameter without palpable lymph nodes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.2.4. A palpable breast mass >5 cm in diameter with palpable lymph nodes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.2.5. Ulcerated mass on the breast with multiple lymph node involvement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6.3. What percentage of breast cancer patients in your institution ...

	None	< 25%	25-50%	50-75%	>75%	Don't know
	[0]	[1]	[2]	[3]	[4]	[9]
6.3.1. Undergo mastectomy as opposed to breast conserving surgery?	<input type="checkbox"/>					
6.3.2. Who have a mastectomy, also have breast reconstruction surgery?	<input type="checkbox"/>					
6.3.3. Who have surgery for invasive breast cancer, also have axillary lymph node staging based on tissue diagnosis (including sampling or removal of lymph nodes followed by pathologic analysis of removed tissue)?	<input type="checkbox"/>					
6.3.4. Who have axillary lymph node staging and undergo complete axillary lymph node dissection [ALND] (as opposed to sentinel lymph node biopsy).	<input type="checkbox"/>					
6.3.5. Received breast cancer surgery (if necessary) within 3 months of diagnosis?	<input type="checkbox"/>					

6.4. Of those patients who undergo mastectomy, what is/are the reason(s) that the mastectomy is selected?

	No	Yes	Don't know
	[0]	[1]	[9]
6.4.1. Tumor too large for breast conservation surgery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.4.2. Radiation therapy is not available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.4.3. Surgeon prefers mastectomy over lumpectomy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.4.4. Patient prefers mastectomy over lumpectomy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.4.5. Other [specify]:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6.5 What information do you receive from pathology reports before you perform a breast procedure?

	No	Yes	Don't know
	(0)	(1)	(9)
6.5.1. Surgical margins	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.5.2. Lobular vs. ductal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.5.3. Estrogen receptor status	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.5.4. Other (Specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.5.5. I don't receive any pathology reports	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6.6. What imaging, if any, do you receive before you perform a breast procedure?

	No	Yes	Don't know
	(0)	(1)	(9)
6.6.1. Mammography	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.6.2. Ultrasound	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.6.3. Other (specify):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.6.4. I don't receive any imaging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6.7. If surgical procedures from breast cancer treatment are available in your institution, please indicate the main reasons for delays in treatment for women who DID NOT receive breast surgery within 3 months of diagnosis (Select all that apply)

	No	Yes	Don't know
	(0)	(1)	(9)
6.7.1. Access: Surgery is available, but it cannot be scheduled within 3 months	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.7.2. Geographic barrier: Patients live too far away	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.7.3. Cost: Patients cannot afford the surgery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.7.4. Refusal: Patients decline the treatment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.7.5. Insurance: Administrative issues/insurance problems create delay	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.7.6. Medical workup: Workup studies takes more than 3 months	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.7.7. Other (specify):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional comments:

## 7. RADIATION THERAPY

COMPLETE THIS SECTION ONLY IF YOU WORK IN RADIATION TREATMENT

7.1 How many radiologists are there in your Institution? \_\_\_\_\_ Don't Know

7.2. Please indicate where patients in your facility access radiation treatment

	No	Yes	Don't know
	[0]	[1]	[9]
7.2.1. Our institution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.2.2. Other institution in same city	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.2.3. Travel to another city in country	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.2.4. Outside the country	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.2.5. Don't know	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7.3. Of the patients for whom radiation therapy is indicated, please estimate the percentage of them who actually received radiation therapy?

Never	Less than 25%	25-50%	51-75%	Over 75%	Don't Know
[0]	[1]	[2]	[3]	[4]	[5]
<input type="checkbox"/>					

7.4. Of the patients who received radiation therapy, which type of machine was used to deliver the radiotherapy to the majority of them? [Select all answers that apply]

	No	Yes	Don't know
	[0]	[1]	[9]
7.4.1. Cobalt-60 unit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.4.2. Linear accelerator [LINAC]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.4.3. Either cobalt-60 unit or LINAC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.4.4. Don't know	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7.5. Of those patients who DID NOT receive radiation therapy, what is/are the reason[s]? [Select all that apply]

	No	Yes	Don't know
	[0]	[1]	[9]
7.5.1. Access Radiation therapy is not available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.5.2. Access Therapy is available, but the wait is too long	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.5.3. Geographic barrier Therapy available, but the patients live too far away	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.5.4. Cost Therapy available, but the patients cannot afford the therapy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.5.5. Refusal Therapy available, but the patient declined the treatment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.5.6. Others [specify]:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## 7.6. Who performs the planning for patients?

	No	Yes	Don't know
	[0]	[1]	[9]
7.6.1. Medical physicist	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.6.2. Dosimetrist	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.6.3. Physician	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.6.4. Combination	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## 7.7 Which of the following treatments are available to women with breast cancer at your institution?

	No	Yes	Don't know
	[0]	[1]	[9]
7.7.1 Stage I			
7.7.1.1 Breast-conserving whole-breast irradiation as part of breast-conserving therapy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.7.2 Stage II			
7.7.2.1. Postmastectomy irradiation of chest wall and regional nodes for high-risk cases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.7.2.2. Breast-conserving whole-breast irradiation as part of breast-conserving therapy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.7.3. Locally advanced			
7.7.3.1. Postmastectomy irradiation of chest wall and regional nodes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.7.3.2. Breast-conserving whole-breast irradiation as part of breast-conserving therapy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.7.4. Metastatic and recurrent			
7.7.4.1. Palliative radiation therapy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional comments:

## 8. Systemic Treatment

COMPLETE THIS SECTION ONLY IF YOU WORK IN THE FIELD OF SYSTEMIC THERAPY

8.1. Which of following medicines included on the 2015 WHO list of essential medicines for breast cancer are available in your center?

	Available	Not available
8.1.1. Doxorubicin	<input type="checkbox"/>	<input type="checkbox"/>
8.1.2. Cyclophosphamide	<input type="checkbox"/>	<input type="checkbox"/>
8.1.3. Paclitaxel	<input type="checkbox"/>	<input type="checkbox"/>
8.1.4. Docetaxel	<input type="checkbox"/>	<input type="checkbox"/>
8.1.5. Methotrexate	<input type="checkbox"/>	<input type="checkbox"/>
8.1.6. 5-fluorouracil	<input type="checkbox"/>	<input type="checkbox"/>
8.1.7. Trastuzumab	<input type="checkbox"/>	<input type="checkbox"/>
8.1.8. Carboplatin	<input type="checkbox"/>	<input type="checkbox"/>
8.1.9. Capecitabine	<input type="checkbox"/>	<input type="checkbox"/>
8.1.10. Vinorelbine	<input type="checkbox"/>	<input type="checkbox"/>
8.1.11. Gemcitabine	<input type="checkbox"/>	<input type="checkbox"/>
8.1.12. Tamoxifen	<input type="checkbox"/>	<input type="checkbox"/>
8.1.13. Anastrozole (or other aromatase inhibitor – Letrozole and/or Exemestane)	<input type="checkbox"/>	<input type="checkbox"/>

8.2 What type of Systemic Treatments are available for treating breast cancer at your institution?

	No (0)	Yes (1)	Don't know (9)
<b>Early Stage [Stage I/II] Cancer</b>			
8.2.1 Classic CMF AC, EC, or FAC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.2 Taxanes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.3 Growth factors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.4 Dose-dense chemotherapy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.5 Oophorectomy in premenopausal women	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.6 Tamoxifen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.7 Aromatase inhibitors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.8 LH-RH agonists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.9 Trastuzumab for treating HER2 positive disease	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Locally advanced Cancer</b>			
8.2.10 Preoperative chemotherapy with AC, EC, FAC, or CMF	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.11 Taxanes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.12 Growth factors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.13 Dose-dense chemotherapy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.14 Oophorectomy in premenopausal women	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.15 Tamoxifen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.16 Aromatase inhibitors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	No	Yes	Don't know
8.2.17LH-RH agonists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.18Trastuzumab for treating HER2 positive disease	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Metastatic and recurrent Cancer			
8.2.19Classic CMF Anthracycline monotherapy or in combination	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.20Sequential single agent or combination chemotherapy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.21Trastuzumab	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.22Lapatinib	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.23Bevacizumab	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.24Oophorectomy in premenopausal women	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.25Tamoxifen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.26Aromatase inhibitors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.27Fulvestrant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.28Nonopioid & opioid analgesics & symptom management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.29Bisphosphonates	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2.30Growth factors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### 8.3 What are the principal barriers to patients receiving their recommended therapy? (Select all that apply)

	No	Yes	Don't know
	(0)	(1)	(9)
8.3.1 Access - Chemotherapy drugs are not available at the institution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.3.2 Cost - Chemotherapy available, but the patients cannot afford the drugs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.3.3 Location - Chemotherapy available, but the patients live too far away	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.3.4 Refusal- Therapy available, but the patient declined the treatment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.3.5 Other (specify):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### 8.4. Of the patients who are prescribed chemotherapy or endocrine therapy, please estimate the percentage of women who

	None	< 25%	25-50%	50-75%	>75%	Don't know
	(0)	(1)	(2)	(3)	(4)	(9)
Early stage Cancers						
8.4.1 Begin chemotherapy within 3 months of surgery	<input type="checkbox"/>					
8.4.2 Begin chemotherapy within 6 months of surgery	<input type="checkbox"/>					
8.4.3 Begin chemotherapy within 1 year of surgery	<input type="checkbox"/>					
8.4.4 Receive adjuvant endocrine therapy	<input type="checkbox"/>					
8.4.5 Initiate endocrine therapy (where recommended) within one year of initial diagnosis or initial surgical treatment	<input type="checkbox"/>					
Metastatic patients						
8.4.6 Who receive chemotherapy	<input type="checkbox"/>					
8.4.7 Who receive endocrine therapy	<input type="checkbox"/>					
8.4.8 The percentage of patients who initiate their prescribed treatment	<input type="checkbox"/>					
8.4.9 The percentage of patients who complete their prescribed treatment	<input type="checkbox"/>					

8.5. Of the patients whose estrogen and progesterone receptors status are NOT tested, what is/are the reason[s]? [Select all that apply.]

	No	Yes	Don't know
	(0)	(1)	(9)
8.5.1 Access: Immunohistochemistry to assess ER/PR status is not available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.5.2 Cost: Test available, but patients cannot afford the laboratory tests	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.5.3 Insufficient tissue	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.5.4 Other (specify):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8.6. Of the patients whose HER2 status is NOT tested, what is/are the reason[s]? [Select all that apply.]

	No	Yes	Don't know
	(0)	(1)	(9)
8.6.1. Access: Immunohistochemistry/FISH to assess HER2 status is not available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.6.2. Cost: Test available, but patients cannot afford it	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.6.3. Other (specify):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional comments:

If you have any suggestions for improving this questionnaire, please write them below. We appreciate your thoughts and suggestions. Please don't forget to fill out the estimated time to complete the questionnaire on Page 1.

Thank you





THE UNITED REPUBLIC OF TANZANIA  
Ministry of Health, Community Development,  
Gender, Elderly and Children

