Improving Breast Cancer Care in the Middle East and Africa

Andrea Manzano, Katarina Gralén,
Nils Wilking, Thomas Hofmarcher

iHE
THE SWEDISH INSTITUTE FOR HEALTH ECONOMICS
ENABLING INFORMED DECISION MAKING

Authors:
Andrea Manzano, IHE - The Swedish Institute for Health Economics, Stockholm, Sweden
Katarina Gralén, IHE – The Swedish Institute for Health Economics, Lund, Sweden
Nils Wilking, Department of Oncology-Pathology, Karolinska Institutet, Stockholm, Sweden
Thomas Hofmarcher, IHE - The Swedish Institute for Health Economics, Lund, Sweden

Please cite this report as:
Manzano A, Gralén K, Wilking N, Hofmarcher T. Improving Breast Cancer Care in the Middle East and Africa. IHE REPORT 2024:6. IHE: Lund, Sweden.

Disclosure:
This report was commissioned and funded by the International Alliance of Patients' Organizations (IAPO) and based on independent research delivered by IHE. IAPO received grants from AstraZeneca, Eli Lilly, MSD, Novartis Middle East FZE ("Novartis"), and Pfizer to commission IHE with this report. The views and opinions of the authors are not necessarily those of IAPO nor AstraZeneca, Eli Lilly, MSD, Novartis, or Pfizer. The responsibility for the analysis, interpretations, and conclusions, as well as errors or omissions lies solely with the authors.

IHE REPORT 2024:6
e-ISSN: 1651-8187
ISSN: 1651-7628

The report can be downloaded from IHE's website.

Foreword

In 2021, the Swedish Institute for Health Economics (IHE) published its first major report on cancer care Middle East and Africa, offering a comparative analysis of the burden of cancer and access to cancer care services in various countries across the region. On the epidemiological side, one aspect that stood out was the high number of breast cancer cases among women.

This report takes a closer look at breast cancer in nine countries across the region. It intends to raise awareness of the size of the burden of breast cancer and the need to address the disease comprehensively as outlined in the Global Breast Cancer Initiative by the World Health Organization. All areas of breast cancer control – early detection, diagnostics, and treatment - as well as the overall organization and governance of breast cancer care are analyzed in every country. Country-specific recommendations on how to improve the current state of breast cancer care are also provided.

The analysis in this report builds on a review of publicly available sources to describe the state of breast cancer care in the Middle East and Africa. In addition, IHE with the support of the International Alliance of Patients' Organizations (IAPO) held a series of virtual workshops and conducted a survey with a large number of country-level experts in the field of breast cancer in every country in 2023–2024. The patient voice, represented by representatives of patient organizations, was included in these workshops and the survey to ensure inclusion of the patient's perspective. This ensured that the insights and findings of the report are informed by the actual needs and lived experiences of women battling breast cancer.

The engagement of workshop and survey participants was instrumental for the preparation of this report, offering feedback that significantly shaped the challenges and recommendations included. IHE extends its heartfelt gratitude to all workshop and survey participants for their contributions and the insightful feedback provided. This collaborative effort underscores a profound commitment to translating research findings into tangible improvements in breast cancer care within the nine countries in the years to come.

The report was funded by IAPO. Responsibility for the analysis, interpretations, and conclusions, as well as errors or omissions lies solely with the authors.

Lund, April 2024

Peter Lindgren
Managing Director, IHE

Table of Contents

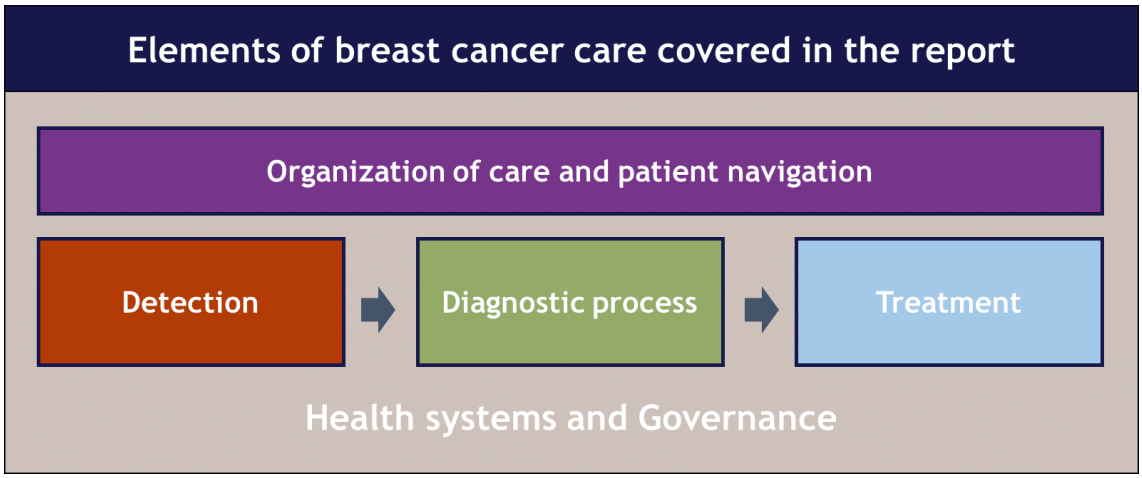
Summary

Breast cancer represents a significant public health issue in the Middle East and Africa. In 2022, it accounted for around 34% of new cancer cases and 22% of cancer deaths among women in the region. The annual number of new breast cancer cases has almost doubled over the past two decades. Despite the increasing demand for care, the opportunities to provide patients with good care so that they can not only live longer with the disease but also beat it have never been better. However, the sad reality is that the majority of patients in the Middle East and Africa do not have access to good care that would give them the same chances of survival as patients in Europe or Northern America.

To address the growing burden of breast cancer, the World Health Organization (WHO) launched the Global Breast Cancer Initiative (GBCI) in 2021. It provides strategic guidance and coordination aimed at improving breast cancer care, with a focus on low- and middle-income countries. The GBCI has a goal of reducing the mortality rate of breast cancer by 2.5 percent each year, which has the potential to save 2.5 million lives between 2020 and 2040.

This policy report follows in the footsteps of the WHO GBCI. It describes the current state of breast cancer care in nine countries in the Middle East and Africa (MEA-9): Algeria, Egypt, Israel, Jordan, Morocco, Saudi Arabia, South Africa, Türkiye, and the United Arab Emirates. This is a diverse region, home to approximately 397 million people, with wide economic disparities between countries such as Morocco and Saudi Arabia. Despite these differences, all MEA-9 countries face the common challenge of the escalating burden of breast cancer.

This report provides a review of the burden of breast cancer and the challenges patients face along the care pathway in each country. It covers the three pillars of the GBCI – detection, diagnostic process, treatment – and complements this with a description of the organization of care as well as an overview of the health systems and the governance of breast cancer care. This description seeks to support local policymakers in the decision-making and prioritization of initiatives in breast cancer care. The report is intended to foster the exchange of best practices in breast cancer care across the MEA region.



Common challenges in breast cancer care

Despite the differences between individual MEA-9 countries, several recurring challenges were identified in the different stages of the care pathway.

Challenges in Early Detection

WHO GBCI target: *>60% of invasive breast cancers are stage I or II at diagnosis.*

Importance of the target: Early detection of breast cancer increases the chances of survival, with close to 100% in stage I but less than 30% in stage IV. It is also the least expensive to treat a patient with stage I and the most expensive with stage IV.

Main challenge in MEA-9: Late detection of a great proportion of breast cancer cases. Only a few countries meet the WHO GBCI 60% target, and many countries lack country-wide data on the stage distribution, hindering the possibility of monitoring early detection initiatives.

Main reasons:

- **Health literacy gaps**: There is a notable disparity between knowledge and action. While many women understand common symptoms or the need for screening, they often do not follow through. In addition, many women still lack knowledge of common symptoms as well as implications of detecting the disease as early as possible.
- **Fear of diagnosis, social stigma, and socio-economic consequences**: Despite having symptoms, women are hesitant to seek help and to disclose their cancer status within their communities due to fear of social repercussions for themselves and their families as well as financial consequences from out-of-pocket payments for the expected medical treatment.
- **Limited access to primary care and training deficiencies**: Women with symptoms may face difficulties to schedule appointments for diagnostic checkups due to lack of clarity where to seek help, lack of public insurance coverage, and geographical barriers. Primary health care workers are not always properly trained to recognize common symptoms of breast cancer.
- **No organized screening programs**: Population-based screening programs with active invitations and call-recall systems are missing in most countries. Only non-organized or opportunistic screening is provided, resulting in low participation rates.
- **No genetic risk assessment**: Genetic testing for BRCA status in (female) family members of patients who carry mutations is not done routinely due to the associated costs.

Challenges in the Diagnostic Process

WHO GBCI target: *Diagnostic evaluation, imaging, tissue sampling, and pathology within 60 days.*

Importance of the target: Keeping the time between diagnosis and treatment start as short as possible (0-30 days vs. ≥61 days) increases the survival chances of breast cancer patients.

Main challenge in MEA-9: Long delays in the diagnostic process and no comprehensive assessment prior to treatment start. The limited evidence available shows that - on average - nearly all countries fail to meet the WHO GBCI 60 days target.

Main reasons:

- **Lack of patient navigation**: Patients are faced with fragmented health care systems and improper referral systems between different levels of care and providers of care. Patients may be unsure about where to seek medical attention, whether to consult a gynecologist, visit primary care facilities, public or private service providers, etc.
- **Restricted accessibility of diagnostic services**: Diagnostic services are mostly concentrated in major cities, leading to geographical barriers for women living in rural areas. In the absence of public health coverage, women often face substantial out-of-pocket expenses for various diagnostic tests in addition to costs for travels.
- **Limited diagnostic infrastructure and lack of quality assurance**: Shortages of essential imaging equipment, such as mammography machines and MRIs, as well as pathology laboratories are prevalent. Quality control of equipment is neglected.
- **Shortage of skilled health care workers and training deficiencies**: Shortages of clinical specialists in diagnostics, including pathologists, biomedical scientists, radiologists, and radiographers, are common. Inadequate training of health care professionals, such as radiologists struggling with mammogram interpretation, hamper accurate and effective diagnostics.
- **No reimbursement of novel biomarker tests and gene expression profiling tests**: Testing for novel biomarkers, such as BRCA1/2, PIK3CA, PD-L1, NTRK, dMMR/MSI-H, TMB-H, as well as gene expression profiling tests, such as Oncotype DX and MammaPrint, is very limited in most countries.

Challenges in Treatment

WHO GBCI target: *>80% of patients undergo multimodality treatment without abandonment.*

Importance of the target: In the last two decades, the global standard-of-care in breast cancer treatment has witnessed unprecedented improvements with the introduction of novel classes of medicines, including HER2-targeted therapies, CDK4/6 inhibitors, BRCA-targeted therapies, and immunotherapy.

Main challenge in MEA-9: Limited access to multimodal treatment (surgery, radiation therapy, cancer medicines) and novel treatment options. Apart from good access for local citizens in the Gulf countries, most countries struggle with providing comprehensive treatment to all their inhabitants and may fail to meet the WHO GBCI 80% target.

Main reasons:

- **Uneven adoption of multidisciplinary team meetings**: Multidisciplinary team meetings to decide on the most appropriate treatment approach are hardly conducted in some countries and clinics.
- **Neglect of psychosocial support for patients**: There is a lack of patient involvement and psychosocial support during the treatment process, leaving women alone to deal with the emotional and psychological aspects of breast cancer.
- **Shortage of oncology specialists**: Most countries report critical workforce shortages of breast surgeons, radiation oncologists, and/or medical oncologists. This results in treatment delays and restricted access to treatment by specialists.
- **Restricted access to radiation therapy**: A shortage of radiation therapy equipment and restricted geographical access in nearly all countries present significant hurdles in providing timely and effective treatment.

- **Lack of reimbursement of novel medicines**: Many patients across the region do not have adequate access to novel medicines, with the exception of some older HER2-targeted therapies and potentially some CDK4/6 inhibitors. The access is especially limited for early-stage disease, but better for metastatic disease.

Key areas for improvement

Despite the long list of challenges, there are many positive signs that breast cancer patients' access to good care is improving. Mortality rates of breast cancer have increased less strongly than incidence rates in the last two decades, which indirectly indicates improved survival. More women are nowadays diagnosed in earlier stages, which improves their chances to survive.

For health policy makers across the region, it is important to build on the improvements achieved in the past as well as on existing policy frameworks such as the WHO GBCI. Actions to improve the status quo will require multi-stakeholder involvement while putting patients at the center of all decision-making.

Areas for improvement	Description
Strengthen the governance of breast cancer care	• Breast cancer should be viewed as a strategic area to address a high disease burden that affects the lives of countless women and their families. A best-practice example is the Egyptian "Women's Health Initiative" that started in 2019. • Investments in evidence-based interventions in all areas of the care pathway should be planned and executed, as advocated for by the WHO GBCI. • Data collection of the resources used, the interventions made, and the patient outcomes achieved needs to be prioritized to assess and monitor the effective and efficient use of resources.
Improve the health literacy of women and men on breast health	• Implement community-based breast health education programs, collaborate with community leaders for advocacy, use testimonials and culturally appropriate materials for raising awareness on breast health. • Promote participation in screening programs and tailor awareness campaigns to women in vulnerable groups. • Reach out to men and educate them on the importance of early detection of breast cancer for themselves and their loved ones.
Optimize the organization and delivery of care	• Enhance the involvement of primary care (or the typical first point of contact with the health system) in early detection. • Upgrade opportunistic screening programs to population-based programs with active invitations and call-recall systems, while guaranteeing free access. • Utilize mobile mammography trucks to reach women living in underserved areas. A best-practice example is the "Pink Caravan" initiative in the UAE that uses mobile trucks to traverse the country, providing accessible and free screenings. • Establish or update national clinical guidelines for breast cancer care and ensure their implementation at clinics and hospitals across the country. A best-practice example is the implementation of therapeutic guidelines in medical oncology for breast cancer in Algeria as of 2022.

	• Establish standardized patient pathways, defining all services to be received along the pathway, timelines for referrals, and responsible service providers. • Provide patient-centered care and support through the introduction of patient navigators or breast cancer nurses who can provide clear guidance for patients along the entire care pathway.
Invest in human resources and infrastructure	• Train and recruit all kinds of specialists involved in the diagnosis and treatment of breast cancer, such as radiologists, pathologists, breast surgeons, and medical oncologists, to cater for the increasing number of patients. • Enhance training for general physicians to recognize breast cancer symptoms and for specialists to ensure adherence to evolving quality standards. • Expand the number of breast cancer clinics, especially in regions with limited geographic access to ensure a more equitable distribution of resources. • Address equipment scarcity for imaging analysis (mammography machines and other scanners), pathological assessment (pathology laboratories), and treatment (radiation therapy machines). • Establish or enhance quality controls of all equipment used in the diagnosis and treatment process.
Adopt innovative diagnostic and treatment approaches	• Test the use of artificial intelligence-supported imaging analysis for mammograms. • Expand access to comprehensive biomarker testing and gene expression profiling tests in tandem with the reimbursement of appropriate medicines. • Expand access to novel medicines and prioritize reimbursement of medicines with a high clinical benefit and acceptable cost-effectiveness profile. • Administer hypofractionated radiation therapy in appropriate patients to save time and resources.

Acknowledgement

IHE and IAPO held a series of virtual workshops with country-level experts in the field of breast cancer in the involved countries between July 2023 and March 2024. Additional country-level experts answered an online survey. We want to express our sincere gratitude to the following experts for their time and valuable insights.

Algeria

- Prof. Amel Lajroud (Lead breast oncologist at Centre Pierre et Marie Curie)
- Prof. Sabiha Bouzbid (PhD, MD, Epidemiologist. Faculty of Medicine - BADJI Mokhtar Annaba University)
- Prof. Hayette Aouras (Gynecologist, Cancer Surgeon at Faculty of Medicine - BADJI Mokhtar Annaba University)
- Ms. Hamida Kettab (General Secretary Association el Amel d'aide aux personnes atteintes de cancer Algérie)

Egypt

- Dr. Emad Shash (Medical director and General Manager at the Breast Comprehensive Cancer Hospital at the National Cancer Institute)
- Dr. Ahmad Morsy (Executive director at the National Program for Women Health at Ministry of Health and Population)
- Dr. Ahmed H. Abdelaziz (Associate professor of oncology at Ain Shams University)

Israel

- Prof. Lital Keinan-Boker (Director of the Israel Center for Disease Control and Full Professor at the School of Public Health, University of Haifa)
- M.Sc. Tali Rosin (CEO at One in Nine)
- Dr. Shani Paluch-Shimon (Director of Breast Oncology at Hadassa MC & Member of the Israeli National Cancer Council)
- Prof. Eitan Friedman (School of Medicine Tel-Aviv University & Founder of the Oncogenetics service and the Meirav High-risk clinic at Sheba Medical Center, Tel-Hashomer & Head of Ministry of Health Ethics Committee for Genetic Studies)
- Prof. Einat Carmon (Director of the Breast Center and the Breast Surgery Unit at Assuta Ashdod Hospital)

Jordan

- Dr. Omar Nimri (Former Director, Cancer Prevention Dept. Head and PI, Jordan Cancer Registry at Ministry of Health; Current MD at Disease Prevention & Control Directorate, Jordan Center for Disease Control)
- Dr. Reem Al-Ajlouni (Director of the Jordan Breast Cancer Program/ King Hussein Cancer Foundation)
- Dr. Ahmed Shahin (Medical Oncologist, Royal Medical Services)
- Dr. Jihad R Al-Maani (Ministry of Health)

Morocco

- Prof. Hassan Errihani (Professor at Faculty of Medicine and Pharmacy of Rabat and Head of Department of Medical Oncology at the National Institute of Oncology)

- Dr. Youssef Chami (Project manager at Lalla Salma Foundation for Cancer Prevention and Treatment)
- Dr. Myriam Nciri (CEO at Dar Zhor Association)
- Dr. Karima Oualla (Associate professor at the Faculty of Medicine and Pharmacy, Hassan II University Hospital)

Saudi Arabia

- Dr. Suad M. Bin Amer (Founder & Vice-president of Zahra Breast Cancer Foundation)
- Dr. Atlal Abusanad (Head of the Breast Cancer Unit at King Abdulaziz University Hospital and Member of the Oncology Pharmacy Committee at the Ministry of Health)
- Dr. Faisal Azam (Consultant Medical Oncologist, King Fahad Specialist Hospital Dammam)

South Africa

- Ms. Lauren Pretorius (CEO, Campaigning for Cancer)
- Dr. Liana Roodt (Senior surgical consultant, Breast and Endocrine Unit Groote Schuur Hospital; Executive Director and CEO Project Flamingo Breast Cancer NPC; Executive Director The Cancer Alliance of South Africa)
- Prof. Carol-Ann Benn (Extraordinary Professor, Department of Immunology, Faculty of Health Sciences, University of Pretoria; Head of Breast Care Centre of Excellence in Netcare Milpark Hospital)
- Dr. Manala Makua (Chief Director, National Department of Health)
- Prof. Jenny Edge (Executive Director, Breast Course 4 Nurses & Head of Breast Cancer Care at Charlotte Maxeke Academic Hospital, University Witwatersrand)
- Ms. Noelene Kotschan, (CEO and Founder PinkDrive and MBTM)
- Dr. Dominc van Loggerenberg, (Head of Research, Breast Care Centre of Excellence in Netcare Milpark Hospital)

Türkiye

- Dr. Belma Kurdoglu (PhD. Head of Executive Board of Cancer Survivors Association)
- Dr. Umut Demirci (Memorial Ankara Hospital & Faculty of Medicine at Üsküdar University)
- Prof. Yeşim Eralp (Professor of Medical Oncology at Acıbadem University)
- Dr. Toker Ergüder (World Health Organization, Türkiye Office)

United Arab Emirates

- Dr. Sawsan AlMadhi (Advocacy Advisor, CEO & Founder, AlignnEficient Health Consultancies)
- Dr. Jamila Ibrahim (Pink Caravan Mobile Clinic Executive, Friends of Cancer Patients)
- Dr. Lamia Seifiddine (Senior Cancer Officer, Comprehensive Screening Specialist, Department of Health Abu Dhabi)
- Mr. Majed Mohamed Ibrahim (Advocacy & Scientific Affairs Manager, Friends of Cancer Patients
- Dr. Sahar Idris (Radiology specialist, Pink Caravan, Friends of Cancer Patients)
- Dr. Fathi Azribi (Consultant medical oncologist, American Hospital Dubai)
- Dr. Hassan Jaafar (Consultant medical oncologist, Burjeel Medical City, Abu Dhabi)

Disclaimer: This report does not necessarily reflect the views of the country-level experts or their organizations involved.

List of abbreviations

AI	Artificial intelligence
AMO	Assurance Maladie Obligatoire
ANAM	L'Agence Nationale de l'Assurance Maladie
ASCO	American Society of Clinical Oncology
BCED	Breast Cancer Early Detection
BRCA	Breast cancer gene
BSE	Breast self-examination
CANSA	Cancer Association of South Africa
CAP	College of American Pathologists
CASNOS	Caisse Nationale de Sécurité Sociale des Non-Salariés
CBE	Clinical breast examination
CCO	Curative Care Organization
CCS	Country Cooperation Strategy
CDK4/6	Cyclin-dependent kinase 4 and 6
CHBAH	Chris Hani Baragwanath Academic Hospital
CM-VI	Centre Mohammed VI pour le traitement des cancers
CNAS	Caisse Nationale des Assurances Sociales des Travailleurs Salariés
CNOPS	Caisse Nationale des Organismes de Prévoyance Sociale
CNSS	Caisse Nationale de Sécurité Sociale
EBRT	External beam radiation therapy
EML	Essential Medicines List
ER	Estrogen receptor
ESMO	European Society for Medical Oncology
EUSOMA	European Society of Breast Cancer Specialists
FOCP	Friends of Cancer Patients
GBCI	Global Breast Cancer Initiative
GDP	Gross Domestic Product
GLOBOCAN	Global Cancer Observatory
GP	General practitioner
HER2	Human Epidermal Growth Factor Receptor 2
HIO	Health Insurance Organization
HMO	Health Maintenance Organization
HR	Hormone receptor
HTA	Health technology assessment
IAEA	International Atomic Energy Agency
IARC	International Agency for Research on Cancer
ICIs	Immune checkpoint inhibitors
INO	Institut National d'Oncologie Sidi Mohamed Ben Abdellah
JBCP	Jordan Breast Cancer Program
KHCC	King Hussein Cancer Center
KHCF	King Hussein Cancer Foundation and Center
KV therapy	Kilovoltage therapy

LMICs	Low and middle-income Countries
LINACs	Linear accelerators
MDTs	Multidisciplinary teams
MOHAP	Ministry of Health and Prevention
MoHP	Ministry of Health and Population
MRI	Magnetic resonance imaging
MV therapy	Megavoltage therapy
NCCN	National Comprehensive Cancer Network
NCCP	National Cancer Control Plans
NCDs	Non-Communicable Diseases
NCSF	National Cancer Strategic Framework
NDoH	National Department of Health
NGO	Non-Governmental Organization
NHI	National Health Insurance
NHLS	National Health Laboratory Service
NHS	National Health Service
OOP	Out-of-pocket
PD-L1	Programmed death-ligand 1
PISCBE	Provided Initiated Screening Clinical Breast Examination
PMBs	Prescribed Minimum Benefits
PR	Progesterone receptor
RMS	Royal Medical Services
SANCI	National Cancer Institute of Saudi Arabia
TNBC	Triple-negative breast cancer
WHO	World Health Organization

Country abbreviations

ALG	Algeria
EGY	Egypt
ISR	Israel
JOR	Jordan
MOR	Morocco
SAU	Saudi Arabia
SAF	South Africa
TUR	Türkiye
UAE	United Arab Emirates
MEA-9	The nine countries listed above
MEA	The greater region of the Middle East and Africa

1. Introduction

Breast cancer is the most commonly diagnosed cancer type and the leading cause of cancer death in women globally (1). Breast cancer occurs in every country of the world in women[1] at any age after puberty, but with increasing likelihood later in life (3). In 2022, an estimated 2.29 million new breast cancer cases were diagnosed and around 665,000 women died from the disease. Projections by the World Health Organization (WHO) point to continued increases in the number of breast cancer patients in the coming decades (4). Breast cancer is responsible for 25% of all new cancer cases in women and 16% of all cancer deaths in women worldwide (5); see Figure 1. The estimated average lifetime risk for a woman (before the age of 85) to get breast cancer is close to 9%. This risk is highest in Northern America at 14% and lowest in Asia at 5% (5).

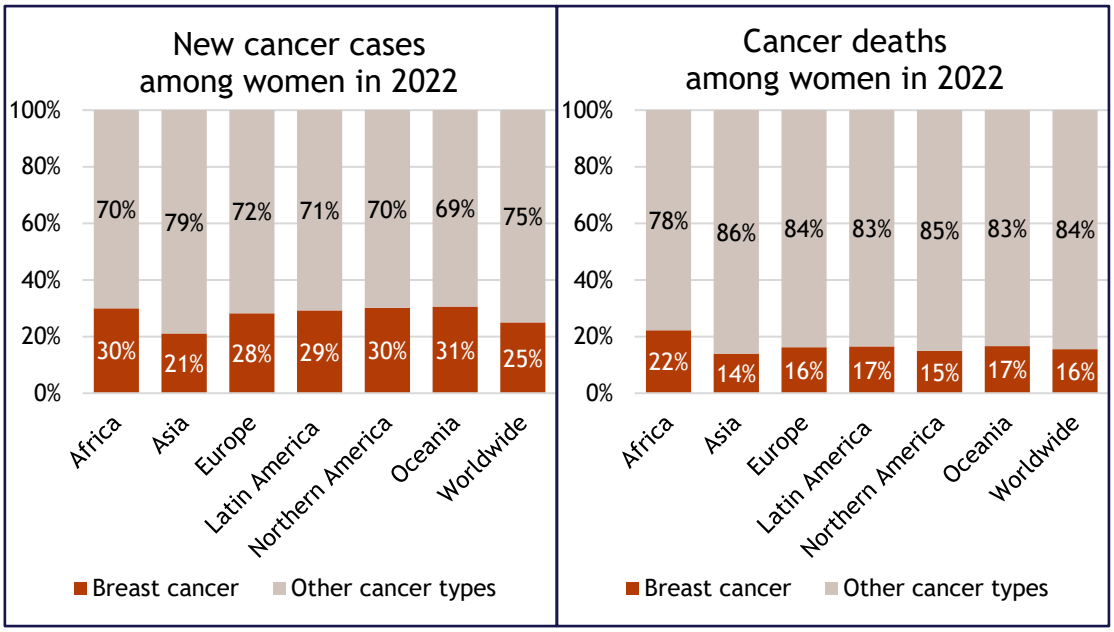


Figure 1: Proportion of new breast cancer cases and deaths among women by world region in 2022.

Notes: Cancer is defined as all types excluding non-melanoma skin cancer. Source: IARC (5).

The provision of high-quality care for breast cancer patients can save many lives. The latest international data for cancer survival show large country differences across the globe. A five-year survival rate of only 40% has been reported for the Eastern Cape region of South Africa, 77% for Algeria, 82% for Türkiye, 84% for Jordan, 88% for Israel, and 90% for the United States in the diagnosis period 2010-2014 (6, 7). According to the WHO, the burden of avoidable breast cancer deaths disproportionately affects low- and middle-income countries (LMICs) where over 70% of breast-cancer deaths are premature, occurring in women under 70 years of age (8). The WHO also points out that higher breast cancer mortality rates in LMICs and among disadvantaged populations result from late-stage diagnosis and limited access to quality treatment, which in several LMICs is compounded by a lack of awareness regarding the benefits of early detection and access to effective therapies (8).

[1] Men can also get breast cancer, but it is rare. Only about 1 out of every 100 breast cancer cases diagnosed in the United States is found in men (2). This report focuses on breast cancer in women.

Early detection of breast cancer is vital for survival, with five-year survival rates ranging from 99% for localized disease to 28% for metastatic disease in the United States (9). On the one hand, early detection requires awareness both among women and general practitioners about early signs of breast cancer. On the other hand, breast cancer screening programs can help to detect tumors as early as possible. Women in the Middle East and bordering regions face many challenges that prevent early detection, such as lack of access of universal health coverage, minor role of primary care, few advanced diagnostics centers, stigma, cultural/societal values, fear of treatment, lack of organized screening programs (10).

The treatment of breast cancer generally consists of a combination surgery (to remove the tumor), radiation therapy, and cancer medicines (11). The treatment has evolved in recent decades. An improved biological understanding of breast cancer has led to the development of a more personalized therapeutic approach that takes into account the molecular features of the tumor. Nowadays, several different subtypes of breast cancer are known, and their treatment approach differs. The era of personalized medicine started with the identification of receptors for estrogen and progesterone in the 1970-80s. These analyses identified patients with hormonal dependent breast cancer that could be treated with medicines like tamoxifen and aromatase inhibitors. This development continued with the introduction of trastuzumab for the treatment of patients with HER2-positive tumors at the turn of the millennium. In the last decade, CDK4/6 inhibitors were introduced to treat HER2-negative, hormone receptor-positive patients. More recently, immunotherapy was introduced for the treatment of triple-negative patients and BRCA-targeted therapies for patients with BRCA mutations. However, as this report shows, many women across the Middle East and Africa do not have access to newer treatment options.

The early detection of breast cancer and access to high-quality treatment does not only save lives of patients but has many positive indirect effects on the women herself, her family, and the economy. Better health outcomes help women to continue their responsibilities for their families and also continue their work lives. They would also reduce the need for informal care from their family members. The global number of children estimated to have become orphans in 2020 due to their mother dying from breast cancer in that year was 258,000 (equal to 25% of all maternal orphans related to cancer death), most of them located in Asia and Africa (12). There is a strong need to ensure that the policy environment is recognizing the medical and non-medical benefits of improving breast cancer in the Middle East and Africa.

In response to the high and growing burden of breast cancer, the WHO established the Global Breast Cancer Initiative (GBCI) in 2021 (8). It aims to provide strategic guidance and coordination to improve breast cancer care, with a focus on LMICs. The GBCI has a goal of reducing the mortality rate of breast cancer by 2.5 percent each year, which has the potential to save 2.5 million lives between 2020 and 2040. To achieve this goal, the GBCI has established three evidence-based key performance indicators (KPIs) which cover the three key stages along the patient pathway; see Figure 2.

1. **KPI 1: The aim is to increase the proportion of early-stage breast cancer diagnosis to ensure that at least 60% of cases are diagnosed in stage I or II.**
    - Example from the Middle East: In Jordan, 54% of breast cancer diagnoses were at advanced stages (III-IV) in 2015/2016 (13). See chapter 6 for more details.
2. **KPI 2: The aim is to ensure a timely diagnosis within 60 days.**

- Example from the Middle East: In Morocco, the average diagnostic delay has been found to be 97 days (14). See chapter 7 for more details.

3. **KPI 3: The aim is to enhance access to standard breast cancer treatments to ensure that at least 80% of patients complete their treatment.**

    - Example from the Middle East: In Egypt, a study found that the adherence rate to adjuvant hormone therapy in hormone receptor-positive breast cancer patients was close to 64% (15). See chapter 8 for more details.

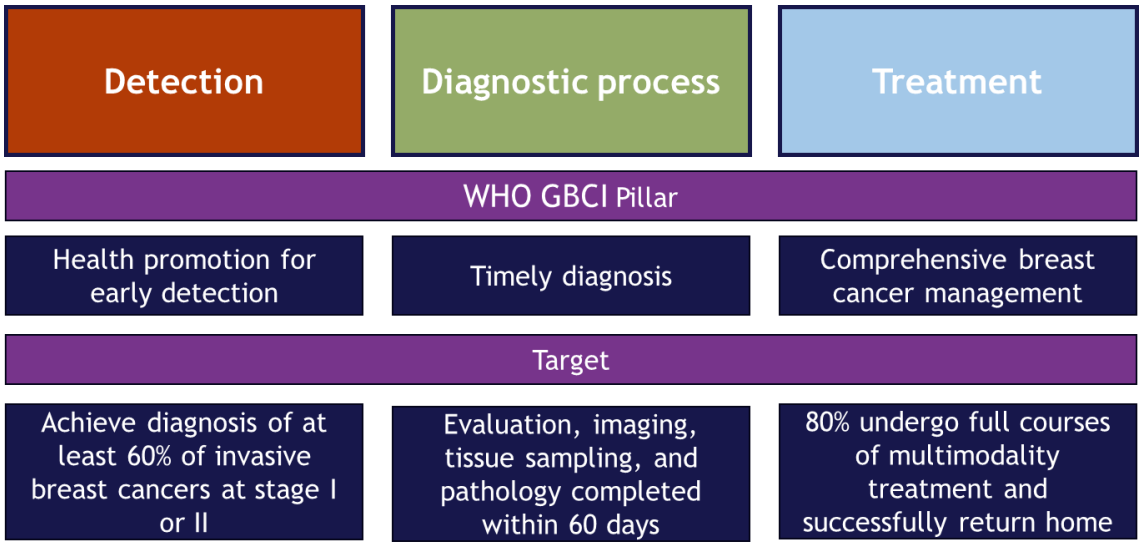


Figure 2: Pillars and targets of the WHO GBCI and key stages of the care pathway.
Source: WHO (8).

1.1 Purpose and scope of the report

This policy report follows in the footsteps of the WHO GBCI. It aims to describe the current state of breast cancer care in selected countries in the Middle East and Africa (MEA). The core set of countries (MEA-9) are:

- Algeria
- Egypt
- Israel
- Jordan
- Morocco
- Türkiye
- Saudi Arabia
- South Africa
- United Arab Emirates

The report provides a description of the disease burden and the economic burden of breast cancer as well as of challenges patients face along the care pathway. It covers the three pillars of the GBCI – detection, diagnostic process, treatment – and complements this with a description of the organization of care as well as an overview of the health systems and the governance of breast cancer care; see Figure 3. It identifies barriers to effective, efficient,

equitable, and responsive breast cancer care. Based on the analysis, recommendations for local policymakers for improved breast cancer care are proposed.

The description and recommendations in this report seek to support local policymakers in the decision-making and prioritization of initiatives in breast cancer care. The report is also intended to foster the exchange of best practices in breast cancer care across the MEA region. The information should support efforts to plan and take action to improve the lives of women with breast cancer and to reduce the burden of breast cancer to society.

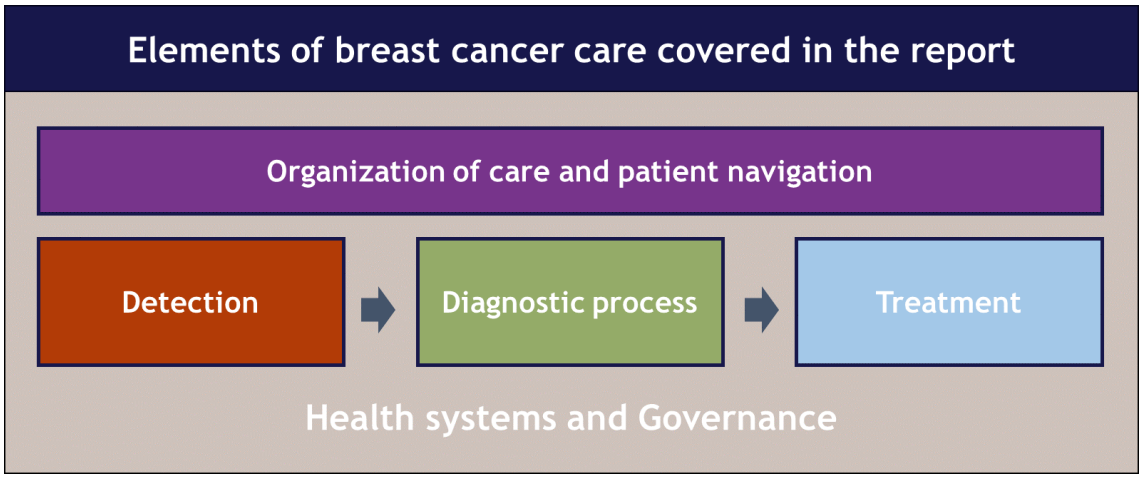


Figure 3: Elements of breast cancer care covered in the report.

1.2 General methodology

A three-step methodology was applied; see Figure 4. Firstly, a sample of countries was defined. The selection of countries aimed to encompass a wide range of socio-economic contexts and barriers to breast cancer care in middle-income and high-income countries in the greater region of the Middle East and Africa. It is crucial to recognize the remarkable diversity present within the MEA region, which encompasses a variety of cultures, religions, social norms, languages, political systems, and economic structures. An additional criterion for the country selection was the feasibility of obtaining input from local stakeholders, enabling a comprehensive understanding of the breast cancer care landscape within each included country.

In collaboration with the International Alliance of Patients' Organizations (IAPO) and their sponsors, a total of nine countries were identified: Algeria, Egypt, Israel, Jordan, Morocco, Saudi Arabia, South Africa, Türkiye, and the United Arab Emirates (UAE). By including both middle-income and high-income countries, this selection facilitated a comprehensive examination of the diverse barriers and challenges encountered in breast cancer care across the region's varied contexts.

Figure 4: Steps used for analyzing the landscape of breast cancer care in MEA-9.

The second step involved a literature review of the current landscape of breast cancer care in the MEA-9 region. A pragmatic literature review was undertaken to gather evidence on the current landscape of breast cancer. This review encompassed the examination of scientific articles and was complemented by a search of grey literature that included reports and policy documents by national and international bodies as well as governments.

Table 1: Included experts and mode of information collection

Country and data collection method	Name	Classification of organization
Algeria		
Questionnaire	Hamida Kettab	Patient organization
Workshop	Amel Lajroud	Hospital
	Sabiha Bouzbid	Academia
	Hayette Aouras	Hospital
Egypt		
Workshop	Emad Shash	Hospital
	Ahmad Morsy	MoH
	Ahmed H. Abdelaziz	Academia
Israel		
Workshop	Lital Keinan-Boker	MoH
	Tali Rosin	Patient organization
	Shani Paluch-Shimon	Hospital
	Eitan Friedman	Academia, MoH and Hospital
Questionnaire	Einat Carmon	Hospital
Jordan		
Workshop	Omar Nimri	Government
	Reem Al-Ajlouni	NGO
Questionnaire	Ahmed Shahin	Hospital
	Jihad R Al-Maani	MoH
Morocco		
Workshop	Hassan Errihani	Hospital and academia
	Youssef Chami	Patient organization
	Karima Oualla	Hospital and academia
	Myriam Nciri	Patient organization
Saudi Arabia		
Workshop	Atlal Abusanad	Hospital
Questionnaire	Suad M. Bin Amer	Patient organization
	Faisal Azam	Hospital
South Africa		
Workshop	Lauren Pretorius	Patient organization
	Liana Roodt	Patient organization and hospital
	Carol-Ann Benn	Academia and hospital
	Jenny Edge	Patient organization and hospital
	Manala Makua	MoH
Questionnaire	Noelene Kotschanand	Patient organization
Türkiye		
Questionnaire	Belma Kurdoglu	Patient organization
	Yeşim Eralp	Hospital and academia
	Umut Demirci	Hospital and academia
	Toker Ergüder	WHO
UAE		
Workshop	Majed Mohammed	Patient organization
	Hana Gotbi	Patient organization and service delivery
	Jamila Ibrahim	Patient organization and service delivery
	Lamia Ahmed Safieldeen	DoH
	Sahar Idris	Patient organization and service delivery
Questionnaire	Sawsan AlMadhi	Patient organization and policy
	Fathi Azribi	Hospital
	Hassan Jaafar	Hospital

The third step involved interviews with local experts; see Table 1. These interviews were conducted to supplement and enhance the credibility and comprehensiveness of the findings as well as to encompass nuances not addressed in the literature review. The primary method

was a virtual workshop-style discussion with multiple local experts in every country. The workshops entailed engaging with a diverse range of stakeholders representing multiple aspects of breast cancer care within each country. This included representatives from patient organizations, professionals responsible for coordinating breast cancer screening programs, experts in cancer policy, radiologists, oncologists, pathologists, and breast cancer nurses. The inclusion of patient organizations as expert voices from each country proved instrumental in enriching the research with the lived experiences of breast cancer patients. For local experts who could not attend the workshops, an online survey was used to gather information.

2. Breast cancer and its burden

Breast cancer is a disease in which abnormal breast cells grow out of control and form tumors. Breast cancer is the leading cause of cancer-related deaths and the most frequently diagnosed cancer type among women globally (5). In the MEA region, breast cancer is a significant concern. In 2022, it accounted for 34% of new cancer cases and 23% of cancer deaths among women in the MEA-9; see Figure 5. The estimated average lifetime risk for a woman (before the age of 85) to get breast cancer is close to 7%, or one in 14 women (5). In countries such as Israel and the UAE, the risk is even higher at an estimated 10-11% or one in 9 women.

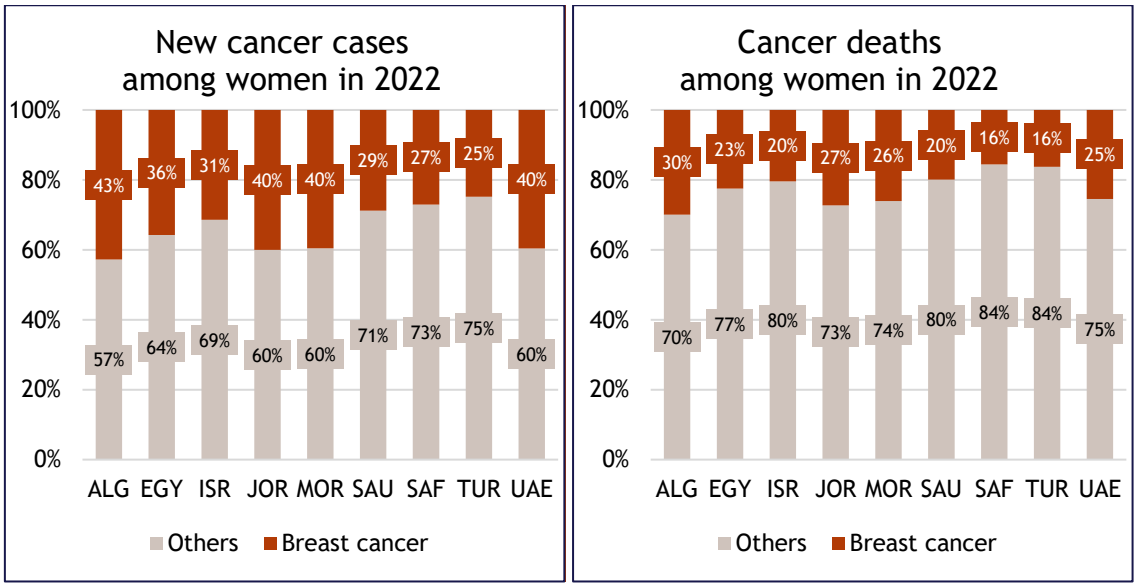


Figure 5: Proportion of new breast cancer cases and deaths among women in the Middle East and Africa in 2022.

Notes: Cancer is defined as all types excluding non-melanoma skin cancer. Source: IARC (5).

2.1 Risk factors

Many potential risk factors with varying levels of strength and supporting evidence for developing breast cancer have been identified (16). In general, risk factors can be divided into non-modifiable and modifiable risk factors; see Table 2 and Table 3. According to the WHO, up to 30% of all breast cancer cases are caused by modifiable risk factors and therefore theoretically preventable (3). Table 3 lists the modifiable risk factors that the Centers for Disease Control and Prevention in the United States consider that if changed could lower the risk of getting breast cancer (17).

Info Box 1 - BRCA gene mutations are more commonly found in certain ethnic groups

Israel has a relatively high prevalence of BRCA gene mutations compared to other countries. This is attributed to the fact that around 30% of Israel's population is comprised of Ashkenazi Jews (18). It is estimated that about 2.5% of Ashkenazi Jewish women carry a BRCA mutation, while in the general population, this number is estimated to be only 0.2% (18) (19).

Another example is the Afrikaner population in South Africa, who are descendants of a small European settler group. This group constitutes approximately 12% of the Gauteng Province population. Numerous genetic disorders have been identified within this group, including elevated levels of mutations in the BRCA genes (20).

Table 2: Non-modifiable risk factors of breast cancer

Risk factor	General description	Specifics for MEA
Age	The risk to develop breast cancer increases with age (21).	Breast cancer tends to be diagnosed at an earlier age in Arab countries such as Saudi Arabia, Jordan, Algeria, and Morocco compared to Western countries. The average age at presentation is about ten years earlier in these countries; see Figure 6 (22).
Family history (Heredity)	Approximately 5-10% of all breast cancers have a hereditary background (23). The most common cause of hereditary breast cancer is an inherited mutation in the BRCA1 or BRCA2 gene (23). About 50 out of 100 women with BRCA1/2 mutations will develop breast cancer by the time they turn 70 years, compared to only 7 out of 100 women without these mutations in the United States (24).	It is currently unclear how common BRCA1/2 mutations are in the MEA-9, as genetic testing and counseling services are not widely available and are costly. Some studies in the region suggest a comparatively high prevalence of these mutations. A study in Saudi Arabia with a small sample found that the prevalence of BRCA1/2 mutations among Saudi patients was 12.9% (25).
Ethnicity	Caucasian women have the highest risk to develop breast cancer in the United States (26). Yet Black and Hispanic women are at an increased risk of developing some subtypes of breast cancer, such as TNBC, compared to Caucasian women (27-29).	Compared to other countries, Israel has a relatively higher prevalence of BRCA gene mutations, which may be attributed to the fact that around 30% of Israel's population has Ashkenaz roots (18). It is estimated that about 2.5% of Ashkenazi Jewish women carry a BRCA mutation, while in the general population, this number is estimated to be only 0.2% (18, 19).
Breast density	Women with a greater breast density (i.e., a greater amount of fibrous and glandular tissues in their breasts) are at a higher risk of developing breast cancer (30).	Similar rates of breast density have been found in some MEA countries compared with the ones in Western countries. A study in Lebanon found that 53% of women had dense breasts, compared to 55% in the United States (31, 32).

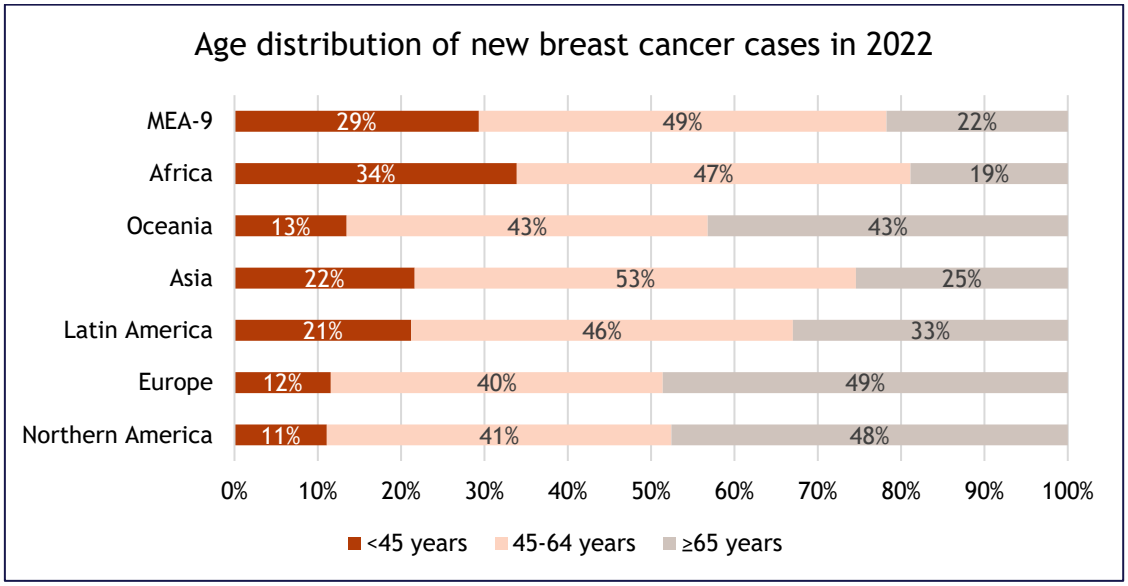


Figure 6: Age distribution of new breast cancer cases in 2022 by world region.

Notes: MEA-9 includes ALG, EGY, ISR, JOR, MOR, SAU, SAF, TUR, UAE. Source: IARC (5).

Table 3: Modifiable risk factors of breast cancer

Risk factor	Description	Specifics for MEA
Obesity and overweight	The risk increases with higher body mass index (33). The link seems to be stronger in postmenopausal women than in premenopausal women (33).	Obesity rates in the MEA-9 are comparatively high. In Jordan, Saudi Arabia, Egypt, and the UAE it is estimated that more than 40% of the female adult population is obese (34). Figure 7 shows how female obesity rates have been continuously increasing in all countries since 1975.
Physical inactivity	A sedentary lifestyle increases the risk (35).	The countries with the highest prevalence of physical inactivity are Saudi Arabia (45%) and Algeria (40%); see Figure 8. Also, the latest data on physical activity in Israel for 2018-2020 show that 72-74% of the population do not comply with the Ministry of Health's recommendations for physical activity (36).
No prolonged breastfeeding	Women who never breastfed their babies have a higher risk to get breast cancer (37).	Some studies in the region indicate a lower prevalence of breastfeeding (38). In Egypt, fewer than 30% of babies between 4-5 months of age are exclusively breastfeed (39).
No child births	Having given birth to children is associated with a lower risk of hormone receptor-positive breast cancer (40).	Türkiye and the UAE have the lowest fertility rates (births per woman) from the studied countries at 1.9 and 1.4 children, lower than the world average of 2.2 children (41).
Alcohol consumption	It increases the risk for breast cancer (42).	While the reported alcohol consumption per woman in most countries in the Middle East is close zero (or zero, such as in Saudi Arabia), the consumption level in South Africa is 3.5 liters per year (43).
Cigarette smoking	It might increase the risk for breast cancer (44).	Reported smoking levels among women in many countries in the Middle East are close to zero, such as in Morocco, Saudi Arabia, Kuwait, and Egypt (45). In Türkiye, female smoking rates are at 19.2% (45).
Use of postmenopausal hormone replacement therapy (HRT) to treat menopausal symptoms	It increases the risk for breast cancer (46).	There is limited information on the use of HRT to treat menopausal symptoms in the MEA region, but some studies suggest that the use is low. For instance, a study from the UAE from 2020 showed that women prefer natural approaches rather than medicines to treat symptoms (47).

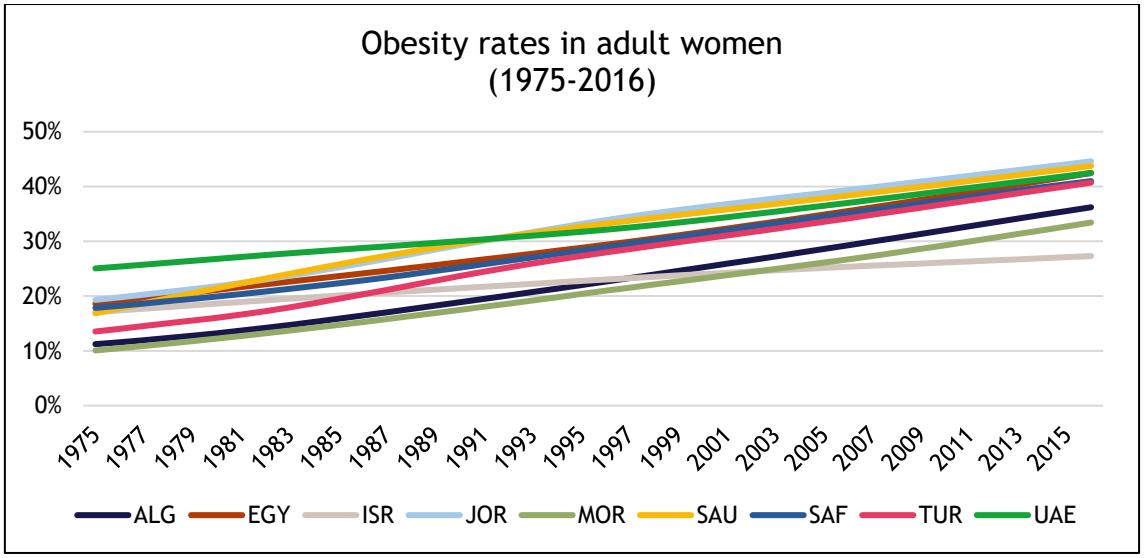


Figure 7: Evolution of obesity rates among women in the MEA region.

Notes: Obesity is defined as BMI ≥ 30. Age group ≥ 18 years. Source: NCD Risk Factor Collaboration (48).

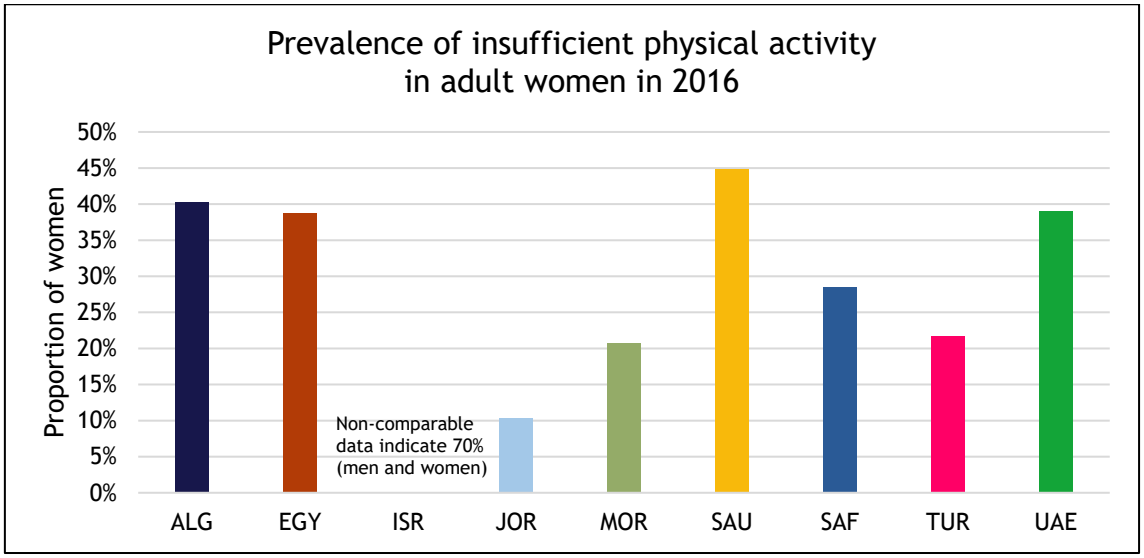


Figure 8: Prevalence of insufficient physical activity in adult women in the MEA region.

Notes: Figure shows age-standardized estimates. Comparable data specific to Israel was not available, yet findings from the Fourth National Health Survey indicate that approximately two thirds of Israelis do not adhere to the Ministry of Health's recommendations to engage in an activity at a moderate intensity for at least 150 cumulative minutes per week or 75 minutes per week at high intensity (36). Source: WHO (49).

2.2 Incidence and mortality

Over the past few decades, there has been a notable increase in the number of breast cancer cases due to various factors. Figure 9 illustrates the historical and future trends in breast cancer incidence and mortality rates. Overall, the estimated incidence rate of breast cancer among women in the MEA-9 region rose from 29 cases per 100,000 women in 2001 to 51 cases per 100,000 women in 2020. The estimated increase in incidence for the weighted average in the region between 2001 and 2018 was 61%. Meanwhile, the estimated mortality rate of breast cancer also increased during the same period, but only by 26%. This lower relative increase in

mortality compared to incidence is a positive sign of progress. However, the past trends should be interpreted with caution because during most of this period, many countries lacked population-based cancer registries with countrywide coverage (50, 51).

Demographic changes, such as population growth and aging, have played an important role in the growing disease burden. The proportion of women aged 50 years and older has increased in all MEA-9 countries. Unfavorable developments in major risk factors, such as obesity and physical inactivity, have also contributed to the escalation of breast cancer cases, as detailed in section 2.1. Moreover, with the increasing availability and accessibility of screening programs, a greater number of breast cancer cases are now being detected, whereas they would have gone unnoticed previously (52, 53). The registration of cancer cases in cancer registries in the MEA region has also improved and increased data completeness might explain some of the recorded increase (50, 51).

Figure 9 also shows projections of what would happen in the absence of further improvements in cancer care and changes in risk factors between 2020 and 2040. The expected demographic development would further increase the incidence rate from 51 per 100,000 in 2020 to 63 per 100,000 women in 2040 in the MEA-9 countries. The mortality rate would increase from 17 per 100,000 to 23 per 100,000 women (4).

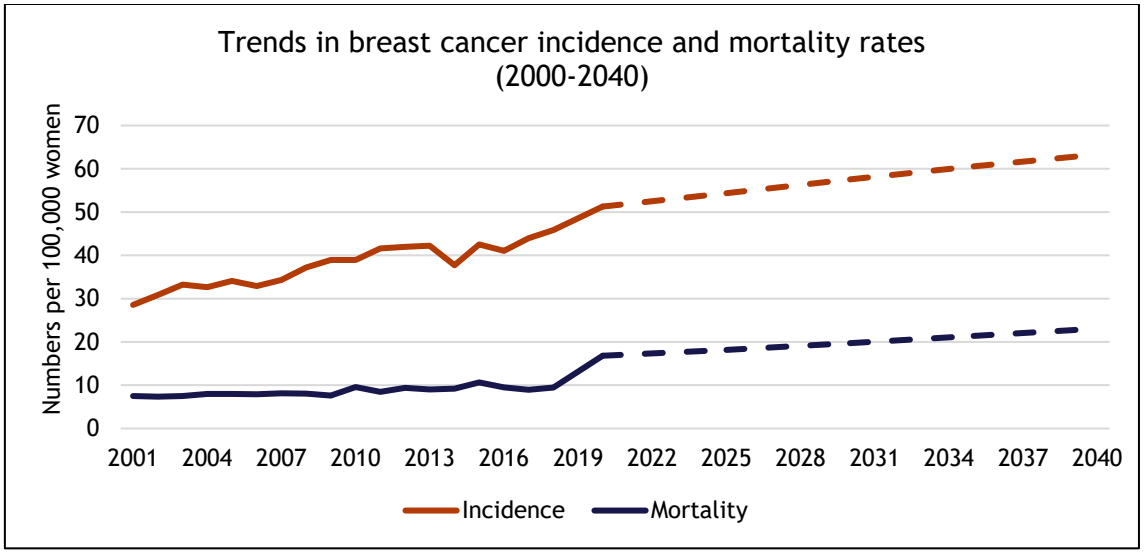


Figure 9: Estimated trends in breast cancer incidence and mortality crude rates per 100,000 women in MEA region, 2001-2040.

Notes: The numbers are the population-weighted averages of ALG, EGY, ISR, JOR, MOR, SAU, SAF, TUR, and UAE. Numbers between 2020 and 2040 are predictions based on unchanged age-specific risks to get and die from breast cancer (base year=2020). Source: see Figure 10 and Figure 11 and IARC (4).

Figure 10 shows how the crude breast cancer incidence rates in MEA-9 countries have been on the rise in all countries, except for Israel. Israel has consistently had the highest incidence rate among all countries, which has remained stable over the years and is projected to remain fairly stable until 2040. In 2000, the incidence rate was 111 cases per 100,000 women, and it is estimated to be 108 cases per 100,000 women in 2040. Saudi Arabia had the lowest incidence rate between 2000 and 2020, but it more than tripled from 8 to 27 cases per 100,000 women within this period of time.

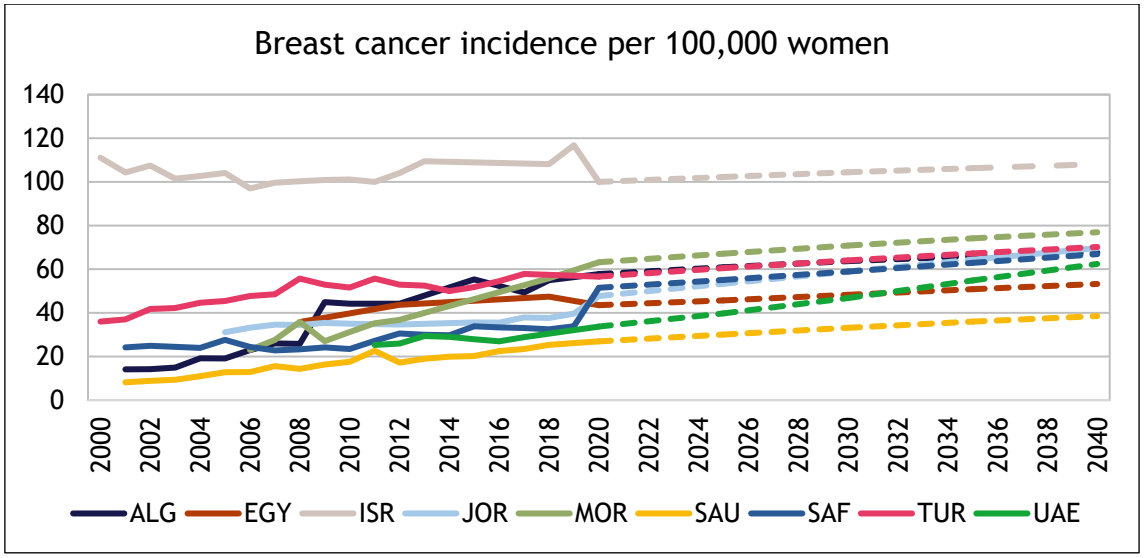


Figure 10: Breast cancer incidence crude rate per 100,000 women in MEA-9, 2000-2040.

Notes and sources: Incidence crude rates for ALG, were calculated from the cancer registry report in in Sétif (2001–2010) (54), 2012 (55), 2015 (56), 2017 (57) , 2018 (58). Data for EGY: 2008 (59), 2018 (60). Data for ISR 2000-2012 (61), 2013 (62), 2018 and 2019 (63, 64). Data for JOR 2005-2009 (65) 2010-2019 (66). Data for MOR 2006-2012 (67) 2018 (68). Data for SAU (69) 2018 (70). Data for SAF (71). Data for TUR 2000-2012 (61) 2012-2017 (72). Data for UAE 2011-2017(73). Data for all countries between 2020-2040 is a forecast from GLOBOCAN (4).

The crude mortality rates for breast cancer varied among countries, with most of them showing a stagnant trend between 2000 and 2020; see Figure 11. In 2020, Israel had the highest mortality rate of 27.5 deaths per 100,000 women, followed by Morocco at 20 and Algeria at 19 deaths per 100,000 women. Looking ahead, the UAE and Saudi Arabia are expected to experience the greatest increase in mortality rates between 2020 and 2040, with projected increases of 139% and 63%, respectively.

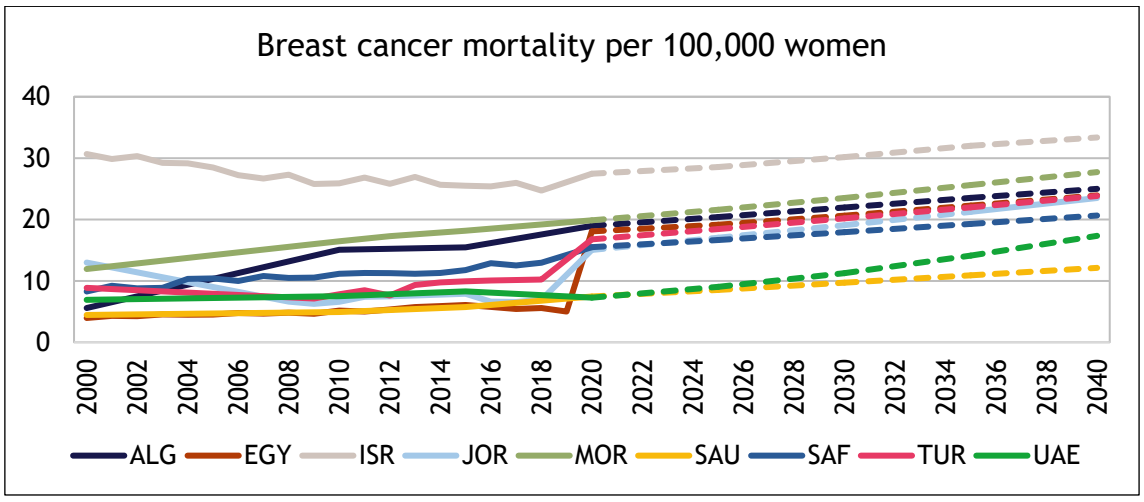


Figure 11: Breast cancer mortality crude rate per 100,000 women in MEA-9, 2000-2040.

Notes and sources: GLOBOCAN estimates were used for 2020-2040 and for historic data of ISR, EGY and SAF. Global Health Estimates from the WHO were used for ALG, JOR, MOR, SAU, TUR and UAE (74). Data for all countries between 2020-2040 are based on forecasts from GLOBOCAN, with 2020 as the base year (4). The application of different methodologies by varying sources and the reliance on forecasts may explain significant variations in reported data between 2018 and 2020, particularly in EGY, JOR and TUR.

Figure 12 shows the age-standardized cancer incidence and mortality rates for each MEA-9 country in 2022. Age-standardized rates allow for a fair comparison of the breast cancer burden across populations with different age structures. The country with the highest incidence was Israel, with an estimated 77 cases per 100,000 women. Saudi Arabia had the lowest incidence with 25 cases per 100,000 women. Algeria had the highest mortality rate with 20 deaths per 100,000 women and Saudi Arabia the lowest one with 7 deaths per 100,000 women. The latter does not mean that Saudi Arabia provided better care to patients than other countries. For instance, the relative gap between incidence and mortality is largest in Israel, indicating better survival than in all other countries.

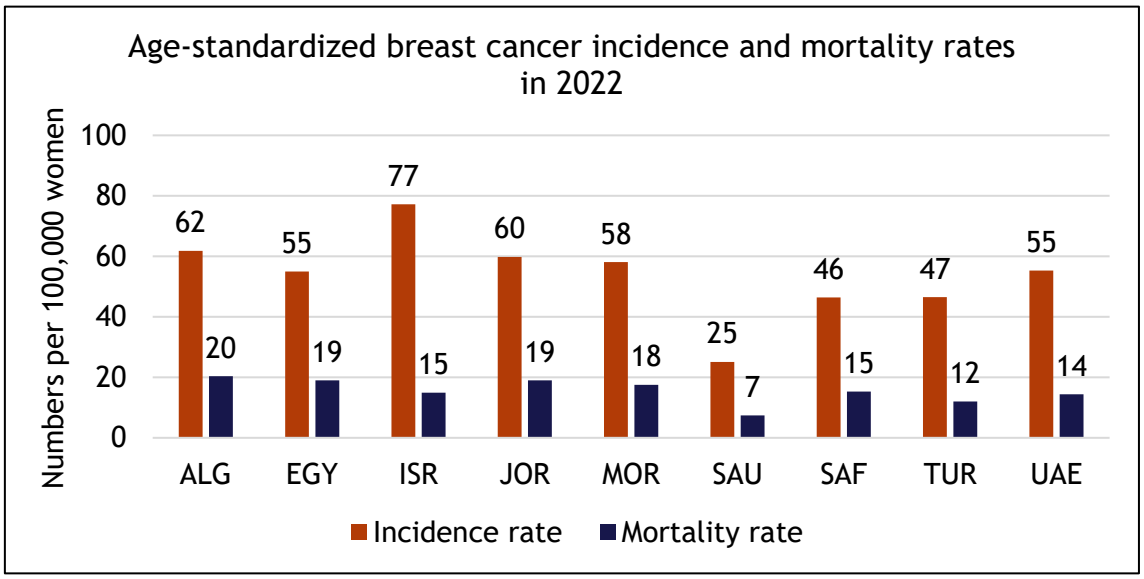


Figure 12: Age-standardized incidence and mortality rates of breast cancer in MEA-9 countries in 2022.

Source: IARC (5).

2.3 Subtypes

Breast cancer consists of several distinct subtypes that differ in their biological characteristics. The consideration of these subtypes is important because the outcomes for patients differ by subtype (survival and quality of life; see sections 2.4 and 2.5). Differences in outcomes are explained by varying aggressiveness of the tumors and the varying availability of effective treatments.

The standard classification of the subtypes is based on the presence of three receptors in the tumor cells; two hormone receptors (HR) called estrogen receptor (ER) and progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2). They are typically classified into four subtypes based on the tumor's expression of ER, PR, and HER2 (75, 76); see Table 4. The most common subtype is luminal A, which is hormone-receptor positive (i.e., ER and PR positive) and HER2-negative. In addition to the classification based on HR and HER2 expressions, in recent years other gene expressions or mutations have been found to be clinically relevant. Examples are tumors with BRCA mutations and HER2-low cancers (includes cases of luminal A and B as well as TNBC).

Table 4: Subtypes of breast cancer

Subtype	Expression of receptors
Luminal A	ER-positive, PR-positive, HER2-negative
Luminal B	ER-positive, PR-any-level, HER2-positive
HER2+	ER-negative, PR-negative, HER2-positive
Triple-negative breast cancer (TNBC)	ER-negative, PR-negative, HER2-negative

Source: (75, 76).

Figure 13 compiles evidence from various studies regarding the prevalence of breast cancer subtypes in MEA-9 countries. The majority of cases in all countries were of the luminal A subtype, ranging from 36% to 62%, followed by the luminal B subtype, which ranged from 13% to 32%. The TNBC subtype accounted for 11% to 21% of cases, while the HER2 subtype comprised 4% to 12% of cases. It is important to note that these findings are based on studies with relatively small populations rather than population-based cancer registries, with the exception of Israel, and should therefore be interpreted with caution. However, the overall pattern is fairly similar to that in the United States (77).

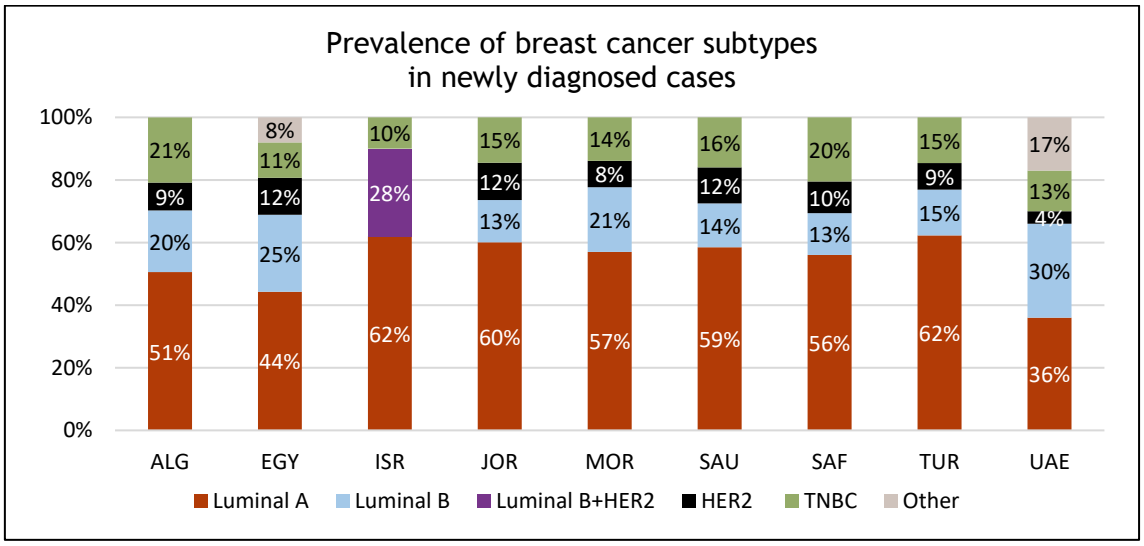


Figure 13: Prevalence of breast cancer subtypes in MEA-9 countries.

Notes: Data for ALG corresponds to diagnoses between 2008-2013 (n=3,014). Data for SAU corresponds to diagnoses for a university hospital from 2012 to 2018 (n=740). Data for EGY is for diagnoses between 2003 to 2008 (n=359). Data for ISR is from the national cancer registry from 2019 for 70% of all invasive breast cancer cases. Data for JOR from archives from 2007 to 2011 (n=193). Data for MOR was collected from the Rabat registry (n=1,025). Data for SAF includes information gathered from South Africa's national cancer registry from 2009-2011 and a cancer hospital in Namibia, but 96% of the sample was from South Africa (n=10,047). Data for TUR was collected from 24 different health units from 2005 to 2011 (n=11542). Data for UAE comes from the Sharjah Breast Care Center from 2016 to 2018 (n=94). Source: ALG (78) EGY (79) ISR (80) JOR (81) MOR (82) SAU (83) SAF (84) TUR (85) UAE (86).

2.4 Survival

From a patient perspective, survival is one of the most important outcomes. Survival is also a key indicator to evaluate the effectiveness of the entire care process. In many MEA-9 countries, information about survival rates is scarce. This is because many countries did not (or still do not) have cancer registries in place that are able to link incidence cases to deaths (50). The lack of relevant and up-to-date data to measure the performance of the care process is a major limitation that needs critical attention.

The international CONCORD-3 program[2] has estimated survival estimates for breast cancer for several MEA-9 countries based on information from regional or countywide cancer registries. For countries not covered in the CONCORD-3 program, national estimates were sourced, although this limits the comparability. Figure 14 shows that Israel and the UAE had five-year survival rates of close to 90%. South Africa had the lowest five-year survival rate of 40%, although this estimate is very uncertain and only uses data from the Eastern Cape province. The reported 100% five-year survival rate for breast cancer in Morocco is a significant outlier, reflecting issues with data reliability rather than actual patient outcomes, because estimated annual deaths were close to 4,000 women in 2022 (5). A proxy measure for survival is the complement of the mortality-to-incidence ratio [1–MIR = one minus the number of cancer deaths divided by the number of newly diagnosed cancer cases] (87, 88). Based on estimates for incidence and mortality in 2022, Figure 14 suggests that the UAE had the highest survival rate and Egypt the lowest one. Overall, a country's economic strength might be a significant factor for predicting survival, as the more affluent Gulf countries (Saudi Arabia, UAE) and Israel exhibit higher survival rates than other less wealthy MEA-9 countries. Previous studies in Europe and the Asia-Pacific region have also demonstrated a positive correlation between economic wealth and survival rates for cancer in general (89, 90).

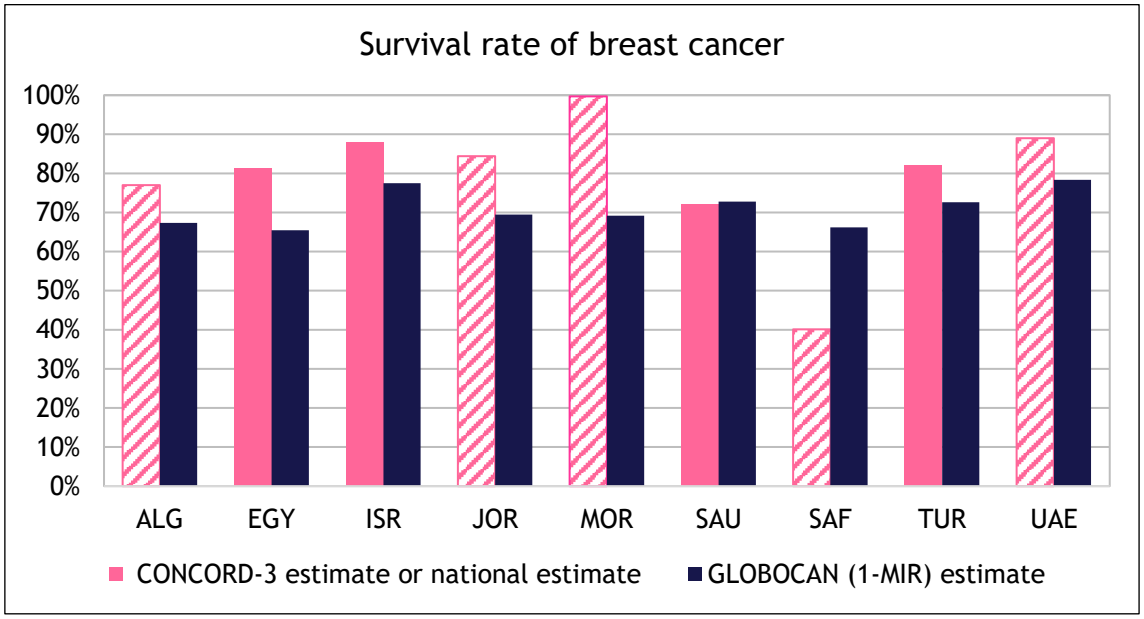


Figure 14: Estimates of breast cancer survival (left-bar = 5-year survival rate in 2010-2014 or most recent year; right bar = 1-MIR in 2022) in MEA-9 countries.

Notes and sources: Patterned bars indicate lower reliability. 1-MIR = complement of the mortality-to-incidence ratio based on GLOBOCAN data in all countries. 5-year survival rates for ISR (100% coverage), JOR (100% coverage), TUR (23.4% coverage), MOR (12.7% coverage), ALG (6.3% coverage), SAF (2% coverage) for 2010-2014 were retrieved from CONCORD-3 (6). According to CONCORD-3, estimates for ALG, JOR, MOR, and SAF were less reliable due to loss of follow-up or patients being registered only from death certificates, autopsy, or with incomplete registered dates (6). This affects the reported 100% survival rate for MOR, which is not reflective of actual outcomes and is rather indicative of severe data reliability issues. 5-year survival rates were retrieved from published studies for EGY with 7,125 records from 3 public oncology services in 2007-2016 (91). Data for SAU come from the Saudi cancer registry,

[2] The CONCORD program is the largest international project to provide 5-year age-standardized (according to ICSS) net survival rates for countries around the world, including some of the MEA-9 countries with (regional or national) cancer registries. The latest CONCORD-3 release estimated survival rates for 18 cancer groups diagnosed during the 15-year period 2000–2014 and followed up to Dec 31, 2014 (6).

covering the population for 2005-2009 (92). Data for UAE were retrieved for 988 patients diagnosed between 2008 and 2012 at Tawam hospital (93).

Info Box 2 - How many lives of women with breast cancer would be saved ever year if the MEA-9 countries achieved the same survival rate as the United States?

Combining patient numbers of newly diagnosed breast cancer cases in 2022 from GLOBOCAN with the difference in 5-year survival rates between the United States and a specific country observed in CONCORD-3 or a national estimated as shown in Figure 14, yields the following crude estimates of lives of women that could be saved every year:

- Algeria: 2,175
- Egypt: 2,815
- Israel: 171
- Jordan: 196
- Morocco: N/A
- South Africa: 7,452
- Saudi Arabia: 750
- Türkiye: 2,450
- UAE: 34

The subtypes of breast cancer play a significant role in determining how cancer behaves and responds to treatment, which ultimately affects survival rates. Figure 15 shows differences in the 3-year survival rates reported in a study for Morocco. The most common subtype, luminal A, had the highest survival rate (88%), whereas TNBC had the lowest survival rate (49%). This patterns is similar to the one observed in the United States (77).

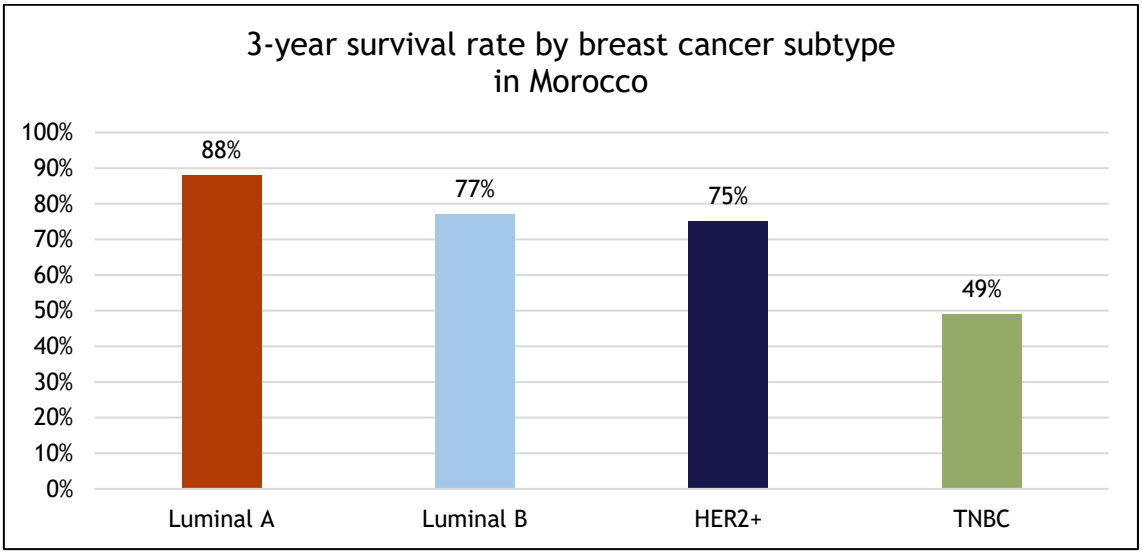


Figure 15: 3-year overall survival rates by breast cancer subtype in Morocco.

Notes: Data shows overall survival rates of 366 patients diagnosed in the northeast region of Morocco in 2007-2010. Source: (94).

2.5 Quality of life

Breast cancer can significantly diminish the quality of life of patients, affecting them in various ways. Research has identified several key areas linked to quality-of-life challenges for those living with breast cancer, including: 1) physical alterations affecting both function and body image perception; 2) psychological and emotional shifts that can complicate disease management; and 3) the social and interpersonal repercussions (95). Table 5 highlights various factors that previous studies have identified as contributing to the negative impact on quality of life.

Table 5: Aspects of quality of life affected in breast cancer

Area	Aspect	Description
Physical changes	**Decline in physical functioning**	Patients report low functional well-being, including limitations in the patient's professional and personal activities as well as lack of sleep quality (96).
	Body image	Patients who undergo mastectomies (surgical removal of the breast) can experience long-lasting negative effects on self-esteem, quality of life, and gender identity (97).
	Infertility and hair loss	Medical treatments such as chemotherapy can temporarily or permanently cause infertility and hair loss (98).
Emotional challenges	**Psychological distress**	Patients may experience a range of negative emotional symptoms, including distress, depression, anxiety, social isolation, pain, lack of self-identity, and sexual dysfunction (99). In particular, younger women diagnosed with breast cancer may struggle more with mental preparation for treatment as women diagnosed in their 30s and 40s report lower quality of life than women in their 50s and 60s (100).
Practical aspects	**Job loss / financial hardship**	Concerns about losing a job during and after treatment, facing discrimination at work, the possibility of financial instability, and long-term unemployment are among the most prevalent worries among breast cancer patients of working age (101, 102).
	Support from family members	A breast cancer diagnosis and subsequent treatment can have a significant impact on family members, such as partners, children or parents who often take on new roles and responsibilities as informal caregivers. These responsibilities may include providing practical household support and caring for children and elderly family members, potentially affecting the caregiver's ability to work and resulting in income loss for the family (103). Studies of caregivers to cancer patients have shown a productivity loss of 21-27% due to absenteeism/presenteeism at work (104).

2.6 Economic burden

Breast cancer imposes an economic burden on patients and their families as well as on the health systems and the economy. From a societal perspective, the cost of breast cancer can be broadly defined into three components (105); see Table 6.

Table 6: Components of the economic burden of breast cancer

Direct costs	These are the costs of disease-related resource consumption. They include both public and private expenditure for services within the health care system, such as diagnostic procedures, surgeries, radiation therapy, and medicines. Expenditure for social support services outside of the health care system are also direct costs. Expenditure by patients for travelling to receive treatment are also direct costs.
Indirect costs (productivity loss)	These are costs of patients' productivity loss arising from the inability to work due to the disease. They consist of the temporary or permanent inability to work in the formal labor market (called morbidity-related loss) and from premature death (called mortality-related loss) of working-age patients.
Informal care costs	These costs represent the value of the time spent by family members and friends to provide unpaid care, such as transportation to a health care facility and assistance with household chores.

Recent studies that include all three components of the economic burden of breast cancer in MEA-9 are scarce. Figure 16 provides insights from a study conducted in Israel that included both the direct and indirect costs associated with advanced breast cancer (106). The study

estimated the total annual costs to be EUR 70.5 million, corresponding to EUR 1.6 million per 100,000 women. The study found that nearly 70% of the total costs were due to indirect costs, due to the high mortality rates involved in advanced breast cancer. This not only deprives society of the contributions that patients could have made, but also imposes a financial burden on the economy.

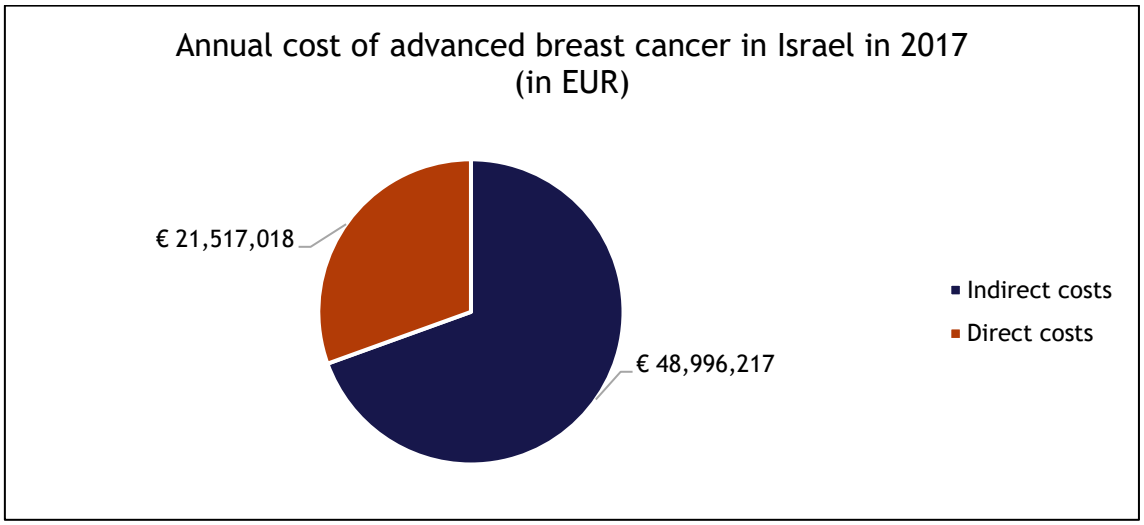


Figure 16: Economic burden of advanced breast cancer in Israel in 2017.

Notes: Direct costs include diagnostics, treatment, and other medical services costs. Indirect costs include productivity loss from reduced employment rate and premature mortality. Source: (106).

Another study in the Gulf countries looked at how early and advanced breast cancer affects workforce productivity (107). The study calculated the expenses of an employee's absence due to illness (absenteeism) and the costs of reduced productivity and reduced work quality of employees working despite being unwell (presenteeism). The overall impact of only these two factors, without taking into account premature mortality costs, is shown in Figure 17 for Saudi Arabia and the UAE. The costs for absenteeism and presenteeism were about equally high in each country, at Int$ 219-265 million in Saudi Arabia and Int$ 67-82 million in the UAE. The high numbers might be related to the younger age at diagnosis of breast cancer patients in the region and hence a large proportion of working-age patients.

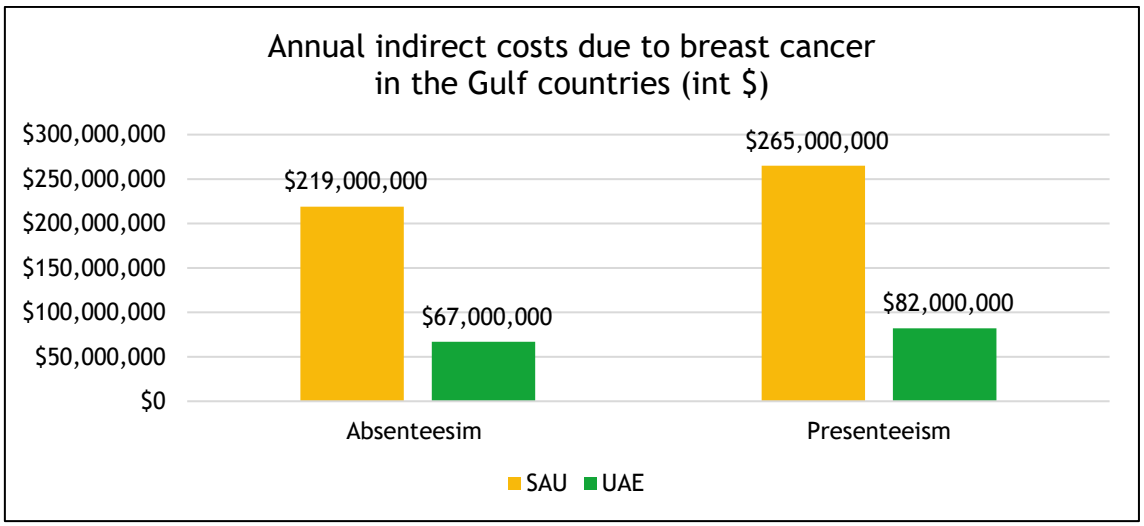


Figure 17: Annual indirect costs due to breast cancer in the Gulf countries in 2019.

Source: (107).

The direct costs of breast cancer are in many studies limited to medical expenditure by health care providers and do not include out-of-pocket payments by patients. Figure 18 shows the distribution of these direct medical costs in Jordan and Saudi Arabia by disease stage in 2015 and 2018, respectively (108, 109). The direct costs are higher in Saudi Arabia than in Jordan for each disease stage. The reasons for the annual direct medical cost of breast cancer patients being larger in Saudi Arabia than in Jordan are complex and multifactorial, involving differences in health care infrastructure and resources, as Saudi Arabia has a larger and more developed health care system than Jordan and a generally higher price level. Also, Saudi Arabia has a more comprehensive health care insurance system that covers a larger proportion of the population, which may result in higher spending.

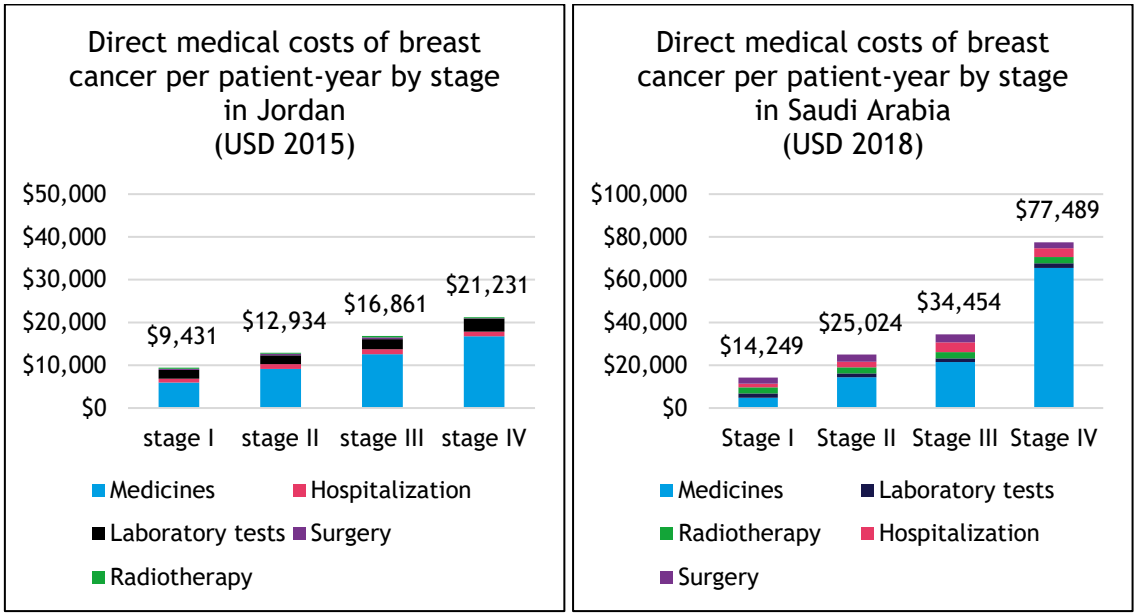


Figure 18: Direct medical costs of breast cancer in Jordan and Saudi Arabia.

Notes: JOR data was collected from 2011 to 2014 from two public health care providers, and SAU data comes from a sample of 300 patients, also from two public health care providers. Source: (108, 109).

Looking at the composition of the direct medical costs in Figure 18, a common observation is that medicines account for the largest proportion of the costs, on average 60% to 72% across all stages in Saudi Arabia and Jordan. Another common observation is that the direct medical costs of treating breast cancer increase significantly with stage at diagnosis. Treating a patient with stage IV disease is more than twice as expensive as a patient with stage I disease in Jordan, while in Saudi Arabia there is a five-fold difference between stage I and stage IV. These findings illustrate the significant financial burden of treating advanced-stage breast cancer and highlight the financial advantage of early detection.

Women with breast cancer in the MEA-9 region face various out-of-pocket payments (OOP) during the care process. This includes OOP for medical services during the diagnostic process and the treatment process, which depends critically on the health coverage level of a patient; see section 3.1. Other sources for OOP include ancillary services such as wigs. Hair loss can be a challenging side effect of breast cancer treatment, and using wigs can provide patients with a sense of comfort and confidence during this time. Although some health insurance policies may cover the cost of wigs, this is not always the case, and even when coverage is provided, it may not cover the entire cost. For example, in Israel, the Clait and Maccabi funds refund 33% of the cost of a wig with a ceiling (110, 111). The cost of wigs can vary significantly depending

on various factors such as style, quality, and material, and can range from a few hundred dollars to several thousand dollars.

Transportation costs are another source of OOP for women and their families. In Egypt, one-third of patients surveyed in a recent study reported difficulties in covering these expenses (112). The study focused on patients living in urban areas, such as Cairo and Greater Cairo, who often faced lengthy travel times of up to three hours to attend health care appointments. Women living in rural areas, who may travel greater distances, might experience even higher transportation costs in accessing breast cancer care. In Morocco, a recent study revealed that 85% of the breast cancer patients sampled considered transportation costs to be a significant obstacle in reaching the National Institute of Oncology in Rabat (113).

Job loss is yet another factor that can worsen the financial strain of women undergoing breast cancer treatment. A study conducted in Egypt found that a group of breast cancer patients experienced a 50% reduction in their employment rate after their diagnosis (112). Losing a job can mean a loss of household income and health insurance coverage, which makes it even more difficult to afford OOP for medical and non-medical services during treatment. This creates additional stress and emotional burden for women and negatively impacts their overall health and well-being.

3. Health systems overview

This chapter provides a brief overview of the health care systems in the MEA-9 countries. It is important to keep this information in mind when discussing breast cancer care. Some fundamental challenges that women with breast cancer are facing are rooted in the design of the health care systems. This includes health care coverage through public or private insurance schemes as well as health care expenditure.

3.1 Health care coverage and financing

The MEA-9 countries have achieved significant improvements in their health care systems since the late 1990s, particularly in providing Universal Health Coverage (UHC). Despite this progress, there are still notable disparities between individual countries in providing affordable and high-quality health care services. While some countries have successfully achieved UHC for their populations, others are still striving to ensure universal access to health care services. Furthermore, health care systems in the region are facing challenges due to the increasing demand for services caused by aging populations.

The WHO index of essential service coverage indicates that the coverage of essential health services varied from 60 points (out of 100) in Jordan to 84 points in Israel, as shown in Figure 19 (114). This index measures the accessibility of essential health services to a country's population without causing financial strain. A lower index scores highlights a greater unmet need for health care services. Adequate service coverage ensures that women receive comprehensive and quality care, which can significantly impact breast cancer patients' overall prognosis, treatment outcomes, and quality of life.

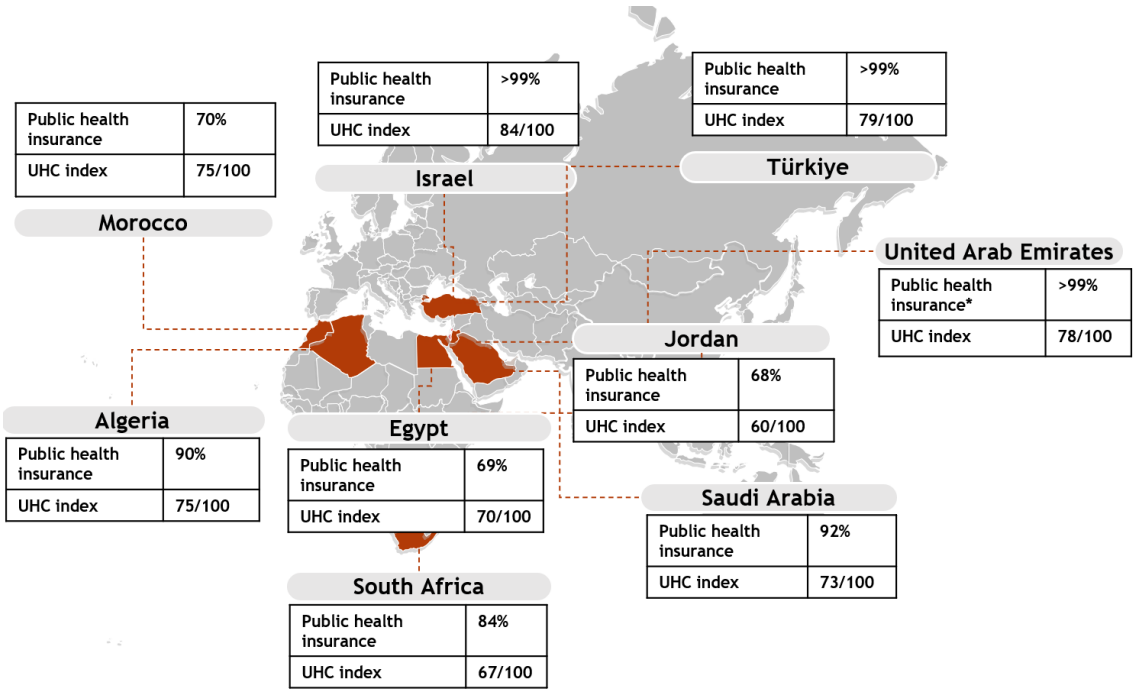


Figure 19: Public health insurance coverage (% of population covered) in MEA-9 countries.

Notes: *Public health insurance primarily encompasses the local population, which may result in a lower percentage of immigrants being covered. MOR data for public health insurance is from 2020, but public health coverage has improved since then. Sources: UHC index (114), ALG (115), EGY (116), ISR (117), JOR (118), MOR (119), SAU (120), SAF (121), TUR (51), UAE (50).

Algeria

The public health system is funded by the government and two mandatory social security funds controlled by the Ministry of Labor and Social Security (122-124). These funds, the Caisse Nationale des Assurances Sociales des Travailleurs Salariés (CNAS) and the Caisse Nationale de Sécurité Sociale des Non-Salariés (CASNOS), cover employed and self-employed individuals, respectively, and are funded through employee and employer contributions (125, 126). Around 90% of the population is covered by compulsory public insurance (local experts suggested around 98% coverage in 2021), granting free access to public health care services (127, 128). However, OOP are still required for most medical services due to the low reimbursement rates from CNAS/CASNOS. Uninsured individuals must pay for all medical expenses outright, although some free care is available in public hospitals. One of the primary concerns in the public health sector is the waiting time for appointments. According to local experts, these can span from one to one and a half months. Such prolonged waiting times frequently drive patients to seek care in private facilities. Private health care is limited and operates separately from the public sector, requiring full OOP for all services unless one has private health insurance, which is uncommon according to local experts (128).

Egypt

The health system is managed by the Ministry of Health and Population (MoHP) and is comprised of various public, quasi-public, and private providers and financing entities (129-131). Public health providers include the MoHP and separate entities which provide health care to the military and the police (130). Another public provider – concentrated in Cairo and other urban areas – are the University Hospitals that are run by the Ministry of Higher Education (130). Tertiary care predominantly relies on public-based services, with approximately 75 to 80% of services provided by the public sector, according to local experts.

The Teaching Hospitals and Institutes Organization is an organization with several hospitals, and with funding coming from the Ministry of Finance, the MoHP, private firms, international donor grants, the Health Insurance Organization (HIO), and co-payments of patients (130). The Curative Care Organization (CCO) is a non-profit organization under the authority of the MoHP and operates several hospitals in urban areas, with funding coming from contracts and co-payments of patients but no direct public funding (130). The HIO is an independent public organization under the authority of the MoHP that operates health care facilities and provides compulsory insurance to formal sector workers (incl. civil servants and their families), farmers, widows and pensioners, school children, and newborns until the age of five, with funding mainly coming from insurance premiums and co-payments of patients (130, 132). Lastly, the private sector includes a wide network of for-profit and non-profit providers with outpatient clinics and hospitals across the whole country (133).

The country has set an ambitious target to achieve UHC by 2030-2032 (134, 135). This nationwide initiative seeks to evolve the current fragmented system into a cohesive, long-term structure. While local experts believe that this goal may not be entirely attainable for 2030, notable progress has been made. As of 2022, public insurance coverage expanded to encompass 69% of the population, a marked increase from the 58.8% recorded in 2017 (116, 136, 137). It is important to note that the percentage of people who actually use public services may be lower due to issues with quality and long waiting times (130). Those who have the financial resources frequently choose private health care options. For individuals without insurance, MoHP facilities are accessible, with some services being complimentary while others require co-payments; however, the use of these services remains limited as many continue to seek

treatment from private health care providers (130). Efforts are underway to address these challenges.

Israel

All citizens and permanent residents have been covered by the National Health Insurance (NHI) since 1995. They have to choose from four non-profit health plans (also known as HMOs - Health Maintenance Organizations): Clalit, Maccabi, Meuhedet, and Leumit (117). These plans provide comprehensive benefits, including primary care, diagnostic services, outpatient care, and prescription medicines. The benefits offered are determined and monitored by the Ministry of Health and are the same across all plans. Residents must pay a monthly fee to the National Insurance Institute. Overall, the NHI is primarily funded through government taxation and progressive payroll taxes (138).

Many citizens opt for paying additional voluntary health insurance to enhance the coverage of benefits not included in the NHI basket. These private health insurances can either be provided by non-profit health plans or by for-profit health plans (139). In 2020, 20% of the population had only NHI, 40% of the population had non-profit insurance in addition on to NHI, 37% of the population had double insurance coverage (including for-profit and non-profit insurances), and 3% had only for-profit insurance (140).

Jordan

The health care landscape in Jordan is a blend of public, semi-governmental, private, and international charitable providers. The public sector encompasses the Ministry of Health, the Royal Medical Services (RMS), and hospitals affiliated with universities. Among the insured population, about 60% of Jordanians receive care from the MoH through the civil health insurance fund, the RMS serve 27% of Jordanians, and university hospitals cater to roughly 2.5% (118). As of 2018, civil health insurance by the MoH was expanded to include all Jordanian citizens over the age of 60; previously only Jordanian citizens over the age of 70 and children below the age of six were automatically included (141). Jordanian citizens classified as “poor” by the Ministry of Social Development are also covered by the civil health insurance fund (142).

Notably, many individuals are enrolled in multiple insurance programs, causing some overlap. As a result, an estimated 68% of Jordanians are covered by the public sector (118). Meanwhile, the private sector predominantly serves non-Jordanian residents and uninsured Jordanians. Sources from the MoH estimated in 2022 that approximately 72% of Jordanians had some type of health coverage including private insurances (143). Local experts highlighted that the lack of insurance coverage is not solely an issue for refugees, as it also affects certain Jordanians who are not covered by any insurance scheme. Both uninsured Jordanians and refugees have access to health care services at MoH facilities, where they are eligible for treatment at a subsidized rate, known as the "uninsured Jordanian rate" (144).

Morocco

In 2005, the government created a new administrative structure for the public health insurance system, called the National Health Insurance Agency (L’Agence Nationale de l’Assurance Maladie, ANAM) (145). The ANAM is responsible for supervision, management, and regulation of the Mandatory Health Insurance Plan (Assurance Maladie Obligatoire, AMO). All Moroccans employed in the formal sector are obliged to be part of AMO, and employees’ dependents (spouses and unmarried children under the age of 21) are also covered. There are two schemes within AMO depending on the sector of employment: CNOPS (Caisse Nationale des Organismes de Prévoyance Sociale) covers public sector workers and students and CNSS (Caisse Nationale

de Sécurité Sociale) covers private sector workers. Previously, RAMED targeted impoverished and vulnerable households (146-148).

Morocco has undertaken initiatives toward achieving UHC, notably with the establishment of the Haute Autorité de la santé (High Health Authority) in 2023 (149). This move, legislated by Law No. 07-22, aims to enhance the governance of the health system. The High Health Authority plays a crucial role in ensuring the seamless operation of state activities in health and overseeing the AMO, marking a pivotal step in Morocco's health sector reform (149).

As of 2017, AMO and RAMED combined covered approximately 47% of the population (150). ANAM set forth an ambitious plan for 2020 to 2024 to extend basic medical coverage to broader segments of the population, targeting over 95% coverage by 2025 (151). By September 2022, the proportion of individuals covered by AMO had risen to 79.8% (152). RAMED was phased out at the end of 2022, and individuals previously covered by RAMED have since then been transferred to AMO. As a result, approximately 9.4 million Moroccan citizens gained access to AMO by the end of 2022 (153). Local experts have drawn attention to a particular challenge faced by numerous women who, lacking access to computers or computer literacy, were formerly beneficiaries of RAMED as they transition to AMO during 2023. The process of transitioning to AMO requires computer usage, which presents a substantial obstacle for these women.

Although specific data on the impact of AMO expansion on breast cancer patients is unavailable, it has been noted that the proportion of insured breast cancer patients in certain publicly funded oncology hospitals significantly improved with the previous insurance coverage, RAMED. A study conducted between 2008 and 2010 revealed that around 82.5-82.8% of breast cancer patients treated at Centre Mohammed VI pour le traitement des cancers (CM-VI) and Institut National d'Oncologie Sidi Mohamed Ben Abdellah (INO) did not have any health insurance. This proportion decreased to 1.3-12.1% in 2015-2017 (154).

In general, AMO covers 70% to 90% of the costs of a defined set of health care services, while patients need to cover the rest by OOP (155). AMO only reimburses health care services if they are accessed in the public health system.

Saudi Arabia

All local citizens as well as all expatriates working in the public sector have free access to public health care services (156). Expatriates working in the private sector must have compulsory health insurance through their employer, and they are generally treated in the private sector (157, 158). The employer-provided insurance only covers a basic level of care and (white-collar) private-sector expatriates therefore often buy private health insurance to extend their coverage. Public health care used to be solely financed via government subsidies, but since 2005 it also draws on compulsory health insurance for expatriates, and since 2016 also on compulsory health insurance for national private sector employees. The latter insurance policy gives citizens access to the private health sector in addition to the public one (158, 159).

South Africa

The public health system is led by the National Department of Health (NDoH) and nine provincial departments of health (160). The public health system exists alongside a private health system. Public health services, delivered in primary, secondary, and tertiary/quaternary health facilities, are led by the individual provincial departments of health (161). Public health services are financed from general tax revenue but may contain co-payments from patients who have some available resources. The basic service package available in the public sector is

defined by standard treatment guidelines (STG) and the essential medicines list (EML), which is a list of medicines derived from the STG (161). The majority of the population (around 84%) access health care through public sector clinics and hospitals (121). The public system faces many challenges related to fragmentation of services, staff shortages, financial constraints, and low quality of services (162, 163).

The private sector provides health care for around 17% of the population and offers higher quality services at a higher cost (164). Private health services are mainly financed by prepaid plans of people with private health insurance (medical aid schemes), which may not cover the full medical costs, requiring OOP by patients (164). All medical aid schemes must cover at least all medical services in line with the regulated Prescribed Minimum Benefits (PMBs) (165). The share of the population covered by a medical aid scheme has essentially remained unchanged between 2012 and 2019 at around 17% (166).

The National Health Insurance (NHI) is a health financing system initiated in 2012, aiming to ensure that all citizens and permanent residents have access to good-quality health services provided by both the public and private health sector (160). The NHI would pool funds currently going to private insurers with those in the public sector and be implemented in phases over a 14-year period until 2026, with the ultimate goal to achieve UHC (167, 168). Private facilities would continue to operate but would be accessible to everyone and their funding would come from public sources (167, 168). After many years of delay, the NHI bill was adopted by the National Assembly and the National Council of Provinces in 2023 (169).

Türkiye

Universal public health insurance administered by the Social Security Institution (SSI) covers 99% of the population (170). Every citizen is assigned a unique identification number (T.C. Kimlik No.), which gives them free access to health care services in the public sector. The shift towards universal and mandatory health insurance started in 2003 and was fully implemented by around 2008 (171). Despite widespread public coverage, an increasing number of people are opting for supplementary private health insurance to cover additional services, such as treatment in private hospitals (170). Private insurance typically covers examination costs but not costs of newer medicines that are not yet reimbursed by the SSI.

United Arab Emirates

Health insurance regulations and rules differ somewhat in the seven emirates. In general, local citizens have public health insurance coverage, which gives them access to both public and private health care providers (172). Local experts noted that the Ministry of Health and Prevention (MOHAP) provides support for Emirati women with breast cancer, ensuring full coverage for their treatment, screenings, and survival journey. Expatriates, on the other hand, receive compulsory health insurance coverage through their employer, which also gives them access to public and private health care providers (172). The extent of expatriates' insurance coverage depends amongst other things on their salary. Services not covered by the insurance need to be paid OOP.

The following rules apply in the three largest emirates (172). All citizens and expatriates are covered by health insurance in Abu Dhabi. According to local experts, anyone who exhibits breast cancer symptoms is checked if they go to a hospital regardless of having an insurance plan. In Dubai, all citizens and expatriates are obliged to get health insurance in order to officially reside in Dubai. In Sharjah, health insurance covers all Sharjah-based employees.

Despite the comprehensive coverage, local experts indicated that there are still some people without health insurance (mostly expatriates in blue-collar jobs) (50).

If not fully covered, breast cancer patients can seek assistance from charities in the UAE. Local experts noted that charities vary in their policies, with some accepting all cases while others have specific criteria based on factors like nationality or other categorizations. These criteria sometimes create challenges for women seeking funds for their treatment, adding to their psychological and mental stress. One of the organizations that assists all cancer patients, regardless of nationality, ethnicity and other factors is Friends of Cancer Patients (FOCP).

3.2 Health spending

The monetary resources invested in health care differ in the MEA-9 countries. South Africa, Israel and Jordan spend around 8% of their gross domestic product (GDP) on health care, while Egypt, Türkiye, and UAE spend around 5%. Figure 20 shows how the public portion of total health spending falls short of the informal WHO's target of 5% public spending in all countries with the exemption of South Africa, Saudi Arabia, and Israel. In terms of absolute numbers, Israel spends $4339 per capita on health care, in contrast to Egypt's $180 and Algeria's $205 (not adjusted for differences in purchasing power). In Egypt, Jordan, and Morocco – the three countries without UHC in 2021 – OOP expenditure surpassed public expenditure. Particularly, OOP expenditure accounts for almost 55% of total health care expenses in Egypt, which signifies a significant financial burden that patients are facing.

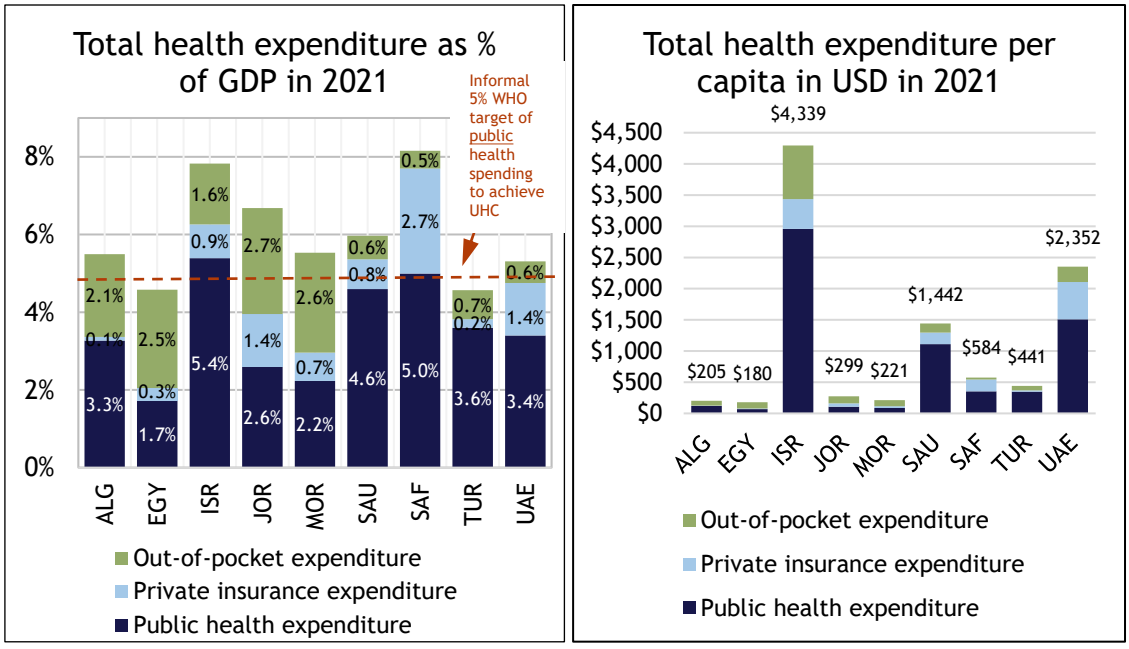


Figure 20: Total health expenditure as percentage of GDP and in USD per capita in 2021.

Notes: GDP = gross domestic product. Expenditure is not adjusted for differences in purchasing power parity. Source: WHO (173).

4. Governance of breast cancer care

The governance of breast cancer care is often shaped within the greater area of cancer care. Many countries in the MEA region have established national cancer control programs (NCCP), often simply called "national cancer plans"; see Table 7. The WHO endorses NCCPs as the best available method to control both the causes and the consequences of cancer in a strategic and comprehensive way (174). They are "*designed to reduce cancer incidence and mortality and improve the quality of life of cancer patients, through the systematic and equitable implementation of evidence-based strategies for prevention, early detection, diagnosis, treatment and palliation, making the best use of available resources.*" (175). Many of the NCCPs in the MEA-9 contain specific actions related to breast cancer care.

Table 7: National cancer plans

Country	Plan and time period	Publisher of the plan	Actions across breast cancer care	Funding plan
Algeria	Plan for 2015-2019	MoH	Yes	Yes
Egypt	Plan for 2016-2020	MoH	Yes, since 2019	
Israel	No national cancer plan (only an early detection plan)	MoH	Yes, since 2014	Yes
Jordan	No plan		Yes, since 2006	
Morocco	Plan for 2020-2029	MoH	Yes	Yes
Saudi Arabia	Plan for 2014-2025	MoH	Yes	No
South Africa	Plan for 2017-2022	NDoH	Yes	No
Türkiye	Plan for 2021-2023	MoH	Yes	No
UAE	No publicly available plan			

Notes: MoH = Ministry of Health. NDoH = National Department of Health.

Algeria

The Ministry of Health launched a national cancer plan – "Vision stratégique de lutte contre le cancer centrée sur le malade" – for 2015-2019 (176). The overall aim of the plan was the reduction of cancer-related mortality and morbidity rates, as well as improving the quality of life of patients during and after their treatment. One of the eight strategic areas covered in the plan was devoted to enhancing screening, with a particular emphasis on breast cancer (176). Some of the strategic areas included are:

- Procurement of mobile clinics dedicated to breast cancer screening.
- Establishment of an expert committee responsible for organizing breast cancer screening initiatives.
- Implementation of training programs focusing on mammography and ultrasound techniques.
- Allocation of a dedicated budget to enhance awareness of breast cancer screening.

There are concrete plans for updating the national cancer plan covering the period for 2023-2030. Minister of Health M Abdelhak Saïhi confirmed that the plan will prioritize prevention and spreading awareness about the importance of early detection (177). The Algerian public authorities have been proactive in enhancing the country's cancer care infrastructure, including the establishment of a national cancer agency and increased funding for cancer management.

In 2024, an extra 30 billion dinars were designated for the National Fund for Cancer Control, underscoring this dedication (178).

Egypt

In July 2019, the country intensified its commitment to combating breast cancer by launching the "Women's Health Initiative". This initiative aims to conduct breast cancer screening and evaluate other health-related risk factors (179). The main priorities have been to raise breast cancer awareness and to improve early detection. Local experts highlight that the campaign addresses three objectives influencing the entire breast cancer journey:

- The first objective is to raise breast cancer awareness. This initiative has successfully enabled over 20 million women to make 35 million visits, according to local experts. This achievement underscores the foundation of a culture of regular health check-ups, which is pivotal for the effective screening and early detection of non-communicable diseases.
- The second objective is to enhance early detection, capitalizing on the extensive network of primary health facilities. According to experts, there are over 5,000 such facilities, and more than 3,000 are actively contributing to the campaign.
- The third objective of the campaign strives to boost treatment accessibility. The integration of multidisciplinary teams (MDTs) has been a core part of this strategy, accompanied by standardization of treatment protocols, the introduction of services such as breast reconstructions. Additionally, there has been an expansion in reimbursement options for newer treatments, including CDK4/6 inhibitors and trastuzumab for metastatic cases.

Local experts have observed as an indirect effect of the campaign that patients who previously sought treatment in private or non-governmental centers are now gravitating towards the breast cancer campaign. This shift is attributed to the campaign's provision of unique services and treatment modalities not found elsewhere.

Israel

Israel currently has no national cancer plan but has plans directed towards non-communicable diseases (NCDs) in general. The Country Cooperation Strategy (CCS) for Israel and the WHO for the period 2019-2025 was developed in order to outline the strategic priorities and areas of collaboration between Israel and the WHO (180). The CCS identified NCDs, including cancer, as a strategic priority and emphasized the importance of policies aimed at reducing risk factors such as obesity and physical inactivity. Additionally, the CCS highlighted the need to promote research in innovation in personalized medicine to improve outcomes for patients with NCDs. While the CCS mentions cancer as a whole disease area, it does not include specific objectives for breast cancer.

Jordan

According to local experts, despite numerous attempts over the past years to establish an NCCP, the launch of the national cancer plan has been continuously delayed due to different reasons including financial constraints and other competing priorities. Local experts noted that the plan is currently under revision and will probably be available in the coming years. Despite not having a national cancer plan there have been important measures to tackle the increasing incidence in breast cancer. The King Hussein Cancer Foundation (KHCF) in collaboration with MoH launched the Jordan Breast Cancer Program (JBCP) in 2007, a national program

coordinating and leading breast cancer early detection efforts (181). It also led to the publication of breast screening and diagnosis guidelines in 2011 (65).

Since its inception, the JBCP has achieved numerous milestones, including leading wide community outreach activities throughout Jordan and conducting mass awareness campaigns to educate the public about the crucial importance of early detection (182). The purpose is to reduce morbidity and mortality from breast cancer by screening and early detection, and to increase the share of patients diagnosed in earlier stages (13). According to local experts, the program has also provided underprivileged women with free screening services through its mobile units and referrals, benefiting over 45,000 women to date. Furthermore, the JBCP has established breast cancer screening and diagnostic centers across the country, while offering training and support to health care professionals to improve the quality of breast cancer care. Overall, the JBCP has made significant progress in reducing the impact of breast cancer in Jordan and remains an essential program in the country's public health agenda; see more in section 6.2.

Morocco

The latest national cancer plans for 2010–2019 and 2020–2029 were drafted by the National Institute of Oncology with support from the Lalla Salma Foundation and adopted by the MoH (183-185). In the first plan, specialized gynecological and breast cancer centers were established in the CM-VI in Casablanca and the INO in Rabat (154). Improving early detection of breast cancer is a crucial aspect of the 2020-2029 national cancer plan (185). The plan focuses on three primary actions:

- The first action aims to address disparities in breast cancer by focusing on improving access to high-quality, cost-free regular cancer screenings.
- The second action is centered around enhancing the effectiveness of early diagnosis programs for breast cancer. This involves bolstering diagnostic services and establishing robust monitoring and evaluation mechanisms.
- The third action point involves fostering public-private partnerships to enhance access to diagnostic services for breast cancer screening. This collaborative approach aims to leverage the strengths of both sectors to improve the availability and quality of diagnostic services, ultimately facilitating early detection and intervention.

Saudi Arabia

The National Plan for Cancer Control for the period of 2014-2025 in Saudi Arabia aims to reduce breast cancer mortality by 30% (186). To achieve this goal, the plan includes various objectives, such as increasing awareness about breast cancer signs and symptoms among health care workers and the implementation of an integrated population-based level screening program (186). The plan also emphasizes primary prevention through awareness-raising campaigns targeting modifiable risk factors like smoking and unhealthy diets. Additionally, the plan aims to strengthen the national cancer registry and to conduct and support cancer research.

Local experts highlight additional priorities, including:

- The Ministry of Health is evaluating the availability of cancer medicines, recently using the ESMO-Magnitude of Clinical Benefit Scale to balance the clinical benefits of medicines with their costs.
- Initiatives are in progress to privatize health care services, including oncology centers, with the aim of offering more prompt and timely services to patients.

- Efforts to recruit more physicians and address shortages in critical areas, such as medical oncology and nursing, are ongoing. There is a push to encourage young physicians to specialize in areas where there is a lack of staff.
- Expanding clinical trials is a priority, though currently most are conducted at the King Faisal Specialist Hospital & Research Centre in Riyadh, with a few in the Medical Cities under the MoH.
- The completion of the Saudi genome project, which investigates mutational abnormalities specific to the Saudi population for basic oncology research, represents a significant advance.

The National Cancer Institute of Saudi Arabia (SANCI) plays a crucial role in the implementation and evolution of the National Cancer Plan 2014-2025. SANCI was established in 2016 after the initiation of the National Cancer Plan (187), to help bolster the plan's objectives and ensure its successful execution. SANCI functions as a key advisory organization, tasked with devising comprehensive national strategies aimed at the prevention, control, and battle against cancer along with other health authorities (187).

South Africa

The National Cancer Strategic Framework (NCSF) for South Africa for the period 2017–2022 includes a long list of challenges in different areas of cancer care service delivery, health workforce, information, medical products, vaccines, and technologies, financing, leadership/governance (188). The plan recognizes breast cancer as one of the five priority cancers. In 2017, the National Department of Health (NDoH) also launched the Breast Cancer Prevention and Control Policy with actions and recommendations that seek to improve breast cancer awareness, prevention and for timely and effective treatments (189, 190). The primary aims of the plan were to 1) improve survival 2) decrease time for presentation and time to treatment 3) decrease stage at presentation 4) improve quality of life in survivorship 5) effectively monitor and evaluate program implementation and the impact of the interventions.

Türkiye

The NCCP in Türkiye has been released periodically to outline actions that address cancer prevention, detection, treatment, and palliative care. The first NCCP was released in 2009 and covered the period of 2009-2015, focusing on the preparation of an effective breast screening program (191). In 2013, the second NCCP was released, covering the period of 2013-2018 and aimed at expanding and improving the national breast cancer screening program (192).

In August 2021, the MoH launched the third NCCP (193), which provides a detailed description of cancer registration and the epidemiological situation in Türkiye, along with reviewing prevention and screening areas. One of the five primary actions of the third NCCP is to improve and increase the coverage of breast cancer screening. The progress indicator for breast cancer screening is to improve the number of patients participating in screening programs every year. It is worth noting that the third NCCP has the shortest list of actions and does not include any actions related to diagnostics and treatment.

United Arab Emirates

According to local experts, there is a national cancer plan prepared by the MOHAP currently in place, but it is not publicly accessible. On the local level, there are also cancer control plans and Abu Dhabi has had one for more than ten years. Already in 2016, the MOHAP announced an aim to reduce cancer mortality by 18% until 2021 as one of the key health care indicators in the UAE Vision 2021 National Agenda (194, 195).

In 2017, the MOHAP launched a national strategy to combat NCDs, including cancer, for 2017–2021 (196). The plan includes eight strategic goals, including reducing the number of smokers by 30% and reducing the consumption of salt, sugar, and saturated fats by 30% (196). It also includes goals on improving screening and early detection of NCDs. Cancer-specific actions in the NCD plan include strengthening cancer registry programs, publishing the national cancer registry report, improving information, evaluation, and monitoring systems. Local experts indicated that an update of the current plan is planned.

5. Organization of breast cancer care

The organization of breast cancer care constitutes a multi-layered system designed to offer support from the moment women notice symptoms at home or undergo a regular screening to their long-term management of the disease. This system integrates various health care services and professionals to ensure timely diagnosis, effective treatment, and continuous care for breast cancer patients.

This section presents an overview of the organization of breast cancer care and the typical journey breast cancer patients undertake in different countries. It also includes a brief description of how health care systems in different countries provide for breast cancer screening, diagnosis, treatment, and follow-up care. For some countries, it includes examples of Non-Governmental Organizations (NGOs) that often play a vital role in supporting breast cancer patients by filling gaps in health care systems. These organizations are varied and provide a range of essential services, from launching awareness campaigns and offering free or low-cost screenings to providing financial aid for treatments, emotional support, and advocacy for improved health care policies.

Algeria

Breast cancer patients covered by CNAS/CASNOS receive free care in the public health care system, covering all cancer care services – surgery, radiation therapy, medicines. The main entry point to the public health care system for a patient who suspects has breast cancer would typically be through a primary care clinic (salle de soins). If breast cancer is suspected, the health care provider may refer the patient to a diagnostic center for further testing. Local experts noted that diagnostic evaluations, such as mammography and microbiopsy, as well as the extension assessment are paid by the patient and only partially reimbursed by social security. Only after breast cancer is diagnosed, all subsequent services are provided for free in the public system.

Treatment of cancer patients in the public system is mainly provided at specialized hospital centers (EHS) which have dedicated cancer treatment centers (center anti-cancer, CAC) attached to them, but also at community hospitals (EPSP) and university hospital centers (CHU) (197). There are over 20 public CAC and 7 radiation therapy centers, according to local experts. Local experts noted that there used to be a lack of specialized breast cancer clinics, which often resulted in delays, as women from various regions must travel long distances, incurring out-of-pocket transportation costs. However, geographical accessibility has improved in recent years.

Local experts noted that the Ministry of Health recently started to establish a specialized unit known as "Cellule d'accueil" within a majority of cancer centers, predominantly in the newer cancer centers. This specialized unit is comprised of an interdisciplinary team including general practitioners, psychologists, and social assistance professionals. Their primary objective is to expedite the scheduling process for patients requiring radiology or biopsy procedures, ensuring timely appointments, and mitigating any potential diagnostic delays.

Egypt

The main model for accessing cancer care, applying both to patients covered by the HIO and uninsured patients, is that a patient with symptoms would go directly to a general hospital for a checkup (50). Studies conducted in the country indicate that breast cancer patients typically look for medical advice after discovering symptoms with medical visits to general surgeons or

directly in cancer centers (198). Also, primary care facilities have been utilized as a convenient option for conducting clinical breast examination (CBE) among women over 18 years (or only above 35 years according to local experts) (199). If any abnormality is present, the patient is referred to secondary or tertiary care where she undergoes mammography and further tests, according to local experts. After cancer is diagnosed, the patient receives cancer treatment in the same hospital if it has in-house cancer care services; otherwise, the patient is referred to a hospital with such services.

Many cancer patients are treated in HIO hospitals, MoHP hospitals, and university hospitals where services are mostly covered by public expenses (200). Yet a challenge highlighted by local experts are high co-payments for cancer care services, in particular for cancer medicines. Cancer patients may also seek care in the private sector at their own expense or with private insurance coverage. NGOs help cancer patients in different ways, supporting public hospitals, providing treatment services in their own facilities, or providing emotional support to patients directly. Multiple non-profit and charity organizations offer free screening and treatment to cancer patients in different governorates in the country (201, 202).

Since 2019, the country has strengthened its dedication to combating breast cancer with the launch of the "Women's Health Initiative", described in section 4. This initiative offers a comprehensive range of services, from awareness campaigns to screening and diagnosis, all at no cost. The services encompass MDT assessment, surgery, and various therapeutic modalities, including radiation therapy, chemotherapy, and targeted treatments, as noted by local experts.

Israel

Breast cancer patients who are covered by the four health plans are entitled to free cancer care services in the public health care systems, which includes surgeries, genetic tests, medicines, and other benefits (203). There is a national breast cancer screening program, that is described in detail in section 6.2, with high participation rates. Local experts concur that the majority of breast cancer cases are diagnosed through this program. After a conclusive diagnosis, patients are quickly referred to tertiary hospitals or large community hospitals. From that point onwards, all care is provided in a hospital setting.

If a woman suspects having breast cancer, she can directly access public breast cancer centers without referrals, although some centers require a referral from primary care (204). These centers offer comprehensive screening, diagnosis, and treatment services. Many breast cancer patients receive treatment at specialized centers such as the Sheba Medical Center, Hadassah Medical Center, Rabin Medical Center, Sourasky Medical Center, and Kaplan Breast Health Center.

According to local experts, private insurances play a role in facilitating access to cutting edge molecular and genetic tests. They also influence the decision-making process regarding the choice of surgical facilities and coverage for specific medicines. In some cases, novel medicines may not yet be included in the National Health Scheme, but they could already be covered by private insurance.

The NGO “One in Nine” is actively engaged in elevating public consciousness about breast cancer and promoting breast health in Israel. One in Nine places a strong emphasis on educating women about their illness. This includes detailed information about treatment options, tests, and what to expect during the treatment process. They also focus intensively on the emotional and psychological needs of patients.

Some health funds provide financial assistance for travel expenses related appointments to receive chemotherapy and radiation therapy (205). Additionally, breast cancer patients can receive free of charge legal assistance from NGOs to help them with their health insurance fund, expense reimbursements, and other patient rights (205).

Jordan

Cancer treatment is provided free of charge to all Jordanian citizens in the public sector, regardless of their general health insurance status (206). In contrast, non-Jordanian cancer patients pay OOP for their treatment costs unless they receive support from charitable organizations that partner with their treating hospitals (207). The KHCF offers a nonprofit cancer insurance program, which partially subsidizes treatment at the King Hussein Cancer Center (KHCC) for patients who pay affordable premiums (207). According to local experts, refugees are charged at the "uninsured Jordanian" rate, which includes subsidies, or they may receive support from the KHCF Goodwill Fund, contingent upon the availability of funds. Private insurance companies typically exclude coverage for both cancer screening and treatment (206).

Cancer treatment is provided through public hospitals affiliated with the MoH and the RMS, university hospitals, and the KHCC (206). The KHCC is a national non-governmental and non-profit institute for cancer care founded in 1997, and the only specialized cancer center in Jordan (208). The KHCC treats around 60–70% of all cancer patients in Jordan (65). Breast cancer patients can either seek care either directly at the KHCC or be referred.

A breast cancer patient's journey often begins with a CBE. In the public sector, each health care provider has its own insurance schemes that cover screening, diagnosis, and treatment. Local experts emphasize that the hurdles faced by the local population during this journey do not primarily arise from insurance coverage, but rather from the diagnostic and subsequent procedures; detailed in sections 6, 7, and 8. This is because the public sector extends free screening and diagnosis services to insured individuals. However, roughly one-third of the population (the uninsured) may encounter obstacles or substantial expenses when attempting to access breast cancer screening, as noted by local experts. In the private sector, only a handful of insurance plans provide coverage for preventive care.

Morocco

Women with symptoms of breast cancer primarily access public primary health care centers to get a CBE by trained health care personnel. If any abnormalities are detected, patients are referred to diagnostic centers for further evaluation, including mammography and/or breast ultrasound, and biopsy if needed (209). Once breast cancer is diagnosed, patients are then referred to treatment centers.

In 2020, there were 2,126 primary health care centers (210). Local experts confirmed that all women can undergo CBE at any of these centers. Additionally, local experts mentioned that each province has at least one diagnostic center and each region has at least one treatment center. There are several dozens of public and private cancer care centers spread across larger cities with multiple centers in Casablanca and Rabat (211). The leading cancer institutes are the CM-VI in Casablanca and the INO in Rabat (154).

Cancer care services in the public cancer care centers for patients on AMO are fully covered without any co-payments, according to local experts. Some patients (such as some self-employed people) may have private health insurance to help them pay for services that they access in the private health care sector. The Lalla Salma Foundation supports many uninsured

cancer patients by covering treatment-related expenses, including expenditure for modern cancer medicines.

Saudi Arabia

Cancer care is widely available through several public entities, including the Ministry of Health, Ministry of Higher Education via university hospitals and specialized institutions catering to various government sectors such as the Military, the National Guard Ministry, the Arabian American Oil Company (Aramco), and the Ministry of Interior (187). The Al-Faisal organization also contributes to this effort, operating the King Faisal Specialist Hospitals and Research Centre (KFSH&RC) located in Riyadh and with branches in Jeddah and Medina.

Most cancer patients are treated at hospitals in the various public sectors (MoH, military, etc.), where all Saudi citizens receive free treatment (187). Patients with insurance (expats with compulsory insurance) who are treated in the private sector will be reimbursed for their expenses. Only if someone has no private insurance and is treated in the private sector, there will be significant OOP expenses, according to local experts. Approximately 15-20% of governmental hospitals operate as "business centers" which offer services to expats covered by insurance or other patients willing to pay OOP, according to local experts.

The MoH is responsible for the organizational structure and classification of oncology facilities across the country (187). While there are no centers exclusively dedicated to "breast cancer", comprehensive oncology centers are available, offering a broad spectrum of services for all cancer types (187). Additionally, there are specialized oncology departments focused on specific treatments and services, though they do not provide the full range of oncology care. Furthermore, oncology service units exist as secondary facilities. These units offer a more limited range of services and operate in conjunction with a primary facility, forming a hub-and-spoke system of care delivery (187).

The main national cancer care centers (all affiliated with the MoH) are located in Riyadh, Jeddah, and Dammam (212). They offer modern cancer treatment and have qualified medical staff (213). Yet these big centers are overcrowded, because patients from all over the country try to get treatment there (50). Radiation therapy centers do not exist outside the three cities (50). During recent years, the MoH has established smaller cancer treatment centers (“satellite centers”) in other cities, such as Mecca, Medina, and Qassim (214).

Women suspecting breast cancer are advised to initially seek medical attention at primary health care centers by walking in, rather than making pre-arranged appointments (215). Waiting in lines can be a deterrent for some women, causing them to skip primary care and go directly to hospitals when their symptoms worsen (215). Until recently, mammography screening was not free in the private sector. If a healthy woman wanted to do a mammography screening, a physician would need to put symptoms in the medical record in order to make the referral available for free. This has changed recently and now mammography screening is listed among reimbursable services in the insurance policy.

South Africa

Women with breast cancer symptoms typically begin the patient journey at the primary care level (216). The recommended pathway stated for the diagnosis of breast cancer in the PMBs is to have a medical visit with a registered nurse and a GP (217). Nevertheless, local experts acknowledge the role of traditional healers, who often serve as the initial point of entry into the health care system, as elaborated in section 6. Breast cancer care services such as CBE, medical consultations, surgery, radiology and diagnostic imaging, chemotherapy, radiation

therapy and breast reconstruction are included in the PMBs for early and locally advanced breast cancer (218). Hormone therapy, chemotherapy, and some level of palliative care is included in the PMBs for advanced/metastatic patients (219). There are waiting lists to access radiation therapy services, although waiting times differ from facility to facility and from cancer to cancer. Waiting times to receive drug treatment are much shorter, but this varies across the country (50).

Breast cancer patients with a private medical aid scheme will receive services by private providers according to their scheme rules and budgets, with the minimum services being the ones specified in the PMBs. Most schemes have limits and may exclude cover for certain novel and/or expensive treatments (220).

Türkiye

Public health insurance by the SSI covers all cancer services in public sector health facilities. However, patients are required to pay different co-payments for primary, secondary, and tertiary care services (170). Women with breast cancer symptoms can be referred to opportunistic screening by their gynecologist, primary care physician, or breast surgeon, or they can go directly to screening facilities (221). As a result, their first contact with the health system may occur at the primary level, or they may go directly to a hospital in secondary care (51). While the national screening program fully covers the cost of mammography, opportunistic screening is not covered, so women need private medical insurance or pay OOP for the costs (221).

United Arab Emirates

Health insurance covers cancer services for both citizens and expatriates. Typically, a local citizen suspecting they have breast cancer will first consult a primary care clinic within the public health care system. If required, they might be referred to a diagnostic center for more detailed testing. Women can directly approach secondary or tertiary care facilities. Most often expatriates are the ones that opt to directly consult secondary or tertiary care facilities for diagnosis, due to the limitations of screening coverage. The type of services women receive depends on their health insurance plan. Local experts also noted the existence of financial support systems for breast cancer patients. For example, the Red Crescent, a humanitarian organization, has set aside specific resources dedicated to aiding breast cancer treatment and care.

Despite health insurance, reaching the annual cap of the insurance is a challenge for cancer patients – both for citizens and expatriates (222). Starting from 2019, the health authority in Dubai established a special fund to fully cover expatriate patients with breast cancer who have exceeded the insurance cap (223). As all expatriates on work visa have their health insurance coverage linked to their work contracts, a breast cancer diagnosis can be a deal breaker (222).

The few cancer patients without health insurance (mostly expatriates in blue-collar jobs) are either treated in the UAE and then they are helped by NGOs such as FOCP, or they return to their home country to get/continue treatment. Because of the diversity of the community in the country, the community typically comes together when someone is in need and helps, according to local experts (50).

6. Early detection

This chapter describes the context and current status of early detection of breast cancer in each country, along with main challenges. Breast cancer can generally be detected in two ways; see Figure 21. First, a patient may detect/experience symptoms and then consult a health care professional for diagnostic confirmation. Second, women who fall into the age group covered by a breast cancer screening program may have an asymptomatic tumor detected on their mammogram and/or CBE. Although breast cancer screening programs are becoming more prevalent in the MEA region, breast self-awareness remains crucial for breast cancer detection. Women with a known family history of breast cancer and women who know they are carriers of a BRCA1/2 mutation need to be especially vigilant about early signs and symptoms.

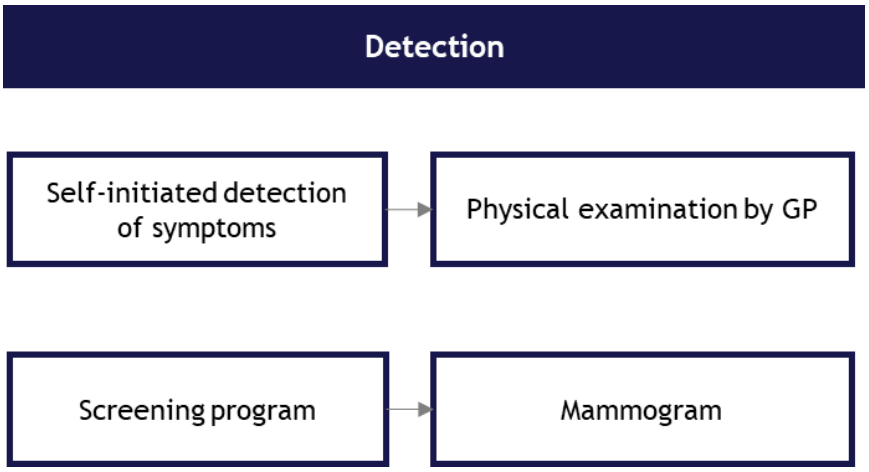


Figure 21: Early detection pathway.

Breast cancer patients in the MEA-9 countries face challenges in getting an early breast cancer diagnosis for several reasons explored in this chapter. One of the main reasons is the lack of functional organized screening programs, placing the burden on asymptomatic women to take the preventative initiatives to obtain a CBE or a mammography. The other main reason relates to health illiteracy of women in terms of knowledge/awareness of common breast cancer symptoms. Overarching reasons can be found in economic barriers which prevent women from seeking help for financial reasons (see section 3.1 about health care coverage) as well as in social barriers, which includes cultural reasons for not seeking help due to anticipated social stigma and negative repercussions.

Figure 22 summarizes the latest available evidence on the stage of diagnosis of breast cancer in each country. It also includes the WHO GBCI target of detecting at least 60% of cases in an early stage (stages I and II). Interpreting the country-specific data requires caution due to its compilation from diverse studies over various years and across different populations with most of the figures coming from hospital-based studies. Among all the countries evaluated, only Israel, Türkiye, and the UAE exceed the WHO GBCI 60% target value, with rates of 80%, 81%, and 66%, respectively, diagnosed in stage I and II. Egypt, Jordan, and Saudi Arabia seem to be the furthest away from the 60% target value. However, the presented data for Egypt only cover the period before initiation of the Women's Health Initiative in 2019. A recent analysis of the first years of this initiative (July 2019 to June 2021) shows a significant downstaging among women reached, with 80.5% diagnosed in stages 0 to II (224). Local experts in Jordan also pointed out that the stage distribution has improved since the publication of the data shown in Figure 22.

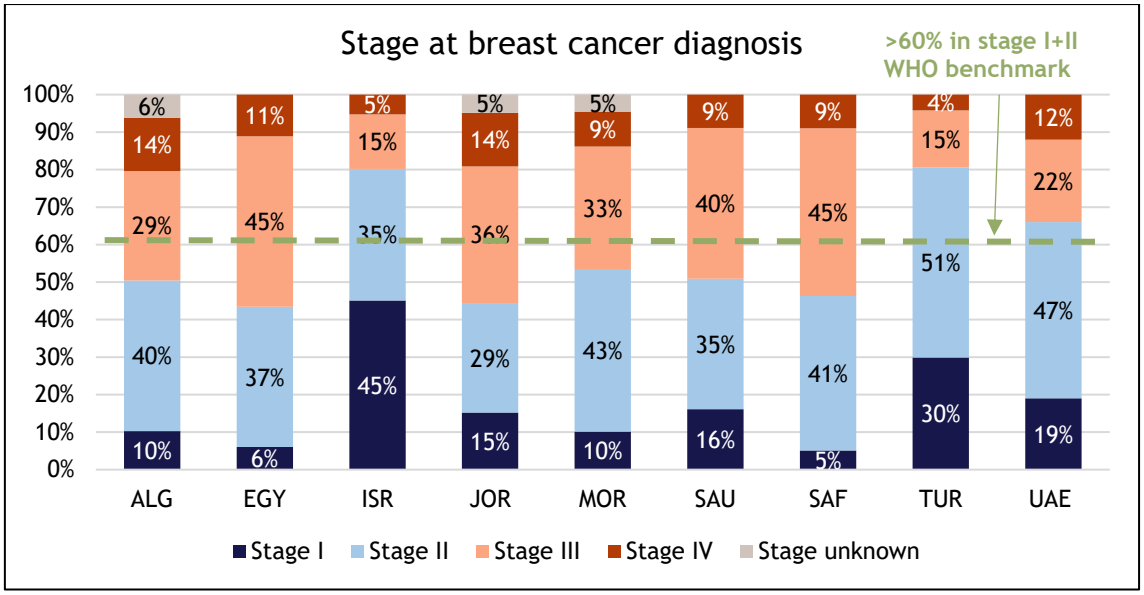


Figure 22: Stage distribution of breast cancer at diagnosis and WHO GBCI target.

Notes: Data for ALG covers patients in community and university hospitals from the public sector in 2016 (n=1436). Data for EGY comes from a meta-analysis of studies with data from 1997 to 2015 (n=31,172). Data for ISR cover records from women treated in the Northern region at the Ziv and Carmel medical centers (n=1,140). Data for JOR cover women diagnosed in UJH and Bashir Hospital in 2011-2014 (n=867). Data for MOR cover women diagnosed in 2008-2017 in INO Rabat (n=1,020) and CM-VI Casablanca (n=635). Data for SAU cover women diagnosed in 2004-2011 in the Saad Specialist Hospital. The data for the UAE represents a set of data points extracted from a graphical analysis conducted in a study focusing on women across the entire UAE during the period of 2015-2017. Data for SAF refer to diagnosis in the Chris Hani Baragwanath Academic Hospital (CHBAH) in 2006-2012 (n=1200). Data from TUR is for patients diagnosed in 2005-2017 at 36 centers (n=19,503). Sources: (91, 225), ISR (226), EGY (227), JOR (228), MOR (82), SAU (229), SAF (230), TUR (231), UAE (232).

A recent study by IARC, including cancer registry data from Algeria, Morocco, the UAE, and other countries in the MEA region not among the MEA-9, highlighted the inconsistent practice of recording stage information and found that about one in four breast cancer diagnoses lacks such details, hindering the effectiveness of monitoring early detection initiatives (232). Additionally, the simultaneous use of two different classification systems (TNM and SEER) in many cancer registries introduces extra complexity, potentially compromising the data's completeness and accuracy (232). Thus, the use of current data on the stage distribution to infer the effectiveness of breast cancer detection in most MEA-9 countries warrants a cautious interpretation. Efforts are needed to confirm and improve data accuracy and completeness.

Cancer stage at diagnosis is heavily associated with survival chances. The earlier the diagnosis is made, the higher the chances to survive; see Figure 23. In cases where the tumor is detected while it is still localized (i.e., localized and stage I, according to the SEER and TNM classification, respectively), the 5-year survival rates reported in a published paper are nearly 98% in Jordan (228, 233). In the most advanced stage (i.e., stage IV), the 5-year survival rates drop to 46%. By comparison, the 5-year relative survival rate in localized breast cancer was 99% in the United States in the diagnosis period 2013-2019 and only 31% in metastatic breast cancer (234).

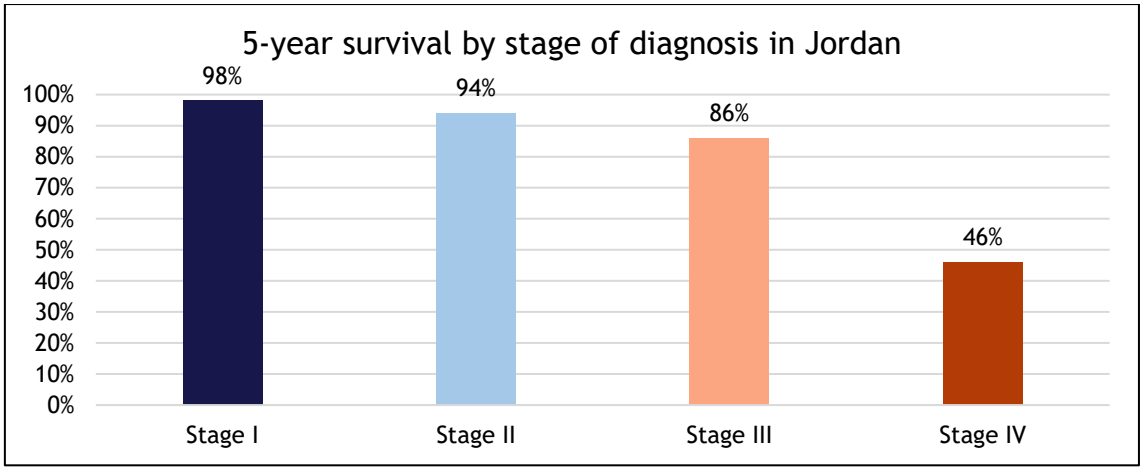


Figure 23: 5-year survival rates by stage of diagnosis in Jordan.

Notes: Survival rates for Jordan are based on the overall survival rates between 2011 and 2014 from two of the main public health providers. Source: (228, 233).

6.1 Self-initiated detection

Breast self-awareness by women to look out for breast cancer symptoms is considered crucial, especially since organized screening programs are lacking in most countries in the MEA region. If a woman experiences symptoms, the first step for her is to visit a health care professional, such as a general practitioner (GP) in primary care. The GP may perform a physical examination (a CBE) and then refer the patient to a specialist for a mammography if necessary.

The most common breast cancer symptoms are summarized in Figure 24.

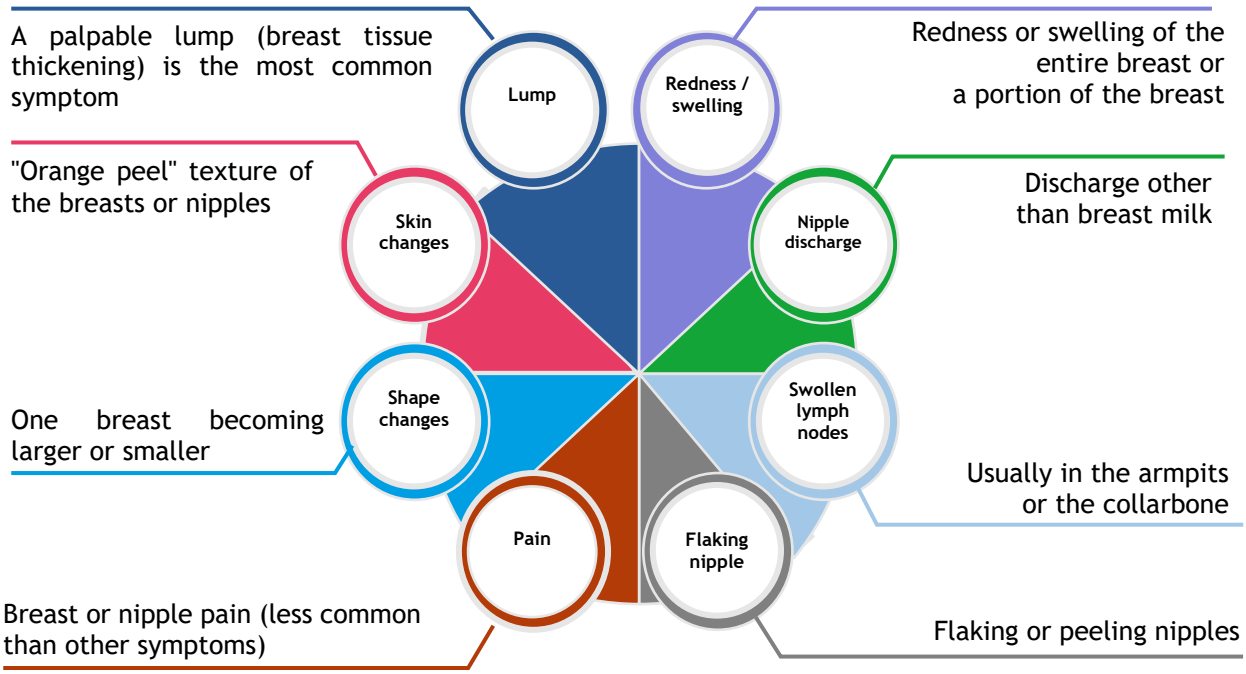


Figure 24: Common signs and symptoms of breast cancer.

Source: (235).

According to the WHO, there are two main areas to ensure early diagnosis (236).

1. Increased awareness of first signs of cancer:
    a. Knowledge about common symptoms of breast cancer is key and health literacy is a critical skill for early detection (237). Awareness campaigns on symptoms (and on the opportunity of screening programs) can increase the health literacy in the population. The "Breast Cancer Awareness Month" in October every year is an example of a global awareness initiative. These campaigns are often run jointly by governments and patient organizations to maximize outreach.
    b. Primary care providers (GPs, nurses) need to be trained to recognize symptoms of breast cancer.
2. Improved accessibility and affordability of health services and improved referral from primary care to specialized care:
    a. Geographical and financial barriers might prevent patients from accessing health services rapidly. Psychosocial barriers (e.g., fear and stigma) might also delay the time until patients access health services for a diagnostic confirmation.
    b. Clear referral guidelines and pathways are needed to facilitate quick referral from primary care to appropriate diagnostic services in specialized care.

6.1.1 Overview of main challenges in the region

The subsequent section provides an overview of the state of self-initiated detection of breast cancer in each country. It highlights barriers identified in both the literature and by local experts as the principal challenges. Figure 25 summarizes common challenges across countries.

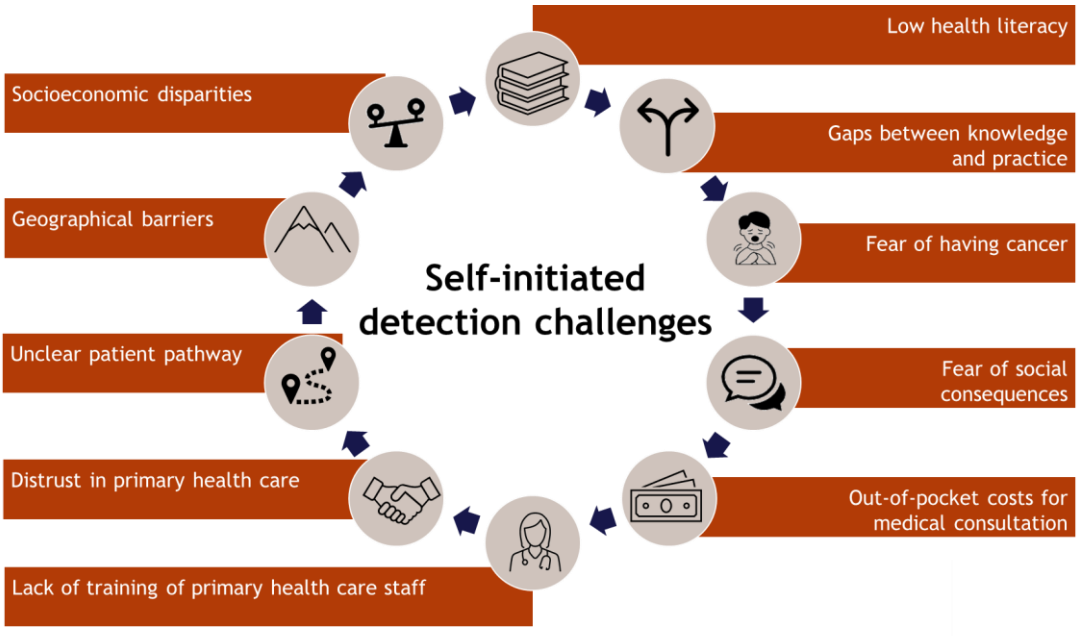


Figure 25: Challenges with self-initiated detection in the MEA-9 countries.

6.1.2 Country-specific status and challenges

Algeria

There are awareness campaigns in Algeria in different media platforms such as billboards in public areas, posters in waiting rooms and in press (57). Awareness campaigns are more common in October, called “Pink October”, which is the breast cancer awareness month.

Main challenges

- **Lack of culture of prevention**: Breast cancer is seldomly discussed openly in rural communities due to being perceived as a taboo, although local experts note that there has been a general increase in awareness among women compared to previous years.
- **Fear of having cancer**: According to local experts, many women in rural areas exhibit fear and hesitation when it comes to seeking out screening services. There seems to be a prevailing belief that "when you look for something, you find it," which contributes to their reluctance.
- **Social consequences**: For some women, a breast cancer diagnosis results in divorce as the husband would not accept a wife having cancer (238). Local experts noted that women in rural areas also worry about the potential negative impact on their daughters' marital prospects, given the perceived hereditary nature of breast cancer.
- **Lack of training of primary care workers**: Local experts have observed instances where delays in time to treatment have arisen because physicians incorrectly identified tumors as benign.
- **Low health literacy:** In a prospective multicenter cohort study of breast cancer patient in Algeria (N=1437) physicians reported delays in diagnosis with the main reason being the patient not seeking medical care (225). However, a retrospective study in the region of Batna (N=267) showed that the median time from first symptoms to having first consultation was only 15 days (25% 3 days – 75% 70 days) (239).

Egypt

A questionnaire study including 600 women that had visited primary health care centers in primarily Cairo showed that the main source for information on cancer were TV and radio (60%), while 6% reported that their main source was a medical person or book, and 7% answered newspapers (240). Also results from a study from the Nile Delta (N=48) showed that the primary sources from which women learned about breast self-examination were television, nursing or medical school or a medical doctor. The women in the latter study all agreed that more information on breast cancer and screening was needed and that the government should provide more health education, e.g., in collaboration with media and by having female physicians visiting primary school (241).

Main challenges

- **Prolonged delays in seeking medical attention:** An analysis of breast cancer records (N=5,236) from 2007 to 2016 from three public oncology services in Alexandria showed that the time from first symptom to first specialist consultation was less than 1 month in 11% of the cases, between 1 and 6 months in 59% of the cases and more than 6 months for 31% of the cases (91). Another study using 2016 data revealed that 61% of the waiting time—from the onset of the first symptom to the commencement of treatment—was attributed to patients (242). On average, they took 4.4 months to seek medical assistance.

- **Low health literacy:** A study on female university students in Egypt published in 2013 showed that there is a low level of knowledge on breast cancer risk factors, early warning signs and breast self-exam among female university students and that only few students practice breast self-exam monthly. The most common reasons for not practicing breast self-exam were ”did not know how to perform it” (47.7%) and lack of interest (35%) (243). Another study including 600 women that had visited a primary health care center found that knowledge about breast cancer was limited in 80% of cases, even though almost all interviewed women (94%) had heard about breast cancer. Of all respondents, 38% believed that breast cancer is an incurable disease (240). Another study found that even if women understood that early detection was important to reduce mortality, they did not know the symptoms of breast cancer. Thus, the women tended to ignore early signs, not understanding that there was a need to seek help (241). In addition, local experts emphasize the importance of raising awareness and education among not just women, but also men and health care providers.
- **Geographical barriers:** Local experts highlighted one of the primary challenges hindering women from seeking care were the accessibility of services. However, after the Women’s Health Initiative was launched, it improved service accessibility, and as a result there was a notable increase in adherence to early detection practices, especially in rural areas.
- **Distrust in primary health care physicians:** Results from an interview study published in 2012 with women from rural and urban areas in the Nile Delta (N=48) showed that there was a distrust in primary health care physicians regarding breast cancer. Most of the women said they would go directly to an oncologist if they suspected something with their breast, while some preferred a gynecologist. It was stressed that women wished that the physicians also showed more empathy and hope. It would be beneficial if primary health care physicians increase awareness of breast screening and self-examination in their patients (241). Local experts also mentioned that lack of trust in medical services within the community, particularly in rural areas, is an important challenge.
- **Lack of culture of prevention:** Local experts have pointed out a critical need to retain women who have undergone the initial screening. Culturally, people might believe that if they are not showing symptoms, there is no need to continue medical consultations. This underscores the importance of promoting consistent screenings, not just a one-time event, and instituting follow-up calls for those who have completed their initial visit.
- **Fear of having cancer:** There is a prevailing fear of receiving a cancer diagnosis, according to local experts.
- **Unclear patient navigation:** Local experts noted that the referral system needs to improve as the patient navigation for the patients who need to continue their treatment in different facilities is still not clear. Many patients were unsure about where to seek medical attention, uncertain whether to consult a gynecologist, primary care facilities, private services, or other health care providers, according to local experts.
- **Lack of training of primary care workers:** Local experts highlighted that a delayed diagnosis might, in part, be due to health care providers' unfamiliarity with alarming signs of breast cancer. Nonetheless, the training given by the Women’s Health Initiative has introduced positive shifts in this area, according to local experts. There have been numerous efforts to train primary care physicians on the best practices to conduct CBE.

Israel

The adult population in Israel exhibits a comparatively high level of general health literacy, exceeding that of many European countries (244). Approximately 70% of the population has sufficient health literacy (245). Consequently, women in Israel may be better equipped than women in other MEA countries to comprehend the importance of early detection and screening for breast cancer.

Self-examination is not encouraged (246), and instead local experts highlight that the approach to early detection is through breast cancer awareness. Women are expected to be aware of changes in their breasts and seek medical attention if needed. Local experts also shared that CBE for women in primary settings who are not at a high-risk is deemed inefficient. As described in section 6.2.2, the participation in the national screening program is high and meets its objectives.

Main challenges

- **Social stigma:** The findings of a study on the Druze minority suggest that Druze men tend to have more negative perceptions of breast cancer and are more likely to adopt these negative beliefs as their own than for Druze women (247). For instance, Druze men might feel more uncomfortable around people with breast cancer and are more likely to engage in avoidant behavior than women.
- **Lack of training of primary care workers:** A study revealed that young women (those under 40) and post-partum women often experience diagnostic delays after consulting a breast surgeon (248). Local experts stressed the importance of providing training to primary care personnel in order to identify uncommon signs of breast cancer. This is particularly crucial for young women who could potentially miss out on early diagnosis due to preventable delays caused by a lack of suspicion regarding breast cancer.
- **Shortage of breast surgeons:** Local experts further highlighted that a scarcity of breast surgeons presents an additional challenge to early detection, given that family physicians lack the authorization to directly recommend mammograms. Local experts noted the initiation of a pilot program within the HMOs to tackle this surgeon shortage, focusing on training and aiding health care professionals to streamline the process for women with suspicious symptoms.

Jordan

The JBCP is a national program under the KHCF. It adopts a holistic social and behavioral change approach that promotes breast cancer early detection at different levels starting at the grassroots level of community, to health care providers and systems, to policy and decision makers. This includes various activities to reach the community and to raise awareness both in one-to-one and group activities (249). There are three main areas (i) to raise awareness of breast cancer among the public and the communities of women, (ii) to increase skills and awareness of medical staff, and (iii) to improve availability and standards of mammography (250). Community outreach and awareness-raising efforts are conducted throughout the year. Every October, Jordan hosts a widespread campaign to raise breast cancer awareness through media, street advertisements, and educational lectures. According to local experts, awareness campaigns run throughout the entire year.

From a questionnaire study based on the answers from 400 women approached at outpatient clinics in Jordan it was found that almost all women (99.5%) had heard about breast cancer and 87% wanted to know more about it. The majority of the responders (70%) received their

information on breast cancer from media (TV, radio, newspapers and social media), while only 12% stated their main source of information were friends and relatives, 10% awareness lectures and 8% said their main source of information on breast cancer were health centers (251).

54% of breast cancer cases in Jordan were found at advanced stages (III-IV) in 2015-2016 (13). Although this number suggests that many cases are diagnosed late, local experts expressed there has been a significant improvement, in particular there has been progress in detecting early-stage cases (stages 0 and I). The proportion of cases diagnosed at late stages is currently around 40%, according to local experts, although this data is not yet published.

Surveys on knowledge, attitudes, and practices conducted continuously indicate that women's knowledge about breast cancer and the importance of early detection has improved in recent years, according to local experts. Also, experts pointed out that taboos surrounding the topic are being broken, and there is a growing interest in breast cancer awareness and participation in related activities within the community. While there is sufficient literacy and knowledge regarding breast health, there remains a challenge in translating this knowledge into practice, as the demand for services still falls below optimal levels.

Main challenges

- **Gaps between knowledge and practice:** While there is a general awareness of the importance of regular breast health checks, there is a noticeable gap between knowledge and practice. In a study spanning all of Jordan with a sample of 2,058 women, 82% acknowledged the significance of frequent self-breast exams (252). However, only 57% reported conducting one in the past month (252). Similarly, while 80% recognized the importance of CBE, just 34% stated they had undergone one in the last two years (252). The main barriers for doing CBE and mammography were absence of symptoms (252).
- **Low health literacy:** A study conducted at two cancer centers in Jordan with data from 2012-2014 showed that the mean presentation time (time between symptoms' appearance and first consultation) for breast cancer was 201 days (median 30 days). About 30% had a delay in presentation (253). However, recent studies and observations from local experts indicate a notable improvement in breast cancer awareness. A 2018 study revealed that 44% of the women surveyed demonstrated good to excellent knowledge regarding the signs and symptoms of breast cancer (254). Also, underscoring this progress, a 2021 survey by the JBCP conducted after an awareness campaign revealed that only 6% of respondents were unaware of any breast cancer detection methods (255).
- **Lack of training of primary care workers:** In the study cited previously for 2012-2014, 17% of the women who had attended a medical visit were misdiagnosed with other conditions than cancer or told by their physicians that the symptoms were benign (253).
- **Unclear patient navigation:** The fragmented nature of the Jordanian health system poses challenges in patient navigation and clarity in the health care journey, according to local experts.
- **Out-of-pocket payments for medical consultation:** Local experts noted that affordability is another issue, even if the services are partially covered by insurance, there are still costs that women have to bear.

Morocco

To raise awareness about breast cancer, a nationwide campaign is held every October. This campaign utilizes various mediums such as posters, billboards, radio, television, print media,

and social media. Its impact can be seen in the participation rate for non-organized screenings offered across the country. Data from 2016 showed that 52–87% of the screenings performed at primary health centers during this year were registered during the post-campaign months (November and December) (256). Nevertheless, a study at the two largest public oncology centers in the country, the CM-VI and INO, with data from 2008 to 2017 found that of the patients in the study, 97% were symptomatic at the time of diagnosis (154).

Main challenges

- **Lack of training of primary care workers:** A study conducted at the University Hospital of Rabat assessed breast cancer knowledge among nurses and physicians (257). While all the physicians demonstrated satisfactory knowledge, with 47% exhibiting excellent knowledge, the results for nurses were more varied. Only 43% of nurses showed good knowledge, and 57% had limited understanding. Interestingly, none of the physicians, but 60% of the nurses, believed that prayer alone could cure breast cancer without the need for medical therapy. Ensuring a high level of knowledge among health care professionals is crucial, as it directly impacts the information relayed to patients about symptoms and screening recommendations. Though this study dates back to 2011 and the situation may have since evolved, local experts still raise concerns. They suggest that some health care workers might lack the training to identify specific breast cancer cases, such as misjudging young symptomatic patients as being too young for the disease.
- **Out-of-pocket payments for medical consultation and geographical distance:** In a study with data from 2012 to 2013 on patients with breast cancer (N=130) treated at the hospital CHU Mohammed VI in Marrakech it was shown that 63% waited more than six months from the first signs to the diagnosis, with a mean of 8.5 months. Reasons for this delay were among others: lack of financial means (40%) and geographical distances (23%) (258).
- **Reliance on traditional medicine:** In the same study, sociocultural beliefs using traditional treatments first (20%) were the third most common reason for patients to delay seeking medical care (258).
- **Delays in seeking care:** A study of 2,120 breast cancer patients from two prominent oncology centers revealed that the median time between the appearance of the first symptoms and the initial medical consultation ("access delay") was 6 months (154). Moreover, for 30% of these patients this interval exceeded 12 months. Notably, the access delay was significantly reduced during the 2013-2017 period compared to 2008-2012, likely due to the impact of awareness campaigns and the national screening program.
- **Continuity of breast cancer awareness throughout the year:** Local experts pointed out that both the Lalla Salma Foundation and the MoH conduct regular campaigns throughout the year to raise awareness about women's health. However, some other experts argued that these efforts are insufficient, emphasizing the need for a stronger and more consistent approach throughout the entire year.
- **Low health literacy:** Based on the results from interviewing 150 women in rural areas in the province of Taounate showed that even though 77% of the women stated they had received information on breast cancer, only 31% of all the women responded correctly to at least half of the questions on cancer risk, symptoms, and detection. The weak knowledge was partly explained as an effect of the women participating not having an education and not working professionally. The main source of information on breast cancer was medical staff, and the second source was television. Six out of ten

women (63%) in the study answered that they self-examined their breast. One conclusion from the study was that there is a need for better information and motivation for women on breast cancer (259). Another study conducted by the National Institute of Oncology in Rabat, involving 200 participants, found that the number of days taken by patients to seek medical help was longer than the health system delay (260). The median patient delay for women to seek help was 65 days. Women from lower socioeconomic groups, living in rural communities, being illiterate, and having low health literacy on breast health had a significantly higher chance of experiencing total delays (patient plus health system) of more than 4 months.

- **Shortage of primary care workers:** Local experts mentioned that a major challenge lies in ensuring the availability of human resources as there is a shortage of health care workers. By the end of 2021, the number of health workers per 1,000 people was only 1.64, falling far below the minimum requirement set by the United Nations to achieve sustainable development goals, which is 4.45 health workers per 1,000 people (261).

Saudi Arabia

In the National Cancer Control Plan for 2014-2025 it was stated that approximately 50% of breast cancer cases get diagnosed in advanced stages (186). However there has been an important decline in the number of regional and distant breast cancer cases diagnosed since the early 2000s, alongside a significant increase in localized cases (262). This positive shift towards early detection can be attributed to various factors, such as the modernization of the country, which has led to improved health awareness among the general population, accompanied by a trend of urbanization (262).

In addition, numerous initiatives have been implemented to raise breast cancer awareness, further supporting the improvement in early detection. In 2012, the Ministry of Health launched the Breast Cancer Early Detection (BCED) project on a national scale (262). According to local experts, self-examination is promoted through awareness campaigns and sometimes by GPs or gynecologists as well. Also, local experts noted that many diagnoses are made in October, when there is a discount on screening mammography services in the private sector.

Main challenges

- **Lack of awareness**: In a study of female teachers (N= 316) performed during 2019 and 2020 in Buraydah, fewer than half (43%) said they performed breast self-examination, while 10% went to a clinic for their examination (263). Among the main reasons for not performing self-examinations were ignorance of the examination (263). Local experts also identified this challenge as a contributing factor to delays in diagnosis.
- **Fear of having cancer:** In the study cited before, 25% of female teachers said that they did not performed self-examinations due to the fear of discovering tumors (263).
- **Language barriers:** In a study, the difficulty to speak with foreign health care professionals was cited as one of the main barriers (264).
- **Difficulties in system navigation:** According to local experts, early-stage breast cancer diagnosis is more common in the private sector, while later-stage diagnoses occur more frequently within governmental facilities, possibly due to system navigation challenges of local citizens with lower socio-economic status rather than symptom awareness.
- **Social consequences**: Studies have also shown fears associated with cultural and community barriers (e.g. shyness and embarrassment) (264). Also, local experts noted that cultural stigma around breast cancer diagnosis contributes to delays in the detection.

- **Low health literacy:** While there is a positive attitude towards breast self-examination, there remains a significant deficit of health literacy regarding breast health. For example, a study in Jeddah showed that 97% of participants recognized the importance of early detection for improving survival chances (265). Surprisingly, although the majority of participants had a bachelor's degree, 92% were considered to have inadequate knowledge about the symptoms and risk factors of breast cancer.
- **Lack of training of primary care workers:** A 2013 study involving female medical students from Taif revealed that only 8% possessed comprehensive knowledge about breast cancer and self-examination (266).
- **Socioeconomic disparities in self-examination:** In a 2013 study with a representative sample, women with lower educational levels and belonging to a lower socio-economic group were less likely to self-examine their breasts compared to their more affluent counterparts (267).

South Africa

It is recommended that all women over the age of 40 who visit a primary health clinic for any reason receive a CBE called PISCBE (Provider Initiated Screening Clinical Breast Exam) (268). If any abnormality is detected, women should be referred to a regional breast unit for further evaluation. Additionally, every primary health care facility should prioritize breast health education. This ensures women are well-informed about breast cancer and the significance of routine screenings.

Local experts underscored that traditional healers often serve as the first point of care for many patients. They also highlighted the advantages of incorporating traditional healers into the health care system. Such integration can help ensure a more seamless transition for patients who are transitioning from traditional diagnostic approaches, framing it as a 'complementary' rather than an 'alternative' method.

Local experts noted the importance of customizing breast cancer care solutions to the current landscape. They observed the rise in urbanization, enhanced accessibility to technology in urban regions, and a demographic that is both aging and increasingly tech-savvy. Such trends suggest opportunities to leverage technology in urban settings for more effective breast cancer awareness and early detection.

Main challenges

- **Geographical barriers:** Geographical proximity to health centers can have a significant impact on breast cancer staging at diagnosis. Research indicates that women living more than 20 kilometers away from tertiary health centers are more likely to be diagnosed with advanced stage breast cancer (stage III/IV). In fact, a study found that 62% of patients residing further from the center were diagnosed with late-stage breast cancer compared to 50% of those living within 20 kilometers (269).
- **Transportation barriers:** Building on the previous challenge, local experts identify transportation as a primary obstacle to early breast cancer detection. Informal surveys conducted at Tygerberg Hospital in Cape Town indicate that transportation is the foremost barrier to care.
- **Low utilization of health care services:** In some regions, women with non-communicable diseases report low utilization of health care services, like in the Sowetan region (269).

- **Unclear patient navigation:** Local experts have pointed out that the provinces have different access points, and the evaluation also varies between the private and public sectors. This lack of standardized access and evaluation is a significant problem as women frequently struggle to identify where they should seek care, resulting in delays. According to local experts this challenge extends beyond the public sector, even women with private insurance face difficulties in pinpointing their access points for screening.
- **Low health literacy in some communities:** One study in the rural community of Makwarani showed that 69% of women in the sample had never heard of breast cancer and 95% had never heard about breast cancer diagnostic checks (270). However, local experts emphasized that women are in general aware of the need of having CBE and mammography, signaling that this is probably an issue of specific communities.
- **Insufficient early detection education given in health care facilities:** In the same study cited previously only 14% of the women in the sample had received information in health facilities, the rest mainly from the media (270).
- **Reliance on traditional medicine**: In some rural communities, traditional healers may be consulted prior to attending to a health center (269). Some local experts shared success stories about the incorporation of traditional healers into care teams in clinics. This has helped enhance access and also to integrate cultural awareness within the health care system. One of its challenges, however, is that traditional medicine often entails a significant out-of-pocket expense.
- **Rising preference for complementary medicine**: Local experts have observed a growing trend where individuals, particularly young, educated women in the private sector, are increasingly turning to complementary medicine before seeking conventional medical care.
- **Difficulties to take time off for examinations**: The ability to access health care in a timely manner is often influenced by economic factors. Local experts note that patients frequently postpone seeking health care because they cannot afford to take time off from work and need to continue earning money.
- **Fear of social consequences:** Due to the fear of social stigma, certain women may postpone seeking medical attention for themselves, because if they are diagnosed with breast cancer, their daughters are believed to be at risk of developing breast cancer too (270).

Türkiye

Public health centers provide training and guidance to encourage women to conduct monthly self-examinations once they turn 20 years old (271). Women between the ages of 40 and 69 are recommended to undergo CBE once a year and mammography every two years (271). A study found that the mean time for a woman to seek medical care when finding breast cancer symptoms is almost 5 weeks and considered it to be an average of developed and developing countries (272).

Main challenges

- **Gaps between knowledge and practice:** According to a study, the rates of breast self-examination in Türkiye are high, with around 80% of women performing it (273). However, the same study found that the self-examinations were not being adequate, for instance, they were not performed as regularly as recommended (273). Another study found that even if women had sufficient knowledge on breast cancer, this does not necessarily translated into regular screening with mammography or regular breast

self-examination (274). In the study, less than 1% of women performed the self-exam correctly (274).

- **Low awareness:** A study revealed that the primary cause for delaying medical care was patients ignoring symptoms, a trend particularly correlated with being in the younger age group of 30 to 39 years (272). Also, local experts have identified low health literacy and a lack of awareness regarding the importance of self-examination as major obstacles to early detection.
- **Long waiting times:** Local experts noted that patients face difficulties in securing an appointment at health clinics when experiencing symptoms, particularly in the public sector.

UAE

In the past, there were limited clinics or primary care centers offering mammography in semi-urban and rural areas, according to local experts. As a result, women from these regions frequently traveled to urban centers for these procedures. However, today, both private and governmental organizations, including initiatives like the Pink Caravan, are actively working to extend these screenings to rural locales, delivering services directly to women where they live. This development represents a significant advancement in overcoming geographical barriers and ensuring widespread access to crucial health screenings. Experts noted that all local citizens (Emirati) across the UAE can access screenings. Expatriates, on the other hand, can access them after obtaining a health card and making the necessary payment.

Main challenges

- **Low health literacy regarding symptoms:** In a study examining delays in seeking health care, some women reported having painless breast lumps. Their lack of concern was primarily due to the absence of pain (93). Local experts further emphasized that some women tend to self-diagnose, mistakenly believing they do not have cancer.
- **Social consequences:** The study cited above reached the conclusion that women were expected to suffer in silence and behave as role models for others (93). Concerns about societal perceptions of women with breast cancer and the pressure to conform to community standards played a more significant role in decision-making than the actual fear of death from breast cancer (93). Local experts also noted that some women delay screenings due to feelings of shame or fear of social judgment, with concerns such as being ridiculed or viewed as having “bad karma”. Women might also worry about potential rejection or divorce from their spouse due to their diagnosis, which according to local experts has been observed in some cases.
- **Unawareness of health services:** Local experts noted that new expatriates are sometimes unaware of the available health services in the UAE.
- **Fear of having cancer:** Local experts indicated that many people still harbor misconceptions about breast cancer, often perceiving it as an inevitable death sentence. However, initiatives such as FOCP are working to dispel these myths, emphasizing through their campaigns that breast cancer is a treatable disease, particularly, when diagnosed early.
- **Difficulties for getting an appointment:** Local experts indicated that securing an appointment at a health clinic can be challenging for women exhibiting symptoms. A study conducted in 2010-2011 at the Tawam Hospital showed that the time interval between initial breast cancer symptoms and seeking medical help was between three months to three years (275).

6.2 Screening programs

Breast cancer screening programs aim to test asymptomatic women within specific age groups at regular intervals. The primary goal is to identify cancer in its early stages, thereby reducing the mortality associated with late-stage diagnoses (276). In the MEA-9 countries, breast cancer screening is practiced to varying extents in all countries; see Table 8. Country-specific screening programs and their challenges are described below.

Table 8: Early detection programs for breast cancer

Country	Year of launch	Type of organization	Target group	Interval	Test method	Source
Algeria	2018 (Pilot in 7 provinces)	Non-organized	Women aged 40-70	Unknown	Mammography	(197, 277, 278)
Egypt	2019	Non-organized	Women aged ≥35	1 year	CBE and mammography	(279)
Israel	1995	Organized	Women aged 50-74	2 years	Mammography	(280)
Jordan	2006	Non-organized	Women aged ≥40	1-2 years	Mammography and CBE	(65, 281)
Morocco	2010	Non-organized	Women aged 40-69	2 years	CBE	(256)
Saudi Arabia	N/A	Organized*	Women aged 40-69	2 years	Mammography	(282)
South Africa	2017	Opportunistic	Women aged ≥40	6 months	CBE	(190)
Türkiye	2004	Organized	Women aged 40-69	2 years and 1 year for CBE	Mammography and CBE	(283)
UAE	N/A	Non-organized	Women aged ≥40, or younger with a family history of cancer	2 years	Mammography	(195, 284)

Notes: * According to local experts, women are not actively invited, yet the program is usually referred to as being “organized”.

In the MEA-9, awareness of symptoms to facilitate self-initiated detection is critical as most countries lack effective screening programs. Studies conducted in the region, such as in Jordan, have revealed that approximately 95% of breast cancer cases are diagnosed after women have already begun experiencing symptoms (253). In Türkiye, a study found that close to 70% of women were diagnosed after getting symptoms (272). In comparison, in Europe half of all new cases are self-detected and half are detected through organized screening (285). The lack of organized screening programs and/or low participation in these programs in MEA-9 also contributes to the high percentage of cases diagnosed at advanced stages; see Figure 22 at the beginning of chapter 6.

Several factors determine the quality and success of a breast cancer screening program:

1. **Test method**

The method has to be safe and effective. The effectiveness depends on the accuracy of the screening method. Accuracy is judged by having a high sensitivity (i.e., as few people as possible with the disease get through undetected) and high specificity (i.e., as few people as

possible without the disease are subject to further diagnostic tests) (286).[3] The main methods used for breast cancer screening are the following:

- **Mammography**: it is the primary tool to screen for breast cancer using mammography machines by doing an X-ray of the breasts; see more in section 7.1.
- **CBE**: it is a physical exam performed by a health care professional who has received training to perform it.

Mammography is the only breast screening method with substantial evidence supporting its effectiveness in reducing breast cancer mortality in large-scale programs (276, 287). Population-based mammography screening demands more resources, necessitating additional radiographers, radiologists, facilities, and equipment (288). Yet recent advances with the use of artificial intelligence (AI) supported imaging analysis for mammograms have been shown to reduce the need for radiologists (289). Nevertheless, in low-resource settings where the health system lacks the capacity for mammography screening, population-based mammography is not recommended (276). Instead, CBE is alternative with sufficient evidence of shifting the stage distribution of tumors detected towards lower stages in low-resource settings (276). Given the diverse economic and health care landscapes of countries in the MEA-9, it is imperative to thoughtfully evaluate which early detection techniques to adopt. Such a decision should consider the evidence supporting the effectiveness of interventions, the necessary resources for their implementation, and their accessibility in each country.

2. **Type of organization**

Breast cancer screening programs vary widely in their organization, scope, and approach, reflecting the diversity in health care systems, resources, and priorities of different regions or countries. Main types are the following:

- **Organized population-based programs:** They target a healthy segment of the population eligible for breast cancer screening, using active invitations and call-recall systems to promote participation. Invitation efforts are centralized and underpinned by centralized quality assurance (287). The WHO emphasizes that only organized screening programs are likely to be fully successful in reaching a high proportion of the at-risk population (290).
- **Non-organized programs:** These programs identify a specific segment of the population that is eligible for breast cancer screening, and women within this segment have the right to request and receive screening. In non-organized programs, women independently seek screening based on their own concerns or perceived risk factors.
- **Opportunistic programs:** Sometimes considered a subtype of a non-organized program, opportunistic programs offered women without symptoms of breast cancer when they seek health care services for reasons unrelated to cancer. Women are not systematically invited to screen at certain intervals and there are no standardized protocols (287).

3. **Target population**

The target population should be a population segment that has an increased risk of developing a certain cancer type. It should neither be defined too broadly nor too narrowly. The WHO

[3] The accuracy is determined by the frequency of both false positive diagnoses (i.e., detection of a cancer that does not exist; type I error) and false negative diagnoses (i.e., failure to detect an existing cancer; type II error).

recommends prioritizing women aged 50 to 69 (287). In some high income settings, organized screening programs have extended their target group to both younger and older women, targeting women aged 45-74 years (287, 291, 292). Given the earlier onset of breast cancer in the MEA-9 region (293, 294) (295), there has been advocacy for the inclusion of younger age groups in countries like Jordan and the UAE (65, 296). Therefore, the starting age in most MEA-9 countries is at the age of 40 as shown in Table 8.

4. **Screening interval**

If the interval between two screening sessions is too short, it will lead to high screening costs with no additional patient benefits. If the interval is too long, screening will fail to detect many cancers at an early stage. Depending on the test method, the interval for breast cancer screening is usually every one to three years (297).

5. **Public information campaigns**

They are intended to raise awareness and to inform people about the availability and benefits of screening. Information campaigns have been shown to be a powerful tool to promote and increase the utilization of screening services by lowering peoples' reservations and concerns about it (298, 299). The main breast cancer awareness campaigns occur in October (288).

6. **Follow-up actions**

Mechanisms for referral and treatment of abnormalities have to be put in place (290). There is little sense in spending money on screening unless all patients with a diagnosis are offered appropriate treatment.

7. **Coordination and quality assurance of activities across the entire pathway**

A quality control system to manage and monitor screening tests and clinical quality is essential (300). This requires an information system that can send out invitations for initial screening, recall individuals for repeated screening, follow those with a positive diagnosis, and monitor and evaluate the program. Some examples of KPIs used in quality assurance of breast cancer screening are participation rate, examination coverage, further assessment rate, and detection rate (286).

8. **Inclusion of all population segments**

Refugees and displaced populations face barriers in accessing breast cancer prevention services and cancer care services in general, worldwide as well as in the Middle East (301, 302). The most prominent barriers are costs for services and transportation, difficulties in navigating the host country's health system, lack of knowledge on cancer, and social stigma (301).

6.2.1 Overview of the main challenges in the region

The subsequent section provides an overview of the state of breast cancer early detection and screening efforts in each country. It describes the primary challenges to effective screening, as identified in the literature and by local experts. Figure 26 summarizes common challenges across countries.

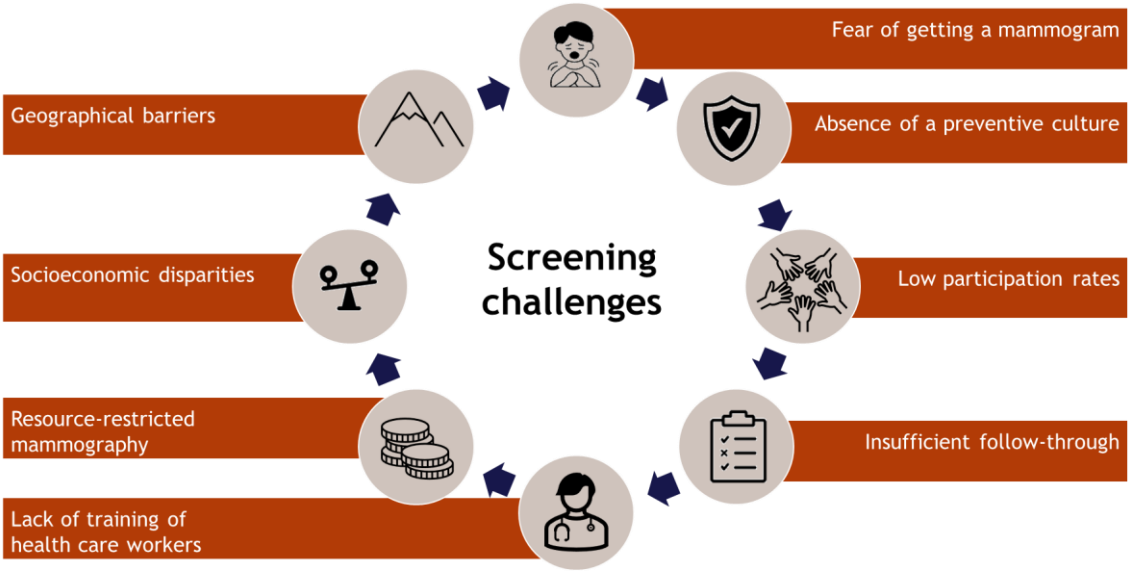


Figure 26: Challenges with screening programs in the MEA-9 countries.

6.2.2 Country-specific status and challenges

Algeria

In line with the national cancer plan for 2015-2019, pilot projects focused on organized breast screening programs were initiated in 2018 across seven selected provinces (303). As of 2023, a comprehensive nationwide screening program has still not been fully implemented. Even though there is an active steering center dedicated to the program's expansion, it is anticipated that achieving full operational status will take time. In parallel, the government is working on procuring the necessary equipment for the designated screening centers. Despite the absence of a countrywide organized program, progress in the early diagnosis of breast cancer has been made over time. Upon detection, the median tumor size was 9 cm in 2000, 7 cm in 2005, and in 3 cm in 2020, with fewer than 20% of women now presenting with metastatic breast cancer at diagnosis, according to local experts.

Main challenges

- **Lack of guidelines:** There are no established or widely agreed-upon set of guidelines or procedures in place for conducting breast cancer screening within the country (304).
- **Low participation rates:** Local experts noted that screening participation rates were low. This was especially evident among women from rural communities. According to local experts, the current diagnosis rate through these screening efforts stands between 10-20%. For this reason, the majority of cases are detected in women with symptoms.
- **Geographical barriers:** Mass screening at health facilities will only work in urban areas, whereas mobile teams would be needed to cover women living in isolated areas. Opportunistic screening occurs in women with personal risk factors and/or a family history of cancer, but this is mainly offered in urban areas and attracts women from higher socio-economic layers, according to local experts.

Egypt

Until 2019, breast cancer screening was only organized by NGOs which captured a few thousand women according to local experts. In July 2019, the “Women’s Health Initiative” was launched

to establish a countrywide breast cancer screening program (179). The initiative offers free screening to women aged 35 or older, which corresponds to around 28 million women (279, 305). CBE is used as a screening method. The initiative was implemented in three bi-monthly phases over the whole country. By 2020, 8.5 million women underwent screening (279). By 2023, this number had risen to 33 million (306).

The program is coupled to a referral system that guarantees screened women with a positive diagnosis access to treatment at MoHP hospitals. According to local experts, the program is now an ongoing continuous one with recurring annual visits for CBE. Women screened since program launch are given future appointments. The program is fully funded by the MoHP and is designed to be a sustainable program with secured funds rather than a short-lived initiative.

One clear indicator of the program's success is the downstaging of breast cancer. A meta-analysis gathering studies with data from the beginnings of the 2000s until 2015 found that more than half of diagnosis (56%) were made in stage III and IV (227). By 2023, that number dropped to 30% of all diagnoses made through the program (306). The proportion of women in the target age that were examined between July 2019 to June 2021 was 57%. The program has enhanced radiology and pathology laboratories, further explained in section 7. Also, by February 2023, the campaign had trained over 17,500 health care professionals (307).

Main challenges

- **Diversity of data:** Local experts highlighted challenges in establishing benchmarks and comparing data to monitor progress. This difficulty arises from the heterogeneous nature of participants in the campaign. Some women underwent screening as a preventative measure, while others joined the program after noticing symptoms. Moreover, comprehensive details about the participants remain to be fully understood. For example, when considering re-examination rates, it is unclear what percentage represents women undergoing annual check-ups, those with a family history of breast cancer, or those who returned due to mammogram findings.
- **Insufficient follow-through:** While around 8.7 million women have received re-examination services (134), there remains a gap in maintaining consistent communication with them. Local experts have noted that while the initiative is in the process of implementing an outreach system via SMS or phone calls, this system is not yet fully operational, potentially leaving many women without timely reminders or follow-up information.

Israel

The national breast cancer detection program started in 1995, providing regular mammograms every two years to women aged 50 to 74 with an average risk of breast cancer (280). For those at increased risk (according to experts, women with a lifetime risk of over 20%), there is a different follow-up plan, including MRIs and shorter intervals between mammograms. For instance, women over 40 years with a high-risk are eligible for annual mammograms (280). Local experts noted that women usually receive invitations from their HMOs for mammograms, and there is flexibility for women over 45 to request covered mammograms from their HMOs.

The screening program is regularly monitored for quality control. Between 2015 and 2019, the participation rate in the program remained steady at approximately 70%, which was the intended target (280). Some sources estimate that half of all breast cancer cases get diagnosed through the population-based screening program (308). Local experts estimate that many more

cases are diagnosed within the screening program (approx. 80% of the cases in the target age group).

Local experts mentioned that certain populations in Israel, such as Muslim Arabs, Yemenite Jews, and North Africans, experience a notably earlier average age of breast cancer onset compared to Western societies. Consequently, they emphasize the significance of enhancing and exploring risk stratification methods for screening protocols.

Main challenges

- **Absence of a preventive culture:** Although the one-time screening participation rates have met the national targets, the rates of repeated screenings fall short of the established targets (280). This suggests a lack of sustained commitment from women to participate in ongoing screening over time.
- **Disparities between ethnic groups:** Screening participation rates vary across different ethnic groups. The Arab-minority group shows lower breast cancer screening participation rates with 64.8% compared to Jewish women with 78.2% (309). Local experts said that there have been numerous webinars and campaigns conducted in Hebrew, but there is a lack of such resources available in Arabic, mainly because not every medical center serves a substantial Arab population.
- **Disparities between religious groups:** Research suggests that there are significant differences in breast cancer screening rates among Jewish women based on their level of religiosity. According to a study, ultra-orthodox Jewish women had substantially lower participation rates with only 50.7%, compared to other less religious Jewish women with 78% and non-religious Jewish women with 81.4% (309).
- **High recall rates:** The recall rate for tests was found to be up to three times higher than the target (280). Overuse of additional tests may indicate potential technical failures that could lead to overdiagnosis of breast cancer. Overdiagnosis occurs when abnormalities are detected that would not have caused harm to the patient if left untreated, resulting in unnecessary treatments. This is a concerning issue as it can lead to increased health care costs and unnecessary stress and discomfort for women.
- **Age interval might not be wide enough:** According to local experts, women of average risk who are under 45 or above 74 years old are not eligible for subsidized mammograms. With increasing life expectancy, this could potentially become an issue in the future.
- **Geographical barriers:** Local experts mentioned that access to mammography screening is lower in rural areas.

Jordan

The JBCP is a national early detection program, (65). It leads and coordinates breast cancer early detection efforts including improving and providing universal access to mammography for all women aged 40 years and older. National guidelines recommend a CBE every year for women aged 25 years to 39, and a mammogram along with a CBE every year for women aged 40 and older (13, 252). The decision to start screening with mammograms at 40 was based on the fact that approximately half of the women in the country are diagnosed before age 51 (65). For women of all ages with an elevated risk of breast cancer, a variety of recommendations are in place, such as clinical check-ups every 6 to 12 months, an annual mammogram, a suggested annual breast MRI, the consideration of strategies to reduce risk (13).

The JBCP stands on three foundational pillars. First, it emphasizes the importance of early detection by ensuring the availability and accessibility of quality detection services across both public and private health sectors. This includes collaboration for the provision of breast imaging units, training programs for health care professionals, and the development of national screening guidelines, with a shift towards starting biannual screenings at 40 years. Local experts highlighted that so far, 40 breast imaging units have achieved accreditation, and 69 out of 90 have seen upgrades. The second pillar is geared towards raising awareness and altering societal perceptions of breast cancer through diverse strategies like mass media campaigns, community interactions, and leveraging a network of 120 community health educators. The final pillar underscores the significance of shaping an environment conducive to combating breast cancer by focusing on advocacy, policy formulation, and research.

According to local experts, screening services, including CBE and mammography, are provided for free to insured women. Subsidized fees for screening are also offered in private facilities to address affordability issues, according to experts. In October and November all JBCP partners from private facilities offer discounts for breast cancer imaging units. Additionally, to reach women in remote areas, the program operates two mammography mobile units in collaboration with the MoH and the KHCC that visit underserved and underprivileged communities to provide early detection services (310).

A study with data from 2012-2014 found that about 95% of breast cancer cases are diagnosed after symptomatic presentation (253). Local experts note that the situation has improved. In the last 5 years, local experts have noted a rise in stage 0 case diagnoses, signaling notable progress. Diagnosing women at stage 0 suggests they are being identified through screening rather than symptom presentation. The JBCP strives to foster a shift in societal attitudes by engaging the entire community, not just women. For example, there is an emphasis on encouraging men to recognize the importance of ensuring their loved ones access the routine screening tests.

Main challenges

- **Low participation rates:** In a study conducted with 2,058 women across, about 50% were familiar with mammography screening (254). However, only 27.5% of women aged over 40 reported having undergone the procedure in the past 5 years. Another study found a similar screening rate with mammography for the targeted age group, around 22% (311).
- **Absence of a preventive culture:** In that same study conducted across Jordan, the primary reasons cited for not undergoing mammography was that 64% of women felt no symptoms (254). The absence of a preventive culture also affects health care providers that sometimes fail to suggest screening for women who seem healthy. In the aforementioned study, 80% of the women reported not receiving recommendations from their physicians to undergo screening. Although it is worth noting that this study also encompassed women outside the targeted age range for mammography (254).
- **Out-of-pocket payments for screening:** The above mentioned study also found that costs associated with screenings were cited as a barrier by 9% of the study participants (254). For those without insurance, the mammography cost stands at $69. Given that the average family income is $639 per month (249), this cost can be prohibitive. This financial obstacle may be a contributing factor to the fact that only 13,000 women, or 1.1% of the eligible population, have undergone screening (249).
- **Geographical barriers:** Access to screening is low in underprivileged areas. However, two mobile mammography units are available (65).

- **Fear of having cancer:** Fear of having cancer is a detractor for undergoing screening according to different studies (254, 312). Local experts also noted that on the community and cultural side, fear of the test results is a common barrier.
- **Fear of getting a mammogram:** Local experts have observed that fear of the test itself, not just the fear of diagnosis, is a common factor discouraging individuals from undergoing screening.

Morocco

The National Breast Cancer Screening Program was established in 2010, initially targeting women aged 45-69 years but later expanded to include those aged 40-69 years (256). As part of this program, women are invited to undergo CBE when they visit primary health care centers (256). Each of the primary care centers has an annual target of exams to reach. CBE is performed by trained nurses, midwives, and GPs, who then refer women with positive screening results to one of the country's 27 early detection centers for further assessment, including digital mammography. According to experts, early detection and initial diagnosis at primary care centers are provided free of charge. The Cancer Screening in Five Continents project by the IARC reports a screening coverage rate of 56% (313), which is slightly below the annual target of 60% (256).

Main challenges

- **Resource-restricted mammography**: The detection rate of breast cancer in the screening program is significantly lower compared to mammography screening and CBE-screening in high-income countries (1/1000 in Morocco versus 5-6/1000 in the United States and Europe) (256). This difference can be attributed in part to the lower sensitivity of CBE compared to mammography. In addition, data show that the positivity of CBE and detection rates of breast cancer vary between the regions in Morocco. This shows the need to increase knowledge through annual refresher trainings and ensuring that all providers are certified (256).
- **Lack of training of health care workers:** The formal training of providers of the CBE (GPs, nurses and midwifes) at the primary health centers lasts for 4 days. However, it is described as non-structured, and there is no available certificate to verify participation in the 4-day training. Additionally, supervisory visits revealed instances where some nurses and midwives performed CBE without formal training. Instead, they received non-formal training from GPs within the same primary health center. A study involving focus group discussions with these service providers suggested the need for periodic refresher training (256).
- **Gaps between knowledge and practice:** In a separate study with 2,011 participants, GPs displayed good awareness of the importance of early breast cancer detection (314). However, the actual systematic practice of CBE was found to be low, with only 18% of physicians in the sample performing it regularly for all patients in the target age group.
- **Insufficient follow-through:** There is no mechanism to identify and invite eligible women, so the program operates in an opportunistic way meaning that only women without symptoms attending health care services for reasons unrelated to breast cancer get the opportunity of a CBE (256, 313).

Saudi Arabia

The national screening program offers mammography for women aged 40-69 years every two years (315). There are designated hospitals and primary care centers by the MoH to perform the screening across the country (282). Mammography has been available in all regions since

2005 and a nationwide breast cancer screening center was established in Riyadh in 2007 as well as a regional mammography screening program in Al Qassim in 2007 (316). Participation in screening has been low in the past, with 92% of women in a representative sample in 2013 reporting that they never had received a mammogram (267).

Main challenges

- **Low participation rates:** A study among female employees of King Saud University aged 40 years and above showed that 51% reported intending to undergo mammography; however, only 19% actually received a mammography (317). Local experts noted that in part low participation rates are due to lack of encouragement from GPs and nurses to participate in screening.
- **Fear of having cancer:** In a study of the main barriers to participate in mammography, the lack of coping skills regarding the examination results was cited as a reason (317). One study conducted at 12 primary care centers, both rural and urban ones, found that the main reasons for women >30 years (N=816) not participating in free of charge breast cancer screening were personal fears (e.g., fear of physicians, examiners, hospitals and the fear of results and consequences) (264). Of all participants only 16% had been screened for breast cancer previously, either via mammography or CBE.
- **Lack of clear follow-up:** According to local experts the follow-up procedures for positive cases remain unclear (e.g. being recalled for another screening). It is possible that there is probably no established pathway for them.
- **Absence of personalized invitations:** According to local experts, invitations are not sent out to invite individual women for screening, however, there are awareness campaigns.
- **Lack of trust in health care workers:** In a study, several women who chose not to participate in screening cited their lack of confidence in radiologists as a reason (317).
- **Geographical barriers:** Access to screening is low in rural areas, according to local experts.
- **Socioeconomic disparities:** Research has shown that a woman's level of education significantly influences her likelihood of undergoing mammography. Women with lower education tend to have a reduced likelihood of participating in screening (264). Additionally, those with lower monthly family incomes are less likely to engage in screenings. In a 2013 study with a representative sample, women with lower educational levels and belonging to a lower socio-economic group were less likely to get a mammogram compared to their more affluent counterparts (267).

South Africa

Only opportunistic screening with mammography exists in major centers, with the NDoH recommending regular CBE at district clinics and by general practitioners. The NDoH promotes the Breast Cancer Awareness Month to encourage women to perform regular self-exams and regularly go for further screening (318). In an effort to adopt a patient-centered approach and promote cost-effective health care screening, the NDoH has taken steps to address the multifaceted aspects of health conditions. When a woman visits a health care facility, it is recommended that both breast and cervical examinations are conducted. The current patient risk assessment method is commonly known as the 'High-5 Method.' During their routine six-month check-ups, patients are encouraged to report on five questions, including whether they have performed a breast self-exam (319). If there are any signs or indications suggesting the possibility of breast cancer, the course of action is determined by the level of suspicion:

- In cases where there is a strong suspicion of malignancy, an urgent referral for the patient is initiated.
- When there is an intermediate level of suspicion, it is advisable to make an early referral within 21 days.
- For situations where there is a low or negligible suspicion, a routine referral is scheduled within 60 days.

The Cancer Association of South Africa (CANSA) advises women aged 40 and above to undergo annual mammograms, while those over 55 are recommended to have a mammogram every two years (320). Women can undergo screening at public hospitals or through the Radiological Society of South Africa, and a physician's referral letter is not required in principle (320).

The NDoH recommends women at a high risk of developing breast cancer to follow a different set of recommendations that include getting an annual breast MRI in addition to mammography and CBE. This category comprises women with confirmed BRCA mutations, first-degree relatives of BRCA mutation carriers, women who underwent chest radiation therapy in their youth, and those with other genetic mutations (268).

Main challenges

- **Resource-restricted mammography**: Due to limited resources and infrastructure in the public health care system, population-based mammography is not used for screening purposes. Screening with mammography is recommended for symptomatic patients or high-risk populations who can be screened in specialized breast units (190).
- **Lack of funding:** There is no dedicated budget for the screening program (190). Also, local experts noted that the integration of breast cancer screening in the High-5 imitative is difficult due to high patient volume and limited resources.
- **Low utilization of mammography screening in the private sector**: Local experts explained that in Discovery, a leading well-known medical aid provider, only 24% of women who were eligible to have a mammogram screening actually took advantage of this opportunity.
- **Disparities:** Local experts shared that despite the robust policy for breast cancer control, there are significant gaps in its practical application due to discrepancies between the 9 provinces, rural vs. urban settings, and public vs. private health system.
- **Lack of training of health care workers:** Local experts have pointed out that in rural areas, health care providers may lack the necessary knowledge to detect breast-related issues unless the symptoms are highly noticeable.

Türkiye

Since 2004, an organized screening program has been available in Türkiye that offers mammography every two years to women aged 40-69 years (283). In recognition of the fact that almost half of breast cancer diagnoses occur in women under 50 years, the MoH changed the original age group for screening from 50 to 69 years to 40 to 69 years (231). The Cancer Early Diagnosis, Screening, and Training Centers (KETEM), in collaboration with community health centers, execute early diagnosis and screening programs, including the "Mobile Mammography Project". There are a total of 331 cancer screening centers in Türkiye, with 42 of them being mobile (271). The MoH offers various initiatives to create awareness of the program, such as media mass campaigns, a dedicated website, and social media platforms (283). The eligible population is invited to screening by SMS and phone calls (283). The aim of the NCCPs from 2009 and 2013 was to achieve a breast cancer screening rate of 70% in the

target population, whereas the NCCP from 2021 no longer explicitly mentions the 70% benchmark (191-193).

Main challenges

- **Low participation rates:** The proportion of women aged 50–69 who were screened with mammography in the past 2 years in 2019 was close to 36% and in 2020 it decreased to 27% (321). These numbers are well below the 70%-aim specified in the NCCPs from 2009 and 2013. Also, studies have shown that even if women are aware of the importance of breast cancer screening this does not necessarily translates in higher participation rates for screening. For instance, a Turkish study found that women had good levels of awareness of mammography screening, but almost half of the participants (47%) did not perform a mammography (322). Another study found that only 1/5 of their sample was detected through screening of asymptomatic women (272).
- **Insufficient follow-through:** In the previous study researchers noticed that only 22% of the patients in the target age group admitted receiving invitations to the screening program and their participation rate was 66% (272).
- **Fear of having cancer:** Local experts stated that despite being aware of breast cancer, the fear of receiving a diagnosis often causes women to postpone their screening appointments.
- **Inadequate information-sharing strategies for screening:** According to a study, just 39% of the women who participated in the survey were aware that mammography screening is recommended to begin at the age of 40 (323). This lack of accurate knowledge could potentially lead some women to believe that the screening process begins at a later age than it actually does.
- **Lack of training of primary care workers:** Local experts indicated that GPs and nurses seldom proactively recommend preventive mammography to their patients.
- **Geographical barriers:** According to local experts, women in remote and underserved areas have limited access to screening services.

UAE

A non-organized screening program offering mammography every two years to women aged 40 years and older exists (195). The Health Authority of Abu Dhabi began a breast cancer screening in 2008, and the Dubai Health Authority introduced one in 2014 (324). By 2015, the MOHAP extended this program to the other Emirates, specifically for local citizens (324). Additionally, the MOHAP released guides to raise public awareness detailing the locations of screening centers for various types of cancer and providing information on support groups (195). However, local experts noted that breast cancer screening is not covered in the public sector for expatriates.

A study for the region in 2020 showed unpublished data from MOHAP that suggested a low breast cancer screening uptake of approximately 6.7% (324). However, the actual uptake might be higher as the progress in early detection has been significant. In 2000, diagnoses at stage IV made up 20% of new cases, but by 2015, this dropped to 6% (324). Experts attribute this shift to increased awareness of breast cancer and a rise in screening participation. In addition, it has been mandatory for women over 40 years in Abu Dhabi to undergo breast cancer screening to renew their health insurance since 2009 (324). These regulations, along with increasing openness about breast cancer experiences, have led to improvements. According to local experts, while past concerns centered on post-treatment appearance, genetic stigma, and

family reactions, the month of October now serves as an opportunity to celebrate awareness and survival. There has also been a notable rise in male involvement.

Main challenges

- **Lack of awareness:** Among the women surveyed in a study, 50% expressed reluctance to undergo mammography screening, with the most common reasons being lack of symptoms (31%), fear of the potential results (26%), and not considering themselves at higher risk due to the absence of a family history of breast cancer (25%) (325). Also, qualitative studies have shown that women have positive attitudes towards breast cancer screening but would like more breast cancer awareness campaigns year-round (326).
- **Fear of getting a mammogram**: A study found that a significant proportion of women (16.7%) believed that mammograms were not safe due to the risk of radiation exposure, potentially leading to a decrease in breast cancer screenings (325).
- **No encouragement from primary care practitioners:** Local experts noted that, to a significant extent, women are not actively encouraged to undergo routine screening by primary care practitioners.
- **Out-of-pocket payments for screening:** Expatriates may sometimes feel discouraged if their insurance does not cover screening costs (10). Local experts observed that some women might delay their mammograms until October to take advantage of free screenings or discounts offered by private companies.
- **Difficulties to track screened women:** A challenge that local experts shared for the Pink Caravan is that many women who have had mammograms in the past do not retain their previous mammogram images. When these women come for screening again to the Pink Caravan, they are reported as if they are screening for the first time, because there is not a system in place to connect with other hospitals directly to access images. It is important that women retain their medical images for future reference and accurate assessment.
- **Limited public access to KPIs and incomplete data:** Although data on participation rates is collected, it is not readily available to the public. An official request is necessary to access this information, according to local experts. Between 2015 and 2017, 20% of diagnosed breast cancer cases were missing stage information (232). The absence of complete staging data compromises research quality and could distort evaluations of the effectiveness of the screening program.

6.3 Genetic risk assessment

Genetic risk assessment (also called genetic counseling) has become more and more common in the recent decade. As described in section 2.1, women with inherited BRCA1/2 mutations have much higher chances of getting breast cancer. Uncovering genetic risks before they get breast cancer, can be vital for women carrying BRCA1/2 mutations. Women with a family history of breast, ovarian or pancreatic cancer are primary targets for genetic testing according to guidelines by the NCCN (327). Women who have these mutations may be advised to begin breast cancer screening earlier and more frequently.

6.3.1 Overview of the main challenges in the region

The subsequent section provides an overview of the state of genetic risk assessment in breast cancer in each country. Figure 27 summarizes common challenges across the MEA-9 countries.

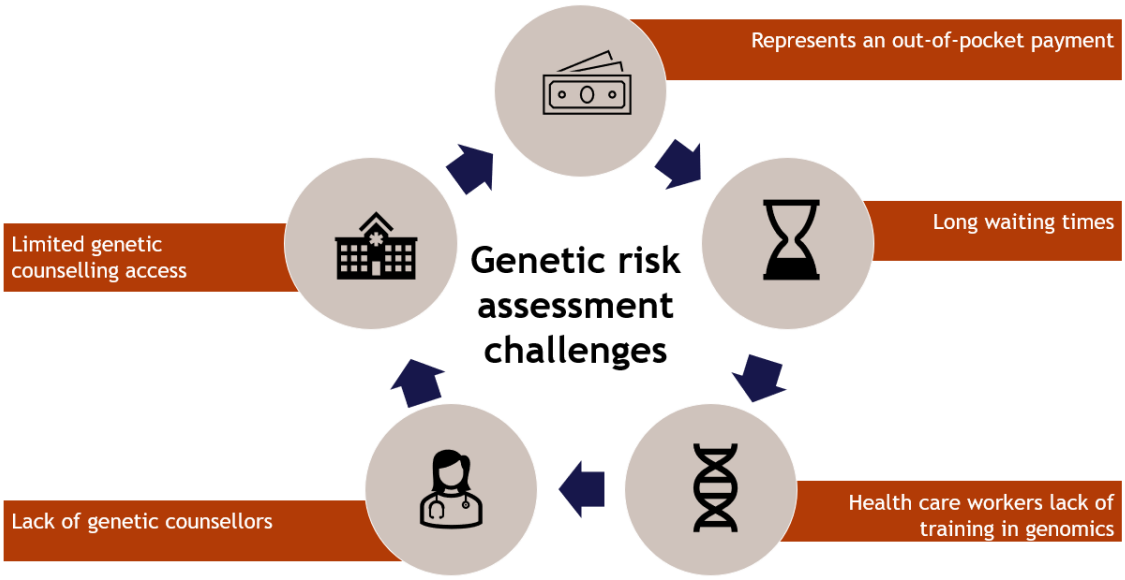


Figure 27: Challenges with genetic risk assessment in the MEA-9 countries.

Algeria

Access to clinical genetic services is notably limited. A significant barrier is the associated cost, compounded by the absence of public insurance coverage for such services. Local experts pointed out that there are plans in the pipeline to offer these services at the Centre Pierre et Marie Curie in Algiers. A recent study showed that patients with limited knowledge about genetics were positive towards genetic testing as it could help preventing cancers in their family (328).

Main challenges

- **Long waiting times:** Local experts indicate that the waiting periods for genetic tests can be extensive, ranging from 6 months to one year. This delay is primarily attributed to the availability of only one facility in the northern region that conducts these tests.
- **Out-of-pocket payment for tests:** Local experts noted that typically any patient needing or desiring this test must approach private medical providers and bear the expenses out-of-pocket.

Egypt

University hospitals and major private hospitals offer genetic testing for inherited cancers and somatic mutations (acquired during a patient's life) (329). This includes tests for BRCA mutation that are available in breast cancer specialized hospitals. However, access to clinical genetic testing remains limited. Local experts acknowledge ongoing efforts to enhance access to comprehensive molecular testing across the entire oncology spectrum. Collaborations with NGOs and potential public-private partnership initiatives are under exploration.

Main challenges

- **Represents an out-of-pocket payment:** Egyptian women often refuse genetic testing primarily because it represents a significant out-of-pocket cost (330).

Israel

Certain eligible women can receive free genetic counselling and genetic testing including BRCA mutation tests through the public health sector. Women who have a first or second-degree relative with a known BRCA mutation or who are of Ashkenazi origin[4] (30% of the population in Israel; see section 2.1) can access the test for free since 2020 (18, 203). Additionally, patients with ovarian, breast and pancreatic cancer can also get tested for BRCA mutations at no cost (18). Women who are carriers of a BRCA mutation are entitled to free annual MRIs, in addition to annual mammography and medical consultations (203). Local experts explained that carriers of BRCA mutation receive advice on other preventive measures like risk-reducing surgeries as well as advise to refer family members for genetic testing.

A recent study revealed that genetic testing rates in Israel are higher than in many European countries and the United States (331). The study found that almost all patients with advanced HR+HER2- and TNBC had undergone genetic testing. Israel has a well-developed medical genetics infrastructure with 15 public hospitals offering genetic services and a high ratio of genetic counselors per patient compared to Sweden and the United Kingdom (18).

The NGO Good BRCA Genes is dedicated to supporting individuals who carry BRCA gene mutations (332). They focus on the well-being of these women, offering support through a Facebook community composed of women with BRCA or similar genetic mutations. The organization also engages in various activities like supporting newly diagnosed carriers, and to enhance the quality of care and support available to BRCA carriers.

Main challenges

- **Eligibility ambiguity in reimbursed testing:** The eligibility criteria for reimbursed BRCA testing can be stringent and require specific knowledge that many women may not possess. For example, some women may have mixed heritage and may be unsure about their ethnic origins or family history of BRCA mutations (18).
- **Health care workers lack training in genomics**: The low referral rates for genetic testing among women who should be tested can be attributed to the lack of knowledge about genetics among many primary health care workers. One study found that only 35% of families with a family history of breast and ovarian cancer had been referred to genetic counseling (333). Also, local experts highlighted that there is a requirement for women seeking genetic testing to receive pretest counseling before undergoing the testing. Some oncologists are unwilling to provide this counselling.
- **Cultural influences on BRCA testing uptake:** There are unique cultural or social factors that contribute to lower testing rates among specific groups. For instance, compared to other populations, ultra-orthodox Jewish women have a lower uptake of BRCA genetic testing (18).
- **Geographical barriers:** There are geographical disparities in access to dedicated screening for BRCA carriers, particularly in the southern and northern regions (334).
- **Long waiting times:** Although genetic tests are available to eligible populations through the HMOs, there can be significant waiting times of up to a year (18). Despite the availability of specialized high-risk screening clinics for female BRCA mutation carriers integrated into breast centers within public hospitals, due to shifts in population screening implementation, meeting the entirety of the demand is a challenge (334). Local experts have highlighted as an example that the present population of Jewish Ashkenazi women in Israel, aged between 25 and 80, stands at around one million.

[4] Local experts noted that women of Ashkenazi origin are those with at least one Ashkenazi grandparent.

- **Inadequate post-diagnosis emotional support for BRCA mutation carriers:** Local experts indicated that women who discover they are carriers of BRCA mutations often feel a lack of emotional and psychological support post-diagnosis. High-risk clinics have psychologists available to provide assistance. However, these experts note that most women typically attend just one or two sessions. A significant portion of the challenges these women encounter arises from dealing with the side effects of risk-reducing surgery.
- **Coordination challenges between hospitals and community:** Despite the availability of free BRCA mutation tests, significant challenges persist in the coordination between community health care providers and hospitals. This disconnect often results in women who require monitoring having to manage and transport binders filled with all their necessary references and documents.

Jordan

Studies have found a prevalence of BRCA1/2 mutations of 7–13% in Jordanian breast cancer patients (65). The Breast Cancer Screening and Diagnosis Guidelines include recommendations for referral to a genetic counsellor for further evaluation for individuals with a genetic predisposition of breast cancer (13). In 2015, a genetic counselling clinic was established at the KHCC (65). The test is available for high-risk groups and family members. They include young patients, patients with TNBC, patients diagnosed with a family history of breast cancer, ovarian cancer, or male breast cancer (65).

Main challenges:

- **Limited availability:** According to local experts, BRCA testing is not a routine procedure in hospitals; the test is conducted mostly only at the KHCC.

Morocco

Local experts noted a lack of genetic counseling services. Typically, when BRCA mutations are detected in a patient, the general procedure involves discussing the potential implications for family members. However, experts have observed some hesitation among patients to communicate this information with their families. As of now, the BRCA mutation tests are not reimbursed in the public system. Nevertheless, discussions are underway with ANAM regarding the possibility of reimbursement, especially for high-risk individuals such as family members of carriers of BRCA mutations.

Main challenges

- **Possible high demand for genetic counselling**: Studies have found a high rate of consanguineous marriages, around 19-28%, with approximately half of them occurring between first cousins (335). There are estimates suggesting that about 5% of newborns in Morocco are born with a genetic condition (335). However, systematic screening is not currently practiced.
- **Lack of genetic counsellors:** In 2016, there was no specialization in genetic counselling available for geneticists (335).

Saudi Arabia

A study of breast cancer patients in Saudi Arabia found a prevalence of BRCA mutation of 10.2% (336). This prevalence is higher than that observed in other global populations. In addition, another study found that the prevalence of TP53 mutation was 40%, a value that is among the

highest in the world (337). TP53 is a tumor suppressor gene that plays a critical role in preventing the development and progression of cancer. Mutations in the TP53 gene are associated with a wide range of cancers, including breast cancer.

The clinical guidelines for breast cancer management recommend considering family risk for genetic counseling in the pre-treatment assessment (338). However, the statement is quite broad and does not clearly define who is considered to be at high-risk. Additionally, while BRCA mutations are mentioned in the guidelines in the context of treatments for TNBC, the guidelines do not provide sufficient emphasis on the surveillance of healthy individuals with BRCA or other gene mutations.

Main challenges

- **Shortage of health care workers specialized in genetics:** There is a shortage of health care professionals who specialize in genetics and counseling for genetic conditions A study in 2018 mentioned that there were only six genetic counselors available in the country (25).
- **No organized BRCA mutations screening:** Local experts noted that there is no organized way to screen high-risk women and follow-up on their family members. There are only some fragmented screening services, e.g., in Riyadh at the King Faisal Specialist Hospital & Research Center, King Fahad Medical City, and National Guard hospital. However, most people do not have access to these services.
- **Lack of central laboratories:** The scarcity of local central laboratories reported in previous studies can have several potential impacts for genetic testing (25). This can lead to delays in diagnosis, missed opportunities for early detection, and inadequate treatment for breast cancer patients.
- **Geographical barriers:** Another impact is the increased costs for patients who have to travel to laboratories located in other regions (25). This can be a significant financial burden, particularly for low-income individuals. Additionally, centralized laboratories may not be able to provide genetic counseling services in the same location where testing is performed, which can limit the availability of counseling for patients and their families.

South Africa

Breast cancer guidelines emphasize the significance of providing genetic counseling to individuals with an elevated risk of breast cancer due to genetic predisposition. Women diagnosed with breast cancer and meeting specific criteria, such as having any known predisposition gene, being diagnosed before 40 years old or with TNBC before 60 years old, having any family history of male breast cancer, or having a close female relative diagnosed with breast cancer under different age groups, should be referred to genetic services (268). Women at a high risk of developing breast cancer are recommended to get an annual breast MRI in addition to mammography and CBE. This category comprises women with confirmed BRCA mutations, first-degree relatives of BRCA mutation carriers, women who underwent chest radiation therapy in their youth, and those with other genetic mutations (268).

Genetic testing of BRCA1/2 is included in the PMBs for women with certain criteria that includes family history of breast and ovarian cancer, combination of family history with other related types of cancer and belonging to certain ethnic groups (more about Afrikaner and Ashkenazi population in section 2.1) (217). Local experts indicate that BRCA1/2 testing among other tests are widely accessible in both the state and private sectors. They highlighted that the National Health Laboratory Service (NHLS) provides targeted testing for founder population groups and

offers comprehensive tests for BRCA1/2 among other genes. Local experts also explained that a significant portion of medical testing is sent to other countries as the cost of doing so is lower than getting the same tests done through private laboratories within the country.

Main challenges

- **Uneven access to genetic counselling by region:** As of 2023, there are 30 practicing genetic counsellors in South Africa, according to local experts. The majority of the counsellors working in the public health sector are located only in two provinces – Gauteng and Western Cape, leaving the rest of the country with a paucity of genetic counsellors. In the provinces where there are no genetic counsellors, BRCA1/2 testing is facilitated by other kinds of medical practitioners, such as oncologists.
- **Brain drain of genetic counsellors:** As of 2023, there are 18 registered genetic counsellors who, although trained in South Africa, are not currently practicing within the country. The majority have chosen to work overseas. Local experts indicate that since 2021, 8 of these genetic counsellors have migrated to the United Kingdom, largely due to the lack of new positions being made available in the public sector.
- **Lack of infrastructure in rural areas:** In 2017, there were no genetic testing facilities available in rural areas (339).
- **Long waiting times:** According to local experts the timelines for receiving results vary significantly, ranging from nine months in the public sector to two to four weeks in the private sector.
- **Represents an out-of-pocket payment:** Local experts indicate that the majority of private sector medical insurance plans do not cover the costs of genetic testing, especially for those on less comprehensive plans. When coverage is provided, the expenses are often taken from a "savings" allocation within the plan, which is designated for miscellaneous medical expenses.

Türkiye

Consanguineous marriages are relatively common, especially in rural areas and among some religious and ethnic groups. The rate of consanguineous marriage in published studies ranges from 22% to 24%, with higher rates observed in the Southern Anatolian region (340, 341). These marriages can increase the risk of genetic disorders and birth defects in offspring, especially if there is a history of inherited diseases in the family. To raise awareness about these risks, various efforts have been made, including genetic counseling and premarital genetic testing. For women with known BRCA mutations, the recommended screening protocol is to undergo a mammogram and MRI annually, starting from the age of 25 years (221). There are 41 centers in the country that offer genetic counseling, of which 7 belong to the public sector and 11 are affiliated with universities, while the remaining are in the private sector (341).

Main challenges

- **Represents an out-of-pocket payment:** BRCA mutation tests for healthy women are not covered by the SSI, and women are required to pay for the tests out-of-pocket (342).
- **Health care workers lack training in genomics:** There is a need to make sure physicians and nurses in primary and secondary levels of health care can provide guidance and direct patients to the appropriate tertiary centers for genetic counseling (341). Also, some studies have found that Turkish nurses' knowledge of genomics is moderate, with a score of 8.9 out of 12 (343). Other studies have shown that over half

of the participants (54%) reported having an insufficient understanding of the genetics of common diseases, indicating a need for improvement in this area (344). In the same study only 30% of the participants reported having received genetics training after completing their bachelor's degree.

- **Limited genetic counseling access:** Breast cancer centers may have suboptimal access to genetic counseling for breast cancer patients, as only 78% of these centers were found to have a dedicated genetic department (345).

UAE

According to local experts, the breast cancer screening guidelines have specific provisions for high-risk groups, including women with a family history of cancer or those who have had previous cancers. These high-risk individuals are directed to Centers of Excellence for more in-depth screening, such as genetic testing. Research suggests that access to genetic testing and counseling is limited (346). However, the country has seen recent progress. In 2022, the Department of Health Abu Dhabi launched the Precision Oncology Program, the first of its kind in the region (347). The initial phase of the program centers on breast cancer patients. The primary objective is to facilitate tailored cancer prevention plans for women at risk, as well as personalized treatment strategies for patients. Furthermore, the UAE has launched the Emirati Genome Program, a study leveraging cutting-edge technology to understand the genetic makeup of Emiratis (348). Local experts mentioned the availability of genetic tests within this study, like the BRCA test, for high-risk women. These women also benefit from accompanying counseling sessions. Nevertheless, patients who require genetic testing must either pay for the test out-of-pocket or rely on pharmaceutical companies that offer BRCA testing specifically for breast cancer patients (346).

Main challenges

- **Limited genetic counseling access:** Lack of genetic counselling infrastructure in comprehensive cancer centers; one of the only major cancer centers offering genetic counselling is the Tawam Hospital (346). Having few centers offering genetic counselling leads to long waiting times.
- **Long waiting times:** Tests that are performed outside of the country on average are ready in up to 6 weeks (346).
- **Represents an out-of-pocket payment:** Most health insurances exclude genetic testing from reimbursement (346). This lack of access to genetic testing and counseling can create financial challenges and limit the options available for patients who need these services.

6.4 Overview of main challenges in early detection

In the MEA-9 countries, the early detection of breast cancer faces multifaceted challenges. The most recurring challenges across the areas of self-initiated detection, screening, and genetic risk assessment are the following:

- Many women dread the perceived social repercussions, such as jeopardizing their daughters' marriage prospects or facing abandonment by their spouses. Coupled with the pervasive misconception that cancer is incurable, and fear associated with mammograms, this inhibits early detection.
- Financial obstacles further complicate matters, as many essential services necessitate out-of-pocket payments. In some countries, mammographies are not publicly funded

for the whole population. Reimbursement for BRCA testing in high-risk women remains scarce.

- There is a shortage of primary care professionals - a challenge compounded by the often inadequate training of these workers in recognizing breast cancer symptoms and counseling women about early detection services.
- Geographical barriers, like transportation challenges and insufficient infrastructure, restrict service access across countries.
- A cross-cutting challenge are socioeconomic disparities, manifesting in unequal care standards across the private and public sectors, varying regions, and among different socioeconomic groups.

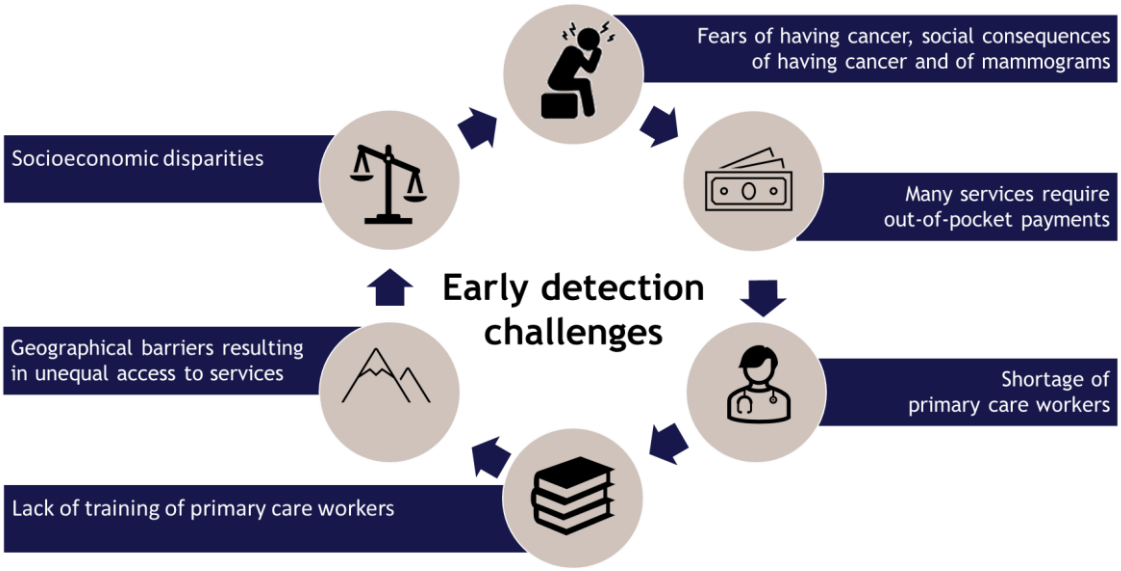


Figure 28: Main challenges in early detection in the MEA-9 countries.

7. Diagnostics

Breast cancer is diagnosed with a triple assessment that involves a physical examination, a mammography/ultrasound imaging and a biopsy (285). If the suspicion is confirmed, the spread of the tumor in the body is examined and the molecular characteristics of the tumor using biomarker testing are determined. Information on the spread of the tumor and the breast cancer subtype will be used to inform the most suitable therapeutic approach.

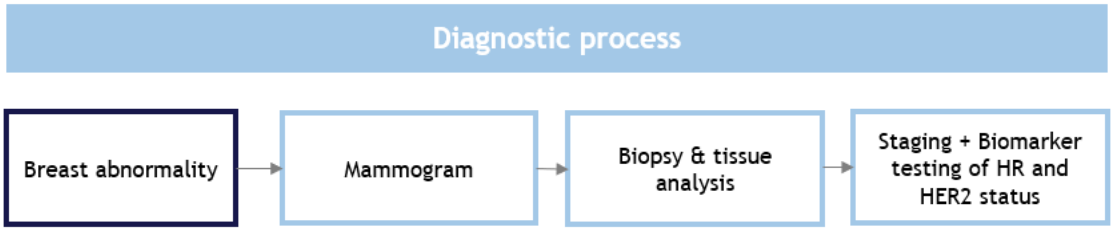


Figure 29: Diagnostic pathway.

Early clinical detection of breast cancer is only effective if timely and high-quality treatment is initiated promptly after diagnosis. Studies have demonstrated that delaying treatment beyond three months can negatively impact survival rates, highlighting the importance of obtaining a definitive diagnosis as soon as possible (349). The WHO's GBCI has established timely diagnostics as the second pillar of its framework (8). The initiative aims to ensure that patients complete all diagnostic evaluations, including imaging, tissue sampling, and pathology, within 60 days of diagnosis.

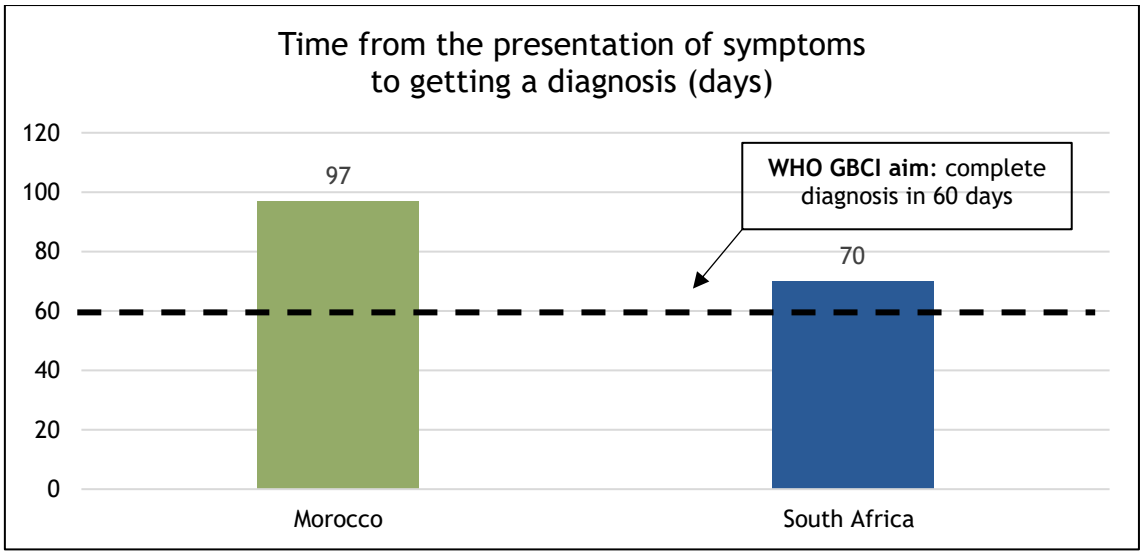


Figure 30: Average number of days to get a breast cancer diagnosis.

Notes: MOR data reflects the median diagnostic delay at the Hospital of the Hassan II University Hospital Center (n=410). SAF data was collected from R. K, Khan hospital included delays in initial imaging, pathology, staging and referral (n=45) Source: (350, 351).

Info Box 3 - Rapid breast cancer diagnosis clinics in Egypt

The Egyptian Ministry of Health has recently entered into an agreement with GE Healthcare and Gustave Roussy to establish Rapid Breast Cancer Diagnosis Clinics (352). These clinics are designed to offer quick and efficient diagnosis within a day and will bring together a range of medical services including radiologists, breast surgeons, pathologists, oncologists, nurses and more.

7.1 Diagnostic imaging

Mammography, which is a low-dose X-ray imaging method, is the most common method to diagnose breast cancer. An ultrasound of the breast might also be used as an imaging method. A magnetic resonance imaging (MRI) scan of the breast might be recommended in some clinical situations, for instance when there is a suspicion of BRCA mutations or when the conventional test results are unclear (353). Key features of the three imaging methods are summarized in Table 9. Comparable data on the availability of diagnostic imaging equipment is scarce. The WHO only provides some older data on availability of mammography units, which show that Türkiye had the highest numbers per million women and South Africa and Morocco the lowest numbers; see Figure 31.

Table 9: Imaging methods for breast cancer diagnosis

Mammography	Mammography entails a low dose of radiation to produce an image (called mammogram) used to detect malignant tumors.
Ultrasound	An ultrasound captures computer images of the inside of the breasts using sound waves.
MRI	Breast MRI creates detailed cross-sectional images of the inside of the breast using radio waves and magnets. It is mostly recommended for women with high-risk profiles, which includes carriers of BRCA1/2 mutations, women with no known mutation but a breast cancer family history, women with dense breasts or with breast implant ruptures among others (353).

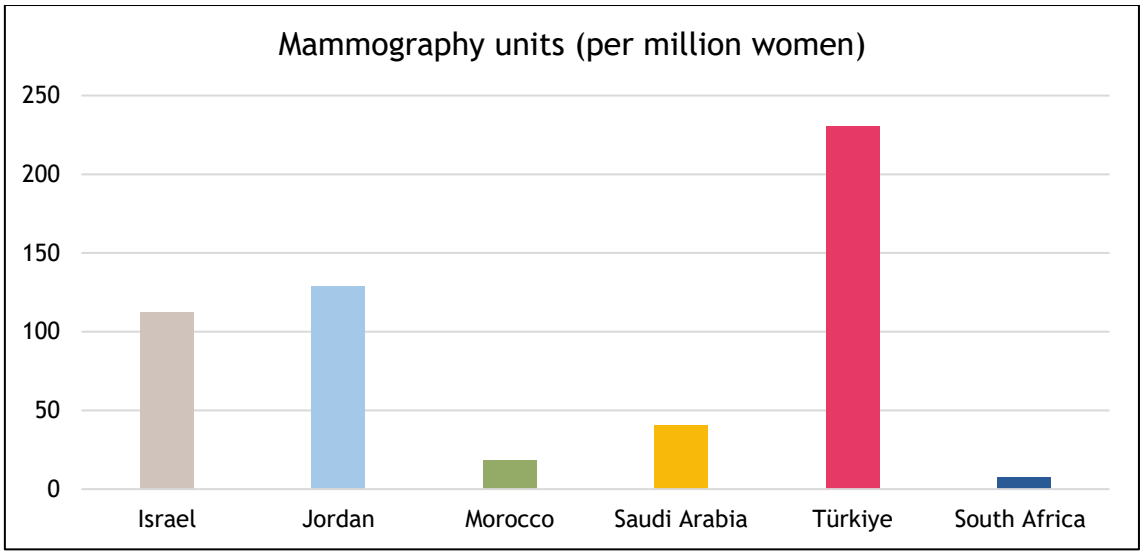


Figure 31: Mammography units per million women in 2014.
Source: WHO (354).

7.1.1 Country-specific status and challenges

Algeria

Local experts agreed that geographical accessibility is no longer a concern as there are breast cancer centers located throughout the country. Mammography and ultrasound equipment are also widely accessible nationwide.

Main challenges

- **Long waiting times:** According to local experts, one of the main challenges is to secure an appointment, as waiting times can be long, ranging from 1 to 2 months. Local experts noted that the delays to getting an examination have been shortened in recent years, particularly in larger health care facilities. The waiting time for patients to receive a final diagnosis in a study in the region of Batna was 34 days (239).
- **Disparities between private and public sector:** Many women prefer to get a diagnosis in the private sector due to long delays in the public sector. Local experts indicated that obtaining an MRI and bone scans through the public sector may require a wait of up to two months. In contrast, opting for these examinations through the private sector could expedite the process significantly, with results available in a maximum of 3 days. Due to prolonged waiting times in radiology and pathology within the public sector, obtaining a comprehensive breast cancer diagnosis might extend to three months. In the private sector, however, the same process typically takes just a week, according to experts.
- **Geographical barriers:** Local experts noted that some regions have limited access to some technology like MRI. In these cases, women need to travel to other regions.

Egypt

The Egyptian Government has recently provided financial support to facilitate the purchase of mammography and ultrasound machines (307). Local experts shared that there are approximately 70 mammography machines in operation currently, with another 100 machines in the process of purchasing. The goal is to reach 350 mammography machines in 2026-2027.

The Women's Health Initiative has also helped to enhance pathology laboratories and advanced diagnostic equipment, including mammograph and ultrasound machines, as well as training health care workers (307).

Main challenges

- **Lack of skilled radiologists:** As the number of women undergoing mammography grows, there is a rising demand for diagnostic services. Local experts have identified key challenges, including a shortage of skilled mammography technicians. Additionally, not all radiologists are adept at interventional radiology procedures, which encompass both interpreting images and the precise manipulation of needles within the breast.

Israel

The MoH has implemented programs to enhance imaging services in the public sector. A few years ago, the shortage of imaging personnel and high demand for MRI scans led to longer waiting times. To address these issues, the MoH launched a nationwide program in 2015 aimed at improving the accessibility and availability of MRI exams (355). The program involved a comprehensive approach that focused on improving the quality and efficiency of MRI services across the country. The results were a 38% reduction in waiting times with an increase in the number of radiographers and radiologists with formal MRI training (355).

Main challenges

- **Limited diagnostic resources:** Low rates of mammography machines and MRI units per million inhabitants. In 2022, Israel had a total of 11.5 mammography machines per million inhabitants (356). However, compared to countries with similar GDP per capita,

Israel had fewer machines per capita. For example, Austria had a ratio of 21.1, Finland 30.9, and Belgium 36.4. In the same year, Israel also had a lower ratio of MRI units, with 5.2 machines per million inhabitants, while Austria had 26.6, Finland 33.2, and Belgium 11.7 (356). Both indicators suggest that there may be room for improvement in Israel's machine availability to meet patient demand.

- **Shortage of radiologists:** In 2022, the chairman of radiologist services stated that there is a significant shortage of certified radiologists, and the problem is expected to worsen in the coming years. The primary reasons for this shortage are that radiologists have attractive incentives to work remotely for hospitals abroad, and also that a significant number of radiologists are approaching retirement age (357). According to local experts, lack of breast imaging specialists is the main issue in this regard, particularly radiation oncologists.
- **Diagnostic limitations in the community setting:** Local experts concur that diagnosing conditions within a community setting present several challenges compared to specialized health care facilities. Meanwhile, HMOs encourage women to get mammograms in the community rather than medical centers, especially when abnormalities are not obvious.
- **Gap in timely imaging process:** The objective is to complete the imaging diagnostic procedure within five weeks, yet only 60% of women met this goal in 2019 (280).
- **Inadequate emotional support:** Local experts noted that patients often experience insufficient emotional support during the entire diagnostic journey.
- **Unnecessary use of MRIs:** Local experts noted that one of the reasons for delays in surgical decisions is the sometimes-unnecessary use of MRIs.

Jordan

In Jordan, there are 85 mammographs in total, equal to 129 mammographs per million women 50-69 years old (358). The time it takes for a woman to receive a diagnosis or final results after seeking medical attention from a physician or breast imaging unit can vary significantly. According to local experts, this duration can range from 1 day to 1 month (average 7-14 days), with availability of health facilities and providers influencing this time frame.

Main challenges

- **Fragmentation of the health care sector:** According to local experts, one of the main challenges is the fragmentation of the health care sector, as Jordan lacks a centralized entity to effectively manage and coordinate health services. The fragmentation jeopardizes the continuity of care as not all services are available from screening until reaching a final diagnosis are available everywhere in the same quality.
- **Geographical barriers:** The full spectrum of diagnostic services is provided mainly in the biggest cities, Amman, Irbid, Zarqa, according to local experts. Consequently, women residing in more remote areas must cover transportation expenses and endure longer travel times to access these services.
- **Lack of funding:** Another factor highlighted by experts was the lack of funding for health care facilities that impedes acquiring all the necessary resources and equipment.
- **Shortage of specialized radiologists:** A study noted that a shortage of specialized radiologists and trained female technicians poses a challenge in the cancer diagnostic processes (206). Local experts have emphasized the scarcity of trained health care professionals, particularly radiologists with the expertise to accurately diagnose breast cancer. While there are ongoing training programs in collaboration with the JBCP, the KHCC, and the MoH aimed at addressing this issue (65, 359), it is worth noting that,

according to local experts, there is an additional problem in the public health sector: the lack of effective retention strategies for human resources, which has led to radiologists migrating to the private sector.

- **Disparity in health care facility quality:** Local experts have observed that the quality of health facilities differs across the country. Some areas possess outdated and unreliable equipment, whereas others, especially in the private sector and the KHCC, boast the latest advanced technology.

Morocco

In Morocco, there are 44 mammographs in total, equal to 18 mammograms per million women 50-69 years old (358). Local experts considered that geographical accessibility for mammography services is not a major concern since there is a diagnostic center available in each province of Morocco. They also mentioned there are a couple of mammography units and ultrasound machines in each diagnostic center.

Main challenges

- **Shortage of radiologists:** Morocco experiences shortages of all kinds of medical specialists in the public sector, one of them is radiologists. In 2019, there were a total of 402 radiologists in the country (360). Local experts have stated that introducing mammography screening itself would not be problematic. The real challenge lies in ensuring sufficient numbers of radiologists in each diagnostic center.
- **Lack of quality control**: The lack of quality assurance is an issue, particularly due to the lack of accreditation of mammography pathology units (313).

Saudi Arabia

According to local experts, mammography machines and ultrasounds are readily accessible throughout the country. The Saudi Food and Drug Administration (SFDA) regulates medical devices, including mammography machines, to ensure they meet international standards (361). The SFDA continuously monitors and inspects facilities to ensure compliance with regulations.

Main challenges

- **Shortage of radiologists:** There is a shortage of skilled and experienced technicians and radiologists specialized in breast cancer (362).
- **Geographical barriers:** Local experts noted that geographic accessibility impacts timely diagnosis and timely referral due to the concentration of diagnostic facilities in the biggest cities, resulting in potential delays for patients living in peripheral areas, though care is eventually provided.
- **Diagnostic equipment limitations:** According to local experts, the availability of MRI units is low in peripheral areas.

South Africa

According to the PMBs, all patients displaying symptoms should undergo imaging for diagnostic assessment. While mammography is the gold standard, for women under the age of 35, an ultrasound is the preferred method (217). In special cases, an MRI is recommended.

A recent study has indicated a notable expansion and evolution of the imaging workforce in South Africa, with increases in the number of sonographers, radiologists, and diagnostic radiographers in the past two decades (2002-2019) (363). The average annual percentage

growth of radiologists in South Africa was more than twice that of the United States, according to this study.

Main challenges

- **Diagnostic equipment shortage:** There is limited availability of breast MRI in the public sector (364). Also, there is a limited number of mammography machines. Even centers serving vast regions, like the one in Cape Town, are not sufficiently equipped. There are only two mammography machines in the public sector in Cape Town (one at Tygerberg one at Groote Schuur) that serve a massive surrounding area, according to local experts. This shortage leads to a heavy reliance on ultrasounds and CBE.
- **Digital infrastructure deficit:** Local experts have observed that some facilities lack computers for viewing scans, resulting in most imaging being viewed on mobile phones.
- **Geographical barriers:** Mammography screening is primarily only available in large cities with tertiary-care hospitals (364).
- **Delayed confirmatory diagnostics:** Bottlenecks in the health system led to long waiting times for diagnostic tests, causing anxiety among patients and potential progression of the disease. Local experts noted that in the Eastern Cape the patient's journey through the system can take up to 6-9 months from the first time a lump is felt to getting a biopsy and imaging.

Türkiye

In 2021, Türkiye had a relatively high number of mammography machines, with a total of 11.8 machines per million inhabitants (356). In comparison to countries with similar GDP per capita, such as Mexico with 9.6, Costa Rica with 8.7, and even Israel with 10.8, the availability of mammography machines in Türkiye was greater. The number of MRI units in Türkiye was also high, with 11.3 machines per million inhabitants in 2021, compared to Mexico with a ratio of 2.6, Costa Rica with 0.4, and even Israel with 5.3 (365). This suggests that infrastructure for breast cancer screening and diagnosis in Türkiye appears to be good.

Main challenges

- **Lack of quality:** According to a study, 56% of mammography images failed to meet the required quality standards (366).The rates of non-compliance were highest among private hospitals at 79%, followed by public hospitals at 57%, and university hospitals at 25%. The primary reason for these failures was incorrect positioning during imaging.
- **Incompleteness of reports:** The study also found that nearly 60% of mammography reports were of insufficient quality (366). The primary cause was incompleteness, with many reports lacking crucial information such as the purpose of the test, the results, and recommendations.
- **Low coordination among health care providers:** According to local experts, the lack of effective coordination among diagnostic service providers significantly hampers early diagnosis efforts.
- **Long waiting times:** The process of getting diagnosed (undergoing tests, receiving results, etc.) takes longer for patients with public insurance, according to local experts.

UAE

In Abu Dhabi, innovative AI systems have been introduced to diagnose breast cancer from ultrasound images (346). These tools aid radiologists and aim to decrease the number of false-positive findings.

Main challenges

- **Insufficient training on breast cancer of radiographers[5]:** Radiographers in the UAE are primarily involved in producing mammogram images, that are later interpreted by a radiologist. In a survey among radiographers working in mammography screening only 56% had completed a specialization in mammography (367). The authors of the study suggest that integrating role extension into radiology practice could help address this challenge by reducing the gap between image acquisition and final reporting.
- **Lack of prescribed time frames for receiving a diagnosis:** According to local experts, there are no target values of how long the process to get the full diagnosis of breast cancer should take.
- **Out-of-pocket payment for imaging exams:** Local experts noted that some populations groups have no or limited reimbursement of imaging exams.

7.2 Biopsy and pathological assessment

A breast biopsy is performed if the imaging test results indicate the possibility of breast cancer. The procedure entails removing a sample of breast tissue, e.g., with a core needle biopsy. The sample is then examined by a pathologist to determine tumor characteristics and guiding treatment decisions. The pathological assessment includes examinations of at least the following features:

- Histological type of the tumor (e.g., ductal carcinoma, lobular carcinoma)
- Receptor status of the three central biomarkers, i.e., ER, PR, and HER2
- Grade of cancer cells that determine how fast the tumor is spreading
- Ki-67 as a marker for proliferation
- Size of the tumor

A new biopsy should be carried out in patients with recurrent breast cancer to confirm tumor characteristics and to allow for additional biomarker testing.

7.2.1 Country-specific status and challenges

Algeria

A study in the region of Batna (N=267) showed that the median time to diagnosis, i.e. number of days between first consultation and the first result of the biopsy, was 34 days (25% 17 days - 75% 100 days) (239).

Main challenges

- **Shortage of breast pathologists:** Local experts noted that while there is an adequate supply of pathologists in major centers, smaller centers frequently lack pathologists specialized in breast cancer.
- **Out-of-pocket payments for services:** Local experts noted that when women choose to conduct tests in the private sector, they will incur significant OOP expenses.
- **Disparity in diagnostic exams between private and public sector:** As noted in section 7.1, the waiting times for diagnostic exams differ significantly between the public and private sectors. Local experts state that obtaining a histological exam in a public

[5] A radiographer can be a radiologist technologist, physician assistant or nurse practitioner.

hospital takes around 15 to 20 days, while in the private sector, it typically takes no more than 7 days.

Egypt

Within the Women's Health Initiative, enhancing pathology laboratories has been a priority (307). Local experts highlighted that there has been a substantial investment in histopathology services due to the surge in demand. According to them, one of the primary goals has been to enhance the reporting turnaround time. To achieve this, various measures have been taken, such as training programs for histopathologists. Also, external accreditation to ensure quality and consistency has been prioritized. Consequently, one of the leading breast cancer hospitals secured accreditation from the College of American Pathologists (CAP). As of 2023, efforts are underway to achieve the same accreditation for other centers, including Cairo University Hospital.

Main challenges

- **Lack of quality in reports:** According to local experts, one of the major challenges in histopathology services was the lack of standardization in reports on many types of cancer including breast cancer.

Israel

One of the established targets for the diagnostic process is that 90% of women complete their biopsy testing within 7 weeks of their mammography screening (280).

Main challenges

- **Shortfall in timely biopsy competition:** The completion rate in 2019 fall short of the established target stated above, with only around 67% of women finishing within the expected timeframe (280).
- **Shortage in pathologists:** Local experts highlighted the shortage of pathologists, which often results in delays in diagnosis.
- **Quality concerns in private pathology:** Local experts have pointed out as a significant challenge that many biopsies are conducted in private pathology laboratories that lack rigorous quality controls. Consequently, numerous patients receive incorrect treatment due to inconsistencies in the pathology results.
- **Long waiting times for MRI-guided breast biopsies:** Local experts said there are important delays in MRI-guided breast biopsies.

Jordan

The Breast Cancer Screening and Diagnosis Guidelines include recommendations that breast core needle biopsy is done if imaging or clinical findings are suspected to be malignant (13). As access to mammography has improved, an increasing number of women are now undergoing breast biopsies (65).

Main challenges

- **Delays in getting results:** In a study with data from 2012-2014, about half of the patients had a breast cancer diagnosis in more than 4 weeks which represented a delay in diagnosis (253). The mean diagnosis time (time between seeking medical advice and the date of final diagnosis based on histopathological examination) was 97.5 days (median 23.5 days).

Morocco

In 2015, there were 31 histopathology laboratories in the public sector (368).

Main challenges

- **Shortage of pathologists in the public sector:** Local experts highlighted a significant shortage of pathologists in the public sector, which often results in the need to send biopsy samples to private laboratories.
- **Lack of quality control**: The lack of quality assurance is an issue, particularly due to the lack of accreditation for pathology units (313).

Saudi Arabia

Main challenges

- **Shortage of pathologists:** A lack of skilled health care professionals, including pathologists, can contribute to delays in breast cancer diagnosis. According to a 2021 MoH report on newly enrolled employees in fellowship programs and higher studies by specialty, histopathology had notably fewer enrollees, with only 5 individuals, compared to radiology, which had 91 (369). This disparity underscores a possible need for more professionals specializing in histopathology to expedite breast cancer diagnosis.

South Africa

According to local guidelines, the gold standard for diagnosis is a core needle biopsy (217). When an urgent diagnosis is needed, fine needle aspiration cytology is recommended. For certain special situations, excision biopsy and punch biopsy are employed.

Main challenges

- **Shortage of pathologists in the public sector:** In 2013, a concerning trend of pathologists leaving the public sector for the private sector was reported (370). The driving factors behind this migration included poor working conditions, inadequate financial compensation, inflexible work schedules, and a lack of autonomy in workplace procedures.
- **Out-of-pocket payments for services:** Local experts noted that the cost associated with obtaining a core needle biopsy for diagnosis can be a significant hurdle. Many medical insurances do not cover this expense until a formal diagnosis is confirmed. According to local experts, this limitation in access to diagnostic procedures can result in potentially harmful interventions, such as the excision of a lump without the benefit of a thorough diagnostic evaluation.
- **Lack of quality of reports:** The European Society of Breast Cancer Specialists (EUSOMA) considers as a minimum requirement that 95% of histopathology reports should be complete (371). A study in four South African breast cancer centers in the public sector found that among core biopsies 75% of the reports were complete and among surgical samples 74% (371). Incomplete reporting in breast cancer histopathology results was attributed to two main factors. The first factor found was the lack of tumor grade in the reports (371). The lack of tumor grade may prevent the clinician from accurately assessing the aggressiveness of the tumor and determining the most appropriate treatment course. The second factor was the absence of FISH testing when the HER2 status results were inconclusive (371). HER2 status is a crucial determinant for selecting

the appropriate treatment plan, and failure to conduct FISH testing can lead to missed opportunities for targeted therapies. This can have a negative impact on patient outcomes, as they may not receive the best possible treatment.

Türkiye

A study in 2020 showed that the median time for receiving histopathologic results was 12 days (345).

Main challenges

- **Lack of quality control:** Accreditation of pathology services is important to ensure high-quality breast cancer screening services and accurate diagnostics. Currently, there is a lack of accreditation of pathology services (283).
- **Low satisfaction among pathologists:** A study conducted in 2021 on job satisfaction of Turkish pathologists found that only half of the participants perceived their pathology laboratory's physical conditions as satisfactory. In addition, a significant number of pathologists reported that they worked alongside inexperienced technicians (372).

UAE

Many laboratories have received accreditation from the CAP, indicating their adherence to quality standards (346). Accredited laboratories are required to implement measures to ensure the quality of their services and are expected to use tumor checklists for each histopathology report (346).

Main challenges

- **Cultural beliefs:** According to experts, typically, there is a week's wait between tests, but having clear breast cancer symptoms speeds up this process. If possible, an immediate biopsy is conducted, though some local women hold reservations due to certain cultural beliefs or fears, such as the biopsy spreading tumor cells, or they might not be mentally prepared for the procedure. For this reason, sometimes the diagnostic process gets delayed.
- **Possible shortage of pathologists:** As of 2021, only 1.8% of all physicians in Dubai were specialized in anatomic and clinical pathology, with a total of 211 physicians in this field (373). While it is unclear whether this number indicates a shortage in Dubai specifically, the growing demand for pathology services worldwide suggests a need for more qualified pathologists. Local experts did not mention this shortage as a challenge.

7.3 Biomarker testing

For the past decades, biomarker testing consisted mainly of determining the receptor status of ER, PR, and HER2. These tests are required to determine the breast cancer subtype (see section 2.3). This information is used to inform the therapeutic approach. Another essential biomarker is Ki-67, which measures the aggressiveness of the tumor.

Newer biomarkers that have become relevant to inform the therapeutic approach are:

- BRCA1/2 status has become relevant since the approval of the first poly ADP ribose polymerase (PARP)-directed medicines in breast cancer in 2018.

- Programmed death-ligand 1 (PD-L1) status has become relevant since the approval of the first immunotherapy medicine in TNBC in 2019. High levels of PD-L1 in cancer cells, in general, predict favorable outcomes for immunotherapy (374).
- PIK3CA has become relevant since the approval of targeted therapies called PI3K inhibitors in 2019 (375).
- NTRK has become relevant since the approval of tumor-agnostic targeted therapies as last-line treatments in solid tumors, including breast cancer, in 2018.
- dMMR/MSI-H and TMB-H are biomarkers relevant for the administration of immunotherapy since approvals as last-line treatments in solid tumors, including breast cancer, in 2017 and 2020, respectively.

Table 10: Access to biomarker testing in the public sector in MEA-9 countries in 2023/24

Setting and subtype	Test	Lower-middle income			Upper-middle income			High-income				
		ALG	EGY	MOR	JOR *	TUR †	SAF	ISR	SAU Citizen	SAU Expat	UAE Emirati	UAE Expat
Essential biomarkers	ER & PR	Routine	Routine	Routine	Routine	Routine	Routine	Routine	Routine	Routine	Routine	Routine
	HER2	Routine	Routine	Routine	Routine	Routine	Routine	Routine	Routine	Routine	Routine	Routine
	Ki-67	Routine	Routine	Routine	Routine	Routine	Routine	Routine	Routine	Routine	Routine	Routine
Gene expression profiles	Oncotype DX, Mamma Print, etc.	Not reimbursed	Limited public reimbursement	Not reimbursed	Limited public reimbursement	Limited private reimbursement	Not reimbursed	Limited public reimbursement	Routine	Routine	Routine	Not reimbursed
Newer biomarkers	PIK3CA	Not reimbursed	Not reimbursed	Routine	Routine	Limited private reimbursement	Not reimbursed	Routine	Routine	Routine	Not reimbursed	Not reimbursed
	BRCA1/2	Limited public reimbursement	Not reimbursed	Routine	Routine	Limited private reimbursement	Routine	Limited public reimbursement	Routine	Routine	Routine	Routine
	PD-L1	Limited public reimbursement	Not reimbursed	Routine	Routine	Routine	Not reimbursed	Routine	Routine	Routine	Routine	Routine
	NTRK	Not reimbursed	Not reimbursed	Not reimbursed	Not reimbursed	Not reimbursed	Not reimbursed	Limited public reimbursement	Not reimbursed	Not reimbursed	Not reimbursed	Not reimbursed
	dMMR/MSI-H	Not reimbursed	Not reimbursed	Not reimbursed	Routine	Routine	Not reimbursed	Routine	Routine	Routine	Routine	Routine
	TMB-H	Not reimbursed	Not reimbursed	Not reimbursed	Not reimbursed	Not reimbursed	Not reimbursed	Limited public reimbursement	Not reimbursed	Not reimbursed	Not reimbursed	Not reimbursed

	Not reimbursed		Routine reimbursement
	Limited public reimbursement		Limited private reimbursement

Notes: * Jordan data shows availability in the RMS only. † Türkiye data refers to the availability in the private sector only. "Limited public reimbursement" refers to scenarios where tests are reimbursed only for specific patient groups, in certain public hospitals, or under circumstances where pharmaceutical companies bear the costs. This category also encompasses situations where tests are only partially funded, requiring patients to contribute towards the expense. Somatic BRCA testing is not publicly reimbursed in Israel. Source: All the information was provided by local experts.

7.3.1 Country-specific status and challenges

Algeria

According to local experts, all histological samples undergo ER/PR/HER2 testing, and this is publicly reimbursed. As for the limited access to newer diagnostic tests, local experts noted that as access to novel breast cancer medicines gets better, access to the necessary tests for obtaining these medicines will also see improvement.

Main challenges

- **Out-of-pocket payments for newer biomarker tests:** Gene expression profiles and tests for newer biomarkers are not fully available in the public sector. These expensive profiles are only available in the private sector, as noted by local experts.

Egypt

Molecular testing in tumor samples is a standard practice in Egypt (329). Local experts report that all histological samples undergo ER/PR/HER2 testing, which is publicly funded. However, access to newer biomarker diagnostic tests and gene expression profiles is limited.

Main challenges

- **Out-of-pocket payments for newer biomarker tests:** Gene expression profiles are expensive and available only in the private sector, according to local experts. Local experts noted that payment for BRCA1/2 testing is aided by pharmaceutical companies and patient organizations, yet it is not available otherwise for patients in the public sector.

Israel

In Israel, there is generally good access to biomarker testing, as most tests are covered by public reimbursement, with only a few exceptions. Local experts anticipate that additional tests, such as the ESR1 mutation testing for breast cancer patients, will likely be covered soon.

Main challenges

- **Availability of new tests only in the private sector:** Local experts noted that many patients opt to undergo testing for newer biomarkers in the private sector.
- **Obstacles to reimburse precision medicine tests:** According to local experts, the Breast Cancer Index Test was rejected in 2022 from a request to include it in the Health Basket.

Jordan

Main challenges

- **Limited diagnostic resources in some regions**: Typically, most cancer patients at KHCC and RMS undergo biomarker testing (50). In contrast, outside of those institutions the rate of such testing can be significantly lower (50).

Morocco

According to local experts, essential biomarkers in breast cancer are reimbursed. Some other biomarker tests are only available in the main cancer centers (209). Local experts noted that BRCA testing is not performed for all breast cancer patients. However, experts noted that there is progress in using diagnostic methods, specifically next-generation sequencing (NGS), to identify multiple targetable alterations, including BRCA mutations. Currently, some private centers in Rabat and Casablanca have already integrated NGS testing. Moreover, local experts anticipate that these tests will soon be available in additional cities as well.

Main challenges

- **Gaps between reimbursement and clinical practice:** In a retrospective study including 2,120 breast cancer patients treated at two leading oncology centers (CM-VI and INO) showed that ER and PR status were documented for 78% and 91% of the patients, respectively. HER2 status was available for 70% and 86% of the patients, respectively (154). Despite reimbursement of these tests in the public sector, there seem to be challenges in incorporating them consistently into clinical practice.

- **Access to diagnostic tests without access to treatment:** Local experts have highlighted that tests for PIK3CA and BRCA1/2 are publicly available. However, the corresponding targeted therapies for breast cancer patients with these mutations are not available in the public sector; see section 8.3. Thus, identifying eligible breast cancer patients for these targeted treatments does not currently impact their treatment options.

Saudi Arabia

Biomarker testing is guaranteed as it is critical in the diagnosis, staging, and treatment planning of breast cancer. However, not all health care facilities possess the capabilities to conduct these sophisticated tests. According to local experts, in cases where peripheral centers lack the necessary resources to analyze tissue samples, they employ a spoke-and-hub approach, sending the samples to larger hospitals for biomarker testing. This system of organization enables smaller, peripheral centers—the "spokes"—to collaborate with more equipped, central facilities—the "hub." By doing so, they ensure that even without the direct capability to perform detailed analyses, such as biomarker testing, patients across different regions can still access these essential diagnostic services.

According to local experts, testing for newer biomarkers is conducted when there is an associated medicine, with pharmaceutical companies often covering the costs of these tests. Facilities like the King Faisal Specialist Hospital & Research Centre, along with the Medical Cities, are equipped with the capabilities to perform such testing.

South Africa

The quality of essential biomarker testing was assessed in a study conducted in four public sector breast cancer centers, where the completeness was found to be high (371). Specifically, the reporting completeness per receptor was found to be 98% for ER, 97.9% for PR, and 97.8% for HER2. Additionally, the variability in reporting receptor status between the four centers was not significant.

Main challenges

- **Limited access to new diagnostic tests for personalized medicine:** Local experts indicate that access to panel testing, including NGS, is limited.
- **Lack of quality of reports:** While the aforementioned study indicates satisfactory completeness of reports concerning biomarkers, local experts have raised concerns about the quality of these essential biomarker reports within the public sector. In specific regions of the country, there has been notable discourse around cases of TNBC. Local experts believe this might be connected to challenges in overseeing biomarker assessments.
- **Limited diagnostic resources:** Local experts indicate that the NHLS faces shortages of certain laboratory reagents, leading to delays of over six months in receiving genomic test results. By the time these results are available, patients have often already received treatment without the critical genomic information that could influence their care. In the Western Cape, one solution explored was to outsource tests, achieving a similar cost but reducing the result wait time to just six weeks.
- **Availability of treatment limits diagnostic tests:** The decision to offer specific diagnostic tests often hinges on the practicality of the next steps. If a test identifies a condition that requires expensive or unavailable treatment, the utility of performing the test can be questioned. This is particularly relevant for conditions where the

treatment is targeted and personalized, such as therapies that target BRCA. As a result, numerous tests that are legally reimbursable are often not conducted in practice.

Türkiye

Essential biomarker testing is reimbursed and tied to the availability of appropriate reimbursed cancer medicines by the SSI (51).

Main challenges

- **Disparities in quality across regions:** According to a study, molecular subtype analysis was included in 87% of the pathologic reports from various geographical regions (345). However, in the Eastern Anatolia region, this analysis was included in only half of the reports, showing significant variation.

UAE

Main challenges

- **Availability of new tests only in the private sector:** Local experts noted that many patients opt to undergo testing for newer biomarkers in the private sector.

7.4 Overview of main challenges in diagnostics

The main challenges across imaging, pathological assessment, and biomarker testing in the MEA-9 countries are shown in Figure 32. Some of the most common challenges are the following:

- When women choose—or are compelled by lack of public coverage—to undergo tests in the private sector, they face out-of-pocket expenses. In the MEA-9 countries, reimbursements for gene expression panels and newer biomarker tests are severely limited. As a result, women opting for these tests bear a significant financial burden.
- Diagnostic services are predominantly concentrated in major cities. As a result, women from more remote areas face the burden of transportation costs and extended travel times. This pattern is seen in several countries, including Jordan, Algeria, and South Africa.
- Another predominant concern is the prolonged waiting times for getting the diagnostic results. For example, in the Eastern Cape, a patient might wait between 6 to 9 months from initially detecting a lump to receiving biopsy and imaging results. This challenge is magnified in the MEA region by the lack of standardized diagnostic processes with maximum time frames in between different procedures. Israel is the only country with defined timelines, yet even they have not consistently been met.
- Lack of quality assurance in diagnostic services is widespread, especially concerning the reliability and completeness of reports. In Türkiye, a study found that nearly 60% of mammography reports were of insufficient quality. In Israel, there are concerns about the lack of rigorous quality controls in private pathology laboratories.
- Diagnostic resources, particularly mammography equipment and MRIs, are in short supply in some MEA-9 countries. Even in Israel, often perceived as a regional standard, grapples with the constraints of limited diagnostic equipment.
- The shortage of skilled professionals is another issue seen in Algeria, Jordan, Morocco, Saudi Arabia, South Africa, and the UAE that face some level of shortages of different specializations important for breast cancer diagnosis, such as specialized breast pathologists, radiologists, and radiographers.

- The shortage of health care professionals is often intertwined with insufficient training, as evidenced by the insufficient ability of technicians to read mammograms in Egypt and similar challenges prevail with radiographers in the UAE.
- The low job satisfaction observed in various countries, notably Türkiye and South Africa, risks exacerbating staffing issues due to potential brain drain to wealthier countries, particularly among pathologists and genetic counsellors.

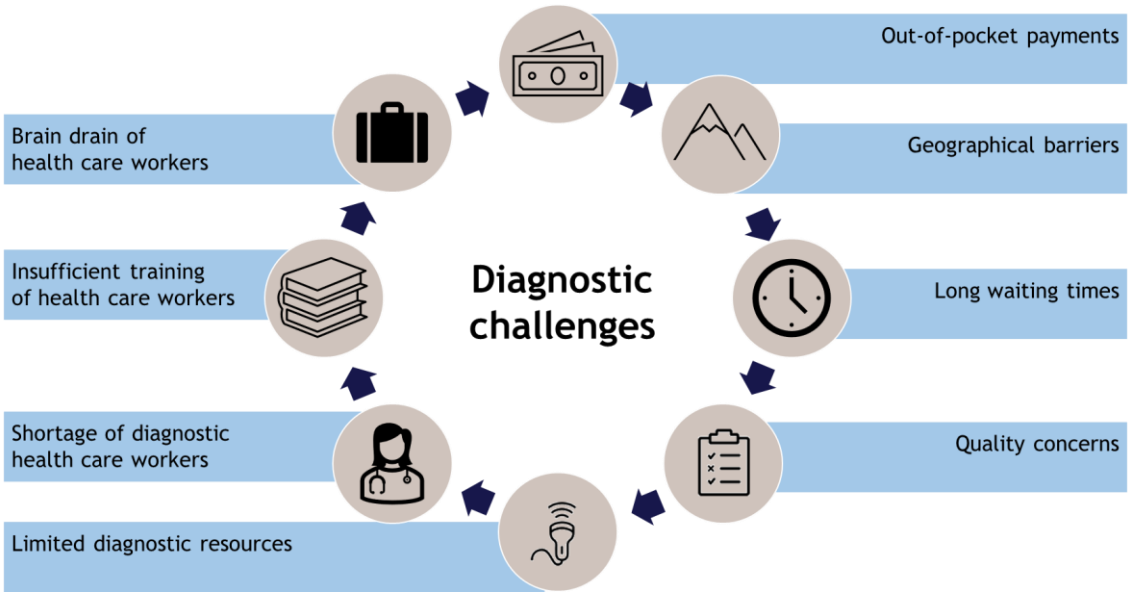


Figure 32: Main challenges in the diagnostic process in the MEA-9 countries.

8. Treatment

The optimal treatment of breast cancer patients differs by disease stage and tumor characteristics; see Figure 33. In general, breast cancer patients may be treated with surgery, radiation therapy, systemic therapy (i.e., cancer medicines), or a combination of these treatment modalities.

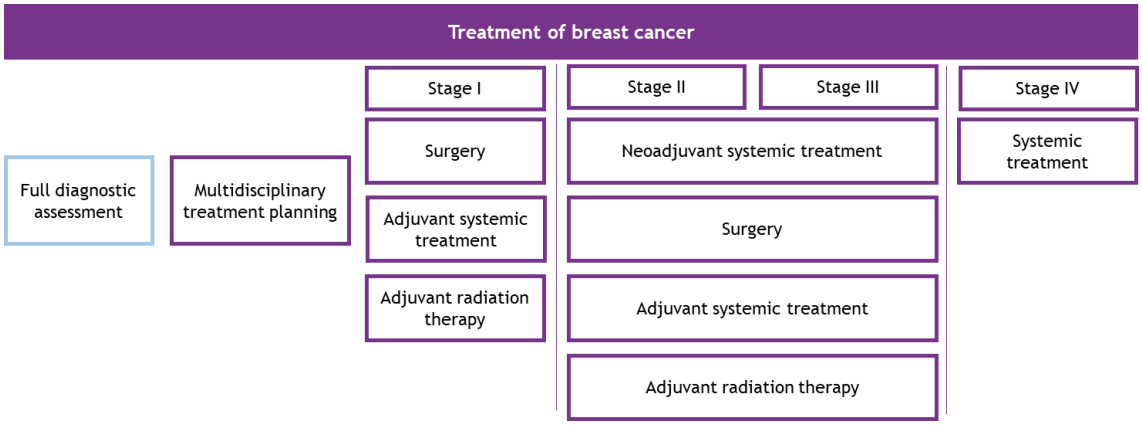


Figure 33: Treatment pathway for breast cancer.

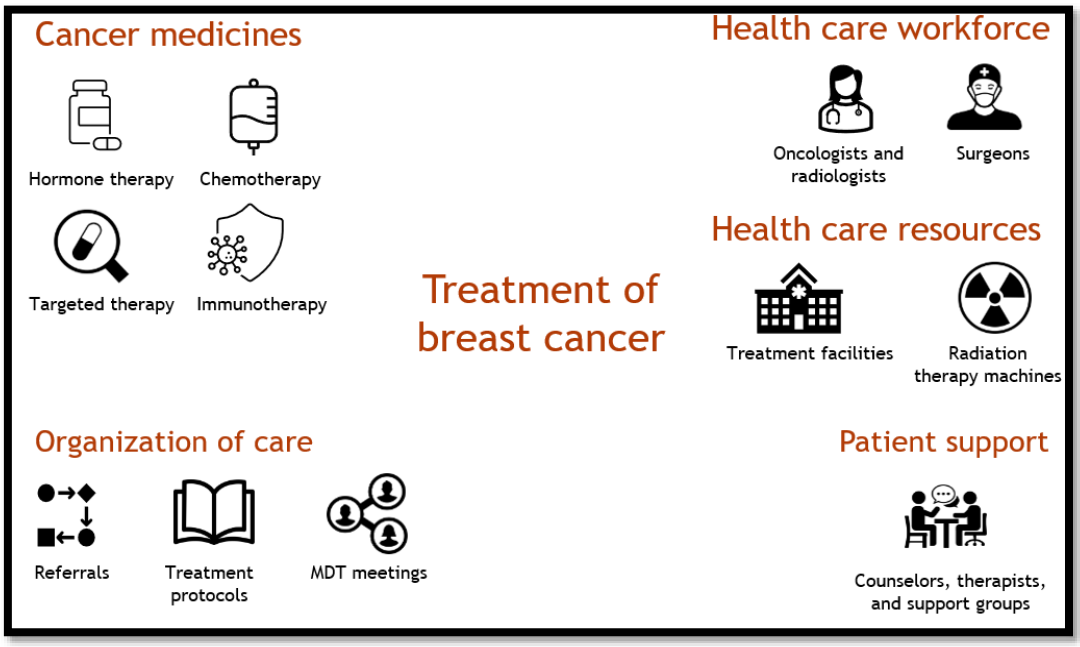


Figure 34: Key elements in the treatment of breast cancer patients.

Some of the essential elements for a breast cancer treatment are detailed in Figure 34. They include:

- **Health care resources and workforce:** The treatment of breast cancer requires specialized health care facilities (ideally specialized breast cancer centers) with radiation therapy equipment and infusion centers for the administration of medicines. Additionally, a comprehensive treatment approach requires a multidisciplinary team of

health care professionals, such as breast surgeons, oncologists, radiologists, and nurses. The capacity of available infrastructure (inpatient beds and outpatients places as well as radiation therapy equipment) and the number of health care professionals needs to be sufficiently high to meet the demand for breast cancer care.

- **Organization of cancer care:** Firstly, a breast cancer treatment plan should be drawn up by a multidisciplinary team (MDT), including at least a radiologist, radiographer, pathologist, surgeon, medical oncologist, radiation oncologist, breast care nurse, and breast data manager (285). Secondly, the different steps in the provision of treatment require a well-functioning referral system. Coordinating referrals effectively helps minimize delays in receiving different treatments. Thirdly, the establishment of national evidence-based treatment guidelines for breast cancer care, derived from the robust and latest scientific evidence, helps to ensure an equitable provision of care across the whole country. Adherence to clinical guidelines in breast cancer care has been demonstrated to enhance overall survival rates and diminish the risk of recurrence (376).
- **Patient support:** Emotional and psychological well-being is of paramount importance during breast cancer treatment. Services like counseling, support groups, and access to mental health professionals are vital in assisting patients as they navigate these challenges. One third of breast cancer patients report significant emotional distress, and nearly half indicate elevated levels of depression and anxiety (285).
- **Treatment modalities - surgery, radiation therapy, and cancer medicines:** The specific treatment approach depends on the stage and subtype of breast cancer, with the aim of providing the most effective and tailored care for each patient's unique situation. Essentially all patients with early-stage disease will receive breast surgery, which might be preceded by use of cancer medicines for a limited amount of time (neoadjuvant therapy) and is succeeded by more treatment with cancer medicines and/or radiation therapy (adjuvant therapy). The treatment of metastatic breast cancer primarily involves cancer medicines; see Table 11 for more details.

Table 11: Treatment modalities in breast cancer and its subtypes

Surgery	There are two main types of surgery to remove a tumor in the breast, irrespective of the breast cancer subtype. • **Breast-conserving surgery** (also known as lumpectomy) is surgery to remove the tumor as well as some surrounding normal tissue. Only the part of the breast containing the tumor is removed. • **Mastectomy** is a surgery in which the entire breast that contains the tumor is removed, including all of the breast tissue and sometimes other nearby tissues. Some women may also have both breasts removed in a double mastectomy.
Radiation therapy	Radiation therapy is treatment with high-energy rays (or particles) that destroy cancer cells. • In HR-positive cases and TNBC cases, it is usually given after breast surgery to help destroy remaining cancer cells. This lowers the risk that the cancer will grow back in the same breast or nearby lymph nodes (local recurrence). • In HER2-positive cases, it is commonly recommended after breast surgery, but it may be given before surgery as part of a neoadjuvant treatment approach.

Cancer medicines (systemic therapy)	There are four types of systemic therapy used in breast cancer treatment: • **Chemotherapy** uses chemicals to kill fast-growing cells in the body. Unlike radiation therapy, which targets a specific area of the body, chemotherapy circulates throughout the body and kills cancer cells wherever they are. Chemotherapy is used in all breast cancer subtypes, albeit to varying extent. • **Hormone therapy** (also known as **endocrine therapy**) is used for HR-positive cases. It aims to interfere with the hormonal signals that drive the growth of these cancers. • **Targeted therapy** aims at specific proteins or pathways that are involved in the growth and spread of cancer cells. HER2-targeted therapies are used in HER2-positive cases. CDK4/6 inhibitors are used in HR-positive cases. PARP inhibitors are used in BRCA-positive cases. Antibody-drug conjugates are used for HER2-low cases. • **Immunotherapy** with checkpoint inhibitors helps the body's immune system recognize and attack cancer cells. It is primarily used for TNBC cases.

Source: American Cancer Society (377, 378).

8.1 Organization, workforce, and patient support

8.1.1 Country-specific status and challenges

Algeria

While the diagnosis of breast cancer can frequently experience delays, local experts mentioned that starting treatment typically faces few holdups. For example, at the Centre Pierre et Marie Curie center in Algiers, the initiation of treatment usually spans 1 to 1.5 months, according to local experts. Studies in the country have shown a similar time for starting treatment after diagnosis. For instance, a study of 1,437 breast cancer patients showed that the median time from diagnosis to first-line treatment was 25 days (225). Local experts said that in newer cancer centers, this duration can be even briefer, ranging from 1 to 2 weeks. A study in the region of Batna (N=267) showed that the median time to management (the time between first consultation and treatment start) was 4.5 months (239).

According to local experts, the majority of health care facilities have set up MDTs. Newer centers are actively pursuing the establishment of MDTs to improve collaborative care and decision-making. After MDT consultations, breast surgeries are typically carried out within a span of 15 days.

Following the introduction of the National Cancer Plan 2015-2019, a national cancer committee was established to periodically update therapeutic guidelines and develop new ones (379). Since 2016, six of such guidelines have been released, including one for breast cancer. Local experts have indicated that the most recent update was in 2022, integrating new treatment recommendations from both the European Society for Medical Oncology (ESMO) and the National Comprehensive Cancer Network (NCCN) in the United States.

Main challenges

- **Hesitant adoption of new treatment approaches:** Local experts noted that there was initial resistance to adopting neoadjuvant therapy (performed before surgery) in clinical practice in 2015, primarily due to surgeon reluctance. Today, it is employed for HER2 positive and TNBC cases. Still, the decision to use this treatment often varies depending on the surgeon and treatment center. In some cases, the patients themselves want to start treatment with surgery and not cancer medicines, according to local experts.
- **Shortage of surgical oncologists:** There are no specialized training programs or courses specifically dedicated to oncology surgery (57). Surgeries in cancer patients are carried out by surgeons who specialize in specific organs rather than by surgeons specialized specifically in oncology.

Egypt

A study published in 2022, based on registries from three public oncology services in Alexandria showed that more than 75% of breast cancer patients started their treatment journey with chemotherapy within 1.6 months (91).

According to local experts, there is nowadays a greater focus on tumor biology in the treatment approach, which has led to the understanding that certain groups of patients can benefit from neoadjuvant treatments. Local experts noted that around half of patients have access to some form of neoadjuvant therapies when deemed necessary. They also highlighted that there are well-established guidelines and treatment protocols for certain breast cancer subtypes, such as the HER2-positive group.

Within the Women's Health Initiative, local experts have highlighted the organization of numerous training activities for breast surgeons. They have also conducted training programs for oncologists, such as the '100 Days of Health' campaign.

Main challenges

- **Lack of uniform treatment guidelines:** Due to the fragmentation among health care providers, developing consistent treatment guidelines has been challenging. Local experts highlighted that one of the presidential initiatives aimed to create a foundational guideline system, akin to entities like the National Health Service (NHS) in the United Kingdom or NCCN in the United States. The goal of these guidelines was to unify the dispersed services and offer a comprehensive approach to breast cancer care. With the introduction of universal health insurance, there is an aspiration to transition from the current fragmented framework to a more unified system over time, paving the way for standardized treatment guidelines for breast cancer care.
- **Uneven adoption of MDT meetings:** Multidisciplinary management is gaining importance in Egypt, but it is not yet widely practiced throughout the country due to technical and financial reasons (329).
- **International economic disturbances:** The international economic landscape, combined with the recent devaluation of the Egyptian pound, has added layers of complexity (380). Since many health goods are imported and priced in foreign currencies, their cost has risen significantly, which limits access, according to local experts.

Israel

The "Health Basket" defines the set of health care services, treatments, and products that are covered by the NHI. According to local experts, when additions to the Health Basket are made, this involves the consideration of international guidelines like those from the American Society of Clinical Oncology (ASCO), ESMO, and NCCN, to ensure that the health care services provided are aligned with global best practices.

Specific mandated time frames are in place to facilitate prompt treatment. Breast cancer patients are guaranteed timely care as the surgeries must be performed in a 30-day window from the time the decision to perform the surgery was decided (381). However, local experts have noted that these time frames are not always strictly adhered to.

Patient cases with multiple treatment options must be assessed in MDTs. According to local experts, this mandate was established in 2022, detailing the specific participants and procedures for these meetings. Certain cases, such as T1N0 hormone-positive breast cancer, where surgery is the preferred choice with no alternative methods, might not necessitate an MDT. Specifically, breast cancer patients with HER2-positive, TNBC, or tumors larger than 2 cm are required to undergo discussions in these meetings as per health ministry guidelines.

Local experts expressed that in the community setting, comprehensive oncology practices are lacking, and most patients receive management within hospitals. Only those who have concluded their adjuvant therapy (after surgery) are generally managed in the community. In general, women who have undergone breast cancer treatment are at an increased risk of developing other conditions, such as diabetes, cardiovascular disease, and secondary cancers. Local experts highlighted that it remains ambiguous whether primary care providers or oncologists should manage their long-term follow-up care. Given the scarcity of oncologists, it might be beneficial to consider alternative methods to offer continuous care for breast cancer survivors in the community setting.

Main challenges

- **Shortage of breast surgeons:** Local experts highlighted the shortage of surgical breast oncologists.
- **Coordination challenges between hospitals and community:** The disconnect between community health care facilities and hospitals leads to a situation where primary care physicians lack access to essential information unless patients personally provide their records.
- **Shortage of mental health professionals in the public sector:** Local experts have pointed out that psychologists are often disincentivized from working in the public health sector, which leads to a decreased availability of mental health professionals to assist women with breast cancer. Furthermore, whereas the government previously covered costs for mental health services, now HMOs are responsible. This shift has resulted in a significant shortage and a lack of available services.
- **Patients' unawareness of their rights:** Local experts highlighted that women often do not realize they are entitled to 8 to 12 psychological counseling sessions in the hospital, covered by their HMO. Also, local experts pointed out that women diagnosed in the community who do not proactively seek an oncologist before surgery might miss out on crucial referrals to oncologists or the opportunity for an MDT.
- **Long waiting times for patient support:** There was an agreement among local experts that waiting times to access mental health support are excessively long. NGOs, such as 'One in Nine', step in to provide breast cancer patients with emotional support.

Jordan

Local experts indicate that the majority of cancer patients receive treatment at the KHCC, followed by the Military Oncology Center and Al Bashir Hospital. They also commend the level of care provided. According to local experts, there are many emerging breast units spread across both the private and public sectors, indicating the improving availability of breast cancer care services. Regarding geographical barriers, local experts are hopeful for positive changes in the near future, given the ongoing projects aimed at enhancing geographical accessibility. There are plans in motion to set up a sub-center from the KHCC in Aqaba in the southern regions, the first phase of which is expected to launch in the third quarter of 2024 (382).

Local experts estimated that the timeframe from diagnosis to the initiation of treatment can range from two weeks but sometimes can extend up to two months. A study conducted at two cancer centers in Jordan found a similar waiting time, with an average treatment time (from diagnosis to treatment initiation) of 23 days, and a median of 14 days (65). Until recently, over fifty percent of patients diagnosed with non-metastatic conditions received neoadjuvant chemotherapy due to the fact that the majority of patients exhibits a sizable tumor size at the time of diagnosis (65).

Local experts noted that cancer care (which is free for insured patients) might not always require significant OOP payments from uninsured patients. The Jordanian government, through mechanisms like the Royal Court exemption, assists its citizens in accessing care. As a result, the financial weight of cancer treatments falls more on the state than on individual patients.

Main challenges

- **Absence of standardized treatment protocols:** Local experts asserted that the fragmentation of the health care system results in a notable lack of cohesion, especially evident in the lack of standardized treatment protocols for cancer patients. Each institution tends to adopt its own approach. Notably, there were endeavors in 2017 to align protocols between the KHCC and the MoH, but according to local experts, significant advancements are still pending.
- **Geographical barriers:** According to local experts, in some regions, particularly in the north and underprivileged areas, there are not enough oncological medical facilities leading to patients having to head to bigger cities.
- **Long waiting times:** Often, in the public sector there is an increased demand for services that leads to long waiting times, according to local experts. In a study at two cancer centers it was found that around one third of the patients had delays in treatment initiation (65).
- **Shortage of surgical oncologists:** Specialized surgical oncologists perform the surgery in about half of the patients with breast cancer, while the rest are performed by general surgeons with a sometimes less optimal results (65).

Morocco

In a study of breast cancer patients treated at the CM-VI and the INO, the median interval from when the breast cancer diagnosis was confirmed to the registration at an oncology center was between 0.7 and 15 months (154). The study showed that most of the patients that received treatment at the centers were covered by insurance of some kind, with a strong improvement between the periods 2008-2010 and 2015-2017. Surgery was the most common way to treat breast cancer, with 70-86% of all patients receiving it.

An important recent progress, as highlighted by local experts, is the emergence of multidisciplinary medical decision-making through the establishment of MDTs in the country. The INO in Rabat has four MDTs, with one focusing on breast cancer. Local experts mentioned that Morocco was the first country in the region to have developed local clinical guidelines tailored for its population, with the current availability of the 5th edition and ongoing work on the 6th edition.

After the 2023 earthquake in Morocco, the health care system experienced increased pressure, notably affecting cancer care continuity. The disaster intensified emotional and psychological stress among cancer patients and challenged the health care infrastructure, especially in rural areas (383). Despite these hurdles, reports indicate that cancer treatment accessibility, including radiation, chemotherapy, and surgery, remained stable (383). Nonetheless, providing fundamental services like accommodation for patients seeking temporary treatment in urban centers proved challenging.

Main challenges

- **Geographical barriers:** When evaluating the top oncology centers, CM-VI and INO, a study found that there was a lower representation of breast cancer patients from rural areas compared with urban and semi-urban populations (154). Merely 10-14% of the registered breast cancer patients lived in rural areas, despite the fact that around 36% of the population resided in rural areas in 2020. It remains uncertain whether this disparity is a result of patients having better access to nearby oncology centers or if significant barriers, such as costs and transportation, hinder their ability to reach larger oncology centers.
- **Shortage of surgical oncologists and oncologists**: According to local experts, there is a shortage of health care professionals who specialize in treating breast cancer patients, particularly in the area of specialized surgeons. As a result, many patients have to undergo surgeries performed by general surgeons instead of surgical oncologists (154). Additionally, there was still a critical scarcity of only 107 oncologists available across the country in 2019 (360).
- **Low accessibility of MDT meetings in certain settings:** There has been an improvement in decision making with MDT, but patients in rural and semiurban settings, or even in the private sector, may encounter obstacles when trying to have their cases discussed in these meetings. Local experts emphasized the need to raise awareness among patients about the importance of undergoing MDT meetings to create the best treatment plan. In some cases, patients receive a breast cancer diagnosis and undergo surgery without the opportunity to consult with a medical oncologist.
- **Low use of neoadjuvant therapy:** Ten years ago, the use of neoadjuvant therapy was limited, but now it is more accessible to patients at INO at least. Patients in treatment centers located in rural and semiurban areas may still encounter challenges in accessing neoadjuvant therapy, according to local experts.

Saudi Arabia

According to local experts, the time between diagnosis and start of treatment is mostly within 3 months. In general, MDT meetings are standard practice for taking treatment decisions. Patients are involved as much as possible, but only if they are willing to be involved. Local experts noted that the Saudi health workforce often receives training abroad with scholarships in countries like the United States, Canada, and the United Kingdom.

During recent years, the MoH has established smaller cancer treatment centers ("satellite centers") in Mecca, Medina, and Qassim (384). The aim is to establish these satellite centers in all 20 regions of the country by 2030 (50). Also, in 2019 the MoH launched the medical referral program "Ehalati" that aids in directing (any kinds of) patients to appropriate hospitals for management when their initial care center lacks necessary resources/expertise to treat their condition (385). This referral is done electronically.

The Cooperative Health Insurance Council confirmed that health insurance providers must shoulder the expenses related to treating benign growths and breast cancers, up to the maximum coverage limit (386). The coverage has a maximum limit set at 500,000 Saudi riyals (equivalent to 133,285 USD as of August 2023). This comprehensive coverage spans the entirety of a patient's treatment journey, from initial examinations through to medicines and any necessary restorative procedures.

Main challenges

- **Absence of standardized treatment protocols:** Common treatment guidelines are not feasible due to the fragmentation of the health care system and thus patients might be treated differently by different providers (50).
- **Geographical barriers:** A notable gap exists in the availability of oncology centers in the northern and southern regions. In these regions, there are only hospitals with satellite units to administer chemotherapy. Once diagnosed, patients from these areas should be sent to bigger hospitals. This requires effective coordination to prevent patients from getting lost in the system.
- **Shortage of medical oncologists:** Health care services for cancer patients in rural areas are usually delivered by general or family physicians due to lack of oncologists in these areas, which results in poor quality of care (387). Local experts also stated an important shortage of medical oncologists. Surgical oncology and radiology are better staffed. Many breast surgeons and radiologists are expatriates.
- **Shortage of breast surgeons:** Local experts noted that sometimes general surgeons perform surgeries instead of breast surgeons, leading to suboptimal treatments.
- **Limited psychosocial support:** The landscape of patient support is marked by a dearth of support groups and a significant gap in Arabic-centric platforms (388). This lack particularly impacts women from conservative backgrounds, posing considerable obstacles to their ability to openly communicate and seek assistance for their cancer journeys (388). However, recent years have seen encouraging developments, such as the emergence of new online support groups. A notable example is "Najia," which was established in 2016. It has shown remarkable growth, expanding its membership to over 160 individuals by 2021 (388).

South Africa

Access to high-quality breast cancer care is very different across provinces and sectors. In general, the private sector offers high quality, but costly care. More than 80% of patients are treated in the public sector (389).

Main challenges

- **Skill shortages in oncology:** Local experts noted that there is a significant deficiency in skilled health care professionals across all oncology fields. This also includes a shortage of nuclear medicine physicians, radiation therapists, and nurses.

- **Limited surgical availability and reliance on funding from NGOs**: In the Western Cape's major hospitals, there is only one surgical list per week for breast surgery, despite a high patient load of almost 700 annually, according to local experts. Limited surgical slots also lead to problems in offering procedures like reconstructions. The waiting time for a mastectomy can be up to four months (390). Local experts revealed that some breast cancer units, despite handling nearly 700 patients annually, operate with just one senior surgical consultant. NGOs often intervene, providing additional personnel and financing extra surgical lists. However, such a setup is not sustainable in the long term.
- **Financial constraints for non-PMB treatments:** Local experts noted that when breast cancer is seen as a PMB, the funding comes out of the medical scheme's risk pool, not the oncology benefit. This situation leaves many patients without funds for non-PMB level of care treatments that are available to them.
- **Transportation costs:** Many breast cancer patients report that the cost of transportation is a major expense and a key factor in discontinuing their treatment regimens (391). For example, in certain areas of Cape Town, it is estimated that households spend up to 43% of their monthly income on transportation costs alone (392). Local experts have noted that while the state offers hospital transportation from secondary hospitals to breast cancer centers, patients residing in inner-city areas are expected to rely on public transportation, which creates a substantial barrier.
- **Lack of psychosocial assistance:** Local experts noted there is an absence of psychosocial support for patients between diagnosis and reaching a breast care unit.
- **Supply chain disruptions:** Local experts noted that disruptions in the supply chain in the Eastern Cape region, combined with unpaid staff and nursing strikes, have resulted in the cancellation of surgeries. Such continuous interruptions can profoundly impact the availability and quality of health care.

Türkiye

Efforts have been made to establish a standardized approach for breast cancer care across various institutions and cities (345). A key focus in recent times has been on increasing the use of breast-conserving surgery, with encouraging results as the breast-conserving surgery rate in 2018 was 57% compared with 35% in 2008 (345). The Turkish Federation of Breast Diseases Societies (TFBDS) provides ongoing education and training to health care professionals involved in the breast cancer care continuum, including physicians, nurses, and technicians (393). In order to be a member, each society is required to conduct MDT meetings once per week with health care workers from different specialties. MDT meetings were conducted in 87% of cases in 2018 (345).

Main challenges

- **Long waiting times:** A study found that of all the steps in an average breast cancer diagnostic process, the step that took the longest was having an appointment with an oncologist (272). Also, local experts mentioned that once diagnosed, patients often have to wait for an extended period before they can start their treatment at public hospitals due to long waiting lists.
- **Limited surgical availability**: Local experts noted that there is a shortage of breast surgeons and long waiting times for breast surgery.
- **Geographical barriers:** A study that included 24 institutions in 18 cities found that the mean time between a clinical appointment and initiation of treatment was 29 days (345). There were substantial differences in the delay between regions, with average

waiting time in Southeast Anatolia being more than double - 66 days – the national average. Also, local experts noted that women in remote and underserved areas face challenges in accessing treatment services after initial diagnosis.

- **Lack of comprehensive care:** Local experts said there may be a shortage of comprehensive breast centers within oncology units. For this reason, patients are at risk of experiencing fragmented care, leading to less efficient treatment pathways.

UAE

Patients generally express satisfaction with their care. However, challenges do arise, largely due to the diverse patient population in the UAE.

Main challenges

- **Fragmented treatment provision:** Local experts highlighted the challenges posed by the fragmented service delivery in health care. Patients often navigate multiple institutions for diagnosis, surgery, and radiation therapy due to frequent referrals. This constant transitioning not only emotionally burdens women but also jeopardizes the quality of care by undermining an MDT approach to treatment.
- **Geographical barriers:** Tawam Hospital is one of the main comprehensive cancer centers in the UAE, located in the eastern region of Abu Dhabi. For patients residing in other parts of the country, such as Dubai or Sharjah, the distance to this hospital may pose a challenge in terms of accessibility (324).
- **Shortage of nurses:** The shortage of nurses, especially in the field of oncology, is a significant issue. Many nurses are incentivized to work in higher-paying centers, exacerbating the problem. To address the risk of nurse shortages, the UAE has reduced some requirements to attract more nurses from other countries (346).
- **Barriers for neoadjuvant therapy:** In the private sector, general surgeons may have financial incentives that discourage them from referring breast cancer patients to breast surgeons (346). These patients may undergo surgery directly and not receive appropriate neoadjuvant therapy (performed before surgery), as their treatment plan was not discussed by an MDT, which can result in suboptimal treatment and outcomes.
- **Patient-induced treatment delays:** Local experts note that some patients are hesitant to commence treatment, frequently seeking multiple opinions or even being in denial about their diagnosis. This hesitation leads to treatment delays as patients explore various physician recommendations, seek assurance in their choices, or in the case of expatriates consider returning to their home countries.
- **Financial concerns:** A significant challenge patients often encounter is the financial burden of their treatments. At Friends of Cancer Patients, a set of beneficiaries, already diagnosed, may approach them for financial aid. Being a charitable entity, their support is determined by each individual's socioeconomic status and treatment requirements. As a result, many patients reach out to multiple charities, which can introduce waiting periods. Despite efforts to fast-track the process, some charities have waitlists that span up to a month, potentially delaying the start of treatment.
- **Job insecurity for expatriates:** Expats diagnosed with cancer often grapple with the risk of job loss due to prolonged absences needed for treatments such as surgery, radiation therapy, and systemic therapy. A job loss typically equates to losing their residence permit. Although the government subsidizes treatment, daily expenses like housing, food, and utilities remain uncovered. Local experts highlight that, faced with these financial pressures, many patients may find themselves returning to their home countries, interrupting their ongoing treatment in the UAE.

8.2 Radiation therapy

Radiation therapy is a fundamental modality in the treatment of many cancers, including breast cancer. Over half of all breast cancer patients undergo radiation therapy at some stage of their treatment (394). The availability of diverse radiation therapy machines offers oncologists and radiation therapists a range of tools to deliver the most suitable treatment for a specific patient's needs. Each type of therapy has its unique advantages depending on the clinical scenario. The types of radiation therapy machines for breast cancer treatment include the following technologies:

- **External beam radiation (EBRT):** This is the most common radiation therapy method for breast cancer (395).
    - **Megavoltage (MV) therapy:** Linear accelerators (linacs) deliver high-energy X-rays in the MV range to the breast tissue. Cobalt-60 machines are an older type of EBRT in the MV range, which might still be used in some treatment centers in the MEA-9 countries.
    - **Kilovoltage (kV) therapy:** Radiation therapy machines delivering low-energy X-rays in the kV range are particularly useful for early stages of breast cancer in which tumors are small and located close to the surface of the breast. Yet it has also been used in the metastatic setting (396).
- **Brachytherapy:** It is a type of radiation therapy in which a radioactive source is placed inside or next to the area requiring treatment. In the context of breast cancer treatment, brachytherapy may be used as a type of partial breast irradiation to deliver radiation directly to the area around the tumor site (395).

In relation to meeting the health care needs of the population for radiation therapy, considering both current cancer patients and those who might develop it, the International Atomic Energy Agency (IAEA) has published a recommendation of 4 linacs per 1 million inhabitants (397, 398). The availability of linacs (part of MV therapy) is below this recommended benchmark in all countries; see Figure 35. The countries with the highest ratios are Israel with 3.7 MV therapy machines per 1 million inhabitants followed by Türkiye with a ratio of 3.4. The remaining countries lag significantly, having fewer than 2 MV therapy machines per 1 million inhabitants. Algeria has that lowest ratio of 0.8.

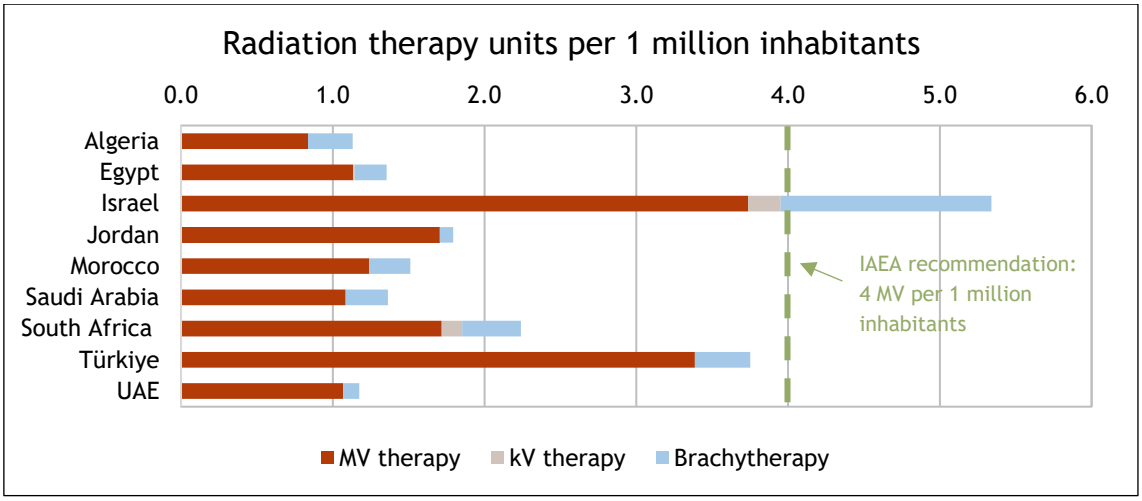


Figure 35: Radiation therapy machines per 1 million inhabitants.

Notes: MV therapy includes linacs and cobalt-60 machines. Source: DIRAC database (399).

In addition, the IAEA and the European Society for Radiotherapy and Oncology (ESTRO) have another recommendation that directly relates to the number of cancer patients needing treatment. It is more reflective of the potential demand and recommends 1 linac (part of MV therapy) per 450 cancer patients (400). No country in the MEA-9 region meets this recommendation; see Figure 36. The UAE comes closest with a ratio of 0.95, while Algeria, on the other hand, has the lowest ratio at 0.29 MV machines per 450 cancer patients. To infer the quality of care, however, the consideration of the mere number of radiation therapy machines is not enough. Other aspects that should be considered are the age of the machinery (whether they are older linacs or the use of cobalt-60 machines instead of newer linacs), whether the machines are properly maintained, and the presence of trained professionals to operate the machines.

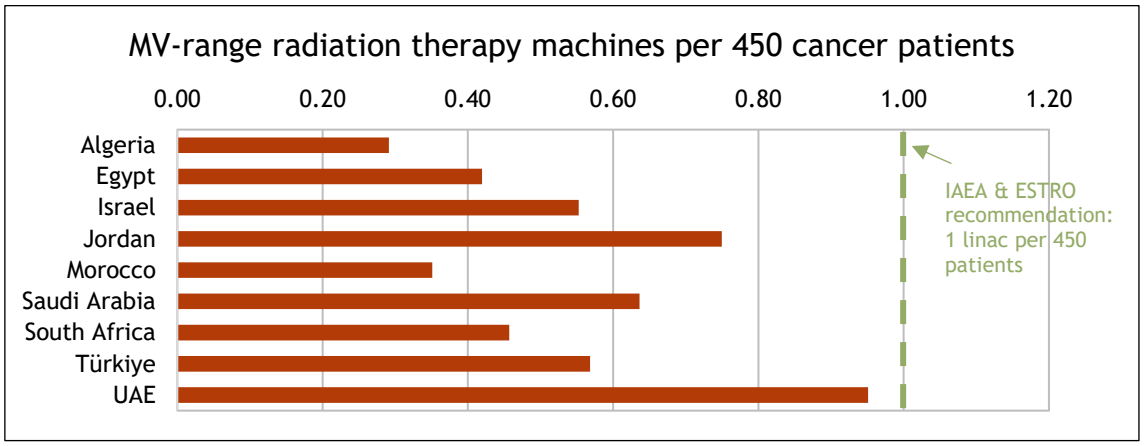


Figure 36: MV-range radiation therapy machines per 450 cancer patients.

Notes: MV therapy includes linacs and cobalt-60 machines. Cancer patients were defined as "newly diagnosed cancer cases" in 2020 as reported by GLOBOCAN. Source: DIRAC database (399).

Recent advancements in hypofractionation for breast cancer are reshaping treatment recommendations (401). Hypofractionation shortens the treatment duration without compromising health outcomes. Major clinical trials have demonstrated that the number of radiation therapy sessions (called fractions) in adjuvant breast cancer treatment could be reduced from a 3-week (15 fractions, 5 days per week) to a 1-week (5 fractions, 5 days per week) schedule (402, 403). This approach not only provides a more cost-effective utilization of health care resources but also frees up resources for other areas of cancer care. Recent estimates indicated that the health care costs of adjuvant hypofractionated radiation therapy in breast cancer is around one third lower than conventional radiation therapy (404). Additionally, it cuts down on non-medical expenses for patients and their families, including transportation costs and the daily commitments of informal caregivers accompanying patients to the hospital.

8.2.1 Country-specific status and challenges

Algeria

Many cancer treatment centers have been established over the last decades that are equipped with modern radiation therapy units, according to local experts. In 2023, the number of radiation therapy machines was 50 (37 machines in the MV-range and 13 brachytherapy units) (399).

Main challenges

- **Long waiting times:** Local experts pointed out significant delays in accessing radiation therapy within the public sector. There are also regions with significantly longer waiting times, specifically in the southern parts where patients may need to wait for six months whereas in the eastern parts the waiting time is around three months (50).
- **Patient preferences:** Local experts noted that patients tend to favor treatment in larger centers, even if it means enduring longer waiting times.
- **Limited number of radiation therapy machines:** The availability of radiation therapy machines, as shown in Figure 35 and Figure 36, falls short of international recommendations. According to local experts, there is a limited number of university hospitals, primarily located in major cities, that offer radiation therapy, and there is a notable scarcity of private facilities providing this treatment.

Egypt

In 2023, the number of radiation therapy machines was 148 (124 machines in the MV-range, 1 machine in the kV-range, and 23 brachytherapy units) (399).

Main challenges

- **Geographical barriers:** The unequal distribution of radiation therapy machines poses a significant challenge, with nearly half of them concentrated in Cairo (50). This requires cancer patients from rural areas to travel vast distances for treatment. Moreover, extended waiting lists in certain regions add up to geographical barriers (50).
- **Limited number of radiation therapy machines:** The number of radiation therapy machines, as highlighted in Figure 35 and Figure 36, is below international recommendations.

Israel

There are good levels of availability of modern radiation therapy equipment and highly skilled medical professionals involved in radiation therapy. Some of the most important radiation centers that offer cutting-edge radiation therapy are the Davidoff Cancer Center, the Sheba Medical Center, Hadassah Medical Center, and the Tel Aviv Sourasky Medical Center. In 2023, the number of radiation therapy machines was 50 (35 machines in the MV-range, 2 machines in the kV-range, and 13 brachytherapy units) (399).

Main challenges

- **Risk of accessibility challenges:** The ratio of radiation therapy equipment per 100,000 inhabitants in Israel is relatively low compared with other countries in the OECD with similar GDP per capita. According to the OECD, in 2021, Israel had a ratio of 4.4 radiation therapy equipment per 100,000 inhabitants, while Austria had a ratio of 11.7 per 100,000 inhabitants in the same year (405). Figure 36 also shows that the number of radiation therapy machines is below international recommendations to adequately meet patient demand. This could lead to prolonged waiting times for treatment.

Jordan

There were a total of 20 radiation therapy machines (19 machines in the MV-range and only 1 brachytherapy unit) in the country in 2023 (399). The equipment is located in only a few facilities in Amman, including at the KHCC, the RMS, one public hospital, and private hospitals.

Main challenges

- **Geographical barriers:** Radiation therapy facilities are primarily found centrally, hence it is difficult for patients living in rural areas to receive the services (65). To address this issue, support is provided to some degree for transportation and accommodation.
- **Limited number of radiation therapy machines:** The number of radiation therapy machines, as highlighted in Figure 35 and Figure 36, is below the standards set by international recommendations.

Morocco

Large progress has been made in recent decades to improve the availability of radiation therapy units. There was only one linac in the country in 2000 (50). Until 2023, this number had grown to 46 linacs and 10 brachytherapy units spread across the country (399).

Main challenges

- **Limited number of radiation therapy machines:** Despite the increasing number of machines in the last two decades, the current numbers, as highlighted in Figure 35 and Figure 36, are still below international recommendations.

Saudi Arabia

In 2023, there were 49 radiation therapy machines (39 machines in the MV-range and 10 brachytherapy units) in the country (399). Nearly all of them were located in Riyadh, Jeddah, and Dammam.

Main challenges

- **Geographical barriers:** For radiation therapy, the main challenge is the geography of the country, with poor access in rural areas (50).
- **Limited number of radiation therapy machines:** The number of radiation therapy machines, as highlighted in Figure 35 and Figure 36, is below international recommendations.

South Africa

Radiation therapy is included in the PMBs and available at all major public hospitals throughout the country (50). Not all modern radiation techniques (such as stereotactic body radiation therapy) are available at all centers but are being introduced. The recent advances in hypofractionation in breast cancer are helping reduce waiting times for radiation therapy (50). In 2022, the number of radiation therapy machines was 133 (102 machines in the MV-range, 8 machines in the kV-range, and 23 brachytherapy units) (399).

Main challenges

- **Limited number of radiation therapy machines:** The public sector's radiation therapy sites are facing a shortage of equipment, which is causing poor performance (406). Without radiation therapy, the risk of cancer recurrence increases, and physicians may proactively recommend more aggressive treatments such as mastectomies instead of breast-conserving surgeries. Currently, the lack of radiation therapy is recognized in the medical clinical guidelines of South Africa as a contraindication for breast-conserving surgeries (406).

- **Lack of radiation oncologists and radiation therapists:** The shortage of radiation therapists and radiation oncologists in the public sector is a prevalent issue across the country, resulting in extended waiting times for patients to receive radiation therapy and an excessive workload for the existing staff (407).
- **Lack of brachytherapy in the private sector:** Local experts have pointed out that brachytherapy is not offered in the private sector in Cape Town. This has resulted in patients being redirected to other centers, leading to extensive waiting lists. By the time some patients finally get access to brachytherapy, it may no longer be beneficial.

Türkiye

There were 141 radiation therapy centers spread across the country in 2019, with some of them being modern facilities that offer various treatment options for breast cancer patients (397). Although there has been progress in the provision of radiation therapy for breast cancer patients, there are still several challenges that need to be addressed to ensure that all patients have equitable access to timely and high-quality care. In 2023, the number of radiation therapy machines was 318 (287 machines in the MV-range and 31 brachytherapy units) (399).

Main challenges

- **Limited number of radiation therapy machines:** There is a relatively low number of radiation therapy machines per capita in Türkiye compared with other countries with similar levels of economic development, which can result in longer waiting times for treatment and reduced access to specialized radiation therapy techniques. According to the OECD, the ratio was 3 per 100,000 inhabitants in 2020, while the OECD average was 8 per 100,000 (405).
- **Geographical disparities to access:** There are significant regional disparities in the availability of linacs. While the average ratio of linacs per million inhabitants across the country was 3.14 in 2019, which falls below the recommended level of 4 by the IAEA, some regions have much lower ratios. The regions with the lowest ratios are East Anatolia and Southeast Anatolia, with only 1.82 and 0.78 linacs per million inhabitants, respectively (397).
- **Lack of radiation oncologists and radiation therapists:** Türkiye is currently facing a shortage of highly skilled professionals in radiology, particularly in the field of radiation oncology. According to the available data, there were only 596 radiation oncologists in the country in 2019, which falls below the suggested range of 680 to 740 professionals (397). Additionally, there is a shortage of radiation therapy technicians, with only 1,100 technicians reported in the same year, compared with the recommended range of 1,700 to 1,850 technicians (397).

UAE

Across the country, there are several centers that offer radiation therapy services (346). These centers are fully equipped with modern and advanced equipment, such as linacs, tomotherapy units, and brachytherapy units (346). The majority of the equipment is of the latest generation. In the near future, four new centers are planning to establish radiation facilities that will incorporate the latest technologies (346). This expansion of radiation therapy providers has the potential to benefit breast cancer patients. In 2023, the number of radiation therapy machines was 11 (10 machines in the MV-range and only 1 brachytherapy unit) (399). This number is close to international recommendations, see Figure 36, when taking into account the comparatively low number of cancer patients in the UAE.

8.3 Cancer medicines

Cancer medicines are an integral part of modern cancer care and are essential for improving patient outcomes (408, 409). Breast cancer medicines have revolutionized the treatment paradigm, offering hope and enhanced survival rates for patients (410); see also Table 11 above. Chemotherapy was the foundational treatment initiated in the mid-20th century, and it remains a backbone in many breast cancer management protocols to date, despite the potential side effects arising from the non-selective action on both malignant and normal cells (411, 412). Hormone therapies, targeting cancers driven by hormonal receptors, have been employed since the 1970s, providing a more specific intervention for certain breast cancer subtypes (413). The dawn of the 21st century witnessed the emergence of HER2-directed targeted therapies, designed to interrupt specific pathways crucial for the growth of breast cancer cells, marking a shift towards precision medicine (414). The 2010s further expanded the therapeutic landscape with the advent of targeted therapies such as CDK4/6 inhibitors, PARP inhibitors, and PI3K inhibitors. This also includes antibody drug conjugates, which combine the features of targeted therapy and chemotherapy. Immunotherapies are the latest addition to the therapeutic arsenal and are designed to bolster the ability of the body's immune system to attack malignancies.

Table 12: Regulatory approval and reimbursement status of US FDA approved medicine indications for breast cancer in the early-stage setting in the MEA-9 countries in 2023/24

Subtype	Medicine	Year of FDA approval	Lower-middle income			Upper-middle income			High-income				
			ALG	EGY	MOR	JOR	TUR	SAF	ISR	SAU Citizen	SAU Expat	UAE Citizen	UAE Expat
Early-stage setting (neoadjuvant and/or adjuvant)													
HR+ HER2-	Abemaciclib	2021											
HER2+	Trastuzumab	2006											
	Pertuzumab	2013											
	Trastuzumab emtansine	2019											
	Neratinib	2017											
TNBC	Pembrolizumab	2021											
gBRCA+	Olaparib	2022											

No regulatory approval
Has regulatory approval but no reimbursement
Has regulatory approval and some reimbursement in private insurances
Has regulatory approval and some level of public reimbursement
Has regulatory approval and reimbursement

Notes: HR+ HER2- denotes cancers with hormone receptors but without HER2 receptors. HER2+ refers to cancers with an overexpression of HER2. TNBC are cancers lacking an expression of hormone and HER2 receptors. gBRCA+ indicates germline BRCA mutation positivity. Source: Availability data for most medicines was provided by local experts, combined with additional published sources (65, 415).

The launch of new and more effective cancer medicines is crucial for improving patient outcomes. Before new medicines reach all eligible patients in a country, three key hurdles need to be overcome. The first hurdle is regulatory approval by the national regulatory body. In many MEA-9 countries, the national regulatory bodies require a new medicine to already be approved by the Food and Drug Administration (FDA) in the United States and the European Medicines Agency (EMA) in Europe (50, 51). The second hurdle is reimbursement by the public and private health care payers/insurances. Previous analyses of the reimbursement situation of new cancer medicines in the MEA-9 countries showed a mixed picture, with Gulf countries generally

reimbursing the highest number of medicines (50, 51). The third hurdle is uptake in clinical practice. Previous evidence suggests limited and varied uptake of reimbursed cancer medicines, including breast cancer medicines, in the MEA region (50). A related issue to the uptake of medicines is adherence by patients to prescribed treatment protocols. In breast cancer treatment, adjuvant (post-surgery) use of medicines is common and might last between one to five or even ten years (401).

The regulatory approval status and the reimbursement status of modern breast cancer medicines in the MEA-9 countries are shown separately by treatment setting in Table 12 for the early-stage setting and Table 13 for the metastatic setting. The three high-income countries – Israel, Saudi Arabia, the UAE – have by far the best access situation to medicines. The three lower-middle income countries – Algeria, Egypt, Morocco – together with the public sector in South Africa have the most limited access to medicines.

Table 13: Regulatory approval and reimbursement status of US FDA approved medicine indications for breast cancer in the metastatic setting in the MEA-9 countries in 2023/24

Subtype	Medicine	Year of FDA approval	Lower-middle income			Upper-middle income			High-income				
			ALG	EGY	MOR	JOR	TUR	SAF	ISR	SAU Citizen	SAU Expat	UAE Citizen	UAE Expat
Metastatic setting													
HR+ HER2-	Abemaciclib	2017											
	Palbociclib	2015											
	Ribociclib	2017											
HER2+	Trastuzumab	1998											
	Pertuzumab	2012											
	Trastuzumab emtansine	2013											
	Lapatinib	2007											
	Tucatinib	2020											
	Trastuzumab deruxtecan (for HER2 low)	2019-2022											
TNBC	Atezolizumab	2019											
	Pembrolizumab	2020											
	Sacituzumab govitecan	2020											
gBRCA+	Olaparib	2018											
	Talazoparib	2018											

No regulatory approval
Has regulatory approval but no reimbursement
Has regulatory approval and some reimbursement only in private insurances
Has regulatory approval and some level of reimbursement
Has regulatory approval and reimbursement

Note: HR+ HER2- denotes cancers with hormone receptors but without HER2 receptors. HER2+ refers to cancers with an overexpression of HER2. TNBC are cancers lacking an expression of hormone and HER2 receptors. gBRCA+ indicates germline BRCA mutation positivity. Atezolizumab lost its FDA approval in 2021. Source: Availability data for most medicines was provided by local experts, combined with additional published sources (65, 415).

8.3.1 Country-specific status and challenges

Algeria

In recent years, there has been a financial commitment to combating cancer through the acquisition of modern cancer medicines. Nearly half of the entire budget allocated to the Central Hospital Pharmacy is used for buying cancer medicines (416).

Local experts highlighted that treatment adherence is typically not an issue, with patients remaining committed to continuing treatment despite potential side effects. They estimate an adherence rate to adjuvant treatment of 90%.

Main challenges

- **Delayed regulatory approval:** The extended time frame for regulatory approvals contributes to delays in the introduction of new breast cancer medicines into the market, restricting accessibility in both the private and public sector.
- **Restricted access to newer medicines:** Most newer breast cancer medicines are not reimbursed and readily accessible to patients, as shown in Table 12 and Table 13.

Egypt

Local experts noted that health economic evaluations are increasingly being used to guide the introduction of new cancer medicines.

A study with data from 2021 from Helwan University Hospital showed that adherence rates (64%) and discontinuation rates (11%) in breast cancer patients with adjuvant hormone therapy were similar to rates observed in other parts of the world (15).

Main challenges

- **Out-of-pocket payments:** A study with data from 2013 to 2015 with a sample mostly from Cairo, revealed that 80% of breast cancer patients had difficulties affording their medicines (112). While the situation likely improved with the Women's Health Initiative since 2019, in Table 12 and Table 13 it is noticeable that there is still room for improving access to newer medicines.
- **Lack of adequate therapeutic alternatives:** Local experts noted that patients with TNBC, comprising around 11% of breast cancer cases in the country, lack adequate modern systemic treatment options and thus receive only chemotherapy.

Israel

Most patients treated in the public sector have access to the treatments listed in Table 12 and Table 13. Local experts noted that some of the medicines that are not yet available will be included in the Health Basket for 2024. When it comes to the role of private insurance in accessing modern medicines, local experts point out that patients typically receive reimbursements covering a significant portion of medicine costs, if their insurance plan includes the prescribed medicine. Nevertheless, the exact out-of-pocket amount can vary based on the specific insurance policy.

Main challenges

- **Risk of discontinuation of treatments:** Local experts said that the lack of adherence to treatment is an unaddressed issue that impacts survival. A study revealed that 23%

of individuals initiating adjuvant hormone therapy with tamoxifen ceased treatment over a 5-year monitoring period (417). The study further indicated that women below the age of 45 and those who are underweight are especially prone to discontinuation and nonadherence to adjuvant hormone therapy.

- **Disruptions in supply of medicines:** Local experts noted that excessive bureaucracy within the HMOs can lead to interruptions in the supply of prescribed medicines. While these disruptions tend to be brief, they often arise from unnecessary administrative procedures not rooted in medical reasoning. The extent of these challenges largely depends on the decision-makers within the HMOs.
- **Lack of continuity in medication:** According to local experts, disruptions in medication may occur in the metastatic setting due to varying patient behavior. Some patients are often proactive in securing timely refills to prevent medication shortages, while other patients might wait until their next medical appointment before renewing their prescriptions, which could lead to extended periods, sometimes a month or more, without the necessary medication.

Jordan

Targeted medicines, such as trastuzumab, are available across multiple indications in the country (65). Pertuzumab is available in the early and metastatic setting. CDK4/6 inhibitors are also available at the KHCC and in the private sector. Table 12 and Table 13 show the availability of newer breast cancer medicines at the RMS. Many newer cancer medicines are readily available in early stages whereas the availability is slightly more restricted in the metastatic setting. However, there are newer medicines available for every breast cancer subtype.

Main challenges

- **Rising prices of novel medicines:** The cost of new cancer medicines is rising, which is adding to the financial strain of managing cancer in Jordan (418). It becomes increasingly difficult to ensure to access therapies that could save or prolong their lives. In response to this issue, the KHCC has started performing cost-effectiveness analysis as a tool to negotiate prices and ensure value-for-money (418).

Morocco

According to local experts, Morocco has been one of the pioneering countries in Africa in adopting new cancer medicines. Morocco has taken the lead in introducing various modern breast cancer treatments, including endocrine therapy, HER2 targeted treatments, dual HER2 blockade, and CDK4/6 inhibitors in metastatic disease.

Main challenges

- **Delayed regulatory approval:** The extended time frame for regulatory approvals contributes to delays in the introduction of new breast cancer medicines into the market, restricting accessibility in both the private and public sector.
- **Lack of reimbursement of newer medicines:** Local experts mentioned difficulties in the reimbursement of some newer medicines, especially in the metastatic setting with antibody-drug conjugates.
- **Bureaucratic delay in access to new, reimbursed medicines:** Some newer medicines, such as immunotherapy agents (atezolizumab, pembrolizumab) and CDK4/6 inhibitors, have secured reimbursement but still require approval from expert committees. This

bureaucratic step could potentially delay the timely administration of treatments, according to local experts.

- **Low adherence to prescribed medicines:** Local experts mentioned a lack of adherence by patients to oral prescription medicines.

Saudi Arabia

Previous reports have described how there are no concerns in the provision of modern cancer medicines, including immunotherapy and targeted therapy neither in big centers nor smaller satellite centers (50). Local experts have observed that a wide range of newer breast cancer medicines is readily accessible across various government sectors and within the private sector for insured individuals, as detailed in Table 12 and Table 13. As part of the Saudi Vision 2030, the aim is to move from the current system to a value-based pricing system using health technology assessment (HTA) to inform pricing and reimbursement decisions (419).

Main challenges

- **Logistic and administrative barriers:** According to local experts, the availability of newer medicines is generally not a concern, as the MoH can procure even medicines that have not yet received regulatory approval in exceptional cases. However, the delivery of these medicines may pose challenges. Specifically, an administrative process is necessary to access medicines that have recently been approved or that the MoH has obtained through central purchase.

South Africa

According to a study from 2017, chemotherapy and hormone therapy were widely available for breast cancer patients in the public sector, whereas targeted therapy was only available in the private sector (389). Local experts noted that the majority of modern breast cancer medicines are available in the private sector, but real access depends on the patient's medical aid scheme. Trastuzumab is the only treatment from Table 12 listed in the PMBs (217), which define the minimum standard in the medical aid schemes.

Main challenges

- **Lack of health technology assessment:** According to local experts, there is no comprehensive HTA conducted to evaluate the cost-effectiveness or budget impact of medicines to be added to the public EML.
- **Restricted access to newer medicines:** Local experts agreed that although many medicines in Table 12 and Table 13 are on the public list (EML), they are not available in reality in the public sector. This situation is aggravated in the metastatic setting were only ribociclib is available in the public list in buyouts.
- **Strict criteria to access newer medicines:** Local experts noted that pembrolizumab is only available for very selective TNBC patients. Young patients have to meet strict criteria to get it.
- **Limited access to protocols and formularies:** Patients and insurers often do not have easy access to the treatment protocols and formularies, making it challenging to understand what treatments are covered. According to local experts, the NGO Campaigning for Cancer is working on a project towards improving transparency of treatment protocols.
- **Prolonged time to secure reimbursement in the private sector:** Patient's access to care is significantly influenced by the type of insurance they have. According to local

experts, trastuzumab, faced a prolonged struggle to secure reimbursement in the private sector.

- **High co-payments for treatment with private insurances:** Local experts noted that in the private sector the copay for medicines in Table 12 and Table 13 is between 25% to 50%. In certain instances, such as for trastuzumab, there should be no co-payment, but patients often find themselves needing to engage in legal proceedings to contest these additional costs.
- **Cycle limitations in the private sector:** In the private sector, patients may face limitations on the number of treatment cycles they can receive before undergoing reassessment for additional cycles.
- **Social support deficiency:** Local experts referred to a recent study that highlighted the primary factor influencing chemotherapy adherence, which is the lack of social support. In South Africa, more than 40% of mothers are single parents (420). According to local experts, grandmothers often play a significant role in raising children, resulting in an added burden for mothers and grandmothers who tend to prioritize their family's needs over their own health.

Türkiye

The SSI assesses whether new cancer medicines will be covered under its reimbursement policies (421). The assessment process includes a budget impact analysis and a cost-effectiveness analysis, although the systematic use of HTA for guiding reimbursement decisions is still evolving (422, 423).

Main challenges

- **Long delays between regulatory approval and reimbursement:** Local experts have pointed out significant delays between the regulatory approval of new breast cancer medicines and the subsequent reimbursement by the SSI. A previous report found that treatment options available to lung cancer patients in Türkiye in 2022 were aligned with those recommended by European clinical guidelines in 2016, indicating a minimum six-year delay in introducing new cancer medicines (51). This situation leads to a scenario where newer medicines are accessible only to patients who can afford to pay for them out-of-pocket.
- **Lack of reimbursement of newer medicines:** The SSI rarely reimburses newer medicines for early-stage treatment and only a select few are covered in the metastatic setting. Specifically, patients with TNBC or BRCA+ status receiving treatment in the public sector for metastatic cancer do not have access to immunotherapies or targeted therapies. In contrast, local experts mentioned that private insurance policies offer broader access to newer medicines, although the extent of coverage varies based on individual insurance plans. As indicated in Table 12 and Table 13, private insurance tends to offer more extensive coverage for metastatic stages compared with early stages.
- **Long waiting times:** Local experts noted that there are long waiting times for receiving medicines.
- **Risk of non-adherence to treatment:** Local experts said that the lack of adherence to treatment is an unaddressed issue.
- **Restricted access to clinical trials:** According to local experts, there is limited accessibility to clinical trials, both in early and metastatic settings. This prevents patients from accessing treatments that are still in the research phase.

UAE

Local experts emphasized that there are minimal barriers to offering the latest breast cancer medicines to women in the UAE. Yet there some differences in access to medicines for Emiratis and expatriates, with slightly more restricted access for the latter group as indicated in Table 12 and Table 13. Complaints about treatment quality are rare, according to local experts.

Main challenges

- **Limitations in insurance coverage for expatriates**: Among expatriates with private health insurance, there could be limitations in coverage. This is particularly true for those on basic plans, which offer only the minimum mandatory coverage and are often subscribed to by low-salaried, blue-collar workers (50). These limitations can restrict access to certain medicines and treatments.
- **Coverage gap for those without insurance:** The few expatriates without private health insurance (at most 5% of the population) have no coverage for medicines (50).
- **Low adherence to treatments:** According to local experts, non-compliance of patients with the treatment plan is a significant concern.

8.4 Overview of main challenges in treatment

The main challenges of breast cancer treatment with a focus on organization of care, workforce, radiation therapy, access to cancer medicines, and patient support in the MEA-9 countries are shown in Figure 37. Some of the most common challenges are the following:

- Despite a final diagnosis of breast cancer, many patients may have to wait one month or longer until the actual start of treatment.
- There is a lack of psychosocial assistance for patients before, during, and after treatment. This underscores a neglect of effectively addressing the emotional and psychological dimensions of breast cancer care.
- The uneven adoption of MDTs in countries such as Egypt and Morocco reflect a potential gap in cohesive, patient-centered care. The absence of MDTs might partly explain why many patients may undergo surgery directly without consideration of neoadjuvant treatment with cancer medicines in countries like Morocco, Algeria, and the UAE.
- Shortages in the cancer care workforce are widespread. Algeria, Israel, Morocco, and South Africa experience a paucity of breast surgeons, and South Africa and Türkiye experience shortages of radiation oncologists and radiation therapists. The availability of medical oncologists is comparatively good, but there are still gaps.
- A scarcity or limited number of radiation therapy equipment is seen in almost all countries, which poses a significant challenge for prompt and effective treatment. Furthermore, there is a skewed geographical distribution of radiation therapy equipment in countries including South Africa, Saudi Arabia, Jordan, Egypt, and Türkiye, which further exacerbates accessibility issues for patients living in rural areas.
- There are delays in the regulatory approval of new breast cancer medicines, which inhibits access in both the public and private sector. The reimbursement of medicines varies largely across the MEA-9 countries, with the three high-income countries – Israel, Saudi Arabia, the UAE – having by far the best access situation to medicines. The three lower-middle income countries – Algeria, Egypt, Morocco – together with the public sector in South Africa have the most limited access to medicines.

- Non-adherence by patients to prescribed adjuvant medical therapy in countries like Morocco and Saudi Arabia raise concerns about the effectiveness of current treatment protocols and the support received by patients.

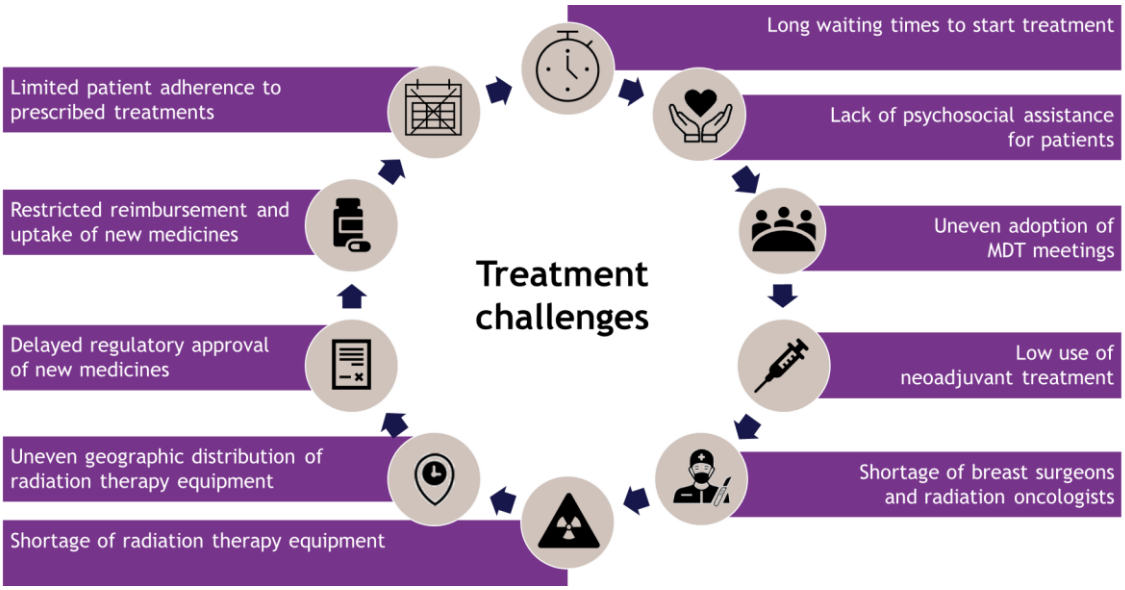


Figure 37: Main challenges in treatment in the MEA-9 countries.

9. Policy recommendations

The MEA-9 region has witnessed a near doubling in the annual incidence of new breast cancer cases over the past two decades. While health care systems grapple with the growing patient population, the capability to provide effective care – offering patients not just extended lives but the possibility of overcoming the disease – has significantly improved. Among these advancements are the following:

- A significant shift towards earlier stages of breast cancer at diagnosis. For instance, in Egypt from the early 2000s to 2015, 56% of diagnoses were made at stages III and IV. By 2023, this figure had decreased to 30%, thanks primarily to the efforts part of the Women's Health Initiative.
- Widespread access to essential biomarker testing (ER, PR, HER2, and Ki-67) for the majority of patients in the MEA-9 region. This helps to determine the subtype of breast cancer and subsequently informs a more personalized treatment approach.
- In countries such as Israel and South Africa, genetic counseling for BRCA1/2 mutations is available in the public sector for women of certain ethnic groups, enhancing early detection and preventive strategies.
- Introduction of national clinical guidelines in order to standardize and elevate the quality of breast cancer treatment for all patients throughout the whole country, exemplified by Algeria's recent adoption of cohesive guidelines.
- The very existence of NGOs and patient organizations like the Jordan Breast Cancer Program, One in Nine, Pink Caravan, and Campaigning for Cancer has been instrumental in overcoming social barriers and dispelling myths surrounding the disease as well as providing patient support when no formal support services are offered by health systems.

Despite the progress, the reality is that the majority of patients in the MEA region still lack access to high-quality care, resulting in survival rates that fall short of those observed in Europe and Northern America. The analysis in this report – built around the WHO GBCI – outlines the many challenges breast cancer patients encounter in MEA-9, ranging from fear and social stigma linked to breast cancer, to geographical barriers and inadequate public health coverage, among many others. These obstacles hinder access to high-quality care for women and amplify the overall disease and economic burden of breast cancer care to countries.

This report concludes with a set of recommendations for each country. They were derived from the analysis in previous chapters (particularly chapters 3 to 8) and complemented with insights from local experts who proposed practical and significant measures to enhance breast cancer care in the coming years. The recommendations are organized according to the report's main chapters rather than by urgency or impact. Their objective is to provide a strategic roadmap for enhancing care quality and patient outcomes throughout the MEA-9 region.

A general key recommendation is the need to strengthen the participation of patient organizations in decision-making processes in breast cancer care. This approach is in line with the WHO "Framework for Meaningful Engagement of People Living with Noncommunicable Diseases, and Mental Health and Neurological Conditions" (424). This framework promotes an evidence-based methodology for integrating patients and their representatives into health care planning, policy development, and service delivery. By drawing on the lived experiences of breast cancer patients and survivors, it can significantly enhance the efficacy, acceptance, and execution of health initiatives, ultimately leading to better health outcomes.

9.1 Algeria

ALGERIA – Recommendations

Governance of breast cancer care

- Public spending on health care amounts to around 3% of GDP, which falls short of the informal WHO spending target of 5%. Additional spending to bring the country closer to the benchmark would be needed. The insufficient public spending can have various impacts on Algeria's ability to address breast cancer adequately, from prevention to treatment and follow-up.
- CNAS/CASNOS usually do not cover the full price of medical services at public health facilities for diagnostic services. This leads to rather high out-of-pocket expenditure of patients. Higher reimbursement rates by CNAS/CASNOS for medical services could be considered.
- Emphasize and strengthen the participation of patient organizations in decision-making processes concerning breast cancer care.
- Addressing the scarcity of specialized breast cancer clinics necessitates a multifaceted strategy. This strategy should leverage available resources, foster partnerships, and encourage community involvement. One effective method is to enhance and equip current health care centers to provide specialized breast cancer services, which can be more cost-efficient than constructing new standalone clinics. Additionally, the continued deployment of mobile clinics, equipped to deliver breast cancer screenings and basic treatments, can benefit underserved areas by operating on a rotational schedule. It is also essential to designate a specific portion of the health budget for the establishment and maintenance of breast cancer care units, optimally situated within existing hospitals in key locations.

Early detection (self-initiated detection, screening, and genetic risk assessment)

- Implement a community-based education program where trained health care workers or community volunteers provide personalized sessions on breast cancer awareness and screening benefits. One-on-one education allows for a trust-based relationship, making it easier to address individual fears and concerns.
- Collaborate with local imams, community elders, and women's group leaders to advocate for the importance of breast cancer screening. Their endorsement can help reduce stigma and dispel fears.
- Organize awareness sessions where entire families, including men, are invited to learn about breast cancer.
- Use testimonials from women who have undergone screening and benefited from early detection. Emphasize the stories of women who have continued to lead fulfilling family lives post-diagnosis.
- Create culturally appropriate pamphlets, posters, and videos that address specific fears like divorce and marital prospects. Using different languages such as Arabic, Tamazight, French, and dialects for better accessibility.
- General physicians should receive enhanced training to promptly recognize the early symptoms of breast cancer. Mandating regular participation in continuous medical education for health professionals can facilitate this. Such training can be provided on-site or through online platforms offering courses and webinars.
- Current estimates suggest that approximately 10-20% of breast cancers are detected through screening, however, there are no precise metrics to indicate participation rates for the country or across different communities. Adequate monitoring is crucial; without it, effectively targeting specific communities is challenging. Implementing comprehensive KPIs for breast cancer screening programs is imperative. Such KPIs not only assess the program's immediate success but also provide crucial insights for future planning, resource allocation, and iterative improvement. It is also important to monitor the consistency of screenings (i.e., the rate of repeated screenings), to learn if the early detection strategies have had a long-term impact in health behaviors of women.
- The National Cancer Plan of 2015-2019 included the procurement of mobile clinics, but there is still a lack of mobile screening units to reach remote rural areas and ensure screenings are free or affordable. Reducing structural barriers to reach screening is crucial for improving uptake of screening in rural communities.
- There is an absence of systematic breast cancer screening using mammography in the community. Population-based screenings with CBE for all asymptomatic women visiting health care facilities for any reason (for instance, visits to general physicians or gynecologists), could be a potential strategy to detect breast cancer at earlier stages if implementing mammography is not feasible.
- The absence of clear guidelines for the breast cancer screening process can leave women uncertain about where to go for care and how to navigate the health care system. Implementing structured guidelines could clarify the patient pathway.
- Many individuals carrying hereditary mutations remain undetected due to limited access to BRCA1/2 tests. Algerian women could benefit from comprehensive campaigns that educate the

wider population about the advantages of genetic risk assessment. In parallel, training community health workers to spread awareness at the grassroots level about genetic preconditions is crucial for emphasizing the importance of early detection and prevention. This represents an initial step towards enhancing access to these tests and genetic counselling.

Diagnostic process (imaging, biopsy, biomarker testing)

- There are long waiting times to secure appointments at diagnostic services. Investment in expanding health care facilities, including diagnostic centers, to accommodate more patients is needed to reduce waiting times.
- While the availability of mammography equipment and ultrasound has seen improvements, there are still areas lacking essential diagnostic tools, such as MRI, especially in semi-urban and rural regions.
- Explore expanding social security coverage to cover full expenses related to mammography in the private sector if the necessary equipment is available and accredited.
- Explore subsidized private services for patients who cannot wait for prolonged periods, negotiate with private institutions to offer discount rates or subsidy for diagnostic services.
- Improve proper training in breast pathology for pathologists and laboratory technicians by developing and implementing a standardized curriculum for breast pathology training. This can help ensure uniformity and adherence to best practices.
- It is crucial to improve the quality control of pathology by ensuring that laboratories and diagnostic centers get accredited by international health bodies to maintain quality standards.
- While access to essential biomarker testing (hormone receptor status and HER2) is good, there is a lack of access to newer biomarker tests. Access to testing for these biomarkers needs to be guaranteed simultaneously with the reimbursement of the matching medicines.

Treatment (organization, workforce, patient support, radiation therapy, medicines)

- The efforts to establish and update national clinical guidelines (including for breast cancer) since the National Cancer Plan's inception in 2015-2019 have been fruitful. Yet some physicians remain hesitant to adopt new treatment approaches. Organizing seminars, workshops, and conferences to educate medical professionals about the advantages and supporting evidence of treatments, like neoadjuvant therapy, could prove beneficial.
- Breast cancer patients could benefit from patient education materials to empower them and help them understand their treatment options.
- Given that many patients lean towards getting treated at larger health care establishments, it could be beneficial to initiate awareness campaigns. These campaigns should highlight the merits of seeking care in local facilities. Additionally, the establishment of patient support groups and counseling services can guide patients in making informed treatment decisions and appreciating the benefits of nearby treatment centers.
- To improve geographical accessibility, there is a need to establish or upgrade medical facilities in underserved regions.
- The deficiency in oncology surgery training needs to be addressed comprehensively. This might involve forging partnerships with international medical institutions to craft training programs in oncology surgery. Such collaborations could encompass exchange programs or 'twinning' initiatives, allowing foreign experts to educate local surgeons. Additionally, there is a need to establish national training programs and postgraduate courses specifically tailored to oncology surgery.
- The limited availability of radiation therapy equipment contributes to extended waiting times. One solution might involve expanding the operational hours of current radiation therapy centers, possibly including weekends, to serve a greater number of patients. Additionally, exploring hypofractionated radiation therapy could allow patients to complete their radiation therapy courses more rapidly and save resources.
- The regulatory approval process for breast cancer medicines, particularly those with substantial clinical benefits, could be expedited.
- Access to newer breast cancer medicines, particularly in the early-stage setting, is restricted. Transitioning to a value-based and transparent HTA process could aid in giving priority to the introduction of new and effective medicines.
- Enhance the availability of newer breast cancer medicines within the private sector, ensuring prompt access for individuals with private insurance, especially for conditions not yet included in national clinical guidelines. This would help to provide quicker and more comprehensive treatment options for patients.

9.2 Egypt

EGYPT - Recommendations

Governance of breast cancer care

- Public spending on health care amounts to around 2% of GDP, which is exceptionally low even in the MEA region and falls greatly short of the informal WHO spending target of 5%. Additional spending to bring the country closer to the benchmark and as part of implementing UHC would be needed. The insufficient public spending can have various impacts on Egypt's ability to address breast cancer adequately, from prevention to treatment and follow-up.
- Efforts are in motion to achieve UHC by 2030-2032. While this target might be ambitious, the initiative aims to address the current fragmentation and complexity of the health system. This existing uncoordinated approach, with its multitude of providers and payers, leads to duplicated services and inefficiencies in the allocation of both financial and human resources, as well as in capital investment. However, as the UHC rollout progresses, there is promise for establishing a more streamlined and effective breast cancer care pathway. This could ensure quicker interventions, minimize out-of-pocket expenses for patients, and enhance overall patient outcomes.
- Addressing the challenge posed by international economic disturbances, particularly in a context where the Egyptian pound has been devalued, requires a multi-faceted approach. Since importing goods, such as medicines, has become more expensive, investing in and promoting local manufacturing of essential health goods could be considered to reduce dependency on imports.
- Since its inception, the Women's Health Initiative, aimed at breast cancer screening and assessing other health-related risk factors, has successfully reached a vast segment of the population. For the sustainability and ongoing success of the initiative, it is imperative to thoroughly evaluate its impact on (i) patient treatment uptake, (ii) stage distribution, and (iii) treatment outcomes in relation to campaign costs. This underscores the crucial role of robust data management and research as integral components of the initiative.
- Emphasize and strengthen the participation of patient organizations in decision-making processes concerning breast cancer care.

Early detection (self-initiated detection, screening, and genetic risk assessment)

- The breast cancer screening campaign as part of the Women's Health Initiative has been turned into a permanent program offering recurring annual visits for screened women. It also includes a guarantee to receive treatment upon positive diagnosis. Efforts to ensure a continuously high participation rate need to be prioritized.
- There are prolonged delays in seeking medical attention for breast cancer in Egypt. The majority of Egyptian have TV and radio as their main sources for information on cancer care. Many women could benefit from the implementation of nationwide campaigns to raise awareness about the early signs of breast cancer and the importance of timely medical intervention with mass media and social media.
- The downstaging of breast cancer, combined with the increased participation of women in the Women's Health Initiative, suggests that health literacy among women has significantly improved in recent years. However, hosting awareness sessions that invite entire families, including men, to learn about breast cancer could further enhance examination rates, and more crucially, re-examination rates.
- The expansion of the Women's Health Initiative should be prioritized by increasing the number of primary health care facilities, especially in semi-urban and rural areas.
- After patients get diagnosed with breast cancer within the Women's Health Initiative the patient referral system between hospitals needs to be improved.
- Through the Women's Health Initiative, primary care physicians have been trained to recognize the early signs of breast cancer. It is essential to continue consistently updating them on the latest best practices for breast cancer detection.
- To address distrust in primary health care physicians, it would be beneficial to organize workshops for primary health care workers focusing on patient-centered communication. Emphasize the importance of empathy, active listening, and offering hope to patients.
- To help implement a culture of preventive screening it is necessary to establish a robust call-recall system through which patients receive SMS, calls, or emails about their upcoming screenings. Periodic reminders can significantly increase the retention rate.
- Highlight testimonials from women who have proactively participated in preventive screenings and benefited from early detection. Prioritize stories that emphasize the positive impact of timely intervention, showcasing women who have maintained vibrant and fulfilling lives thanks to preventive care.
- Addressing the challenge of diverse and heterogeneous data necessitates the creation of unified and standardized data collection methods. This ensures consistent capture of essential and

relevant data for all women undergoing screening. Additionally, it is crucial to segment the data effectively. By establishing distinct categories within the data collection tool, it becomes possible to differentiate between women undergoing preventative screening, those presenting with noticeable symptoms, those with a family history of breast cancer, and those returning for follow-up screenings.

- The HIO, potentially in partnership with international health organizations, could subsidize the cost of genetic testing for women with a history of breast cancer. This would make testing more affordable and accessible to a broader segment of the population.

Diagnostic process (imaging, biopsy, biomarker testing)

- The number of radiologists trained in breast imaging is not meeting the growing demand for mammographies. One emerging solution is to train radiographers in mammography image interpretation. Additionally, telemammography, which allows mammograms to be interpreted remotely by skilled radiologists, presents another viable alternative to address local shortages.
- While several steps have been taken to enhance pathology services, further improvements in the quality and standardization of histopathology reports remain necessary. Implementing regular peer reviews, where pathologists evaluate each other's reports for thoroughness and precision, is essential. Additionally, adopting digital templates for reports will ensure consistent inclusion of all vital information.
- Molecular diagnostic testing needs to be improved in order to establish the prerequisites to administer modern cancer medicines. While essential biomarker testing (hormone receptor status and HER2) is recommended, there are still gaps in making sure all patients are tested for HER2 status. Access to newer biomarker tests is limited and should be expanded in tandem with the reimbursement of the matching medicines.

Treatment (organization, workforce, patient support, radiation therapy, medicines)

- Establishing common, nationwide treatment guidelines should be considered, but this is still difficult due to the fragmentation of the health care providers. Yet, the rollout of UHC is an opportunity to provide more coherent and standardized care to all patients.
- To tackle the uneven adoption of MDT meetings, crafting resource-adapted guidelines for MDT meetings, ensuring uniformity across diverse health care environments could be explored. Another possible solution to improve MDT meetings accessibility could be the use of telemedicine solutions. This would enable remote MDT meetings and bridge the gap between urban expertise and remote locations, eliminating the need for physical attendance.
- Enhance oncology training programs to ensure medical professionals are up to date with the latest global therapeutic advances and treatment strategies.
- The geographic distribution of radiation therapy machines is inadequate. This forces some patients to travel long distances and others to be on waiting lists. An assessment of underserved areas could be conducted to determine where the installation of additional machines is of greatest benefit.
- Although the Women's Health Initiative has enhanced the availability of modern cancer medicines, access to targeted therapies and immunotherapies remains limited. Many of these medicines have secured regulatory approval, but a vast majority are not covered for reimbursement in the public sector. For TNBC, no modern treatment options are currently reimbursed, representing an inequality compared to other breast cancer subtypes.
- Even if many medicines are accessible in the private sector, the high co-payments for modern cancer medicines render them unaffordable for a majority of patients. Collaborative efforts between health care providers and payers should explore ways and methods that can minimize out-of-pocket expenses and maximize treatment outcomes.

9.3 Israel

ISRAEL - Recommendations

Governance of breast cancer care

- At present, there is no existing or recent national cancer plan. While the CCS for 2019-2025 addresses cancer as a comprehensive disease category, it does not outline specific objectives for breast cancer. Given the high burden of cancer, establishing a national cancer plan should be a priority in the near future.
- Emphasize and strengthen the participation of patient organizations in decision-making processes concerning breast cancer care.

Early detection (self-initiated detection, screening, and genetic risk assessment)

- Based on existing materials in Hebrew, develop and launch targeted health promotion campaigns in Arabic, collaborating closely with Arab community leaders to ensure that the messages are both culturally and linguistically appropriate for the Arab-minority group.
- Allow family physicians or general practitioners to directly recommend mammograms, especially in high-risk cases, bridging the gap created by the current shortage of specialized surgeons.
- In the medium term, to address the shortage of breast surgeons, it would be beneficial to expand the number of training programs in breast surgery. Encouraging medical students to specialize in this field could be achieved through scholarships, grants, or other incentives.
- Ensure that mammogram facilities and clinics are staffed with female technicians and physicians, providing a more comfortable environment for women who might feel uncomfortable.
- Continue collaboration with religious leaders to improve screening rates of ultra-orthodox communities. Work with rabbis and other respected figures in the ultra-orthodox community to communicate the importance of breast cancer screening from both a health and religious perspective.
- To address the diagnostic delays experienced by young and postpartum women, it is recommended to develop and integrate enhanced training modules on breast cancer detection into the curriculum for primary care professionals. These modules should particularly emphasize the signs in young and post-partum women. In addition, regular refresher courses should be conducted to ensure continuous knowledge update.
- To tackle the issue of declining participation in repeated mammography screenings, it is important to launch campaigns that emphasize the significance of consistent screenings, rather than just a one-time check. Additionally, enhancing the reminder system to alert women about their upcoming screenings would further support this effort.
- Conduct a thorough review to investigate the root causes of overdiagnosis in mammography screening.
- Undertake an in-depth analysis to assess the feasibility and cost-effectiveness of broadening the age range for subsidized mammograms, especially for ethnic groups that tend to experience younger age onsets. Additionally, considering the rising life expectancy and shifting risk factors, it is important to re-evaluate the inclusion of older age groups in the screening program.
- To improve the low referral rates for genetic testing attributed to a knowledge gap among primary care health workers, it is crucial to prioritize the education and training of health care professionals on the importance of genetics in breast and ovarian cancer.
- To ensure equitable access to dedicated BRCA screening in Israel's northern and southern regions, the development and improvement of medical facilities in these areas must be prioritized, which will also aid in reducing waiting times.
- To adequately assist BRCA mutation carriers following their diagnosis, there is a need for a holistic emotional and psychological support system. Beyond initial counseling, this framework should encompass regular peer-support groups, workshops tailored to address the side effects of risk-reducing surgeries, and consistent check-ins from mental health experts.
- Establish well-defined communication channels between HMOs and patients for genetic counseling. This would ensure that all involved parties are informed about where the testing is being conducted, the specific tests that are being performed, and when results can be expected.
- Consider continuing incorporating genetic screening protocols for high-risk populations.
- Channel funds towards public education initiatives and the establishment of high-risk breast cancer clinics across the country.

Diagnostic process (imaging, biopsy, and biomarker testing)

- The shortage of radiologists, particularly breast imaging specialists and radiation oncologists, should be addressed by increasing the number of radiology residency slots in medical schools and enhancing compensation packages for these professionals.

- Ensure that community health care centers are equipped with state-of-the-art mammography machines and diagnostic tools, narrowing the equipment gap between them and specialized facilities and provide specialize training for health care workers in the community setting.
- Considering ensuring that diagnostic centers provide integrated psychological and emotional counseling services that patients can access before, during, and after diagnosis.
- A comprehensive review is recommended to identify the root causes of MRI overutilization for diagnostic imaging. Once these causes are understood, decisions should be implemented to guide physicians on the appropriateness of MRI requests. In contrast, delays in MRI-guided biopsies can be mitigated by using freed up capacity of MRI machines or by designating specific time slots exclusively for such procedures.
- While timeframes for receiving a complete pathological assessment have been established, they have not been consistently met. An assessment should be made to identify bottlenecks and determinants of non-adherence.
- To counteract the shortage of pathologists, there is a need to increase residency slots in pathology and enhance compensation packages to both retain current pathologists and attract new ones.
- The quality control in private pathology must be bolstered with the implementation of stringent quality assurance measures. Introducing certification requirements and conducting regular audits are conceivable measures.
- Consider expanding gene expression profiling as part of the characterization of the tumor.

Treatment (organization, workforce, patient support, radiation therapy, medicines)

- Launch public awareness campaigns to inform breast cancer patients about their rights, such as MDT meetings, and available mental health support. Use various media channels and health care facilities to disseminate this information. In addition or alternatively, establish of navigation services within hospitals and health care facilities to help women be aware of their patient rights.
- Additional funding should be allocated to provide financial incentives to attract and retain mental health professionals in the public sector, particularly those specializing in oncology and breast cancer support. To help alleviate current long waiting times, consider implementing virtual counseling services to expand access to mental health support.
- Address the holistic care needs of metastatic patients, ensuring their specialized requirements are met both medically and psychologically.
- Given the current accessibility challenges to radiation therapy, consider conducting a comprehensive assessment of the current state of radiation therapy equipment and its geographical distribution across different regions.
- Work with policymakers to reconsider the reimbursement of precision medicine tests that have demonstrated clinical utility and benefits for breast cancer patients.
- To avoid interruptions in medication, consider introducing automated medicine refill systems where patients receive reminders and can request refills through online portals.
- Work with health care providers and HMOs to streamline administrative procedures for medicine procurement and distribution. Eliminate unnecessary bureaucratic hurdles that delay the supply of prescribed medicines.
- Launch patient education campaigns to raise awareness about the importance of treatment adherence. Provide resources and support to help patients understand the benefits of completing their treatment regimens.

9.4 Jordan

JORDAN - Recommendations

Governance of breast cancer care

- Public spending on health care amounts to around 3% of GDP, which falls short of the informal WHO spending target of 5%. Additional spending to bring the country closer to the benchmark would be needed. The insufficient public spending can have various impacts on Jordan's ability to address breast cancer adequately, from prevention to treatment and follow-up.
- Currently, there is no national cancer plan in place. However, local experts anticipate its development in the medium term. Establishing a national cancer plan should be a priority along with its implementation. The KHCC, as the dominating cancer care provider, needs to be involved in the planning phase, drawing on their competence and experience, while at the same time making sure that the plan improves access to equitable cancer care across the whole country.
- There needs to be increased funding from both public and private sources to bolster breast cancer early detection programs. Additionally, persist in securing donor support and funding, similar to initiatives such as the Spanish Cooperation, but specifically targeted for breast cancer.
- Data fragmentation across a range of health care facilities and institutions in Jordan significantly obstructs comprehensive data analysis pertaining to breast cancer care. Consequently, it is crucial to pursue the standardization of data collection methods and to focus on developing interoperable electronic health information technology systems.
- Emphasize and strengthen the participation of patient organizations in decision-making processes concerning breast cancer care.

Early detection (self-initiated detection, screening, and genetic risk assessment)

- Initiate efforts to expand the Jordan Breast Cancer Program to ensure that all women can access early detection services without dependence on insurance coverage.
- To bridge the knowledge-practice gap in women, early detection services need to be more accessible and affordable. One possibility would be to include early detection in the essential package of primary health care services provided at MoH health centers. Also, ensure that diagnostic services are not only centralized in the big cities.
- Keep growing the specialized training programs for primary care workers, focusing on health promotion and clinical practice skills.
- Considering the high fragmentation of Jordan's health care system, it is advisable to explore patient navigation strategies starting with having clear and easy to navigate referral pathways between primary health care centers and hospitals.
- To help implement a culture of preventive screening it is necessary to start the foundations of a call-recall system where patients receive SMS, calls, or emails about their upcoming screenings. Periodic reminders can significantly increase the retention rate.
- For uninsured women foster collaborations between public and private sectors to create cost-sharing arrangements that make screening more affordable during the whole year and not only in October and November.
- To address the fear of having a mammogram, continue to disseminate easy-to-understand materials that explain the mammogram procedure, its purpose, and what to expect during the test.
- The MoH, potentially in partnership with international health organizations, could subsidize the cost of genetic testing for women with a history of breast cancer. This would make testing more affordable and accessible to a broader segment of the population.

Diagnostic process (imaging, biopsy, biomarker testing)

- The demand for mammographies is outpacing the number of radiologists trained in breast imaging. To tackle this, the JBCP has set up training and fellowship programs for radiologists and radiographers at the KHCC. Another way to manage local shortages is through telemammography, enabling remote interpretation of mammograms by expert radiologists. At the same time, it is crucial to provide better incentives to keep radiologists working in the public sector.
- Considering the varying quality of diagnostic services across Jordan in different facilities, it is crucial to continue implementing quality improvement programs such as the Breast Imaging Accreditation Program by the JBCP in collaboration with the Healthcare Accreditation Council.
- To meet the growing demand for biopsies, prioritize the establishment of streamlined diagnostic pathways for faster results.
- In the medium to long term, it will be important to create a centralized health care coordination authority tasked with overseeing and streamlining health care services and resources across the country. This includes fostering partnerships between public health care facilities and private sector organizations to secure additional funding and resources.

- Although essential biomarker testing, such as hormone receptor status and HER2, is readily performed at the KHCC, obtaining these tests in other health care facilities can be a more challenging endeavor. Ensuring widespread access to these tests is crucial to providing patients with the most optimal treatment options.
- Molecular diagnostic testing needs to be improved in all hospitals apart from the KHCC to establish the prerequisites to administer modern cancer medicines.

Treatment (organization, workforce, patient support, radiation therapy, medicines)

- Addressing imbalances in the quality of care, with high-quality care at the KHCC and lower quality elsewhere, is a pressing concern. This imbalance is, in large part, a result of the limited availability of modern health care infrastructure outside of Amman. While the planned sub-center from the KHCC in Aqaba promises enhanced access to oncological medical facilities in the southern regions, there remains an urgent need to bolster access to high-quality health care facilities in the northern areas and underserved regions.
- Establishing common, nationwide treatment guidelines should be considered, but this is still difficult due to the fragmentation of the health care providers.
- Invest in medical education and training programs to increase the number of specialized surgical oncologists. Offer incentives such as scholarships and training opportunities to encourage medical students to specialize in surgical oncology.
- The number of radiation therapy machines falls short of recommended standards. A potential solution lies in the planned establishment of smaller cancer treatment centers in various regions outside of Amman, which could ameliorate this situation. Additionally, exploring hypofractionated radiation therapy could allow patients to complete their radiation therapy courses more rapidly and save resources.
- Access to newer breast cancer medicines is uneven, with better access at the KHCC and the RMS. A more systematic use of HTA (as already partly done at the KHCC) could guide reimbursement decisions to the most cost-effective treatments and ensure transparency and consistency in a value-based decision-making process.

9.5 Morocco

MOROCCO – Recommendations

Governance of breast cancer care

- Public spending on health care amounts to around 2% of GDP, which falls short of the informal WHO spending target of 5%. Additional spending to bring the country closer to the benchmark would be needed. The insufficient public spending can have various impacts on Morocco's ability to address breast cancer adequately, from prevention to treatment and follow-up.
- Considering the substantial efforts to achieve UHC through AMO there is a potential concern of overcrowding and extended waiting times. The rollout of UHC should be executed in a thorough and gradual approach. This approach should encompass capacity expansion, effective resource allocation, and a commitment to maintaining or enhancing the quality of health care services.
- Establish physical access points, such as community centers or government offices, equipped with computers and staffed with trained personnel who can assist women previously covered by RAMED in navigating the AMO transition process.
- Emphasize and strengthen the participation of patient organizations in decision-making processes concerning breast cancer care.

Early detection (self-initiated detection, screening, and genetic risk assessment)

- Primary care workers should receive enhanced training to promptly recognize early symptoms of breast cancer. Mandating regular participation in continuous medical education for health professionals can facilitate this. Such training can be provided on-site or through online platforms offering courses and webinars.
- Addressing the shortage of primary care workers is of paramount importance to ensure the provision of adequate health care services to the population, especially in light of the increasing demand within AMO. It is advisable to conduct a comprehensive workforce needs assessment to pinpoint the areas and specialties with a shortage of primary care workers. Additionally, the development of long-term workforce planning strategies aimed at the training and recruitment of additional health care professionals is recommended.
- Given that awareness campaigns and the national screening program seemed effective during the 2013-2017 period, campaigns tailored to specific communities or regions might further enhance the outreach. These campaigns could take into account local languages, cultural beliefs, and customs.
- To bridge the knowledge-practice gap in women, it is crucial to initiate community outreach programs focused on educating women about the significance of regular CBE and mammograms. Additionally, sharing success stories and testimonials of women who identified breast health concerns early through routine screenings can serve as inspiration for others. Emphasize the stories of women who have continued to lead fulfilling family lives post-diagnosis.
- Continue developing a comprehensive year-round awareness calendar that outlines specific activities, events, and campaigns to be conducted each month.
- For uninsured women, foster collaborations between public and private sectors to create cost-sharing arrangements that make screening more affordable during the whole year and not only in October and November.
- It is advisable to explore patient navigation strategies aimed at providing comprehensive support to breast cancer patients throughout their entire care journey, beginning with raising awareness and facilitating early diagnosis.
- Considering the reduced sensitivity of CBE compared with mammography, it is crucial to establish a nationally recognized training curriculum for CBE. This will ensure that all health care professionals (physicians and nurses) possess consistent and current expertise. Re-evaluate the 4-day training duration to determine if it is sufficient for health care workers to become proficient in CBE. Extend the duration if necessary. Upon successful completion of the training program, health care workers could be awarded a certificate to validate their expertise.
- Consider introducing an SMS or phone call invitation system for screening, including sending out reminders.
- To address the shortage of genetic counselors, collaborate with medical institutions to offer specialized courses in genetic counseling, thereby training current health care professionals. Consider integrating this service into breast cancer care in the medium term.

Diagnostic process (imaging, biopsy, biomarker testing)

- It is crucial to improve the quality control of mammography and pathology units by ensuring that laboratories and diagnostic centers get accredited by international health bodies to maintain quality standards.
- There is an insufficient number of radiologists specializing in breast imaging. A promising approach is to train radiographers in mammography image interpretation. Also, telemammography, which

enables remote interpretation of mammograms by expert radiologists, offers a valuable solution to tackle local shortages.

- To address the shortage of pathologists, it is recommended to expand the number of pathology residency positions in medical schools and improve compensation packages for these professionals, especially in the public sector where the deficit is the most pronounced.
- It is advised to conduct a comprehensive analysis to evaluate the absence of documented essential biomarker testing in biopsies. This will determine whether the issue lies in the omission of testing or in the failure to record the tests performed.

Treatment (organization, workforce, patient support, radiation therapy, medicines)

- Initiate a detailed study to understand the specific treatment barriers faced by rural populations, whether related to cost, transportation, awareness, or other factors.
- Consider running awareness campaigns to educate patients about the importance of MDT meetings in devising effective breast cancer treatment plans.
- Implement patient education campaigns to raise awareness about the importance of treatment adherence. Provide resources and support to help patients understand the benefits of completing their treatment regimens.
- Invest in medical education and training programs to increase the number of specialized oncologists and surgical oncologists. Offer incentives such as scholarships and training opportunities to encourage medical students to specialize in oncology and surgical oncology.
- Enhance oncology training programs to ensure medical professionals are up to date with the latest global therapeutic strategies, particularly neoadjuvant therapies.
- Significant progress has been made in recent decades to enhance the availability of radiation therapy units. Despite these advancements, the number of radiation therapy machines still lags the recommended standards. A possible solution to this issue is the proposed establishment of smaller cancer treatment centers across various regions. Additionally, exploring hypofractionated radiation therapy would allow patients to complete their radiation therapy courses more rapidly and save resources.
- The process for getting regulatory approval for breast cancer medicines, especially those with substantial health benefits, should be sped up. This change would make these medicines available more quickly in the private sector, and possibly in the public sector later on. This is crucial for advanced breast cancer where most new treatments have not gotten approval yet.
- Access to newer breast cancer medicines, in both early and metastatic stages, is significantly restricted. Transitioning to a value-based and transparent HTA process could aid in giving priority to the introduction of new and effective medicines.
- Consider revising the necessity for expert committee approval to obtain reimbursement for certain reimbursed medicines.

9.6 Saudi Arabia

SAUDI ARABIA - Recommendations
Governance of breast cancer care
• The National Plan for Cancer Control for the period of 2014-2025 aims to reduce breast cancer mortality by 30%. The plan includes various objectives, such as increasing awareness about breast cancer symptoms among health care workers and the implementation of an integrated population-based level screening program. It will be important to evaluate the impact of the National Cancer Plan to assess progress over time and draw learnings for the future. • Introduce an efficient electronic appointment system at primary health care centers, allowing women to schedule visits at convenient times, thereby reducing wait times. • Considering the high fragmentation of Saudi Arabia's health care system, it is advisable to explore patient navigation strategies starting with having clear and easy to navigate referral pathways between screening services, primary health care centers, diagnostic services, hospitals, etc. • Emphasize and strengthen the participation of patient organizations in decision-making processes concerning breast cancer care.
Early detection (self-initiated detection, screening, and genetic risk assessment)
• Despite free provision of breast cancer screening, it appears that participation rates are still low. Participation rates could improve with a call-recall system where women receive SMS, calls, or emails about their upcoming screenings. Periodic reminders could significantly increase the retention rate. • Promote transparency **of the breast cancer screening program** by making participation rates and other KPIs readily accessible to the public through official channels, websites, and annual reports. In addition, use this information to continuously evaluate the effectiveness of the program, making necessary adjustments based on data analysis. • Collaborate with local imams, community elders, and women's group leaders to advocate for the importance of breast cancer screening. Their endorsement can help reduce stigma and dispel fears. • Use testimonials from women who have undergone screening and benefited from early detection. Emphasize the stories of women who have continued to lead fulfilling family lives post-diagnosis. • Organize awareness sessions where entire families, including men, are invited to learn about breast cancer. • Develop and distribute multilingual information brochures and websites that provide comprehensive details on breast cancer care options, screening, and available health care facilities in Saudi Arabia for expatriates. • Consider providing primary care practitioners with patient education materials about breast cancer screening to distribute during ordinary appointments. • Prioritize BRCA mutation screening to identify women at high risk. Currently, most individuals with mutations remain undetected due to limited access to BRCA1/2 testing. Although such tests are offered at the King Faisal Specialist Hospital & Research Center and the National Guard Hospital, widespread access is still challenging. • Train existing health care professionals, such as primary care physicians, in basic genetic counselling principles to enhance the reach in underserved regions. • Consider deploying mobile genetic testing units equipped with necessary facilities to reach remote areas, ensuring wider access.
Diagnostic process (imaging, biopsy, biomarker testing)
• There is a need to recruit more trained radiologists to analyze the imaging results. One potential solution would be to have specialized training programs for radiographers in mammography to improve their knowledge and skills in breast cancer detection. Another potential solution is telemammography, which enables remote interpretation of mammograms by expert radiologists. • Collaborate with medical institutions to promote workforce development in the field of pathology. • Evaluate the proportion of patients receiving essential biomarker testing and testing for newer biomarkers at all institutions across the country to assess adherence.
Treatment (organization, workforce, patient support, radiation therapy, medicines)
• Develop and expand culturally sensitive, Arabic-centric online and offline support platforms nationwide. Encourage the creation of more initiatives like "Najia" to address the psychosocial needs of cancer patients before, during, and after the treatment process. • Implement patient navigation services within hospitals and health care facilities to support women and prevent them from getting lost within the system as well as to reduce delays in the treatment process.

- No real national treatment guidelines exist and can be applied consistently due to the fragmentation of the health system. The ongoing transformation of the health system as part of the Saudi Vision 2030 needs to improve this to ensure a more equitable provision of cancer care.
- Continue prioritizing initiatives to train and recruit medical oncologists and nurses to help alleviate current staff shortages.
- Ensure breast surgeries are performed by specialized breast surgeons rather than general surgeons.
- Radiation therapy is predominantly concentrated in Riyadh, Jeddah, and Dammam, leading to limited access in other areas. One option is to improve the availability of radiation therapy in rural areas. Another option is to use hypofractionated radiation therapy more often, which enables patients to complete their radiation therapy courses more quickly. This would make it easier for patients from rural areas to receive short-term treatment in major cities and also save resources.
- Although a wide range of newer breast cancer medicines are accessible in both early and metastatic stages across various government and private sector facilities, the actual delivery of these medicines continues to encounter logistic hurdles. Developing a comprehensive digital platform to integrate procurement, inventory management, and distribution processes for medicines is warranted.

9.7 South Africa

SOUTH AFRICA – Recommendations
Governance of breast cancer care
• While public health care spending, at approximately 5% of GDP, aligns with WHO standards, notable disparities in the allocation of these funds exist. These disparities stem from variations in the governance of provincial health authorities. It is important to intensify efforts towards ensuring equitable health care provision across the entire country. • Transportation is a major obstacle for many South African patients seeking timely and regular breast cancer care. Building on existing transportation initiatives, like the one by NGOs such as Campaigning for Cancer that harnesses an app linked to the public transport system, is crucial. • Emphasize and strengthen the participation of patient organizations in decision-making processes concerning breast cancer care.
Early detection (self-initiated detection, screening, and genetic risk assessment)
• Recognizing that traditional healers are often the first point of care for women, makes it necessary to harness their potential as enablers in the health care system. By investing in their education about breast cancer symptoms, this could improve the chances of timely referrals. Engaging with and equipping healers, possibly with handheld sonar devices, can enhance initial consultations, seamlessly integrating traditional and modern health care methods to optimize early diagnosis and treatment. • Given the rising preference of complementary medicine, integrative health clinics that combine complementary and conventional medicine under one roof could be considered. This would offer patients a holistic approach to their health care. • Formally recognize and define the role of navigators within the national health care system, by dedicating a portion of the national or regional health care budget specifically for the recruitment, training, and remuneration of navigators. • The 2017 breast cancer control policy includes a standard to enhance breast education, providing materials and instructing women on breast self-examination techniques. Before the policy, research indicated that women in certain provinces were not receiving this education. Continuing emphasizing the development of educational materials is crucial to bolster breast cancer awareness and cultivate a culture of prevention. Incorporating digital distribution methods can further this reach. • Given the increasing digitalization and availability of self-monitoring tools, it is recommended to widely adopt and promote digital tools designed for keeping track of self-breast examinations and CBE. • Considering the reduced sensitivity of CBE compared with mammography, and the scarcity of mammography equipment, it is crucial to establish a nationally recognized training curriculum for CBE. This could help ensuring that all health care providers possess consistent and updated knowledge in all provinces. • Use testimonials from women who have undergone screening and benefited from early detection. Emphasize the stories of women who have continued to lead fulfilling family lives post-diagnosis. • Many individuals with mutations go undetected because of restricted access to BRCA1/2 tests. While these tests are available, they are not easily accessible due to the NHLS being oversaturated, resulting in extended waiting times. A viable solution may be to outsource these tests. In fact, some facilities have successfully outsourced full-gene sequencing tests to other companies at competitive prices. • Train existing health care professionals, such as oncologists and primary care physicians, in basic genetic counselling principles to enhance the reach in underserved regions. Create more positions for genetic counsellors in the public sector and ensure retention of trained professionals within the country. • Consider deploying mobile genetic testing units equipped with necessary facilities to reach remote areas, ensuring wider access.
Diagnostic process (imaging, biopsy, biomarker testing)
• A comprehensive review is recommended to identify the root causes of bottlenecks within the health care system that impede timely diagnoses. • To address the deficiency of mammography equipment, it is crucial to prioritize investments in additional machines, especially in centers serving vast regions. Moreover, introducing mobile mammography units in rural and semi-urban areas can further bridge the gap in accessibility. • Compared to mammography and MRI, ultrasound machines are generally more affordable and easier to maintain. This makes them a viable option for regions with limited resources. Consider continuing investing in ultrasound technology and dedicated training for health care professionals in its techniques.

- Invest in computers and necessary hardware specifically designed for medical imaging in facilities that lack them, as the imaging tests should be thoroughly reviewed on proper screens (rather than mobile phone screens) before making any treatment decisions.
- Explore the implementation of digital pathology solutions, which can include facilitating virtual collaboration among pathologists, thereby reducing the necessity for them to be physically present in the same location. Additionally, consider long-term investments in digital pathology technology to enhance the cost-effectiveness of diagnoses and prognoses.
- Advocate for government and health care institutions to introduce subsidies or financial assistance programs for critical diagnostic tests like the core needle biopsy.
- To address the shortage of health care workers in various areas, a potential strategy is to engage more primary care physicians in diverse aspects of the diagnostic process.
- Consider implementing periodic quality checks and audits of histopathology reports to ensure compliance with standards and to identify areas and institutions needing improvement.
- To promote the uptake of gene expression profile panels, it is essential to establish effective financing and reimbursement strategies for tests that demonstrate significant clinical benefits and that can prove their cost-effectiveness.

Treatment (organization, workforce, patient support, radiation therapy, medicines)

- Help patients to pay for transportation costs by implementing a comprehensive transportation subsidy or voucher program. Partnering with local transportation providers or initiating state-sponsored transportation services could reduce the economic burden on patients, ensuring consistent and uninterrupted treatment access.
- Improve the patient's experience by fostering a comfortable and welcoming environment, starting with the establishment of dedicated counseling rooms. As an initial measure, consider utilizing technology to provide virtual counseling and support group sessions. As a second step prioritize renovation of infrastructure to create proper spaces for counseling rooms and adequate space for patient consultation.
- Strengthen social support system for patients to improve adherence to chemotherapy and other treatments. Integrate long-term plans for capacity building within the public health sector to reduce overreliance on NGOs and ensure sustainable, quality care for patients.
- Co-payments for cancer care services accessed by insured patients can be high as they are defined in relation to the total price of services. A switch to paying a fixed fee as a co-payment could be considered.
- Conduct a comprehensive review of the current medical funding structures. Explore avenues for broadening the scope of coverage to include essential non-PMB treatments for breast cancer.
- Plan for a long-term expansion of hospital infrastructure to accommodate the growing number of cancer patients. This would also include prioritizing the renovation of old clinics.
- Increase the number of weekly surgical slots dedicated to breast surgery, by investing in additional medical equipment, and training and hiring more breast surgeons. Partnerships with private institutions or international health organizations may also offer temporary relief.
- To improve the shortages of medical oncologists, the implementation of telemedicine and virtual consultations platforms could be explored. To address the shortages of radiologists and radiation oncologists, the number of radiology residency slots in medical schools could be increased and the compensation packages for these professionals could be enhanced.
- The limited availability of radiation therapy equipment contributes to extended waiting times. One solution might involve expanding the operational hours of current radiation therapy centers, possibly including weekends, to serve a greater number of patients. Additionally, continue prioritizing the use of hypofractionated radiation therapy to allow patients to complete their radiation therapy courses quicker and to save resources. In addition, establish and expand brachytherapy facilities within the private sector.
- Develop a centralized digital platform or database that provides easy access to treatment protocols and formularies for both patients and insurers. Continue supporting initiatives like the Campaigning for Cancer project that aim to enhance transparency.
- The current availability of modern cancer medicines is predominantly (for targeted therapies) or exclusively (for immunotherapies) limited to the private sector. In the public sector, the process to include a new medicine on the EML is lengthy. Until recently, the standard-of-care available on the EML for oncology resembled global standards from 20 years ago but this has started to improve. A shift towards a more systematic assessment using HTA could be considered to help prioritize modern cancer medicines.
- Establish an HTA unit along with a rigorous, transparent, and standardized HTA process with clear decision criteria for medicines to ensure that medical protocol and formulary decisions are based on solid health economic rationale and not influenced by political biases or personal preferences.

9.8 Türkiye

TÜRKIYE - Recommendations

Governance of breast cancer care

- Public spending on health care amounts to around 4% of GDP, which falls short of the informal WHO spending target of 5%. Additional spending to bring the country closer to the benchmark would be needed. The insufficient public spending can have various impacts on Türkiye's ability to address breast cancer adequately, from prevention to treatment and follow-up.
- Emphasize and strengthen the participation of patient organizations in decision-making processes concerning breast cancer care.

Early detection (self-initiated detection, screening, and genetic risk assessment)

- While more women recognize the importance of being vigilant about changes in their breasts and understand the importance of mammography than before, this awareness is not universal. Younger women tend to overlook symptoms more frequently. Also, studies reveal that women know breast self-examination and mammography are important, yet they do not actually go to check-ups according to the recommendations. Therefore, it is important to persistently educate women about breast health awareness from an early age and continue reminding women of the importance in ordinary contacts with the health care system. Such continued education is essential for immediate health benefits and for enhancing long-term participation rates in breast cancer screening programs.
- Consider ways to address the challenge of difficulties in securing appointments for women exhibiting breast cancer symptoms.
- While women in the eligible age group (40-69 years) are intended to receive screening invitations via SMS and phone calls, studies indicate that only a small fraction actually receive these notifications. To foster a culture of preventive screening, it is important to continue working on a reliable call-recall system. This system should consistently notify patients about their upcoming screenings through SMS, calls, or emails. This is especially vital for women aged 40-49, who were not previously included in the early detection program but are now eligible.
- General practitioners and nurses seldom proactively recommend preventive mammography to their patients. It could be considered to provide primary care practitioners with patient education materials about breast cancer screening to distribute during ordinary appointments.
- A comprehensive approach to data collection and analysis should be prioritized, specifically focusing on the rates of early diagnosis and survival rates from different groups.
- To improve the low referral rates for genetic testing attributed to a knowledge gap among primary care health workers, it is crucial to prioritize the education and training of health care professionals.

Diagnostic process (imaging, biopsy, biomarker testing)

- There are long waiting times to secure appointments at diagnostic services in the public sector. Invest in expanding health care facilities, including diagnostic centers, to accommodate more patients is needed to reduce waiting times.
- The availability of mammography machines is high. The current priority should lie in ensuring high-quality standards, as studies indicate that numerous mammography machines in both private and public hospitals fall short of meeting these benchmarks. Additionally, a significant number of mammography reports are found to be incomplete, emphasizing the need for improvements in quality assurance and reporting practices.
- It is crucial to improve the quality control of pathology units by ensuring that laboratories and diagnostic centers get accredited by international health bodies to maintain quality standards.
- While essential biomarker testing, including hormone receptor status and HER2, is accessible in major cities, acquiring these tests in less urbanized areas, such as the Eastern Anatolia region, poses challenges. Ensuring widespread access to these tests is crucial to providing patients with the most optimal treatment options.
- To improve pathologist job satisfaction and prevent future talent drain in the public sector, it is advisable to start working on feedback mechanisms where pathologists can voice their concerns, suggestions, and feedback about their work environment.

Treatment (organization, workforce, patient support, radiation therapy, medicines)

- Launch patient education campaigns to raise awareness about the importance of treatment adherence. Provide resources and support to help patients understand the benefits of completing their treatment regimens.
- Prioritize data collection and create a feedback loop where data-driven insights continually refine health care practices. One example where this could be beneficial is the measurement of waiting times. The geography of the country, with worse access to comprehensive cancer centers in rural

and semi-rural areas, is a challenge that affects the start of treatment. Patients in the Southeast Anatolia region have an average waiting time for starting treatment of more than double than patients from other regions. It is necessary to consider ways to improve geographical accessibility and to upgrade medical facilities in underserved regions.

- To address the shortage of breast surgeons that leads to long waiting times for surgery, it would be beneficial to expand the number of training programs in breast surgery. Encouraging medical students to specialize in this field can be achieved through scholarships, grants, or other incentives.
- To address the shortage of radiation oncologists and radiation therapists, it is recommended to increase the number of radiology residency slots in medical schools and enhance compensation packages for these professionals.
- The limited availability of radiation therapy equipment contributes to extended waiting times. One solution is to use hypofractionated radiation therapy more often to allow patients to complete their radiation therapy courses quicker. This would be particularly beneficial for patients living in the East Anatolia and Southeast Anatolia region and also save resources.
- Ensure consistent use of HTA to evaluate new cancer medicines. Prioritize the reimbursement of medicines with high clinical benefit and acceptable cost-effectiveness profile. Constrained health care budgets could be aided by an increased focus on cancer medicines that provide the greatest benefit to patients, while deprioritizing others.
- Facilitate the implementation of clinical trials for medicines and continue to algin the clinical trials ecosystem with international standards. Through the participation in clinical trials, some patients can receive the newest medicines without the need by the SSI to pay for them.

9.9 United Arab Emirates

UAE - Recommendations

Governance of breast cancer care

- Public spending on health care amounts to around 3% of GDP, which falls short of the informal WHO spending target of 5%. Additional spending to bring the country closer to the benchmark may be needed. The insufficient public spending can have various impacts on the UAE's ability to address breast cancer adequately, from prevention to treatment and follow-up.
- Emphasize and strengthen the participation of patient organizations in decision-making processes concerning breast cancer care.

Early detection (self-initiated detection, screening, and genetic risk assessment)

- Collaborate with local imams, community elders, and women's group leaders to advocate for the importance of breast cancer screening. Their endorsement can help reduce stigma and dispel fears.
- Use testimonials from women who have undergone screening and benefited from early detection. Emphasize the stories of women who have continued to lead fulfilling family lives post-diagnosis.
- Organize awareness sessions where entire families, including men, are invited to learn about breast cancer.
- Develop and distribute multilingual information brochures and websites that provide comprehensive details on breast cancer care options, screening, and available health care facilities in the UAE for expatriates.
- Consider providing primary care practitioners with patient education materials about breast cancer screening to distribute during ordinary appointments.
- Consider ways to address the challenge of difficulties in securing appointments for women exhibiting breast cancer symptoms.
- Improve breast cancer awareness and early detection activities all year-round eliminating the need for women to delay screenings until October.
- Launch comprehensive awareness campaigns that address misconceptions about mammograms, emphasizing their safety and benefits.
- Allocate funding for additional mobile mammography clinics to cater to the high demand, ensuring that more women across all Emirates are screened timely.
- Promote the use of electronic health records that include imaging storage and transfer capabilities, to ensure more effective communication with, e.g., services provided by the Pink Caravan initiative.
- Reevaluate age cutoffs for receiving breast cancer screening and consider incorporating risk assessment tools to identify individuals who may benefit from earlier screenings.
- Promote transparency of the breast cancer screening program by making participation rates and other quality indicators readily accessible to the public through official channels, websites, and annual reports. In addition, use this information to continuously evaluate the effectiveness of the program, making necessary adjustments based on data analysis.
- Enhance data completeness in the cancer registry by standardizing the documentation process for diagnosis across health care facilities.
- Consider establishing genetic counseling services in multiple comprehensive cancer centers across the country to reduce waiting times and increase accessibility.
- Continue investing in the development of in-country genetic testing facilities to reduce dependence on overseas testing centers.

Diagnostic process (imaging, biopsy, biomarker testing)

- Establish clear KPIs and time frames for the diagnostic process of breast cancer.
- Explore ways to establish a dedicated fund in each Emirate aimed at offering diagnostic imaging exams to underserved or vulnerable populations who do not have free access.
- Develop specialized training programs for radiographers in mammography to improve their knowledge and skills in breast cancer detection. Encourage continuous professional development and certification in breast imaging.
- Collaborate with medical institutions to promote workforce development in the field of pathology. Establish training programs and incentives to attract and retain qualified pathologists throughout the Emirates.
- Develop patient education materials and counseling services that specifically address common misconceptions and fears related to diagnostic procedures like biopsies.

Treatment (organization, workforce, patient support, radiation therapy, medicines)
• Many cancer patients (especially expatriates) lack knowledge on where to seek care and how to navigate through the health care system. A system with patient navigators should be established. In addition, a more streamlined pathway model of cancer care could be considered. • Provide transportation assistance or subsidies for breast cancer patients who need to travel long distances for treatment. • To optimize the process of financial assistance for the treatment of breast cancer patients, consider collaboration and resource-sharing among charitable organizations and ways to develop a standardized application form to avoid duplication. • Launch patient education campaigns to raise awareness about the importance of treatment adherence. Provide resources and support to help patients understand the benefits of completing their treatment regimens. • Implement quality assurance programs and clinical practice guidelines that emphasize the importance of MDT consultations for breast cancer patients. MDTs comprising various kinds of oncologists, nurses, psychologists, and patient navigators should review all cases prior to treatment start. These teams can provide patients with a holistic understanding of their treatment options and offer guidance on the best course of action, reducing the need for seeking multiple opinions, allowing them to start treatment earlier. • Establish and expand nurse education and training programs, particularly those focused on oncology nursing. • The number of radiation therapy machines is close to meeting internationally recommended standards. However, geographic imbalances in the location of treatment centers with radiation therapy machines is still a challenge.

References

1. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. CA Cancer J Clin. 2021;71(3):209-49.

2. Centers for Disease Control and Prevention. Breast Cancer in Men. [Nov 3, 2023]. Available from: https://www.cdc.gov/cancer/breast/men/index.htm.

3. World Health Organization. Breast cancer. [Jul 26, 2022]. Available from: https://www.who.int/news-room/fact-sheets/detail/breast-cancer.

4. Ferlay J, Ervik M, Lam F, Colombet M, Mery L, Piñeros M, et al. Global Cancer Observatory: Cancer Tomorrow. [Oct 18, 2021]. Available from: https://gco.iarc.fr/tomorrow.

5. Ferlay J, Ervik M, Lam F, Colombet M, Mery L, Piñeros M. Global Cancer Observatory: Cancer Today. [Feb 6, 2024]. Available from: https://gco.iarc.fr/.

6. Allemani C, Matsuda T, Di Carlo V, Harewood R, Matz M, Niksic M, et al. Global surveillance of trends in cancer survival 2000-14 (CONCORD-3): analysis of individual records for 37 513 025 patients diagnosed with one of 18 cancers from 322 population-based registries in 71 countries. Lancet. 2018;391(10125):1023-75.

7. Allemani C, Weir HK, Carreira H, Harewood R, Spika D, Wang XS, et al. Global surveillance of cancer survival 1995-2009: analysis of individual data for 25,676,887 patients from 279 population-based registries in 67 countries (CONCORD-2). Lancet. 2015;385(9972):977-1010.

8. World Health Organization. Global Breast Cancer Initiative implementation framework: Assessing, strengthening and scaling-up of services for the early detection and management of breast cancer. Geneva: WHO, 2023.

9. American Cancer Society. Survival Rates for Breast Cancer. [Dec 21, 2023]. Available from: https://www.cancer.org/cancer/types/breast-cancer/understanding-a-breast-cancer-diagnosis/breast-cancer-survival-rates.html.

10. Elobaid Y, Aw TC, Lim JNW, Hamid S, Grivna M. Breast cancer presentation delays among Arab and national women in the UAE: a qualitative study. SSM Popul Health. 2016;2:155-63.

11. American Cancer Society. Treating Breast Cancer. [Dec 21, 2023]. Available from: https://www.cancer.org/cancer/types/breast-cancer/treatment.html.

12. Guida F, Kidman R, Ferlay J, Schuz J, Soerjomataram I, Kithaka B, et al. Global and regional estimates of orphans attributed to maternal cancer mortality in 2020. Nat Med. 2022;28(12):2563-72.

13. Jordan Breast Cancer Program, King Hussein Cancer Foundation, Ministry of Health. Breast Cancer Screening and Diagnosis Guidelines 2019.

14. Mimouni H, Hassouni K, El marnissi B, Haddou rahou B, Alaoui L, Ismaili R, et al. The patient, diagnosis and treatment delay of the care pathway of patients with breast Cancer in Morocco. Annals of Cancer Research and Therapy. 2022;30(1):11-7.

15. Abdelaziz AH, Ezz El Din Mohamed M, Abdou AM, Rabea AM, Hussien NM. Adherence and Discontinuation of Endocrine Therapy among Egyptian Breast Cancer Patients Receiving Adjuvant Treatment: A Cross-sectional Study. SECI Oncology. 2022(1):1-7.

16. Wild CP, Weiderpass E, Stewart BW. World Cancer Report: Cancer Research for Cancer Prevention. Lyon: International Agency for Research on Cancer, 2020.

17. Centers for Disease Control and Prevention. What Are the Risk Factors for Breast Cancer? 2022 [cited 2023 Feb 20]. Available from: https://www.cdc.gov/cancer/breast/basic_info/risk_factors.htm.

18. The Health Policy Partnership. Genetic testing for BRCA mutations: country profile for Israel. 2019.

19. Warner E, Zhu S, Plewes DB, Hill K, Ramsay EA, Causer PA, et al. Breast Cancer Mortality among Women with a BRCA1 or BRCA2 Mutation in a Magnetic Resonance Imaging Plus Mammography Screening Program. Cancers (Basel). 2020;12(11).

20. Seymour HJ, Wainstein T, Macaulay S, Haw T, Krause A. Breast cancer in high-risk Afrikaner families: Is BRCA founder mutation testing sufficient? S Afr Med J. 2016;106(3):264-7.

21. McGuire A, Brown JA, Malone C, McLaughlin R, Kerin MJ. Effects of age on the detection and management of breast cancer. Cancers (Basel). 2015;7(2):908-29.

22. Najjar H, Easson A. Age at diagnosis of breast cancer in Arab nations. Int J Surg. 2010;8(6):448-52.

23. Larsen MJ, Thomassen M, Gerdes AM, Kruse TA. Hereditary breast cancer: clinical, pathological and molecular characteristics. Breast Cancer (Auckl). 2014;8:145-55.

24. Centers for Disease Control and Prevention. BRCA Gene Mutations. [Sep 8, 2022]. Available from: https://www.cdc.gov/cancer/breast/young_women/bringyourbrave/hereditary_breast_cancer/brca_gene_mutations.htm.

25. Abulkhair O, Al Balwi M, Makram O, Alsubaie L, Faris M, Shehata H, et al. Prevalence of BRCA1 and BRCA2 Mutations Among High-Risk Saudi Patients With Breast Cancer. J Glob Oncol. 2018;4:1-9.

26. Zavala VA, Bracci PM, Carethers JM, Carvajal-Carmona L, Coggins NB, Cruz-Correa MR, et al. Cancer health disparities in racial/ethnic minorities in the United States. Br J Cancer. 2021;124(2):315-32.

27. Kurian AW, Fish K, Shema SJ, Clarke CA. Lifetime risks of specific breast cancer subtypes among women in four racial/ethnic groups. Breast Cancer Res. 2010;12(6):R99.

28. Rey-Vargas L, Sanabria-Salas MC, Fejerman L, Serrano-Gomez SJ. Risk Factors for Triple-Negative Breast Cancer among Latina Women. Cancer Epidemiol Biomarkers Prev. 2019;28(11):1771-83.

29. Siddharth S, Sharma D. Racial Disparity and Triple-Negative Breast Cancer in African-American Women: A Multifaceted Affair between Obesity, Biology, and Socioeconomic Determinants. Cancers (Basel). 2018;10(12).

30. Almansour NM. Triple-Negative Breast Cancer: A Brief Review About Epidemiology, Risk Factors, Signaling Pathways, Treatment and Role of Artificial Intelligence. Front Mol Biosci. 2022;9:836417.

31. Salem C, Atallah D, Safi J, Chahine G, Haddad A, El Kassis N, et al. Breast Density and Breast Cancer Incidence in the Lebanese Population: Results from a Retrospective Multicenter Study. Biomed Res Int. 2017;2017:7594953.

32. Checka CM, Chun JE, Schnabel FR, Lee J, Toth H. The relationship of mammographic density and age: implications for breast cancer screening. AJR Am J Roentgenol. 2012;198(3):W292-5.

33. Bissell MCS, Kerlikowske K, Sprague BL, Tice JA, Gard CC, Tossas KY, et al. Breast Cancer Population Attributable Risk Proportions Associated with Body Mass Index and Breast Density by Race/Ethnicity and Menopausal Status. Cancer Epidemiol Biomarkers Prev. 2020;29(10):2048-56.

34. World population review. Most Obese Countries 2023. 2023 [cited 2023 Feb 20]. Available from: https://worldpopulationreview.com/country-rankings/most-obese-countries.

35. Ma H, Xu X, Clague J, Lu Y, Togawa K, Wang SS, et al. Recreational physical activity and risk of triple negative breast cancer in the California Teachers Study. Breast Cancer Res. 2016;18(1):62.

36. Ministry of health. National Health Survey in Israel, INHIS -4, Selected Findings 2018 - 2020. 2022 [Jan 4, 2024]. Available from: https://www.gov.il/en/departments/news/02082022-02.

37. Phipps AI, Li CI. Breastfeeding and triple-negative breast cancer: potential implications for racial/ethnic disparities. J Natl Cancer Inst. 2014;106(10).

38. Chughtai A. Infographic: Which countries have the lowest breastfeeding rates? : Al Jazeera; 2022 [cited 2023 Feb 20]. Available from: https://www.aljazeera.com/news/2022/8/1/infographic-breastfeeding-benefits-and-challenges.

39. Fadl N, Haile Z. Association between mode of delivery and breastfeeding practices in Egypt: secondary analysis of Egypt Demographic and Health Survey. East Mediterr Health J. 2021;27(5):474-82.

40. Fortner RT, Sisti J, Chai B, Collins LC, Rosner B, Hankinson SE, et al. Parity, breastfeeding, and breast cancer risk by hormone receptor status and molecular phenotype: results from the Nurses' Health Studies. Breast Cancer Res. 2019;21(1):40.

41. World Bank. Fertility rate, total (births per woman). 2020 [cited 2023 Feb 20]. Available from: https://data.worldbank.org/indicator/SP.DYN.TFRT.IN.

42. World Health Organization. Alcohol is one of the biggest risk factors for breast cancer. [Oct 22, 2022]. Available from: https://www.who.int/europe/news/item/20-10-2021-alcohol-is-one-of-the-biggest-risk-factors-for-breast-cancer.

43. World Bank. Total alcohol consumption per capita, female (liters of pure alcohol, projected estimates, female 15+ years of age). 2018 [cited 2023 Feb 24]. Available from: https://data.worldbank.org/indicator/SH.ALC.PCAP.FE.LI.

44. Gaudet MM, Gapstur SM, Sun J, Diver WR, Hannan LM, Thun MJ. Active smoking and breast cancer risk: original cohort data and meta-analysis. J Natl Cancer Inst. 2013;105(8):515-25.

45. World Bank. Prevalence of current tobacco use (% of female adults). 2020 [cited 2023 Feb 24]. Available from: https://genderdata.worldbank.org/indicators/sh-prv-smok/.

46. Collaborative Group on Hormonal Factors in Breast Cancer. Breast cancer and hormone replacement therapy: collaborative reanalysis of data from 51 epidemiological studies of 52,705 women with breast cancer and 108,411 women without breast cancer. Collaborative Group on Hormonal Factors in Breast Cancer. Lancet. 1997;350(9084):1047-59.

47. Smail L, Jassim GA, Sharaf KI. Emirati Women's Knowledge about the Menopause and Menopausal Hormone Therapy. Int J Environ Res Public Health. 2020;17(13).

48. NCD Risk Factor Collaboration. Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128.9 million children, adolescents, and adults. Lancet. 2017;390(10113):2627-42.

49. World Health Organization. Prevalence of insufficient physical activity among adults. 2018.

50. Hofmarcher T, Ahmad A, Lindgren P, Wilking N. Cancer Care in the Middle East and Africa. Lund: IHE, 2021.

51. Hofmarcher T, Lindgren P, Wilking N. Cancer Care in Türkiye in a European Context. Lund: IHE, 2022.

52. Loeb S, Bjurlin MA, Nicholson J, Tammela TL, Penson DF, Carter HB, et al. Overdiagnosis and overtreatment of prostate cancer. European urology. 2014;65(6):1046-55.

53. Heidi D. Nelson MP, Amy Cantor, Jessica Griffin, Monica Daeges, Linda Humphrey. Harms of Breast Cancer Screening: Systematic Review to Update the 2009 U.S. Preventive Services Task Force Recommendation. Annals of Internal Medicine. 2016;164(4):256-67.

54. Hamdi Cherif M, Mahnane A, Boukharouba H, Kara L, Ayat A. Le Cancer a Sétif 1986-2010, Algerie Incidences, Tendances et Survie. Service d´Epidemiologie & Médecine Préventive, CHU de Sétif, 2014.

55. WHO. Cancer Country Profiles. 2014.

56. Hamdi Cherif M, Kara L, Hamouda D, Zoubir A. Données d'incidence du Réseau National des Registres du Cancer ,Algérie 2015. El Hakim. 2018;3:5-13.

57. Bounedjar A, Melzi MA, Idir H, Heba N. General Oncology Care in Algeria. In: Al-Shamsi HO, Abu-Gheida IH, Iqbal F, Al-Awadhi A, editors. Cancer in the Arab World. Singapore: Springer; 2022.

58. WHO. Cancer country profile: Algeria. 2020 [cited 2023 May 31]. Available from: https://www.who.int/publications/m/item/cancer-dza-2020.

59. Ibrahim AS, Khaled HM, Mikhail NN, Baraka H, Kamel H. Cancer incidence in egypt: results of the national population-based cancer registry program. J Cancer Epidemiol. 2014;2014:437971.

60. WHO. Cancer country profile: Egypt. 2020 [cited 2023 May 31]. Available from: https://www.who.int/publications/m/item/cancer-egy-2020.

61. Ervik M, Lam F, Laversanne M, Ferlay J, Bray F. Global Cancer Observatory: Cancer Over Time. [cited 2023 Feb 24]. Available from: https://gco.iarc.fr/overtime.

62. Ministry of health Israel. Breast Invasive Cancer Incidence 2013 [cited 2023 Feb 24]. Available from: https://www.health.gov.il/UnitsOffice/HD/ICDC/ICR/CancerIncidence/Pages/Breast_Invasive.aspx.

63. Ministry of health. Breast cancer in women in Israel 2021.

64. Ministry of health. Breast cancer in women in Israel 2022.

65. Abdel-Razeq H, Mansour A, Jaddan D. Breast Cancer Care in Jordan. JCO Glob Oncol. 2020;6:260-8.

66. Ministry of health. Cancer incidence in Jordan. Jordan Cancer Registry 2010-2018.

67. Elidrissi Errahhali M, Elidrissi Errahhali M, Ouarzane M, Boulouiz R, Bellaoui M. Cancer incidence in eastern Morocco: cancer patterns and incidence trends, 2005-2012. BMC Cancer. 2017;17(1):587.

68. WHO. Cancer country profile: Morocco 2020 [cited 2023 May 31]. Available from: https://www.who.int/publications/m/item/cancer-mar-2020.

69. National Cancer Registry. Cancer incidence report Saudi Arabia 2001-2018.

70. WHO. Cancer country profile: Saudi Arabia. 2020 [cited 2023 May 31]. Available from: https://www.who.int/publications/m/item/cancer-sau-2020.

71. South African National Cancer Registry. Summary statistics of cancer diagnosed histologically 2001-2019.

72. Ministry of health. Turkey cancer statistics 2013-2017.

73. Ministry of health and prevention. Statistics open data. 2011-2017 [cited 2023 Mar 2]. Available from: https://smartapps.moh.gov.ae/ords/f?p=105:511.

74. World Health Organization. WHO mortality database. [cited 2023 Apr 18]. Available from: https://platform.who.int/mortality.

75. Inic Z, Zegarac M, Inic M, Markovic I, Kozomara Z, Djurisic I, et al. Difference between Luminal A and Luminal B Subtypes According to Ki-67, Tumor Size, and Progesterone Receptor Negativity Providing Prognostic Information. Clin Med Insights Oncol. 2014;8:107-11.

76. Liu Z, Zhang XS, Zhang S. Breast tumor subgroups reveal diverse clinical prognostic power. Sci Rep. 2014;4:4002.

77. Surveillance Epidemiology and End Results (SEER) Program. SEER*Stat Database: Incidence - SEER Research Data. National Cancer Institute [Aug 1, 2022]. Available from: https://seer.cancer.gov/.

78. Cherbal F, Gaceb H, Mehemmai C, Saiah I, Bakour R, Rouis AO, et al. Distribution of molecular breast cancer subtypes among Algerian women and correlation with clinical and tumor characteristics: a population-based study. Breast Dis. 2015;35(2):95-102.

79. Salhia B, Tapia C, Ishak EA, Gaber S, Berghuis B, Hussain KH, et al. Molecular subtype analysis determines the association of advanced breast cancer in Egypt with favorable biology. BMC Womens Health. 2011;11:44.

80. Ministry of Health. Breast cancer in women in Israel - Update of incidence and mortality data 2022. 2022.

81. Shomaf M, Masad J, Najjar S, Faydi D. Distribution of breast cancer subtypes among Jordanian women and correlation with histopathological grade: molecular subclassification study. JRSM Short Rep. 2013;4(10):2042533313490516.

82. Mrabti H, Sauvaget C, Benider A, Bendahhou K, Selmouni F, Muwonge R, et al. Patterns of care of breast cancer patients in Morocco - A study of variations in patient profile, tumour characteristics and standard of care over a decade. Breast. 2021;59:193-202.

83. Al-Thoubaity FK. Molecular classification of breast cancer: A retrospective cohort study. Ann Med Surg (Lond). 2020;49:44-8.

84. Dickens C, Duarte R, Zietsman A, Cubasch H, Kellett P, Schuz J, et al. Racial comparison of receptor-defined breast cancer in Southern African women: subtype prevalence and age-incidence analysis of nationwide cancer registry data. Cancer Epidemiol Biomarkers Prev. 2014;23(11):2311-21.

85. Ozmen V. Breast Cancer in Turkey: Clinical and Histopathological Characteristics (Analysis of 13.240 Patients). J Breast Health. 2014;10(2):98-105.

86. Bendardaf R, Saheb Sharif-Askari F, Saheb Sharif-Askari N, Yousuf Guraya S, S AA, Abusnana S. Incidence and Clinicopathological Features of Breast Cancer in the Northern Emirates: Experience from Sharjah Breast Care Center. Int J Womens Health. 2020;12:893-9.

87. Asadzadeh Vostakolaei F, Karim-Kos HE, Janssen-Heijnen MLG, Visser O, Verbeek ALM, Kiemeney LALM. The validity of the mortality to incidence ratio as a proxy for site-specific cancer survival. European Journal of Public Health. 2010;21(5):573-7.

88. Ellis L, Belot A, Rachet B, Coleman MP. The Mortality-to-Incidence Ratio Is Not a Valid Proxy for Cancer Survival. J Glob Oncol. 2019;5:1-9.

89. Hofmarcher T, Brådvik G, Svedman C, Lindgren P, Jönsson B, Wilking N. Comparator Report on Cancer in Europe 2019 – Disease Burden, Costs and Access to Medicines. Lund: IHE, 2019.

90. Hofmarcher T, Keel G, Lindgren P. Cancer care and access to cancer drugs in Asia-Pacific. Lund: IHE, 2021.

91. Rostom Y, Abdelmoneim SE, Shaker M, Mahmoud N. Presentation and management of female breast cancer in Egypt. East Mediterr Health J. 2022;28(10):725-32.

92. Aseafan M, Devol E, AlAhwal M, Souissi R, Sindi R, AlEid H, et al. Population-based survival for cancer patients in Saudi Arabia for the years 2005-2009. Sci Rep. 2022;12(1):235.

93. Elobaid Y, Aamir M, Grivna M, Suliman A, Attoub S, Mousa H, et al. Breast cancer survival and its prognostic factors in the United Arab Emirates: A retrospective study. PLoS One. 2021;16(5):e0251118.

94. Bennis S, Abbass F, Akasbi Y, Znati K, Joutei KA, El Mesbahi O, et al. Prevalence of molecular subtypes and prognosis of invasive breast cancer in north-east of Morocco: retrospective study. BMC Res Notes. 2012;5:436.

95. Heidary Z, Ghaemi M, Hossein Rashidi B, Kohandel Gargari O, Montazeri A. Quality of Life in Breast Cancer Patients: A Systematic Review of the Qualitative Studies. Cancer Control. 2023;30:10732748231168318.

96. Vadaparampil ST, Christie J, Donovan KA, Kim J, Augusto B, Kasting ML, et al. Health-related quality of life in Black breast cancer survivors with and without triple-negative breast cancer (TNBC). Breast Cancer Res Treat. 2017;163(2):331-42.

97. Turk KE, Yilmaz M. The Effect on Quality of Life and Body Image of Mastectomy Among Breast Cancer Survivors. Eur J Breast Health. 2018;14(4):205-10.

98. National Cancer Institute. Fertility Issues in Girls and Women with Cancer. [Oct 22, 2022]. Available from: https://www.cancer.gov/about-cancer/treatment/side-effects/fertility-women.

99. ABC GlobAlliance. Global Status of Advanced Metastatic Breast Cancer 2016.

100. Javan Biparva A, Raoofi S, Rafiei S, Pashazadeh Kan F, Kazerooni M, Bagheribayati F, et al. Global quality of life in breast cancer: systematic review and meta-analysis. BMJ Support Palliat Care. 2022.

101. Blinder V, Eberle C, Patil S, Gany FM, Bradley CJ. Women With Breast Cancer Who Work For Accommodating Employers More Likely To Retain Jobs After Treatment. Health Aff (Millwood). 2017;36(2):274-81.

102. Wang L, Hong BY, Kennedy SA, Chang Y, Hong CJ, Craigie S, et al. Predictors of Unemployment After Breast Cancer Surgery: A Systematic Review and Meta-Analysis of Observational Studies. J Clin Oncol. 2018;36(18):1868-79.

103. Alzehr A, Hulme C, Spencer A, Morgan-Trimmer S. The economic impact of cancer diagnosis to individuals and their families: a systematic review. Support Care Cancer. 2022;30(8):6385-404.

104. Kamal KM, Covvey JR, Dashputre A, Ghosh S, Shah S, Bhosle M, et al. A Systematic Review of the Effect of Cancer Treatment on Work Productivity of Patients and Caregivers. J Manag Care Spec Pharm. 2017;23(2):136-62.

105. Hofmarcher T, Brådvik G, Svedman C, Lindgren P, Jönsson B, Wilking N. Comparator Report on Cancer in Europe 2019 – Disease Burden, Costs and Access to Medicines. Lund: IHE, 2019.

106. Tabor B, Jakubczyk M, Bojanic L, Zawodnik S, Bojkow S, Chahoud L, et al. The economic burden of advanced breast cancer. J Health Policy Outcomes Res: 2021.

107. Finkelstein EA, Malkin JD, Baid D, Alqunaibet A, Mahdi K, Al-Thani MBH, et al. The impact of seven major noncommunicable diseases on direct medical costs, absenteeism, and presenteeism in Gulf Cooperation Council countries. J Med Econ. 2021;24(1):828-34.

108. Mousa R, Hammad E, Melhem J, Al-Jaghbir M. Direct medical costs of breast cancer in Jordan: cost drivers and predictors. Expert Rev Pharmacoecon Outcomes Res. 2021;21(4):647-54.

109. Alghamdi A, Balkhi B, Alqahtani S, Almotairi H. The Economic Burden Associated with the Management of Different Stages of Breast Cancer: A Retrospective Cost of Illness Analysis in Saudi Arabia. Healthcare (Basel). 2021;9(7).

110. Rights for cancer patients (oncology patients). 2020 [cited 2023 10 Apr]. Available from: https://www.clalit.co.il/he/info/clalit4you/pages/rights_of_cancer_patients.aspx.

111. Wigs refunds on the purchase of a wigs One in 9 2017 [cited 2023 10 Apr]. Available from: https://www.onein9.org.il/%D7%A4%D7%99%D7%90%D7%95%D7%AA/.

112. Gany F, Ayash C, Raad N, Wu M, Roberts-Eversley N, Mahmoud H, et al. Financial and food security challenges of Egyptian women undergoing breast cancer treatment. Support Care Cancer. 2020;28(12):5787-94.

113. Elkhalloufi F, Boutayeb S, Lamrani Y, Nmari A, Errihani H. Access to healthcare among Moroccan Breast Cancer Patients: experience of the National Institute of Oncology in Rabat. . Jour of Clin Cas Rep Med Imag and Heal Sci 2023;4.

114. World Bank. UHC service coverage index. 2019 [cited 2023 Mar 3]. Available from: https://data.worldbank.org/indicator/SH.UHC.SRVS.CV.XD.

115. Ly MS, Bassoum O, Faye A. Universal health insurance in Africa: a narrative review of the literature on institutional models. BMJ Glob Health. 2022;7(4).

116. Oxford Business Group. Egypt's insurance sector prepares for a new comprehensive law. 2022 [cited 2023 Feb 1]. Available from: https://oxfordbusinessgroup.com/reports/egypt/2022-report/economy/protection-drive-the-insurance-sector-is-readying-for-a-new-comprehensive-law.

117. Tikkanen R, Osborn R, Mossialos E, Djordjevic A, Wharton G. International Health Care System Profiles: Israel. 2022. Available from: https://www.commonwealthfund.org/international-health-policy-center/countries/israel.

118. Hammad EA, Alabbadi I, Taissir F, Hajjwi M, Obeidat NM, Alefan Q, et al. Hospital unit costs in Jordan: insights from a country facing competing health demands and striving for universal health coverage. Health Econ Rev. 2022;12(1):11.

119. Boukhalfa C. The Road to Universal Coverage by the End of 2022, the Moroccan Challenge. IntechOpen; 2022 [cited 2023 Mar 5]. Available from: https://www.intechopen.com/online-first/84843.

120. Ministry of health. Health expenditures and insurance. 2021.

121. Department of Health. Some key messages on National Health Insurance (NHI). Department: Health Republic of South Africa, 2020.

122. Mohammed A. The Financing Health System Problem in Algeria. International Research Journal of Management, IT & Social Sciences. 2016;3:48.

123. Office of Retirement and Disability Policy-Social Security. Social Security Programs Throughout the World: Africa. [Sep 3, 2020]. Available from: https://www.ssa.gov/policy/docs/progdesc/ssptw/2018-2019/africa/algeria.html.

124. The Ministry of Labor and Social Security in Algeria. The National Policy for Social Security "السياسة الوطنية للضمان الاجتماعي",. Available from: https://www.mtess.gov.dz/ar/%d8%a7%d9%84%d8%b3%d9%8a%d8%a7%d8%b3%d8%a9-%d8%a7%d9%84%d9%88%d8%b7%d9%86%d9%8a%d8%a9-%d9%84%d9%84%d8%b6%d9%85%d8%a7%d9%86-%d8%a7%d9%84%d8%a7%d8%ac%d8%aa%d9%85%d8%a7%d8%b9%d9%8a/.

125. The National Social Insurance Fund for Salaried Workers. Caisse Nationale des Assurances Sociales des Travailleurs Salariés (CNAS). [Sep 11, 2020]. Available from: https://cnas.dz/fr/.

126. The National Social Security Fund for Non-employees. La Caisse Nationale de Sécurité Sociale des Non-Salariés (CASNOS).

127. Dpozine M. Health Insurance Market in Algeria. La Revue des Sciences Commerciales. 2005;4(2):61-79.

128. International Trade Administration. Healthcare Resource Guide: Algeria. [Aug 21, 2020]. Available from: https://2016.export.gov/industry/health/healthcareresourceguide/eg_main_116148.asp.

129. Gericke CA, Britain K, Elmahdawy M, Elsisi G. Health System in Egypt. In: van Ginneken E, Busse R, editors. Health Care Systems and Policies. New York, NY: Springer US; 2018. p. 1-18.

130. Rashad AS, Sharaf MF. Who Benefits from Public Healthcare Subsidies in Egypt? Social Sciences. 2015;4:1162-76.

131. World Health Organization. Egypt - Country Cooperation Strategy at a glance. WHO, 2018.

132. The General Authority for Health Insurance in Egypt. The Health Insurance Organization. [Sep 7, 2020]. Available from: http://hio.gov.eg/ar/Pages/default.aspx#.

133. The Professional Society for Health Economics and Outcomes Research. Egypt Pharmaceutical Global Health Technology Assessment Road Map. [Jul 27, 2020]. Available from: https://tools.ispor.org/htaroadmaps/EgyptPH.asp.

134. Daily news Egypt. Over 30 million women received medical services within the presidential initiative: Health Ministry 2023 [cited 2023 Aug 18]. Available from: https://www.dailynewsegypt.com/2023/05/08/over-30-million-women-received-medical-services-within-the-presidential-initiative-health-ministry/.

135. Eleiba Z. Universal Health Insurance in Egypt: Informal Workers' Perspective. Alternative Policy Solutions; 2020 [Feb 9, 2024]. Available from: https://aps.aucegypt.edu/en/articles/452/universal-health-insurance-in-egypt-informal-workers-perspective.

136. The General Authority for Health Insurance in Egypt. Population, benefeciaries, and percentage of coverage per each governorate: Statistics Center. [Sep 7, 2020]. Available from: http://www.hio.gov.eg/Ar/covers/Pages/Chart1.aspx.

137. The Ministry of Health and Population in Egypt in collaboration with the World Health Organization. Egypt Pharmaceutical Country Profile 2011.

138. Rosen B, Merkur S. Israel: Health system review Health Systems in Transition. 2009.

139. Brammli-Greenberg S, Waitzberg R. Integrating public and private insurance in the Israeli health system: An attempt to reconcile conflicting values. 2020.

140. Ministry of health. The committtee for the empowerment of healht services in Israel and the regulation of the public and private health system 2022.

141. The Jordan Times. Cabinet includes 60-69 age category under free healthcare. [Sep 2, 2021]. Available from: https://www.jordantimes.com/news/local/cabinet-includes-60-69-age-category-under-free-healthcare.

142. The High Health Council of the Hashemite Kingdom of Jordan. The National Strategy for Health Sector in Jordan 2015-2019. 2015.

143. Jordan News Agency. Health: 72% of Jordanians are covered by the insurance umbrella. 2022 [cited 2023 Aug 10]. Available from: https://petra.gov.jo/Include/InnerPage.jsp?ID=232132&lang=ar&name=news.

144. Khader Y, Al Nsour M, Abu Khudair S, Saad R, Tarawneh MR, Lami F. Strengthening Primary Healthcare in Jordan for Achieving Universal Health Coverage: A Need for Family Health Team Approach. Healthcare (Basel). 2023;11(22).

145. Ruger JP, Kress D. Health financing and insurance reform in Morocco. Health affairs (Project Hope). 2007;26(4):1009-16.

146. The Governmental Social Insurance-CNSS. The Mandatory Health Insurance [Aug 11, 2020]. Available from: https://www.cnss.ma/ar/content/%D8%A7%D9%84%D8%AA%D8%A3%D9%85%D9%8A%D9%86-%D8%A7%D9%84%D8%A5%D8%AC%D8%A8%D8%A7%D8%B1%D9%8A-%D8%B9%D9%86-%D8%A7%D9%84%D9%85%D8%B1%D8%B6.

147. Social Protection. Regime for Medical Assistance to the Most Deprived "Regime d'Assistance Médicale aux Economiquement Démunis"- RAMED. [Aug 11, 2020]. Available from: https://socialprotection.org/discover/programmes/regime-d%E2%80%99assistance-m%C3%A9dicale-aux-economiquement-d%C3%A9munis-ramed%E2%80%94regime-medical.

148. Rayaume du Maroc المملكة المغربية. Régime d'Assistance Médicale (RAMED) "راميد نظام المساعدة الطبية ". [Sep 10, 2020]. Available from: https://www.ramed.ma/ar/Pages/default.html.

149. Creation of the High Authority for Health: the bill adopted. 2023 [Feb 9, 2024]. Available from: https://www.h24info.ma/creation-de-la-haute-autorite-de-la-sante-le-projet-de-loi-adopte/.

150. Morocco World News. Only 47% of Moroccans Have Healthcare Coverage. [Aug 26, 2020]. Available from: https://www.moroccoworldnews.com/2018/11/257678/47-moroccans-healthcare-coverage/.

151. The National Health Insurance Agency. L'Agence (ANAM). [Jul 12, 2021]. Available from: http://www.anam.ma/.

152. L'Opinion. Social coverage: 79.8% of Moroccans covered by AMO in 2022 (ANAM). L'Opinion; 2023 [cited 2023 Jul 18]. Available from: https://www.lopinion.ma/Couverture-sociale-798-des-Marocains-couverts-par-l-AMO-en-2022-l-ANAM_a39100.html.

153. Rahhou J. Morocco Expands Health Coverage to over 32 Million Irregular Economy Workers. Morocco World News; 2023 [cited 2023 Jul 17]. Available from: https://www.moroccoworldnews.com/2023/01/353482/morocco-expands-health-coverage-to-over-32-million-irregular-economy-workers.

154. IARC. Patterns of care for women with breast cancer in Morocco: an assessment of breast cancer diagnosis, management, and survival in two leading oncology centres. 2021.

155. International Trade Administration. Healthcare Resource Guide: Morocco. [Sep 3, 2021]. Available from: https://2016.export.gov/industry/health/healthcareresourceguide/eg_main_108604.asp.

156. Almalki M, Fitzgerald G, Clark M. Health care system in Saudi Arabia: an overview. Eastern Mediterranean Health Journal. 2011;17(10).

157. Alghaith T, Almoteiry K, Alamri A, Alluhidan M, Alharf A, Al-Hammad B, et al. Strengthening the Pharmaceutical System in the Kingdom of Saudi Arabia : Towards a Medicine Policy to Support Vision 2030. Washington, DC: World Bank, 2020.

158. The Ministry of Health in Saudi Arabia. The Ministry of Health Annual Report 1437-1438H. [Aug 14, 2020]. Available from: https://www.moh.gov.sa/Ministry/MediaCenter/Publications/saudi/MOH-Annual-Report-1437-1438H.pdf.

159. The Ministry of Health in Saudi Arabia. The Ministry of Health Annual Report 1438-1439H. [Aug 14, 2020]. Available from: https://www.moh.gov.sa/Ministry/About/Documents/MOH_ANNUAL_BOOKLET_2017%20FINAL%20(1).pdf.

160. Government of South Africa. About SA: Health. [Aug 17, 2020]. Available from: https://www.gov.za/about-sa/health.

161. Perumal-Pillay VA, Suleman F. Selection of essential medicines for South Africa - an analysis of in-depth interviews with national essential medicines list committee members. BMC Health Serv Res. 2017;17(1):17.

162. Malakoane B, Heunis JC, Chikobvu P, Kigozi NG, Kruger WH. Public health system challenges in the Free State, South Africa: a situation appraisal to inform health system strengthening. BMC Health Services Research. 2020;20(1):58.

163. Maphumulo WT, Bhengu BR. Challenges of quality improvement in the healthcare of South Africa post-apartheid: A critical review. Curationis. 2019;42(1):e1-e9.

164. RH Bophelo. A glimpse into the South African healthcare industry. [Sep 8, 2021]. Available from: https://www.rhbophelo.co.za/understand-the-south-african-healthcare-industry/.

165. Council for Medical Schemes. What are Prescribed Minimum Benefits? [Sep 8, 2021]. Available from: https://www.medicalschemes.co.za/resources/pmb/.

166. Statistics South Africa. General Household Survey 2019. Pretoria: Stats SA, 2021.

167. Bloomberg. Universal Health Care, the South African Way. [Oct 13, 2021]. Available from: https://www.bloomberg.com/news/articles/2020-01-22/south-african-wants-to-nationalize-health-care-by-2026.

168. BusinessTech. New NHI will see no difference between private and public hospitals: minister. [Oct 13, 2021]. Available from: https://businesstech.co.za/news/government/363654/new-nhi-will-see-no-difference-between-private-and-public-hospitals-minister/.

169. Bloomberg. Contentious South Africa Health Insurance Law Passes Next Hurdle. [Dec 22, 2023]. Available from: https://www.bloomberg.com/news/articles/2023-12-06/contentious-south-africa-health-insurance-law-passes-next-hurdle.

170. European Observatory on Health Systems and Policies. Turkey - Country overview. [May 24, 2022]. Available from: https://eurohealthobservatory.who.int/countries/turkey.

171. Atun R. Transforming Turkey's Health System--Lessons for Universal Coverage. N Engl J Med. 2015;373(14):1285-9.

172. The Ministry of Health and Prevention. Health Insurance. [Sep 14, 2020]. Available from: https://u.ae/en/information-and-services/health-and-fitness/health-insurance.

173. World Health Organization. Global Health Expenditure Database. [Nov 18, 2022]. Available from: https://apps.who.int/nha/database.

174. World Health Organization. Controlling Cancer. [Jun 13, 2022]. Available from: https://www.who.int/activities/controlling-cancer.

175. International Cancer Control Partnership. Developing a NCCP. [Jun 13, 2022]. Available from: https://www.iccp-portal.org/developing-nccp.

176. Le Ministre de la Santé de la Population et de la Réforme Hospitalière. The National Cancer Plan Framework for 2015-2019 "Vision stratégique de lutte contre le cancer centrée sur le malade". 2014.

177. World Health Organization. Cancer prevention and awareness. WHO Africa; 2023 [cited 2023 Mar 7]. Available from: https://www.afro.who.int/node/17243.

178. Ojoko I. Algeria's Landmark Commitment: 30 Billion Dinars Pledged in the Fight Against Cancer. BNN Breaking 2023 [Feb 26, 2024]. Available from: https://bnnbreaking.com/finance-nav/algerias-landmark-commitment-30-billion-dinars-pledged-in-the-fight-against-cancer/.

179. The Arab Republic of Egypt Presidency. Egyptian Women's Health Initiative. [Sep 16, 2021]. Available from: https://www.presidency.eg/en/%D8%A7%D9%84%D8%B1%D8%A6%D8%A7%D8%B3%D8%A9/%D9%85%D8%A8%D8%A7%D8%AF%D8%B1%D8%A9-%D8%B1%D8%A6%D9%8A%D8%B3-%D8%A7%D9%84%D8%AC%D9%85%D9%87%D9%88%D8%B1%D9%8A%D8%A9-%D9%84%D8%AF%D8%B9%D9%85-%D8%B5%D8%AD%D8%A9-%D8%A7%D9%84%D9%85%D8%B1%D8%A3%D8%A9-%D8%A7%D9%84%D9%85%D8%B5%D8%B1%D9%8A%D8%A9/.

180. World Health Organization. Country cooperation strategy, Israel, 2019-2025. Geneva: 2020.

181. Taha H, Nystrom L, Al-Qutob R, Berggren V, Esmaily H, Wahlstrom R. Home visits to improve breast health knowledge and screening practices in a less privileged area in Jordan. BMC Public Health. 2014;14:428.

182. Jordan Breast Cancer Program. Annual Report 2021. 2021.

183. Ministry of Health in Morocco and Lalla Salma Foundation. National Cancer Prevention and Control Plan 2010-2019: Strategic axes and measures "Plan National de Prévention et de Contrôle du Cancer 2010-2019: Axes Stratégiques et mesures".

184. Morocco World News. Morocco to Launch National Plan for Prevention and Treatment of Cancer. [Nov 20, 2020]. Available from: https://www.moroccoworldnews.com/2020/09/320976/morocco-to-launch-national-plan-for-prevention-treatment-of-cancer/.

185. Ministry of Health in Morocco. The National Plan for Cancer Prevention and Control 2020-2029 "PLAN NATIONAL DU CANCER DE PRÉVENTION ET DE CONTRÔLE 2020 - 2029". 2020.

186. The Ministry of Health in Saudi Arabia. National Plan Cancer Control (2014-2025).

187. Abusanad A, Alghamdi M, Bakkar M, Jazieh AR. General Oncology Care in the Kingdom of Saudi Arabia. In: Al-Shamsi HO, Abu-Gheida IH, Iqbal F, Al-Awadhi A, editors. Cancer in the Arab World. Singapore: Springer Singapore; 2022. p. 215-33.

188. The Department of Health in South Africa. The National Cancer Strategic Framework 2017-2022.

189. The Department of Health in South Africa. Policies and Guidelines.

190. National Department of Health. Breast Cancer Prevention and Control Policy 2017.

191. Ministry of Health. National Cancer Progam 2009-2015. Ankara: Department of Cancer Control, 2009.

192. Ministry of Health. Turkey Cancer Control Programme. Ankara: Department of Cancer Control, 2016.

193. Ministry of Health. Turkey Cancer Control Programme. Ankara: General Directorate of Public Health, 2021.

194. Gulf News. 2021: UAE aims to cut cancer cases by 18%. [Sep 3, 2021]. Available from: https://gulfnews.com/uae/health/2021-uae-aims-to-cut-cancer-cases-by-18-1.1665130.

195. The Ministry of Health and Prevention. Cancer. [Aug 18, 2020]. Available from: https://u.ae/en/information-and-services/health-and-fitness/chronic-diseases-and-natural-disorders/cancer-.

196. The Ministry of Health and Prevention. The National Plan for Prevention and combatting NCDs 2017-2021 "2021 - 2017 الخطة الوطنية للوقاية والتصدي للأمراض غير السارية". 2017.

197. Larbi ABID-AORTIC Congress 2015 in Africa. Algeria's Cancer Plan 2015-2019-Strategic vision of a patient-centered fight against cancer. [Aug 17, 2020]. Available from: http://www.santetropicale.com/santemag/algerie/comscien_pdf/cancer_plan_algerie_marrakech.pdf.

198. Mousa SM, Seifeldin IA, Hablas A, Elbana ES, Soliman AS. Patterns of seeking medical care among Egyptian breast cancer patients: relationship to late-stage presentation. Breast. 2011;20(6):555-61.

199. Ministry of health. Women's health. [cited 2023 Aug 16]. Available from: http://www.100millionseha.eg/women.

200. Alorabi M, Elghazawy H. Cancer Control in Egypt: Investing in Health. The ASCO Post. 2021;https://ascopost.com/issues/march-25-2021/cancer-control-in-egypt/.

201. Baheya Foundation. Baheya Foundation for early detection and treatment of breast cancer. [Jul 20, 2020]. Available from: https://www.baheya.org/en

202. Union for International Cancer Control. Shefaa El Orman Oncology Hospital (SOH). [Sep 10, 2020]. Available from: https://www.uicc.org/membership/shefaa-el-orman-oncology-hospital-soh.

203. Gertner Institute for Epidemiology and Health Policy Research. All the rights of women with breast cancer. 2022 [cited 2023 Mar 6]. Available from: https://www.camoni.co.il/%D7%9B%D7%9C-%D7%94%D7%96%D7%9B%D7%95%D7%99%D7%95%D7%AA-%D7%A9%D7%9C-%D7%A0%D7%A9%D7%99%D7%9D-%D7%A2%D7%9D-%D7%A1%D7%A8%D7%98%D7%9F-%D7%94%D7%A9%D7%93.

204. Kaplan Medical Center. Breast Health Center. [cited 2023 Mar 7]. Available from: https://hospitals.clalit.co.il/kaplan/he/med_units/breast/Pages/TheCenterForBreastHealth.aspx.

205. Every right. Important rights for cancer patients. 2023 [cited Mar 6 2023]. Available from: https://www.kolzchut.org.il/he/%D7%A0%D7%97%D7%99%D7%AA%D7%94:%D7

%96%D7%9B%D7%95%D7%99%D7%95%D7%AA_%D7%97%D7%A9%D7%95%D7%91%D7%95%D7%AA_%D7%9C%D7%97%D7%95%D7%9C%D7%99_%D7%A1%D7%A8%D7%98%D7%9F.

206. Abdel-Razeq H, Attiga F, Mansour A. Cancer care in Jordan. Hematol Oncol Stem Cell Ther. 2015;8(2):64-70.

207. Khader J, Al Mousa A, Al-Kayed S, Mahasneh H, Mubaidin R, Al Nassir N, et al. History and Current State of Radiation Oncology Services and Practice in Jordan. JCO Glob Oncol. 2020;6:852-8.

208. King Hussein Cancer Center and Foundation. General Information. [Jul 30, 2020]. Available from: https://khcc.jo/ar/khcc.

209. Boutayeb S, Majbar MA. General Oncology Care in Morocco. In: Al-Shamsi HO, I.H. A-G, Iqbal F, Al-Awadhi A, editors. Cancer in the Arab World. Singapore: Springer; 2022.

210. Zerrour L. Health card in Morocco: These figures to remember.: Aujourd'hui Le Maroc; 2021 [cited 2023 Jul 18]. Available from: https://aujourdhui.ma/societe/carte-sanitaire-au-maroc-ces-chiffres-a-retenir.

211. Lalla Salma Foundation. Oncology Centers in Morocco. [Aug 9, 2020]. Available from: http://www.contrelecancer.ma/en/annuaire/carte/centres-oncologie/.

212. AlAzmi AA, Jastaniah W, Alhamdan HS, AlYamani AO, AlKhudhyr WI, Abdullah SM, et al. Addressing Cancer Treatment Shortages in Saudi Arabia: Results of a National Survey and Expert Panel Recommendations. JCO Glob Oncol. 2020;6:476-85.

213. Jazieh AR. Cancer in My Community: Providing Free Access to Cancer Care in Saudi Arabia. [Apr 1, 2021]. Available from: https://www.cancer.net/blog/2020-09/cancer-my-community-providing-free-access-cancer-care-saudi-arabia.

214. Wazqar D, Kerr M, Regan S, Orchard C. Overview of Cancer Care and Oncology Nursing in the Kingdom of Saudi Arabia. American Journal of Nursing Science. 2017;6:324-32.

215. Almuammar A. Primary health care factors associated with late presentation of cancer in Saudi Arabia. Journal of Radiotherapy in Practice. 2020;19(1):71-5.

216. Moodley J, Cairncross L, Naiker T, Momberg M. Understanding pathways to breast cancer diagnosis among women in the Western Cape Province, South Africa: a qualitative study. BMJ Open. 2016;6(1):e009905.

217. Council for Medical Schemes. Final PMB definition guidelines for early and locally advanced breast cancer. 2020.

218. Council for Medical Schemes. Breast cancer. 2022 [cited 2023 Mar 8]. Available from: https://www.medicalschemes.co.za/cmscript-12-of-2022-focus-on-breast-cancer/.

219. Council for Medical Schemes. Final PMB definition guidelines for locally recurrent or metastatic breast cancer. 2020.

220. Campaigning for Cancer. Cancer & Insurance. [Sep 8, 2021]. Available from: http://www.costofcancer.co.za/cancer_and_insurance.html.

221. DenseBreast. Screening guidelines by country. [cited 2023 Mar 14]. Available from: https://densebreast-info.org/europe/european-screening-guidelines/map-screening-guidelines/.

222. Al-Shamsi H. Expatriates with cancer diagnosis in the United Arab Emirates, hanging on the edge. Journal of Cancer Prevention & Current Research. 2018;9(5):257-8.

223. Arabian Business. Dubai expats to get unlimited insurance coverage for selected cancer treatments. [Dec 11, 2020]. Available from: https://www.arabianbusiness.com/healthcare/410313-dubai-expats-to-get-unlimited-insurance-coverage-for-selected-cancer-treatments.

224. Azim HA, Kassem L, Shohdy KS, Safwat Y, Khallaf E, Naguib S, et al. 1759MO Clinical breast examination for early diagnosis of breast cancer: An Egyptian nationwide study. Annals of Oncology. 2023;34:S929.

225. Smaili F, Boudjella A, Dib A, Braikia S, Zidane H, Reggad R, et al. Epidemiology of breast cancer in women based on diagnosis data from oncologists and senologists in Algeria. Cancer Treat Res Commun. 2020;25:100220.

226. Zidan J, Sikorsky N, Basher W, Sharabi A, Friedman E, Steiner M. Differences in pathological and clinical features of breast cancer in Arab as compared to Jewish women in Northern Israel. Int J Cancer. 2012;131(4):924-9.

227. Azim HA, Elghazawy H, Ghazy RM, Abdelaziz AH, Abdelsalam M, Elzorkany A, et al. Clinicopathologic Features of Breast Cancer in Egypt-Contemporary Profile and Future Needs: A Systematic Review and Meta-Analysis. JCO Glob Oncol. 2023;9:e2200387.

228. Mousa RH, Melhem JM, Hammad EA. Epidemiology of women diagnosed with breast cancer in Jordan: A 5-year survival analysis and patients' characteristics from 2 public hospitals. Saudi Med J. 2021;42(7):776-83.

229. Rudat V, Brune-Erbe I, Noureldin A, Bushnag Z, Almuraikhi N, Altuwaijri S. Epidemiology of breast cancer patients at a tertiary care center in the Eastern Province of Saudi Arabia. Gulf J Oncolog. 2012(11):45-9.

230. McCormack VA, Joffe M, van den Berg E, Broeze N, Silva Idos S, Romieu I, et al. Breast cancer receptor status and stage at diagnosis in over 1,200 consecutive public hospital patients in Soweto, South Africa: a case series. Breast Cancer Res. 2013;15(5):R84.

231. Ozmen V, Ozmen T, Dogru V. Breast Cancer in Turkey; An Analysis of 20.000 Patients with Breast Cancer. Eur J Breast Health. 2019;15(3):141-6.

232. Pineros M, Ginsburg O, Bendahhou K, Eser S, Shelpai WA, Fouad H, et al. Staging practices and breast cancer stage among population-based registries in the MENA region. Cancer Epidemiol. 2022;81:102250.

233. Alawadhi E, Al-Awadi A, Elbasmi A, Coleman MP, Allemani C. Cancer Survival by Stage at Diagnosis in Kuwait: A Population-Based Study. J Oncol. 2019;2019:8463195.

234. National Cancer Institute. Cancer Stat Facts: Female Breast Cancer. [cited 2023 23 Jan]. Available from: https://seer.cancer.gov/statfacts/html/breast.html.

235. Moffitt Cancer Center. Triple Negative Breast Cancer Treatment Information. [Sep 7, 2022]. Available from: https://moffitt.org/cancers/triple-negative-breast-cancer/.

236. World Health Organization. Cancer - Screening and early detection. [Nov 11, 2022]. Available from: https://www.who.int/europe/news-room/fact-sheets/item/cancer-screening-and-early-detection-of-cancer.

237. Sorensen K, Makaroff LE, Myers L, Robinson P, Henning GJ, Gunther CE, et al. The call for a strategic framework to improve cancer literacy in Europe. Arch Public Health. 2020;78:60.

238. El Djazaïr. In the absence of a culture of early detection Algerian women are reluctant to undergo a mammogram due to fear. El Djazaïr. 2018.

239. Mansour F, Lakehal A, Nezzal L. Cancer du Sein: Délais d'Accès au Diagnostic et aux Traitements Etude Rétrospective–Batna, Algérie Août 2015–Février 2016 [Breast Cancer: Delays of Access to Diagnosis and Treatment Retrospective Study–Batna, Algeria August 2015–February 2016]. Oncologie. 2020;22.

240. Allam MF, Abd Elaziz KM. Evaluation of the level of knowledge of Egyptian women of breast cancer and its risk factors. A cross sectional study. J Prev Med Hyg. 2012;53(4):195-8.

241. Uddin N, Fateem E, Hablas A, Seifeldin IA, Brown E, Merajver SD, et al. Public and professional educational needs for downstaging breast cancer in Egypt. J Cancer Educ. 2012;27(1):149-55.

242. Abdelaziz AH, Abdou AM, Habeeb CN. 1022 - Breast cancer treatment waiting time, Patient and provider contributions; An Egyptian breast cancer centre experience. Annals of Oncology. 2018;29.

243. Boulos DN, Ghali RR. Awareness of breast cancer among female students at Ain Shams University, Egypt. Glob J Health Sci. 2013;6(1):154-61.

244. Sorensen K, Pelikan JM, Rothlin F, Ganahl K, Slonska Z, Doyle G, et al. Health literacy in Europe: comparative results of the European health literacy survey (HLS-EU). Eur J Public Health. 2015;25(6):1053-8.

245. Levin-Zamir D, Baron-Epel OB, Cohen V, Elhayany A. The Association of Health Literacy with Health Behavior, Socioeconomic Indicators, and Self-Assessed Health From a National Adult Survey in Israel. J Health Commun. 2016;21(sup2):61-8.

246. Rosenblatt Moshe. Breast self-examination Clalit2017 [cited 2023 Mar 14]. Available from: https://www.clalit.co.il/he/your_health/family/cancer/Pages/check-up_sex.aspx.

247. Gershfeld-Litvin A, Halabi S, Bellizzi KM. Stigma related to breast cancer among women and men: The case of the Druze minority in Israel. J Health Psychol. 2023;28(2):189-99.

248. Menes TS, Sella T, Chodick G. Time to Cancer Diagnosis in Young Women Presenting to Surgeons with Breast-Related Symptoms: A Population-Based Cohort Study. J Womens Health (Larchmt). 2020;29(4):493-502.

249. Hamadeh T, Moonesar IA. Financial Restrictions Limit Early Breast Cancer Screening: The Case of Jordan. J Oncology. 2022;2.

250. Khatib S, Nimri O. General Oncology Care in Jordan. In: Al-Shamsi HO, Abu-Gheida, I.H., Iqbal, F., Al-Awadhi, A. , editor. Cancer in the Arab World. Singapore: Springer; 2022.

251. Al-Najar MS, Nsairat A, Nababteh B, Essam D, Tarawneh D, Alrabadi N, et al. Awareness About Breast Cancer Among Adult Women in Jordan. SAGE Open. 2021;11(4).

252. Jordan Breast Cancer Program. Jordanian Women Knowledge, Attitudes, and Practices (KAP) Towards Breast Cancer Early Detection. King Hussein Cancer Foundation and Center

253. Abu-Helalah AM, Alshraideh HA, Al-Hanaqtah M, Da'na M, Al-Omari A, Mubaidin R. Delay in Presentation, Diagnosis, and Treatment for Breast Cancer Patients in Jordan. Breast J. 2016;22(2):213-7.

254. Al-Mousa DS, Alakhras M, Hossain SZ, Al-Sa'di AG, Al Hasan M, Al-Hayek Y, et al. Knowledge, Attitude and Practice Around Breast Cancer and Mammography Screening Among Jordanian Women. Breast Cancer (Dove Med Press). 2020;12:231-42.

255. Jordan Breast Cancer Program. Jordan Breast Cancer Program Post Campaign Evaluation 2021.

256. Basu P, Selmouni F, Belakhel L, Sauvaget C, Abousselham L, Lucas E, et al. Breast Cancer Screening Program in Morocco: Status of implementation, organization and performance. Int J Cancer. 2018;143(12):3273-80.

257. Ghanem S, Glaoui M, Elkhoyaali S, Mesmoudi M, Boutayeb S, Errihani H. Knowledge of risk factors, beliefs and practices of female healthcare professionals towards breast cancer, Morocco. Pan Afr Med J. 2011;10:21.

258. Aloulou S, El Mahfoudi A, El Omrani A, Khouchani M. Facteurs liés au diagnostic tardif du cancer du sein: expérience du CHU Mohammed VI Marrakech [Factors related to late diagnosis of breast cancer: experience of CHU Mohammed VI Marrakech]. Pan Afr Med J. 2015;21.

259. Keita S, Diarra As, El Fakir S, Tachfouti N, Berraho M, Traoré BM, et al. Connaissances des facteurs de risque et pratiques de dépistage du cancer du seins dans la province de Taounate, Maroc. Revue marocaine de santé publique. 2016;3(5).

260. Benbakhta B, Tazi M, Benjaafar N, Khattabi A, Maaroufi A. [Determinants of patient and health system delays for women with breast cancer in Morocco, 2013]. Rev Epidemiol Sante Publique. 2015;63(3):191-201. Determinants des delais patient et systeme de sante des femmes atteintes d'un cancer du sein au Maroc, 2013.

261. Rahhou J. Morocco Continues to Suffer Acute Shortage of Health Workers. Morocco World News; 2023 [cited 2023 Aug 03]. Available from: https://www.moroccoworldnews.com/2023/03/354359/morocco-continues-to-suffer-acute-shortage-of-health-workers.

262. Abusanad A. Breast Cancer Stage Migration in Saudi Arabia: Examining the Influence of Screening. Glob J Qual Saf Healthc. 2022;5(1):24-6.

263. Alduraibi SK. Breast cancer knowledge and screening behaviors of female teachers: A cross-sectional survey in Buraydah, Saudi Arabia. J Family Med Prim Care. 2022;11(7):3834-9.

264. Abdel-Aziz SB, Amin TT, Al-Gadeeb MB, Alhassar AI, Al-Ramadan A, Al-Helal M, et al. Perceived Barriers to Breast Cancer Screening among Saudi Women at Primary Care Setting. Asian Pac J Cancer Prev. 2017;18(9):2409-17.

265. Alqarni GS, Musslem MT, Alosaimi RM, Filfilan FF, Al Qarni AS, Rizk H. Awareness of and Attitude to Breast Self-Examination and Breast Cancer Among Females in Jeddah, Saudi Arabia. Cureus. 2023;15(3):e36595.

266. Nemenqani D, Abdelmaqsoud S, Al-Malki A, Oraija A, Al-Otaibi E. Knowledge, attitude and practice of breast self examination and breast cancer among female medical students in Taif, Saudi Arabia. Open Journal of Preventive Medicine. 2014;4:69-77.

267. Al-Hanawi MK, Hashmi R, Almubark S, Qattan AMN, Pulok MH. Socioeconomic Inequalities in Uptake of Breast Cancer Screening among Saudi Women: A Cross-Sectional Analysis of a National Survey. Int J Environ Res Public Health. 2020;17(6).

268. Department of Health. Clinical Guidelines for Breast Cancer Control and Management 2019.

269. Dickens C, Joffe M, Jacobson J, Venter F, Schuz J, Cubasch H, et al. Stage at breast cancer diagnosis and distance from diagnostic hospital in a periurban setting: a South African public hospital case series of over 1,000 women. Int J Cancer. 2014;135(9):2173-82.

270. Ramathuba DU, Ratshirumbi CT, Mashamba TM. Knowledge, attitudes and practices toward breast cancer screening in a rural South African community. Curationis. 2015;38(1).

271. Ministry of health. October is Breast Cancer Awareness Month. [cited 2023 Mar 14]. Available from: https://hsgm.saglik.gov.tr/tr/kanser-haber/ekim-ayi-meme-kanseri-farkindalik-ayi-3.html.

272. Ozmen V, Boylu S, Ok E, Canturk NZ, Celik V, Kapkac M, et al. Factors affecting breast cancer treatment delay in Turkey: a study from Turkish Federation of Breast Diseases Societies. Eur J Public Health. 2015;25(1):9-14.

273. Doganer YC, Aydogan U, Kilbas Z, Rohrer JE, Sari O, Usterme N, et al. Predictors affecting breast self-examination practice among Turkish women. Asian Pac J Cancer Prev. 2014;15(20):9021-5.

274. Korkut Y. Assessment of knowledge, attitudes, and behaviors regarding breast and cervical cancer among women in western Turkey. J Int Med Res. 2019;47(4):1660-6.

275. Elobaid Y, Aw T-C, Lim JNW, Hamid S, Grivna M. Breast cancer presentation delays among Arab and national women in the UAE: a qualitative study. SSM - Population Health. 2016;2:155-63.

276. Lauby-Secretan B, Scoccianti C, Loomis D, Benbrahim-Tallaa L, Bouvard V, Bianchini F, et al. Breast-cancer screening--viewpoint of the IARC Working Group. N Engl J Med. 2015;372(24):2353-8.

277. Algérie Presse Service. Mainaa Center for diagnosis, screening, and treatment in Algeria "مركز التشخيص والفحص والعلاج ميناء بولاية الجزائر". [Dec 2, 2020]. Available from: http://www.aps.dz/ar/sante-science-technologie/77913-119-2010.

278. Algérie Presse Service. First pilot centre for breast cancer screening, diagnosis and treatment in Algiers. [Dec 3, 2020]. Available from: http://www.aps.dz/en/health-science-technology/31571-first-pilot-centre-for-breast-cancer-screening-diagnosis-and-treatment-in-algiers.

279. State Information Service - Egypt. Launching an initiative to support women´s Health "مبادرة لدعم صحة المرأة". [Dec 2, 2020]. Available from: https://www.sis.gov.eg/Story/193037/%D9%85%D8%A8%D8%A7%D8%AF%D8%B1%D8%A9-%D8%B1%D8%A6%D9%8A%D8%B3-%D8%A7%D9%84%D8%AC%D9%85%D9%87%D9%88%D8%B1%D9%8A%D8%A9-%D9%84%D8%AF%D8%B9%D9%85-%D8%B5%D8%AD%D8%A9-%D8%A7%D9%84%D9%85%D8%B1%D8%A3%D8%A9-%D8%A7%D9%84%D9%85%D8%B5%D8%B1%D9%8A%D8%A9?lang=ar.

280. Ministry of health. Quality control report on the national breast cancer detection program 2015-2019. National Cancer Registry 2022.

281. Jordan Breast Cancer Program. Breast cancer screening and diagnosis guidelines, version 2.2011. Amman: National Comprehensive Cancer Network.

282. Ministry of health. Breast Cancer Early Detection. [14 March, 2024]. Available from: https://www.moh.gov.sa/en/Ministry/Projects/breast-cancer/Pages/default.aspx.

283. IARC. Country fact sheet: Turkey. WHO [cited 2023 Mar 14]. Available from: https://canscreen5.iarc.fr/?page=countryfactsheetbreast&q=TUR&rc=.

284. The Ministry of Health and Prevention. Early Screening for Cancer [Sep 3, 2021]. Available from: https://www.mohap.gov.ae/en/services/Pages/241.aspx.

285. Biganzoli L, Cardoso F, Beishon M, Cameron D, Cataliotti L, Coles CE, et al. The requirements of a specialist breast centre. Breast. 2020;51:65-84.

286. WHO Regional Office for Europe. A short guide to cancer screening. Increase effectiveness, maximize, benefits and minimize harm. 2022.

287. World Health Organisation. Policy statement and recommended actions for early detection of breast cancer in the Eastern Mediterranean Region. WHO, 2016.

288. Zendehdel K, Basu P, Ginsburg O, Al Homoud S, Slama S, Shaheen R, et al. Cancer Control Eastern Mediterranean Region Special Report 2022.

289. Lang K, Josefsson V, Larsson AM, Larsson S, Hogberg C, Sartor H, et al. Artificial intelligence-supported screen reading versus standard double reading in the Mammography Screening with Artificial Intelligence trial (MASAI): a clinical safety analysis of a randomised, controlled, non-inferiority, single-blinded, screening accuracy study. Lancet Oncol. 2023;24(8):936-44.

290. World Health Organization. Screening for various cancers. [Dec 10, 2020]. Available from: https://www.who.int/cancer/detection/variouscancer/en/.

291. Council of the European Union. Council updates its recommendation to screen for cancer. [Dec 15, 2022]. Available from: https://www.consilium.europa.eu/en/press/press-releases/2022/12/09/council-updates-its-recommendation-to-screen-for-cancer/.

292. European Commission - Directorate-General for Research and Innovation - Group of Chief Scientific Advisors. Cancer screening in the European Union. Publications Office of the European Union: Luxembourg, 2022.

293. Najjar H, Easson A. Age at diagnosis of breast cancer in Arab nations. International Journal of Surgery. 2010;8(6):448-52.

294. Mousavi sm, Zheng T, Dastgiri S, Miller A. Age Distribution of Breast Cancer in the Middle East, Implications for Screening. The breast journal. 2009;15:677-9.

295. Al-Shamsi H, Alrawi S. Breast cancer screening in the United Arab Emirates: is it time to call for a screening at an earlier age? Journal of Cancer Prevention & Current Research. 2018;9.

296. Al-Shamsi H, Alrawi S. Breast cancer screening in the United Arab Emirates: is it time to call for a screening at an earlier age? Journal of Cancer Prevention & Current Research. 2018;9(3).

297. IARC. Breast cancer screening WHO, 2016.

298. Cram P, Fendrick AM, Inadomi J, Cowen ME, Carpenter D, Vijan S. The Impact of a Celebrity Promotional Campaign on the Use of Colon Cancer Screening: The Katie Couric Effect. Archives of Internal Medicine. 2003;163(13):1601-5.

299. Mullins R, Coomber K, Broun K, Wakefield M. Promoting cervical screening after introduction of the human papillomavirus vaccine: The effect of repeated mass media campaigns. Journal of medical screening. 2013;20.

300. Youlden DR, Cramb SM, Dunn NA, Muller JM, Pyke CM, Baade PD. The descriptive epidemiology of female breast cancer: an international comparison of screening, incidence, survival and mortality. Cancer Epidemiol. 2012;36(3):237-48.

301. Alawa J, Alhalabi F, Khoshnood K. Breast Cancer Management Among Refugees and Forcibly Displaced Populations: a Call to Action. Current Breast Cancer Reports. 2019;11(3):129-35.

302. El Saghir NS, Soto Pérez de Celis E, JFares JE, Sullivan R. Cancer Care for Refugees and Displaced Populations: Middle East Conflicts and Global Natural Disasters. American Society of Clinical Oncology Educational Book. 2018(38):433-40.

303. Sellam Y. Cancer Immunotherapy in Algeria: Between Therapeutic Progress and Budget Constraints. 2019 [cited 2023 Aug 10]. Available from: https://pharmaboardroom.com/articles/cancer-immunotherapy-in-algeria-between-therapeutic-progress-and-budget-constraints/.

304. Ministère de la Santé. Plan National Cancer 2015-2019. 2014.

305. Egypt Independent. Egypt's '100 Million Healthy Lives' initiative reaches 4.7 million women. [Sep 2, 2021]. Available from: https://egyptindependent.com/egypts-100-million-healthy-lives-initiative-reaches-4-7-million-women/.

306. Egypt independent. Egyptian initiative to support women's health screened 33 million. 2023 [cited 2023 Aug 16]. Available from: https://egyptindependent.com/egyptian-initiative-to-support-womens-health-screened-33-million/.

307. Daily news Egypt. MoH holds celebration themed 'Egypt's success journey towards expanding women's access to health'. 2023 [cited 2023 Aug 17]. Available from: https://www.dailynewsegypt.com/2023/03/18/moh-holds-celebration-themed-egypts-success-journey-towards-expanding-womens-access-to-health/.

308. Tel Aviv Sourasky Medical Center. Breast health-center. [cited 2023 05 Apr]. Available from: https://www.tasmc.org.il/Surgery/General-Surgery/Pages/Breast-Health.aspx.

309. Pinchas-Mizrachi R, Solnica A, Daoud N. Religiosity Level and Mammography Performance Among Arab and Jewish Women in Israel. J Relig Health. 2021;60(3):1877-94.

310. Jordan Breast Cancer Program. THE HOME VISITIS PROJECTS 2019. [cited 2023 Aug 12]. Available from: https://www.jbcp.jo/whats-happening/135#:~:text=The%20Home%20visits%20project%20targeted,diagnosed%20at%20King%20Hussein%20Cancer.

311. Jordan Breast Cancer Program. JORDANIAN'S FEMALE WILLINGNESS TO PAY FOR MAMMOGRAPHY SERVICES. [cited 2023 Aug 14]. Available from: https://www.jbcp.jo/whats-happening/143.

312. Abu-Helalah MA, Alshraideh HA, Al-Serhan AA, Kawaleet M, Nesheiwat AI. Knowledge, barriers and attitudes towards breast cancer mammography screening in jordan. Asian Pac J Cancer Prev. 2015;16(9):3981-90.

313. WHO. Country fact sheet: Morocco. 2023 [cited 2023 May 3]. Available from: https://canscreen5.iarc.fr/?page=countryfactsheetbreast&q=MAR&rc=.

314. Abda N, Najdi A, El Fakir S, Tachfouti N, Berraho M, Chami Khazraji Y, et al. Knowledge, Attitudes, and Preventive Practice Towards Breast Cancer among General Practitioner Health Professionals in Morocco. Asian Pac J Cancer Prev. 2017;18(4):963-8.

315. Ministry of Health. Breast Cancer Early Detection. [Sep 22, 2021]. Available from: https://www.moh.gov.sa/en/Ministry/Projects/breast-cancer/Pages/default.aspx.

316. El Bcheraoui C, Basulaiman M, Wilson S, Daoud F, Tuffaha M, AlMazroa MA, et al. Breast cancer screening in Saudi Arabia: free but almost no takers. PLoS One. 2015;10(3):e0119051.

317. Alshammari SA, Alhazmi AM, Alenazi HA, Alshammari HS, Alshahrani AM. Mammography uptake among the female staff of King Saud University. J Family Med Prim Care. 2020;9(1):221-8.

318. South African Government. Breast Cancer Awareness Month 2020. [Dec 2, 2020]. Available from: https://www.gov.za/BreastCancerAwarenessMonth2020#:~:text=The%20designation%20of%20October%20as,all%20races%20and%20class%20structures.

319. National Department of Health. Clinical guidelines for breast cancer control and management 2018.

320. CANSA. Breast Cancer Screening can Save Lives. 2022 [cited 2023 Apr 11]. Available from: https://cansa.org.za/breast-cancer-screening-can-save-lives/#:~:text=A%20mammogram%20(a%20special%20x,of%20non%2Dsymptomatic%20breast%20screening.

321. Eurostat. Breast cancer and cervical cancer screenings - historical data (2000-2021). [cited 2024 Jan 25]. Available from: https://ec.europa.eu/eurostat/databrowser/view/hlth_ps_scre/default/table?lang=en&category=hlth.hlth_care.hlth_prev.hlth_prev_h.

322. Mert T. Evaluation of knowledge and practice regarding mammography among a group of Turkish women attending a tertiary hospital. Turk J Surg. 2022;38(3):230-6.

323. Bilge U, Keskin A. Breast Cancer Screening Knowledge in a Turkish Population Education is Necessary. Procedia - Social and Behavioral Sciences. 2014;116:1861-3.

324. Al-Shamsi H, Darr H, Abu-Gheida I, Ansari J, McManus MC, Jaafar H, et al. The State of Cancer Care in the United Arab Emirates in 2020: Challenges and Recommendations, A report by the United Arab Emirates Oncology Task Force. Gulf J Oncolog. 2020;1(32):71-87.

325. Over 40% of women in the UAE have never conducted a mammogram, reveals survey commissioned by SSMC. 2022 [cited 2023 Apr 15]. Available from: https://www.zawya.com/en/press-release/research-and-studies/over-40-of-women-in-the-uae-have-never-conducted-a-mammogram-reveals-survey-commissioned-by-ssmc-nslmwew3.

326. Abu Awwad D, Hossain SZ, Mackey M, Brennan P, Adam S. Women's Breast Cancer Knowledge and Health Communication in the United Arab Emirates. Healthcare. 2020;8(4):495.

327. Daly MB, Pilarski R, Yurgelun MB, Berry MP, Buys SS, Dickson P, et al. NCCN Guidelines Insights: Genetic/Familial High-Risk Assessment: Breast, Ovarian, and Pancreatic, Version 1.2020. J Natl Compr Canc Netw. 2020;18(4):380-91.

328. Cherbal F. Genetic Testing for Hereditary Cancers among Algerian population: Ethical and Social Issues. Conference: Medicine, Philosophy and HealthAt: University Abu Bekr Belkaid, 5-6 December, 2022, Tlemcen, Algeria. 2022.

329. Ibrahim AH, Shash E. General Oncology Care in Egypt. In: Al-Shamsi HO, Abu-Gheida IH, Iqbal F, Al-Awadhi A, editors. Cancer in the Arab World Singapore: Springer; 2022.

330. Soliman M, Refky B, Bahy O, Yousri M, Saudi R, Dohiem M, et al. Awareness of breast cancer genetic risk and role of genetic testing among women in Egypt: An online survey. European Journal of Surgical Oncology. 2022;48(5).

331. Mahtani R, Niyazov A, Lewis K, Rider A, Massey L, Arondekar B, et al. Real-World Study of Regional Differences in Patient Demographics, Clinical Characteristics, and BRCA1/2 Mutation Testing in Patients with Human Epidermal Growth Factor Receptor 2-Negative Advanced Breast Cancer in the United States, Europe, and Israel. Adv Ther. 2023;40(1):331-48.

332. Good BRCA Genes. [Jan 5, 2024]. Available from: https://goodbrcagenes.org/english/.

333. Gabai-Kapara E, Lahad A, Kaufman B, Friedman E, Segev S, Renbaum P, et al. Population-based screening for breast and ovarian cancer risk due to BRCA1 and BRCA2. Proc Natl Acad Sci U S A. 2014;111(39):14205-10.

334. Hermann N, Mor P, Kaidar-Person O, Bernstein-Molho R, Brodsky M, Madorsky Feldman D, et al. Variations in Practice and Geographic Disparities Between Dedicated Multidisciplinary Clinics for BRCA1/BRCA2 Mutation Carriers in Israel. Isr Med Assoc J. 2023;25(1):18-22.

335. Belhassan K, Ouldim K, Sefiani AA. Genetics and genomic medicine in Morocco: the present hope can make the future bright. Mol Genet Genomic Med. 2016;4(6):588-98.

336. Alhuqail AJ, Alzahrani A, Almubarak H, Al-Qadheeb S, Alghofaili L, Almoghrabi N, et al. High prevalence of deleterious BRCA1 and BRCA2 germline mutations in arab breast and ovarian cancer patients. Breast Cancer Res Treat. 2018;168(3):695-702.

337. Alshammari FD. Breast cancer genetic susceptibility: With focus in Saudi Arabia. Journal of Oncological Sciences. 2019;5(1):6-12.

338. Saudi Health Council. Saudi Breast Cancer Management Guidelines The National Cancer Center, 2019.

339. CANSA. Fact sheet on genetic testing for cancer. 2017.

340. Kaplan S, Pinar G, Kaplan B, Aslantekin F, Karabulut E, Ayar B, et al. The Prevalence of Consanguineous Marriages and Affecting Factors in Turkey: A National Survey. J Biosoc Sci. 2016;48(5):616-30.

341. Erdem Y, Teksen F. Genetic screening services provided in Turkey. J Genet Couns. 2013;22(6):858-64.

342. Lab Istanbul. BRCA1 Test and BRCA2 Test Cancer Risk and Genetic Tests. [cited 2023 Mar 14]. Available from: https://www.labistanbul.com.tr/brca1-ve-brca2-genetik-testi.html.

343. Yesilcinar I, Seven M, Sahin E, Calzone K. Genetics and genomic competency of Turkish nurses: A descriptive cross-sectional study. Nurse Educ Today. 2022;109:105239.

344. Coleman B, Calzone KA, Jenkins J, Paniagua C, Rivera R, Hong OS, et al. Multi-ethnic minority nurses' knowledge and practice of genetics and genomics. J Nurs Scholarsh. 2014;46(4):235-44.

345. Cakmak GK, Emiroglu S, Sezer A, Canturk NZ, Yeniay L, Kuru B, et al. Surgical Trends in Breast Cancer in Turkey: An Increase in Breast-Conserving Surgery. JCO Glob Oncol. 2020;6:285-92.

346. Al-Shamsi HO. The State of Cancer Care in the United Arab Emirates in 2022. Clin Pract. 2022;12(6):955-85.

347. Department of Health. The Department of Health Abu Dhabi launches the region's first Precision Personalized Oncology Program. 2022 [cited 2023 Apr 17]. Available from:

https://www.doh.gov.ae/ar/news/doh-launches-the-first-personalised-precision-medicine-programme-for-oncology-in-the-region.

348. The United Arab Emirates Government Portal. The Emirati Genome Programme. [Aug 22, 2023]. Available from: https://u.ae/en/information-and-services/health-and-fitness/research-in-the-field-of-health/the-emirati-genome-programme.

349. Richards MA, Westcombe AM, Love SB, Littlejohns P, Ramirez AJ. Influence of delay on survival in patients with breast cancer: a systematic review. Lancet. 1999;353(9159):1119-26.

350. Mimouni H, Hassouni K, El marnissi B, Haddou rahou B, Alaoui L, Ismaili R, et al. 17. The patient, diagnosis and treatment delay of the care pathwayof patients with breast Cancer in Morocco. Ann Cancer Res Ther. 2022;30:11-7.

351. Dalwai E, Buccimazza I. System delays in breast cancer. S Afr J Surg. 2015;53(2):40-2.

352. Gustave Roussy. Speeding up Breast Cancer Diagnosis in Egypt: GE Healthcare, Gustave Roussy and the Egypt Ministry of Health Partner to Create Rapid Breast Cancer Diagnosis Clinics. Cairo, Egypt and Villejuif & Buc, France2021 [cited 2023 Mar 15]. Available from: https://www.gustaveroussy.fr/en/speeding-breast-cancer-diagnosis-egypt-ge-healthcare-gustave-roussy-and-egypt-ministry-health.

353. Cardoso F, Kyriakides S, Ohno S, Penault-Llorca F, Poortmans P, Rubio IT, et al. Early breast cancer: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. Ann Oncol. 2019;30(8):1194-220.

354. WHO. Total density per million females aged from 50 to 69 years old: Mammography units. 2016. Available from: https://www.who.int/data/gho/data/indicators/indicator-details/GHO/total-density-per-million-females-aged-from-50-to-69-years-old-mammography-units.

355. Boldor N, Vaknin S, Myers V, Hakak N, Somekh M, Wilf-Miron R, et al. Reforming the MRI system: the Israeli National Program to shorten waiting times and increase efficiency. Isr J Health Policy Res. 2021;10(1):57.

356. OECD. Mammography machines (indicator). 2023 [cited 2023 Mar 15]. Available from: https://data.oecd.org/healtheqt/mammography-machines.htm.

357. Knesset. The chairman of the radiological union, Prof. Ilan Shelf, told the health committee: "There is a shortage of 250 radiologists". Knesset news; 2022 [cited 2023 Mar 16]. Available from: https://m.knesset.gov.il/news/pressreleases/pages/press06062022p.aspx.

358. World Health Organisation. Global atlas of medical devices 2022 2022.

359. Jordan Breast Cancer Program. [cited 2023 Aug 16]. Available from: https://www.jbcp.jo/whats-happening/140.

360. Hachimi A, Rachda S, El-Alaoui M, Bouebazebi LB, Belmaati R, Essafti M, et al. What Factors Influence the Choice of Anesthesiology in a Moroccan Medical School? International Journal of Clinical Medicine. 2022;13:57-65.

361. SFDA. SFDA Screening Mammography Quality Standards Program. Radiological Health Executive Department, 2019.

362. Baslaim M, Baroum I, Salman B, Baghlaf B, Al-Farsi M. Breast Cancer Screening Program in Jeddah, Saudi Arabia: Is There a Need for a National Program? Int J Womens Health Wellness. 2016.

363. Mkhize N, Tiwari R, Chikte U, Pitcher R. Temporal Trends in the South African Diagnostic Radiology Workforce (2002-2019). Cureus. 2022;14(7):e27148.

364. Schoub PK. Breast cancer imaging in South Africa in 2018. SA J Radiol. 2018;22(2):1666.

365. OECD. Magnetic resonance imaging (MRI) units (indicator). 2023 [cited 2023 Mar 16]. Available from: https://data.oecd.org/healtheqt/magnetic-resonance-imaging-mri-units.htm#indicator-chart.

366. Ozsoy A, Aribal E, Araz L, Bora Erdogdu M, Sari A, Sencan I, et al. Mammography Quality in Turkey: Auditors' Report on a Nationwide Survey. 2017;14(1):e13470.

367. Abuzaid MM, Hamad W, Elshami W, Tekin H, Ali W, Khayal S. Radiography Advanced Practice in the United Arab Emirates: The Perceptions and Readiness of Mammographers. J Multidiscip Healthc. 2020;13:753-8.

368. MlleBOURRASN N. Thesis: Access to oncological care in Morocco: Status places and perspectives. 2022.

369. Ministry of health. Statistical Yearbook. 2021.

370. Ruggunan SD, Singh S. Sector switching among histopathologists in KwaZulu-Natal, South Africa: a qualitative study. Hum Resour Health. 2013;11:23.

371. Toma A, O'Neil D, Joffe M, Ayeni O, Nel C, van den Berg E, et al. Quality of Histopathological Reporting in Breast Cancer: Results From Four South African Breast Units. JCO Glob Oncol. 2021;7:72-80.

372. Pehlivanoglu B, Hassoy H, Gul G, Aykutlu U, Doganavsargil B. How Does It Feel to Be a Pathologist in Turkey? Results of a Survey on Job Satisfaction and Perception of Pathology. Turk Patoloji Derg. 2021;37(1):39-50. How Does It Feel to Be a Pathologist in Turkey? Results of a Survey on Job Satisfaction and Perception of Pathology.

373. Government of Dubai. Annual Health Statistic Book 2021. 2021.

374. Badve SS, Penault-Llorca F, Reis-Filho JS, Deurloo R, Siziopikou KP, D'Arrigo C, et al. Determining PD-L1 Status in Patients With Triple-Negative Breast Cancer: Lessons Learned From IMpassion130. J Natl Cancer Inst. 2022;114(5):664-75.

375. FDA. FDA approves alpelisib for metastatic breast cancer. 2019 [cited 2023 Aug 23]. Available from: https://www.fda.gov/drugs/resources-information-approved-drugs/fda-approves-alpelisib-metastatic-breast-cancer.

376. Montero AJ. Guidelines are essential to improving clinical outcomes in breast cancer patients. Breast Cancer Res Treat. 2015;153(1):1-2.

377. American Cancer Society. Treatment of Triple-negative Breast Cancer. [Nov 14, 2022]. Available from: https://www.cancer.org/cancer/breast-cancer/treatment/treatment-of-triple-negative.html.

378. Ye F, Dewanjee S, Li Y, Jha NK, Chen ZS, Kumar A, et al. Advancements in clinical aspects of targeted therapy and immunotherapy in breast cancer. Mol Cancer. 2023;22(1):105.

379. Sellam Y. Cancer Immunotherapy in Algeria: Between Therapeutic Progress and Budget Constraints. Pharma Boardroom 2019 [cited 2023 Aug 28]. Available from: https://pharmaboardroom.com/articles/cancer-immunotherapy-in-algeria-between-therapeutic-progress-and-budget-constraints/.

380. Reuters. Egypt's president appears to rule out a further currency devaluation. Reuters; 2023 [cited 2023 Aug 18]. Available from: https://www.reuters.com/article/egypt-economy-currency-idAFL8N3865ER.

381. Ministry of health. Discussed: waiting times for surgeries and procedures in hospitals. 2020.

382. The Jordan Times. King lays foundation stone for King Hussein Cancer Centre project in Aqaba to serve southern region. 2023 [cited 2023 Aug 16]. Available from: https://jordantimes.com/news/local/king-lays-foundation-stone-king-hussein-cancer-centre-project-aqaba-serve-southern-region.

383. Earthquake’s toll on cancer patients and the resilience of a caregiver in Marrakech. 2023 [Feb 9, 2024]. Available from: https://www.uicc.org/news/earthquakes-toll-cancer-patients-and-resilience-caregiver-marrakech.

384. Wazqar D, Kerr M, Regan S, Orchard C. Overview of Cancer Care and Oncology Nursing in the Kingdom of Saudi Arabia. American Journal of Nursing Science. 2017;6:324-32.

385. Ministry of health. MOH: «Ehalati» Program Launched at Hospitals of the Holy Sites. [15 Mar, 2024]. Available from: https://www.moh.gov.sa/en/Ministry/MediaCenter/News/Pages/news-2019-07-30-003.aspx.

386. Insurance CoH. Health insurance companies are required to cover breast cancer treatment and reconstruction. 2019 [cited 2023 Aug 28]. Available from: https://chi.gov.sa/MediaCenter/NEWS/Pages/news-01-10-2019.aspx.

387. Al-Ahmadi K, Al-Zahrani A, Al-Ahmadi S. Spatial Accessibility to Cancer Care Facilities in Saudi Arabia. 2014.

388. Abusanad A. “Najia” Story: A WhatsApp Support Group For Patients With Breast Cancer. Innovations in Digital Health, Diagnostics, and Biomarkers 2021;1:16-8.

389. Lince-Derochei N, Rayne S, VanRensburg C, Benn C, Masukui S, Holeleiv P. Breast cancer in South Africa: developing an affordable and achievable plan to improve detection and survival. South African Health Review, 2017.

390. Gbadamosi N. Getting a mastectomy can be an agonizing wait in South Africa. One surgeon is changing that. 2018 [cited 2023 05 Oct]. Available from: https://edition.cnn.com/2018/11/08/health/project-flamingo-breast-cancer-surgeries-in-south-africa/.

391. Edge J, Kepkey B. Breast cancer patients in South Africa are battling to maintain treatment because of high transport costs. The conversation; 2022 [cited 2023 05 Apr].

Available from: https://theconversation.com/breast-cancer-patients-in-south-africa-are-battling-to-maintain-treatment-because-of-high-transport-costs-193231.

392. Piek J. Affordability and Subsidies in Urban Public Transport: Assessing the impact of public transport affordability on subsidy allocation in Cape Town. Stellenbosch University 2017.

393. Özmen V. Activities of Turkish Federation of Breast Disease Societies. The Journal of Breast Health: 2010.

394. Langlands FE, Horgan K, Dodwell DD, Smith L. Breast cancer subtypes: response to radiotherapy and potential radiosensitisation. Br J Radiol. 2013;86(1023):20120601.

395. American Cancer Society. Treating Breast Cancer 2021.

396. Jovanović M, Aleksandar R, Stojanović S, Milošević N. Kilovoltage radiotherapy as a supportive treatment in locally advanced or metastatic breast cancer – a series of six case reports. 2023 Contract No.: 1.

397. BECERİR H, GÜRDALLI S, YAPICI B, ALKAYA F, ÇAKIR A, YARAY K, et al. Radiotherapy Equipment and Workforce in Turkey. Turk J Oncol. 2021;36.

398. Grover S, Xu MJ, Yeager A, Rosman L, Groen RS, Chackungal S, et al. A systematic review of radiotherapy capacity in low- and middle-income countries. Front Oncol. 2014;4:380.

399. International Atomic Energy Agency. DIRAC-DIrectory of RAdiotherapy Centres. [cited 2023 Mar 15]. Available from: https://dirac.iaea.org/Query/Countries.

400. Rosenblatt E, Zubizarreta E. Radiotherapy in cancer care: facing the global challenge IAEA 2017.

401. Loibl S, Andre F, Bachelot T, Barrios CH, Bergh J, Burstein HJ, et al. Early breast cancer: ESMO Clinical Practice Guideline for diagnosis, treatment and follow-up. Ann Oncol. 2024;35(2):159-82.

402. Levy A, Rivera S. 1-week hypofractionated adjuvant whole-breast radiotherapy: towards a new standard? Lancet. 2020;395(10237):1588-9.

403. Murray Brunt A, Haviland JS, Wheatley DA, Sydenham MA, Alhasso A, Bloomfield DJ, et al. Hypofractionated breast radiotherapy for 1 week versus 3 weeks (FAST-Forward): 5-year efficacy and late normal tissue effects results from a multicentre, non-inferiority, randomised, phase 3 trial. Lancet. 2020;395(10237):1613-26.

404. Liu L, Yang Y, Guo Q, Ren B, Peng Q, Zou L, et al. Comparing hypofractionated to conventional fractionated radiotherapy in postmastectomy breast cancer: a meta-analysis and systematic review. Radiat Oncol. 2020;15(1):17.

405. OECD. Radiotherapy equipment 2021 [cited 2023 Apr 12]. Available from: https://www.oecd-ilibrary.org/social-issues-migration-health/radiotherapy-equipment/indicator/english_47a5492f-en.

406. O'Neil DS, Chen WC, Ayeni O, Nietz S, Buccimazza I, Singh U, et al. Breast Cancer Care Quality in South Africa's Public Health System: An Evaluation Using American

Society of Clinical Oncology/National Quality Forum Measures. J Glob Oncol. 2019;5:1-16.

407. Motshweneng OS, Mdletshe S. Preparing for advanced practice radiation therapy in South Africa: Conceptual and curricular considerations. Health SA. 2021;26:1587.

408. Hofmarcher T, Jönsson B, Wilking N. Access to high-quality oncology care across Europe. Lund: IHE, 2014.

409. Lichtenberg FR. The impact of new drug launches on life-years lost in 2015 from 19 types of cancer in 36 countries. Journal of Demographic Economics. 2018;84(3):309-54.

410. Mener AS, Aggarwal A. Advances in Targeted Therapy for Breast Cancer. Fed Pract. 2015;32(Suppl 4):46S-9S.

411. National Cancer Institute. Breast Cancer Treatment (PDQ®)–Health Professional Version. [cited 2023 Aug 29]. Available from: https://www.cancer.gov/types/breast/hp/breast-treatment-pdq.

412. American Cancer Society. Chemotherapy Side Effects. 2020 [cited 2023 Aug 29]. Available from: https://www.cancer.org/cancer/managing-cancer/treatment-types/chemotherapy/chemotherapy-side-effects.html.

413. Bhidé A, Datar S, Stebbins K. Case Histories of Significant Medical Advances:Tamoxifen. Harvard Business School

414. Kreutzfeldt J, Rozeboom B, Dey N, De P. The trastuzumab era: current and upcoming targeted HER2+ breast cancer therapies. Am J Cancer Res. 2020;10(4):1045-67.

415. Sosyal Güvenlik Kurumundan. Social Security Institution Health Implementation Notification (Sosyal Güvenlik Kurumu Sağlık Uygulama Tebliği). 2023.

416. Sihem B. Nearly 47,000 new cases of cancer in 2023 in Algeria. 2024 [Feb 9, 2024]. Available from: https://www.jeune-independant.net/malades-atteints-de-cancer-pres-de-47-000-nouveaux-cas-en-2023/.

417. Sella T, Chodick G. Adherence and Persistence to Adjuvant Hormonal Therapy in Early-Stage Breast Cancer Patients: A Population-Based Retrospective Cohort Study in Israel. Breast Care (Basel). 2020;15(1):45-53.

418. Treish I, Al Rabayah A, Jaddoua S, Tuffaha H. Impact of a New Cost-Effectiveness Threshold Implementation on Cancer Formulary Decisions in Jordan. Pharmacoecon Open. 2022;6(2):137-45.

419. Al-Omar HA, Attuwaijri AA, Aljuffali IA. Pharmaceutical companies' views on a health technology assessment (HTA) entity in Saudi Arabia. Saudi Pharm J. 2020;28(6):662-8.

420. Sello M, Adedini SA, Odimegwu C, Petlele R, Tapera T. The Relationship between Childcare-Giving Arrangements and Children's Malnutrition Status in South Africa. Int J Environ Res Public Health. 2023;20(3).

421. Global Legal Insights. Pricing & Reimbursement Laws and Regulations 2021 - Turkey. [Jun 30, 2022]. Available from: https://www.globallegalinsights.com/practice-areas/pricing-and-reimbursement-laws-and-regulations/turkey.

422. Kahveci R, Koc EM, Kucuk EO. Health Technology Assessment in Turkey. Int J Technol Assess Health Care. 2017;33(3):402-8.

423. Ozturk K, Karadayi B, Sener O. Stakeholders' Perceptions of Health Technology Assessment in Turkey. Int J Technol Assess Health Care. 2018;34(1):97-104.

424. WHO. WHO framework for meaningful engagement. 2023.

Country cards

Algeria

Population: 44.9 million (2022)
GDP per capita: USD 4,342 (2022)
Life expectancy: 76 years (2021)
Total health expenditure: 5.5% of GDP (2021)
Source: World Bank

Breast cancer

- Breast cancer represents the most prevalent form of cancer among women in Algeria, accounting for **43% of all new cancer diagnoses and 30% of all cancer-related deaths in women.**
- Breast cancer tends to be diagnosed at an earlier age in the Middle East and Africa (MEA) region than in Western countries, approximately 10 years earlier. In 2022, 86% of cases in Algeria were in women below the age of 65.

9 out of 10 women diagnosed with breast cancer in Algeria are under 65 years.

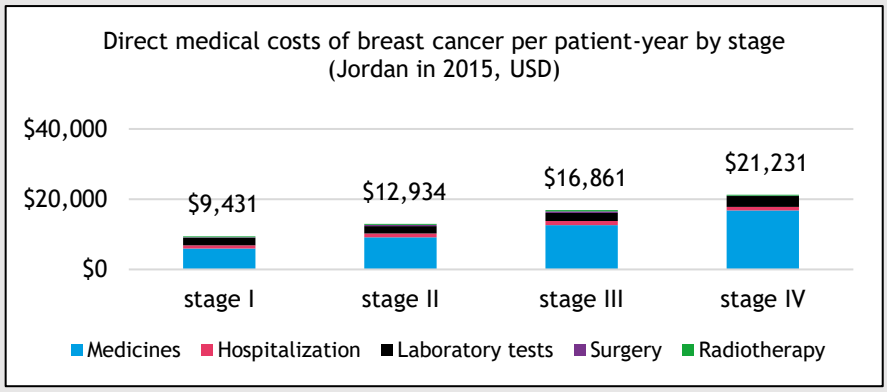
Health system and governance of breast care

Description

- **Around 90-98% of the population is covered by compulsory public insurance**, but out-of-pocket expenses are still necessary for most medical services due to low reimbursement rates. Uninsured individuals face full medical costs. Long waiting times for appointments in the public sector often push patients to opt for private care, which requires full payment unless covered by private health insurance, which is rare.
- Breast cancer patients covered by Caisse Nationale des Assurances Sociales (CNAS) and Caisse Nationale de Sécurité Sociale des Non-Salariés (CASNOS) have access to free care within the public health care system, which includes surgery, radiation therapy, and medicines. **However, diagnostic evaluations like mammography and biopsies are paid for by the patient and only partially reimbursed.** Full coverage applies only after an official diagnosis of breast cancer is made.
- Recent developments have seen the Ministry of Health introduce a specialized unit, the **"Cellule d'accueil"** in many oncology centers, especially in newer ones. This unit is designed to expedite the scheduling process for radiology or biopsy procedures, ensuring patients receive prompt appointments and helping to reduce diagnostic delays.

The Algerian public authorities have been proactive in enhancing the country's cancer care infrastructure, including the establishment of a national cancer agency and increased funding for cancer management. In 2024, an extra 30 billion dinars were designated for the National Fund for Cancer Control, underscoring this dedication.

- **Around half of the economic burden associated with breast cancer comes from indirect costs**, which include productivity losses due to working-age patients' inability to work, either temporarily or permanently, or premature death. This burden is especially acute in the MEA region, where breast cancer presents about a decade earlier than in Western countries.
- The direct medical costs for breast cancer treatment escalate with the stage at diagnosis. For instance, treating late-stage breast cancer in countries similar to Alegria, such as Jordan, can be more than twice as costly as treating early-stage breast cancer, underscoring the critical value of early detection to reduce the economic burden.



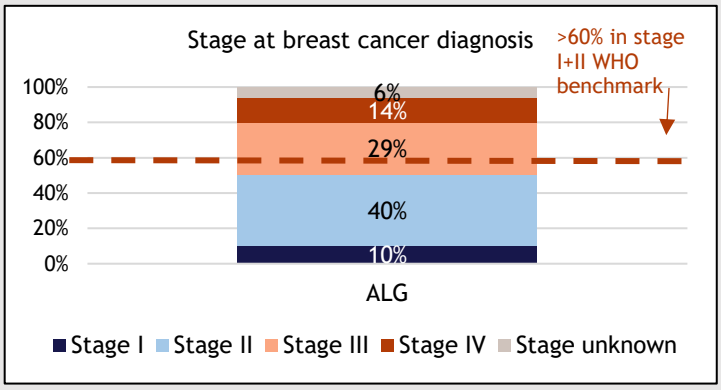
Main recommendations

- Address the lack of specialized breast cancer clinics, for instance, by upgrading existing clinics and continuing to prioritize the deployment of mobile clinics.
- Enhance breast cancer care by increasing investment, such as raising the reimbursement rates for diagnostic services by CNAS/CASNOS.
- Emphasize and strengthen the participation of patient organizations in the decision-making processes.
- Prioritize downstaging of breast cancer at diagnosis to reduce the economic burden of breast cancer.
- Integrate evaluation measures on the National Cancer Plan to assess progress over time.

Early detection

Main challenges

- Early detection faces significant challenges in rural and semi-rural communities, marked by:
  - ❖ a cultural reluctance to discuss the disease,
  - ❖ fear of diagnosis,
  - ❖ and the potential social repercussions of a cancer diagnosis on family dynamics.
- These issues are exacerbated by a lack of adequately trained primary care workers and low health literacy, leading to delays in seeking medical care. Studies in Algeria have confirmed these delays, with a notable range in the time from the onset of symptoms to the first medical consultation, underscoring the need for improved education and health care practices in these communities.
- As of 2023, a comprehensive nationwide screening program for breast cancer has yet to be fully established. Experts indicate that the current diagnosis rate through screening efforts is around **10-20%**. This contributes to **approximately 43% of breast cancer cases being diagnosed at advanced stages (stage III and IV).** Only around half of cases are diagnosed in stage I and II, well below the WHO GBCI target of 60%.



- There is no established or widely agreed-upon set of guidelines or procedures in place for conducting breast cancer screening within the country.
- Access to clinical genetic services in Algeria faces significant challenges, including high costs and lack of public insurance coverage, despite plans to introduce these services at the Centre Pierre et Marie Curie. **Local experts report long waiting times for genetic testing, often extending from 6 months to 1 year**, due to the limited availability of such services, confined to a single facility in the northern region.

Main recommendations

- Continue implementing community engagement and education. For instance, engage men in the conversation with awareness sessions for entire families.
- Consider population-based screenings, involving mammography or clinical breast examinations for asymptomatic women.
- Implement structured guidelines for the breast cancer screening process. This would help women navigate the health care system more easily.
- Improve access to BRCA1/2 tests and genetic counseling to identify and follow-up women carrying mutations.

Diagnostic services

Main challenges

- Local experts have observed improvements in geographical accessibility to breast cancer centers and diagnostic equipment like mammography and ultrasound across the country, leading to shorter delays in receiving a diagnosis in recent years. However, significant challenges persist, including:
  - ❖ long waiting times for appointments, which can range from **1 to 2 months**,
  - ❖ disparities between the private and public sectors in terms of waiting periods for diagnostic tests. While the private sector offers quicker access to services like MRI and bone scans, resulting in a diagnosis within **1 week**, the public sector faces delay of up to **3 months** for a comprehensive diagnosis due to prolonged waiting times in radiology and pathology.
  - ❖ geographical barriers remain for accessing certain technologies, such as MRI, requiring some women to travel to other regions for these services.
- Key challenges in breast cancer diagnosis include a shortage of pathologists in smaller centers, significant out-of-pocket costs for tests in the private sector, and disparities in waiting times for diagnostic exams. **Public sector histological exams can take 15 to 20 days, whereas the private sector typically completes them within 7 days**.
- All histological samples are subject to ER/PR/HER2 testing in the public sector. However, access to newer biomarker tests and gene expression profiles remains limited or sometimes non-existent in the public sector. These advanced tests, crucial for accessing newer breast

Main recommendations

- Invest in expanding health care facilities, including diagnostic centers, to accommodate more patients and reduce waiting times.
- Explore the expansion of social security coverage to fully cover mammography expenses in the private sector.
- Improve access to novel biomarker testing by subsidizing costs.

cancer medicines, are currently only available in the private sector, often resulting in significant out-of-pocket expenses.

Test	Access to biomarker testing in the public sector
Essential biomarkers (ER, PR, HER2, Ki-67)	Available for all
Gene expression profiles (Oncotype DX, Mamma Print, etc.)	Not publicly available
Newer biomarkers (PIK3CA, BRCA1/2, PD-L1, NTRK, dMMR/MSI-H, TMB-H)	BRCA1/2 and PD-L1 have limited public reimbursement while the rest are not publicly available

- Develop and implement a standardized curriculum for breast pathology training to enhance the skills of pathologists and laboratory technicians.
- ☆☆☆ Ensure quality control in pathology by accrediting laboratories and diagnostic centers.

Treatment

Main challenges

- There is a shortage of surgical oncologists due to the absence of specialized training programs in oncology surgery, leading to surgeries being performed by organ-specific surgeons rather than oncology specialists.
- Despite concerted efforts to establish and regularly update national clinical guidelines, including those for breast cancer, since the initiation of the National Cancer Plan in 2015-2019, some physicians still show reluctance to adopt new treatment according to local experts.
- The initiation of treatment usually proceeds smoothly. However, accessing radiation therapy in the public sector often experiences delays. Significant geographical disparities exist; for instance, **patients in the southern parts of the country may face waiting times of up to 6 months, while those in the eastern regions typically wait 3 months**. These delays are primarily due to the lack of available equipment and a preference among patients for treatment at larger, more congested centers.
- Recent financial efforts to fight cancer have led to significant investment in cancer medicines, with nearly half of the Central Hospital Pharmacy's budget dedicated to purchasing these medicines. However, challenges persist including:
  - **delayed regulatory approvals** that hinder the timely introduction of new and effective breast cancer medicines into the market, affecting their accessibility in both the private and public sectors,
  - and **limited reimbursement of newer breast cancer medicines** in the public sector for both early and metastatic stages.

Main recommendations

- Organizing regular seminars for medical professionals to learn about new treatments advances.
- Forge partnerships with international medical institutions to craft training programs in oncology surgery.
- Improve availability of radiation therapy. Explore hypofractionated radiation therapy as a solution to complete radiation therapy courses more quickly and save resources.
- Create awareness campaigns to highlight the advantages of seeking care in local facilities.
- Enhance the availability of newer, effective cancer medicines by transitioning to a value-based and transparent health technology assessment process.

Egypt

Population: 110.9 million (2022)
GDP per capita: USD 4,295 (2022)
Life expectancy: 70 years (2021)
Total health expenditure: 4.6% of GDP (2021)
Source: World Bank

Breast cancer

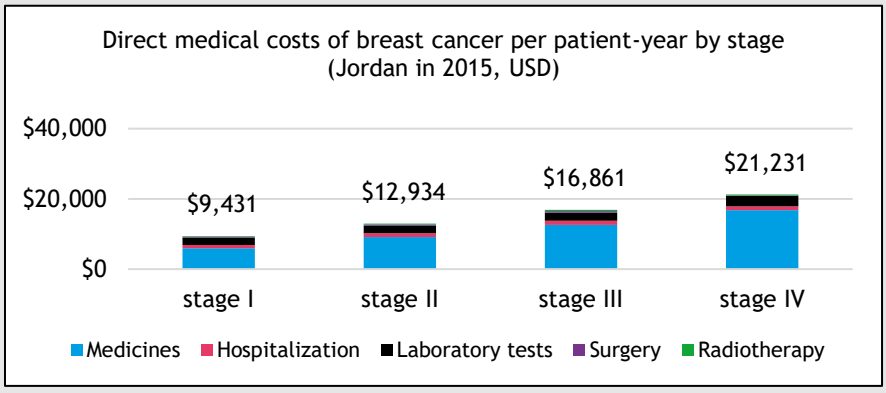
- Breast cancer represents the most prevalent form of cancer among women in Egypt, accounting for **36% of all new cancer diagnoses and 23% of all cancer-related deaths in women.**
- Breast cancer tends to be diagnosed at an earlier age in the Middle East and Africa (MEA) region than in Western countries, approximately 10 years earlier. In 2022, 82% of cases in Egypt were in women below the age of 65.

8 out of 10 women diagnosed with breast cancer in Egypt are under 65 years.

Health system and governance of breast care

Description

- The country has set an ambitious target to achieve universal health coverage by 2030-2032. This nationwide initiative seeks to evolve the current fragmented system into a cohesive structure. Notable progress has been made, as of 2022, public insurance coverage expanded to encompass close to **70%** of the population.
- Due to quality issues and long waiting times, patients who have the financial resources frequently choose private health care options. For individuals without insurance, MoHP facilities are accessible, with some services being complimentary while others require co-payments.
- **Around half of the economic burden associated with breast cancer comes from indirect costs**, which include productivity losses due to working-age patients' inability to work, either temporarily or permanently, or premature death. This burden is especially acute in the MEA region, where breast cancer presents about a decade earlier than in Western countries.
- The direct medical costs for breast cancer treatment escalate with the stage at diagnosis. For instance, treating late-stage breast cancer in countries similar to Egypt, such as Jordan, can be more than twice as costly as treating early-stage breast cancer, underscoring the critical value of early detection in reducing the economic burden.



Egypt's Leap Forward in Breast Cancer Care

The Egyptian public authorities have been proactive in improving breast cancer care in Egypt. In July 2019, the country intensified its commitment to combating breast cancer by launching the "Women's Health Initiative". This initiative has successfully enabled over 20 million women to receive more than 35 million clinical breast examinations (CBE). As of the time of this report, more than 3,000 primary care facilities are actively participating in the campaign, ensuring that all eligible women can receive their CBE. The campaign also aims to improve access to treatment. Local experts have observed as an indirect effect of the campaign that patients who previously sought treatment in private or non-governmental centers are now gravitating towards the breast cancer campaign.

Main recommendations

- Prioritize an increase in public spending on health care more aligned with global standards.
- Continue to evaluate the impact of the Women's Health Initiative on re-examination rates, stage distribution, treatment uptake, and health outcomes.
- Continue prioritizing downstaging of breast cancer at diagnosis to reduce the economic burden of breast cancer.
- Emphasize and strengthen the participation of patient organizations in the decision-making processes.

Early detection

Main challenges

- Numerous **challenges persist for women in seeking medical attention** upon experiencing symptoms. For instance, some studies have estimated an average delay of **4.4** months before seeking help. This delay is attributed to multiple factors, including:
  - limited health literacy among women. It has been found that about **80%** of women possess insufficient knowledge about breast cancer, including prevalent misconceptions regarding its incurability.
  - a cultural lack of emphasis on prevention.
  - a fear of receiving a cancer diagnosis, which hinders regular screenings and follow-ups.
- **Factors within the health care system also impede early detection**, although the Women's Health Initiative has helped mitigate them. Some of them are:
  - Geographic obstacles can limit access to health care services, yet the Women's Health Initiative has improved accessibility in rural areas.
  - The complexity of patient navigation and referral systems.
  - The issue of primary care workers not being adequately trained to recognize warning signs of breast cancer has been partially mitigated through targeted training programs.

By 2020, the Women's Health Initiative had screened 8.5 million women, a number that rose to 33 million by 2023. This period saw a substantial reduction in late-stage (III and IV) breast cancer diagnoses, dropping from 56% in the early 2000s to 2015, to 30% by 2023 among women diagnosed through the Initiative. The Initiative also achieved enhancements in radiology and pathology labs, and over 17,500 health care professionals were trained by February 2023.

- While the Women's Health Initiative has achieved considerable success, it encounters challenges, including the **creation of benchmarks to monitor progress**. This difficulty arises from the varied backgrounds of its participants, complicating the **understanding of re-examination rates**. Furthermore, the **lack of a fully operational outreach system** for consistent communication has made it challenging to sustain engagement with the population that had been screened.
- Ongoing efforts aim to improve access to comprehensive molecular testing, including next-generation sequencing and BRCA testing, across all areas of oncology. Collaborations with NGOs and the exploration of public-private partnerships are part of these efforts.

Main recommendations

- Consider implementing a reminder system for upcoming screenings to improve preventive culture and increase retention rates.
- Continue prioritizing the expansion of the Women's Health Initiative by including primary health care facilities in semi-urban and rural areas.
- Enhance examination and re-examination rates for screening by hosting awareness sessions for entire families, including men.
- Create unified and standardized data collection methods to capture data effectively, including segmenting data.
- Explore potential subsidies for genetic testing costs for women with a family history of breast cancer through partnerships with international health organizations.

Diagnostic services

Main challenges

- The Egyptian government has provided financial support to facilitate the acquisition of mammography and ultrasound machines. Approximately **70** mammography machines are currently operational, with plans to purchase 100 more. **The goal is to reach 350 mammography units by 2026-2027.**
- The increasing number of women undergoing screening has led to a higher demand for diagnostic services, **creating a shortage of skilled mammography technicians**. Additionally, **not all radiologists are proficient in interventional radiology procedures, which require both the interpretation of images and precise needle manipulation within the breast.**
- Enhancing pathology laboratories has been a key focus within the Women's Health Initiative. A primary goal has been to enhance the reporting turnaround time for histopathology services. Efforts to achieve this include training programs for histopathologists and prioritizing external accreditation to ensure quality and consistency. **One major challenge still is the lack of standardization in cancer reports.**
- All histological samples are subject to ER/PR/HER2 testing in the public sector. However, access to newer biomarker tests and gene expression profiles remains limited or sometimes non-existent in the public sector. These advanced tests, crucial for accessing newer breast cancer medicines, are currently only available in the private sector, often resulting in significant out-of-pocket expenses.

Main recommendations

- Consider training radiographers in mammography interpretation or use telemammography to mitigate the shortage of radiologists trained in breast imaging.
- Implement peer reviews and digital templates to improve the quality and standardization of histopathology reports.
- Improve access to novel biomarker testing by subsidizing costs.

Test	Access to biomarker testing in the public sector
Essential biomarkers (ER, PR, HER2, Ki-67)	Available for all
Gene expression profiles (Oncotype DX, Mamma Print, etc.)	Limited public availability
Newer biomarkers (PIK3CA, BRCA1/2, PD-L1, NTRK, dMMR/MSI-H, TMB-H)	Not publicly reimbursed

Treatment

Main challenges

- **Fragmentation in health care has made it difficult to develop consistent treatment guidelines**, though initiatives aim to unify services akin to the NHS in the United Kingdom or the NCCN in the United States.
- Around half of patients have access to some form of neoadjuvant therapies when deemed necessary. However, **some patient groups such as triple-negative breast cancer patients have limited systemic treatment options outside of chemotherapy.**
- While becoming more common, **multidisciplinary team meetings are not widely practiced** across Egypt due to technical and economic barriers.
- International **economic fluctuations** and the devaluation of the Egyptian pound have impacted the cost of imported health goods, such as cancer medicines.
- The total count of **radiation therapy machines does not meet international standards**, leading to limited access and extended waiting periods in certain areas. Furthermore, the **distribution of these machines is uneven**, with **nearly half situated in Cairo**. This disparity forces patients from rural areas to undertake long journeys for treatment.
- A study from 2013 to 2015 showed that **80%** of breast cancer patients, primarily from Cairo, struggled to afford their medicines. Although the Women's Health Initiative has likely improved the situation, there is still a need for better access to novel cancer medicines.

Main recommendations

- Continue working towards common clinical practice guidelines.
- Creating resource-adapted guidelines and utilizing telemedicine could improve the uneven adoption of multidisciplinary team meetings.
- Invest in local manufacturing of medicines to reduce dependency on imports.
- Explore hypofractionated radiation therapy as a solution to complete radiation therapy courses more quickly and save resources.
- Continue prioritizing the availability of novel breast cancer medicines.

Israel

Population: 9.5 million (2022)
GDP per capita: USD 54,391 (2022)
Life expectancy: 83 years (2021)
Total health expenditure: 7.9% of GDP (2021)
Source: World Bank

Breast cancer

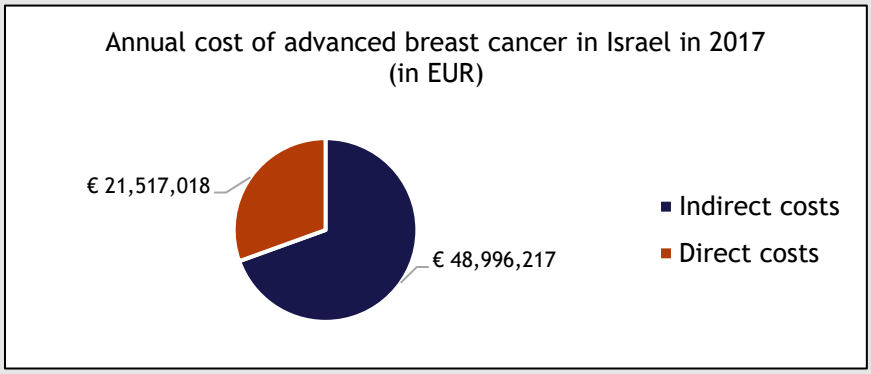
- Breast cancer represents the most prevalent form of cancer among women in Israel, accounting for **31% of all new cancer diagnoses and 20% of all cancer-related deaths in women**.
- In 2022, 57% of breast cancer cases in Israel were diagnosed in women below the age of 65.

6 out of 10 women diagnosed with breast cancer in Israel are under 65 years.

Health system and governance of breast care

Description

- All citizens and permanent residents have been covered by the National Health Insurance (NHI) since 1995. They have to choose from four non-profit health plans (HMOs): Clalit, Maccabi, Meuhedet, and Leumit.
- Many citizens opt for paying additional voluntary health insurance to enhance the coverage of benefits not included in the NHI basket. In 2020, **20%** of the population had only NHI, **40%** of the population had non-profit insurance in addition to NHI, **37%** of the population had double insurance coverage (including for-profit and non-profit insurances), and **3%** had only for-profit insurances. Local experts mentioned that private insurances play a role in:
  - ❖ facilitating access to cutting edge molecular and genetic tests.
  - ❖ influence the decision-making process regarding the choice of surgical facilities.
  - ❖ coverage for specific medicines as some novel medicines may not yet be included in the Health Basket, but they could already be covered by private insurance.
- **Breast cancer patients who are covered by the four health plans are entitled to free cancer care services in the public health care systems, which includes screening, surgeries, genetic tests, medicines, and other benefits.** Women can access public breast cancer centers directly or with a referral, receiving comprehensive services at specialized centers.
- At present, there is no existing or recent national cancer plan. While the Country Cooperation Strategy (CCS) for Israel and the WHO for 2019-2025 addresses cancer as a comprehensive disease category, it does not outline specific objectives for breast cancer. However, **there is a national breast cancer screening program with high participation rates. Local experts concur that most breast cancer cases are diagnosed through this program.**
- Although most breast cancer cases are diagnosed at earlier stages, some women are still diagnosed at advanced stages. **A study estimated the annual costs of advanced breast cancer to be EUR 70.5 million, which translates to EUR 1.6 million per 100,000 women**. The study revealed that nearly **70% of the total costs stem from indirect costs associated with high mortality rates in advanced breast cancer**. Patients who die prematurely from the disease are unable to contribute to society in various ways, including economically, socially, and culturally. This not only represents a significant loss on a personal level but also contributes to a considerable financial strain on the economy.



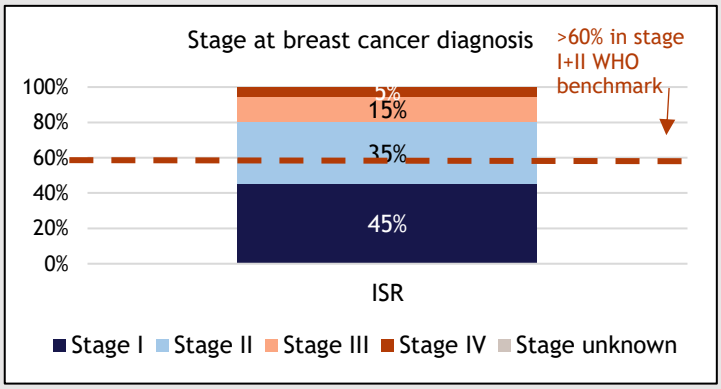
Main recommendations

- Consider establishing a national cancer plan.
- Emphasize and strengthen the participation of patient organizations in the decision-making processes.
- Continue prioritizing downstaging of breast cancer at diagnosis to reduce the economic burden of breast cancer.

Early detection

Main challenges

- **Israel's adult population displays a high level of health literacy**, with around **70%** having sufficient knowledge. This may enhance the understanding of the importance of early breast cancer detection and screening among Israeli women. **As can be seen in the graph below 80% of breast cancer diagnosis are made in stage I and II.**



- **Screening rates, however, vary across ethnic groups, with Arab-minority women having lower mammography rates compared to Jewish women**. The screening rate for Arab women is around **65%** whereas the one for Jewish women is **78%**. Language barriers in health communication might partly explain the differences.
- Social stigma, particularly among the Druze, and religiosity among Jewish women, impact breast cancer detection.
  - ❖ Ultra-orthodox Jewish women show notably lower screening rates than non-ultra-orthodox Jewish women (**51%** vs. **78-81%**).
- There is a crucial need for training primary care workers to recognize uncommon signs of breast cancer, especially in **young and post-partum women**, to avoid diagnostic delays.
- A **lack of breast surgeons** presents an additional challenge to early detection, as family physicians lack the authorization to directly recommend mammograms. Although this problem has prompted the initiation of a pilot program within HMOs to address this by training health care professionals.

Free BRCA Testing and Counseling for High-Risk Women
Eligible women in Israel, including those with a family history of BRCA mutations or of Ashkenazi origin, as well as patients with certain cancers, have access to free genetic counseling and BRCA testing since 2020.

- Strict eligibility criteria for BRCA testing often result in confusion among women regarding their eligibility for the test. Additionally, there is a reported deficiency in genetic knowledge among health care professionals, leading to low referral rates for genetic testing.
- BRCA mutation carriers often encounter **inadequate emotional and psychological support** post-diagnosis.

Main recommendations

- Launching health promotion campaigns in Arabic and engage Arab community leaders to ensure cultural and linguistic relevance for the Arab-minority group.
- Enable family physicians to recommend mammograms directly and increase training programs in breast surgery.
- Work with religious leaders to promote screening within ultra-orthodox communities, emphasizing the importance from health and religious perspectives.
- Develop medical facilities in Israel's northern and southern regions to provide dedicated BRCA screening and reduce waiting times.
- Implement comprehensive emotional and psychological support systems, including peer-support groups and workshops.

Diagnostic services

Main challenges

- Israel has lower rates of mammography machines and MRI units per capita compared to countries with similar GDP per capita, indicating potential for improvement.
- A significant **shortage of certified radiologists**, exacerbated by attractive overseas opportunities and radiologists approaching retirements, affects the timely accessibility of breast imaging services.
- A set goal for the imaging diagnostic process is completion within five weeks; however, in 2019, only **60%** of women achieved this target.
- In 2019, only **67%** of women completed their biopsy testing within the targeted 7 weeks of mammography screening, **missing the 90% goal**. A noted **shortage of pathologists** contributes to diagnostic delays.
- Significant concerns arise from biopsies conducted in private laboratories lacking strict quality controls, leading to incorrect treatments due to inconsistent pathology results.

Main recommendations

- Equip community health care centers with advanced mammography and diagnostic tools and provide specialized training to community health care workers.
- Increase radiology and pathology residency slots.

- There is generally good access to biomarker testing, as most tests are covered by public reimbursement, with only a few exceptions for new biomarker tests. Some patients may opt to undergo new biomarker tests in the private sector at the expense of out-of-pocket payments if not included in their private insurances policies.

Test	Access to biomarker testing in the public sector
Essential biomarkers (ER, PR, HER2, Ki-67)	Available for all
Gene expression profiles (Oncotype DX, Mamma Print, etc.)	Limited public reimbursement
Newer biomarkers (PIK3CA, BRCA1/2, PD-L1, NTRK, dMMR/MSI-H, TMB-H)	BRCA1/2, NTRK and TMB-H have limited public reimbursement while the rest are publicly available

- Ensure timely pathological assessments to meet established timeframes.
- Strengthen quality control in private pathology through stringent quality assurance measures, certification requirements, and regular audits.
- Continue improving access to novel biomarker testing.

Treatment

Main challenges

Ensuring Comprehensive Breast Cancer Care
Israel's "Health Basket" covers a wide range of health care services, ensuring alignment with international clinical guidelines from ASCO, ESMO, and NCCN for best practices. In general, patients in the public sector have broad access to treatments, with additional medicines joining the 2024 Health Basket.

Breast cancer treatment in Israel is subject to specific time frames, with surgeries required within 30 days of decision-making, though adherence varies. Multidisciplinary team meetings for patients with complex treatment paths are mandated, especially for certain breast cancer types, ensuring comprehensive decision-making.

- Local experts highlighted a **shortage of breast surgeons** and noted coordination issues between hospitals and community health care, leading to information gaps.
- The shift in responsibility for covering mental health services from the government to HMOs has resulted in a **shortage of mental health professionals and services for breast cancer patients**. This is compounded by long wait times and a lack of patient awareness regarding their right to **8** to **12** psychological counseling sessions covered by their HMO. NGOs such as "One in Nine" have stepped in to assist breast cancer patients in obtaining emotional support.
- Israel has advanced radiation therapy facilities and professionals. However, challenges include **lower radiation therapy equipment availability compared to other OECD countries**, posing risks of longer wait times for cancer patients.
- Additional treatment challenges include:
  - the ambiguity in managing long-term care for breast cancer survivors,
  - disruptions in medicine supply due to HMO bureaucracy,
  - risk of treatment discontinuation (with 23% of patients stopping adjuvant hormone therapy like tamoxifen over five years),
  - lack of medication continuity in metastatic care.

Main recommendations

- Establish navigation services in health care facilities to increase awareness of patients' rights.
- Explore allocating government funds and incentives to boost the number of mental health professionals focusing on oncology in the public sector.
- Explore introducing automated medicine refill systems with online reminders and refill requests to improve medication continuity.
- Streamline medicine procurement and distribution procedures with health care providers and HMOs, reducing bureaucratic delays.

Jordan

Population: 11.2 million (2022)
GDP per capita: USD 4,311 (2022)
Life expectancy: 74 years (2021)
Total health expenditure: 7.3% of GDP (2021)
Source: World Bank

Breast cancer

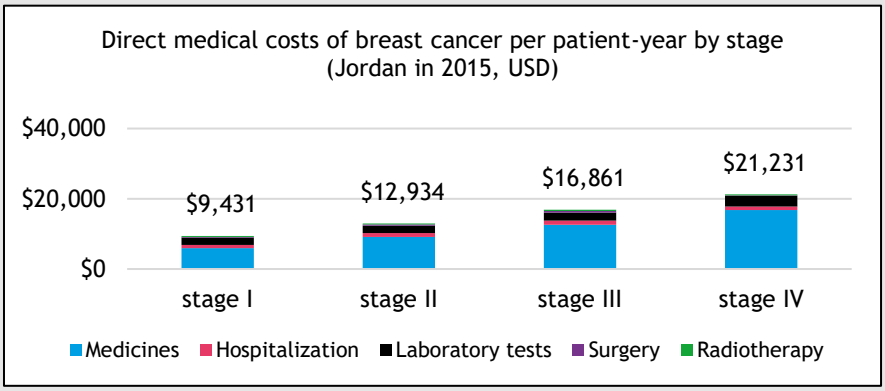
- Breast cancer is the most common cancer type in women (**40%** of all new cancer cases) and responsible for **27%** of all cancer deaths among women in Jordan.
- Breast cancer tends to be diagnosed at an earlier age in the Middle East and Africa (MEA) region than in Western countries, approximately 10 years earlier. In 2022, 85% of cases in Jordan were in women below the age of 65.

9 out of 10 women diagnosed with breast cancer in Jordan are under 65 years.

Health system and governance of breast care

Description

- **An estimated 68% of Jordanians are covered by public health care, with overlap due to enrollment in multiple insurance programs.** The private sector mainly serves non-Jordanian residents and uninsured Jordanians, with **around 72% of Jordanians having some form of health coverage as of 2022** (including private insurances).
- The lack of insurance is an issue for both certain Jordanians and refugees, though both groups can access MoH services at a subsidized rate.
- Public hospitals, Royal Medical Services (RMS), university hospitals, and the King Hussein Cancer Center (KHCC) provide cancer care. **KHCC, founded in 1997, handles 60-70% of Jordan's cancer cases and is the country's sole specialized cancer center.**
- Efforts to launch a National Cancer Control Plan (NCCP) in Jordan have been delayed due to financial constraints and competing priorities, with the plan still under revision and expected in the coming years.
- Data fragmentation across various health care facilities and institutions in Jordan hampers the ability to perform comprehensive data analysis on breast cancer care.
- Breast cancer care often starts with self-examination, leading to clinical assessments. While public health care offers free screening and diagnosis to insured individuals, **one-third of the population, being uninsured, faces challenges to access preventive care services.**
- **Around half of the economic burden associated with breast cancer comes from indirect costs**, which include productivity losses due to working-age patients' inability to work, either temporarily or permanently, or premature death. This burden is especially acute in the MEA region, where breast cancer presents about a decade earlier than in Western countries.
- The direct medical costs for breast cancer treatment escalate with the stage at diagnosis. For instance, **treating late-stage breast cancer in Jordan is more than twice as costly as treating early-stage breast cancer**, underscoring the critical value of early detection to reduce the economic burden.



Main recommendations

- Prioritize the development of a National Cancer Plan.
- Emphasize and strengthen the participation of patient organizations in the decision-making processes.
- Standardize data collection methods across the health system.
- Initiate efforts to ensure that all women can access early detection services without dependence on insurance coverage.
- Continue prioritizing the downstaging of breast cancer at diagnosis to reduce the economic burden of breast cancer.

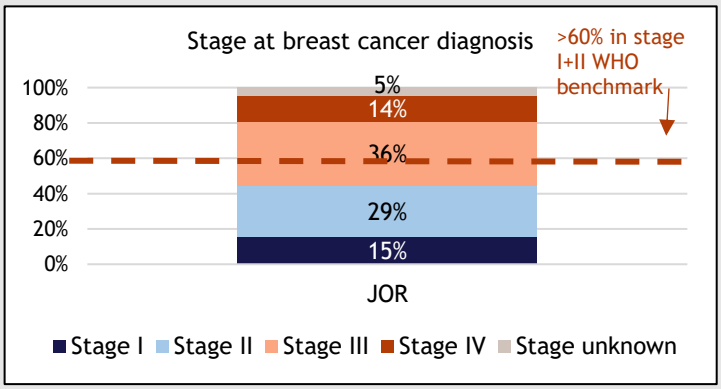
Early detection

Main challenges

- The fragmented nature of the Jordanian health system poses challenges in patient navigation and clarity in the health care journey.

Empowering Early Detection
The Jordan Breast Cancer Program (JBCP) was initiated in 2007 by the King Hussein Cancer Foundation in collaboration with the Ministry of Health. The JBCP has conducted extensive community outreach and awareness campaigns on the importance of early detection to reduce breast cancer morbidity and mortality and aims to increase early-stage diagnosis. It has provided over 45,000 underprivileged women with free screening services via mobile units and referrals, established screening, and diagnostic centers, and offered training to health care professionals.

- The JBCP promotes early breast cancer detection, recommending **yearly clinical breast examination (CBE) for women aged 25-39 and yearly mammography plus CBE for those aged 40 and older**.
- Continuous surveys indicate an increase in breast cancer knowledge and the importance of early detection, with growing community interest and reduced taboos around the topic. However, translating this knowledge into practice remains a challenge. For instance, a survey found that while **80%** recognized the importance of CBE, only **34%** stated they had undergone one in the last two years. The primary barrier to undergoing a CBE is the prevalent belief among women that it is unnecessary to do in the absence of symptoms. In addition, health care providers often do not recommend screening to women who appear healthy.
- **54%** of breast cancer cases in Jordan were found at advanced stages (III-IV) in 2015-2016, as seen in the figure below. Although this number suggests that many cases are diagnosed late, local experts have expressed that there has been significant improvement, particularly in the detection of early-stage cases (stages 0 and I). **According to local experts, the proportion of cases diagnosed at late stages is currently around 40%**, although this data has not yet been published.



- In 2015, a genetic counselling clinic was established at the KHCC, catering to high-risk groups and family members. Outside of the KHCC, BRCA testing is not routinely performed.

Main recommendations

- Explore patient navigation strategies to create easy-to-follow referral pathways between primary health care centers and hospitals.
- Explore including early detection in the essential package of primary health care services provided at MoH health centers.
- Start the foundations of a reminder system where patients receive SMS, calls, or emails about their upcoming screenings.
- Keep growing the specialized training programs for primary care workers.
- Improve access to BRCA1/2 tests and genetic counseling to identify and follow-up women carrying mutations.

Diagnostic services

Main challenges

- The health care sector in Jordan is fragmented, lacking a centralized entity for managing and coordinating health services. **This fragmentation affects the continuity of care, as not all services from screening to diagnosis are equally available or of the same quality everywhere**.
- Diagnostic services are primarily available in major cities like Amman, Irbid, and Zarqa. Women in remote areas face additional challenges, including **travel expenses and longer travel times** to access these services.
- There is a noted **shortage of specialized radiologists and trained female technicians**. Efforts are underway to address this through training programs, but retention in the public sector remains a challenge and migration of radiologists to the private sector is common.
- Typically, most cancer patients at the KHCC and the RMS undergo biomarker testing. In contrast, outside of these institutions, the rate of such testing is significantly lower.

Main recommendations

- ★★★ Continue implementing quality improvement programs, such as the Breast Imaging Accreditation Program by JBCP.
- Explore telemammography to enable additional interpretation of mammograms.

Test	Access to biomarker testing in the RMS
Essential biomarkers (ER, PR, HER2, Ki-67)	Available for all
Gene expression profiles (Oncotype DX, Mamma Print, etc.)	Limited public reimbursement
Newer biomarkers (PIK3CA, BRCA1/2, PD-L1, NTRK, dMMR/MSI-H, TMB-H)	NTRK and TMB-H are not publicly reimbursed while the rest are routinely reimbursed.

Ensure that essential biomarker tests and further molecular diagnostic tests that are prerequisites for administering modern cancer medicines are widely accessible.

Treatment

Main challenges

- **The fragmentation in the health care system leads to a lack of standardized cancer treatment protocols across different institutions**. Each institution tends to adopt its own approach. Notably, there were endeavors in 2017 to align protocols between the KHCC and the MoH, but significant advancements are still pending.
- In the public sector there is often an increased demand for services that leads to long waiting times. The time from diagnosis to treatment initiation typically ranges from **2 weeks** to **2 months**, with an average of **23 days**.
- Most cancer patients in Jordan receive their treatment at the KHCC, followed by the Military Oncology Center and Al Bashir Hospital. Plans are underway to improve geographical accessibility to cancer care, including the establishment of a sub-center of the KHCC in Aqaba in the southern region in the third quarter of 2024. **However, patients in the north and underprivileged areas are still required to travel to bigger cities to be treated**.
- The financial burden of cancer treatment for uninsured patients is often alleviated by government assistance, such as the Royal Court exemption, thus reducing the out-of-pocket expenses for individuals.
- **Approximately half of the breast surgeries are performed by specialized surgical oncologists, with the rest are conducted by general surgeons**, sometimes resulting in less optimal outcomes.
- Jordan has a total of **20 radiation therapy machines.** The equipment is located in only a few facilities in Amman, including at the KHCC, the RMS, one public hospital, and private hospitals. The current number of radiation therapy machines falls below international standards, indicating a need for increased investment.
- A major challenge in cancer care in Jordan is the rising cost of new cancer medicines, which increases the financial burden of cancer management. The escalation in prices risks restricting access to lifesaving or life-prolonging treatments. To address this issue, the **KHCC has begun conducting cost-effectiveness analyses as a strategy to negotiate medicine prices and ensure treatments provide value for money.**

Main recommendations

Improve health care quality in the north and other underserved areas.

Continue efforts for the establishment of unified treatment guidelines.

Invest in medical education and training programs for surgical oncologists.

Explore opening smaller regional cancer treatment centers to enhance radiation therapy availability.

Enhance the availability of newer breast cancer medicines beyond the KHCC.

Morocco

Population: 37.4 million (2022)
GDP per capita: USD 3,442 (2022)
Life expectancy: 74 years (2021)
Total health expenditure: 5.7% of GDP (2021)
Source: World Bank

Breast cancer

- Breast cancer is the most common cancer type in women (**40%** of all new cancer cases) and responsible for **26%** of all cancer deaths among women in Morocco.
- Breast cancer tends to be diagnosed at an earlier age in the Middle East and Africa (MEA) region than in Western countries, approximately 10 years earlier. In 2022, 82% of cases in Morocco were in women below the age of 65.

8 out of 10 women diagnosed with breast cancer in Morocco are under 65 years.

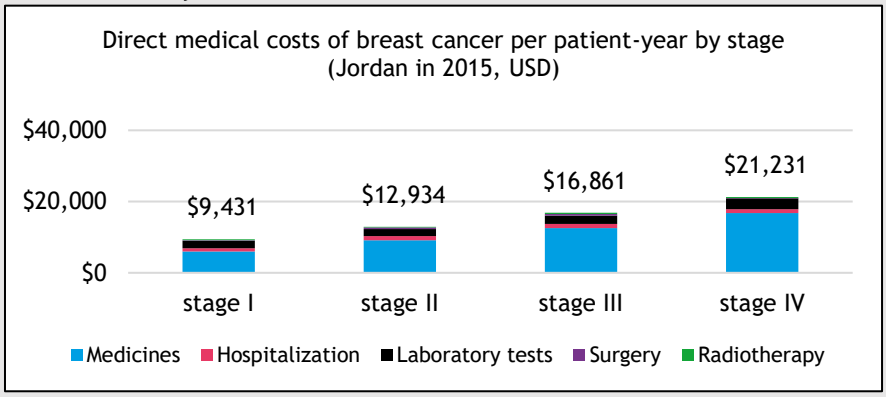
Health system and governance of breast care

Description

- Morocco has undertaken major initiatives toward achieving universal health coverage, with the establishment of the Haute Autorité de la santé (High Health Authority) in 2023. This move aims to ensure a seamless operation of compulsory basic health insurance (AMO).

Morocco's leap towards Universal Health Coverage
As of 2017, the combined coverage of AMO and RAMED (a previous scheme aimed at aiding impoverished and vulnerable households) reached approximately 47% of the population. The National Agency for Health Insurance (ANAM) launched an ambitious initiative spanning from 2020 to 2024, with the goal of expanding basic medical coverage to cover more than 95% of the population by 2025. By September 2022, this strategy had already borne fruit, with the coverage rate under AMO increasing to 80%. With the discontinuation of RAMED by the end of 2022, its beneficiaries were integrated into AMO, thereby granting around 9.4 million Moroccan citizens access to AMO's services by the year's end.

- Many women, previously beneficiaries of RAMED, face difficulties due to their limited access to computers or lack of computer skills, which was required to transition to AMO.
- The first national cancer plan for 2010-2019 led to the creation of specialized breast cancer centers in Casablanca and Rabat. A key goal of the second national cancer plan for 2020-2029 plan is to improve early detection of breast cancer, focusing on: **enhancing access to free, high-quality screenings, improving diagnostic services and monitoring, and promoting public-private partnerships.**
- Diagnostic and treatment centers are available throughout the country, with major cancer care facilities located in Casablanca and Rabat, including the leading institutes CM-VI and INO. Treatment for patients covered by AMO is fully funded without co-payments, while others may use private insurance or receive assistance from the Lalla Salma Foundation.
- **Around half of the economic burden associated with breast cancer comes from indirect costs**, which include productivity losses due to working-age patients' inability to work, either temporarily or permanently, or premature death. This burden is especially acute in the MEA region, where breast cancer presents about a decade earlier than in Western countries.
- The direct medical costs for breast cancer treatment escalate with the stage at diagnosis. For instance, treating late-stage breast cancer in countries similar to Morocco, such as Jordan, can be more than twice as costly as treating early-stage breast cancer, underscoring the critical value of early detection to reduce the economic burden.



Main recommendations

Establish physical access points, e.g., at community centers, equipped with computers and trained staff to help women transition from RAMED to AMO.

Emphasize and strengthen the participation of patient organizations in the decision-making processes.

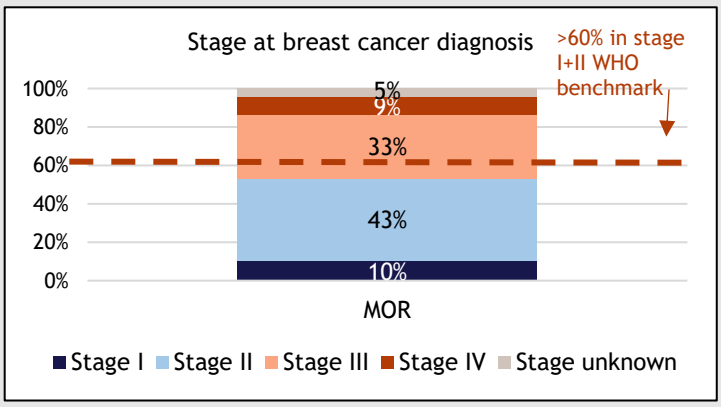
Continue prioritizing the downstaging of breast cancer at diagnosis to reduce the economic burden of breast cancer.

- Women showing symptoms of breast cancer typically visit public health centers for a clinical breast examination (CBE). If abnormalities are found, they are directed to diagnostic centers for further tests, including mammography. A confirmed diagnosis of breast cancer leads to referral to treatment centers. As of 2020, Morocco had **2,126 primary health care centers where all women could receive a CBE.**

Early detection

Main challenges

- The National Breast Cancer Screening Program, targeting women aged **40-69** years, was established in 2010. As part of this program, women within the target population are invited to undergo CBE when they visit primary health care centers. The program lacks a mechanism to systematically identify and invite eligible women, relying on an opportunistic approach where women visiting for unrelated reasons are offered a CBE. The Cancer Screening in Five Continents project by the IARC reports a screening coverage rate of 56%, which is slightly below the annual target of **60%**.
- The annual October breast cancer awareness campaign significantly boosts screening rates, as evidenced by a surge in screenings at primary health centers following the campaign. However, most patients at major oncology centers are symptomatic at diagnosis, indicating late detection. There is a recognized need for continuous breast cancer awareness throughout the year, beyond the October campaign, to improve health literacy, particularly in rural areas where misinformation and lack of education contribute to delays in seeking care.
- Despite general practitioners' awareness of early detection's importance, the actual practice of conducting CBE is low, highlighting a **disconnect between knowledge and practice**. Some studies have also found that there is **lack of breast cancer knowledge among nurses.**
- The formal training for CBE providers at primary health centers is described as non-structured and lacks certification. **Some nurses and midwives perform CBEs without formal training, relying instead on informal training from general practitioners**, highlighting the need for periodic refresher training.
- According to data from women diagnosed in 2008-2017 in INO Rabat (n=1,020) and CM-VI Casablanca (n=635) approximately **42%** of diagnosis were at advanced stage (stage III and IV).



- BRCA genetic tests are not currently reimbursed, but discussions with ANAM are ongoing about potentially offering reimbursement, especially for high-risk individuals like family members of BRCA mutation carriers. However, there is a notable absence of specialized training in genetic counseling for geneticists as of 2016, indicating a gap in the health care system's capacity to offer these critical services.

Main recommendations

- Enhance training for primary care workers to better recognize early breast cancer symptoms, with mandatory continuous medical education.
- Establish a nationally recognized training curriculum for CBE and possibly extend the 4-day training program for CBE proficiency.
- Continue campaigns to raise awareness about screening and tailored them to specific communities.
- Improve access to BRCA1/2 tests and genetic counseling to identify and follow-up women carrying mutations.
- Partner with medical institutions to offer specialized courses in genetic counseling and integrate this service into breast cancer care.

Diagnostic services

Main challenges

- Morocco has **44** mammography units, equating to 18 units per 1 million women aged 50-69, with local experts noting that geographical accessibility to mammography services is generally not a concern due to diagnostic centers in each province, each equipped with mammography and ultrasound machines.
- One of the main issues is the notable shortage of radiologists, with only **402** radiologists across the country in 2019, making the availability of trained radiologists at each diagnostic center difficult.

Main recommendations

- Explore telemammography to enable remote interpretation of mammograms by expert radiologists.

- **A lack of quality assurance in diagnostic activities, highlighted by the absence of accreditation of mammography and pathology units**, compromising the reliability and effectiveness of diagnostic services.
- There is a significant shortage of pathologists in the public sector, which often results in the need to send biopsy samples to private laboratories.
- Essential biomarkers for breast cancer are publicly reimbursed. BRCA testing is not universally performed, but the use of next-generation sequencing (NGS) to identify targetable mutations, including BRCA, is advancing, with NGS testing currently available in some private centers in Rabat and Casablanca and expected to expand to more cities.

Test	Access to biomarker testing in the public sector
Essential biomarkers (ER, PR, HER2, Ki-67)	Available for all
Gene expression profiles (Oncotype DX, Mamma Print, etc.)	Not publicly available
Newer biomarkers (PIK3CA, BRCA1/2, PD-L1, NTRK, dMMR/MSI-H, TMB-H)	NTRK, dMMR/MSI-H and TMB-H are not publicly reimbursed. While the rest of the tests are routinely reimbursed.

- While essential biomarkers are reimbursed, there are gaps in their utilization in clinical practice, as evidenced by a study showing incomplete documentation of ER, PR, and HER2 statuses in pathology reports.

Improve access to novel biomarker testing by subsidizing costs.

Address the shortage of pathologists by expanding the number of residency positions and improving their compensation packages.

Ensure quality control in pathology by accrediting laboratories and diagnostic centers with international health bodies.

Evaluate the absence of documented essential biomarker testing in pathology reports.

Treatment

Main challenges

- Significant progress has been made in multidisciplinary medical decision-making in Morocco, with the National Institute of Oncology in Rabat establishing specialized teams, including one for breast cancer. However, **patients in rural, semi-urban, and private sectors face challenges accessing these discussions, impacting optimal treatment planning.**

Pioneering patient care in Africa

Morocco was the first country in the region to have developed local clinical guidelines tailored for its population, with the current availability of the 5th edition and ongoing work on the 6th edition. Also, Morocco stands out in Africa for adopting new cancer treatments, including endocrine therapy, HER2 targeted treatments, dual HER2 blockade, and CDK4/6 inhibitors in metastatic disease.

- Geographical barriers limit access for rural patients to leading oncology centers, with a study showing underrepresentation of rural breast cancer patients at CM-VI and INO despite a significant rural population.
- There is a **shortage of surgical oncologists**, leading to patients often undergoing surgeries by general surgeons.
- As of 2023, there are a total of **56 radiation therapy machines** available in the country. There has been considerable progress in increasing the availability of radiation therapy units over the past decades. However, the current number is still **below the standards set by international recommendations.**
- Some newer medicines have secured reimbursement but still require approval from expert committees. This **bureaucratic step** could potentially delay the timely administration of treatments.
- The process for regulatory approvals for new medicines takes an extended amount of time, which delays the introduction of effective breast cancer medicines, reducing accessibility in both private and public sectors.

Main recommendations

Review challenges in cancer care access for rural populations.

Boost investment in medical education and training to expand the pool of surgical oncologists.

Improve availability of radiation therapy. Explore hypofractionated radiation therapy as a solution to complete radiation therapy courses more quickly and save resources.

Streamline the approval process for cancer medicines that offer substantial health benefits. Also, reevaluate the need for expert committee approvals for reimbursing certain medicines.

Saudi Arabia

Population: 36.4 million (2022)
GDP per capita: USD 30,448 (2022)
Life expectancy: 77 years (2021)
Total health expenditure: 6.0% of GDP (2021)
Source: World Bank

Breast cancer

- Breast cancer is the most common cancer type in women (**29%** of all new cancer cases) and responsible for **20%** of all cancer deaths among women in Saudi Arabia.
- Breast cancer tends to be diagnosed at an earlier age in the Middle East and Africa (MEA) region than in Western countries, approximately 10 years earlier. In 2022, 89% of cases in Saudi Arabia were in women below the age of 65.

9 out of 10 women diagnosed with breast cancer in Saudi Arabia are under 65 years.

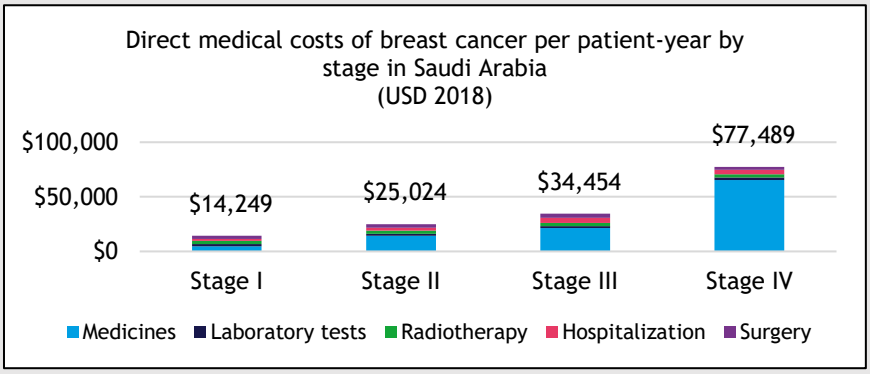
Health system and governance of breast care

Description

- All local citizens and public sector expatriates have free public health care access. Private sector expatriates must have compulsory health insurance provided by their employer, usually receiving care in the private sector. Employer insurance offers a basic care level, leading many white-collar private-sector expatriates to purchase additional private health insurance for extended coverage. Only if someone has no private insurance and is treated in the private sector, there will be significant out-of-pocket expenses, according to local experts.
- Cancer care is widely available through several public entities, including the Ministry of Health hospitals, university hospitals under the Ministry of Higher Education, and specialized institutions catering to various government sectors. In these facilities, **all Saudi citizens receive free treatment**.
- **The main national cancer care centers are located in Riyadh, Jeddah, and Dammam**. They offer modern cancer treatment and have qualified medical staff. Yet these big centers are overcrowded, because patients from all over the country try to get treatment there. During recent years, the MoH has established "**satellite centers**" in other cities, **such as Mecca, Medina, and Qassim.**

The National Plan for Cancer Control for the period of 2014-2025 aims to reduce breast cancer mortality by 30%. The plan includes various objectives, such as increasing awareness about breast cancer symptoms among health care workers and the implementation of an integrated population-based level screening program.

- **Approximately half of the economic impact of breast cancer stems from indirect costs.** These costs are linked to productivity losses when patients are unable to work, either temporarily or permanently, or due to premature death. This challenge is particularly significant in the MEA region, where populations are younger, and breast cancer tends to manifest about a decade earlier than in Western countries. For example, a study estimated that in Saudi Arabia, **the annual indirect costs attributable solely to morbidity (excluding mortality) range between international dollars (int$) 219 and 265 million**.
- The direct medical costs for breast cancer treatment escalate with the stage at diagnosis. For instance, **treating late-stage breast cancer in Saudi Arabia can be more than 5 times as costly as treating early-stage breast cancer**, underscoring the critical value of early detection to reduce the economic burden.



Main recommendations

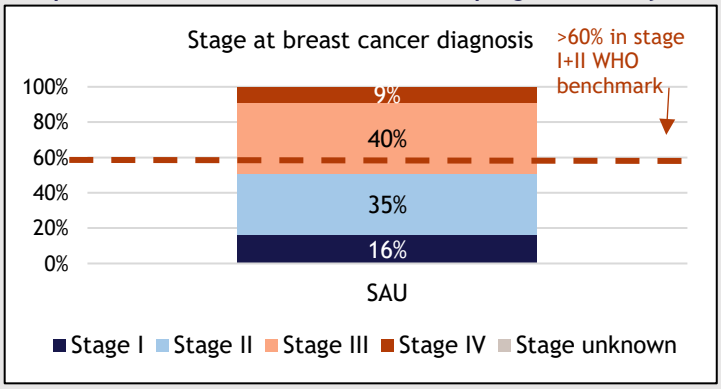
- Emphasize and strengthen the participation of patient organizations in the decision-making processes.
- Continue prioritizing downstaging of breast cancer at diagnosis to reduce the economic burden of breast cancer.
- Evaluate the impact of the National Cancer Plan to assess progress over time.
- Introduce an efficient electronic appointment system at primary health care centers allowing women to schedule visits at convenient times.
- Explore patient navigation strategies to create clear, easy-to-follow referral pathways.

- Breast cancer patients are advised to initially seek medical attention at primary health care centers by walking in, rather than making pre-arranged appointments. Waiting in lines can be a deterrent for some women, causing them to skip primary care and go directly to hospitals when their symptoms worsen.
- Until recently, mammography screening was not free in the private sector. If a healthy woman wanted to do a mammography screening, a physician would need to put symptoms in the medical record in order to make the referral available for free. This has changed recently and now mammography screening is listed among reimbursable services in the insurance policy.

Early detection

Main challenges

- The graph below indicates that a significant number of breast cancer diagnoses at the Saad Specialist Hospital between 2004 and 2011 were made at advanced stages. The situation is anticipated to have improved since then, thanks to **modernization, urbanization, and increased health awareness, further supported by initiatives such as the Breast Cancer Early Detection project,** which was launched in 2012. Nonetheless, there is a **lack of more recent and comprehensive national data to evaluate progress in early detection.**



- **The national screening program offers mammography every two years to women aged 40-69 years.** Mammography has been available in all regions since 2005 and a nationwide breast cancer screening center was established in Riyadh in 2007. **Despite free provision of breast cancer screening, it appears that participation rates are still low.**
- Studies have identified that the fear of discovering cancer significantly hinders self-examinations and participation in screening programs.
  - ❖ This apprehension includes fears related to physicians, medical examiners, hospitals,
  - ❖ and the potential social implications of being diagnosed as there is still some level of social stigma surrounding breast cancer.
- Local experts noted that there is lack of encouragement from general practitioners and nurses to participate in screening.
- There is also a gap between knowledge and practice. A study among female employees at King Saud University aged 40 years and above showed that **51% reported intending to undergo mammography; however, only 19% received a mammography.**

Elevated BRCA and TP53 mutation rates

Saudi Arabian breast cancer patients show a 10% prevalence of BRCA mutations, higher than global averages, with a notably high frequency of BRCA1 mutations. Additionally, a 40% prevalence of TP53 mutations, among the world's highest, has been reported.

- Local experts noted that there is no organized way to screen high-risk women and follow-up on their family members. There are only some fragmented screening services, e.g., at the King Faisal Specialist Hospital & Research Center and National Guard hospital.
- There is a notable shortage of health care workers specializing in genetics, with only **6** genetic counselors reported in 2018.
- There is also a limited number of laboratories for genetic testing. People may need to travel to laboratories located in other regions to receive genetic counseling services.

Main recommendations

- Work on a call-recall system to alert women about upcoming screenings via SMS, calls, or emails.
- Promote transparency by making quality indicators of the effectiveness of the breast cancer screening program readily accessible.
- Collaborate with local religious leaders, community elders, and women's group leaders to promote breast cancer screening.
- Provide primary care practitioners with materials about breast cancer screening to share during ordinary appointments.
- Prioritize BRCA mutation screening to identify women at high risk.
- Train health care professionals in basic genetic counseling.
- Deploying mobile units for genetic testing to remote areas.

Diagnostic services

Main challenges

- **There is a significant shortage of technicians and radiologists with expertise in breast cancer**, hindering the screening process.
- A **lack of skilled health care experts, including pathologists**, can contribute to delays in breast cancer diagnosis. According to the 2021 MoH report on newly enrolled employees in fellowship programs and higher studies by specialty, histopathology had notably fewer enrollees, with only **5 individuals**, compared to radiology, which had 91.
- Access to biomarker testing is guaranteed. However, not all health care facilities possess the capabilities to conduct the tests. According to local experts, in cases where peripheral centers lack the necessary resources to analyze tissue samples, they employ a spoke-and-hub approach, sending the samples to larger hospitals for biomarker testing.

Test	Access to biomarker testing to Saudi citizens and expats
Essential biomarkers (ER, PR, HER2, Ki-67)	Available for all
Gene expression profiles (Oncotype DX, Mamma Print, etc.)	Available for all
Newer biomarkers (PIK3CA, BRCA1/2, PD-L1, NTRK, dMMR/MSI-H, TMB-H)	NTRK and TMB-H are not routinely reimbursed, while the rest of the tests are.

Main recommendations

- Recruit more radiologists or develop specialized training programs for radiographers in mammography or consider implementing telemammography.
- Promote workforce development in pathology.
- Evaluate the proportion of patients receiving essential biomarker testing and testing for newer biomarkers at all institutions across the country.

Treatment

Main challenges

- In Saudi Arabia, the **fragmentation of the health care system** makes uniform treatment guidelines challenging, leading to variability in patient care across different providers.

Comprehensive coverage for breast cancer care

The Cooperative Health Insurance Council mandates that health insurance covers the treatment of benign growths and breast cancers up to a maximum of 500,000 Saudi riyals (approximately 133,285 USD as of August 2023), covering the full spectrum of patient care.

- There is a **lack of patient support groups** and Arabic-centric platforms, especially affecting conservative women. However, the rise of online groups like “Najia” since 2016 has been a positive development.
- A notable gap exists in the geographical availability of oncology centers in the northern and southern regions. In these regions, there are only hospitals with satellite units to administer chemotherapy. Once diagnosed, patients from these areas should be sent to bigger hospitals.
- In rural areas, the **scarcity of oncologists** leads to general or family physicians providing cancer care, which may compromise the quality of treatment.
- Sometimes general surgeons perform surgeries instead of breast surgeons, leading to suboptimal treatments.
- As of 2023, there are a total of **49 radiation therapy machines** available in the country. The current number is below the standards set by international recommendations. The lack of radiation therapy impacts primarily rural areas.
- While the availability of modern breast cancer medicines is not a concern, **the delivery of medicines may pose challenges.** For instance, an administrative process is required to obtain medicines that have just been approved or that have been acquired by the MoH through “central purchase”.
- With Saudi Vision 2030, there is a **shift towards adopting a value-based pricing system for medicines**, utilizing health technology assessment (HTA) to guide pricing and reimbursement decisions, but this is yet to be implemented broadly.

Main recommendations

- Expand culturally sensitive, Arabic-centric online and offline support platforms nationwide.
- Continue prioritizing initiatives to train and recruit medical oncologists and nurses.
- Develop a digital platform to integrate procurement, inventory management, and distribution processes for medicines.
- Enhance rural access to radiation therapy, considering hypofractionated therapy to complete therapy courses more quickly and save resources.

South Africa

Population: 59.8 million (2022)
GDP per capita: USD 6,766 (2022)
Life expectancy: 62 years (2021)
Total health expenditure: 8.3% of GDP (2021)
Source: World Bank

Breast cancer

- Breast cancer is the most common cancer type in women (**27%** of all new cancer cases) and responsible for **16%** of all cancer deaths among women in South Africa.
- Breast cancer tends to be diagnosed at an earlier age in the Middle East and Africa (MEA) region than in Western countries, approximately 10 years earlier. In 2022, 68% of cases in South Africa were in women below the age of 65.

7 out of 10 women diagnosed with breast cancer in South Africa are under 65 years.

Health system and governance of breast care

Description

- The public sector, serving about **84%** of the population, is defined by standard treatment guidelines and an essential medicines list but faces major challenges including **service fragmentation, staffing shortages, financial limitations, and service quality.**
- Conversely, the private sector caters to approximately **17%** of the population, offering higher quality services at a greater cost, mainly funded through private health insurance (medical aid scheme) that does not always cover the full costs of medical services.

Health for all

The National Health Insurance (NHI) scheme, initiated in 2012 and originally aimed to be fully implemented by 2026, seeks to ensure all citizens and permanent residents have access to quality health services across sectors by pooling funds from private insurers and the public sector. The NHI bill was passed in the parliament in 2023 but remains to be implemented.

- Women with breast cancer symptoms typically begin the patient journey at the primary care level. The recommended pathway stated for the diagnosis of breast cancer in the Prescribed Minimum Benefits (PMBs) is to have a medical visit with a registered nurse and a general practitioner. Nevertheless, **traditional healers often serve as the initial point of entry into the health care system**.
- Breast cancer care services such as clinical breast examinations (CBE), medical consultations, surgery, radiology and diagnostic imaging, chemotherapy, radiation therapy, and breast reconstruction are included in the PMBs for early and locally advanced breast cancer. Hormone therapy, chemotherapy, and some level of palliative care is included in the PMBs for metastatic patients.
- In 2017, the National Department of Health (NDoH) introduced **the Breast Cancer Prevention and Control Policy, aimed at enhancing breast cancer awareness, prevention, and ensuring timely and effective treatments.**
- **Around half of the economic burden associated with breast cancer comes from indirect costs,** which include productivity losses due to working-age patients' inability to work, either temporarily or permanently, or premature death. This burden is especially acute in the MEA region, where breast cancer presents about a decade earlier than in Western countries.
- The direct medical costs for breast cancer treatment escalate with the stage at diagnosis. For example**, treating late-stage breast cancer** in other countries like Jordan and Saudi Arabia **can be more than two to five times as expensive as treating cancer detected at an early stage**. This highlights the crucial importance of early detection in reducing the economic impact.

Main recommendations

Continue efforts towards ensuring equitable health care provision across the entire country and population.

Emphasize and strengthen the participation of patient organizations in the decision-making processes.

Prioritize downstaging of breast cancer at diagnosis to reduce the economic burden of breast cancer.

Early detection

Main challenges

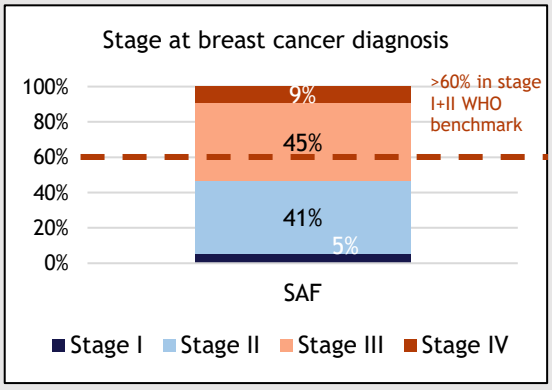
- Women over 40 visiting primary health clinics should receive a Provider-Initiated Screening Clinical Breast Examination (PISCBE). If abnormalities are detected, they are referred to a regional breast unit. Primary health care facilities should prioritize breast health education, informing women about breast cancer and emphasizing the importance of regular screenings.

Main recommendations

Invest in educating traditional healers about breast cancer to improve early referrals.

- Traditional healers are often the first point of care for many patients. Reliance on traditional medicine and a rising preference for complementary medicine before seeking conventional care are notable trends.
- Geographic and transportation barriers significantly impact breast cancer staging at diagnosis, with individuals living more than 20 kilometers from tertiary health centers more likely to be diagnosed at later stages. Other major challenges are:
  - ❖ low health care service utilization,
  - ❖ unclear patient navigation pathways,
  - ❖ low health literacy in some communities,
  - ❖ insufficient early detection education in some health care facilities,
  - ❖ in rural areas, lack of training among health care workers to detect breast-related issues, unless symptoms are pronounced.
  - ❖ economic constraints, including the cost of patients for taking time off work for health care appointments,
  - ❖ and fear of social stigma associated with breast cancer diagnosis, particularly concerning marital prospects for daughters.
- Provinces have different access points, and the evaluation also varies between the private and public sectors. The lack of standardized access and evaluation is a significant problem as **women frequently struggle to identify where they should seek care, resulting in delays**. This challenge extends beyond the public sector, even women with private insurance face difficulties in pinpointing their access points for screening in the private sector.

The graph indicates that a significant number of breast cancer diagnoses at the Chris Hani Baragwanath Academic Hospital (CHBAH) in 2006-2012 were made at advanced stages. Not reaching the current WHO GBCI goal of more than 60% of breast cancer diagnosis at earlier stages (I and II).



- The NDoH is moving towards a patient-centered approach, promoting cost-effective screening by recommending that women receive both breast (CBE) and cervical examinations during ordinary health care visits. The '**High-5 Method**' risk assessment is used to encourage self-breast examination and guide further actions based on the level of cancer suspicion.
- Population-based mammography screening is not feasible in the public health sector due to limited resources and infrastructure, with mammography recommended only for symptomatic or high-risk individuals.
- Within the private sector, among clients of a major medical aid provider, mammography screening uptake is low.
- There is a disparity in access to genetic counselors across regions, with a concentration in **Gauteng** and **Western Cape** and a shortage in other provinces. In addition, there is a trend of genetic counselors trained in South Africa **moving overseas for work**, attributed to the lack of new positions in the public sector.
- Waiting times for genetic testing results vary significantly between the public (up to **9** months) and private sectors (**2** to **4** weeks).

- Establish integrative health clinics that combine complementary and conventional medicine.
- Highlight testimonials from women who benefited from early detection to emphasize the impact of screening and supportive care.
- Establish a national training curriculum for CBE to standardize knowledge.
- Formally recognize patient navigators within the health care system, allocating budget for their recruitment, training, and payment.
- Train health care providers in basic genetic counseling and advocate for more genetic counselor positions in the public sector to retain talent.

Diagnostic services

Main challenges

- **Limited availability of breast MRI and mammography machines in the public sector**. Even centers serving vast regions, like the one in Cape Town, are not sufficiently equipped. This **shortage leads to a heavy reliance on ultrasounds and CBE**.
- Bottlenecks in the health system led to long waiting times for diagnostic tests, causing anxiety among patients and potential progression of the disease. In the Eastern Cape, the patient's journey through the system can take up to **6-9** months from the first time a lump is felt to getting a biopsy and imaging.

Main recommendations

- Prioritize investments in mammography machines for regions with high demand, and mobile units in non-urban areas.

- The public sector faces a significant shortage of pathologists, exacerbated by migration to the private sector due to poor working conditions and inadequate compensation.
- A study showed only **75%** completeness in core biopsies and surgical samples within the public sector. The main issues were the omission of tumor grade, and the absence of FISH testing for inconclusive HER2 status, crucial for the selection of appropriate treatments.
- The expense associated with core needle biopsies is often not covered by medical insurance until after a formal diagnosis.
- Local experts indicate that the National Health Laboratory Service (NHLS) faces shortages of certain laboratory reagents, leading to delays of over **6 months** in receiving genomic test results. In the Western Cape, one solution explored was to outsource tests, achieving a similar cost but reducing the result wait time to just **6 weeks**.

Test	Access to biomarker testing in the public sector
Essential biomarkers (ER, PR, HER2, Ki-67)	Available for all
Gene expression profiles (Oncotype DX, Mamma Print, etc.)	Not publicly available
Newer biomarkers (PIK3CA, BRCA1/2, PD-L1, NTRK, dMMR/MSI-H, TMB-H)	Only BRCA1/2 tests are publicly available while the rest are not.

- Continue investing in ultrasound technology and provide dedicated training.
- Implement digital pathology solutions.
- Reimburse costs for essential diagnostic tests, like the core needle biopsy.
- Implement periodic quality audits for histopathology reports.
- Develop financing and reimbursement strategies for gene expression profile panels.

Treatment

Main challenges

- **Transportation expenses significantly impact breast cancer patients, often becoming a major reason for discontinuing treatment regimens.** In some areas of Cape Town, for instance, it is estimated that households allocate as much as **43%** **of their monthly income solely to transportation costs.** Although the state provides hospital transportation from secondary hospitals to breast cancer centers, **patients living in inner-city regions must depend on public transportation.**
- Major hospitals in the Western Cape face a significant challenge in meeting the demand for breast surgery due to the limited availability of surgical slots, with only one surgical list scheduled per week. This constraint also affects the ability to perform reconstructions. Consequently, patients may experience extended waiting periods for critical surgeries, with delays for a mastectomy reaching up to **4 months**.
- Experts have observed that when breast cancer treatment is classified under the PMB, its funding is drawn from the general risk pool of the medical scheme, rather than from dedicated oncology benefits. This distinction has implications for patients requiring treatments that extend beyond the basic PMB coverage.
- There is a **limited number of radiation therapy machines and a notable shortage of radiation oncologists and therapists** leading to extended waiting times for patients and placing excessive workloads on current staff.
- Chemotherapy and hormone therapy are readily available for breast cancer patients, while targeted treatment is mostly available in the private sector and immunotherapy is not yet available.
- There is **restricted access to newer medicines in the public sector.** Even medicines listed in the public sector list (EML) may not actually be accessible, especially in metastatic cases where options are more limited.
- Comprehensive health technology assessment (HTA) to evaluate the cost-effectiveness or budget impact of medicines to be added to the public EML is not done.
- Difficulties in accessing treatment protocols and formularies make it hard for patients and insurers to understand coverage, although efforts are being made to improve transparency.
- For patients with private insurances, **there are high co-payments for cancer medicines, sometimes up to 50% of the price.** In certain instances, there should be no co-payment, but patients often find themselves needing to engage in legal proceedings to contest these additional costs.

Main recommendations

- Introduce a transportation subsidy or voucher program for cancer patients.
- Collaborate with the private sector to increase breast surgery capacity.
- Increase radiation therapy access by extending hours and focusing on hypofractionation.
- Implement a transparent, standardized HTA process for new medicines.
- Ensure all cancer medicines listed in the EML are readily available in public hospitals.
- Consider fixed-fee co-payments instead of proportional co-payments for cancer care services in the private sector.

Türkiye

Population: 84.9 million (2022)
GDP per capita: USD 10,674 (2022)
Life expectancy: 76 years (2021)
Total health expenditure: 4.6% of GDP (2021)
Source: World Bank

Breast cancer

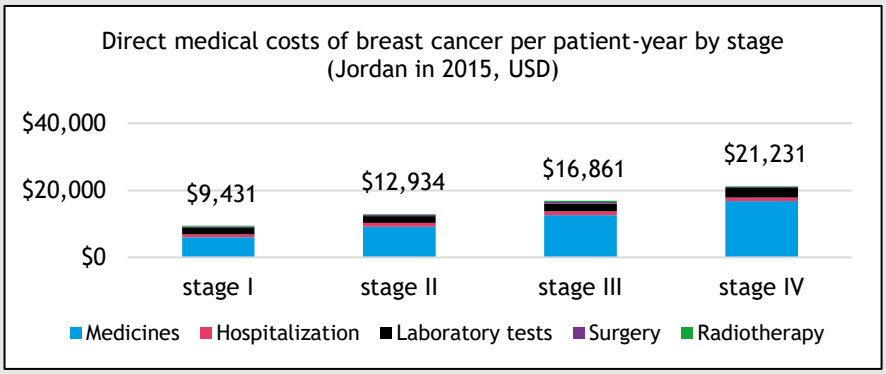
- Breast cancer is the most common cancer type in women (**25%** of all new cancer cases) and responsible for **16%** of all cancer deaths among women in Türkiye.
- Breast cancer tends to be diagnosed at an earlier age in the Middle East and Africa (MEA) region than in Western countries, approximately 10 years earlier. In 2022, 75% of cases in Türkiye were in women below the age of 65.

7 out of 10 women diagnosed with breast cancer in Türkiye are under 65 years.

Health system and governance of breast care

Description

- There is universal public health insurance administered by the Social Security Institution (SSI) which covers 99% of the population. Despite widespread public coverage, an increasing number of people are opting for supplementary private health insurance to cover additional costs, such as treatment in private hospitals. This private insurance typically covers examination costs but not newer medicines that are not yet reimbursed by the SSI.
- The public health expenditure as percentage of GDP is **3.6%** which falls below the informal **5%** WHO target of public health spending.
- **Around half of the economic burden associated with breast cancer comes from indirect costs**, which include productivity losses due to working-age patients' inability to work, either temporarily or permanently, or premature death. This burden is especially acute in the MEA region, where breast cancer presents about a decade earlier than in Western countries.
- The direct medical costs for breast cancer treatment escalate with the stage at diagnosis. For instance, **treating late-stage breast cancer** in **similar** countries like Jordan and Saudi Arabia **can be more than two to five times as expensive as treating cancer detected at an early stage**. This highlights the crucial importance of early detection in reducing the economic impact.



- The third National Cancer Control Plan (NCCP), launched in 2021, focuses on enhancing and expanding breast cancer screening as one of its five key initiatives. Specific measures for diagnostics and treatment of breast cancer are not included. **The primary measure of success for breast cancer screening is the patient participation rate in the screening program.**
- Public health insurance through the SSI provides comprehensive coverage for all cancer services in public health care facilities. Despite this, patients must make co-payments for services at primary, secondary, and tertiary levels of care.
- Women exhibiting breast cancer symptoms have multiple referral options for screening, including their gynecologist, primary care physician, or breast surgeon, and they also have the choice to directly visit screening centers. Although the national screening program fully covers mammography costs, opportunistic screenings are not covered.

Main recommendations

Prioritize an increase in public spending on health care more aligned with global standards.

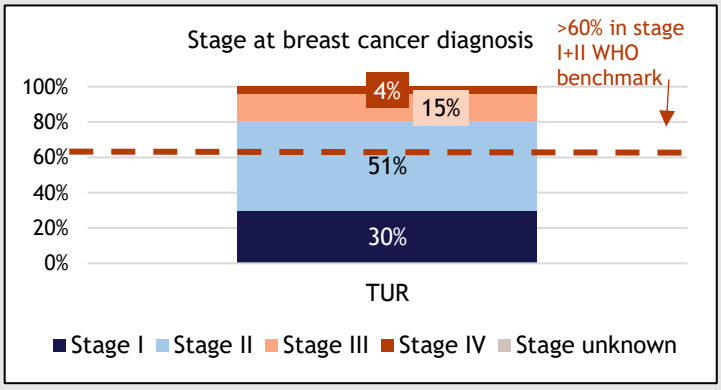
Emphasize and strengthen the participation of patient organizations in the decision-making processes.

Prioritize downstaging of breast cancer at diagnosis to reduce the economic burden of breast cancer.

Early detection

Main challenges

- Public health centers provide training and guidance to encourage women to conduct monthly self-examinations once they turn 20 years old. Despite reported rates of breast self-examinations in around 80% of women, effectiveness is low, with correct practice under **1%**, according to some studies.
- Younger women, especially those aged 30 to 39, tend to delay seeking medical care due to low symptom awareness and health literacy.
- Patients, particularly in the public sector, experience long waits for clinic appointments.
- The graph below indicates that in 2005-2017 most breast cancer cases were diagnosed in stage II according to data from the National Breast Cancer Registry. This aligns with the goal of the WHO GBCI to have more than 60% of breast cancer cases diagnosed at stages I and II.



Türkiye's Organized Screening Program for Early Cancer Detection

Since 2004, an organized screening program has been available in Türkiye that offers mammography every two years to women aged 40-69 years. The Cancer Early Diagnosis, Screening, and Training Centers (KETEM), in collaboration with community health centers, execute early diagnosis and screening programs, including the "Mobile Mammography Project". There are a total of 331 cancer screening centers in Türkiye, with 42 of them being mobile.

- The proportion of women aged 50-69 who were screened with mammography in the past 2 years in 2019 was close to **36%** and in 2020 it decreased to **27%**. These numbers **are well below the 70%-aim specified in the Turkish NCCPs from 2009 and 2013**.
- The eligible population is supposed to be invited to screening by SMS and phone calls. However, a previous study noticed that **only 22% of the patients in the target age group admitted receiving invitations.**
- According to a survey study, only **39%** of women were aware that mammography screening is recommended to begin at the age of 40.
- Primary care providers often do not proactively recommend preventive mammography.
- Fear of a cancer diagnosis leads many women to delay screening appointments.
- There is a need at first and second level health services for physicians and nurses who can provide genetic counseling and refer patients to the appropriate tertiary centers.
- BRCA mutation tests for healthy women are not covered by the SSI, and women are required to pay for the tests out-of-pocket.

Main recommendations

- Provide primary care practitioners with patient education materials about breast cancer screening to distribute during ordinary appointments.
- Continue working on a call-recall system to alert patients about screenings via SMS, calls, or emails, especially targeting women aged 40-49 not previously in the early detection program.
- Improve access to BRCA1/2 tests and genetic counseling to identify and follow-up women carrying mutations.
- Train primary health care professionals in basic genetic counseling.

Diagnostic services

Main challenges

In 2021, Türkiye had a notably high availability of mammography and MRI units, with 11.8 and 11.3 machines per million inhabitants, respectively, surpassing countries with similar GDP like Mexico, Costa Rica, and Israel. This indicates Türkiye's significant strides in enhancing its health care infrastructure for breast cancer screening and diagnosis.

Main recommendations

- Improve quality assurance and reporting practices in imaging diagnostics.

- While there is an adequate number of mammography machines there are problems with the quality of mammography reports. For instance:
  - ❖ Many mammography images from private hospitals fail to meet quality standards, mainly due to incorrect positioning.
  - ❖ Many mammography reports lacked essential details, rendering them insufficient in quality.
- The lack of coordination among health care providers impedes timely diagnosis efforts. Patients with public insurance face longer waits for diagnosis, including tests and results.
- A 2020 study revealed that the median time to receive histopathologic results was **12 days**. Key challenges identified include a **lack of quality control, with pathology services lacking necessary accreditation to guarantee high-quality breast cancer screening and diagnostics**. Moreover, a 2021 survey on Turkish **pathologists' job satisfaction** highlighted that only half were content with their lab's physical conditions, and many reported working with inexperienced technicians.
- There are notable regional disparities in the quality of pathology reports, with molecular subtype analysis included in **87%** of reports overall, but only **50%** in the Eastern Anatolia region, indicating significant geographical variations in diagnostic quality.

Test	Access to biomarker testing in the public sector
Essential biomarkers (ER, PR, HER2, Ki-67)	Available for all
Gene expression profiles (Oncotype DX, Mamma Print, etc.)	Limited reimbursement in the private sector.
Newer biomarkers (PIK3CA, BRCA1/2, PD-L1, NTRK, dMMR/MSI-H, TMB-H)	Only PD-L1 has routine reimbursement in the public sector. PIK3CA, BRCA1/2 and dMMR have limited reimbursement in the private sector.

- Improve quality control of pathology units by ensuring that laboratories and diagnostic centers get accredited by international health bodies.
- Ensure that essential biomarker tests and newer molecular diagnostic tests that are prerequisites for administering modern cancer medicines are widely accessible.
- Work on feedback mechanisms where pathologists can voice their concerns.
- Invest in expanding health care facilities, including diagnostic centers, to reduce waiting times.

Treatment

Main challenges

- Long waiting times for oncologist appointments and treatment start in public hospitals extend the care process. There is a shortage of breast surgeons and surgical slots, which delays surgeries. There is also a **shortage of radiation oncologists and technicians**, with current numbers falling below the suggested range. In addition, a lack of comprehensive breast centers within oncology units may lead to fragmented care.
- Geographical disparities are evident, with treatment initiation times varying significantly across regions and remote areas facing access issues. In a study the delay time between clinical appointments and initiation of treatment was **29 days**. However, in the Southeast Anatolia region the waiting time was more than double, **66 days**.

Significant progress has been made in standardizing breast cancer care, with a notable increase in breast-conserving surgery rates from 35% in 2008 to 57% in 2018. The Turkish Federation of Breast Diseases Societies prioritizes ongoing education for health care professionals and requires weekly multidisciplinary tumor boards, achieving an 87% national participation rate.

- There is a **low per capita number of radiation therapy machines** compared to countries at similar economic levels, leading to longer wait times and limited access to advanced treatments. The ratio in Türkiye is 2.87 per 100,000 inhabitants, below the OECD average of 8 per 100,000. In addition, **there are regional disparities in the availability of linacs for radiation therapy, with some areas, especially East and Southeast Anatolia, having much lower ratios than the recommended level**.
- There are significant delays between the regulatory approval of new medicines and their subsequent reimbursement. This situation leads to a scenario where these medicines are accessible only to patients who can afford to pay for them out-of-pocket.
- The SSI rarely reimburses new medicines for early-stage treatment, and only a select few are covered in the metastatic setting. Patients with TNBC or gBRCA+ status receiving treatment in the public sector for metastatic cancer do not have access to immunotherapies or targeted therapies. In contrast, private insurance policies offer broader access to newer medicines, although the extent of coverage varies based on individual insurance plans.

Main recommendations

- Improve geographical accessibility to cancer centers, especially for patients in rural areas.
- Expand breast surgery training programs and increase radiology residency slots.
- Explore hypofractionated radiation therapy to expedite treatment and save resources, especially for patients in East and Southeast Anatolia.
- Ensure consistent use of health technology assessment to evaluate new cancer medicines and reimburse those with high clinical benefit and acceptable cost-effectiveness profile.

United Arab Emirates

Population: 9.4 million (2022)
GDP per capita: USD 53,708 (2022)
Life expectancy: 79 years (2021)
Total health expenditure: 5.3% of GDP (2021)
Source: World Bank

Breast cancer

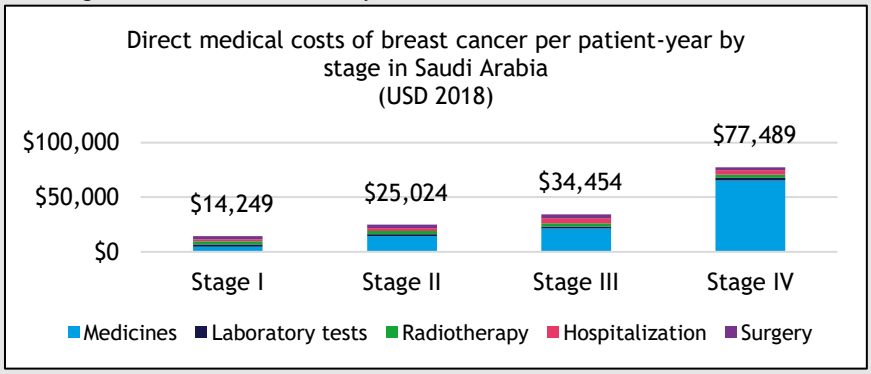
- Breast cancer is the most common cancer type in women (**40%** of all new cancer cases) and responsible for **25%** of all cancer deaths among women in the UAE.
- Breast cancer tends to be diagnosed at an earlier age in the Middle East and Africa (MEA) region than in Western countries, approximately 10 years earlier. In 2022, 87% of cases in the UAE were in women below the age of 65.

9 out of 10 women diagnosed with breast cancer in the UAE are under 65 years.

Health system and governance of breast care

Description

- The health insurance regulations and rules are somewhat different in the seven emirates. In general, local citizens have public health insurance coverage, which gives them access to both public and private health care providers. Expatriates receive compulsory health insurance coverage through their employer, which also gives them access to public and private health care providers.
- The Ministry of Health and Prevention provides support for Emirati women with breast cancer, ensuring full coverage for their treatment, screenings, and survival journey. Expats without full coverage can seek assistance from charities in the UAE to help with expenses for breast cancer treatment.
- Despite health insurance, reaching the annual cap of the insurance is a challenge for cancer patients – both for citizens and expatriates. Starting from 2019, the health authority in Dubai established a special fund to fully cover expatriate patients with breast cancer who have exceeded the insurance cap.
- Public spending on health care amounts to around **3%** of GDP, which falls short of the informal WHO spending target of **5%** of GDP.
- Typically, a local citizen suspecting they have breast cancer will first consult a primary care clinic within the public health care system. If required, they might be referred to a diagnostic center for more detailed testing. Women can also directly approach secondary or tertiary care facilities. Most often expatriates are the ones that opt to directly consult secondary or tertiary care facilities for diagnosis, due to the limitations of screening coverage. The type of services women receive depends on their health insurance plan.
- **Around half of the economic burden associated with breast cancer comes from indirect costs**, which include productivity losses due to working-age patients' inability to work, either temporarily or permanently, or premature death. This burden is especially acute in the MEA region, where breast cancer presents about a decade earlier than in Western countries.
- The direct medical costs for breast cancer treatment escalate with the stage at diagnosis. For instance, **treating late-stage breast cancer in Saudi Arabia (a country comparable to the UAE) can be more than five times as costly as treating early-stage breast cancer**, underscoring the critical value of early detection to reduce the economic burden.



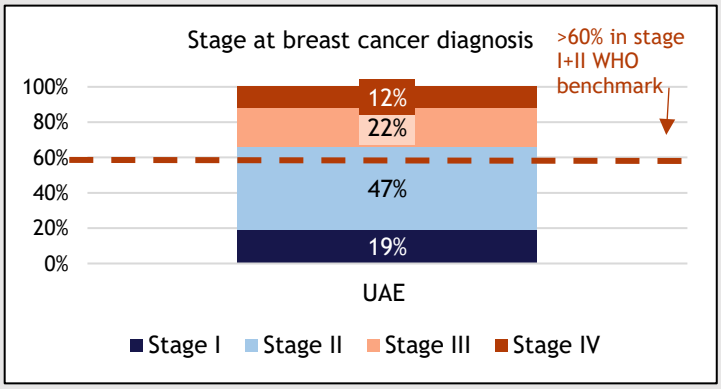
Main recommendations

- Prioritize an increase in public spending on health care.
- Emphasize and strengthen the participation of patient organizations in the decision-making processes.
- Continue prioritizing the downstaging of breast cancer at diagnosis to reduce the economic burden of breast cancer.

Early detection

Main challenges

- A non-organized screening program offering mammography every two years to women aged 40 and older exists. Emirati citizens throughout the UAE are eligible for screenings. Expatriates can access screening after obtaining a health card and making the necessary payment. Local experts noted that some expatriates postpone mammograms, waiting for free screenings or discounts during the month of October, if their insurance policy does not cover the costs.
- Public access to participation rates and other quality indicators of the screening program is restricted, requiring official requests for information.
- Efforts to expand mammography screenings to rural and semi-urban areas have been successful, and now, most women can access these services. The Pink Caravan, for example, organizes annual rides and events, where a team of medical professionals and volunteers travel across the seven emirates, including remote and rural areas, to provide access to screening services.
- The Pink Caravan, however, faces difficulties as many women do not keep their mammogram records, leading to issues in tracking previous screenings. Ensuring women save their medical images physically is crucial for accurate follow-ups.
- For the period of 2015-2017 across the entire UAE, approximately **66%** of breast cancer cases with staging information available at diagnosis were identified **at early stages (I and II)** as shown in the figure below. However, there is an inconsistent practice of recording stage information as around **20%** of diagnosed breast cancer cases were missing stage information.
- Local experts shared that around **64%** of breast cancer cases in Abu Dhabi were diagnosed at a late stage between 2007 and 2008. Although more recent statistics are pending, preliminary evidence suggests a substantial reduction in late-stage diagnoses to about **15%**. This indicates major progress in the early detection and awareness of breast cancer.



- Some women **ignore painless breast lumps** due to a lack of awareness about breast cancer symptoms, leading to delays in seeking treatment.
- Cultural expectations to endure silently and **societal judgment over breast cancer diagnosis** influence women's reluctance to seek screenings or treatment.
- Women often receive **insufficient encouragement** from health care providers to undergo routine breast cancer screenings.
- Despite initiatives from NGOs aimed at educating the public, **misconceptions that breast cancer is a death sentence continue to persist.**

Genetic risk assessment in the UAE is improving

In 2022, the Department of Health Abu Dhabi introduced the Precision Oncology Program, a pioneering initiative in the region focusing initially on breast cancer. Its main goal is to offer individualized cancer prevention plans for at-risk women. Also, the UAE initiated the Emirati Genome Program to explore the genetic foundations of Emiratis using advanced technology. This program includes genetic testing, such as the BRCA test for women at high risk and counseling sessions.

Main recommendations

Provide primary care practitioners with patient education materials about breast cancer screening to distribute during ordinary appointments.

Continue improving breast cancer awareness through community engagement, multilingual resources, and personal stories.

Promote the use of electronic health records that include imaging storage and transfer capabilities, to ensure more effective communication with, e.g., services provided by the Pink Caravan initiative.

Make data on screening rates and other quality indicators of the screening program publicly available.

Enhance data completeness by standardizing the documentation process for diagnosis across health care facilities.

Boost investments in local genetic testing facilities to minimize dependence on overseas testing centers.

Diagnostic services

Main challenges

- In Abu Dhabi, innovative artificial intelligence systems have been introduced to diagnose breast cancer from ultrasound images.
- Radiographers in the UAE, who play a key role in producing mammogram images, lack specialized training in mammography. A study found that only **56%** of them have completed a specialization in this area.
- There are no established national targets for the timeline during which a breast cancer diagnosis should be completed. Yet **many pathology labs have received accreditation from the College of American Pathologists** (CAP), indicating their adherence to quality standards.
- Cultural beliefs and fears, such as the misconception that biopsies can spread cancer or a lack of mental preparedness for the diagnosis, can delay the breast cancer diagnostic process, despite efforts to expedite it for those with clear symptoms.
- **Less than 2% of physicians in Dubai specialize in pathology.** There may be a need for more pathologists to meet the growing global demand for pathology services.

Test	Access to biomarker testing	
	Emirati citizens	Expats
Essential biomarkers (ER, PR, HER2, Ki-67)	Available for all	
Gene expression profiles (Oncotype DX, Mamma Print, etc.)	Available for all	Not reimbursed
Newer biomarkers (PIK3CA, BRCA1/2, PD-L1, NTRK, dMMR/MSI-H, TMB-H)	PIK3CA, NTRK, TMB-H are not reimbursed, while the rest are reimbursed.	

Main recommendations

- Implement specialized training and ongoing professional development for radiographers in mammography and boost the pathology workforce.
- Establish clear timelines for breast cancer diagnosis and standardize and expedite the process.
- Create dedicated funds to provide free diagnostic imaging exams for underserved groups.
- Develop educational materials and counseling services to dispel misconceptions about diagnostic procedures such as biopsies.

Treatment

Main challenges

- A notable **nurse shortage in oncology** is exacerbated by higher pay in certain centers, with the UAE easing recruitment requirements to mitigate this issue.
- Tawam Hospital is the main comprehensive cancer center in the UAE, located in the eastern region of Abu Dhabi. **For patients residing in other parts of the country, such as Dubai or Sharjah, the distance to the hospital may pose a challenge in terms of accessibility**.
- There are patient-induced treatment delays, driven by seeking multiple opinions or denial of diagnosis.
- Insurance coverage for expatriates, especially those on basic plans, may be limited, affecting access to specific medicines and treatments. A small percentage of expatriates without private health insurance lack coverage entirely.
- The financial burden of treatment of uncovered patients prompts them to seek aid from charities like Friends of Cancer Patients, where they may face delays due to **waitlists**.
- **Expatriates face job insecurity** when undergoing cancer treatment, risking the loss of their residence permit and financial hardship, which may force them to return home.
- The health care system's fragmented service delivery complicates the patient's journey and impacts the quality of care by undermining multidisciplinary treatment approaches.
- **Non-adherence to treatment** plans is a prevalent issue.

Despite challenges, local experts emphasize that there are minimal barriers to offering the latest breast cancer treatments to women in the UAE. Complaints about treatment quality are rare, and advanced treatment options are readily available. Patients generally express satisfaction with their care.

Main recommendations

- Broaden specialization in oncology for nurses.
- Offer transportation help for patients traveling far for treatment.
- Introducing patient navigators to address the knowledge gap in cancer care navigation.
- Initiate campaigns to educate patients on the importance of adhering to treatment plans.
- Facilitate financial aid processes of NGOs.
- Implement quality assurance to promote multidisciplinary team consultations.

IHE REPORT 2024:6