CANCER CARE IN THE MIDDLE EAST AND AFRICA

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Disclosure: Even though this report aims to describe the current state of cancer care, some statistics shown in this report do not cover the most recent years, in particular the impact of the COVID-19 pandemic.

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Foreword

Cancer is one of the most widely discussed health policy issues globally. The aging population in countries all over the globe increases the disease burden caused by cancer, both to individual people and to health care systems. On the upside, significant scientific advancements have been made in recent decades leading to improved diagnosis and treatment of cancer. Lack of access to the constant inflow of innovative diagnostic and treatment modalities remains a major challenge that needs to be addressed.

The Swedish Institute for Health Economics (IHE) has for many years now published regular updates on the burden of cancer and access to cancer drugs in Europe. This report expands IHE's research in in this area to the Middle East and Africa. The report builds on a comparative analysis of nine countries across the region. It intends to raise awareness of the size of the burden of cancer and the need to address it comprehensively. All areas of cancer control – prevention, screening, diagnosis and treatment, survivorship, as well as governance – are therefore analyzed in every country with country-specific recommendations on how to improve the current state of cancer care.

The analysis in this report builds on a review of publicly available sources to describe the state of cancer care in the Middle East and Africa. In addition, IHE held a series of virtual workshops with a large number of country-level experts in the field of oncology in every country between December 2020 and June 2021. Preliminary report findings were discussed during these workshops. IHE wants to thank all workshop participants for their active engagement and the insightful feedback provided.

The report was funded by the PhRMA MEA Oncology Working Group. Responsibility for the analysis, interpretations, and conclusions, as well as errors or omissions lies solely with the authors.

Lund, November 2021
Peter Lindgren
Managing Director, IHE

Executive summary

This policy report describes the current state of cancer care in nine countries in the Middle East and Africa (MEA-9): Algeria, Egypt, Jordan, Kuwait, Lebanon, Morocco, Saudi Arabia, South Africa, and the United Arab Emirates (UAE). These countries comprise around 300 million people. They are diverse in economic terms, with the three Gulf countries (Kuwait, Saudi Arabia, UAE) being much wealthier than the other countries. Yet the challenge of the increasing burden of cancer is shared by all countries.

What is the burden of cancer?

Cancer is on the verge of becoming the second biggest cause of disease burden in the MEA-9 countries. It was the third-leading cause of death in 2000 and had become the second-leading cause of death behind cardiovascular diseases in six of the nine countries by 2016.

The annual number of newly diagnosed cancer cases per 100,000 inhabitants has been increasing in all MEA-9 countries since 2000. This is partly related to the demographic change (population aging), and unfavorable trends in major risk factors of cancer, in particular smoking and obesity. Newly diagnosed cancer cases might almost double from 410,000 to 720,000 cases per year between 2020 and 2040 solely due to the expected demographic development. Policy makers need to prepare the health systems for this. Adequate planning followed by effective measures is needed to address the already considerable and steadily increasing disease burden of cancer.

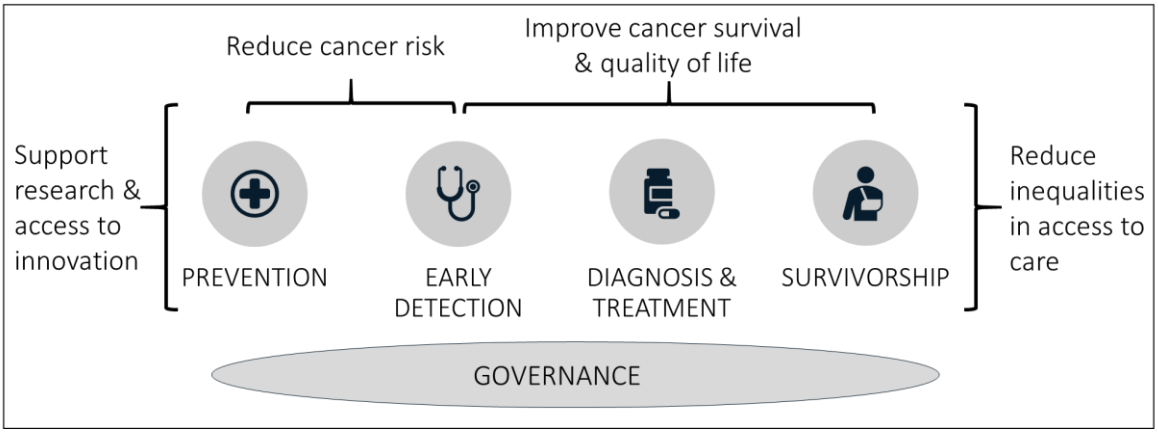
Cancer imposes also an economic burden on society. One part of the economic burden are direct costs relating to the health care resources used for cancer. These costs (PPP-adjusted) are estimated to have ranged from around $15 per capita in Morocco and Egypt to over $100 in Kuwait in 2018. The other part of the economic burden are indirect costs relating to productivity loss (foregone labor market earnings) caused by sick leave, early retirement, and premature mortality. Indirect costs are estimated to have been on average almost equally large as direct costs in the MEA-9 countries in 2018. The consideration of indirect costs is important in health care decision-making to achieve an effective allocation of resources that maximizes benefits to society.

How good are outcomes for cancer patients?

Survival is arguably the single most important outcome for cancer patients. Egypt and Morocco have the lowest survival in cancer and Kuwait, Saudi Arabia, and the UAE have the highest one. The latter countries have also higher per-capita health spending than the former countries. This hints at a positive correlation between survival and health care investment – something which previously has also been observed among countries in Europe and in the Asia-Pacific region.

How can the situation for cancer patients be improved?

A holistic approach to improving cancer care is important. The figure below shows five areas of cancer control. Four areas – prevention, early detection, diagnosis and treatment, survivorship – follow a life-course approach and the fifth area – governance – is a cross-cutting area that affects the other four. The brackets in the figure below define overarching goals that actions in the different areas are supposed to address. Through prevention measures, lifestyles that increase the risk of developing cancer should be reduced. Early detection of pre-cancer through screening can also help to reduce the risk of developing cancer. For people who have developed cancer, early detection together with high-quality diagnosis and treatment is imperative for improving survival. Palliative care in the end-of-life setting and psychosocial care for survivors can increase patients' quality of life. A common goal is to reduce inequalities in patient access to cancer care. This includes increasing universal health coverage (currently ranging from 17% in South Africa to 100% in the Gulf countries for their own citizens but not all expatriates) but also overcoming geographic barriers, socio-economic barriers, and cultural barriers. At the same time, supporting cancer research and enabling access to new diagnostic and treatment modalities is vital.



Governance of cancer care

National cancer control programs are formalized plans to address cancer. The World Health Organization (WHO) endorses them as the best available method to control both the causes and the consequences of cancer in a strategic and comprehensive way. Most of the MEA-9 countries have either active cancer control plans or have had them in the past. However, these plans outline varying goals and are not always fully comprehensive in terms of defining actions to address all areas of cancer control. Almost all plans lack dedicated funding plans for the defined actions. This casts some doubt on the actual implementation of the planned actions, as many actions require funding.

A fundamental challenge is the monitoring of cancer and patient outcomes in the MEA-9 countries. Availability of reliable data on cancer to inform cancer policy is mediocre, even in the Gulf countries.

Underreporting of the number of cancer patients in national/regional cancer registries is common. There are considerably delays in the release of the latest cancer statistics (often 4–5 years of delay). Key outcomes to measure performance of cancer care, such as survival rates, are usually not reported, because cause of death registration is not working properly. Without such data it is impossible to assess the effectiveness of cancer control measures. In addition, the absence of concrete data on health spending on cancer makes it impossible to assess the cost-effectiveness of any cancer control measure.

Prevention of cancer

The WHO lists dozens of risk factors for cancer, including tobacco consumption, obesity, alcohol consumption, sunlight and ultraviolet radiation, infection with certain agents such as human papillomavirus (HPV) and hepatitis B and C viruses, high intake of red meat, airborne particulate matter originating from domestic heating and cooking, and occupational carcinogens such as asbestos and heavy metals. The relative risk to develop cancer differs by risk factor – for example, cigarette smoking leads to an enormous increase in the risk to get lung cancer, whereas high consumption of red meat modestly increases the risk to get colorectal cancer. The prioritization of combating these risk factors in each country needs to take into account the varying local prevalence of the risk factors as well as the effectiveness of prevention measures in the local context.

Cigarette smoking and obesity are the two biggest risk factors in most MEA-9 countries. Several countries in the Middle East have some of the highest smoking rates – among men only – in the world. Even though all countries have taken measures to combat smoking, these measures are not always implemented and enforced. Obesity rates are also high in all MEA-9 countries, typically with higher rates in women than in men. Combating obesity is more complicated and requires both a change in eating habits (calorie intake) and physical activity patterns (calorie consumption). Most countries have also started successful initiatives to combat carcinogenic infections, in particular vaccination of infants against hepatitis B and treatment of patients with hepatitis C. Vaccination programs for girls and boys against HPV are mostly lacking.

Early detection of cancer

Early detection of cancer increases the chances of survival, because treatment of early-stage disease is more likely to result in long-term cure. Increasing awareness of symptoms of cancer (e.g., a lump in the breast or blood in the stool) among the general population can help to increase the number of early diagnoses. Currently, presentation with late-stage disease is common in the MEA-9 countries, indicating low health literacy in the general population. Awareness campaigns to educate people about the most common signs of cancer are only run to a limited extent. In addition, general

physicians and nurses need to be educated to recognize symptoms of cancers and access and referral to specialized care for diagnostic confirmation needs to be improved.

Established screening methods exist for a handful of common cancers. All MEA-9 countries have implemented breast cancer screening for women, albeit to varying extents. Breast cancer is also the most common cancer type in all countries. Cervical cancer screening for women is also implemented to some extent in all countries. Other screening programs are less common. The prioritization of screening programs needs to be adapted to the local context, because the cancer epidemiology differs. For example, colorectal cancer screening is more urgent in the Gulf countries, because of comparatively high rates of colorectal cancer.

Diagnosis and treatment of cancer

The diagnosis and treatment of cancer are at the core of the care process. This requires adequate infrastructure in terms of hospital beds and care places in outpatient clinics as well as adequate numbers of qualified medical staff. In the MEA-9 countries, the numbers of specialized medical doctors and nursing staff is comparatively low, especially in the six non-Gulf countries.

The diagnostic workup (of solid tumors) typically requires imaging analysis (e.g., X-ray, CT, MRI, PET scans) and blood analysis. Afterwards a biopsy is performed to obtain tumor tissue. This enables a pathological confirmation of the cancer. In the last two decades, biomarker testing of the tumor tissue has been added as a crucial step (e.g., HER2-testing in breast cancer), because the understanding of the nature of a tumor has changed and many targeted drug therapies that act on specific genomic alterations have been developed. Most MEA-9 countries have only very limited availability of modern imaging equipment (such as PET scans). Biomarker testing is typically only performed in selected patients (e.g., not all women with a breast cancer diagnosis receive HER2-testing) and is also limited by the fact that few targeted drug therapies are available on a broad scale, thus rendering biomarker testing unnecessary.

Depending on the cancer type, the treatment modalities include either surgery to remove the tumor, radiation therapy, drug therapy, or a combination thereof. In all MEA-9 countries, the availability of radiation therapy units is fairly good but geographic access is a major challenge in rural areas of large countries (Algeria, Egypt, Morocco, Saudi Arabia, South Africa). The availability of modern drug therapy is generally low, with very pronounced lack of access in Algeria, Egypt, Jordan, Morocco, and South Africa. This concerns both regulatory approval and reimbursement approval of drugs. Reimbursement approval is also no guarantee for access of every patient in a country, because of fragmented health care systems with multiple actors for different population segments that each require their own reimbursement approval and – more generally – because of absence of universal

health coverage. The main principle for the pricing of new drugs is external reference pricing and the price serves as the main criterion for the reimbursement decision. The main focus is on achieving the lowest possible price for drugs instead of also taking into account the value that drugs provide to patients. Some countries (e.g., Egypt, Kuwait, Saudi Arabia) might move away from this principle in the coming years with the increasing role of health technology assessment (HTA) of new drug therapies to guide decisions of pricing and reimbursement.

Survivorship of cancer patients

Cancer survivors often face long-term consequences of their disease, which impairs them in various ways in their daily lives. This includes both physical effects (e.g., chronic fatigue) and mental effects (e.g., feelings of anxiety). In the MEA-9 countries, it is almost exclusively left to family members of the cancer patient to provide help and support. Professional psycho-oncology counseling is generally not available. The burden of providing informal care is falling disproportionally on women who are expected to help other family members in need.

Policy recommendations

For each country, a set of recommendations for the different areas of cancer control are provided at the end of the report. At the top of the priority list is to recognize the burden of cancer. Cancer is a growing challenge in the years and decades to come. Ensuring equitable health access for a rising number of cancer patients will be crucial. Expanding universal health coverage to all residents and offering greater and faster access to modern cancer care services should be priorities for all MEA-9 countries.

Currently, access to high-quality cancer care is limited in various dimensions in all MEA-9 countries. This affects patient outcomes negatively. Lack of access conflicts with an individual's right to health. Apart from the moral argument for providing the best possible cancer care, there is also an economic argument. A change of the notion that health care spending on cancer care is only a cost is needed. Cancer care spending is also an investment. Healthy adults need less time off work, are more productive at work, and do not need to retire early. This benefits the economy and reduces the economic burden that cancer imposes on society. The economic return of investing into health needs to be recognized by decision makers.

Cancer care spending decisions should ideally be evidence-based. This necessitates the generation and use of local data on cancer and health care activities. Better access to data is imperative to ensure cost-effective use of both existing and additional health care resources in the fight against cancer.

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IHE held a series of virtual workshops with country-level experts in the field of oncology in all countries between December 2020 and June 2021. We want to express our sincere gratitude to the following participating experts for their time and valuable insights:

Algeria

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- Prof. Adda Bounedjar (Head of Medical Oncology Service at Centre Anti-Cancer Blida)
- Prof. Kamel Bouzid (Head of Oncology Department at Center Pierre Marie Curie)
- Dr. Fatiha Cherf-Bouzida (Contributor to the first National Cancer Plan)
- Prof. Esma Kerboua (Center Pierre Marie Curie)
- Prof. Messaoud Zitouni (Coordinator of the first National Cancer Plan)

Egypt

- Dr. Ahmed H. Abdelaziz (Ain Shams University Hospitals)
- Dr. Asmaa Abourawash (Head of Pharmacoeconomics Unit at Egyptian Drug Authority, EDA)
- Dr. Yasmine Hennawi (Cairo Cure and Cairo University)
- Dr. Loay Kassem (Cairo Cure and Cairo University)
- Dr. Amal S. Sedrak (Egyptian Authority for Unified Procurement, UPA)

Jordan

- Prof. Hikmat Abdel-Razeq (Chief Medical Officer at King Hussein Cancer Center, KHCC)
- Dr. Asem Mansour (CEO at KHCC)
- Ms. Nisreen Qatamish (Director General at King Hussein Cancer Foundation)
- Dr. Imad Treish (Chief Strategy Officer at KHCC)

Kuwait

- Dr. Maryam Alowayesh (Kuwait University)
- Dr. Abdulaziz Hamadah (Head of the Hematology Department at Kuwait Cancer Control Center, KCCC)

Lebanon

- Prof. Nagi El-Saghir (American University of Beirut & Lebanese Breast Cancer Foundation)
- Dr. Fadi Nasr (Mount Lebanon Hospital)
- Ms. Hana Nimer (SAID NGO – Colorectal Cancer Awareness Association Lebanon)

Morocco

- Prof. Hassan Errihani (National Institute of Oncology)
- Prof. Chakib Nejjari (Mohammed VI University of Health Sciences)

Saudi Arabia

- Dr. Ahmed Aljedai (Assistant Deputy Minister of Therapeutic Affairs for Support Services at Ministry of Health)
- Dr. Abdullah Al-Sharm (Head of cancer committee at Ministry of Health)

South Africa

- Prof. Georgia Demetriou (University of Witwatersrand and Charlotte Maxeke Johannesburg Academic Hospital)
- Ms. Lauren Pretorius (CEO at Campaigning for Cancer)
- Prof. Paul Ruff (University of Witwatersrand)
- Dr. Elvira Singh (National Cancer Registry)

United Arab Emirates

- Dr. Sawsan Al Madhi (Friends of Cancer Patients)
- Dr. Omar Najim (Department of Health, Abu Dhabi)

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

List of abbreviations

ALK	Anaplastic lymphoma kinase
AMO	Mandatory Health Insurance Plan
ANAM	National Health Insurance Agency
ANPP	National Agency for Pharmaceutical Products
ATC	Anatomical therapeutic chemical classification
CAC	Cancer treatment center
CANSA	Cancer Association of South Africa
CAR-T cell	Chimeric antigen receptor T cell
CASNOS	Caisse Nationale de Sécurité Sociale des Non-Salariés
CBE	Clinical breast examination
CCO	Curative Care Organization
CHU	University hospital centers in Algeria
CNAS	Caisse Nationale des Assurances Sociales des Travailleurs Salariés
CNOPS	Caisse Nationale des Organismes de Prévoyance Sociale
CNSS	Caisse Nationale de Sécurité Sociale
COI	Cost-of-illness
CSC	Civil Servants Cooperative
CT	Computed tomography
DALY	Disability-adjusted life year
EDA	Egyptian Drug Authority
EGFR	Epidermal growth factor receptor
EHS	Specialized hospital centers in Algeria
EMA	European Medicines Agency
EML	Essential Medicines List
EPH	General hospitals in Algeria
EPSP	Community hospitals in Algeria
ERP	External (or international) reference pricing
FACT	Foundation for the Accreditation of Cellular Therapy
FCM	Friction-cost method
FDA	Food and Drug Administration
FOP	Front of package
GDP	Gross domestic product
GLOBOCAN	Global Cancer Observatory
HBV	Hepatitis B virus
HCM	Human-capital method
HCV	Hepatitis C virus
HER2	Human epidermal growth factor receptor 2
HIO	Health Insurance Organization
HIV/AIDS	Human immunodeficiency virus and acquired immune deficiency syndrome
HPV	Human papillomavirus
HRT	Hormone replacement therapy
HTA	Health technology assessment
IARC	International Agency for Research on Cancer
IAEA	International Atomic Energy Agency
ICD	International Classification of Diseases
ICER	Incremental cost-effectiveness ratio
IPU	Integrated Purchasing Unit
IT	Information technology
JFDA	Jordan Food and Drug Administration
JNDF	Jordan National Drug Formulary
KCCC	Kuwait Cancer Control Center
KHCC	King Hussein Cancer Center
KHCF	King Hussein Cancer Foundation
LDCT	Low-dose computed tomography
Linac	Medical linear accelerators
mg	milligram

MoH	Ministry of Health
MOHAP	Ministry of Health and Prevention
MoHP	Ministry of Health and Population
MOPH	Ministry of Public Health
MRI	Magnetic resonance imaging
MSPRH	Ministry of Health, Population, and Hospital Reform
MV	megavoltage
NCCP	National cancer control program
NCD	Non-communicable disease
NCSF	National Cancer Strategic Framework for South Africa
NDoH	National Department of Health
NGO	Non-governmental organization
NHI	National Health Insurance
NSSF	National Social Security Fund
OOP	Out-of-pocket payment
PCH	Central Hospital Pharmacy
PD1	Programmed cell death protein 1
PD-L1	Programmed death-ligand 1
PET	Positron emission tomography
PMB	Prescribed Minimum Benefits
PPP	Purchasing power parity
PSA	Prostate-specific antigen
PYWLL	Potential years of working life lost
QALY	Quality-adjusted life year
RAMED	Medical Assistance Regime
RMS	Royal Medical Services
SAHPRA	South African Health Products Regulatory Authority
SEP	Single-Exit-Price
SFDA	Saudi Food and Drug Authority
SMD	Standard monthly dose
STG	Standard treatment guidelines
THE	Total health expenditure
UHC	Universal health coverage
UHIS	Universal Health Insurance System
UN	United Nations
UNHCR	United Nations High Commissioner for Refugees
UNRWA	United Nations Relief and Works Agency for Palestine Refugees in the Near East
UPA	Egyptian Authority for Unified Procurement, Medical Supply and the Management of Medical Technology
USPSTF	United States Preventive Services Task Force
VBP	Value-based pricing
VIA	Visual inspection with acetic acid
WHO	World Health Organization

Country abbreviations

DZA	Algeria
EGY	Egypt
JOR	Jordan
KWT	Kuwait
LBN	Lebanon
MAR	Morocco
SAU	Saudi Arabia
ZAF	South Africa
UAE	United Arab Emirates
MEA-9	All of the nine countries above
MEA	Middle East and Africa
MENA	Middle East and North Africa
DEU	Germany
SVN	Slovenia
SWE	Sweden
EU-3	Germany+Slovenia+Sweden
EU-31	27 countries of the European Union plus Iceland, Norway, Switzerland, and the UK
UK	United Kingdom
US	United States of America

Table of contents

1. Introduction

Cancer is the collective name of a group of over 100 diseases that can occur in all parts of the body. The defining feature of the disease is the uncontrolled growth and division of abnormal cells in the body. These cells form a tumor that may invade adjoining parts of the body and spread to other organs, a process called metastasis. Metastases disrupt the normal functioning of the body and are the major cause of death from cancer (1). The most common cancer types worldwide are lung cancer, breast cancer, colorectal cancer, and prostate cancer. Globally, over 18 million new cancer cases were diagnosed in 2018 and almost 10 million people died from cancer, making cancer the second leading cause of death (2).

Cancer affects people of all ages. The risk of getting cancer is very low in younger ages but increases dramatically in older ages. This is because the cellular repair mechanisms become less effective as a person grows older. Aging is therefore a key factor in the development of cancer and cancer is considered an aging-associated disease. This is visible in Figure 1 where the number of newly diagnosed cases (incidence) and the number of cancer deaths (mortality) rise with age. What looks like a decrease after age 64 is simply a reflection of fewer people living at those ages rather than a decreasing risk of getting cancer. Cancer is also caused by an accumulation of and exposure to risks (such as tobacco use, obesity, infection with carcinogenic viruses and bacteria, air pollution) that increase over a person's lifetime. The World Health Organization (WHO) estimates that between 30–50% of cancer deaths could be prevented by modifying or avoiding these risks (1).

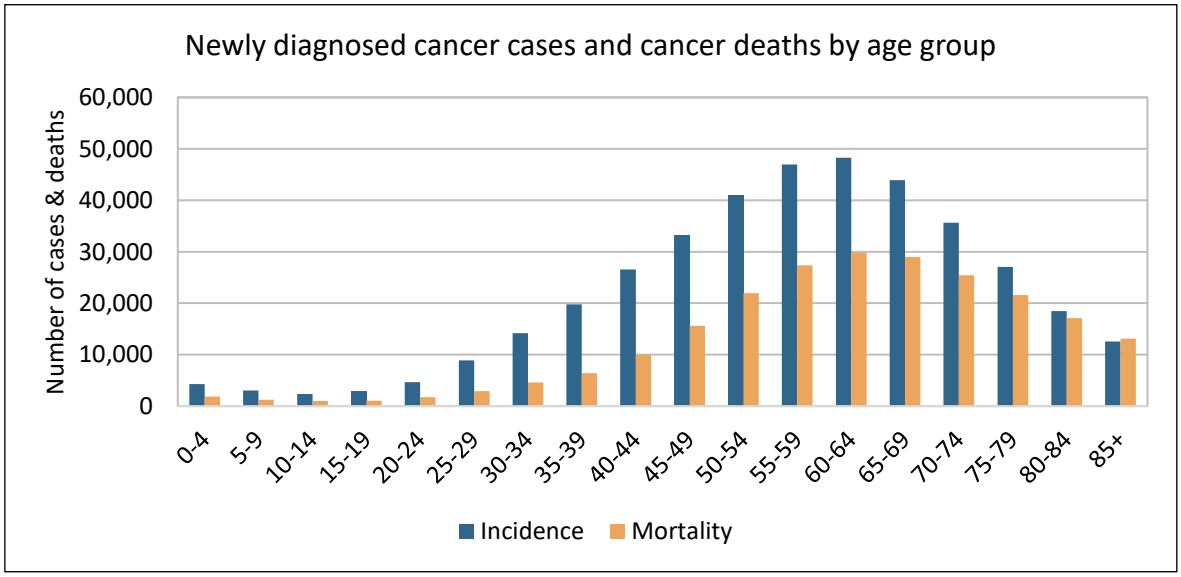


Figure 1: Cases of cancer incidence and mortality in MEA-9 by age group, 2018
Notes: MEA-9 includes DZA, EGY, JOR, KWT, LBN, MAR, SAU, ZAF, UAE. Cancer refers to all cancer sites but non-melanoma skin cancer (ICD-10 C00-C97/C44). Source: GLOBOCAN (3).

The treatment of cancer depends on the site and grade of the tumor and the stage of the disease as well as patients' general health status. Treatment generally includes surgery (to remove solid tumors), radiation therapy, chemotherapy, hormonal therapy, targeted therapy, and more recently also immunotherapy. Detection and treatment at an early stage generally results in a higher probability of surviving (1). Innovation in detection and treatment have increased the probability of surviving cancer in recent decades (4, 5). Several formerly incurable cancer types have started to be transformed into a chronic and manageable condition in an increasing share of patients.

1.1 Cancer and cancer policy in MEA

Cancer in the Middle East and Africa (MEA) is on the rise. Rapid population growth, population aging, and changes in lifestyles mean that the number of newly diagnosed cancer cases (incidence) and the number of cancer deaths (mortality) are predicted to rise faster than in any other region of the world. Figure 2 shows projections of what would happen in the absence of further improvements in cancer care and changes in risk factors between 2020 and 2040. New cancer cases might almost double from 410,000 to 720,000 cases per year (from 132 to 186 cases per 100,000 inhabitants) due to the expected demographic development (6).

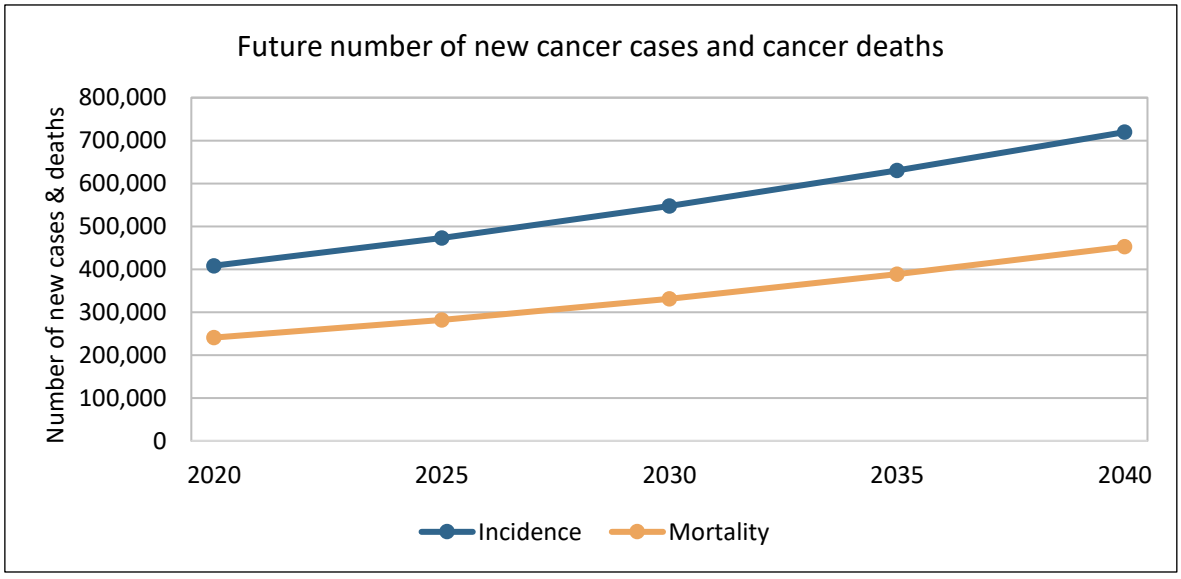


Figure 2: Projection of total cases of cancer incidence and mortality in MEA-9, 2020–2040

Notes: MEA-9 includes DZA, EGY, JOR, KWT, LBN, MAR, SAU, ZAF, UAE. Cancer refers to all cancer sites but non-melanoma skin cancer (ICD-10 C00-C97/C44). Projections are based on constant age-specific rates and only driven by expected changes in the population structure (base year = 2020). Source: GLOBOCAN (6).

Overall population growth and population aging are key trends in the MEA region; see Figure 3 for the past and expected future demographic development. The total population has been steadily increasing from about 200 million in 2000, and it might almost reach 400 million in 2040. A growing

population means that more people will get cancer, all else equal. The age structure of the population has also been changing. The share of children (0–14 years) has been decreasing from around 35% in 2000 and might plunge to 24% in 2040 due to decreasing fertility rates. The share of working age people (15–64 years) has been increasing in the past and might continue to expand slightly in the two coming decades. The biggest challenge ahead in terms of cancer is the rising share of older people (65 years and older), who have the highest risk of getting cancer. While the share of older people was stable at around 4–5% between 2000 and 2020, it might double to 10% by 2040 as fewer people die at younger ages. In sum, both overall population growth and population aging exert an upward pressure on cancer incidence and cancer mortality in the years to come.

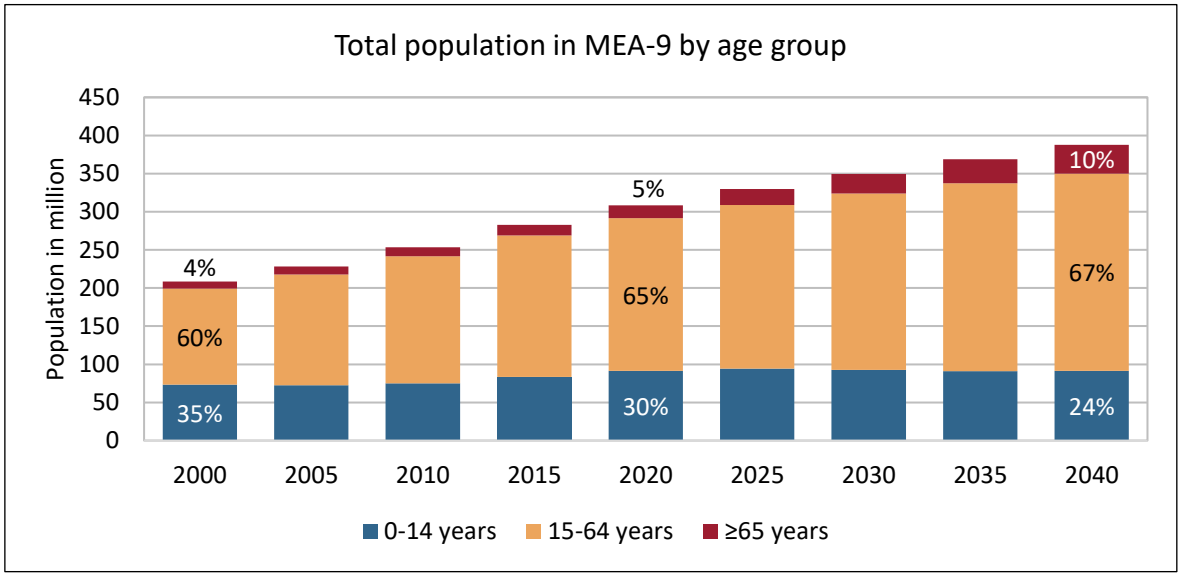


Figure 3: Population (in millions) in MEA-9 by age group, 2000–2040

Notes: MEA-9 includes DZA, EGY, JOR, KWT, LBN, MAR, SAU, ZAF, UAE. Shares do not sum to 100% due to rounding. Numbers for 2020–2040 are estimates based on the "medium variant". Source: UN (7).

The projections in Figure 2 and Figure 3 of the future development underline the need to invest in all areas of cancer care – prevention, screening, diagnosis and treatment, survivorship – to meet the demographic challenge and to flatten the increasing curves in cancer incidence and mortality. Providing patients with access to high-quality cancer care represents a major challenge for all health care systems and especially in the MEA region. Effective strategies to balance constrained health care budgets with access to high-quality cancer care are of great importance. On the scientific front, great progress has been made in recent decades (see chapter 3 in ref. (8) and chapter 2 in ref. (9)). Our understanding of the nature of cancer and the availability of modern technologies to detect and treat cancer are ever expanding. A critical task for health policy makers is to ensure patient access to innovation in a quickly evolving environment.

The COVID-19 pandemic has put a spotlight on the health care systems around the world. Demands on health care have skyrocketed in record time and led to a near breakdown of health care provision

in some highly affected areas. Public funds were cleared quickly so that testing equipment and protective equipment could be purchased, while lockdowns of societal life have severely hit the economy. The close connection between a disease and consequences for the economy has never been so salient. The fact that a similar connection exists for cancer is important to recognize.

Compared to COVID-19, which is an infectious disease, cancer is a non-communicable disease. No lockdowns can prevent the spread of cancer (see Info Box 1 for effects of the COVID-19 pandemic on cancer). Cancer is a long-term challenge for health care systems. The demographic development will always be the driving force behind the burden that cancer imposes on society. However, just as COVID-19, cancer is costly to the economy. Premature death, sick leave, and early retirement of cancer patients, who otherwise would have been working, represent a big loss to the economy. Informal caregivers who must stay at home and care for the cancer patient instead of pursuing their regular work are another source of loss to the economy. Not investing in cancer care and improving patient outcomes thus has wider implications for the economy.

Info Box 1 – Impact of the COVID-19 pandemic on cancer

The COVID-19 pandemic led to delays in the diagnosis of cancer, which in turn led to later stage diagnoses and decreased overall survival. It also led to delays and discontinuation of the treatment of cancer, which in turn led to worse treatment outcomes and decreased overall survival (10).

Delays in diagnosis of cancer

- Health care seeking behavior of symptomatic patients declined out of fear of contracting COVID-19 at a health care facility.
- Lung cancer diagnosis got delayed because symptoms were mistaken to be COVID-19.
- Screening activities for the early detection of asymptomatic cancers had to be paused.

Delays in treatment of cancer

- The large number of hospitalized COVID-19 patients led to capacity shortages at hospitals for other patient groups, including cancer patients. Surgeries, radiation therapy sessions, and administration of drugs needed to be postponed and ongoing treatments needed to be paused.
- Follow-up visits by cancer patients were skipped out of fear of contracting COVID-19 at a health care facility.

Despite the challenge that cancer represents in the coming decades in the MEA region, there is a silver lining on the horizon. The general demographic structure with a mostly constant share of the population in working age in the coming decades (Figure 3) is favorable for building a strong economy. This era, sometimes called the “demographic window of opportunity”, should be used to invest in health care and cancer care. This investment can yield health returns that reinforce the economy. Public spending on health care and cancer care is thus an investment and not just a cost.

1.2 Purpose and scope of the report

The purpose of this report is to describe the current state of cancer care in the MEA region. The report covers nine countries (referred to as MEA-9 in this report): Algeria, Egypt, Jordan, Kuwait, Lebanon, Morocco, Saudi Arabia, South Africa, and the United Arab Emirates (UAE). The report aims to provide a comprehensive assessment and infer relationships between current cancer care and observed patient outcomes. It aims to identify barriers to effective, efficient, equitable, and responsive cancer care, based on which policy recommendations for improved cancer care are made. This information should support efforts to plan and take action to reduce the burden of cancer.

The MEA-9 countries are – for selected indicators – also benchmarked against Germany, Slovenia, and Sweden (referred to as EU-3 in this report), which represent successful examples of achieving high survival rates relative to their economic strength in Europe. Germany and Sweden are examples of countries with a high economic strength in terms of gross domestic product (GDP), and they can serve as benchmarks for the three richer MEA countries: Kuwait, Saudi Arabia, and the UAE. For the other six MEA countries with emerging economies, Slovenia can serve as a benchmark of a country that used to have much more limited economic resources but used them efficiently. An average value of 31 European countries – the 27 countries of the European Union plus Iceland, Norway, Switzerland, and the UK (referred to as EU-31 in this report) – is also used as a benchmark and taken from a previous report on the state of cancer in Europe (8).

The report consists of four main chapters. Chapter 2 analyzes the burden of cancer, distinguishing between the disease burden and the economic burden. Chapter 3 reviews the organization and financing of health care and cancer care. Chapter 4 analyzes the current state of cancer care, in the areas of governance, prevention, early detection, diagnosis and treatment, and survivorship. Chapter 5 provides country-specific recommendations to support the provision of high-quality cancer care.

2. Burden of cancer

This chapter describes key aspects of the burden of cancer in MEA-9 in terms of the disease burden (section 2.1), cancer epidemiology (section 2.2), and the economic burden (section 2.3). It covers the development of the disease burden of cancer during the last two decades and provides an estimate of the economic burden in the year 2018.

2.1 Burden of disease

To understand the extent of the burden of cancer (here defined as malignant neoplasms) in relation to other diseases, two measures are used. The first measure is the number of deaths due to cancer in comparison to the number of total deaths. The second measure is the number of Disability Adjusted Life Years (DALYs) that cancer and other diseases cause.

2.1.1 Deaths

In 2016, around 1.72 million people died in MEA-9, of which 204,500 people died of cancer. This made cancer (12% of all deaths) the second leading cause of death behind cardiovascular diseases (33% of all deaths); see Figure 4. This is also true for most individual countries. In the UAE (12%) and Saudi Arabia (10%), cancer was the third leading cause of death – after cardiovascular diseases and unintentional injuries. In South Africa (10%), cancer was also the third leading cause of death – after infectious and parasitic diseases and cardiovascular diseases.

The rank of cancer as the second leading cause of death in 2016 in MEA-9 has changed from 2000 when it ranked third (10% of deaths), after cardiovascular diseases and infectious and parasitic diseases; see Figure 4. The proportion of deaths from cancer increased between 2000 and 2016 in all MEA-9 countries except in Lebanon, where it remained the same (at 16%). The highest increase was in Morocco where the proportion of cancer increased from 9% in 2000 to 14% in 2016 followed by the UAE where cancer deaths increased from 8% to 12%. By comparison, in the EU-31 more than a quarter of all deaths (27%) were due to cancer in 2016.

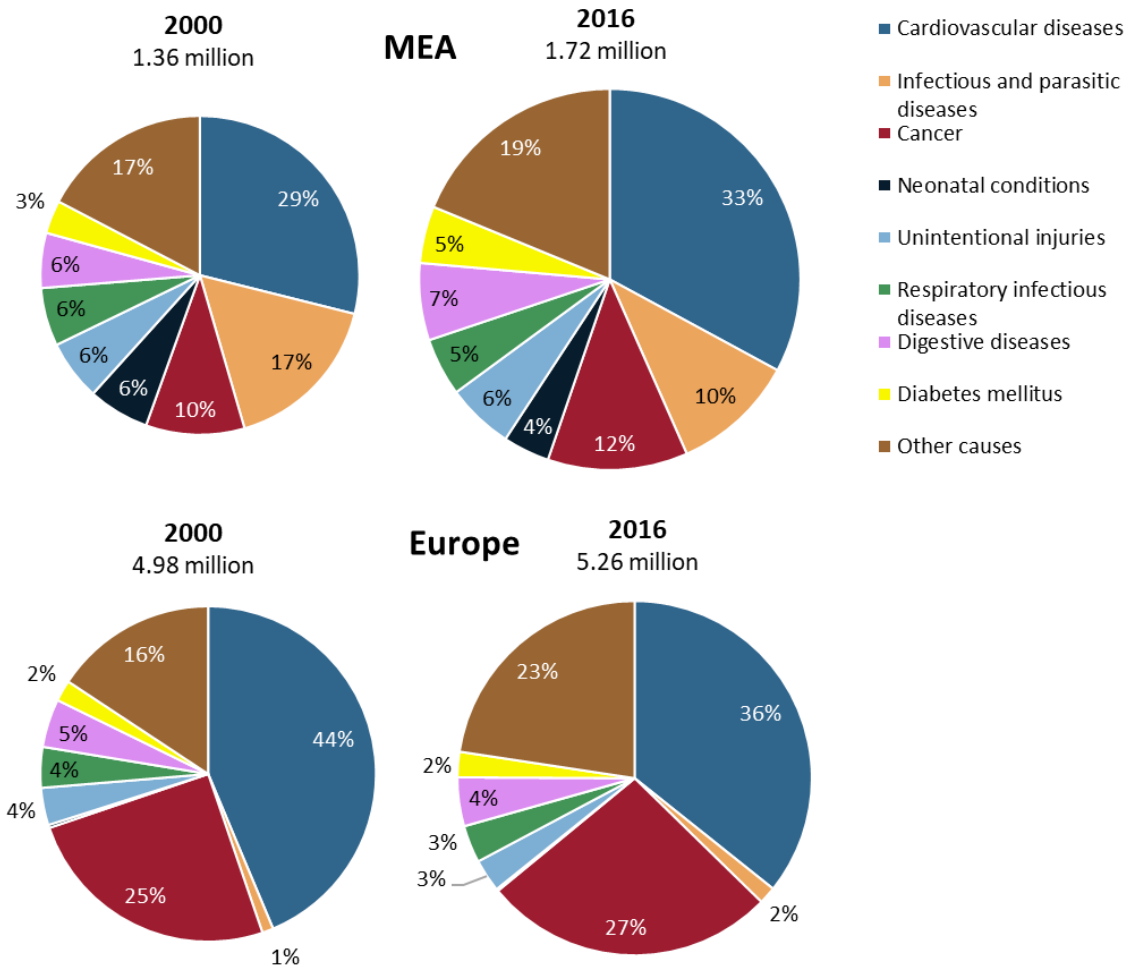


Figure 4: Leading causes of death in MEA-9 and EU-31, 2000 & 2016
Source: WHO (11).

Figure 5 shows how the 1.72 million total deaths and the 204,500 cancer deaths in 2016 were distributed across different age groups in MEA-9. The absolute number of cancer deaths increased with age, whereas the total number of deaths was high in small children (0–4 years) before declining during adolescence and young adulthood. Around 40% of all deaths occurred in people aged 70 and older, but only 33% of cancer deaths (or around 68,000 deaths) occur in this age group. Cancer is thus disproportionally affecting the younger population. Looking at cancer deaths as a share of all deaths in each age group (illustrated by the red line in Figure 5), there are two peaks visible. The first one is in the age group 5-14 years where 11% died of cancer. The second peak is in the age group 50–59 years where 20% of all deaths were due to cancer.

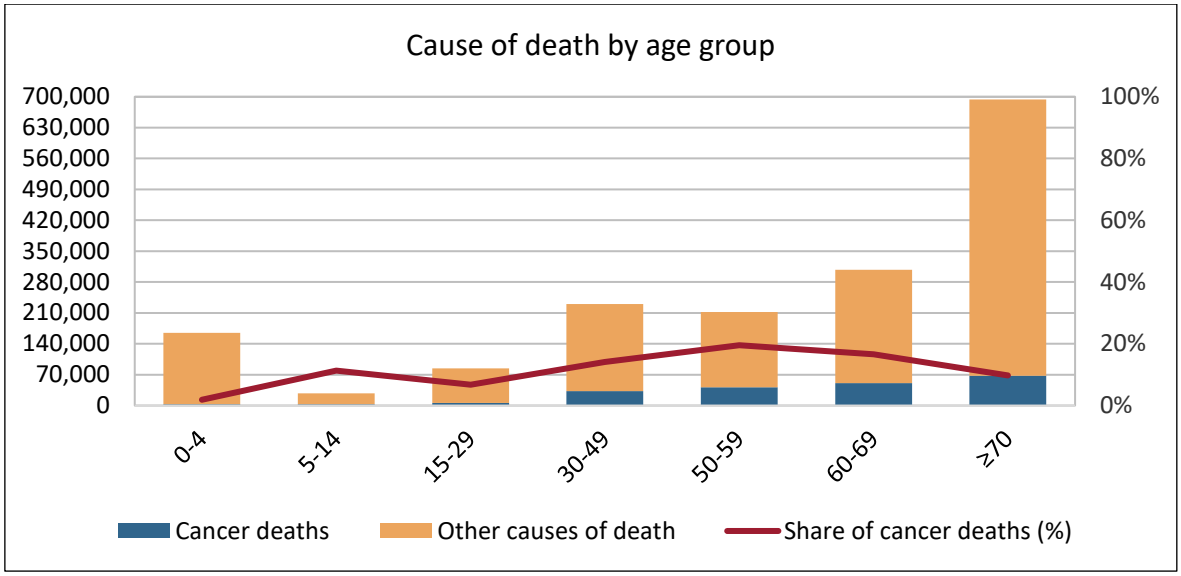


Figure 5: Number of deaths by cause (left scale) and cancer deaths as a proportion of total deaths (right scale) by age group in MEA-9, 2016
Source: WHO (11).

2.1.2 DALYs

DALYs are a comprehensive measure of the disease burden, developed by the WHO (12). They consider two aspects of a disease; the morbidity aspect (the impact of a disease on people's quality of life) and the mortality aspect (premature death due to the disease). Such a comprehensive measure is important when comparing the burden of different diseases, as many diseases are not fatal but still cause a huge burden to society and health systems. One DALY represents one lost year of healthy life. The sum of all DALYs across a country's population represents the burden of disease. It can be considered as a measure of the gap between the current health state of a population and the ideal situation in which the entire population lives to an advanced age, free of disease and disability.

Figure 6 represents an overview of the disease burden measured in DALYs in MEA-9 in 2000 and 2016 (11). The total number of DALYs in the region increased from 81 to 91 million indicating an increased total disease burden in the population, yet this occurred at a time when the total population also increased (from 210 to 289 million people). Infectious and parasitic diseases[1], which caused the greatest share of DALYs in 2000, decreased from 19% to 13% while the share of cardiovascular diseases increased from 13% to 15%, making them the leading source of DALYs in 2016. Cancer

[1] The great share of infectious diseases in MEA-9 is partly related to the great burden of infectious and parasitic diseases in South Africa, mainly human immunodeficiency virus infection and acquired immune deficiency syndrome (HIV/AIDS). The share of the burden of infectious and parasitic diseases, out of the total burden of all diseases, was 42% in 2000 and 33% in 2016 in South Africa whereas in all other MEA-9 countries it was less than 10% in 2000 and less than 5% in 2016 (11).

caused 6% of total DALYs in 2000 and increased its share to 7% in 2016. This meant that cancer climbed from seventh place in 2000 to fourth place in 2016. By comparison, cancer was the second-leading cause of DALYs in the EU-31 in 2016 with 20%.

On the country level, the total DALYs of cancer as well as the relative share of cancer among all diseases have increased in all MEA-9 countries except in Saudi Arabia between 2000 and 2016. In Saudi Arabia, although the total DALYs of cancer have increased, the share remained almost constant (6%). Countries where the rank of the cancer share was significantly altered were Egypt and Morocco. In Egypt, the cancer share increased from 7% to 8%, propelling cancer from fifth place in 2000 to third place in 2016. In Morocco, the cancer share increased from 5% to 9%, placing cancer in fourth place in 2016 after ranking seventh in 2000.

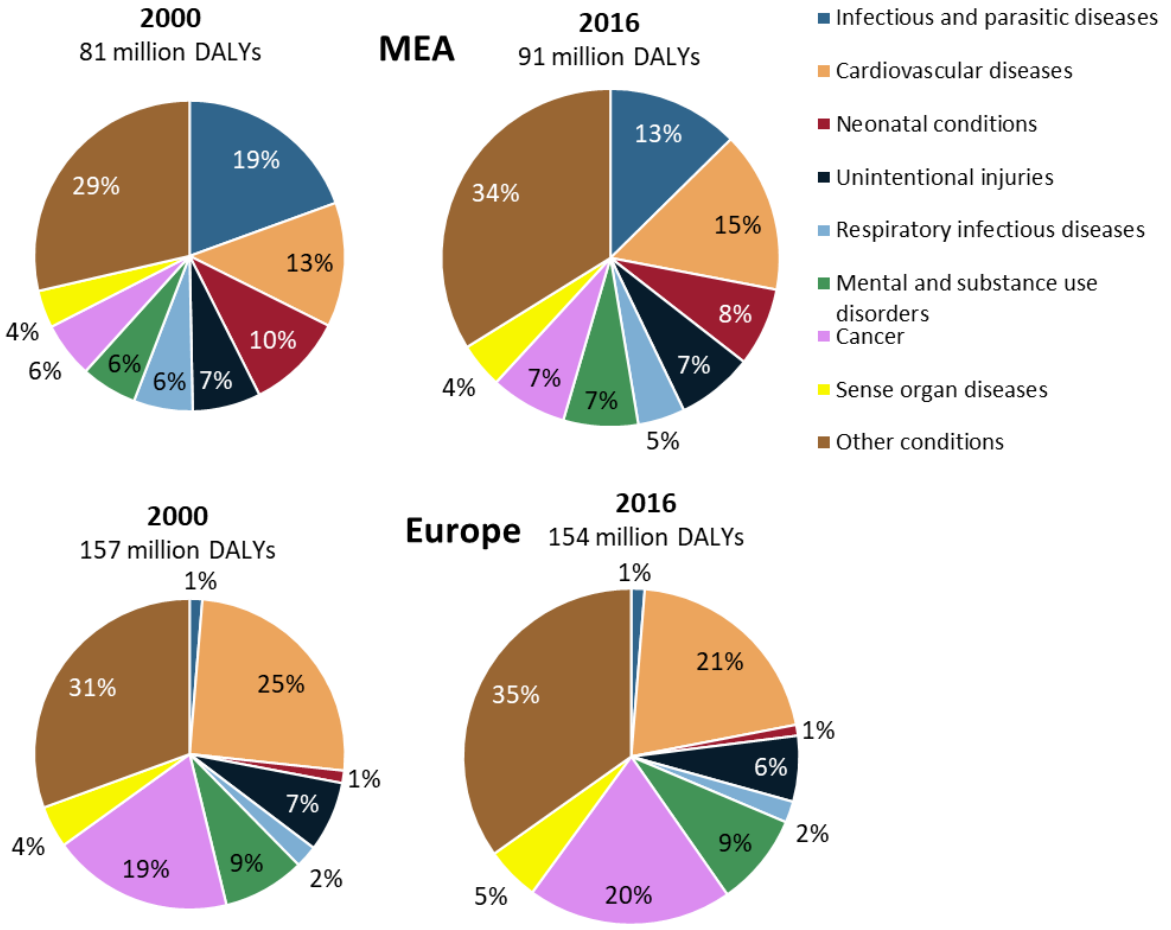


Figure 6: Disease burden of the largest disease groups in MEA-9 and EU-31, 2000 & 2016
Source: WHO (11).

Table 1 lists the ten cancer types that caused the greatest disease burden in terms of DALYs in MEA-9 in 2000 and 2016. The total burden of cancer increased between 2000 and 2016, as shown at the bottom of the table, both as a total number (from 4.6 to 6.7 million) and per 1000 inhabitants (from 22 to 23). Breast cancer ranked first in both years representing 10% (2000) and 11% (2016) of the

total DALYs caused by cancer. It was followed by lung cancer with 9% in 2000 and 10% in 2016. Liver cancer saw a great increase with an almost doubled total number of DALYs and an increased share from 8% to 10%, putting it in second place in 2016. The share of lymphomas and multiple myeloma, ranked in third place in 2000 and fourth place in 2016, was the same in both years (8%).

Table 1: Disease burden of the top 10 cancer types in MEA-9, 2000 & 2016

	2000				2016		
	Total DALYs (´000)	DALYs per 1000 inhab.	Share		Total DALYs (´000)	DALYs per 1000 inhab.	Share
1st Breast	470	2	10%	1st Breast	728	3	11%
2nd Lung	441	2	9%	2nd Liver	660	2	10%
3rd Lymphomas, mult. myeloma	383	2	8%	3rd Lung	656	2	10%
4th Leukemia	382	2	8%	4th Lymphomas, mult. myeloma	511	2	8%
5th Liver	368	2	8%	5th Leukemia	421	1	6%
6th Colorectum	245	1	5%	6th Colorectum	413	1	6%
7th Cervix uteri	204	1	4%	7th Brain CNS	294	1	4%
8th Brain CNS	198	1	4%	8th Cervix uteri	243	1	4%
9th Stomach	185	1	4%	9th Stomach	223	1	3%
10th Esophagus	159	1	3%	10th Bladder	206	1	3%
All cancers	4,670	22	100%	All cancers	6,667	23	100%

Notes: CNS = central nervous system. Source: WHO (11).

Figure 7 shows the disease burden of cancer in MEA-9 in 2000 and 2016 by country. South Africa had the highest cancer burden with close to 30 DALYs per 1000 inhabitants in both years. The country with the lowest cancer burden was the UAE despite the increase from 7 to 8 DALYs per 1000 inhabitants between 2000 and 2016. Increases were also recorded in Kuwait, Algeria, Morocco, and Egypt. By contrast, Saudi Arabia, Jordan, and Lebanon recorded decreases.

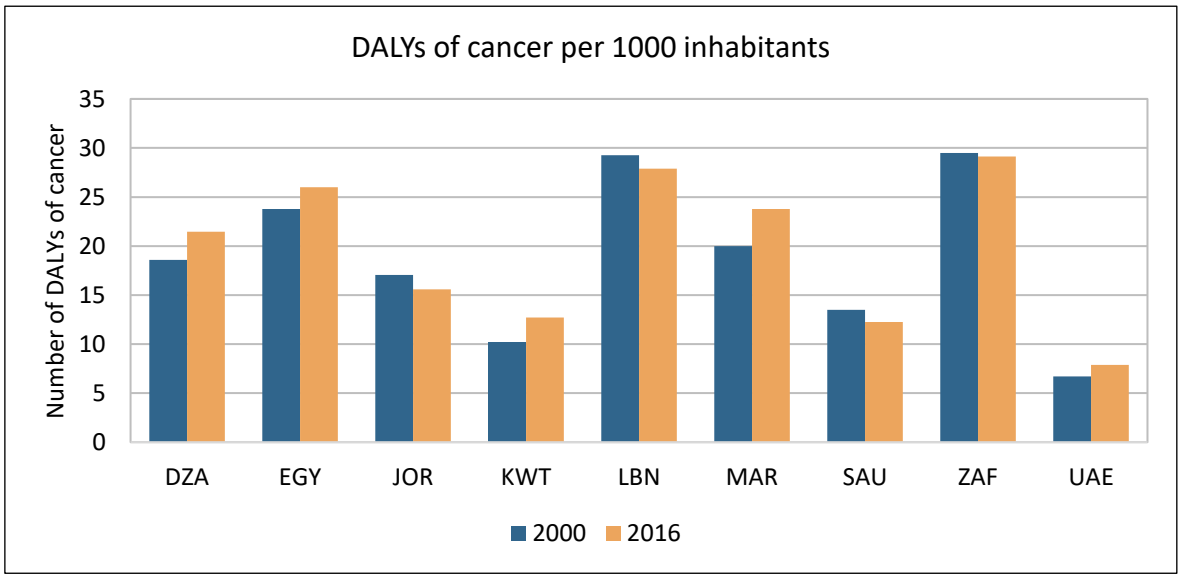


Figure 7: DALYs caused by cancer per 1000 inhabitants in MEA-9, 2000 & 2016
Source: WHO (11).

2.1.3 Future development

The disease burden of cancer in Europe can serve as an indication of what the future development of the disease burden in MEA-9 countries might look like. The EU-31 countries analyzed in a previous report have come much longer in their demographic transition with a smaller share of children (0–14 years) and a greater share of older people (≥65 years) in the total population. This has important implications, as cancer is an aging-associated disease.

In terms of deaths, over one fourth of all deaths were due to cancer in EU-31 in 2016 (8). This made cancer the second leading cause of death behind cardiovascular diseases. In some European countries, cancer deaths have already exceeded deaths due to cardiovascular diseases. Cancer was also the disease group that causes the second greatest disease burden in terms of DALYs after cardiovascular diseases in EU-31 in 2016. In sum, cancer is set to become the leading cause of death and disease burden in Europe in the foreseeable future. Much of this pattern in Europe can actually be attributed to a substantially decreased mortality in cardiovascular diseases. As more and more people survive heart attacks and strokes, they have a chance to grow older, which is when the risk to develop cancer increases.

In MEA-9, the disease burden of cardiovascular diseases is still on the rise. On the other hand, neonatal conditions and infectious diseases are declining. As more and more people survive childhood and young adulthood, they risk getting other diseases in adulthood – often chronic diseases associated with an unhealthy lifestyle such as diabetes but also cardiovascular diseases and eventually cancer. The share of cancer deaths in MEA-9 (12% compared to 27% in EU-31 in 2016) and the share of cancer-caused DALYs in MEA-9 (7% compared to 20% in EU-31 in 2016) can thus be expected to increase considerably in the coming decades.

2.2 Cancer epidemiology

Epidemiological measures, such as incidence, mortality, and survival, help to characterize the disease burden of cancer and to monitor the development over time. Data for these measures are ideally collected from patient records by national population-based cancer registries. All MEA-9 countries have cancer registries (see section 4.2), but not all of them cover the whole country or are population-based. Some registries have much better coverage of their own citizens whereas foreign citizens living in the country are poorly covered. Even if a registry is in place, aggregated data from the registry are not always publicly available in a database and summary reports are published at irregular intervals. The lack of publication of up-to-date data is another limitation. In addition, survival is almost never reported by any registry.

These limitations in the MEA-9 countries mean that all data in this section should be interpreted cautiously. The lack of accessible data from national sources necessitates the use of other data sources. For countries that publicly publish data from national cancer registries, this information was used directly. In other countries, data from population-based registry reports were also prioritized, even if they only had a regional coverage. Remaining data gaps in incidence and mortality were filled with data from the International Agency for Research on Cancer (IARC) and its estimates provided in the Global Cancer Observatory (GLOBOCAN) database. Data gaps in survival were filled with data from CONCORD, a program for worldwide surveillance of cancer survival led by the London School of Hygiene & Tropical Medicine, which analyzes data from regional and national cancer registries in a comparable way.

2.2.1 Incidence

Cancer incidence refers to the number of new cancer cases diagnosed within a certain year in a specific geographical area. Across the MEA-9 countries there were around 394,000 new cancer cases in 2018 (3). To compare countries of different sizes in a comprehensive way, a convenient measure is the crude rate. The crude rate is obtained by expressing the number of cancer cases per 100,000 inhabitants. The crude rate is also relevant to consider for national policy makers when monitoring the development over time. Total numbers of cancer cases are less relevant to monitor when the underlying total population is changing fast. In MEA-9, the combined population grew by 43% from 208 to 299 million people between 2000 and 2018 (13).

2.2.1.1 Crude rates

Figure 8 shows cancer incidence crude rates for all cancers combined for both sexes. There is an increasing trend in reported incidence numbers between 2000 and 2018 in MEA-9. Among the countries for which data are available for the early 2000s, South Africa had the highest incidence rate of around 90 cases per 100,000 inhabitants. Saudi Arabia had the lowest incidence rate with around 30 cases per 100,000 inhabitants. Lebanon recorded the highest crude rate starting from 2005 when data were first available and recorded more than 200 cases per 100,000 inhabitants in 2018. The UAE had the lowest crude rate between 2011 and 2018, but it almost doubled from 25 to 47 cases per 100,000 inhabitants within this short period of time. Kuwait was the only country with a stable trend between 2005 and 2018.

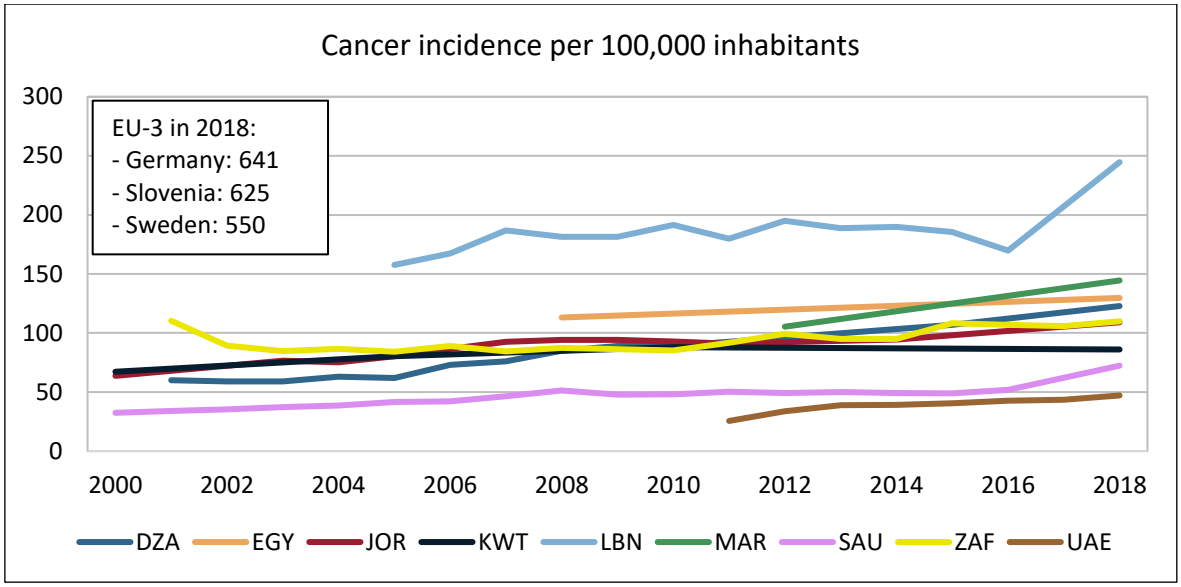


Figure 8: Cancer incidence per 100,000 inhabitants in MEA-9, 2000–2018

Notes: Cancer refers to all cancer sites except non-melanoma skin cancer (ICD-10 C00-C97/C44). Incidence rates for DZA were calculated from the cancer registry report in Sétif (2001–2010) and the National Registry Network study for 2015 (14, 15). For EGY, the GLOBOCAN estimate for 2008 was used due to inaccessible registry reports (16). Incidence cases for JOR (including C44), LBN, ZAF, and UAE were retrieved from the national cancer registry in each country (17-22). For KWT, estimates were calculated from a published study for the Gulf countries (23). For SAU, beside the Saudi cancer registry, an estimate from a published study was used for missing years (24). GLOBOCAN estimates were used in case registry data were lacking in 2012 and/or 2018 (3, 16). Local experts in LBN noted that the 2018 GLOBOCAN estimates are likely overestimated due to unknown cancer epidemiology among the large refugee population.

Although incidence data are not perfectly reliable in all countries and the values in 2018 are mostly estimates, Figure 8 shows a clear increase in incidence over time in almost all MEA-9 countries. There are several factors that can help to explain the increase in cancer incidence between 2000 and 2018:

- Population aging: As the risk of getting cancer increases with age, an aging population contributes to an increasing number of cancer cases. As shown in Figure 9, the share of people aged 50 and older has been increasing in all countries since 2000. Lebanon and Morocco had the highest shares of ≥50-year-old people in 2020, whereas the UAE had the lowest share. This contributes to high crude rates in Lebanon and Morocco and low rates in the UAE.
- Risk factors: Many lifestyle factors, infections, and environmental factors are linked to cancer; see section 4.3. The adoption of and exposure to some of these factors has been increasing in MEA-9. Prominent examples are smoking (linked to, inter alia, lung cancer and bladder cancer), obesity (linked to, inter alia, colorectal cancer and postmenopausal breast cancer), infection with hepatitis C virus (linked to liver cancer; see Info Box 2).

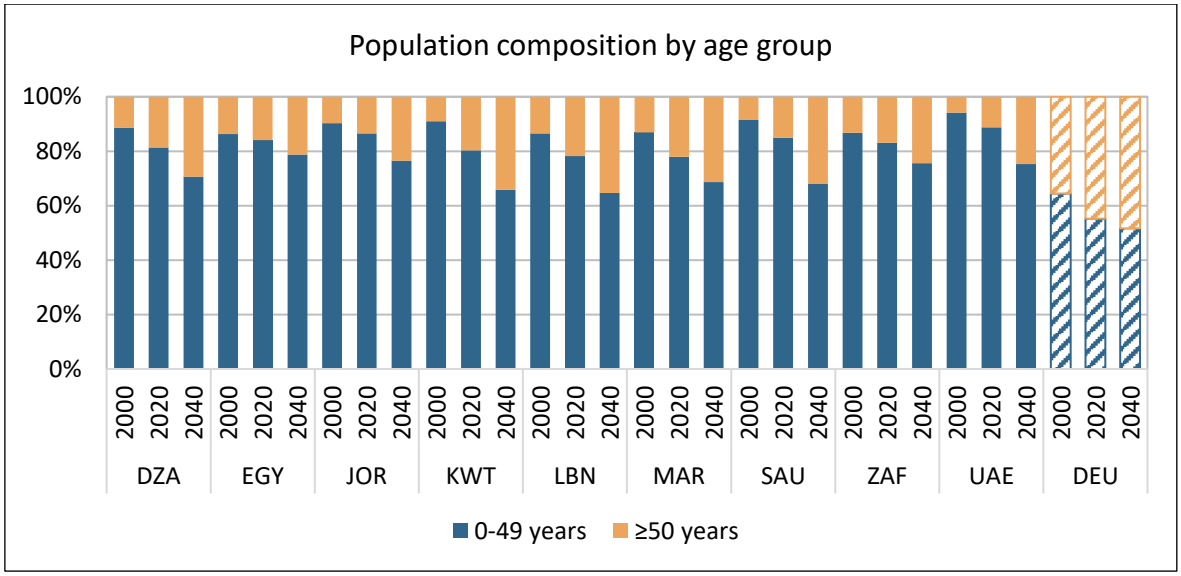


Figure 9: Population composition by age group in MEA-9 and Germany, 2000–2040
Notes: Numbers for 2020 and 2040 are estimates based on the "medium variant". Source: WHO (7).

- Screening: Screening programs for breast cancer, cervical cancer, colorectal cancer, and prostate cancer have been implemented to varying extent in all MEA-9 countries; see section 4.4. The experience from other parts of the world shows that increasing use of screening for breast cancer and especially screening for prostate cancer can lead to the detection of cases of latent disease that never would have become symptomatic (25, 26). These asymptomatic cases should not be counted, and failing to do so will artificially increase incidence.

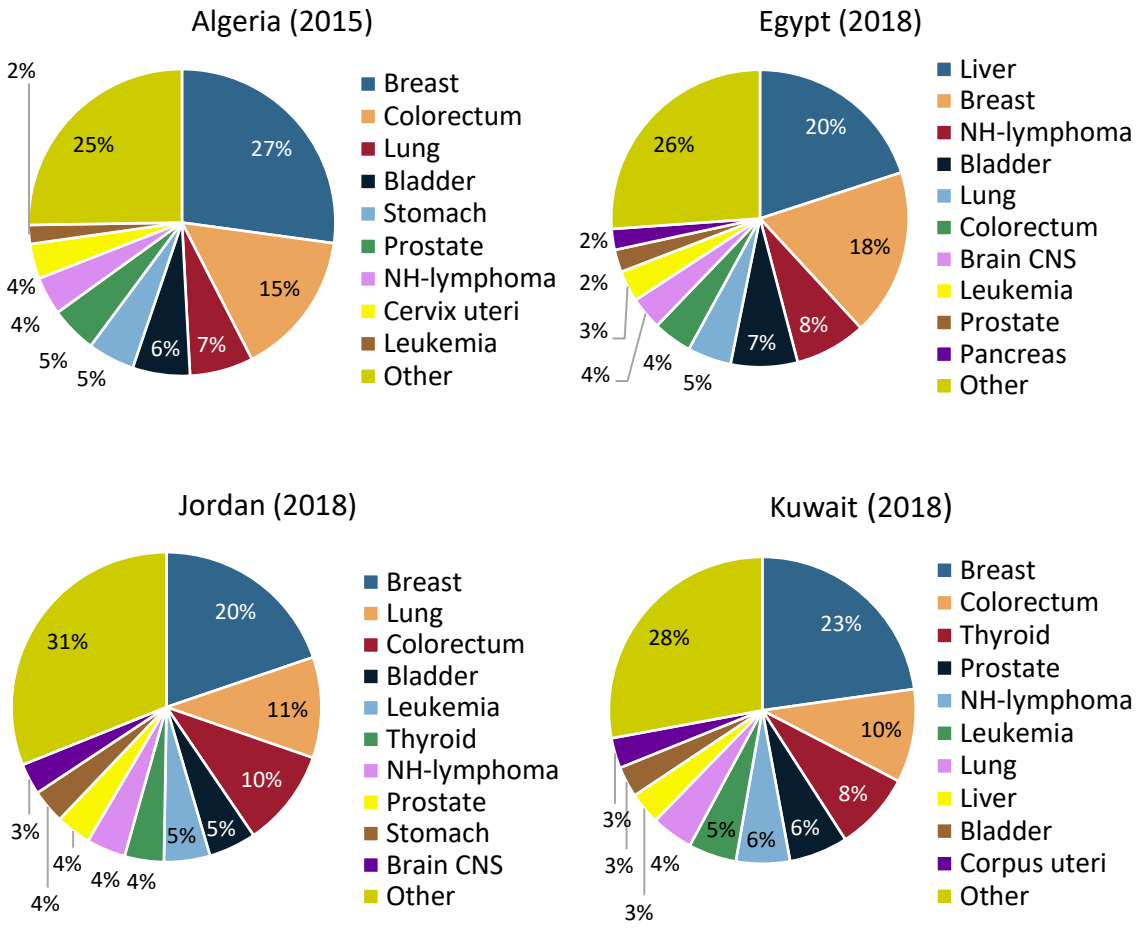
- Epidemiological development in other diseases (competing risks of death): Cardiovascular diseases are the leading cause of death in MEA-9 followed by infectious and parasitic diseases; see Figure 4. The drop in fatalities of infectious diseases due to improved vaccination coverage together with higher survival of heart attacks and strokes due to improvements in medical treatment means that people live longer. As people grow older, this leaves more people at risk of getting cancer (27).

- Cancer registration: The registration of cancer in local registries has become better over time; see section 4.2. Some of the reported increase in cancer incidence might reflect increased completeness of covering all patient records.

2.2.1.2 Incidence by cancer type

The development of a sound cancer control strategy requires knowledge about the distribution of different cancer types in a country. Figure 10 shows the most common types in each country for men and women combined in 2018. Breast cancer was the most common type in all countries except in Egypt, where it was the second most common type. Colorectal cancer was in second or third place

in six countries, whereas lung cancer was in second or third place in four countries. Thyroid cancer was in third place in the three Gulf countries (Kuwait, Saudi Arabia, UAE). Figure 10 also includes a graph of the most common types in EU-31, where there were four almost equally common types: breast, prostate, colorectal, and lung cancer. Compared to MEA-9, prostate cancer sticks out and this can be explained by the larger share of older people in the population in Europe (as prostate cancer is very uncommon below age 65) and more screening.



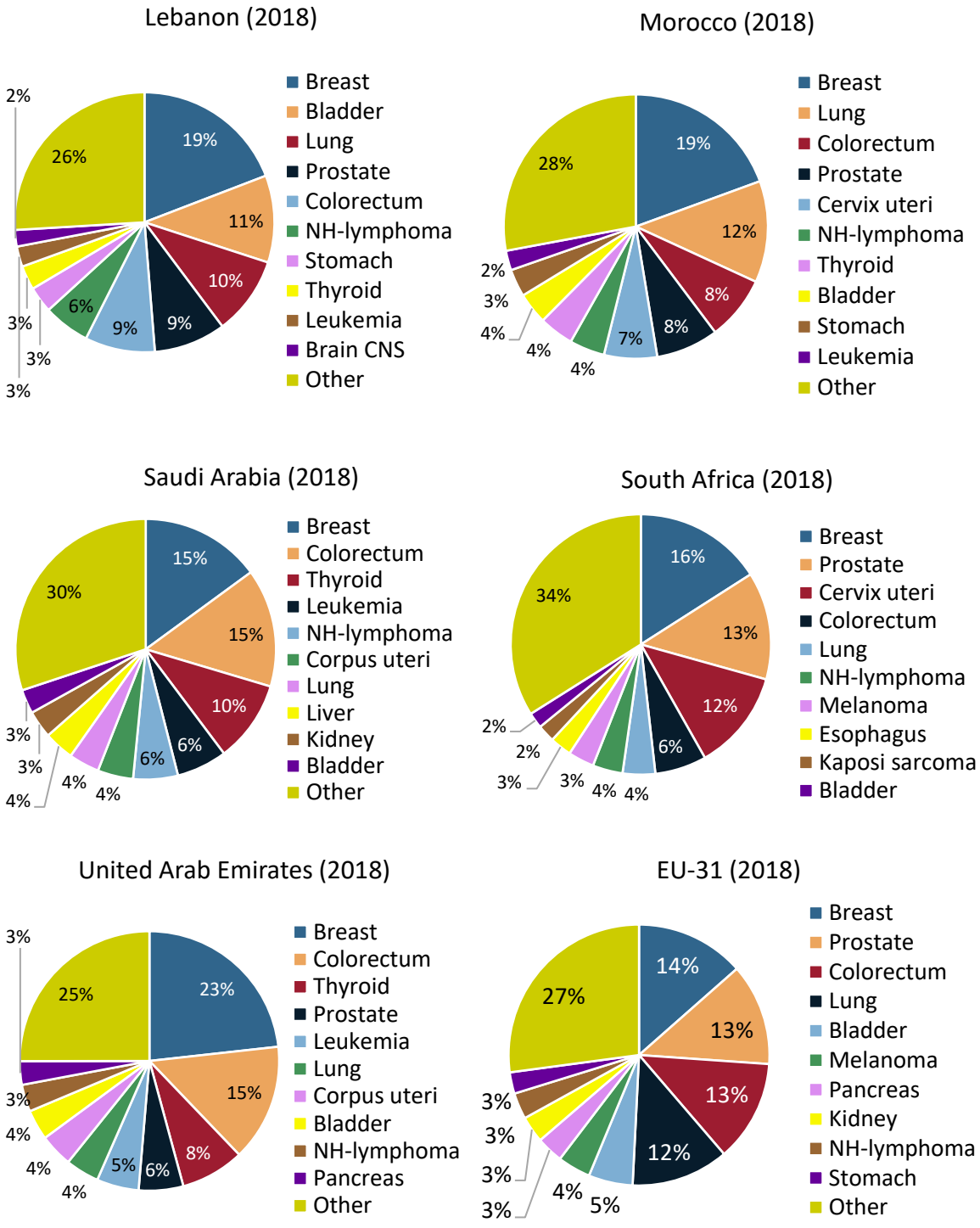


Figure 10: Cancer incidence by cancer type, 2018

Notes: NH=Non-Hodgkin. CNS=Central nervous system. Source: GLOBOCAN (3), and local study for Algeria (14) and cancer registry for South Africa (19).

Figure 11 shows the most commonly diagnosed types in MEA-9 separately for men and women in 2018. Among men, the most common cancer type was prostate cancer with a share of 14% of all diagnosed cases. Lung and liver cancer came in joint second place with a share of 12% each, followed by colorectal and bladder cancer each contributing to 8% of all diagnosed cases. The high share of

lung cancer is associated with high smoking rates (see section 4.3), while the high share of liver cancer is driven by Egypt; see Info Box 2.

Info Box 2 – Liver cancer and hepatitis C virus (HCV) in Egypt

The main cause of liver cancer in the Middle East and North Africa (MENA) region is HCV infection, followed by hepatitis B virus (HBV) infection (28). During the period 1990–2017 both infections accounted for 70% of the total liver cancer cases in the region (28, 29). Most of the cases are clustered in Egypt which accounts for 83.5% of the total liver cancer cases in the MENA region. Studies concluded that the history of the nationwide anti-schistosomiasis injection campaigns (1950s–1980s), using unsterilized needles and syringes, played a significant role in the spread of HCV (30-33). In addition, transmissions due to improper infection control practices represented a concern in the persistence of HCV (34, 35). In 2018, Egypt launched a major national program for screening and treatment of HCV aiming to achieve full disease control and subsequent elimination by 2030 (35, 36). This should lead to a decrease in liver cancer cases in the near future.

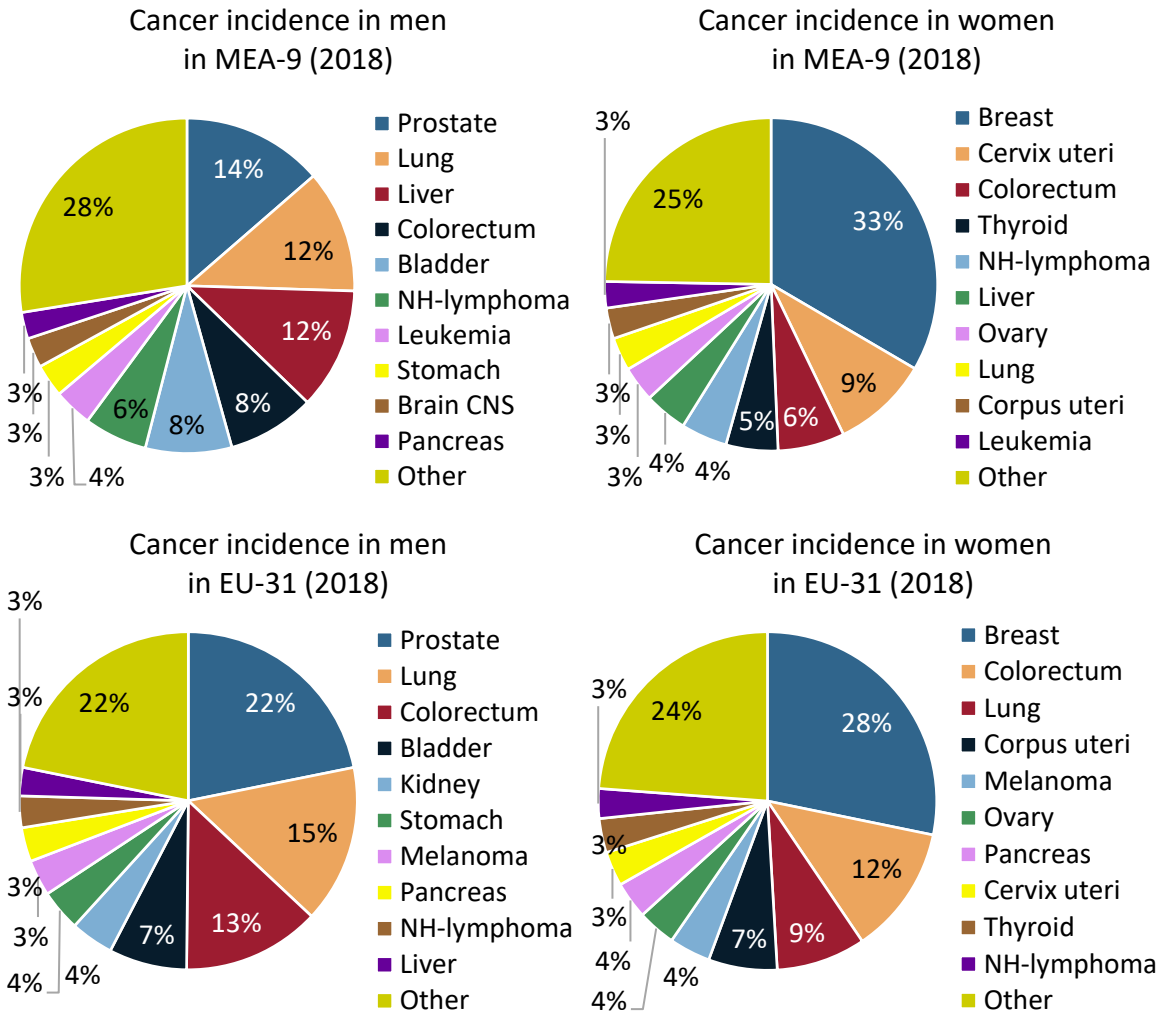


Figure 11: Cancer types most commonly diagnosed in men and women in MEA-9 and EU-31, 2018
Source: GLOBOCAN (3).

For women, Figure 11 shows that breast cancer was by far the most common cancer type with a share of 33% of all diagnosed cases. The second most common type was cervical cancer (9%), followed by colorectal cancer (6%). The high share of cervical cancer is partly driven by South Africa; see Info Box 3. The start of cervical cancer screening programs in some of MEA-9 countries might also have led to a higher detection of cases compared to other cancer types. Thyroid cancer is the fourth most common cancer type (5%). On a worldwide level, women are about three times as likely as men to be diagnosed with thyroid cancer, but the reason for this disparity is unclear and, importantly, there are no differences by sex in mortality from thyroid cancer (37).

Info Box 3 – Cervical cancer and HIV/AIDS and human papillomavirus (HPV) in South Africa

South Africa has one of the highest prevalence of HIV/AIDS in the world (38). Causes of the high infection rate are of both biological and social nature. This includes a lack of awareness on the individual level on how to prevent getting infected leading to unprotected sexual intercourse, gender-based violence, poor protection of highly vulnerable key populations such as sex workers, in conjunction with an inadequate provision of treatment by health care services (38, 39). HIV/AIDS is linked to different cancer types such as cervical cancer, anal cancer, non-Hodgkin's lymphoma, Hodgkin's lymphoma, Kaposi sarcoma, and conjunctival cancer (37, 40, 41). South Africa has nowadays the largest anti-retroviral therapy program in the world, offering treatment and fighting the spread of HIV (42). HIV/AIDS has now become a chronic condition with patients leading normal lives. But as a result of people living longer with HIV, the incidence of HIV-related cancer types is increasing.

The prevalence of HPV is also high in South Africa in general, and especially high among HIV-positive men and women (43, 44). This is because HPV is also transmitted through unprotected sexual intercourse. HPV infection is the prime cause of cervical cancer, and co-infection with HIV increases the risk to develop cervical cancer (45). In 2000, a nationwide cervical cancer screening program was initiated (46). The government has also implemented a national HPV vaccination program for girls in public schools in 2014 (47).

The overall increase in cancer incidence between 2000 and 2018 shown in Figure 11 was also shared by an increase in incidence in some of the major cancer types. Figure 12 to 14 show the development of incidence crude rates of breast, lung, and colorectal cancer (accounting one third of all diagnosed cases in MEA-9) between 2000 and 2018. Breast cancer incidence shows a clear increase in all countries. Wide disparities in the crude rate are also noticeable, with Lebanon recording rates three times higher than in Saudi Arabia and the UAE. The crude rates in 2018 for lung cancer (Figure 13) and colorectal cancer (Figure 14) were less than 15 cases per 100,000 inhabitants in all MEA-9 countries except in Lebanon which had higher rates. The development in lung cancer was relatively stable between 2005 and 2015 in most countries. By contrast, colorectal cancer incidence has been increasing throughout the entire period in all countries except in Jordan where it was stable.

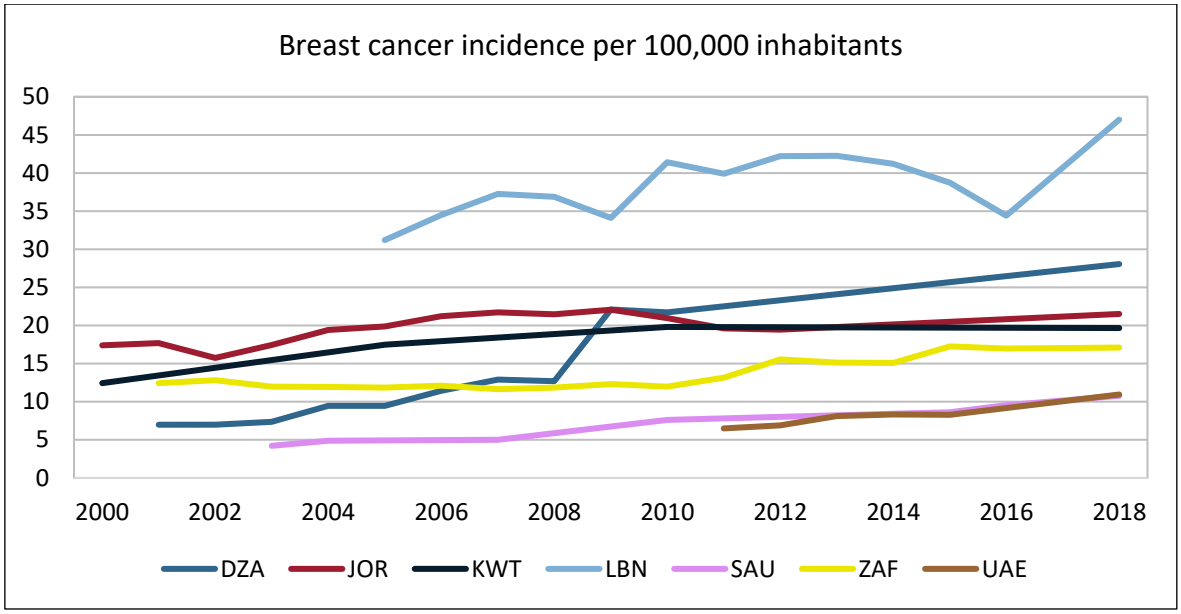


Figure 12: Breast cancer incidence per 100,000 inhabitants in MEA-9, 2000–2018

Notes: Incidence crude rates for DZA were calculated from the cancer registry report in Sétif (2001–2010) (15). Incidence cases for JOR, LBN, SAU, ZAF, and UAE were retrieved from the national cancer registry reports in each country (17-22). For KWT, three estimates were calculated from a published study for the Gulf countries (23). EGY and MAR are missing due to missing population-based data. GLOBOCAN estimates were used in 2018 (3, 16). Local experts in LBN noted that the 2018 GLOBOCAN estimates are likely overestimated due to unknown cancer epidemiology among the large refugee population.

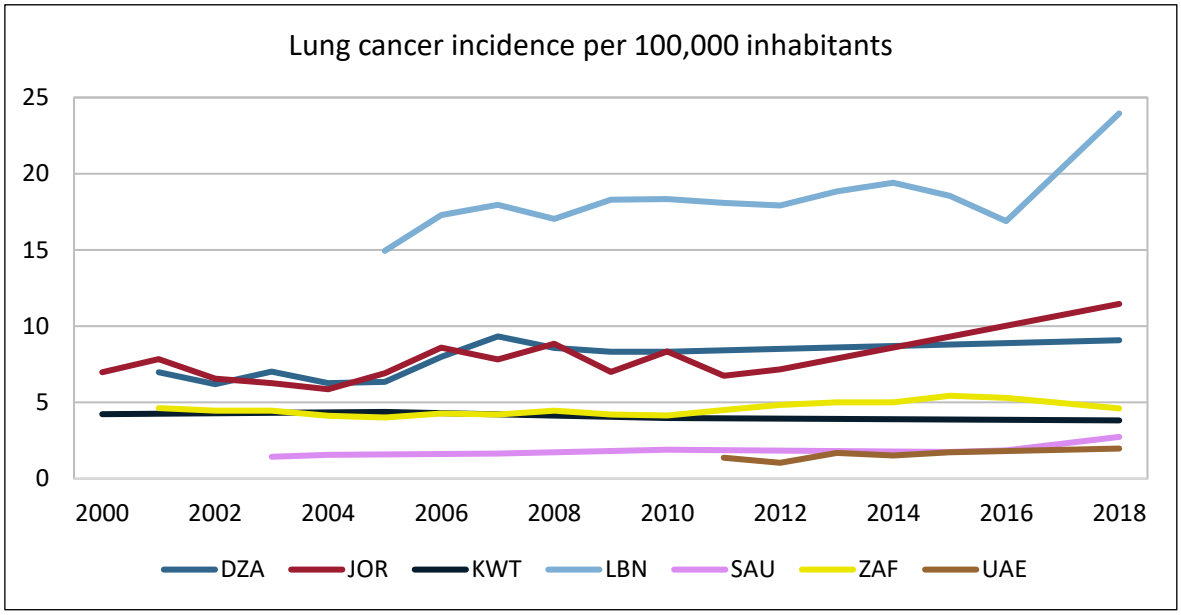


Figure 13: Lung cancer incidence per 100,000 inhabitants in MEA-9, 2000–2018

Notes: Incidence crude rates for DZA were calculated from the cancer registry report in Sétif (2001–2010) (15). Incidence cases for JOR, LBN, SAU, ZAF, and UAE were retrieved from the national cancer registry reports in each country (17-22). For KWT, three estimates were calculated from a published study for the Gulf countries (23). EGY and MAR are missing due to missing population-based data. GLOBOCAN estimates were used in 2018 (3, 16). Note that the sudden increase in the estimates in LBN between 2016 and 2018 is due to using different sources. Local experts in LBN noted that the 2018 GLOBOCAN estimates are likely overestimated due to unknown cancer epidemiology among the large refugee population.

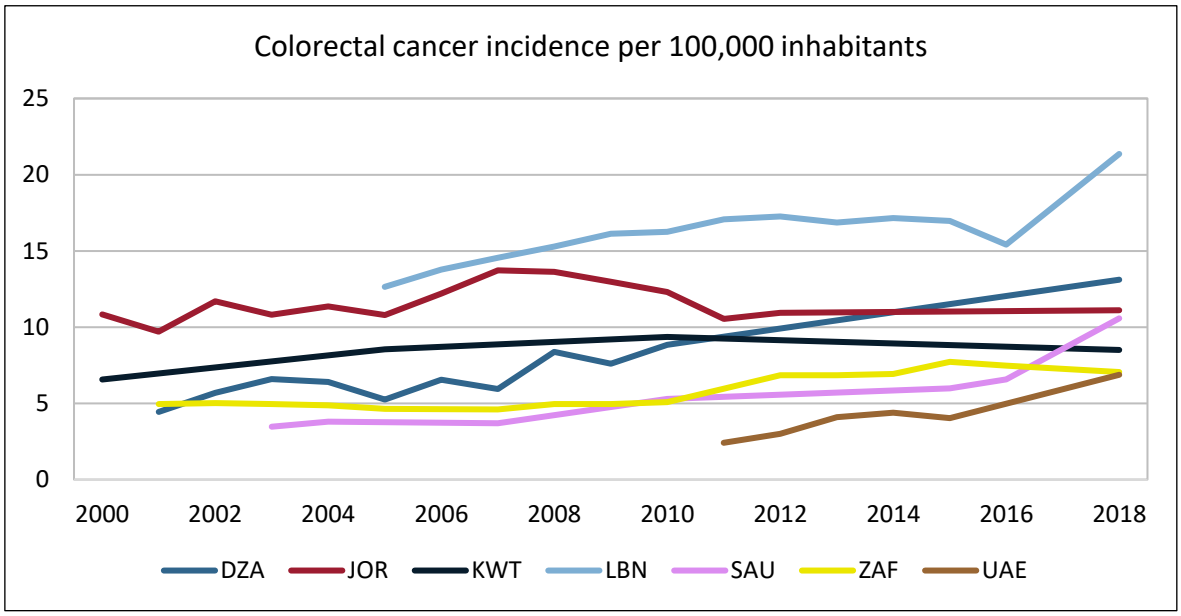


Figure 14: Colorectal cancer incidence per 100,000 inhabitants in MEA-9, 2000–2018

Notes: : Incidence crude rates for DZA were calculated from the cancer registry report in Sétif (2001–2010) (15). Incidence cases for JOR, LBN, SAU, ZAF, and UAE were retrieved from the national cancer registry reports in each country (17-22). For KWT, three estimates were calculated from a published study for the Gulf countries (23). EGY and MAR are missing due to missing population-based data. GLOBOCAN estimates were used in 2018 (3, 16). Local experts in LBN noted that the 2018 GLOBOCAN estimates are likely overestimated due to unknown cancer epidemiology among the large refugee population.

2.2.1.3 Incidence by age

Figure 15 shows the age of cancer patients at diagnosis, grouped by broad age groups. Saudi Arabia and the UAE had the youngest patient population in 2018. Almost 75% of all new diagnoses were made in people aged younger than 60 years in these two countries, whereas this number was less than 50% in Lebanon. Figure 15 also shows that the median age at presentation is considerably lower in all MEA-9 countries than in EU-31. This is partly related to the demographic structure (rather than any biological differences), with older people – who are at a higher risk of getting cancer – accounting for a much larger share of the total population in EU-31 than in MEA-9.

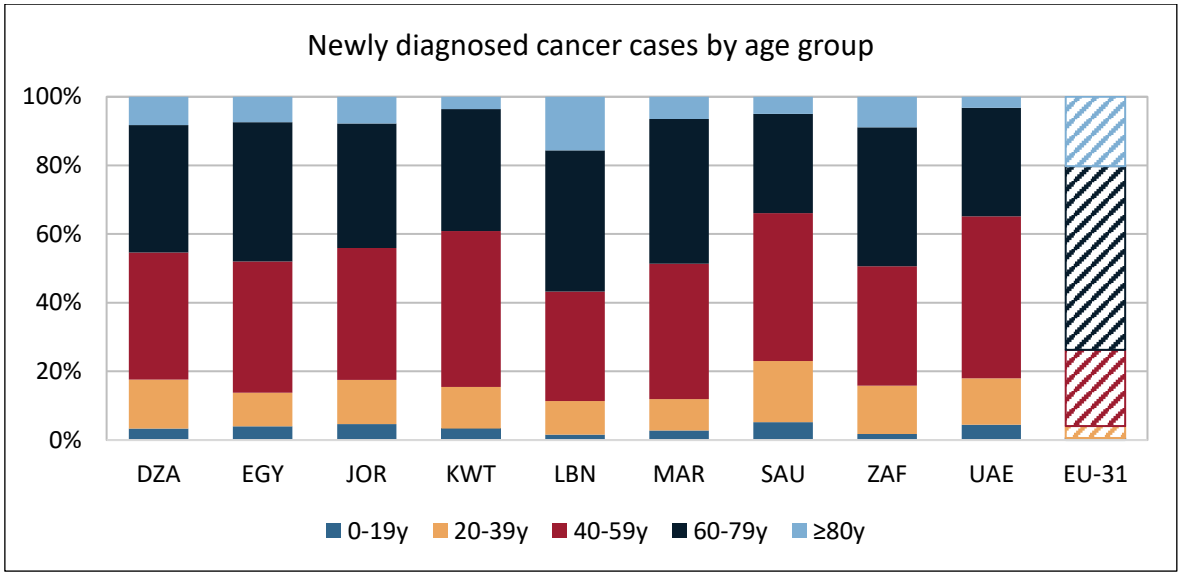


Figure 15: Cancer incidence by age group in MEA-9 and EU-31, 2018
Source: GLOBOCAN (3).

2.2.2 Mortality

Cancer mortality refers to the number of deaths caused by cancer in a certain year in a specific geographical area. Across the MEA-9 countries there were around 232,000 cancer deaths in 2018 (3). Similar to cancer incidence above, this section presents crude rates of cancer mortality per 100,000 inhabitants. This ensures that numbers are comparable between countries and within countries over time, as the influence of population size and growth is removed. When interpreting numbers on cancer mortality the close connection to cancer incidence is important to keep in mind. A high cancer mortality rate in a country does not automatically imply poor quality of cancer care; rather it could be a result of the country's high incidence rate. Thus, two countries with different mortality crude rates might still be equally good at providing cancer care. The close connection to cancer incidence also means that factors explaining the observed increase in cancer incidence in MEA-9 between 2000 and 2018 (population aging, risk factors, screening, the epidemiological development in other diseases) indirectly influence trends in cancer mortality. Screening and treatment have a direct influence on mortality trends.

Info Box 4 – Cause-of-death registration in the Middle East

There is a lack of full information on causes of death in many countries in the Middle East. This is partly linked to death rituals in Arabic Muslim countries, where early burial is common and autopsy is controversial due to religious or sociocultural beliefs (48). Non-invasive autopsy imaging (virtual autopsy) was introduced as an alternative for invasive autopsy; however, it is not widely practiced in Arab countries (49, 50). Forensic autopsy is used mostly for quality control, medical education, research, and medico-legal investigations when there are suspicions of unnatural death (49).

Cancer registries of many MEA-9 countries lack of data on cancer mortality. This might be the result of underlying challenges in the registration of causes of death. Errors in death certification are common in some countries in the Middle East and there is a lack of a precise examination of causes of death (51); see Info Box 4.

2.2.2.1 Crude rates

Figure 16 shows cancer mortality crude rates for all cancers combined for both sexes. Despite differences in the magnitude of mortality rates between countries in MEA-9, the reported mortality rates increased between 2000 and 2018 in all countries except in Saudi Arabia. In 2000, Lebanon, Egypt, and Jordan recorded the highest mortality rates with more than 60 cases per 100,000 inhabitants. The UAE, Kuwait, and Saudi Arabia had the lowest rates with fewer than 33 cases per 100,000 inhabitants. Lebanon recorded the highest crude rate throughout the considered time period and had more than 130 deaths per 100,000 inhabitants in 2018. The countries with the lowest mortality crude rates in 2018 were the UAE, Saudi Arabia, and Kuwait with fewer than 40 cases per 100,000 inhabitants. The fact that Lebanon had the highest mortality rate and the UAE had the lowest one mirrors the countries relative position in the incidence rate shown in Figure 8.

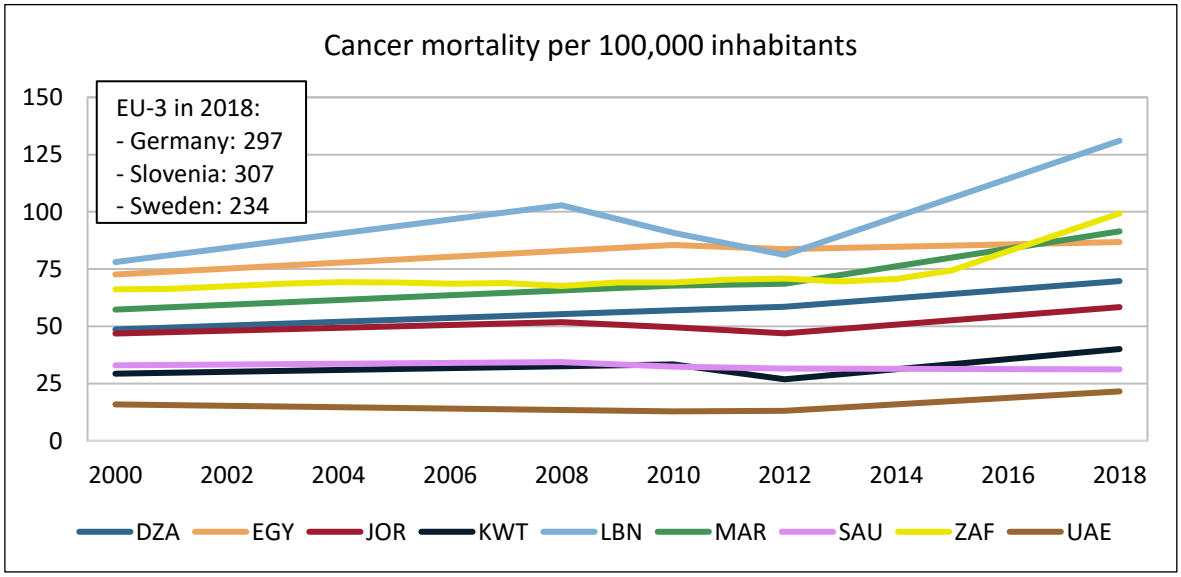
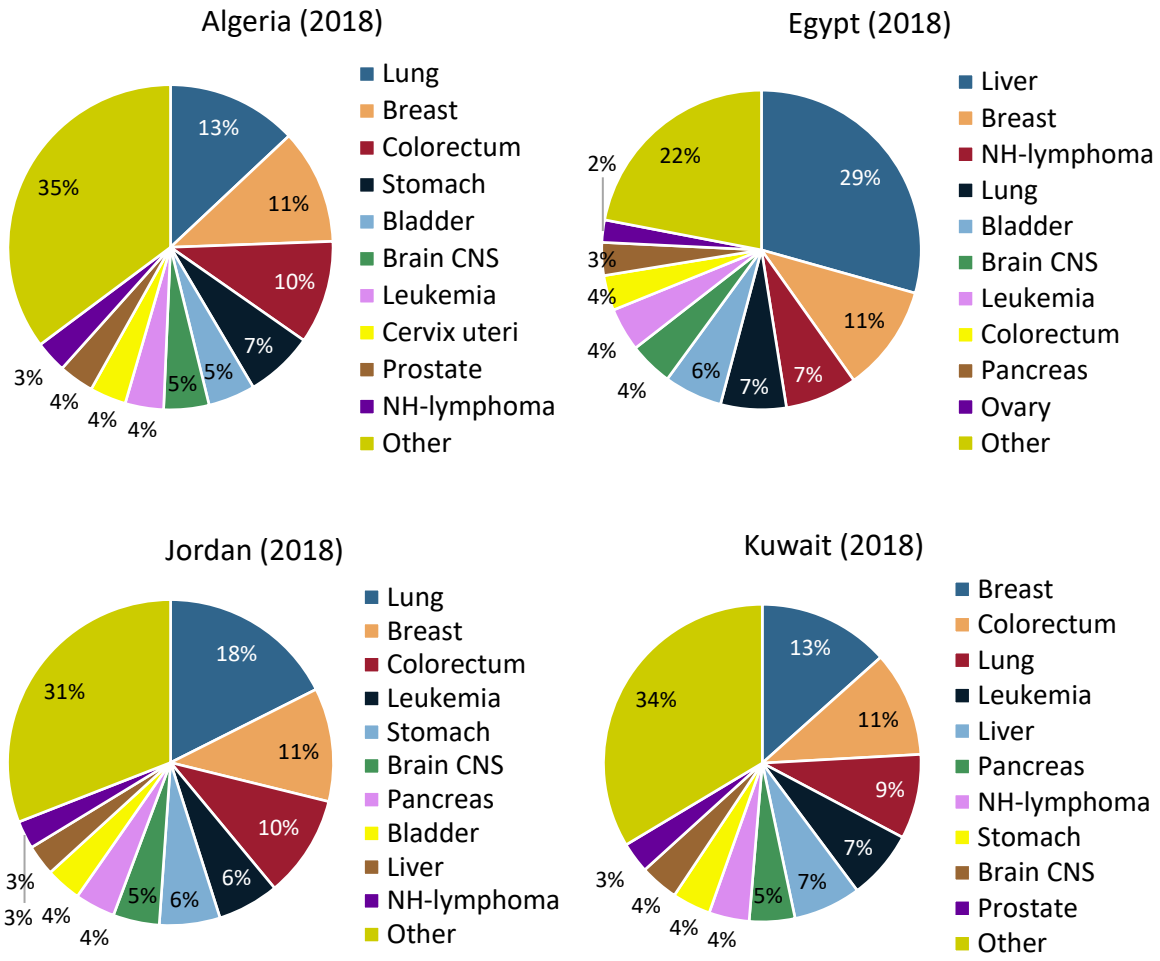


Figure 16: Cancer mortality per 100,000 inhabitants in MEA-9, 2000–2018

Notes: Cancer refers to all cancer sites (ICD-10 C00-C97). WHO estimates were used for years 2000 and 2010 and GLOBOCAN estimates were used for years 2012 and 2018 for all countries, except for ZAF for 2000–2015 where actual vital statistics reported to the WHO were used (3, 11, 52). Local experts in LBN noted that the 2018 GLOBOCAN estimates are likely overestimated due to unknown cancer epidemiology among the large refugee population.

2.2.2.2 Mortality by cancer type

Figure 17 shows the cancer types causing the most deaths in each country for men and women combined in 2018. Lung cancer was the most common cause of death from cancer in five of the nine MEA countries, and at least in the top five in the other countries. Colorectal cancer was in first place in Saudi Arabia and the UAE, and it is among the top three cancer types in six additional countries. In Kuwait, breast cancer was in first place and in six countries it was in second place and in the remaining two countries in third place. Egypt stands out with liver cancer being by far the most common cause of death; see Info Box 2. In EU-31, lung cancer is in first place and causes almost twice as many deaths as colorectal cancer in second place. The historically high smoking rates in both men and women in Europe might explain the larger share of lung cancer deaths compared to MEA-9 where female smoking rates are very low. Breast cancer occupies a smaller share in EU-31 than in MEA-9, which might reflect better treatment and more widespread screening leading to earlier diagnosis.



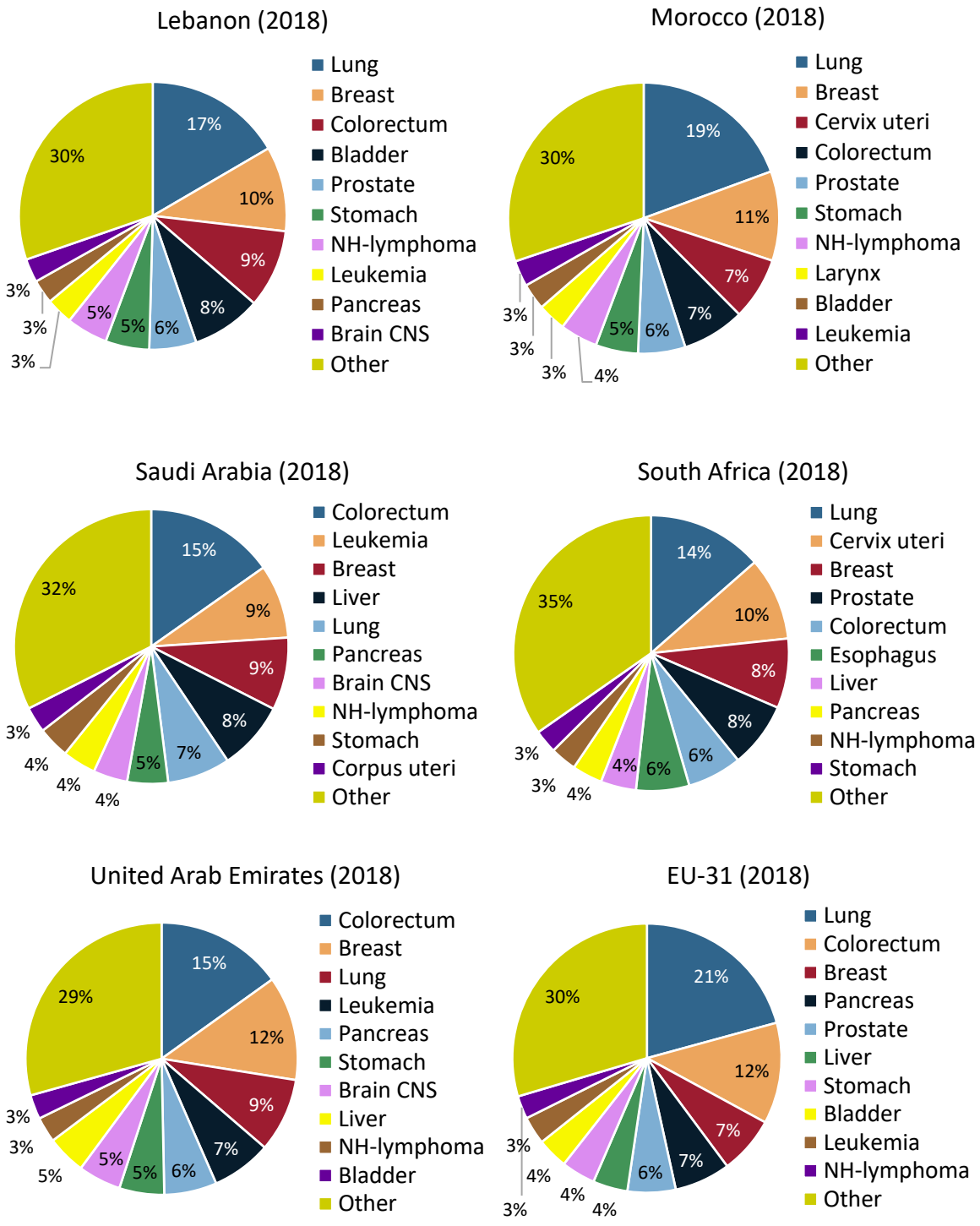


Figure 17: Cancer mortality by cancer type, 2018

Notes: NH=Non-Hodgkin. CNS=Central nervous system. Source: GLOBOCAN (3).

Figure 18 shows the cancer types causing the most deaths separately for men and women in 2018. In men in MEA-9, the liver and lung cancer were each responsible for 17% of all cancer deaths. They were followed by prostate cancer (7%) and colorectal cancer (7%). The fact that liver and lung cancer account for a much larger share of deaths than of incidence cases is explained by the low survival

rates of these two cancer types. The reverse is true for prostate cancer. In women in MEA-9, breast cancer was by far the most common type with a share of 22%. Cervical cancer came in second place (9%) and liver cancer in third place (8%), followed by colorectal cancer (7%) and lung cancer (6%).

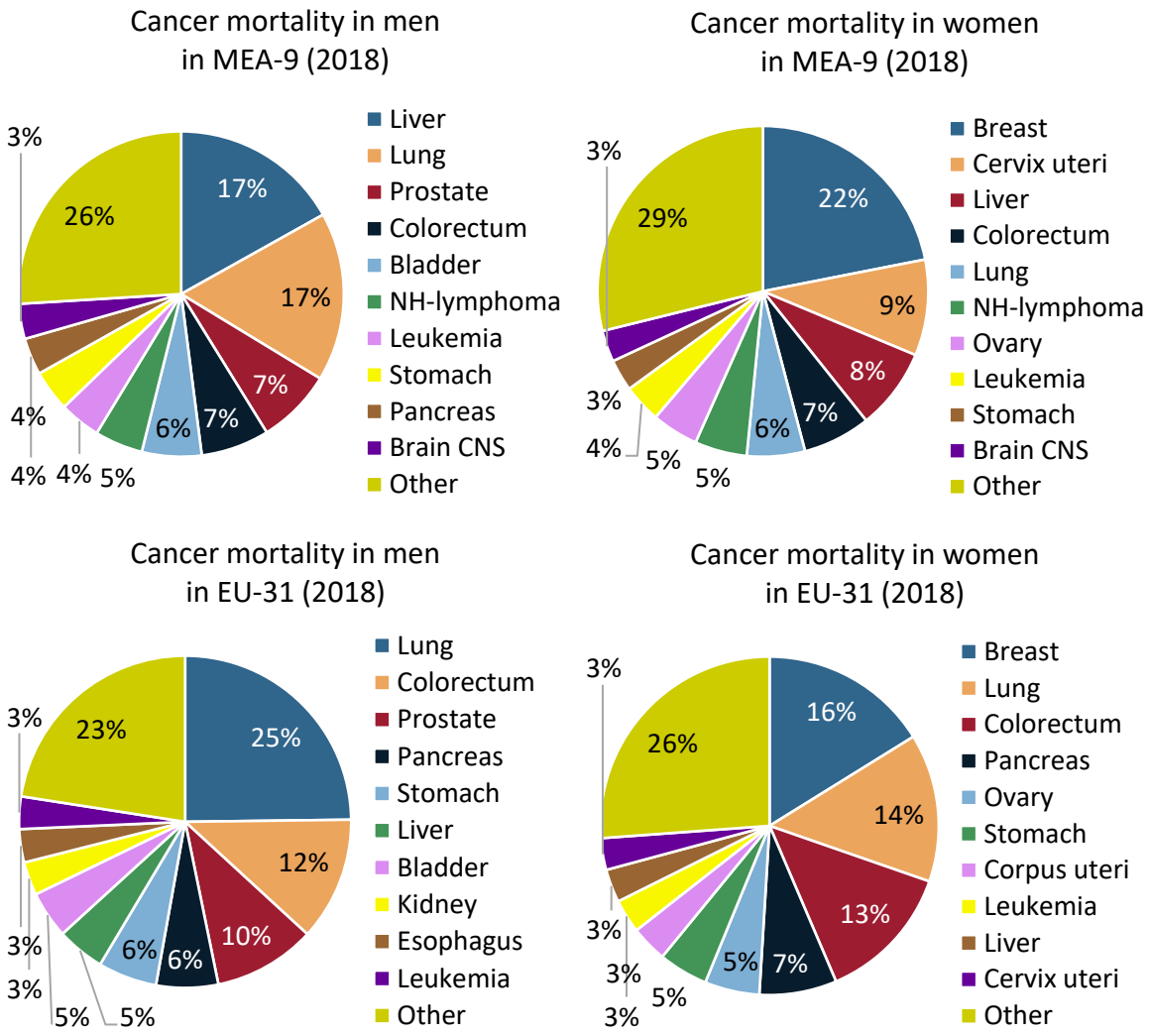


Figure 18: Cancer types causing the most deaths in men and women in the MEA-9 and EU-31, 2018

Source: GLOBOCAN (3).

2.2.3 Survival

Survival is the epidemiological concept that links the measures of incidence and mortality. It measures the share of people that have been diagnosed with cancer in a certain year and that are still alive after a specified period of time. Survival rates are commonly measured in terms of 5-year survival rates, i.e., the share of people diagnosed with cancer in year t that is still alive in year t+5.[2,3]

As cautioned above, survival estimates for the MEA-9 countries are not reliable due to low-quality cause-of-death registration in cancer registries. Most registries do not publish survival estimates at all. The international CONCORD-3 program[4] has calculated survival estimates for some MEA-9 countries and cancer types. In absence of survival estimates, previous studies have relied on 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] as a proxy measure for survival despite its limitations (56, 57). The 1–MIR ranges from 0% (i.e., no one survives cancer) to 100% (everyone survives cancer).

Figure 19 shows the 1–MIR for all cancers combined in 2018 based on GLOBOCAN data. Egypt and Morocco have the lowest ratio (around 35%), whereas Kuwait, Saudi Arabia, and the UAE have the highest ratio (around 55%). The latter countries have ratios on par with Germany and just below Sweden. Figure 22 also hints that the economic strength of a country seems to matter, as the wealthy Gulf countries (Kuwait, Saudi Arabia, UAE) perform distinctly better than the other poorer MEA-9 countries. A positive correlation between survival and economic wealth has also been previously documented in samples of countries in Europe and the Asia-Pacific region (8, 58).

[2] This means that data on the 5-year survival rate of cancer patients diagnosed in 2021 can only be calculated for sure after 2026. The method to do this is called “cohort analysis”. There are alternative methods, “period analysis” and “mixed analysis”, which can provide a good approximation of the likely result already before 2026 (53, 54).

[3] Two adjustments are routinely made to survival rates to receive comparable rates across time and countries. Firstly, net (also called “relative”) rates rather than absolute (“gross”) rates are compared. The net survival rate is the ratio of two survival rates: the absolute survival rate of cancer patients divided by the expected survival rate of people in the general population with similar age and sex in the same country and calendar year (55). This adjusts survival rates for the effect of competing causes of death (background mortality) that would otherwise bias comparisons across time and between countries. Thus, net survival rates indicate the hypothetical situation in which cancer is the only cause of death (53). Secondly, the age structure of cancer patients differs across countries and within countries across time. Since survival rates for most cancer types vary by age (typically they decrease with age), they are adjusted for age at diagnosis (5). The International Cancer Survival Standard (ICSS) is usually used to this end.

[4] 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 (4).

The consideration of survival rates in all cancers combined ignores the differing incidence of cancer types between countries. For example, a relatively high share of lung cancer cases in a country will drag down the overall survival rate in the country because lung cancer has a lower-than-average survival. Therefore, country comparisons such as in Figure 19 have to be interpreted with great caution.

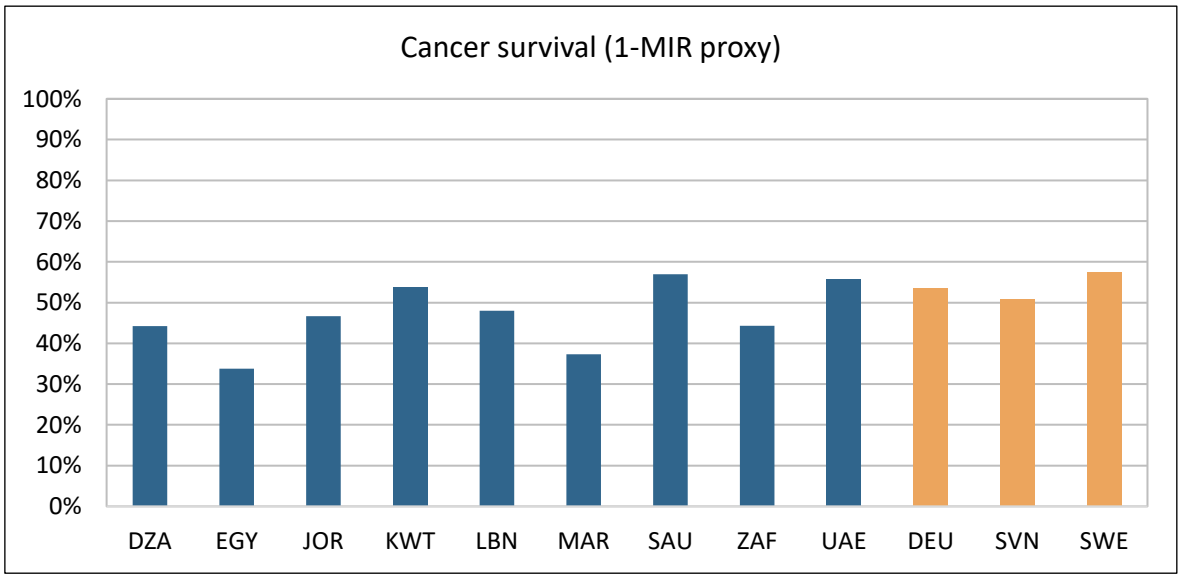


Figure 19: Cancer survival (expressed as the complement of the mortality-to-incidence ratio) in MEA-9 and EU-3, 2018

Notes: Cancer is defined as ICD-10 C00-C97/C44. Source: GLOBOCAN (3).

The comparison of survival rates (or the 1-MIR proxy) of specific cancer types is a better way to inform conclusions about the quality of care provided to patients. Figure 20 to Figure 22 show survival rates of selected cancer types. 5-year survival rates published by CONCORD-3 for the period 2010–2014 and estimates from national studies are shown alongside the 1-MIR proxy based on GLOBOCAN data from 2018.

- Breast cancer – Figure 20: South Africa (40%) and Algeria (60%) recorded the lowest survival rates. Published survival estimates for Egypt, Morocco, Jordan, and Lebanon are almost as high or even higher than in EU-3. However, these estimates need to be interpreted very cautiously, because the 1-MIR proxy suggests that these countries probably had lower survival rates than all Gulf countries and EU-3 countries. Sweden had the highest survival rate (and 1-MIR proxy). Info Box 5 illustrates how many lives could be gained in MEA-9 if all countries were to achieve as good results as Sweden.
- Lung cancer – Figure 21: Lung cancer patients have poor prospects, compared to patients with breast and colorectal cancer. Morocco had the lowest survival rate with 3% compared to the highest rate of 28% in Jordan (which is probably grossly overestimated judging from the 1-MIR proxy). Most MEA-9 countries had survival rates of less than 15%.

- Colorectal cancer – Figure 22: Survival estimates differ widely, ranging from 11% in South Africa (which local experts dismissed and indicated that it might only reflect metastatic disease only) to 75% in Jordan. The 1-MIR proxy suggests that country differences are probably far less pronounced in reality, and that the Gulf countries achieve the best results in MEA-9.

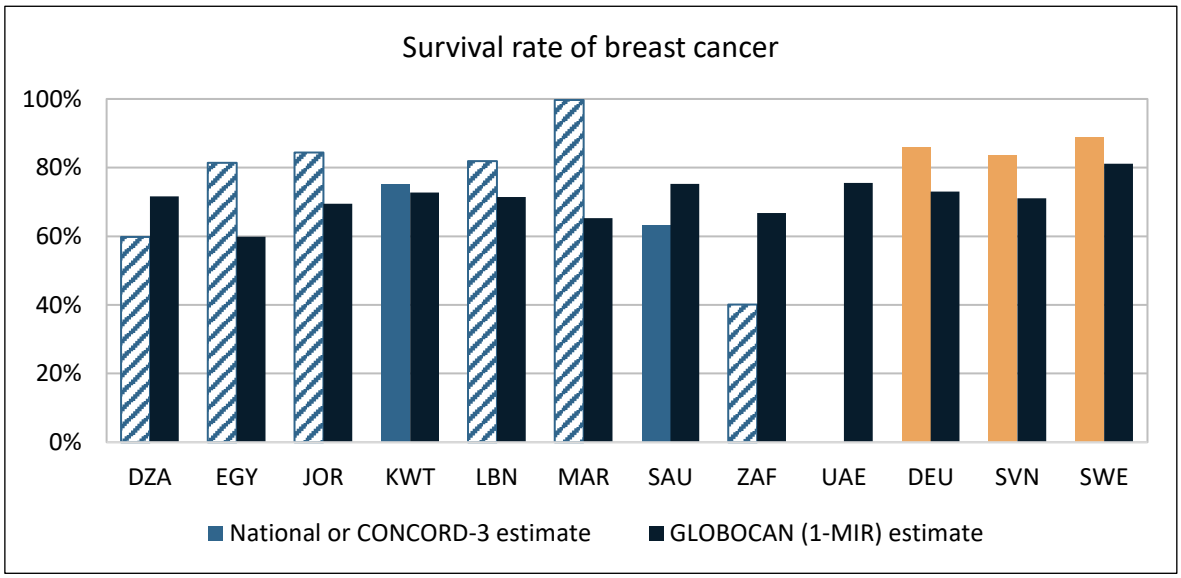


Figure 20: Estimates of breast cancer survival (left-bar = 5-year survival rate in 2010–2014 or most recent year; right bar = 1-MIR in 2018)

Notes: Patterned bars indicate lower reliability. 1-MIR = complement of the mortality-to-incidence ratio based on GLOBOCAN in all countries. 5-year survival rates for JOR (100% coverage), KWT (100% coverage), MAR (12.7% coverage), ZAF (2% coverage), DEU (10 registries), SVN (100% coverage), SWE (100% coverage) for 2010–2014 were retrieved from CONCORD-3 (4). According to CONCORD-3, estimates for JOR, MAR, and ZAF were less reliable due to loss of follow-up or patients being registered only from death certificates, autopsy, or with incomplete registered dates (4). 5-year survival rates were retrieved from published studies for DZA (covering 6% of the population) in 2014, EGY (covering more than 5% and excluding non-invasive or bilateral/unknown lateral breast carcinomas) in 1999–2007, and LBN (covering 9% of all breast cancer patients) in 1997–2010 (59-61). Data for SAU come from the Saudi cancer registry report in 2007, covering the Saudi population for 2000–2004 (62). No 5-year survival rate data were available for UAE.

Info Box 5 – How many lives of women with breast cancer would be saved ever year if the MEA-9 countries achieved the same survival rate as Sweden?

Combining patient numbers of newly diagnosed breast cancer cases in 2018 from GLOBOCAN with the difference in 5-year survival rates between Sweden and a specific country observed in Figure 20, yields the following rough estimate of lives that could be saved every year:

- Algeria: 3,400
- Egypt: 1,700
- Jordan: 90
- Kuwait: 110
- Lebanon: 220
- Morocco: N/A
- Saudi Arabia: 930
- South Africa: 6,800
- UAE: N/A

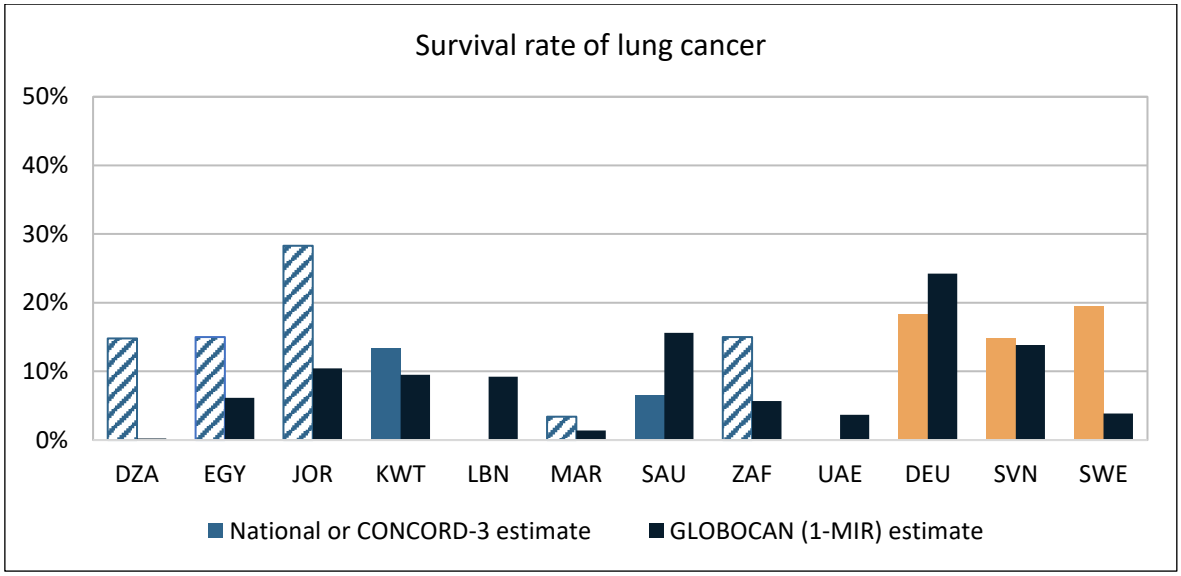


Figure 21: Estimates of lung cancer survival (left-bar = 5-year survival rate in 2010–2014 or most recent year; right bar = 1-MIR in 2018)

Notes: Patterned bars indicate lower reliability. 1-MIR = complement of the mortality-to-incidence ratio based on GLOBOCAN in all countries. 5-year survival rates for JOR (100% coverage), KWT (100% coverage), ZAF (2% coverage), DEU (10 registries), SVN (100% coverage), and SWE (100% coverage) for 2010–2014 were retrieved from CONCORD-3 data analysis (4). Estimates for JOR and ZAF are less reliable due to loss of follow-up or patients being registered only from death certificates, autopsy, or with incomplete registered dates (4). 5-year survival rates were retrieved from published studies for DZA (covering 6% of the population) in 2014 and MAR (Rabat) in 2008 (59, 63). The survival rate for EGY was retrieved from the cancer registry report in Aswan (covering 2%) in 2008 and only noted that the rate was less than 15% (64). Data for SAU come from the Saudi cancer registry report in 2007, covering the Saudi population for 2000–2004 (62). No 5-year survival rate data were available for UAE.

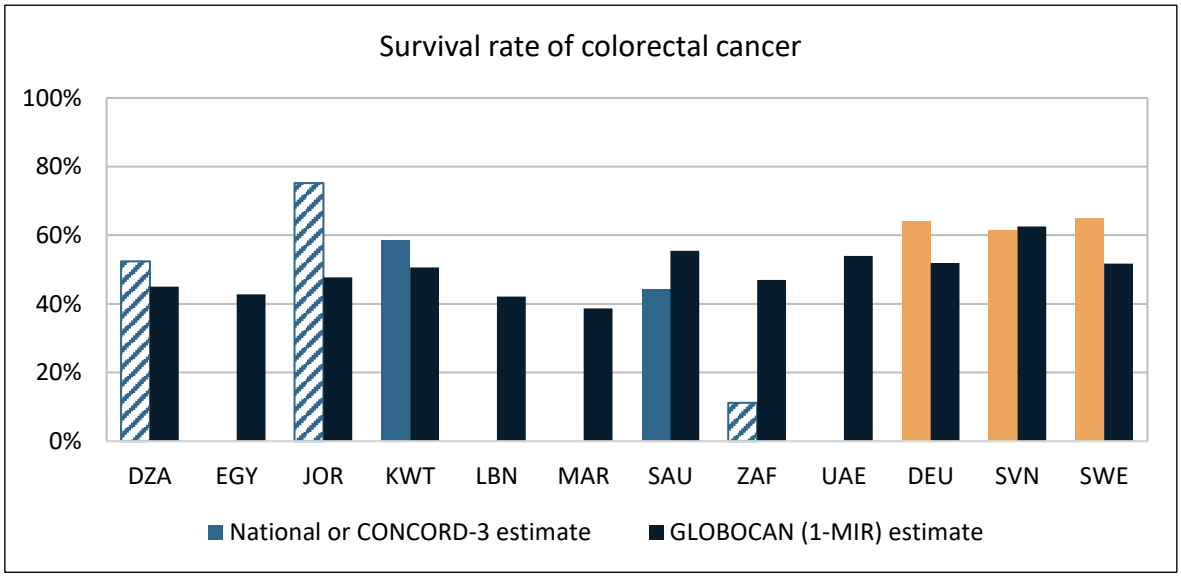


Figure 22: Estimates of colorectal cancer survival (left-bar = 5-year survival rate in 2010–2014 or most recent year; right bar = 1-MIR in 2018)

Notes: Patterned bars indicate lower reliability. 1-MIR = complement of the mortality-to-incidence ratio based on GLOBOCAN in all countries. 5-year survival rates for JOR (100% coverage), KWT (100% coverage), ZAF (2% coverage), DEU (10 registries), SVN (100% coverage), SWE (100% coverage) for 2010–2014 were retrieved from CONCORD-3 data analysis and represent the incidence-weighted average of colon cancer and rectal cancer survival rates (4). According to CONCORD-3, estimates for JOR and ZAF were less reliable due

to loss of follow-up or patients being registered only from death certificates, autopsy, or with incomplete registered dates (4). 5-year survival rates were retrieved from published studies for DZA (covering 6% of the population) in 2014 (59). Data for SAU come from the Saudi cancer registry report in 2007, covering the Saudi population for 2000–2004 (62). No 5-year survival rate data were available for EGY, LBN, MAR, and UAE.

2.3 Economic burden

The economic burden of cancer refers to the costs that cancer imposes on society. Costs are here defined more broadly than in an everyday meaning. Three types of costs can be distinguished:[5]

- Direct costs are costs of resource consumption arising from the disease. These are expenditures made for services within the health care system, such as for oncologists, hospital beds, radiation therapy machines, drugs, etc. Formally provided social support services, such as by non-governmental organizations (NGOs), are also direct costs.
- Indirect costs 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 and from premature death of people in working age.
- Informal care costs arise from the time forgone by relatives and friends to provide unpaid care, such as help with transportation to a health care facility and support at home with household chores.

The economic burden of cancer is linked to the disease burden of cancer in various ways. If there is a large number of patients diagnosed with cancer every year, the direct costs for diagnosis and treatment will be high. If the quality of the cancer care provided is low, survival rates will be low. Low survival means that the number of cancer deaths is high. If these deaths occur in patients in working age, mortality-caused productivity loss will be high. Progress in cancer care, such as new imaging techniques for diagnosis, new treatment modalities, and additional screening programs may entail an extension (rather than a replacement) of health care services, which increases direct costs. More effective treatment might enable patients to go back to work and might decrease the need for help from family members, thus decreasing morbidity-caused productivity loss and informal care costs.

[5] Another cost component that is sometimes included in cost-of-illness studies are intangible costs. These costs refer to a valuation of reduced quality of life due to a disease. Unlike direct, indirect, and informal costs, these costs have no direct connection to the use of or lack of production of resources. Cost-of-illness studies often exclude intangible costs, as they are difficult to measure and cannot be valued with existing (market) prices. Omitting intangible costs is nonetheless unsatisfactory, as the implicit assumption would be that the economic value of quality of life is zero (65).

This section aims to estimate the economic burden of cancer in the MEA-9 countries in 2018. A prevalence-based cost-of-illness (COI) approach was adopted to estimate the costs (66). This method entails the estimation of costs incurred during a given year – 2018 in this report. A societal perspective was adopted to estimate the total costs of cancers. The results are expressed in US dollars to facilitate comparison across countries using exchange rates in 2018 (67). Costs were also adjusted for price differentials between countries (purchasing power parities, PPP) in 2018 unless otherwise noted (67); see Table A1 in the Appendix for the exchange rates and PPP conversion factors used. Costs per capita were calculated using population data from the WHO (67).

2.3.1 Direct costs

Different health care resources are used in the care process of cancer patients. To locate the cancer, medical equipment, such as Computerized Tomography (CT) scanners and Magnetic Resonance Imaging (MRI) scanners either alone or in combination with Positron Emission Tomography (PET) scanners, are used. Pathologists and diagnostic radiologists examine the nature of the cancer. Surgeons, radiologists, medical oncologists, and hematologists assisted by nurses perform surgery on the tumors and initiate radiation therapy and systemic therapy (i.e., chemotherapy, hormonal therapy, immunotherapy, and molecularly targeted therapy). Modern cancer care also includes psychosocial care and rehabilitation. Other resource-consuming cornerstones of cancer care are screening programs and primary prevention measures, such as vaccination programs, cancer awareness campaigns, smoking cessation clinics.

The direct costs of cancer constitute the sum of the resources mentioned above (68). Even though they cover mostly resources within the health care system, they also cover some resources outside of it, such as social care services. Direct costs include both publicly paid resources, financed by tax money and/or social security contributions, and privately paid resources, including out-of-pocket payments for health care visits and drugs as well as fees for private health insurance, as well as charity-funded activities and resources spent by NGOs.

2.3.1.1 Methodology

Direct costs were calculated in a top-down manner, in line with previous studies on the cost of cancer (8, 9). In a first step, estimates of gross domestic product (GDP) and total health expenditure (THE)[6] for 2018 were obtained from the WHO (67); see Table 2. In a second step, a pragmatic literature

[6] The total health expenditure or "current expenditure on health" are defined as the final consumption of health goods and services. Expenditure from both public and private sources are included.

search was performed to obtain information on the share (or the absolute size) of the total health expenditure spent on cancer.[7] No relevant peer-reviewed studies or reports in the grey literature with an original analysis of country-specific data could be identified for any country. Local experts were asked if there is any reliable source.

In Algeria, the experts suggested to use the funding specified in the national cancer plan for 2015–2019 amounting to DZD 185 billion for the operational budget of the cancer control centers plus the budget of a special cancer fund of around DZD 50 billion. The total sum is DZD 235 billion or DZD 47 billion per year, corresponding to 3.7% of total health expenditure (in 2018). This estimate represents a slight underestimation as it does not include any health expenditure paid out-of-pocket by cancer patients. In Jordan, the experts noted that the only published source is a report by the High Health Council for the year 2013, which specifies JOD 74 million in expenditures by the King Hussein Cancer Center (KHCC) (69). As the KHCC treats around 65% of all cancer patients (see section 3), and assuming similar expenditure for the remaining 35% of patients (an overestimation as quality of care is lower outside the KHCC), this would put total expenditures to around JOD 114 million or 6.5% of total health expenditure in 2013. Yet the local experts noted that the total cancer expenditure had probably increased to around 363 million until 2018, corresponding to 11.0% of total health expenditure. The former %-share is used as a lower bound and the latter %-share as an upper bound in the estimations for Jordan. In the remaining countries, experts did not know of similar information, with some noting that the national ministries of health do not have disease-specific spending targets when they approve health care budgets.

For the other seven MEA countries, an indirect method was applied to estimate the share of the total health expenditure spent on cancer. The two following approaches were taken:[8]

1. Using the disease burden in terms of deaths in a MEA country in relation to the disease burden in EU-31 and the estimated direct costs of cancer in EU-31: First, the ratio between the share of direct costs of cancer in EU-31 in 2018 (6.2%) and the mortality share of cancer in EU-31 in 2016 (26.7%) was calculated (8). This ratio was then multiplied with the mortality share of cancer in every MEA country (between 9.6% and 15.9%) in 2016. This yielded shares for the cancer-specific health expenditure between 2.2% and 3.7%; see Table 2.

[7] Search terms used were “economic burden of cancer COUNTRY”.
[8] This method was also used in a previous international cancer report in the Middle East and North Africa (70). More recently, this approach was also used by a study for Saudi Arabia which estimated the direct costs of cancer in 2015 based on epidemiological and economic data observed in the US (24). Similarly, a study on the direct costs of cancer of Syrian refugees in Jordan, Lebanon, and Turkey in 2017 based its estimations on epidemiological and economic data observed in 27 European countries (71).

2. Using the disease burden in terms of DALYs in a MEA country in relation to the disease burden in EU-31 and the estimated direct costs of cancer in EU-31: First, the ratio between the share of direct costs of cancer in Europe in 2018 (6.2%) and the DALY share of cancer in EU-31 in 2016 (19.7%) was calculated (8). This ratio was then multiplied with the DALY share of cancer in every MEA country (between 4.6% and 10.7%) in 2016. This yielded shares for the cancer-specific health expenditure between 1.4% and 3.4%; see Table 2.

Table 2: Estimation of the direct costs of cancer (not PPP-adjusted) in 2018

	GDP (M $)	**GDP per capita ($)**	**Total health expenditure (% GDP)**	**Total health expenditure (M $)**	**Total health expenditure per capita ($)**	
Algeria	173,757	4,115	6.2%	10,805	256	
Egypt	249,751	2,538	4.9%	12,357	126	
Jordan	42,231	4,238	7.8%	3,290	330	
Kuwait	141,620	34,230	5.0%	7,080	1,711	
Lebanon	56,372	8,218	8.4%	4,709	686	
Morocco	118,534	3,290	5.3%	6,297	175	
Saudi Arabia	786,522	23,337	6.4%	50,035	1,485	
South Africa	368,288	6,373	8.3%	30,396	526	
UAE	414,179	43,005	4.2%	17,503	1,817	
	Method 1 (mortality)			Method 2 (DALY)		
	Health expenditure on cancer (% THE)	Health expenditure on cancer (M $)	Health expenditure on cancer per capita ($)	Health expenditure on cancer (% THE)	Health expenditure on cancer (M $)	Health expenditure on cancer per capita ($)
Algeria	3.1% (3.7%)	331 (403)	8 (10)	2.5% (3.7%)	272 (403)	6 (10)
Egypt	3.0%	367	4	2.6%	319	3
Jordan	2.8% (6.5%–11.0%)	93 (213–363)	9 (21–36)	2.3% (6.5%–11.0%)	75 (213–363)	7 (21–36)
Kuwait	3.6%	252	61	2.1%	149	36
Lebanon	3.7%	174	25	3.4%	159	23
Morocco	3.3%	209	6	2.8%	178	5
Saudi Arabia	2.2%	1,115	33	1.8%	898	27
South Africa	2.3%	685	12	1.9%	564	10
UAE	2.8%	484	50	1.4%	253	26

Notes: M = million. GDP = gross domestic product. THE = total health expenditure. Data on GDP and on THE come from the WHO (67). Method 1 (2) relies on the share of cancer deaths (share of DALYs from cancer) in a MEA country as a basis for rescaling the share of health expenditure on cancer observed in Europe. The final numbers used throughout the report are the average of method 1 and method 2. Numbers in parentheses for Algeria and Jordan show cost estimates from local experts, and these were used in the final analysis.

The two approaches yielded similar estimates for most countries – only estimates for Kuwait and the UAE differed more. This similarity is not surprising as deaths and DALYs are highly correlated. As

it is not clear which of the two estimates represents a better reflection of the reality, the average of the two estimates in every country was calculated and applied in the final calculations.[9]

In a third and final step, the data collected and calculated in the two previous steps were combined to arrive at the health expenditure on cancer; see Table 2. The direct costs of cancer are thus only composed of costs within the health care system in this report. Cancer is defined, analogously to the data for EU-31 used in the second step, as neoplasms (ICD-10 C00-D48) although some underlying estimates for European countries only refer to malignant neoplasms (ICD-10 C00-C97).

2.3.1.2 Results

Figure 23 shows the estimated direct costs of cancer in the MEA-9 countries in 2018. Great country differences are noticeable, even though all costs were PPP-adjusted which decreased the gap between Gulf countries and the other countries. The direct costs per capita ranged from around $15 in Morocco and Egypt to over $100 in Kuwait. In Saudi Arabia and the UAE, the direct costs amounted to around $70 per capita and in Jordan to around $50–80 per capita. In Lebanon and Algeria, they were around $35 per capita, followed by South Africa with $23 per capita. By comparison, the EU-3 countries had much higher direct costs per capita of between $200 and $400 (PPP-adjusted), but these countries have also more cancer patients per capita.

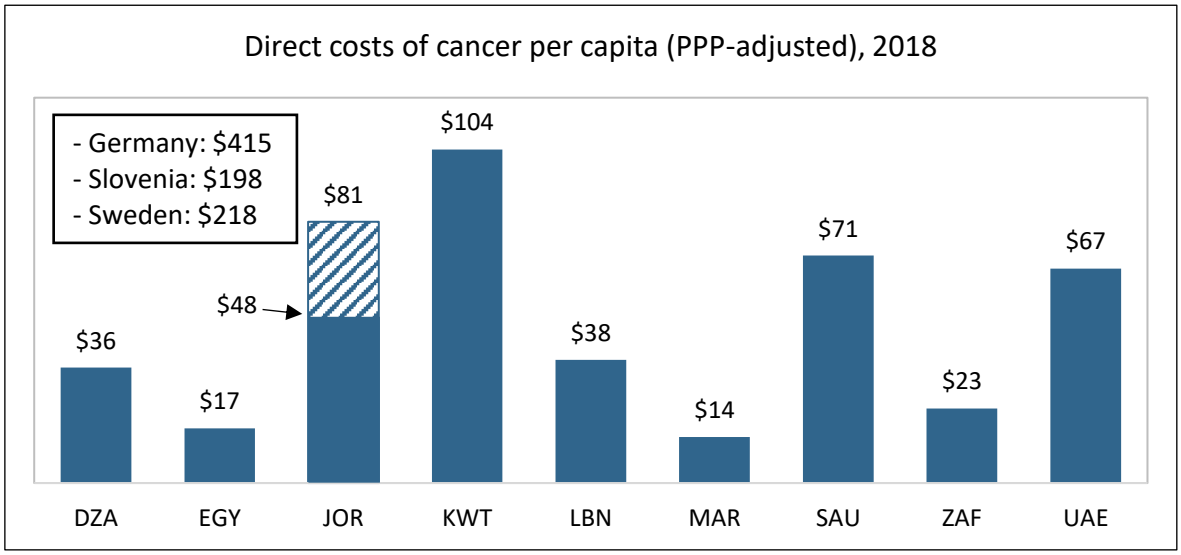


Figure 23: Direct costs of cancer per capita (PPP-adjusted) in MEA-9, 2018

Notes: The costs are the average of the estimates derived from method 1 and method 2 shown in Table 2. The hatched pattern in JOR shows an upper bound estimate based on comments from local experts.

[9] Note also that the application of data from the US, which spends around 5% of its total health expenditure on cancer (67, 72), instead of data from EU-31 in these two approaches would have yielded very similar results.

The reason for the large differences in the direct costs of cancer in Figure 23 can mainly be attributed to disparities in economic conditions in the countries. As shown in Table 2, GDP differs greatly. But the share of economic resources spent on health care overall (ranging from 4.2% in the UAE to around 8% in Jordan, Lebanon, and South Africa) matters too. The wide differences in per capita spending on health care means that there a completely different opportunities for spending on cancer in countries like Kuwait and the UAE compared to countries like Egypt and Morocco. Nonetheless, when comparing the direct costs of cancer between countries, it is important to remember that these costs only represent a single number of the monetary value of all resources used. For the monetary inputs to yield the highest benefits to patients, the allocation and organization of resources is pivotal (73).

2.3.2 Indirect costs

From an economic perspective, it is costly when patients of working age:

- are forced to be on sick leave to receive treatment and recover from the disease,
- are forced to retire early due permanent incapacity/disability, and
- die.

Info Box 6 – Indirect costs and health care decision-making

The consideration of indirect costs is important in health care decision-making to achieve an effective allocation of resources that maximizes benefits to society.

Example:

- A new medical intervention A costs the health care system $100, increases patient health by a certain extent, and reduces indirect costs by $10.
- Another new medical intervention B is used in the same patient group as A but costs the health care system $110, increases patient health by the same extent as A, and reduces indirect costs by $30.

From a health care perspective, only direct costs matter and hence intervention A should be adopted. This is because A is as good as B in helping patients, but A is $10 cheaper in terms of health care costs.

From a societal perspective, both direct and indirect costs matter and hence intervention B should be adopted. This is because B is a good as A in helping patients, but the societal costs (health care costs + indirect costs) of B are $10 lower.

A cost to society arises if these patients could have been expected to work in the absence of disease. Their foregone labor market earnings represent a productivity loss caused by morbidity (i.e., sick leave and early retirement) and premature mortality. These two types of productivity loss constitute the indirect costs of a disease (68). Costs refer here to the value of resources that are not being created

due to sick leave, early retirement, and premature death of working-age people.[10] Not considering indirect costs in health care decision-making can lead to a suboptimal allocation of resources from a societal perspective; see Info Box 6.

2.3.2.1 Methodology

Even though the concept of indirect costs is broadly accepted, there is less agreement on the exact methodology to value and calculate them (68). Two different methodologies are commonly used: the human-capital method (HCM) and the friction-cost method (FCM). The HCM takes the patient's perspective and counts any hour not worked as an hour lost, whereas the FCM takes the employer's perspective and counts only those hours not worked as lost until another employee takes over the patient's work (76). The FCM method rests on the controversial assumption that there are unemployed persons that can quickly replace cancer patients who temporarily or permanently leave the labor market. The choice of the method matters for the size of the indirect costs. The FCM typically yields smaller costs than the HCM (77). In line with previous studies on the cost of cancer (8, 9), the HCM is used for the estimation of indirect costs in this report.

The productivity loss from premature mortality represents the present value of the future earnings that a working-age person who dies would have been expected to generate throughout her/his working life.[11] In a first step, potential years of working life lost (PYWLL) were calculated for each country, based on age-specific and sex-specific data on cancer deaths (ICD-10 C00-C97) for 2018 from GLOBOCAN (3). As data on deaths are grouped into five-year age intervals, all deaths in an age interval were assumed to occur in the middle of that interval[12], and working age was defined to range from age 15 to the official retirement age in each country.[13] In a second step, PYWLL were

[10] The fact that individuals' time is a limited resource for which there is an alternative cost is widely accepted in economic theory (74, 75). One hour of lost production thus corresponds to the value of the work that would have been carried out. Transfer payments within the social security system (sick leave benefits, disability benefits, widower's/widow's pensions, etc.) should not be included to avoid double counting of costs.

[11] The value of paid work in the informal sector, the unpaid work of homemakers, or work done as volunteering is thus not included.

[12] For instance, a death in the age interval 45–49 years was assumed to occur at age 47.5 and result in 12.5 PYWLL (= retirement age of 60 years minus age at death of 47.5 years). One additional step that is sometimes taken is to correct the PYWLL in each age interval for the general risk of death in that age group to take into account the likelihood of reaching retirement age. In line with previous cancer reports, we did not correct for this.

[13] The following retirement ages were applied: DZA (60y men, 55y women), EGY (60y both), JOR (60y men, 55y women), KWT (55y men, 50y women), LBN (60y both), MAR (60y both), SAU (60y men, 55y women) ZAF (60y both), UAE (50y both) (78-80). A general criticism of this approach is that deaths of men and women are treated differently if the retirement age for men and women differs. Moreover, only deaths during working age are considered. While a value is attached to the death of a 15-year-old person, the death of a 14-year-old person is disregarded. The exclusion of 0–14-year-old children leads to an underestimation of the indirect costs.

combined with country-specific data on sex-specific mean annual earnings and sex-specific employment rates.[14] Future lost earnings were discounted with a 3.5% annual discount rate and a zero real growth rate in future earnings was assumed.

The estimation of the productivity loss from morbidity in the MEA-9 countries is more challenging as no detailed data on disease-specific sick leave and early retirement are available and no previous results in the literature were found. In order to provide a rough idea of the possible size of this type of productivity loss, a similar strategy as for the direct costs was applied. The size of the productivity loss from morbidity in each MEA-9 country was estimated based on the ratio between the loss from morbidity and the loss from premature mortality observed in EU-31 in 2018 in a previous study (8). This ratio (0.41) was applied to the estimated cost of the productivity loss from premature mortality in every MEA-9 country.

2.3.2.2 Results

The number of PYWLL due premature death from cancer differed vastly between the MEA-9 countries in 2018, see Figure 24. South Africa and Lebanon had the greatest number of PYWLL per 100,000 inhabitants of more than 300 each. This number is almost eight times the PYWLL in the UAE (38 PYWLL) and four times the PYWLL in Kuwait (75 PYWLL). Much of these large country differences between Kuwait and the UAE and all other countries are a result of lower retirement ages (around 50 years) in the two former countries compared to the rest of the countries (around 60 years). The higher retirement age in the three European countries in Figure 24 drives up PYWLL there, but despite this, Sweden achieves lower numbers than several MEA-9 countries. Figure 24 also shows that the number of PYWLL were higher in women than in men in Algeria, Lebanon, Morocco, South Africa, and the UAE. Differences in retirement age between men and women, with women retiring earlier than men in some countries, influence these results.

[14] Sex-specific mean annual earnings from employment for all countries were obtained primarily from the International Labour Organization and secondarily from national statistical offices for 2018 or the latest available year (81-85) and inflation-adjusted to 2018 prices where necessary (86). Sex-specific employment rates in the age group 15+ years in 2018 were obtained from the World Bank and applied to all PYWLL (87), implicitly assuming a uniform employment rate during working age.

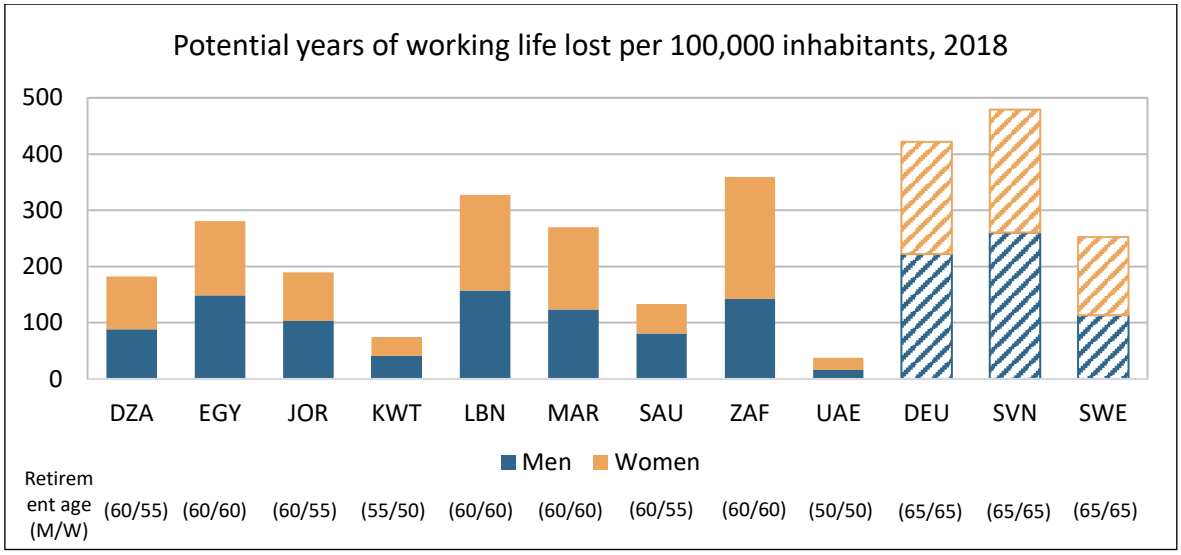


Figure 24: PYWLL from premature mortality per 100,000 inhabitants by sex in MEA-9 and EU-3, 2018

The estimates of the indirect costs of cancer in 2018 are shown in Figure 25. They are the sum of the productivity loss from premature mortality (resulting from PYWLL)[15] and productivity loss from morbidity. Saudi Arabia had the highest indirect costs of $50 per capita (PPP-adjusted) which was almost four times the size of the indirect costs in Egypt of $13 per capita. South Africa also had comparatively high indirect costs of around $40 per capita. The productivity loss from morbidity is uncertain, but here estimated to equal 29% of the total indirect costs in all countries based on the assumption made on their size in relation to the productivity loss from premature mortality. By comparison, indirect costs were around $250 per capita in Germany and Slovenia, and around $200 in Sweden (PPP-adjusted), but these countries have also much higher (male and female) employment rates, which drives up productivity losses.

[15] The results for productivity loss from premature mortality are only partly comparable to results from previous studies. A study for South Africa estimated a loss of $1.9 billion (PPP-adjusted) in 2012 compared to $1.6 billion in this report, which is inter alia explained by different assumptions on the discount rate and the future growth rate in earnings (88). A study for Saudi Arabia estimated a loss of $2.6 billion (PPP-adjusted) in 2011 compared to $1.1 billion in this report, which is inter alia explained by different assumptions on the employment rate and the retirement age (89).

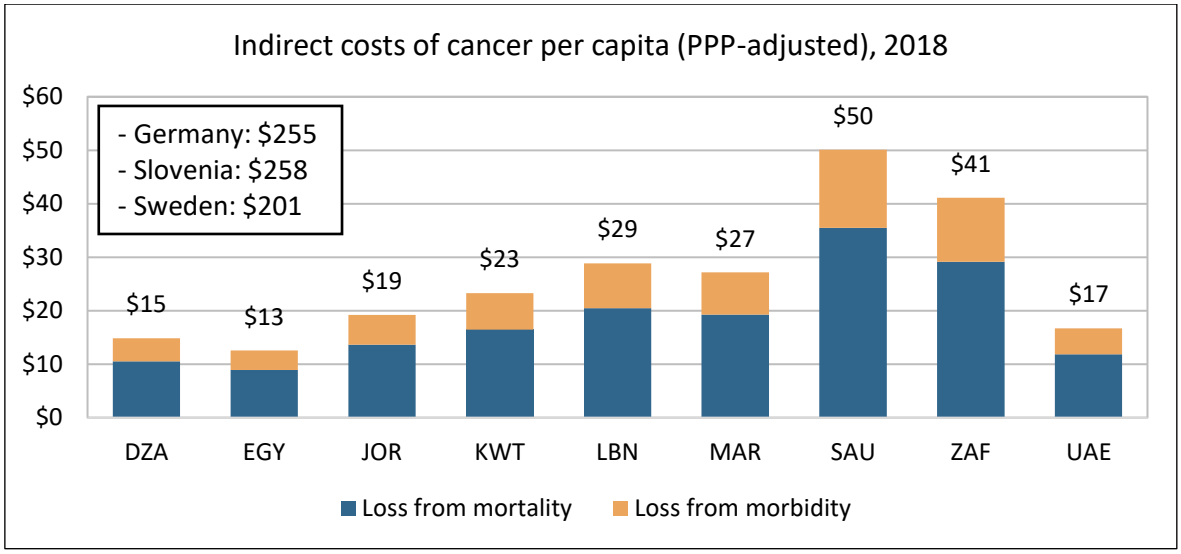


Figure 25: Indirect costs of cancer per capita (PPP-adjusted) in MEA-9, 2018

2.3.3 Informal care costs

Informal care refers to the services and help provided to the patient by informal caregivers in the form of relatives and friends (90, 91). These services are very important complements but also substitutes to formal care services. They include accompanying and transporting the patient to the hospital to receive treatment and providing support and care for the patient at home. Most palliative care is essentially provided by informal caregivers (92). If these services had not been provided informally, formal services would have been needed to replace them. This means that the work and time spent by informal caregivers entail an opportunity cost, which should be assigned an economic value.

Cancer patients in low-income and middle-income countries are more likely to have an informal caregiver (a family member) living permanently in the same household than patients in high-income countries (93). The high presence of multi-generational households in the MEA-9 countries is in this regard beneficial for cancer patients. The burden of informal care is however falling disproportionally on women who are often housewives and hence expected to help other family members in need (94-98).

A systematic assessment of the extent of informal care for cancer patients is not available in any MEA-9 country. The absence of any useful data impedes an estimation of the informal care costs. It is also difficult to gauge the approximate magnitude of the informal care costs in the MEA-9 countries based on results in Europe. As noted above, the household structure in high-income European countries is different with fewer multi-generational households and the extent of formal care services might also be higher. Nonetheless, previous results for Europe indicate that informal

care costs are about as large as morbidity-caused indirect costs. As the extent of informal care might be higher in the MEA-9 countries than in Europe, the relative size of informal care costs might also be higher in the MEA-9 countries.

2.3.4 Total costs

The sum of direct costs, indirect costs, and informal care costs represent the economic burden that cancer imposes on society. Such a societal perspective on the costs of a disease is important for decision making in health care, if the aim is to ensure value-for-money for patients, taxpayers, and society at large. Essentially every new intervention made in the health care system (e.g., use of a new drug, use of an improved surgical procedure, implementation of a screening program) will always also affect costs outside the health care system. If these costs are not taken into account, decisions might be misguided and will not maximize value-for-money for society.

In this report, only direct costs and indirect costs were possible to estimate. Figure 26 shows the combined estimates of the direct and indirect costs of cancer in 2018. Saudi Arabia and Kuwait had the highest total costs of cancer per capita with just over $120 (PPP-adjusted), followed by Jordan and the UAE with $80–100 and Lebanon and South Africa with close to $65. The total costs of cancer were lowest in Egypt with $30 per capita. By comparison, the total costs of cancer in EU-3 ranged from $418 to $671 per capita (PPP-adjusted) in 2018 (8).

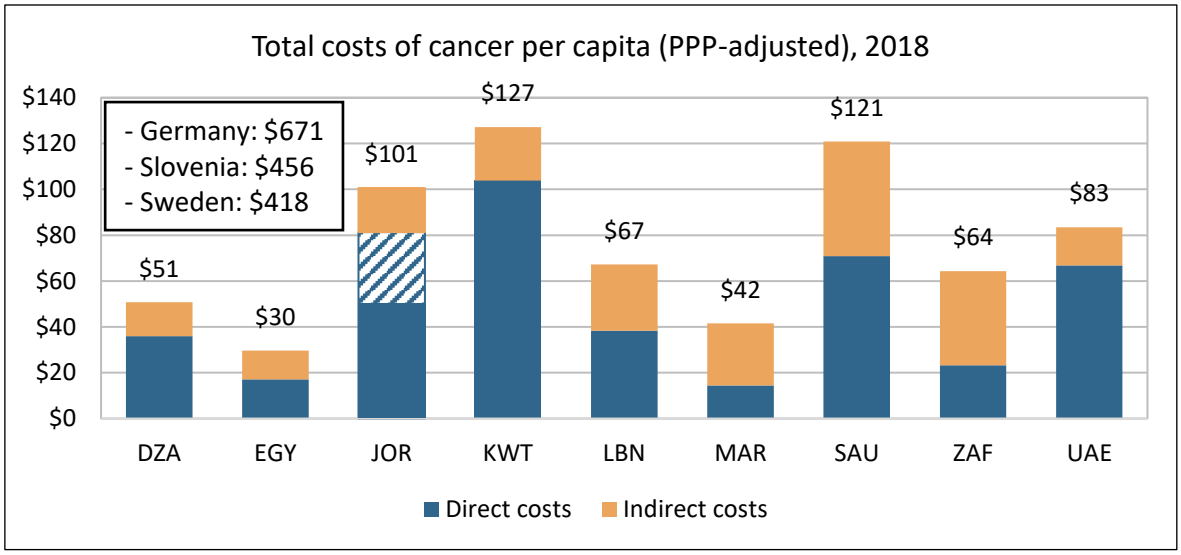


Figure 26: Total costs of cancer per capita (PPP-adjusted) in MEA-9, 2018
Notes: The hatched pattern in JOR shows an upper bound estimate based on comments from local experts.

An interesting observation in Figure 26 is the composition of the total costs. Even though Saudi Arabia and Kuwait had fairly similar total costs, they were mostly composed of direct costs in Kuwait (82%) compared to Saudi Arabia (59%). The comparatively small size of indirect costs in Kuwait

and also in the UAE is a result of low productivity losses due to low retirement ages in these countries. Direct costs and indirect costs were of similar size in Lebanon and Egypt, whereas in Morocco and South Africa indirect costs were almost twice as large as direct costs.

2.4 Key findings

- Availability of reliable and up-to-date epidemiological data on cancer to inform cancer policy is lacking in many MEA-9 countries. Good data on cancer epidemiology are vital to understand the current situation, to define future goals, and to monitor progress over time towards those goals.
- Cancer is set to become the number two cause of disease burden in the MEA-9 countries. In terms of deaths, cancer was the third-leading cause of death in 2000 and had become the second-leading cause of death behind cardiovascular diseases in six of the nine countries in 2016. In terms of DALYs, the same increasing pattern over time is observable. Cancer has jumped from being the seventh-leading cause of DALYs to fourth-leading cause of DALYs.
- The number of newly diagnosed cancer cases is increasing in the MEA-9 countries. Estimated cancer incidence (per 100,000 inhabitants) was highest in Lebanon and lowest in Saudi Arabia and the UAE in 2018. Trends in cancer incidence are partly related to the demographic change (population aging), as cancer is an aging-associated disease. Trends in risk factors such as smoking and obesity in the population also influence incidence.
- A handful of cancer types account for most of the newly diagnosed cancer cases. Breast cancer, colorectal cancer, and lung cancer were among the most common cancer types across all MEA-9 countries. The incidence of these three cancer types - most strongly for breast cancer and colorectal cancer - has also been increasing since at least 2000.
- Deaths from cancer are increasing in all MEA-9 countries, except in Saudi Arabia where they remained stable since 2000. Estimated cancer mortality (per 100,000 inhabitants) was highest in Lebanon, South Africa, and Morocco and lowest in the UAE, Saudi Arabia, and Kuwait in 2018.
- Past and current cancer survival rates are difficult to assess due to lack of and/or unreliable data. For the countries with data, survival rates for specific cancer types are generally (much) lower than in the EU-3 countries. Analyzing the mortality-incidence ratio as a proxy for survival reveals that Egypt and Morocco might have the lowest survival in cancer and Kuwait, Saudi Arabia, and the UAE have the highest. The latter countries are also distinctly

wealthier than the former countries, hinting at a positive correlation between survival and economic resources.

- The burden of cancer has an important economic dimension. Resources spent within the health care system on cancer care, hours spent by informal caregivers caring for the patient, and productivity loss from working-age patients dying prematurely, retiring early, or being on sick leave are all examples of costs that cancer imposes on society. Failing to invest in cancer care has thus wider consequences for the economy.
- Data to assess the economic burden of cancer are scarce. Disease-specific health expenditure data or cost-of-illness studies based on national resource use data hardly exist. The same is true for sick leave or early retirement data as well as data on the extent of informal care. Any such data would be important to inform a cost-conscious use of societal resources.
- The direct costs of cancer - per capita - differ greatly between countries in 2018. Per capita health expenditure on cancer ranged from around $15 in Morocco and Egypt to over $100 in Kuwait (PPP-adjusted). Differences in spending are reflecting disparities in general economic conditions and spending levels on health care.
- The indirect costs of cancer - per capita - were highest in Saudi Arabia with $50 and lowest in Egypt with $13 per capita (PPP-adjusted). In several MEA-9 countries, indirect costs were of a similar size or larger than the direct costs.
- The costs of informal care are unclear in the MEA-9 countries due to lack of data. Most supportive care is essentially only provided by informal caregivers.

3. Organization and financing of health care and cancer care

This chapter provides an overview of the health system in the MEA-9 countries. It starts with a general overview of health spending and universal health coverage (UHC). This is followed by a description of the organization and financing of the health system as well as of cancer care. A targeted literature search was performed to inform this description. Input received from local experts during workshops in all countries was also included.

3.1 Health spending and universal health coverage

A key characteristic of every health care system is the level of spending. Table 2 in section 2.3 already provides an overview and shows large differences – Gulf countries vs. other MEA countries – in absolute spending levels (US-dollars). Yet a fundamental question is how much to spend on health. This question has mainly been discussed in the context of achieving UHC. Public health researchers have also proposed setting explicit targets (99). One of the possible measures in tracking progress towards UHC are public health expenditure relative to GDP. The question of what defines an adequate level of public health spending has engaged scholars and the WHO in recent decades (100). The 2010 World Health Report of the WHO notes in relation to public health spending that it is "*difficult to get close to universal health coverage at less than 4–5% of GDP* [p.98]" (101). This informal target is thus not officially endorsed but the 5%-of-GDP reference keeps being used as a benchmark by the WHO (102).

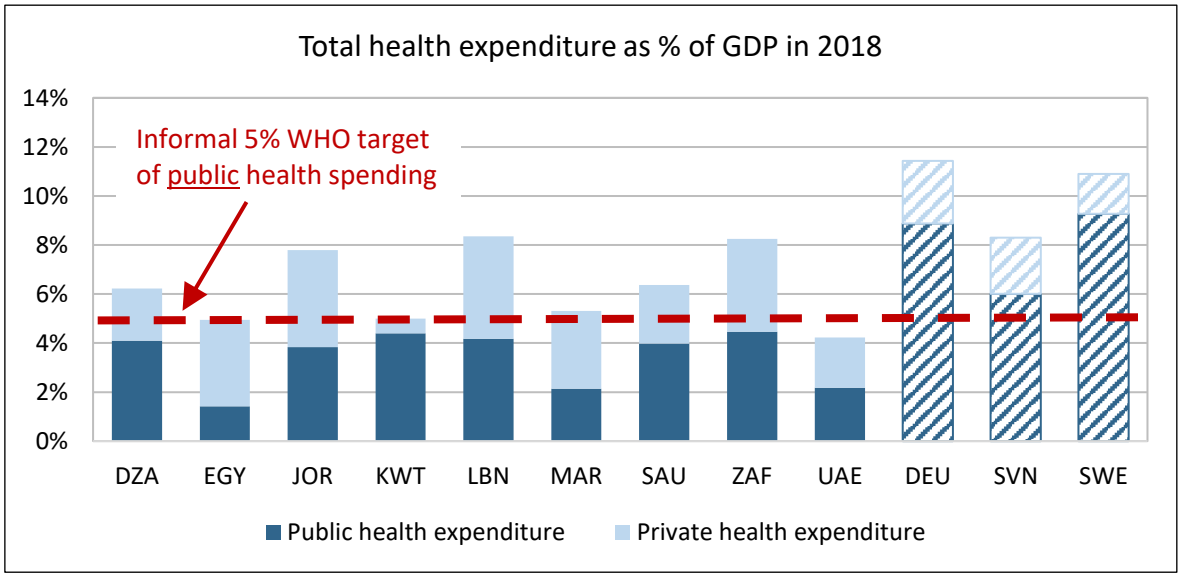


Figure 27: Total health expenditure as % of GDP, 2018
Notes: GDP = gross domestic product. Source: WHO (67).

In the MEA-9 countries, total health expenditure as a share of GDP reached 5% or more in 2018, with the exception of the UAE (whose exceptionally high GDP biases this analysis somewhat); see Figure 27. However, in none of the MEA-9 countries did public health expenditure as a share of GDP reach 5%. Egypt, Morocco, and the UAE are furthest away at 2% or less, while the remaining countries are at around 4%. By contrast, in the EU-3 countries this share is between 6% and 9% of GDP.

As emphasized above, the level of public health spending matters for being able to provide coverage to the whole population. In fact, the 2030 Agenda for Sustainable Development, adopted by all UN member states in 2015, calls for action to achieve UHC. The Sustainable Development Goal 3.8 states: "*Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines*[16] *and vaccines for all [until 2030].*" (104).

Table 3 shows the latest available estimates for the share of the population covered by public health insurance in MEA-9. Only the three Gulf countries achieve UHC for their own citizens while expatriates are required to have at least some minimum form of health insurance. South Africa is farthest away from achieving UHC.

Table 3: Share of population covered by public health insurance

	Share of population covered by public health insurance (latest available estimate)
Algeria	90%
Egypt	58.8% through the HIO, while uninsured people can get basic services at MoH hospitals
Jordan	68% for citizens and 55% for the whole population
Kuwait	100% for citizens, while expatriates need to obtain a public or a private health insurance
Lebanon	47% for citizens (7% only have private health insurance), while uninsured citizens are covered by the MoPH, and refugees might be covered by different UN agencies
Morocco	68%
Saudi Arabia	100% for citizens and expatriates working in the public sector, while expatriates working in the private sector receive compulsory insurance coverage through their employer
South Africa	17% with medical aid schemes, while uninsured people can get basic services at public sector clinics and centers
UAE	100% for citizens, while expatriates receive insurance coverage through their employer
Germany	90%, while the rest must have private insurance
Slovenia	>99%
Sweden	>99%

Source: see the country-specific sections describing the health system below.

A cancer diagnosis and the absence of UHC typically has severe effects on patients' financial situation, as illustrated by a recent study from Morocco. Among a sample of patients treated at the

[16] The WHO defines essential medicines as "a subset of the total range of pharmaceuticals that satisfy the priority health care needs of the population. They are selected with due regard to public health relevance, evidence on efficacy and safety, and cost–effectiveness." (103).

leading cancer center in Rabat, 66% of patients were uninsured and almost all patients claimed that cancer is a costly disease as well as a disease that leads to a drop in income and inevitable impoverishment (105).

Total health expenditures are financed through a mix of sources, with public spending typically accounting for the greatest contribution; see Figure 28. Absence of UHC – in Egypt, Jordan, Lebanon, Morocco, South Africa – finds a clear expression in a greater share of health expenditure covered by private health insurance and out-of-pocket payments (OOP). The influence of the large number of expatriates that need to obtain private health insurance in Saudi Arabia and the UAE is also visible in Figure 28.

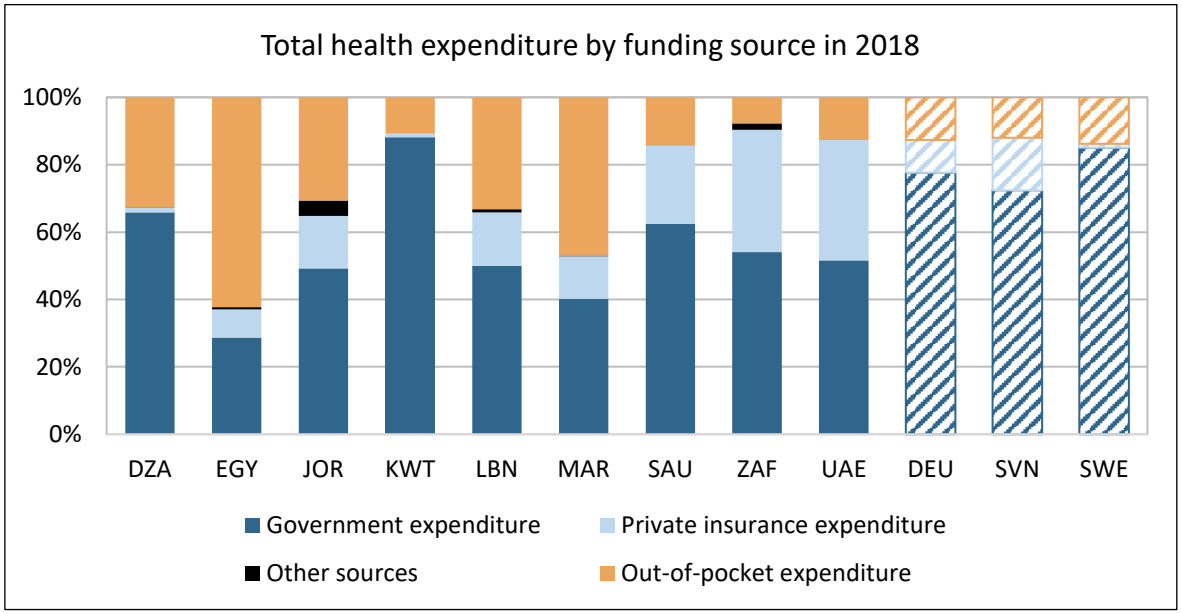


Figure 28: Total health expenditure by funding source, 2018

Notes: "Other sources" encompass non-domestic funding, such as development aid. Source: WHO (67).

3.2 Algeria

Table 4: Algeria – overview

Population (2019) (13, 106)	43.1 million (0.6% foreigners)		**Men**	**Women**
GDP per capita (in PPP) (2019) (107)	11,997 Int$	**Cancer incidence, no. of cases (2018) (14)**	17,088	25,632
Total health expenditure (% of GDP) (2018) (67)	6.2%	**Cancer mortality, no. of cases (2018) (3)**	15,727	13,201
Pharmaceutical spending (% of total health expenditure) (2016) (108)	31.2%	**Top 3 cancer types, incidence (2015) (14)**	1. Colorectum 2. Lung 3. Bladder	1. Breast 2. Colorectum 3. Thyroid
Life expectancy (2015–2020) (109)	76.6 years	**Top 3 cancer types, mortality (2018) (3)**	1. Lung 2. Colorectum 3. Stomach	1. Breast 2. Colorectum 3. Cervix uteri

3.2.1 Health system

The health system is overseen by the Ministry of Health, Population, and Hospital Reform (MSPRH), which is responsible for disease prevention, disease management, research and planning, cooperation, training, and hospital reforms (110). There are five regional health councils and health observatories as well as 58 (until recently 48) directorates of health and population, one in every province (111). The first level of public health care are primary care clinics (salle de soins) providing basic care services and prevention services. From these clinics, patients are referred to polyclinics or hospitals. The public hospital sector consists of general hospitals (EPH), community hospitals (EPSP), specialized hospital centers (EHS), and university hospital centers (CHU) (112).

The public health system is financed through contributions from the state and two compulsory public insurance funds regulated by the Ministry of Labor and Social Security (113-115). The two funds are the Caisse Nationale des Assurances Sociales des Travailleurs Salariés (CNAS), covering employed people and their families and financed via contributions from employees and employers, and the Caisse Nationale de Sécurité Sociale des Non-Salariés (CASNOS), covering self-employed people (116, 117). 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 (118, 119). However, the reimbursement amount by CNAS/CASNOS for medical services is usually less than the amount paid by the patient, thus necessitating co-payments. The uninsured population needs to rely on OOP when accessing health services, although they can get some free care in public hospitals when sick.

The private health care sector is limited. It is not integrated with the public sector. Unless patients have a private health insurance (which few have according to local experts), they have to pay the full price for all private medical care services OOP (119).

3.2.2 Cancer care

Cancer patients covered by CNAS/CASNOS receive free care in the public health care system, covering all cancer care services – surgery, radiation therapy, drugs. Treatment of cancer patients in the public sector is mainly provided at EHS which have dedicated cancer treatment centers (centre anti-cancer, CAC) attached to them, but also at EPSP and CHU (112). There are over 20 public CAC and 7 radiation therapy centers, according to local experts.

Despite public health insurance coverage for the vast majority of the population, the main challenges of the current cancer care system are – according to local experts – the quality of care and the inaccessibility of certain services in the public health sector. Services accessed in the private health sector are not covered. Despite this, many patients undergo blood and X-ray examinations in the private sector, which places a heavy burden on low-income families. Waiting times for receiving treatment in the public sector differs by the kind of service. For surgery, there are no delays and for medical oncology, there is at most a 2-week delay. However, there are long delays for radiation therapy – whereas in some regions patients only have to wait for a few weeks, in the southern parts of Algeria they wait for six months and in the eastern part for three months. In addition, many modern cancer drugs (targeted therapies and immunotherapies) are currently (mid-2021) not available, although this might change toward the end of 2021. Wealthy patients are travelling to Morocco or Turkey to receive those drugs and pay OOP.

3.3 Egypt

Table 5: Egypt – Overview

Population (2019) (13, 106)	100.4 million (0.5% foreigners)		**Men**	**Women**
GDP per capita (in PPP) (2019) (107)	12,261 Int$	**Cancer incidence, no. of cases (2018) (3)**	62,531	65,106
Total health expenditure (% of GDP) (2018) (67)	4.9%	**Cancer mortality, no. of cases (2018) (3)**	46,136	38,396
Pharmaceutical spending (% of total health expenditure) (2016) (108)	25.9%	**Top 3 cancer types, incidence (2018) (3)**	1. Liver 2. Bladder 3. Non-Hodgkin lymphoma	1. Breast 2. Liver 3. Non-Hodgkin lymphoma
Life expectancy (2015–2020) (109)	71.7 years	**Top 3 cancer types, mortality (2018) (3)**	1. Liver 2. Lung 3. Bladder	1. Breast 2. Liver 3. Non-Hodgkin lymphoma

3.3.1 Health system

The health system is overseen by the Ministry of Health and Population (MoHP). The system is fragmented with multiple public, quasi-public, and private providers and financing entities (120-122). Public health providers include the MoHP and separate entities which provide health care to the military and the police, with funding coming from the Ministry of Finance and co-payments of patients (121). Another public provider – concentrated in Cairo and other urban areas – are the University Hospitals that are run by the Ministry of Higher Education (121). The Teaching Hospitals and Institutes Organization is a quasi-governmental 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 (121). 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 (121). 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 five years of age, with funding mainly coming from insurance premiums and co-payments of patients (121, 123). Lastly, the private sector includes a wide network of for-profit and non-profit providers with outpatient clinics and hospitals across the whole country (124).

Hospitals are the main entry point to the health care system. Primary health care (e.g., a system with general practitioners' offices) is not well developed, according to local experts. The fragmentation of hospital providers is a major challenge. They provide different types of care and different quality

of care. The WHO has also noted that the fragmentation leads to duplication and inefficiencies in the allocation of financial and human resources and in capital investment in the health care system (122). According to local experts, moving towards a system with comprehensive primary health care facilities as the main point of entry to the health care system (like in Europe) would be good in principle. But it would require a complete overhaul of the health system, ranging from educating primary care physicians, building new facilities, establishing referral system, developing a functioning reimbursement system, etc.

Around 58.8% of the population was covered by compulsory public insurance through the HIO in 2017, up from 51% in 2011 (125, 126). However, less than half of the insured patients are actually utilizing the HIO health care services (121). The main reason is that the HIO is only able to provide low-quality health services and waiting lists for some urgent interventions are long. This forces many patients to seek help in the private sector. According to local experts, if patients have enough private financial means, they choose they private sector over HIO and MoPH services. Uninsured patients can access services at facilities run by the MoHP. Many basic services at the MoHP facilities are free while the rest require co-payments. Despite this, the utilization of MoHP outpatient facilities is low as even uninsured patients rather seem to seek care in the private sector (121). However, there are major plans underway to fix some of these challenges.

A provision in the constitution of 2014 has put Egypt on track for progressing towards UHC (122). The legislative structure for this is the universal health insurance law from December 2017, which aims to replace the HIO insurance coverage by extending it to cover all citizens (thus also covering people working in the informal sector) with the new Universal Health Insurance System (UHIS). This transformation is part of the Egypt Vision 2030 (127-129). The implementation of the UHIS has already started in five governorates as part of the law's first phase (128, 130). The plan is to implement the law in all 27 governorates of the country in six geographical phases to achieve UHC by 2027 (previously the aim was by 2032) (131-133).

3.3.2 Cancer care

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. After cancer being 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 (134). Yet a challenge highlighted by local experts

are high co-payments for cancer care services, in particular for cancer drugs. There are around 16 comprehensive cancer centers (135). The National Cancer Institute in Cairo, established in 1969, is the leading cancer treatment center and cancer research and teaching institute (136). The MoHP commissioned the National Cancer Institute to control cancer incidence and mortality in the country through developing quality programs in electronic integrated registration, patient cancer care, prevention, education, and research (137, 138). In response to the increasing cancer burden, the MoHP established cancer centers in more governorates besides the specialized cancer centers in MoHP hospitals and university hospitals (139). In 2018, the HIO launched its first dedicated cancer center. The center started to provide breast and cervical cancer treatment to the HIO insured population, for free or at a reduced price, until the universal health insurance law is implemented (123, 140).

Cancer patients may also seek care in the private sector at their own expense or with private insurance coverage. NGO organizations 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 (141, 142).

3.4 Jordan

Table 6: Jordan – overview

Population (2019) (13, 106)	10.1 million (33.1% foreigners)		**Men**	**Women**
GDP per capita (in PPP) (2019) (107)	10,497 Int$	**Cancer incidence, no. of cases (2018) (3)**	4,987	5,872
Total health expenditure (% of GDP) (2018) (67)	7.8%	**Cancer mortality, no. of cases (2018) (3)**	3,117	2,677
Pharmaceutical spending (% of total health expenditure) (2016) (108)	33.8%	**Top 3 cancer types, incidence (2018) (3)**	1. Lung 2. Bladder 3. Colorectum	1. Breast 2. Colorectum 3. Thyroid
Life expectancy (2015–2020) (109)	74.3 years	**Top 3 cancer types, mortality (2018) (3)**	1. Lung 2. Colorectum 3. Stomach	1. Breast 2. Colorectum 3. Lung

3.4.1 Health system

The health system is overseen by the Ministry of Health (MoH) and consists of a public and a private sector (143, 144). The public system relies on primary care clinics as the first point of contact with the health care system (143, 145). These clinics offer access to different services, including vaccination and chronic disease management (143). There are over 30 public hospitals affiliated to

the MoH and spread across the whole country, and there are also over ten military hospitals of the Royal Medical Services (RMS), two educational hospitals, and over 60 private hospitals (146, 147). There are also several health care centers affiliated to the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA).

Public health insurance was first introduced to the Jordanian armed forces in 1963 and the MoH implemented the first civil health insurance in 1965 (144). In 2008, around 75% of the total population were covered by public and private health insurance (148), while this declined to 55% of the total population (68% among Jordanian citizens) in 2015 (149). The decline in the coverage rate compared to 2008 was influenced by the large influx of refugees from neighboring Syria; see Info Box 7. Among the insured population in 2015, 44.5% were insured by the MoH (civil health insurance fund), 38% by the RMS, and 17.5% by others, including UNRWA and private health insurance (149). 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 (150). Jordanian citizens classified as "poor" by the Ministry of Social Development are also covered by the civil health insurance fund (145). All citizens receive MoH benefits provided at subsidized fees and co-payments apply generally (145).

Info Box 7 – Health care access of Syrian refugees in Jordan

After the start of the Syrian civil war in 2011, Jordan has been one of the countries that received the highest number of refugees (151, 152). In 2020, there were around 1.3 million Syrians living in Jordan, of which around half were registered with the United Nations High Commissioner for Refugees (UNHCR) (153, 154). Until 2014, the UNHCR-registered refugees could receive free health services from public facilities. The dependence of refugees on the public health services caused a great burden on the Jordanian health care system (155). After 2014, there was a transition from free to subsidized health services, necessitating refugees to start paying co-payments (154). The government of Jordan manages the refugee situation through the Jordan Response Plan (156). A result of the plan was the MoH announcement in 2020 of a reduction of the subsidized fees for health services so that they match the coverage rate that applies to non-insured Jordanians (154).

3.4.2 Cancer care

Cancer care is provided at no cost to all Jordanian citizens in the public sector, irrespective of insurance status of the patient for general health care (157). Non-Jordanian cancer patients, including refugees, usually have to pay their own expenses, unless they are covered either by their own governments or by charitable organizations that collaborate with the treating hospital (158). Private insurance companies usually do not cover screening or cancer treatment costs (157).

Cancer treatment is provided through public hospitals affiliated with the MoH and the RMS, university hospitals, and the King Hussein Cancer Center (KHCC) (157). There are no more private

cancer clinics since the establishment of the KHCC and only around 1% of patients might go abroad to seek treatment when no more treatment lines are left, according to local experts. 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 (159). According to local experts, the KHCC treats around 60–70% of all cancer patients in Jordan (160). Patients seek care either directly at the KHCC or are referred to the KHCC. In recent years, fewer patients could have been referred to the KHCC due to funding cuts by the government to the KHCC. This means that many patients have to receive treatment at public hospitals, which often have small oncology departments and low expertise in treating cancer. This creates unequal access to cancer care. There is also no proper and clear referral system of patients to the KHCC. An additional organizational challenge is the absence of structured primary care programs and services in the whole country. This requires cancer centers (instead of primary care clinics) to address treatment-related complications and co-morbidities during and after treatment, which puts additional burden on them (160).

The King Hussein Cancer Foundation (KHCF) and the KHCC offer the only available cancer care insurance scheme for cancer treatment at the KHCC to both adults and children from all nationalities (161). The insurance scheme is non-profit, and subscribers pay an annual fee. The scheme covers cancer care costs partially as well as offers one free annual screening to the subscribers (161). In December 2020, there were around 213,000 subscribers, mostly Jordanians and mostly subscribed through their employer, according to local experts.

3.5 Kuwait

Table 7: Kuwait – Overview

Population (2019) (13, 106)	4.2 million (72.1% foreigners)		**Men**	**Women**
GDP per capita (in PPP) (2019) (107)	51,962 Int$	**Cancer incidence, no. of cases (2018) (3)**	1,525	2,037
Total health expenditure (% of GDP) (2018) (67)	5.0%	**Cancer mortality, no. of cases (2018) (3)**	841	801
Pharmaceutical spending (% of total health expenditure) (2016) (108)	18.1%	**Top 3 cancer types, incidence (2018) (3)**	1. Prostate 2. Colorectum 3. Non-Hodgkin lymphoma	1. Breast 2. Thyroid 3. Colorectum
Life expectancy (2015–2020) (109)	75.3 years	**Top 3 cancer types, mortality (2018) (3)**	1. Lung 2. Colorectum 3. Liver	1. Breast 2. Colorectum 3. Leukemia

3.5.1 Health system

The health system is divided into two levels; the central Ministry of Health (MoH) and six regional health offices. The health sector in each region has its own autonomy and decentralized administration role since 1998 (162, 163). The regional offices supervise and manage one or more general hospitals, some specialized outpatient clinics, and primary health centers (polyclinics). They also regulate the private health sector within their designated area (163, 164).

The government introduced a comprehensive health care system to the whole population with free services in the 1950s (163). Based on the latest national review report, the country had attained UHC by the end of the millennium development goals in 2015 (165). All local citizens have free access to the public health system. Expatriates are obligated to apply for a health insurance plan within the public or the private sector (164, 166). Expatriates pay KWD 2 (USD 7) per visit at a polyclinic and KWD 10 (USD 33) per hospital outpatient visit OOP (167). There are also special fees for diagnostic imaging services and laboratory tests, but then typically NGOs help to pay for the fees if the patient cannot afford them (164). A new compulsory health insurance for expatriates working in the private sector was announced in November 2020 (168). Employers will be obligated to pay for the health insurance of their expatriate employees. The insurance will cover most OOP fees, including for X-rays, MRI, PET imaging, laboratory tests. The OOP fee for medical consultation at a polyclinic will continue to be KWD 2 per visit and not be covered.

Even though full access to health care is guaranteed to everyone, increasing the quality of the provided health care is still one of the pillars in the national development plan, the Kuwait Vision 2035 (165, 169).

3.5.2 Cancer care

Cancer care is regulated by the MoH and provided through the Kuwait Cancer Control Center (KCCC) which was founded in 1968 (170). The KCCC is the only place where cancer patients are treated; there are no private providers. It treats over 3000 new cancer patients each year (170). In addition to Kuwaiti residents, also patients from countries part of the Arab States of Gulf Cooperation Council (Kuwait, Saudi Arabia, the UAE, Qatar, Bahrain, and Oman) can receive treatment at the KCCC (170). Before COVID-19, patients from Saudi Arabia that live close to the border with Kuwait would regularly come to the KCCC.

Cancer care services are generally provided for free to local citizens within the public health system. For expatriates with valid residency permits, OOP fees for cancer diagnosis and treatment in all hospitals and clinics were waived in 2011 (171). Since 2018 no more new residency permits are

issued to expatriates who have cancer in an effort to reduce the health care costs of expatriates (172). However, a cancer diagnosis for expatriates already working in the country is not a red flag and they will not be forced to leave the country. Local experts noted that expatriates can be required to be at their workplace physically, and then it is difficult to get time off for treatment. This can result in termination of the work contract. But in general, many employers/households are very supportive and even help to provide and pay for drugs for the expatriates.

3.6 Lebanon

Table 8: Lebanon – overview

Population (2019) (13, 106)	6.9 million (27.2% foreigners)		**Men**	**Women**
GDP per capita (in PPP) (2019) (107)	15,167 Int$	**Cancer incidence, no. of cases (2018) (3)**	8,458	8,298
Total health expenditure (% of GDP) (2018) (67)	8.4%	**Cancer mortality, no. of cases (2018) (3)**	4,810	3,904
Pharmaceutical spending (% of total health expenditure) (2016) (108)	49.3%	**Top 3 cancer types, incidence (2018) (3)**	1. Prostate 2. Bladder 3. Lung	1. Breast 2. Colorectum 3. Lung
Life expectancy (2015–2020) (109)	78.8 years	**Top 3 cancer types, mortality (2018) (3)**	1. Lung 2. Bladder 3. Prostate	1. Breast 2. Lung 3. Colorectum

3.6.1 Health system

The health system is overseen by the Ministry of Public Health (MOPH) (173). The main entry point to the health care system are primary health care centers that are spread all over the country (173, 174). In 2019, there were 238 such centers across the eight Lebanese provinces and they were operated by different entities; 68% were owned and managed by NGOs, 13% by local municipalities, 9% by the MOPH, 8% jointly by NGOs and municipalities, and 2% by to military and academic entities (175). There were 29 public hospitals and 136 private hospitals in 2020 (176). The private sector is the main provider of health care and it accounts for over 80% of the total health care capacity in the country (177).

The public health system is funded by six employment-based social insurance schemes (178). The largest scheme is the National Social Security Fund (NSSF), covering mainly the population employed in the private sector (179). The Civil Servants Cooperative (CSC) covers mostly public sector employees. There also four military schemes: Army, Internal Security Forces, General Security Forces, and State Security Forces. All six schemes have their own rules on what services

are covered and the size of reimbursement rates. It is also fairly common for people to have private health insurance. In total, only 47% of Lebanese citizens were insured in 2017; around 23% percent were covered by the NSSF, 9% by the military schemes, 7% by private insurance, 4% by the CSC and 4% by other schemes (180). The remaining 53% of citizens lack formal coverage, and they are covered by the MOPH, which acts as an "insurer of last resort" (180-182). The MOPH provides a defined health care package to the uninsured population that they can access at the few public hospitals and outpatient clinics as well as at contracted private hospitals. The MOPH covers 85% of the hospital inpatient expenditures as well as provides prescription drugs for severe diseases (cancer, HIV, multiple sclerosis, mental illness) free of charge (181, 182). Despite the coverage by the MOPH, the World Bank has noted that financial protection is quite low and that an over reliance on OOP for certain health services pushes many citizens into poverty in addition to the inequities in the access to health services (180).

Since 2011, the war in Syria has represented a burden on the health system due to large influx of refugees (183, 184). The health system has shown resilience in accommodating the increasing population (185). The support of international organizations such as the WHO and the UN Refugee Agency (UNHCR) played an important role in planning and covering the health care services alongside the MOPH (185). Similarly, health care services for Palestinian refugees are covered through the UN Relief and Works Agency (UNRWA) which operates several dozens of health care centers in the country (178, 182).

The biggest challenge to the health system is the ongoing economic crisis (186); see Info Box 8. According to local experts, the health care budgets are facing severe cuts and many hospitals and clinics cannot function normally anymore.

Info Box 8 – The economic crisis in Lebanon

Lebanon has faced a severe economic crisis since mid-2019. In August 2019, due to what has been described as a Ponzi-like scheme in which the government borrowed from local banks at high interest rates, there has been a growing probability that the government would default on maturing debt obligations (187). Since December 1997, Lebanon had pegged its local currency (the Lebanese pound) against the US-dollar, but the likely default on the debts increased the likelihood that the government would solve the crisis by devaluating the Lebanese pound (187). Even though the central bank maintained the official peg to the US-dollar, the actual exchange rate had plunged by almost 80% until June 2020 (188). By then, the government had already defaulted on several loans. The depreciation of the Lebanese pound led to hyperinflation and pushed people into unemployment and poverty. The situation was exacerbated by COVID-19 and also a massive explosion of ammonium nitrate in August 2020 that destroyed the port of Beirut and buildings around it and left over 300,000 people homeless (189). This led also to a severe political crisis. In 2021, the economic situation continued to deteriorate and the country is currently on the brink of collapse (190).

3.6.2 Cancer care

Cancer care is provided at public and private hospitals. For insured cancer patients, the NSSF covers 90% of hospital care services through direct payment to hospitals and reimburses 95% of expenditure for cancer drugs and 80% for all other drugs and outpatient services (191). According to local experts, patients with private health insurance have their treatment costs covered, but insurance companies might significantly increase the premium after diagnosis. For uninsured cancer patients, the MOPH offers treatment services free of charge based on national protocols updated every 3 to 5 years (184). Clinicians submit a form to the MOPH with the drugs to be received by the uninsured patient. Increases in cancer drug costs have however impaired MOPH coverage already before the current economic crisis (192, 193). The Palestinian refugees receive insurance support from the UNRWA that covers around half of cancer treatment costs (194, 195). Despite this support, most refugees cannot afford cancer treatment expenses at Lebanese hospitals even before the current economic crisis (195). The UNRWA support is also jeopardized in the face of increasing conflict and poverty and prevalence of NCDs among the refugee population (194, 196).

The current economic crisis (see Info Box 8) affects cancer care provided to both insured and uninsured citizens as well as refugees. In November 2019, 10 out of 60 hospitals that offer chemotherapy treatment to cancer patients had to stop delivering it (195, 197). According to local experts, cancer drugs are paid for in US-dollars and hence paying for drugs in Lebanese pound no longer allowed the purchase of many drugs after the pound's depreciation. Health care spending on cancer care has been reduced gradually, in particular on newer cancer drugs. By January 2021, only 2–3 university hospitals still administered modern cancer drugs (immunotherapy and targeted therapy). Smaller hospitals no longer spent money on these drugs. In addition, the MOPH had to reduce its budget and is no longer paying for the free provision of modern cancer drugs to uninsured patients.

3.7 Morocco

Table 9: Morocco – overview

Population (2019) (13, 106)	36.5 million (0.3% foreigners)		**Men**	**Women**
GDP per capita (in PPP) (2019) (107)	7,856 Int$	**Cancer incidence, no. of cases (2018) (3)**	24,844	27,216
Total health expenditure (% of GDP) (2018) (67)	5.3%	**Cancer mortality, no. of cases (2018) (3)**	18,539	14,106
Pharmaceutical spending (% of total health expenditure) (2016) (108)	23.8%	**Top 3 cancer types, incidence (2018) (3)**	1. Lung 2. Prostate 3. Colorectum	1. Breast 2. Cervix uteri 3. Colorectum
Life expectancy (2015–2020) (109)	76.3 years	**Top 3 cancer types, mortality (2018) (3)**	1. Lung 2. Prostate 3. Colorectum	1. Breast 2. Cervix uteri 3. Colorectum

3.7.1 Health system

The health system is overseen by the Ministry of Health (MoH) and consists of a public and a private sector. The MoH is the main provider of health care services, with around 70% of the population accessing care at public hospitals (198). The majority of private health care facilities are located in Casablanca, Rabat, and in other larger cities. Outside larger cities, access to public and private health care services is limited. The MoH aims to use mobile health care services to reach rural and other isolated areas (199).

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) (200). The ANAM is responsible for supervision, management, and regulation of two main insurance schemes: the Mandatory Health Insurance Plan (Assurance Maladie Obligatoire, AMO) and the Medical Assistance Regime (Régime d'Assistance Médicale, RAMED). 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. RAMED is a scheme that targets poor and vulnerable households (201-203). 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 OOP (198). AMO only reimburses these health care services if they are accessed in the public health system. AMO provides better health coverage in terms of accessible services than RAMED. Self-employed people might have a private health insurance that can cover health care expenses, but otherwise they have to rely on OOP. Around 47% of the

population were covered by AMO and RAMED in 2017 (204). This proportion had increased to 68% in 2020 (205).

During the period 2020–2024, the ANAM plans to extend basic medical coverage to additional population groups. The aim is to achieve UHC (i.e., >95% population coverage) by 2025 (206). RAMED will disappear. The whole population will be covered by another system that covers poor/vulnerable households and self-employed people. Concrete action on this has started in 2021 and there is political will to carry through this major undertaking, according to local experts.

3.7.2 Cancer care

There are several dozens of public and private cancer care centers spread across larger cities with multiple centers in Casablanca and Rabat (207). The leading cancer institute is the National Institute of Oncology in Rabat, which treats around 6,000 new patients per year (105). The Lalla Salma Foundation, a non-profit organization, was established in 2005 aiming to prioritize the fight against cancer in Morocco (208).

Cancer care services in the public cancer care centers for patients on AMO are fully covered without any co-payments, according to local experts. For patients on RAMED and for uninsured patients, cancer care services are not covered at all. Some patients (such as some self-employed people) may have a 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 drugs. In December 2019, the MoH launched an initiative to provide free cancer treatment for all children under the age of five (209).

3.8 Saudi Arabia

Table 10: Saudi Arabia – overview

Population (2019) (13, 106)	34.3 million (38.3% foreigners)		**Men**	**Women**
GDP per capita (in PPP) (2019) (107)	48,948 Int$	**Cancer incidence, no. of cases (2018) (3)**	12,194	12,173
Total health expenditure (% of GDP) (2018) (67)	6.4%	**Cancer mortality, no. of cases (2018) (3)**	6,079	4,406
Pharmaceutical spending (% of total health expenditure) (2016) (108)	21.6%	**Top 3 cancer types, incidence (2018) (3)**	1. Colorectum 2. Non-Hodgkin lymphoma 3. Leukemia	1. Breast 2. Thyroid 3. Colorectum
Life expectancy (2015–2020) (109)	74.9 years	**Top 3 cancer types, mortality (2018) (3)**	1. Colorectum 2. Liver 3. Lung	1. Breast 2. Colorectum 3. Leukemia

3.8.1 Health system

The health system is fragmented with multiple public providers and private providers. There are at least five public providers. The Ministry of Health (MoH) is the largest provider covering around 80% of all public employees. There are two providers for the military (the National Guard and the Armed Forces Medical Services). The Ministry of Education acts as a provider for university employees and students, and the Ministry of the Interior acts as provider for the police and customs officers. According to local experts, the public providers are not looking at each other and act independently. Patients might be treated differently by different providers. This fragmentation is a major challenge, as nobody can or is taking the lead.

Primary health care centers act as the first point of access to health care and provide essential health care services, ranging from vaccinations to managing chronic diseases (210). The MoH operates primary health care centers as well as hospitals across the whole country. In 2018, there were a total of 2,390 health care centers and 284 hospitals affiliated to the MoH (210, 211). There were also 158 private hospitals in 2017 (212). The MoH provides around 60% of all health services, the other public providers 17% and the private sector 23% (213).

All local citizens as well as all expatriates working in the public sector have free access to public health care services (214). Expatriates working in the private sector must have compulsory health insurance through their employer, and they are generally treated in the private sector (215, 216). The employer-provided insurance only covers a basic level of care and (white-collar) private-sector expatriates therefore often buy a 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 (212, 216).

The governance and organization of the health care system is currently changing profoundly as part of the Saudi Vision 2030 (217), which states: "*..., we will introduce corporatization into the sector by transferring the responsibility for health care provision to a network of public companies that compete both against each other and against the private sector*." According to local experts, the ultimate aim of Saudi Vision 2030 is to ensure that every patient should be treated for free and have good access to high-quality care. All public providers will be put under one umbrella to minimize the fragmentation. The MoH will act as a regulator and regulate the other public providers, but the health care provision will still be in their hands as well as in the hands of the MoH. The MoH will have four functions: (1) provision of care (the plan is to create "health care clusters" covering primary-secondary-tertiary care in defined geographic areas that define referral and provision of care at all stages – this also includes cancer care), (2) payment for care (through a National Health Insurance Center), (3) supervision, (4) regulation. It is not yet clear how "corporatization" will happen and the effect it will have. As part of the Saudi Vision 2030, the MoH has recently also started to place more emphasis on providing value-based health care, in particular in relation to the introduction of new therapies (218).

3.8.2 Cancer care

The vast majority of cancer patients are treated at hospitals in the various public sectors (MoH, military, etc.), where citizens and public-sector expatriates receive free treatment and co-payments are required (219). Only a small fraction of patients seeks care at private treatment centers (219). However, a great number of wealthier cancer patients used to seek care abroad (over 1,800 patients in 2016), predominantly in the US and Germany (216). According to local experts, fewer wealthier patients (around 300 in 2020) seek care abroad nowadays, as a result of budget cuts for this mode of care delivery. Private-sector expatriates and their dependents may not afford cancer treatment if they do not have a private health insurance that complements the compulsory employer-provided insurance. They might be helped by NGOs to cover the cost of treatment (220).

The main national cancer care centers (all affiliated with the MoH) are located in Riyadh, Jeddah, and Dammam (221). They offer modern cancer treatment and have qualified medical staff (219). Yet these big centers are overcrowded, because patients from all over the country try to get treatment there, according to local experts. Radiation therapy centers do not exist outside the three cities. During recent years, the MoH has established smaller cancer treatment centers ("satellite centers")

in other cities, such as Mecca, Medina, and Qassim (222). According to local experts, the aim is to establish these satellite centers in all 20 regions of the country by 2030. Currently, 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 (223).

Apart from the great geographic disparities in the quality of cancer care, there are several other challenges. Patients tend to arrive at an advanced stage which contributes to a high number of cancer deaths (222). Lack of access to modern treatment, including modern cancer drugs, has also been a long-standing issue (221, 224, 225). In addition, the current fragmentation of the public health providers inhibits collaboration between the providers. This blocks the national cancer registry from functioning well, good cancer research at the national level cannot be conducted (only possible at the level of different institutes), no screening programs can be implemented "nationwide", no real national guidelines for treatment exist and thus cancer patients might be treated differently by different providers.

3.9 South Africa

Table 11: South Africa – overview

Population (2019) (13, 106)	58.6 million (7.2% foreigners)		**Men**	**Women**
GDP per capita (in PPP) (2019) (107)	13,010 Int$	**Cancer incidence, no. of cases (2017) (19)**	27,416	32,728
Total health expenditure (% of GDP) (2018) (67)	8.3%	**Cancer mortality, no. of cases (2015) (52)**	20,424	20,825
Pharmaceutical spending (% of total health expenditure) (2014) (226, 227)	11.9%	**Top 3 cancer types, incidence (2018) (19)**	1. Prostate 2. Colorectum 3. Lung	1. Breast 2. Cervix uteri 3. Colorectum
Life expectancy (2015–2020) (109)	63.6 years	**Top 3 cancer types, mortality (2015) (52)**	1. Lung 2. Prostate 3. Esophagus	1. Cervix uteri 2. Breast 3. Lung

3.9.1 Health system

The public health system is led by the National Department of Health (NDoH) and nine provincial departments of health (228). 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 (229). 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

(229). The majority of the population (around 83%) access health care through public sector clinics and hospitals (228). The public system faces several challenges related to fragmentation of services, staff shortages, financial constraints, and reduced quality of service delivery (230, 231).

The private sector provides health care for around 17% of the population. It provides higher quality than the public sector (often at a similar level to that seen in high-income countries, according to local experts), which is also reflected in much higher spending levels per patient (232). Private health services are mainly financed from prepaid plans of people with a private health insurance (medical aid schemes). These private medical aid schemes may not cover the full medical costs, thus requiring OOP by patients (232). All schemes must cover at least all medical services in line with the regulated Prescribed Minimum Benefits (PMBs) (233). This minimum service package is the same that a patient could have received at a public health facility (234). The share of the population covered by a medical aid scheme has essentially remained unchanged between 2012 and 2019 at around 17% (235). There are also very large ethnical differences in medical aid scheme holders. Only 10% of the black population had a medical aid scheme, compared to 17% of the colored population, 52% of the Indian/Asian population, and 73% of the white population (236). According to local experts, private insurance coverage seems to have hit a ceiling with the main reason being the lack of affordability of insurance premiums by most of the population. A different strategy is needed to break the situation and move towards UHC.

The National Health Insurance (NHI) is a health financing system initiated in pilots in 2012, aiming to ensure that all citizens and permanent residents have access to good-quality health services provided by the public and the private health sector (228). The NHI would take funds currently going to private insurers and pool them with those in the public sector (237, 238). Private facilities would continue to operate, but they would be accessible by everyone and their funding would come from public sources. The role of private insurances might be reduced to covering services not covered by the NHI (237, 238). The NHI is supposed to be implemented in phases over a 14-year period (until 2026) with the ultimate goal to achieve UHC (239), the latter being in line with the vision of the National Development Plan 2030 (228). However, the government bill to enact the NHI was submitted to the parliament in 2019, but has not been approved yet (228). Several factors, including COVID-19 and the economic decline, are causing delays to these plans according to local experts.

3.9.2 Cancer care

Cancer care services at public hospitals are limited to the PMBs (233). Not every cancer patient will be able to receive state-of-the-art treatment but will receive basic care based on existing clinical evidence and cost effectiveness. According to the PMB regulations, formulated in 1998, cancers are

considered to be treatable (i) if they involve only the organ of origin and have not spread to adjacent organs, (ii) if there is no evidence of distant metastatic spread, (iii) if they have not brought about irreversible and irreparable damage to the organ at which they originated or another vital organ; (iv) if points (i) to (iii) do not apply, if there is a well demonstrated five-year survival rate of greater than 10% for the given therapy for the condition concerned (234, 240). According to local experts, radiation therapy is included in the PMBs, but not all modern techniques (such as stereotactic body radiation therapy) are available and covered at all centers. There also 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. Whether a cancer drug is available in a public hospital depends on its listing on the National Tertiary/Quaternary Essential Medicine List (EML) that is also used for defining PMBs in the private sector. Listing on the EML may take many years but is now being expedited. This has been particularly enhanced by increased efficiencies developed during the COVID-19 pandemic, according to local experts.

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 (234). The South African Oncology Consortium, which represents medical oncologist, radiation oncologists, and clinical hematologists, supports quality of care in the private sector by developing evidence-based treatment guidelines for different cancer types and reviewing treatment protocols and treatment plans (241). The biggest private providers are the Cancercare that treats over 2,500 new patients every year and the Independent Clinical Oncology Network (242, 243). NGOs such as the Cancer Alliance, Campaigning for Cancer, the Cancer Association of South Africa (CANSA), the Sunflower Fund, and the Childhood Cancer Foundation in South Africa operate across the public and the private sector and provide information to raise awareness of citizens about their rights as well as provide social services and emotional support (244-247).

Apart from differences in the services accessible in the public and the private sector, local experts indicated several additional challenges. Differences in the quality of cancer care exist across the country, with service delivery being better in the urban provinces of Gauteng and Western Cape as well as urban areas in general, which has historical roots in the old Apartheid system prior to 1994. Patients from outside these larger provinces may however come and seek care there. The geographical differences are also a result of differences in inefficiencies in the governance and leadership of the provincial authorities. In the public sector, there are delays in accessing services, because patients have to go through a complex referral process from primary to secondary to tertiary

care to access cancer care services. In the private sector, the referral system functions more efficiently due to direct referrals and better resources.

3.10 United Arab Emirates

Table 12: United Arab Emirates - Overview

Population (2019) (13, 106)	9.8 million (87.9% foreigners)		**Men**	**Women**
GDP per capita (in PPP) (2019) (107)	69,958 Int$	**Cancer incidence, no. of cases (2018) (3)**	1,943	2,595
Total health expenditure (% of GDP) (2018) (67)	4.2%	**Cancer mortality, no. of cases (2018) (3)**	1,044	965
Pharmaceutical spending (% of total health expenditure) (2016) (108)	16.3%	**Top 3 cancer types, incidence (2018) (3)**	1. Colorectum 2. Prostate 3. Leukemia	1. Breast 2. Thyroid 3. Colorectum
Life expectancy (2015–2020) (109)	77.8 years	**Top 3 cancer types, mortality (2018) (3)**	1. Colorectum 2. Lung 3. Leukemia	1. Breast 2. Colorectum 3. Pancreas

3.10.1 Health system

The health system is divided into two levels since 2005. The Ministry of Health and Prevention (MOHAP) is the federal regulatory health authority and each of the seven emirates has a separate health authority (248, 249). The health systems in the three largest emirates (Abu Dhabi, Dubai, Sharajh) are individually regulated whereas the MOHAP oversees the four smaller ones (250). In 2020, there were around 95 public and private health care centers and hospitals spread across the country and managed by a health authority in each of the seven emirates (251).

The health insurance regulations and rules are somewhat different in the seven emirates. In general, local citizens are provided with public health insurance coverage, which gives them access to both public and private health care providers (252). Expatriates get compulsory health insurance coverage through their employer, which also gives them access to public and private health care providers (252). 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 (252). All citizens and expatriates are covered by health insurance in Abu Dhabi. In Dubai, all citizens and expatriates are obliged to get health insurance in order to be officially residing 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).

One priority of the UAE Vision 2021 National Agenda is to achieve a world-class health care system (253). The MOHAP follows six objectives for 2017–2021, mainly focusing on improving the quality of care (254). The objectives are to (i) provide a comprehensive and integrated health care in innovative and sustainable ways, (ii) develop effective health information systems, (iii) build quality and safety for therapeutic, health care and pharmaceutical systems according to international standards, (iv) provide a vital legislative framework, governance, and regulations for the health care sector services, (v) ensure the delivery of all administrative services according to quality standards, and (vi) entrench a culture of innovation in the institutional work environment.

3.10.2 Cancer care

Cancer care used to be mainly provided in public health care facilities. Beginning in 2005, the private sector started to expand starting with a private chemotherapy facility in the American Hospital Dubai (249). In 2007, the Gulf International Cancer Center was established, being the first outpatient facility solely specialized in cancer care among both public and private providers (249, 255). Cancer care facilities have since then grown quickly in numbers to cater to the need of the fast-growing population (249). In 2019, the UAE Oncology Task Force, affiliated to the Emirates Oncology Society, was established and includes cancer care providers from all over the country (249). The task force aims to improve the quality of cancer care in the country (249).

Health insurance covers all cancer services for citizens and expatriates. Despite health insurance, reaching the annual cap of the insurance is a challenge for cancer patients – both for citizens and expatriates (256). Starting from 2019, the health authority in Dubai established a special fund to fully cover expatriate patients with cervical, colorectal and breast cancer who have exceeded the insurance cap (257). As all expatriates on work visa have their health insurance coverage linked to their work contracts, a cancer diagnosis can be a deal breaker. National labor regulations enable employers to lay off employees who do not meet their job requirements or miss working days, and medical conditions are not an acceptable reason for under-performance at work. As a consequence, expatriate cancer patients might lose their job in the middle of their treatment and are left without health insurance or valid legal residence status and are forced to leave to their home country to seek continuation of their cancer treatment (256).

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 Friends of Cancer Patients, or they go back to their home country to get/continue treatment. Because of the diversity of the community in the country, the community comes together when someone is in need and helps, according to local experts.

4. Current state of cancer care

This chapter describes the current state of cancer care in the MEA-9 countries and identifies barriers to the provision of high-quality cancer care. The chapter starts with a conceptual description of how to define access to cancer care and how to define quality of care in oncology. For the analysis of the different areas of cancer care, a targeted literature search was performed to obtain publicly available data for key performance indicators. This information was complemented with input received from local experts during workshops in all countries. Data from IQVIA, a global provider of pharmaceutical sales data, were also obtained. To complement the IQVIA data, a survey on access to cancer drugs was conducted among members of the PhRMA MEA Oncology Working Group.

4.1 Defining access to high-quality cancer care

4.1.1 Defining access to cancer care

Figure 29 shows the dimensions of universal health coverage (UHC) as described by the WHO. The three dimensions are the population covered, the services covered, and the proportion of costs covered. These dimensions apply to health care in general but also to cancer care. As described in chapter 3, implementing UHC is still in the making in several MEA-9 countries. For cancer care, moving closer to UHC could mean including additional population groups (e.g., expatriates or permanently residing refuges), covering more cancer care services (e.g., PET examination, immunotherapy drugs), and reducing OOP for these services (101).

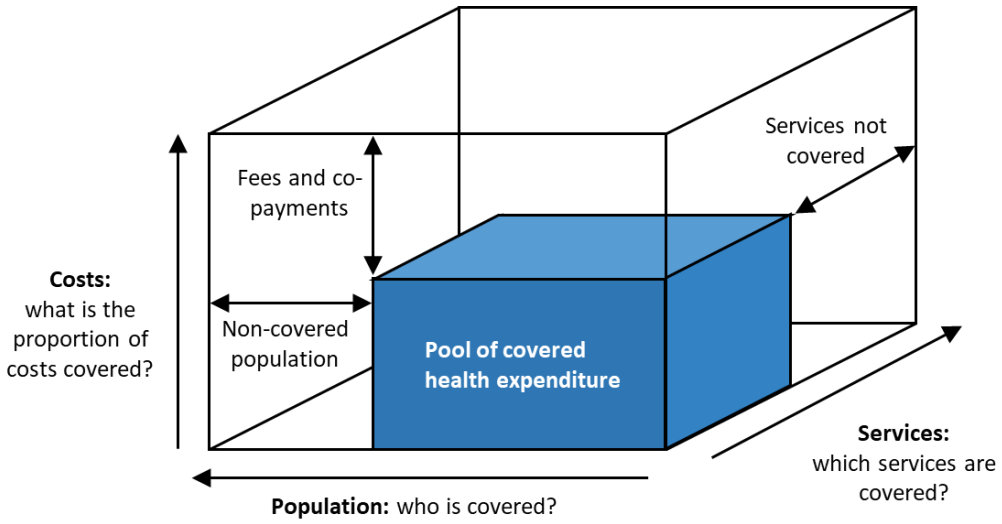


Figure 29: Dimensions of Universal Health Coverage
Source: Adapted from WHO (101).

The dimensions of UHC relate closely to the concept of access to health care. In general, two layers of access to health care can be distinguished. The first layer is a question of basic availability (supply) of health care services that people could theoretically have access to in a country. The second layer is a question of actually being able to gain access to existing health care services (matching demand with supply) (258). While pure availability is mostly a question of financial resources, there are several barriers that prevent patients from gaining access to health care:

- Accessibility denotes the geographic barrier that patients have to overcome to get from their homes to the health care facility. This is linked to the availability of a means of transportation, distance, travel time, and cost (259). In cancer care, the spatial concentration of specialized cancer care facilities is detrimental to accessibility but might increase the quality of care provided for those gaining access. Two other forms of accessibility are contact accessibility, describing the ease of contacting providers for appointments, and appointment accessibility, indicating the length of time it takes to get an appointment (260). Waiting lists are a result of appointment inaccessibility and indicate a mismatch between the demand and supply of health care services.
- Affordability denotes the financial barrier and is about patients' ability to pay for health care services taking into account any health insurance scheme that the patient might have signed or is included in (259).
- Acceptability denotes the social and cultural barrier that stands in between patients and the health care system. It describes patients' attitudes, beliefs, and trust in the ability of the health care system to deliver the help that they need (259). This is also a question of health literacy.

Timely access to treatment is also important in cancer care, as treatment is usually not initiated at the first contact with the health care system. Instead, patients with symptoms are typically referred by a general practitioner to a specialist, who then runs tests and assesses the spread and characteristics of the cancer to derive a comprehensive diagnosis. After the diagnosis, a treatment plan is set up and agreed upon with the patient before the actual start of treatment. All of these steps take time; see Figure 30 for an illustration (261). Keeping waiting times short between all steps is essential to limit cancer progression as much as possible and to thereby improve the odds of survival. All steps in the initial care process need to be optimized to avoid bottlenecks and other lags.

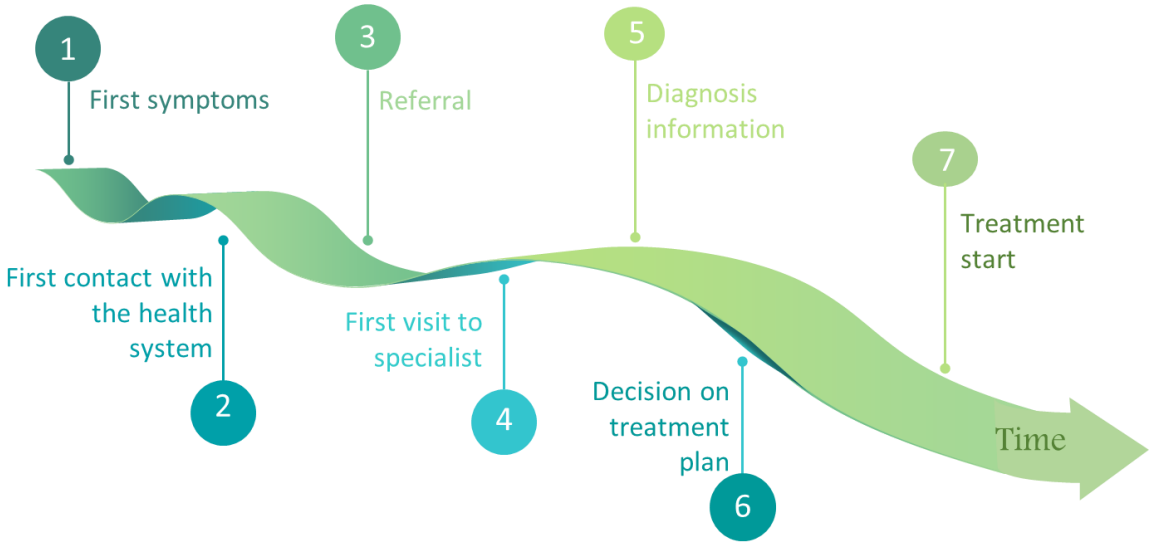


Figure 30: Steps in cancer care between first symptoms and start of treatment

4.1.2 Defining quality of care in oncology

Any discussion about access to cancer care also needs to consider the quality aspect of the care being provided. A conceptual way to think about quality of care is the Donabedian model (262). It postulates that quality of care is composed of three components: quality of structure, quality of process, and quality of outcome; see Figure 31 for an illustration. Quality of structure refers to contextual factors or inputs (such as human resources, physical facilities, equipment) that go into the care process as well as organizational factors. Quality of process refers to the sum of all actions in health care provision (such as diagnosis and treatment) and is, among other things, shaped by clinical and health policy guidelines. Quality of outcome refers to the effects of health care provision on the patient (such as health status, health-related quality of life, patient satisfaction).

An oversimplified but yet useful interpretation of the Donabedian model is to think of the three dimensions in terms of inputs, outputs, and outcomes (263). This interpretation alludes more to the notion of efficiency in care provision. The aim of an efficient care provision is essential to ensure value for money. Quality would here be interpreted as value, and value would be defined as the health outcomes achieved per dollar spent (264). Managing a health care system with limited resources requires policy makers to take critical decisions about which dimension to prioritize and to what extent (101).

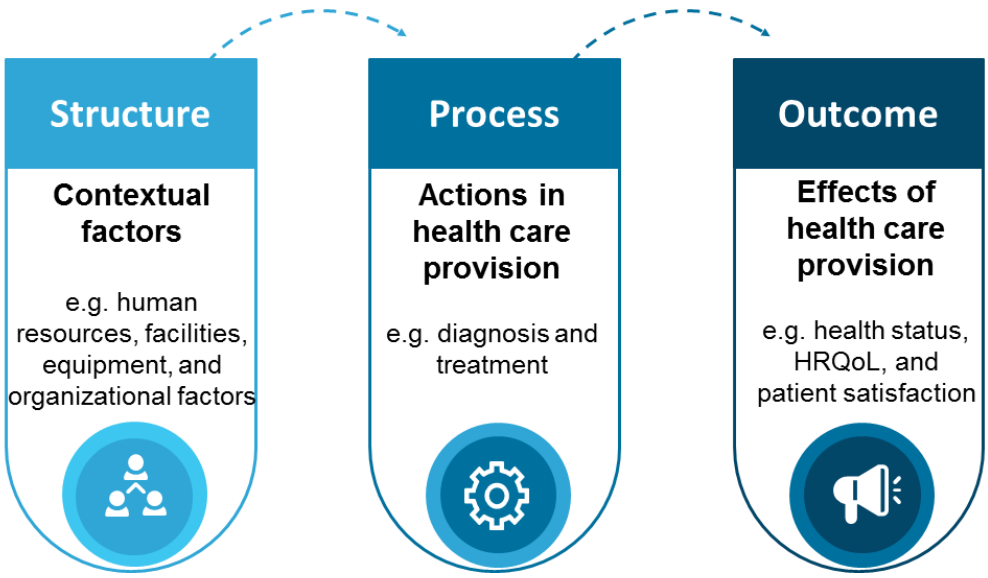


Figure 31: Donabedian model of quality of health care

4.1.3 Assessing cancer care

The rest of this chapter assesses access to and quality of different areas of cancer control. Five different areas are defined in this report; see Figure 32. The first four areas – prevention, early detection, diagnosis and treatment, survivorship – follow a life-course approach whereas the fifth area – governance – is a cross-cutting area that affects the other four.

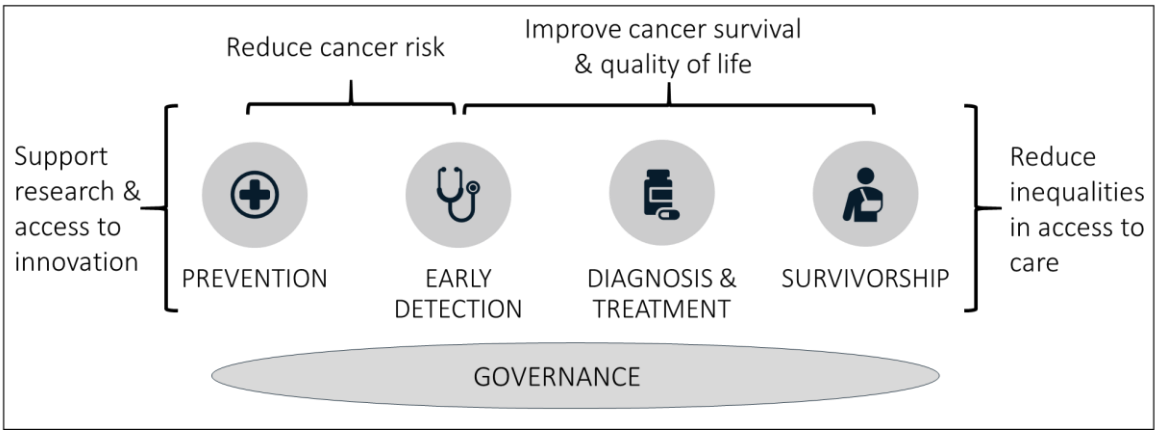


Figure 32: Areas of cancer control and overarching goals

Overarching goals of cancer control are also included in Figure 32. Through prevention measures, lifestyles that increase the risk of developing cancer should be reduced. Early detection of pre-cancer (cancer in situ) through screening can help to reduce the risk of developing cancer. For people who develop cancer, early detection together with high-quality treatment is imperative for improving survival. Palliative care in the end-of-life setting and psychosocial care for survivors can increase patients' quality of life. A common goal is to reduce inequalities in patient access to all of these four core areas of cancer control. This includes increasing UHC (currently ranging from 17% in South

Africa to 100% in the Gulf countries for their own citizens but not all expatriates) and protection from the financial burden of cancer, but also overcoming geographic barriers (urban vs. rural), socio-economic barriers (men vs. women, high-income/educated vs. low-income/educated people, local citizens vs. foreigners), and cultural barriers (religious groups, ethnic backgrounds). At the same time, supporting cancer research and enabling access to new treatment modalities is vital to advance the quality of care.

For all five areas of cancer control, a number of key indicators have been collected. These are analyzed and discussed in more detail in every country below.

4.2 Governance

Effective cancer control requires a strategy that facilitates the coordination of the many tasks in the different areas of cancer control. Many times, this takes the form of a national cancer control program (NCCP). It is also important that there is a designated institution with a clear leadership and responsibility for cancer control, irrespective of whether a formalized NCCP exists or not. Reliable and up-to-date data from cancer registries are essential to monitor the burden of cancer and the effectiveness of different measures for cancer control.

4.2.1 National cancer plans

National cancer control programs, or simply called "national cancer plans", are formalized plans by governments to address cancer. The WHO endorses them as the best available method to control both the causes and the consequences of cancer in a strategic and comprehensive way (265). 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.*" (266). An overview of the national cancer plans in the MEA-9 countries is provided below. NCD plans and additional current policy developments affecting cancer control highlighted by local experts during the workshops are also described (if applicable).

4.2.1.1 Algeria

The MSPRH launched a national cancer plan – "Vision stratégique de lutte contre le cancer centrée sur le malade" – for 2015–2019 (267). The construction of the plan began in December 2012 and was followed by a preliminary report published in June 2013 and a recommendations report published in October 2013 and was written and validated by a large number of experts. Based on the

experts' recommendations, the MSPRH decided to develop a plan to fight against cancer. It was designed and organized collaboratively, and particularly structured with a clear, specific, ambitious yet realistic and attainable timelines of five to ten years, according to local experts. 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. The plan included eight main strategic areas with 19 objectives to be achieved through 60 actions and 239 measures. The strategic areas were (i) prevention of risk factors with focus on tobacco control, (ii) screening with focus on breast cancer, (iii) cancer diagnosis with focus on cytopathology, (iv) interdisciplinary treatment, (v) support and guidance for patients through a referral system, (vi) cancer information and communication system through cancer registries, (vii) training of medical staff and research, (viii) optimizing the available financial resources for cancer care (267). The implementation of the plan spanned across various ministries, including the MSPRH, the ministry of education, ministry of finance, the ministry of labor and social security.

A full-scale evaluation of the plan was supposed to take place in April 2020, but COVID-19 delayed this and now the final evaluation is planned for 2021–2022, which will also result in a final report. According to local experts, the plan succeeded in achieving its objectives in 70% of cases. New cancer centers (CAC) have been established across the country. More than 15 radiation therapy treatment centers have been established, more targeted therapy is being used and immunotherapy might become available soon as well. Screening has also become a priority. Some objectives of the plan have not been achieved. For example, to address smoking, taxes have been increased and awareness campaigns in schools have been run, but the problem is that laws are not being followed/enforced.

According to local experts, a Special Cancer Committee was installed by the government in December 2020. The committee works on treatment guidelines. It will start with guidelines for breast cancer, colorectal cancer, prostate cancer, lung cancer, and head & neck cancer. It will start with medical oncology, followed by radiation therapy, and then surgery. Concerning drugs and the control of their use and costs, the Ministry of Pharmaceutical Industry has been created recently.

Simultaneously to the national cancer plan, the MSPRH also launched a national plan – "Plan Strategique National Multisectoriel de Lutte Integree Contre Les Fracteurs de Risque des Maladies non-Transmissibles 2015–2019" – against risk factors of non-communicable diseases (268). The main areas of the plan were promotion of healthy diet and physical activity, tobacco control, and developing a coordination framework through multiple actions and measures (268).

According to local experts, there are concrete plans for the renewal of the national cancer plan for 2015–2019. It would need to address the objectives that have not been met in the first plan, in particular by correcting the errors and dysfunctions noted and relying on scientific input to address the challenges. The main obstacles were organizational and not necessarily only financial. Delays observed in the implementation of the first cancer plan were essentially linked to the outdated management of public sector hospitals and of health policy in general. A new governance model as well as a reorganization of health care management would be needed to ensure a successful implementation of the upcoming second national cancer plan.

4.2.1.2 Egypt

The latest national cancer plan by the MoHP covered the period 2016–2020 (138). The plan noted many challenges towards achieving comprehensive cancer care in the country. Challenges are the inequity in the distribution of cancer care centers across the country, high costs of cancer care, lack of a specific, integrated, and centralized cancer registry, lack of recognition of cancer symptoms among the public and among health care staff in primary health care, and complexity and fragmentation of the health system and impaired referral system. Against the backdrop of these challenges, the plan included six goals to be achieved by 2020. These goals were (i) strengthening the national cancer registry, (ii) reducing exposure to cancer-causing risk factors, (iii) implementing screening programs for early detection, (iv) improving diagnosis and treatment at all stages of the disease, (v) improving palliative care through “alleviating pain programs”, and (vi) encouraging cancer research (138).

In response to the high burden of liver cancer and breast cancer in the country, two president’s initiatives have been launched. The “100 Million Healthy Lives” initiative was launched in October 2018 to eradicate HCV and reduce NCDs (269). Within this initiative, the “Women’s Health Initiative” was launched in July 2019 to perform breast cancer screening along with examining other health-related risk factors (270).

The NCD unit within the MoHP also developed an action plan for NCD prevention and control through a collaboration with the WHO and in line with the Global Action Plan for the Prevention and Control of NCDs 2013–2020 (271). The plan, called the “National Multisectoral Action Plan for the Prevention and Control of Noncommunicable Diseases 2017–2021 (MAP-NCD)”, adopted a national framework to achieve a goal of reducing premature death from NCDs by 15% by 2021 (271). It focused on the promotion of a healthy diet and physical activity, tobacco control, and HCV screening and treatment.

4.2.1.3 Jordan

Jordan has currently no national cancer plan, according to local experts. The MoH published a national plan against some NCDs (diabetes, hypertension, dyslipidemia, obesity) in 2011, but cancer was not amongst them (272). This plan focused on healthy diet, physical activity, and dietary salt restriction through increasing awareness (273).

In response to the high burden of breast cancer in the country, the MoH launched the "Jordan Breast Cancer Program" in 2006, a national breast cancer screening and early detection program (160). It also led to the publication of breast screening and diagnosis guidelines in 2011 (160). In response to the high burden of lung cancer in the country, the KHCC and the KHCF published a report on tobacco control in 2013 (274). The report defined a number of national priorities, such as establishing a national surveillance program to facilitate periodic reporting of national statistics on tobacco use, studying the burden of tobacco on the national economy, and raising awareness of the population on the risks of tobacco (274). The WHO has also called on the MoH to develop a tobacco control strategy (273).

4.2.1.4 Kuwait

The MoH together with the KCCC developed the latest national cancer plan for the period 2013–2018. The KCCC was responsible for implementing the plan (275). The four main priorities focused on clinical management, clinical services, hospital infrastructure, and cancer control and prevention (275). According to local experts, it is unclear if there will be a renewal of the cancer plan in the near future. As the KCCC is the sole provider of cancer care in the country, it occupies a central role in shaping cancer care. The KCCC publishes cancer management guidelines for each cancer type that are regularly updated (276). The guidelines cover medical, radiation, and surgical treatment.

Controlling NCDs represents a priority on the governmental health agenda. In 2012, a new committee for NCDs was established by a ministerial decree (277). NCDs were integrated into national developmental plans that were developed in line with the Global Action Plan for the Prevention and Control of NCDs 2013–2020 (278). A department for NCDs within the MoH was also established. The national NCDs strategy for 2017–2025 prioritizes prevention measures to reduce risk factors linked to NCDs (279).

4.2.1.5 Lebanon

There is no national cancer plan, despite calls from the Lebanese Cancer Society and the Lebanese Society of Medical Oncology (280-282). However, cancer was among the NCDs mentioned in the

national NCDs plan for the period 2016–2020, which focused mainly on prevention and early detection of risk factors (283). In April 2018, the "National Plan for the Awareness and Early Detection of Colorectal Cancer" was launched and included ten action points to move towards a national screening program (284). According to local experts, the MOPH prioritizes having a good cancer registry in place, but there are currently no intentions to create a national cancer plan. All efforts in the health policy area are currently overshadowed by the economic crisis.

4.2.1.6 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 (205, 285, 286). Similar to the previous plan, the 2020–2029 plan adopted a framework that focused on prevention, early detection, diagnosis and treatment, and palliative care as well as fifth area encompassing quality assurance, IT-based information systems to facilitate monitoring and evaluation, and strengthening research and training. The seamless transition from the first to the second plan was grounded in the general satisfaction of all stakeholders with the progress achieved in the first plan, according to local experts. The second plan is a continuation of the first plan and aims to correct shortcomings as well as proposes innovative actions and measures in all areas. The overall objective is to reduce cancer mortality and morbidity as well as improving the quality of life of patients and their families.

4.2.1.7 Saudi Arabia

The MoH adopted a National Plan for Cancer Control for the period 2014–2025 (287). The main overall long-term goal of the plan is to reduce breast cancer deaths by 30%, and in support of this the MoH published a guide on risk factors and screening of breast cancer (288). In general, the plan has seven objectives focusing on (i) primary prevention including raising the awareness on risk factors and new legislations on smoking and marketing fast food, (ii) cancer screening programs, (iii) improving the quality of the delivered cancer care services, (iv) strengthening surveillance, monitoring and evaluation program of cancer control, including improving the national cancer registry, (v) conducting and strengthening cancer research, (vi) involving patients and their families to participate in the services provided and quality control, and (vii) community partnership to control cancer (287). The MoH had already previously adopted the National Executive Plan for NCDs (2010–2020), which contained provisions to establish cancer treatment centers and palliative care services as well as improving the national cancer registry (289). Despite the national cancer plan, many activities in cancer care are overshadowed and affected by the fundamental changes of the health care system as part of the Saudi Vision 2030.

4.2.1.8 South Africa

In the years before COVID-19 hit the country, the health policy of NDoH had started to change focus, according to local experts. The HIV/AIDS epidemic started to be controlled, and greater focus could be put on cancer and other NCDs. This resulted in a national cancer plan – the National Cancer Strategic Framework (NCSF) for South Africa 2017–2022 (290). The plan 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. The four main priorities of the plan focus on (i) reducing the burden by deaths, disability, and financial strain due to cancer, (ii) primary prevention measures, (iii) adequate screening, testing, and diagnosis, incl. referral mechanism for integrated care are priorities, (iv) provision of high-quality treatment, improvement of the quality of life of cancer survivors through counselling and combating financial and socio-cultural challenges. The NCSF also states that it aims to ensure equitable access to cancer care throughout the country in line with the National Development Plan 2030.

In 2017, the NDoH also launched two cancer treatment policies for cervical cancer and breast cancer which included programs for HPV vaccination, screening, early detection, and treatment (291). Previously, the Strategic Plan for the Prevention and Control of NCDs 2013–2017 already stated that all women who have sexually transmitted diseases should be screened for cervical cancer every five years (292). Local experts also noted that in addition to the existing treatment policies for cervical cancer and breast cancer, similar policies for prostate cancer and lung cancer should be released by the end of 2021 and for colorectal cancer in 2022. However, even though work has been done in terms of producing "documents" (the NCSF, treatment policies for the most common cancer types), there is limited implementation of the plans and policies, according to local experts. One of the reasons is that the health system is primarily built around communicable diseases such as HIV/AIDS and tuberculosis. This made it comparatively easy to introduce HPV vaccination. There is also a deficit in the "knowledge base" at the NDoH in managing cancer and other NCDs.

4.2.1.9 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 (293, 294).

In 2017, the MOHAP launched a national strategy to combat NCDs, including cancer, for 2017–2021 (295). 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% (295). 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 on the current plan is planned after 2021.

4.2.1.10 Overview

The description above shows that most of the MEA-9 countries have either active cancer plans or have had them in the past. Table 13 provides an overview. Jordan and Lebanon are the only countries that lack a plan. Several countries also have additional plans for the control of NCDs, which includes cancer. Not all cancer plans address the whole continuum of care: prevention, early detection, diagnosis and treatment, and survivorship.

Table 13: National cancer plans

	Plan and time period	Publisher of the plan	Monitoring of the plan
Algeria	Plan for 2015–2019 (267)	MoH	A national committee monitored by the MoH
Egypt	Plan for 2016–2020 (138)	MoH	The MoH and the National Cancer Institute
Jordan	No plan	-	-
Kuwait	Plan for 2013–2018 (275)	KCCC	KCCC
Lebanon	No plan	-	-
Morocco	Plan for 2020–2029 (285)	MoH	A network including MoH, National Institute of Oncology, Lalla Salma Foundation, and several public and private institutions
Saudi Arabia	Plan for 2014–2025 (287)	MoH	MoH
South Africa	Plan for 2017–2022 (290)	NDoH	NDoH
UAE	Plan in place (but not publicly available)*	-	-

Notes: * The local experts in the UAE indicated that there is a national cancer plan, but it is not publicly available.

Table 13 also shows the institution that drew up and published the national cancer plan. Usually this is either Ministry of Health and/or the leading cancer institute. Even though Jordan does not have a cancer plan, the leadership for cancer control is mostly in the hands of the KHCC. In Lebanon, there is no corresponding single leading cancer institute. The monitoring of the national cancer plans is often in the same hands as the entity that published the plan. This could potentially limit a critical appraisal of the progress of the defined actions in the plan.

The national cancer plans also specify somewhat different goals; see Table 14. Most often the overarching goals are not further specified in quantitative terms, e.g., a 20% reduction in breast

cancer mortality by 2030 compared to 2020. However, more concrete actions, e.g., relating to specific measures for prevention, are often quantified. Only the cancer plans in Algeria and Morocco specify the aim to reduce the risk of patients to be in financial difficulties due to cancer.

Table 14: Goals included in national cancer plans

	Reduce incidence	Reduce risk to get cancer	Reduce mortality	Improve survival rate	Reduce risk to be in financial difficulties due to cancer
Algeria	Yes (not quantified)	Yes, several quantifiable prevention measures for risk factors	Yes (not quantified)	Yes (not quantified)	Yes, through CNAS/CASNOS
Egypt	Yes (not quantified)	Yes, several quantifiable prevention measures for risk factors	Yes (not quantified)	Yes (not quantified)	No
Jordan	N/A	N/A	N/A	N/A	N/A
Kuwait	Yes (not quantified)	Yes (not quantified)	Yes (not quantified)	Yes (not quantified)	No
Lebanon	N/A	N/A	N/A	N/A	N/A
Morocco	Yes (not quantified)	Yes (not quantified)	Yes (not quantified)	Yes, 80% in breast cancer and childhood cancers	Yes, 100% in all cancer centers
Saudi Arabia	Yes (not quantified)	Yes, several quantifiable prevention measures for risk factors	Yes, breast cancer mortality reduction by 25-30% in women aged 50-69 and by 15% in women aged 40-49	Yes (not quantified)	No
South Africa	Yes (not quantified)	Yes, several quantifiable prevention measures for risk factors	Yes (not quantified)	Yes (not quantified)	No
UAE	N/A	N/A	N/A	N/A	N/A

Almost all cancer plans lack dedicated funding plans for the defined actions; see Table 15. Algeria and Morocco are the only exceptions. Having at least a crude funding plan included in the cancer plan can serve as reality check for whether all planned actions are financially viable. The fact that most cancer plans do not include this information casts some doubt on the feasibility to implement all actions, because they typically require additional funding.

Table 15: Funding plan included in the national cancer plans

	Funding plan included
Algeria	Yes, for years 2015–2019: 179,674 million DZD
Egypt	No
Jordan	N/A
Kuwait	No
Lebanon	N/A

Morocco	Yes, for years 2020–2029: 7,827,250 thousand MAD
Saudi Arabia	No
South Africa	No
UAE	N/A

4.2.2 Cancer registries

To mount the challenge with cancer, policy-makers need reliable and up-to-date local data on the cancer burden. A population-based cancer registry is the best tool to collect such data (296). Such a registry is ideally covering the entire country, but it can also be enough to cover one or multiple regions within the country thought of as being representative of the rest of the country. A description of the state of cancer registration in every country is provided below.

Algeria: There is no nationwide population-based cancer registry. Regional cancer registries exist in three regions along the Mediterranean coastline (297). In the eastern region, the country's first cancer registry has operated since 1986 at the hospital university center in Sétif (298). In the central and western region, registries operate in Algiers and Oran, respectively (299, 300). There are also some smaller registries in different cities. Since 2018, there are three networks – East, Center, West – that cover 70–90% of the population for cancer incidence only. The recent cancer plan 2015–2019 facilitated the establishment of this network with official institutionalization. This led to improvement in coverage. Some underreporting is certainly possible despite the improvements made, according to local experts. The registry networks are population-based and – despite their name – also include the south of Algeria. There is no information on cancer mortality in the registries, which makes it impossible to assess survival. Part of the next cancer plan will be to establish better data infrastructure and common smart tools for data analysis – this should make it possible to assess survival eventually. Encouraging the establishment of registries in uncovered areas and inviting them to join the existing network will also be part of the plan. A separate registry for cancer in children and adolescents is operating independently since 2018, according to local experts.

Egypt: There are regional population-based registries and hospital-based registries in some governorates. The National Cancer Registry Program was established in 2007, aiming to develop a national population-based cancer registry. Even though at least one epidemiological study with estimates for Egypt resulted from this program (301, 302), no official statistics or annual reports with nationwide coverage have been released. One goal of the latest cancer plan (for 2016–2020) was to centralize cancer registration in all cancer centers and ensure the sustainability of registration (138). As of 2021, establishing a national cancer registry is still a challenge, according to local experts.

Jordan: Nationwide cancer registration started in 1996 with the establishment of the Jordan Cancer Registry, which is a population-based registry under the MoH Department of Cancer Prevention

(303). The registry publishes an annual report on incidence only (17, 157). The KHCC has its own hospital-based cancer registry, which also collects data on treatment outcomes and publishes data faster than the Jordan Cancer Registry (160).

Kuwait: The Kuwait Cancer Registry was established in 1971. It is a nationwide population-based registry and based at the KCCC (170, 277, 304). Even though official statistics from the registry are not publicly available, local experts noted that the registry publishes annual reports in physical format (the latest one for 2018) and distributes them among staff at the KCCC. The registry is not yet able to provide official estimates on survival, according to local experts.

Lebanon: The National Cancer Registry is a nationwide population-based registry under the MoPH (18). Annual reports on incidence have been published since 2005 (18). It has been estimated that the registry covers more than 90% of cancer cases in Lebanon (305). Local experts noted that the registration of new cancer cases at the major hospitals works fine, but the main challenges is the registration of cancer cases among refugees. Reliable numbers for incidence are not available among Palestine/Syrian refugees, as some of them go back to their home countries to receive treatment. The quality of mortality data might not be very good, because the cause of death is not always assessed properly, according to local experts. This explains also why nationally representative estimates of survival are lacking. Yet some institutions, such as the American University of Beirut, are able to assess survival and local experts noted that survival varies from institution to institution.

Morocco: Two regional population-based cancer registries exist and are supported by the National Institute of Oncology and the Lalla Salma Foundation (306-308). The Rabat Cancer Registry covers around 2% of the population in the city of Rabat since 2005 (309), while the Greater-Casablanca Cancer Registry covers around 12% of the population in the administrative region of Casablanca since 2004 (306, 307, 310). According to local experts, these two registries give a very good idea of incidence that is representative of the whole country, although exploring incidence in rural areas even more could be beneficial. There are also hospital-based registries in Fes, Marrakesh, and Oujda.

Saudi Arabia: The Saudi Cancer Registry is a nationwide population-based registry originally established in 1992 in the King Faisal Specialist Hospital and Research Center (311). Since 2014, the Saudi Health Council oversees the registry. The registry started to register data in 1994 and publishes an annual report on cancer incidence (20, 311). Local experts noted that underreporting of new cancer cases is a well-known problem, which explains the low reported incidence compared to similar countries. The fragmentation of the health care system also impedes the provision of up-to-date data (the latest data accessible in mid-2021 referring to 2016), because there is no collaboration between health providers. Performance assessment of cancer care based on the data from the registry

is therefore not possible. There are also no good data on survival. There are plans to reactivate the registry and to get newer data as well as to increase the accuracy.

South Africa: The South African National Cancer Registry has collected pathology-based data since 1986 (19), but its activity was impaired by a lack of funding and non-participation of numerous stakeholders (312). The registry was revived in 2009, with plans of transforming it into a population-based registry. In 2011, the National Cancer Registry was legally established and reporting of cancer cases was made compulsory by law (312). It was also decided to establish a population-based cancer registry (19). Since January 2017, a population-based cancer registry – the Ekurhuleni Population Based Cancer Registry – operates in the Ekurhuleni metropolitan municipality (covering around 6% of the total population) and published first statistics for 2018 (19). Ekurhuleni was chosen because it is representative of the country in terms of socio-economic composition (different ethnicities and urban/rural population), and because it has well-defined boundaries, a reasonable population to manage, and is close to Johannesburg which facilitates administration. Local experts also noted that incidence numbers are still underreported because of pathology-based collection. Data are also still collected from a paper-based system instead of from electronic records. Death certification data are also somewhat unreliable. Mortality data are not fully captured in the Ekurhuleni registry, because current confidentiality laws prevent a linkage to the mortality data collected by the Vital Statistics Department.

UAE: The National Cancer Registry is a nationwide population-based registry operating under the MOHAP (313). It has published statistics on incidence online since 2011, whereas mortality was only published for the year 2014 as part of a larger report. Survival statistics are not available, and local experts noted that this is tricky to accomplish, because some expatriates are lost to follow up when they move back home to receive treatment. By contrast, data on cancer incidence are reliable and there is no more underreporting, because all health care providers have been linked to the registry. Strengthening cancer registration as well as publishing a national cancer registry report were included as a set of tools to achieve the second goal – improvement of information, evaluation and monitoring systems – in the NCD plan (2017–2021) (295).

4.2.2.1 Overview

The description above highlights that cancer registration is still a major challenge in the MEA-9 countries. Without good local data from cancer registries, it is difficult to develop, assess, and monitor concrete cancer control measures. The upside is that population-based cancer registries exist in every country; see Table 16. They have either a national coverage or a (representative) regional coverage. The main areas for improvement are:

- Reliability of the data: Underreporting of the number of cancer patients is common. Local experts have raised this issue in most countries, but the magnitude might differ from country to country.
- Comprehensiveness of the data: National cancer reports (if available) are most often only reporting cancer incidence. Without including information on mortality it is impossible to trace out improvements in the treatment of cancer and calculate survival rates, which is the prime patient-relevant outcome.
- Up-to-dateness of the data: Information on the latest available year with data is often published with considerable delay. A five-year delay is not uncommon.
- Public availability of the data: Annual reports or an online database with information are not always available (Kuwait and Morocco). This makes it impossible for external stakeholders to track progress in the government's work with cancer.

Table 16: Cancer registries

	Is there a population-based nationwide cancer registry?	Are there annual publications of the cancer registry in publicly available reports/websites?	What is the latest year of publicly available data (as of April 2021)?
Algeria (300)	No, but three regional networks of population-based registries	Yes, for incidence	2015
Egypt (136)	No, but regional population-based registries and hospital-based registries in some governorates	Yes, for incidence	2010
Jordan (17, 314)	Yes, in addition to a hospital-based cancer registry at the KHCC	Yes, for incidence	2016
Kuwait	Yes	Not publicly available but the KCCC has such reports	(2018)
Lebanon (18)	Yes	Yes, for incidence	2016
Morocco (307, 309)	No, but two regional population-based registries	Not regularly and only for incidence	2005–2007 and 2006–2008
Saudi Arabia (20)	Yes	Yes, for incidence	2016
South Africa (19)	No, but one regional population-based registry	Yes, for incidence	2018
UAE (22)	Yes	Yes, for incidence (and only in 2014 jointly with mortality)	2017

4.3 Prevention

Cancer prevention aims to reduce (and in certain cases to eliminate) the risk of people to get cancer (315). It can help to reduce the number of cancer incidence in a population and thereby also reduce the number of people dying from cancer. Prevention measures aim at:

- avoidance of exposure to cancer-causing lifestyles and substances; for example, tobacco consumption, obesity, asbestos
- treatment of diseases known to cause cancer; for example, HCV, HIV/AIDS, schistosomiasis (bilharzia), and
- vaccination against infectious agents that cause cancer, such as HPV and HBV.

The list of known cancer-causing factors is long.[17] The WHO estimates that around 30–50% of all newly diagnosed cancer cases relate to these factors and are therefore assumed to be preventable (1). Not all risk factors are equally carcinogenic. Smoking is the most important risk factor globally (316). In fact, recent studies for Sweden, the UK, and the US showed that cigarette smoking is responsible for almost half of all preventable cancer cases (317-319).

The payoffs from cancer prevention can take a long time to materialize and have a lasting impact on reducing cancer incidence. Depending on the risk factor, it may take several decades between the exposure to a carcinogen and the diagnosis of cancer (called the latency period) (320). It is therefore important for all MEA-9 countries to take swift actions on cancer prevention. The long latency period also offers some explanation for the reluctance of governments to invest in prevention, as the benefits of reduced cancer cases only materialize (long) after spending on prevention measures. It also explains why it is difficult for individuals to change lifestyles, because the benefits of behavioral changes do not pay off instantly, which reduces the incentives to change.

In Europe, the European Code Against Cancer has guided actions by governments since its first edition in 1987 (321, 322). In its current fourth edition from 2016, the code lists 12 actions that individual people can take to prevent cancer; see Table 17. However, successful cancer prevention

[17] The latest World Cancer Report of the WHO lists tobacco consumption, infectious agents (e.g., Helicobacter pylori, human papillomavirus, hepatitis B and C viruses), alcohol consumption, sunlight and ultraviolet radiation, ionizing radiation (from both natural sources and artificial sources such exposure to medical radiation), diet and nutrition (high intake of processed meat and red meat and low intake of fruits and vegetables), physical inactivity, obesity, dietary carcinogens (e.g., aflatoxin and aristolochic acid), contamination of air (airborne particulate matter originating from, e.g., fuel combustion for transportation or and domestic heating and cooking.), water, soil, and food (e.g., through arsenic), occupational carcinogens (e.g., asbestos, polycyclic aromatic hydrocarbons, heavy metals), pharmaceutical drugs (e.g., hormonal contraceptives) (316).

requires these actions to be supported by governmental policies and actions. There are thus two elements to bear in mind; (1) increase awareness on the individual level to promote a healthy lifestyle and (2) implement and enforce laws meant to address risk factors.

Table 17: The European Code Against Cancer (4th edition)

The European Code Against Cancer – 12 ways to reduce the risk to get cancer
1. Do not smoke. Do not use any form of tobacco.
2. Make your home smoke free. Support smoke-free policies in your workplace.
3. Take action to be a healthy body weight.
4. Be physically active in everyday life. Limit the time you spend sitting.
5. Have a healthy diet: • Eat plenty of whole grains, pulses, vegetables and fruits. • Limit high-calorie foods (foods high in sugar or fat) and avoid sugary drinks. • Avoid processed meat; limit red meat and foods high in salt.
6. If you drink alcohol of any type, limit your intake. Not drinking alcohol is better for cancer prevention.
7. Avoid too much sun, especially for children. Use sun protection. Do not use sunbeds.
8. In the workplace, protect yourself against cancer-causing substances by following health and safety instructions.
9. Find out if you are exposed to radiation from naturally high radon levels in your home. Take action to reduce high radon levels.
10. For women: • Breastfeeding reduces the mother's cancer risk. If you can, breastfeed your baby. • Hormone replacement therapy (HRT) increases the risk of certain cancers. Limit use of HRT.
11. Ensure your children take part in vaccination programs for: • Hepatitis B (for newborns) • Human papillomavirus (HPV) (for girls).
12. Take part in organized cancer screening programs for: • Colorectal cancer (men and women) • Breast cancer (women) • Cervical cancer (women).

Governments in the MEA-9 countries could use the European Code Against Cancer as an inspiration to adapt the 12 actions to the local context. The rest of this section reviews the prevalence of five major risk factors in MEA-9 that are part of the code and describes how MEA-9 governments are tackling them.[18]

4.3.1 Smoking

Tobacco smoke is a toxic mix of more than 7,000 chemicals, out of which many are poisonous and around 70 are known to be carcinogenic (323). Tobacco smoking is the main cause of lung cancer. For example, if a person smokes around 20 cigarettes a day, this person is 20 times more likely to

[18] Local experts noted several other important major risk factors in their countries. In Algeria, the south of the country is still polluted from exposure to nuclear radiation from nuclear tests by France in 1960 (Gerboise Bleue) during the independence war. Carcinogens in the different segments of life (urbanization, industry, agriculture, food, etc.) are also important. In Jordan, carcinogens in the environment and in agriculture are important, but there is lack of data to evaluate the situation.

get lung cancer than a non-smoker. Also, the longer the smoking period and the higher the tobacco amount consumed, the greater risk for developing lung cancer (323, 324). Frequent exposure of non-smokers to other people's tobacco smoke (passive/secondhand smoking) can also increase the risk of developing lung cancer (323). Apart from causing lung cancer, cigarette smoking can also cause cancers of the mouth and throat, esophagus, stomach, colon, rectum, liver, pancreas, larynx, trachea, bronchus, kidney and renal pelvis, bladder, and cervix (323). Other types of tobacco products – cigars, pipe tobacco, chewing tobacco, and snuff – increase the risk of developing lung cancer, esophageal cancer, and/or mouth cancer (324). Waterpipe smoking, which is popular in many countries in the Middle East, is also linked to bladder cancer (325).

4.3.1.1 Smoking rates

Smoking rates in several of the MEA-9 countries are amongst the highest in the world. This is however only true for men, where Jordan recently claimed the top spot worldwide with 65% of male smokers (326); see Figure 33. Around half of all men smoke in Egypt and Morocco. Women have exceptionally low smoking rates, except in Jordan, Lebanon, and South Africa. The enormous differences by sex have been explained by social norms: smoking is viewed as inappropriate and shameful for women among Muslims (327). Figure 33 also shows that smoking rates in men have increased from 2000 to 2016 in almost all countries, while the opposite is true for women. In South Africa, smoking rates have been declining in both men and women during this period. This is similar to the development in the EU-3 countries.

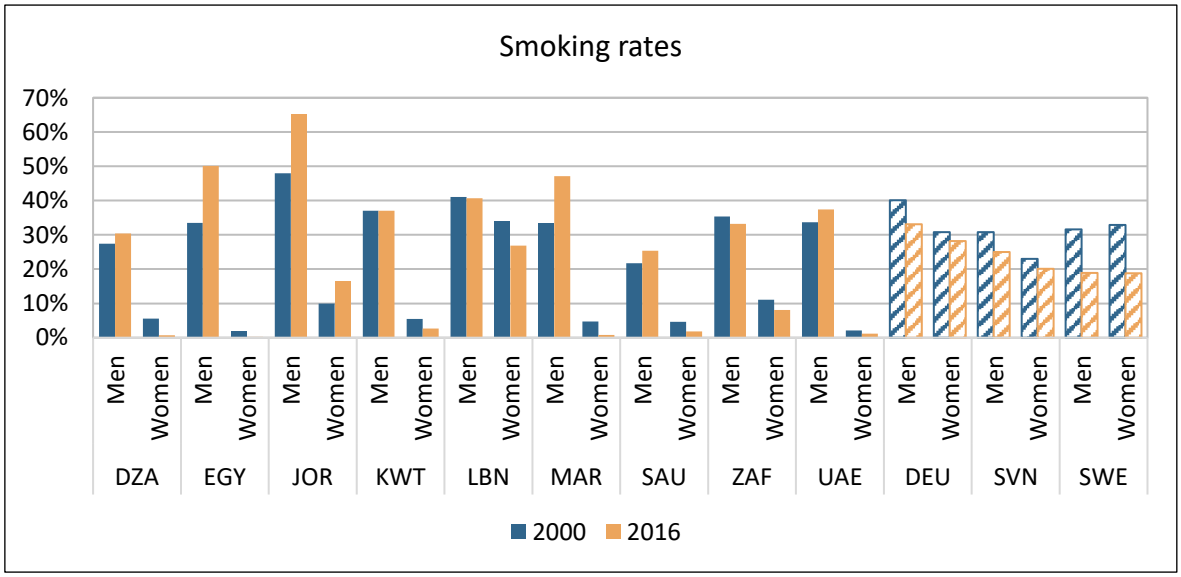


Figure 33: Prevalence of tobacco smoking among adults in MEA-9 and EU-3, 2000 & 2016

Notes: The data show the proportion of men and women aged ≥15 who currently smoke any tobacco product on a daily or non-daily basis. The data exclude smokeless tobacco use and the rates are age-standardized. In Jordan, the data show the percentage of conventional tobacco smokers aged 18–69 in 2019 (instead of 2016).
Source: WHO (328) and for Jordan, World Bank (2000) and MoH (2019) (329, 330).

4.3.1.2 Tobacco control policies

Anti-tobacco legislations and regulations aim to make smoking less attractive. Examples are excise taxes on cigarettes, education on harms (school, mass media campaigns), nudging (warning labels on cigarette packages), restriction of advertisements (mass media, billboards), restriction of use (age limits), restriction of time and location of purchase (special tobacco shops with limited opening hours), restriction of locations to consume (indoor smoking), restriction of product features (menthol/flavored cigarettes).

Cigarette prices

Excise taxes on cigarettes aim to make cigarettes more expensive and thereby reduce the incentive to buy them. Minimum prices are another means to make cigarettes more expensive. Figure 34 shows the total price (base price plus any taxes) of the cheapest brand of a pack of 20 cigarettes in the MEA-9 countries in US dollars and adjusted for general price differences between the countries (PPP). Egypt, Jordan, and Morocco had the highest prices of around Int$ 4.5, followed by Saudi Arabia and the UAE. Algeria and Lebanon had the lowest prices. By comparison, cigarette prices in the EU-3 countries were higher than in all MEA-9 countries.

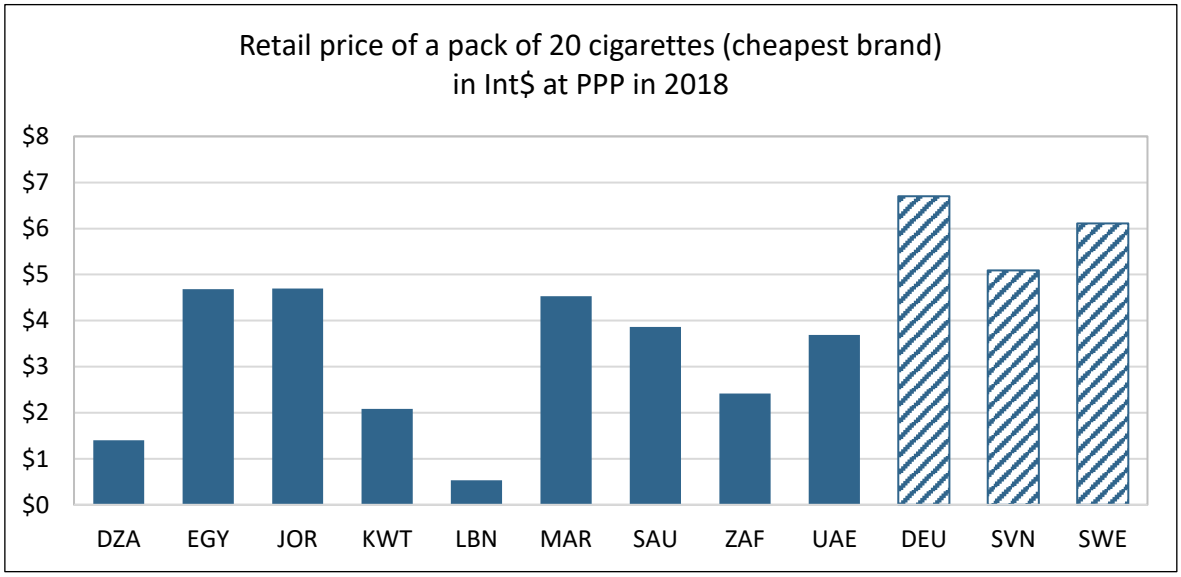


Figure 34: Retail prices of the cheapest brand of a pack of 20 cigarettes in MEA-9 and EU-3 in Int$ at PPP, 2018
Source: WHO (331).

Age limits

The sale of tobacco products is prohibited to minors – under the age of 18 (age of 21 in Kuwait) – in almost all MEA-9 countries. Morocco used to be the only country without an age limit, but

prohibition of tobacco sale to minors was included as one of the actions in the national cancer plan for 2010–2019 (285).

Smoke-free places

Smoke-free places make it more tedious for smokers to smoke and they also reduce passive smoking. Table 18 shows that many MEA-9 countries have legislated on national policies to create smoke-free places. The enforcement of violations of smoke-free laws is also formally in place in most countries.

Table 18: Smoke-free places and enforcement

	Smoke-free indoor offices	Smoke-free public transport	Fines for violations of smoke-free laws	Citizen complaints & investigations of violations of smoke-free laws
Algeria	No	No	No	No
Egypt	Yes	Yes	Yes	Yes
Jordan	Yes (332)	Yes	Yes	No
Kuwait	No	Yes	Yes	Yes
Lebanon	Yes	Yes	Yes	Yes
Morocco	Yes	No	Yes	No
Saudi Arabia	Yes	Yes	Yes	No
South Africa	Yes* (333)	Yes* (333)	N/A	Yes
UAE	Yes*	Yes*	Yes	No

Notes: Indoor public place means any indoor place accessible to the public, including places accessible by appointment or permission. * Designated smoking rooms are allowed under the legislation. Source: WHO (328).

4.3.1.3 Latest tobacco control strategies

Algeria: Tobacco control was one of main areas in the latest cancer plan (2015–2019) as well as the NCDs plan (2015–2019) (268). This included (i) strengthening anti-tobacco legislations and regulations with an aim to establish smoke-free public places, raising tobacco taxes, prohibiting tobacco sales to minors, and prohibiting sales outside of approved retail stores, (ii) offering support for smoking cessation through integrating smoking cessation services into health care services, (iii) setting up a tobacco control monitoring and surveillance system, and (iv) developing research on tobacco control. The aim was to reduce the prevalence of smoking by 5% per year in adults and 10% per year among young people as well as increase smoking cessation to 10% of smokers annually. A vast campaign to raise awareness of smoking in schools was launched, including courses for specific levels. According to local experts, smoking is still a huge challenge despite the efforts made. Even children smoke – among 6 to 11-year-old children around 7% smoke. They can buy cigarettes without any problems because existing legislation is not enforced. Cigarette smuggling contributes to the issue with specific types of cigarettes smuggled from Sub-Saharan Africa. Smoking bans in public indoor places such as schools, universities, public institutions are also not enforced.

Egypt: The latest national cancer plan (2016–2020) listed a set of tobacco control actions. These actions included monitoring tobacco use, raising tobacco taxes, including warning labels on tobacco packages, banning tobacco advertisements, promotion, and sponsorships, offering health counseling service for tobacco cessation, implementing measures to minimize illicit trade of tobacco products, and establishing smoke-free zones at the workplace as well as public places. The plan aimed to reduce tobacco consumption to 30% by 2025 (138). According to local experts, smoking is one of the major public health problems. The trends in smoking rates are not going into the right direction. Awareness campaigns have been run, using the same approach as for raising awareness for breast cancer screening, but this has not yet worked properly.

Jordan: Tobacco control measures have previously included tobacco monitoring and surveillance, prevention of exposure to passive smoking, offering smoking cessation services, raising awareness on the risks of smoking, raising tobacco taxes, and raising fines on tobacco smuggling (274). According to local experts, the prices of a pack of cigarettes are still low, smoke-free areas exist but people smoke nonetheless as bans are not enforced (325), and minors are not allowed to buy cigarettes but this ban is not enforced either.

Kuwait: Tobacco control is part of the latest national NCDs plan (2017–2025) (279). It aims to implement the WHO tobacco agreement, improve surveillance and monitoring of tobacco consumption especially among youth, implement and strengthen tobacco control policy regulations and financing the implementation, promote awareness on tobacco risks in school campaigns, support smoking cessation clinics in health facilities, and train health professionals on behavioral self-management strategies. According to local experts, smoking cessation clinics are now available in all six regions of the country.

Lebanon: The government issued a tobacco regulation law in 2012, but it was poorly implemented and enforced (184). After the country had the highest smoking prevalence in the region in 2015, there were suggestions to amend the 2012-law to include regulations on tobacco consumption, smuggling, and pricing (184). The MOPH focused on the promotion of behavioral changes towards tobacco consumption, reinforcement of smoking-free laws, and banning marketing of tobacco products (283). According to local experts, there are many proper tobacco control measures written down on official papers, but they are not enforced in reality. For example, banning of smoking in restaurants can and has been imposed (325), and although people might initially respect the ban, half a year after the implementation things return to as they were before.

Morocco: The first national cancer plan (2010–2019) focused on running awareness campaigns in the media, targeting mainly young people, as well as on introducing several restrictive policies, such

as raising tobacco taxes, banning retail selling of tobacco, prohibiting tobacco sale to minors, and prohibiting smoking in indoor public places and workplaces (199, 334). According to local experts, the first national cancer plan led to improvements, but smoking is still a major challenge. Cigarette taxes have indeed been raised. There is a need to communicate more about the harms of smoking. The laws banning smoking in public areas as well as banning sales to minors exist, but their enforcement is not functioning properly.

Saudi Arabia: The latest national cancer plan (2014–2025) as well as the NCDs plan (2010–2020) included tobacco control as a priority (287, 289). This included the launch of awareness campaigns and legislation on anti-smoking laws. According to local experts, smoking is a rather recent phenomenon in the country. It started on a broad basis 10–15 years ago; previously smoking was punishable by prison. A massive increase in lung cancer is therefore expected in the next 5–10 years. Prices of cigarette packs have been more than tripled in the last few years, but the number of people smoking is still increasing. Unifying packing has been introduced, there is a complete ban on advertising, and there is also a regulation on tobacco products. There are now smoking cessation clinics in every region of the country that provide their services for free.

South Africa: The national caner plan (2017–2022) as well as the NCDs plan (2013–2017) aim to raise tobacco taxes, enforce tobacco bans and smoke-free places, labelling of packages, raise awareness, and support smoking cessation (290, 292). According to local experts, efforts to reduce smoking have been made, but for example the establishment of smoking cessation clinics remains difficult. The new lung cancer treatment policies do provide a framework for the development of further smoking cessation clinics outside the existing one in Cape Town.

UAE: The NCDs plan (2017–2021) aims to implement tobacco control laws and legislation, raise awareness on tobacco risks, prohibit tobacco marketing, regulate sales of tobacco and raise tobacco taxes, protect society from passive smoking, provide smoking cessation support at hospitals, schools, universities, workplaces, and through a hotline and mobile apps (295). According to local experts, smoking bans in public areas and workplaces are enforced through hefty fines and are generally obeyed by everyone. There is even one region in the UAE where smoking is not allowed at all. Age limits apply for the purchase of cigarettes. A 100% excise tax has also been imposed on cigarettes, and the tax revenue from this is used for prevention measures and education on harms of lifestyle factors.

4.3.2 Obesity

Obesity (commonly defined as a body mass index (BMI) of ≥30) and overweight (BMI of 25–29.9) are linked to multiple cancer types (335, 336). These include endometrial cancer, esophageal adenocarcinoma, postmenopausal breast cancer, liver cancer, renal cancer, and colorectal cancer. Excess body weight is suggested to be a risk factor in more than half of all endometrial cancers while it is less associated to other cancers (337). The age of weight gain might also affect the cancer risk. Being overweight during childhood and young adulthood might increase the risk to get certain cancers compared to gaining weight later in life (337). Intentional weight loss has also been shown to decrease the subsequent cancer risk (338).

Previous studies for the UK and the US showed that obesity and overweight is second-largest preventable cause of cancer (after smoking) and accounts for approximately 17–19% of all preventable cancer cases in these countries (317, 319). However, combating obesity and overweight is complex. Both eating and drinking habits (calorie intake) and physical activity patterns (calorie consumption) affect one's body weight.

4.3.2.1 Obesity rates

The prevalence of obesity is among the highest in the world in some of the MEA-9 countries. Around 40% of all adult women are obese in Egypt, Jordan, Kuwait, Saudi Arabia, South Africa, and the UAE; see Figure 35. Obesity rates in men are lower than in women in all MEA-9 countries. The trend over time shows that obesity rates have increased strongly – both in men and women – in all countries between 2000 and 2016. This unfavorable trend is also shared by the EU-3 countries, but the increases were smaller. Obesity rates are also much more alike between men and women in the EU-3 countries. The big difference in obesity rates in men and women in countries in the Middle East has been explained by higher illiteracy among women, cultural desirability of some degree of obesity, restrictions in lifestyle choices, such as limited access to physical exercise activities, sedentary lifestyle as household chores are done by expatriates, and multiple pregnancies (339).

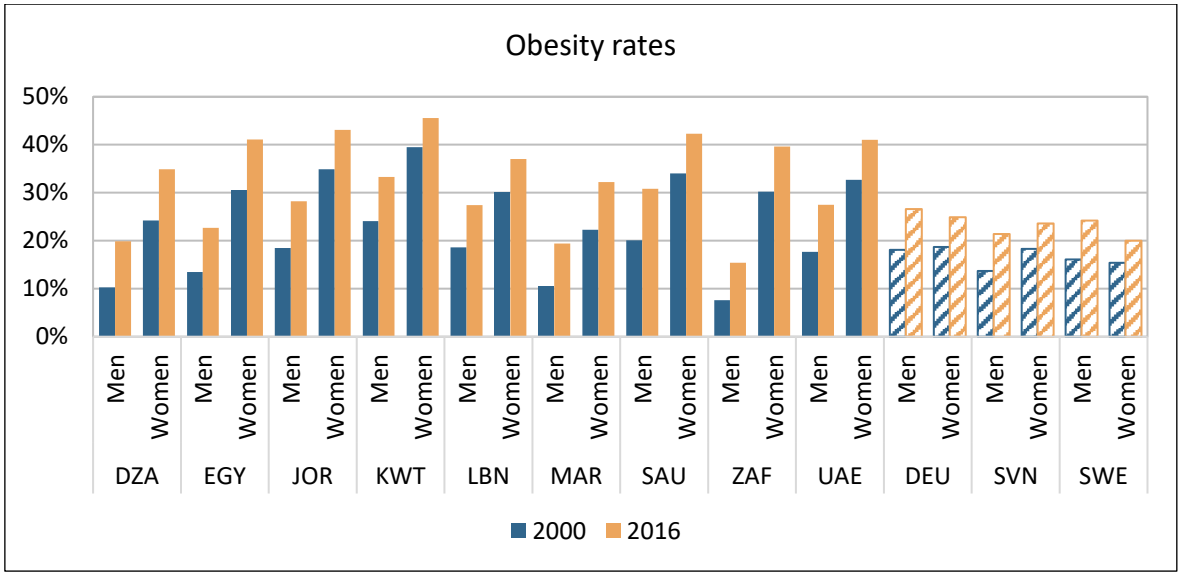


Figure 35: Prevalence of obesity among adults in MEA-9 and EU-3, 2000 & 2016

Notes: The data show the proportion of adult men and women (aged ≥18) with obesity (BMI≥30). The rates are age-standardized. Source: WHO (328).

4.3.2.2 Obesity control policies

Physical activity

Physical activity such as walking, running, biking, swimming, or performing household chores requires extra energy compared to sitting or lying down. Physical activity can help to prevent obesity by increasing the body's calorie consumption. In addition, a positive effect of physical activity on reducing the risk to get certain cancers, such as colorectal cancer and breast cancer, has also been established irrespective of body weight (340).

Insufficient physical activity is exceptionally common in the Gulf countries; see Figure 36. Almost 75% of women and over 60% of men in Kuwait have insufficient physical activity. Physical inactivity patterns in the other MEA-9 countries are similar to the ones observed in the EU-3 countries. Women have higher rates of insufficient physical activity than men in most countries, which mirrors the pattern observed for obesity rates. The hot climate limits the possibility to do outdoor exercises for a large part of the year in the Middle East in general, but the cultural factors behind the imbalance between men and women in obesity rates also partly relate to the imbalance in physical activity patterns (339).

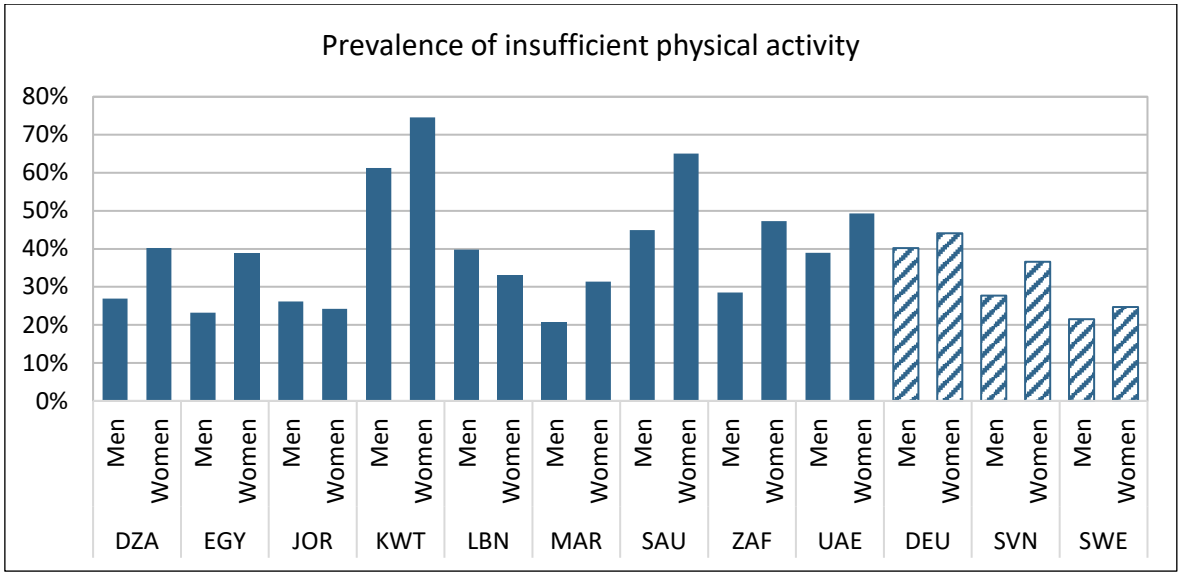


Figure 36: Prevalence of insufficient physical activity among adults in MEA-9 and EU-3, 2016

Notes: The data show the proportion of men and women aged ≥18 years with insufficient physical activity. Insufficient physical activity is defined as attaining less than 150 minutes of moderate-intensity physical activity per week, or less than 75 minutes of vigorous-intensity physical activity per week. The rates are age-standardized, except in Jordan where data also refer to year 2019. Source: WHO (328) and Jordan MoH (329).

Food labeling

The daily calorie intake through food and drinks affects the body weight. Several measures can be taken to help consumers make informed choices on what to eat and drink as well as to provide nudges to adopt a healthy diet. One such measure is food labeling. The Food and Agriculture Organization of the UN recommends accurate and standardized labeling instructions that enable consumers to receive comprehensible information on the content of food items (341). Front of package (FOP) labeling systems provide a product summary of key nutritional aspects, food characteristics, and/or health claims (341, 342). The FOP system can be nutrient specific, a summary indicator, or a food group information. (341). Examples of FOP systems are the “keyhole”, a summary indicator system used in Nordic countries in Europe, a “traffic light system”, used in Portugal, Spain, and the UK, and the “health star”, used in Australia and New Zealand (343-346). Implementing the FOP does not just guide the population to healthier diet choice, but also encourages manufacturers to reduce the levels of unhealthy nutrients (341, 346).

The FOP system has been implemented in multiple MEA-9 countries. Saudi Arabia implemented a FOP nutrient-specific traffic light labeling in 2018 with a compulsory requirement to state the added sugar (347). The UAE implemented a FOP nutrient-specific traffic light labeling as part of its National Program for Happiness and Wellbeing in 2020, while Abu Dhabi implemented the health endorsement logo. South Africa started to implement a FOP health endorsement logo in 2019 which

draws attention to food items with highly processed food, high in sugar, fat, and salt (348). Morocco implemented a FOP graded labeling (347).

Excise taxes

The WHO recommends excise taxes on sugary drinks to make them more expensive and thereby reduce over-consumption (349). Among the MEA-9 countries, Saudi Arabia and the UAE in 2017 and South Africa in 2018 have implemented taxes on sugary drinks (350).

4.3.2.3 Latest strategies on healthy diet and physical activity

Algeria: Promotion of healthy diet and physical activity were the two areas in the national NCDs plan 2015–2019. The actions on healthy diet promotion included the formulation of national guidelines to reduce the daily consumption of salt, sugar, and fats, and the design a standard guide for prevention and management of obesity and overweight in primary care (268). Actions on physical activity included the development of a national communication and information strategy on relationship between physical activity and health, the development of a sports-for-all program, and the development of mobility strategies that encourage walking or cycling (268). According to local experts, the main reason for the high and increasing obesity rates is the changing diet from what used to be a Mediterranean diet with fruits and legumes to a Western diet with fast food. Lack of physical activity and a sedentary lifestyle also contribute to obesity.

Egypt: Following aims in the national cancer plan, the MoHP aims to promote a healthy lifestyle as a way of fighting colon and breast cancer (138). The NCDs plan 2013–2020 aimed to reduce obesity rates and physical inactivity as well as lowering salt and sodium intake (271). According to local experts, the trends are not going into the right direction. Awareness campaigns have been run, using the same approach as for raising awareness for breast cancer screening, but this has not yet worked properly. School lunches have been improved to address obesity early on in children.

Jordan: The national strategy against obesity from 2011 included establishing and strengthening legislations towards healthy diet through reducing saturated fats, reducing salt levels, and banning industrially produced fatty acids as well as promoting physical activity in schools and workplaces (272). According to local experts, the high obesity rates and low physical activity rates show that current measures have not been successful yet.

Kuwait: The NCDs plan for 2017–2025 prioritizes the promotion of a healthy diet and physical activity to reduce obesity rates (279). The main actions include establishing regulations addressing food producers to reduce the salt and sodium content in food, to substitute saturated fats with

unsaturated fatty acids, to reduce the sugar content in drinks and food. Physical activity targets include raising awareness using public and social media platforms, establishing spaces for walking and cycling (bicycle lanes), and including physical activity as a subject in the school curriculum; see Info Box 9. According to local experts, it is doubtful that media campaigns by the MoH to raise awareness reach people and that NGOs might be better equipped to do this work and use social media to reach people. Stomach reduction surgery to lose weight has also been made free to citizens and foreign residents, but waiting lists are long.

Info Box 9 – Obesity, physical inactivity, and social behavior in Kuwait

Despite the planned regulations for food producers in the NCDs plan for 2017–2025, previous studies show that the social behavior of the Kuwaiti people represents a major obstacle to implement effective prevention measures. A main challenge is the urban environment, which facilitates weight gain at home or at the workplace because there is a lack of need for physical activity in daily life (351-353). Another challenge are traditional social gatherings which include serving food as an integral element of the social ritual (354). Previous studies suggested that any management plan for overweight and obese children should include family-based behavior as one of the three main components beside healthy diet and exercise (355). Indeed, targeting cultural variables is crucial to improve adherence to healthy lifestyle measures (356).

Lebanon: The NCDs plan 2016–2020 aimed to promote behavioral changes towards a healthier diet and physical activity and to introduce legislation against marketing food products that contain high amounts of salt, sugar, and/or trans fats (283). According to local experts, awareness campaigns have been run in the media. In March 2019, NGOs organized a "walkathon", a campaign to highlight the importance of physical activity, and provided a free healthy breakfast with fibers to highlight the importance of a healthy diet. A challenge is the lack of government support for such campaigns which would help to broaden outreach. Social media efforts might also help to increase outreach.

Morocco: The latest cancer plan (2020–2029) aims to reduce the risk of cancer through healthy diet and promotion of physical activity (279). The planned measures will be in line with the National Multisectoral NCD Strategy 2020–2029 and include the implementation of a plan to prevent and control overweight and obesity, particularly in children as well as the creation of an environment conducive to a healthy lifestyle and conducive to the practice of physical activity and sport. In addition, establishing legislations that requires FOP label descriptions on the overall nutritional quality of foods has been a priority (347).

Saudi Arabia: The latest cancer plan (2014–2025) aims to reduce overweight and obesity, increase physical activity, and promote a healthy diet while reducing intake of food that contains salt, processed meat, and cancer-causing substances such as aflatoxins (287). According to local experts, increasing obesity rates are a result of changing dietary habits from what used to be based on dairy products and dates to a Western diet with fast food. Food labeling and labeling of drinks has been

implemented, but people do not seem to be influence by it. It is also mandatory for all restaurants to have a calorie count on their menus since recently. Trans fats have also been banned recently. Awareness campaigns are also being run using different channels, but it seems to be difficult to convince people to adopt a healthier lifestyle. This includes also awareness campaigns in schools. Multiple initiatives are also taken to increase physical exercise, including the expansion of sidewalks, gardens, and public parks to make people walk and there are now countless gyms all over the country.

South Africa: The latest NCDs plan (2013–2017) included strategies to address unhealthy diet and physical inactivity. These strategies included reducing salt intake, raising taxes on unhealthy food, offering food subsidies for healthy food, and health care worker counseling (292). The plan notes a concern regarding the feasibility of adopting health care worker counseling because of its high cost however (292).

UAE: The latest plan for NCDs (2017–2021) includes establishing laws on reducing sugar level in sweetened drinks and limiting marketing of unhealthy food and sweetened drinks to children, improving food quality in schools, implementing regulations to reduce consumption of salt and saturated fats, promoting health literacy, and regulating food labeling (295). According to local experts, increasing physical activity is challenging due to the climate with only around three months per year with moderate temperatures. New innovative ideas are needed, such as the "40-40 challenge" – physical activity for 40 minutes on 40 days in a row. Nonetheless, buildings and residential areas are nowadays being built bearing in mind how the design/arrangement can foster health and enable outdoor exercise, also with a special focus on children. High consumption of fast food is a challenge. Food labeling is now mandatory and there are plans to ban advertisements directed towards children in schools and playgrounds. A 100% excise tax has also been imposed on sugary drinks and sugary food, and the tax revenue from this is used for prevention measures and education on harms of lifestyle factors.

4.3.3 HPV vaccination

Infection with the human papillomavirus (HPV) is closely connected to developing many cancer types (357). Nearly all cases of cervical cancer are caused by HPV – a discovery which was awarded with the Nobel Prize in Medicine in 2008. In addition, HPV causes a considerable share of cancers in the neck and oropharynx, anus, penis, vagina, and vulva. HPV is mainly transmitted through sexual intercourse with someone who has the virus, but it can also spread easily through non-sexual skin-to-skin contact (358).

The first HPV vaccine was approved by the US FDA and the EMA in 2006. Germany introduced an immunization program for girls in 2007 and for boys in 2018, while Slovenia introduced a program for girls in 2009 but not yet for boys, and Sweden introduced a program for girls in 2012 and for boys in 2020 (359). The benefit of HPV vaccination in preventing high-grade cervical lesions (pre-stage cervical cancer) and invasive cervical cancer (stage I to IV) based on real-world data covering all of Sweden have recently been demonstrated (360).

In response to the availability of effective HPV vaccines, the WHO launched the Cervical Cancer Elimination Initiative in 2020 (361). To eliminate cervical cancer by 2030, all countries must reach and maintain an incidence rate of below four per 100,0000 women. Achieving this goal rests on three key pillars and their corresponding targets:

- Vaccination: 90% of girls fully vaccinated with the HPV vaccine by the age of 15
- Screening: 70% of women screened using a high-performance test by the age of 35, and again by the age of 45
- Treatment: 90% of women with pre-cancer treated and 90% of women with invasive cancer managed

4.3.3.1 Situation in MEA

The prevalence of infection with HPV and the incidence of cervical cancer and in countries of the Middle East and North Africa is relatively low compared to other regions, with the exception of Morocco which has a high incidence along with South Africa (362). Due to the low HPV prevalence, the cost-effectiveness of a population-based vaccination programs is contentious (362, 363). However, cervical cancer cases are predicted to increase in the future with cervical cancer causing more than 15,000 deaths annually in the whole region of the Middle East and North Africa by 2030 (364). Studies also suggest a high acceptability of the HPV vaccine among the population in the region if it were available and affordable (365). As described below, South Africa and the UAE are the only MEA-9 countries to have introduced a nationwide population-based HPV vaccination program, while Morocco is about to follow suit.

Algeria: One of the national cancer plan (2015–2019) action measures was advocating for HPV vaccination introduction (112). According to local experts, HPV vaccination is not done yet, but it should be possible to introduce it in a few years from now.

Egypt: HPV vaccination is currently not included in the national immunization program (366).

Jordan: According to local experts, the prevalence of HPV is not high. Therefore, HPV vaccination is not deemed to be cost-effective in a Jordanian context.

Kuwait: The HPV vaccine is currently not included in the national immunization program (367).

Lebanon: The cost-effectiveness of introducing HPV vaccination has been evaluated in 2016, but concluded that a massive HPV vaccination campaign would not be cost-effective while highlighting the need for a re-assessment in 2020 (363).

Morocco: According to the national cancer plan for 2020–2029, a national HPV vaccination program for all girls from the age of 11 is supposed to start in 2021, targeting 350,000 girls annually (205, 286).

Saudi Arabia: According to the national cancer plan for 2014–2025, there is a strategy to evaluate the prevalence of HPV in young women (20 to 25 years) and introduce the vaccination only in case of high prevalence (287). In case of low prevalence, the evaluation will be repeated every five years using new samples. Consistent and correct use of condoms was also included within the plan strategies (287).

South Africa: A vaccination program was launched for girls aged ≥9 years at public schools in 2014 (368). The program is fully covered by the NDoH. It worked well in the initial years with participation rates of around 90% (368), although some decline has been reported in subsequent years (369). Vaccination efforts also lost impetus during the COVID-19 pandemic. Girls at private schools can only receive HPV vaccination through their health care providers at cost and vaccination rates have been reported to be less than 20% (370).

UAE: A vaccination program for schoolgirls aged 15–17 was initially introduced in Abu Dhabi in 2008 (371). The program is nowadays nationwide and free for local citizens whereas private health insurance of expatriates usually does not cover it (372).

4.3.4 HBV vaccination

Infection with the hepatitis B virus (HBV) is a major cause of liver cancer and also of liver cirrhosis (373). The WHO estimates that 296 million people were living with chronic HBV infection around the world in 2019, most of them in the Asia-Pacific region and in the Middle East and Africa. An estimated 820,000 deaths, mostly from cirrhosis and liver cancer, were caused globally by hepatitis B in 2019. HBV is a bloodborne virus most commonly spread from mother to child at birth or from an infected child to an uninfected child during the first 5 years of life. While hepatitis B infection

acquired in adulthood leads to chronic hepatitis in less than 5% of cases, infection in infancy and early childhood leads to chronic hepatitis in about 95% of cases. Therefore, prevention of HBV infection in children under the age of five is considered vital for reducing death due to HBV.

The first hepatitis B vaccine was approved by the US FDA already in 1981 (374). Modern vaccines offer 98–100% protection (373). Most of the current HBV-infected population was born before the hepatitis B vaccine became available (375). In its "Global health sector strategy on viral hepatitis 2016–2021", the WHO set a target of 90% of all infants being fully vaccinated against HBV by 2020 (and same target of 90% also for 2030) (376).

4.3.4.1 Situation in MEA

Hepatitis B vaccination functions comparatively well in all MEA-9 countries. Figure 37 shows the latest available estimates of the immunization coverage of infants from 2019. Six of the MEA-9 countries exceeded the WHO target of 90%. Local experts in the UAE noted that vaccination against hepatitis B is mandatory in the country, which explains the high coverage rate. Jordan missed the WHO target narrowly. According to local experts, the prevalence of hepatitis B in Jordan is low, and vaccination is therefore not a priority. Lebanon has a coverage rate of 80%, even though a national vaccination program for all newborns exists since 1998 (377). South Africa has the lowest coverage rate with 77%. By comparison, Sweden exceeds the 90%-target whereas Germany (87%) misses it.

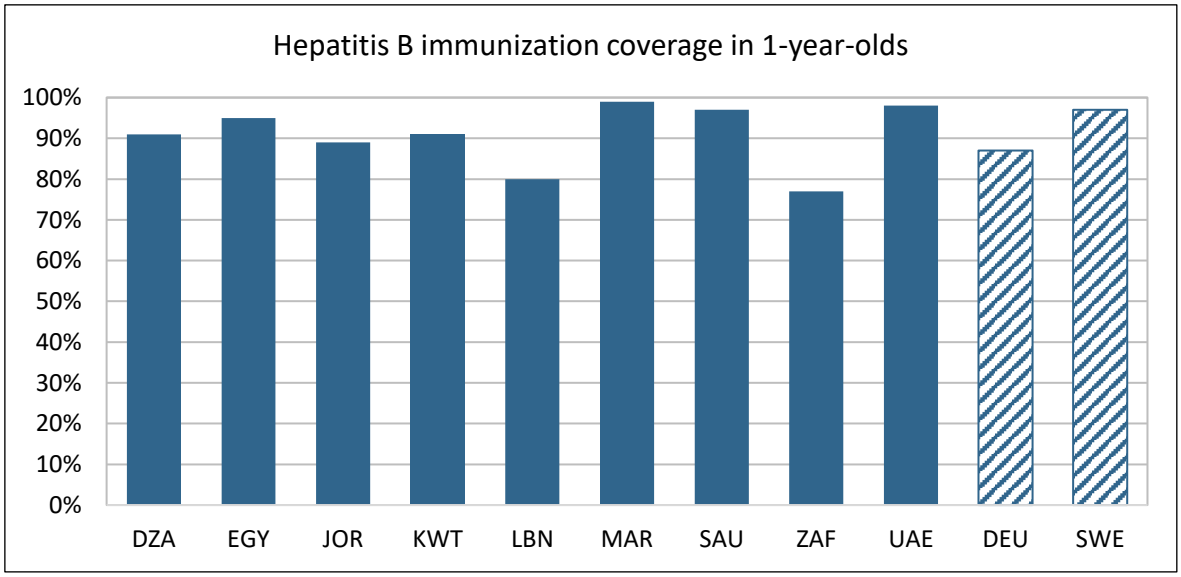


Figure 37: Hepatitis B immunization coverage in 1-year-olds, 2019
Notes: No data available for Slovenia. Source: WHO (328).

4.3.5 HCV treatment

Infection with the hepatitis C virus (HCV) is a major cause of liver cancer and also of liver cirrhosis (378). The discovery of HCV was awarded with the Nobel Prize in Medicine in 2020 (379). The WHO estimates that 58 million people were living with chronic HCV infection around the world in 2019, most of them in the Middle East and Africa and in the Asia-Pacific region. An estimated 290,000 deaths, mostly from cirrhosis and liver cancer, were caused globally by hepatitis C in 2019. HCV is a bloodborne virus most commonly spread through (i) the reuse or inadequate sterilization of medical equipment, especially syringes and needles in a health care setting, (ii) the transfusion of unscreened blood and blood products, (iii) injecting drug use through the sharing of injection equipment (378). Around 30% of infected people spontaneously clear the virus within 6 months of infection without any treatment, whereas the remaining 70% will develop chronic HCV infection (378). There is no vaccine against HCV.

A new generation of highly effective antiviral treatments against chronic HCV infection started to become available in late 2013 and early 2014 with approvals by the US FDA and the EMA in Europe, respectively (379). Initially showing cure rates of around 90%, the latest combinations of antiviral medicines can cure more than 95% of people with an HCV infection (378). In response to the availability of these effective treatments, the WHO set goals for the elimination of HCV by 2030 in its “Global health sector strategy on viral hepatitis 2016–2021” launched in 2016 (376).

4.3.5.1 Situation in MEA

Before the introduction of effective treatments, the prevalence of HCV was very unevenly spread across countries around the world (380). Among the MEA-9 countries, Egypt had by far the highest estimated prevalence with 6.3% infected people in the population in 2015 (380), although variations in the estimated prevalence are large (381); see Figure 38. The high prevalence of HCV in Egypt has historical roots in nationwide anti-schistosomiasis injection campaigns where unsterilized needles and syringes were used; see Info Box 2. Kuwait and the UAE had an HCV prevalence of over 1%. Algeria, Morocco, Saudi Arabia, and South Africa also had an elevated HCV prevalence compared to the EU-3 countries.

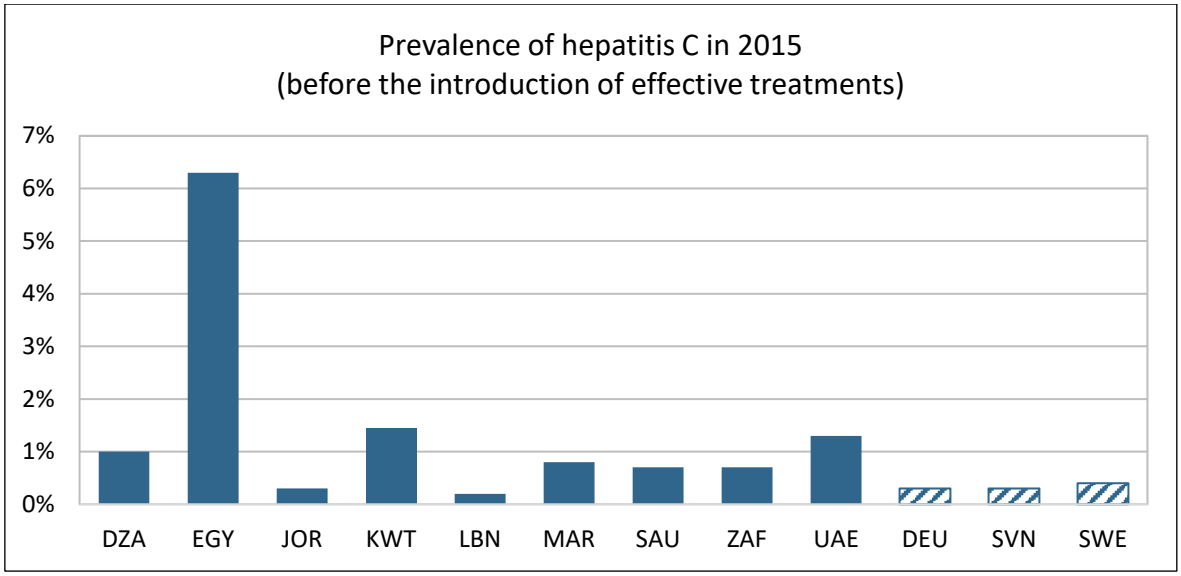


Figure 38: Prevalence of hepatitis C, 2015

Source: Polaris Observatory HCV Collaborators (380) and a meta-analysis of studies for Kuwait published up until 2015 (382) and a national estimate from 2016 for Saudi Arabia (383).

The high prevalence of HCV in Egypt has for a long time posed a significant burden and HCV elimination has been considered a national health priority. Estimates of the economic burden indicated that direct health care costs and indirect costs amounted to 1.4% of the country's GDP in 2015 (384). Already in 2006, the MoHP established the National Committee for Control of Viral Hepatitis to supervise the HCV elimination program (384, 385). In 2014, this committee included the newly launched antiviral treatments in the HCV treatment guidelines after negotiating the price to be more affordable (385), and the MoHP launched the "Plan of action for the prevention, care and treatment of viral hepatitis (2014–2018)" (386). The plan made HCV treatment available for free for all citizens. By 2018, more than 2 million patients had been treated (40% of the estimated HCV-infected population). However, already in 2017, the treatment campaign had lost momentum and most infected cases remained undiagnosed (387). This put the aim to eliminate HCV by 2030 at peril. In response, the president's initiative "100 Million Healthy Lives" to eradicate HCV and NCDs was launched in October 2018 (269). It aimed to screen all Egyptian residents aged 18 or older (around 62.5 million people) for HCV and selected NCDs (diabetes, high blood pressure, and obesity). The campaign was a success and between October 1, 2018 and April 30, 2019 almost 50 million people were screened at designated hospitals or in the campaign's screening vehicles (387). People diagnosed with HCV were referred to the campaign's designated hospitals to receive their treatment free of charge (388). Yet some challenges remain according to local experts. Reinfection with HCV is a challenge. No more screening for HCV is done, but the treatment facilities for HCV are still operating.

In Saudi Arabia, many people with HCV remained undiagnosed and this concerns almost exclusively local citizens as expatriates are screened for HCV before being granted a work visa (383). The national cancer plan (2014–2025) includes aims to reduce HCV and HBV infection rates. The strategies include increasing vaccination coverage against HBV and application of safe injection practices and infection control for HCV (287). Implementing an HCV screening program for adults along with offering antiviral therapy has been recommended to eliminate HCV by 2030 (383).

In all other MEA-9 countries, local experts did not identify HCV as a major challenge. In Jordan, this is explained by the low prevalence of HCV in the population. In Kuwait, screening for infectious diseases, such as HCV and HIV, is nowadays done for all expatriates entering the country. Yet previous studies indicated a much higher HCV prevalence among foreign residents than among local citizens in Kuwait, and also in the UAE (382).

4.4 Early detection

Early detection of cancer increases the chances for survival (389). The two areas of early detection are:

- Early diagnosis (or downstaging): It aims to detect symptomatic patients as early as possible.
- Screening: It aims to test healthy people to identify those having cancer before they experience any symptoms.

4.4.1 Early diagnosis

Cancer symptoms differ from cancer type to cancer type. A lump in the breast may indicate breast cancer, a lump on a testicle may indicate testicular cancer, a lump in the lymph nodes may indicate Hodgkin lymphoma, blood in the stool may indicate colorectal cancer, long-standing coughs may indicate lung cancer, etc. Early diagnosis upon first symptoms is essential. According to the WHO (389), there are two areas to improve early diagnosis:

- Increased awareness of first signs of cancer
    - Physicians, nurses, and other health care providers need to be educated to recognize symptoms of cancers.
    - The general public needs to learn about common symptoms of cancer. Awareness campaigns on symptoms (and on the opportunity of screening, if available) can increase the health literacy in the population. Examples are “Breast cancer awareness month” in October or “Colorectal cancer awareness month” in March.

These campaigns are often run jointly by governments with patient organizations to maximize outreach.

- Improved accessibility and affordability of diagnosis and treatment services, and improved referral from primary care to specialized care
    - Accessibility and affordability relate to the organization of the health care system (see chapter 3). It determines how easy it is for patients to follow the principle "When in doubt, go and see a physician".
    - Quick referral from primary care to specialized care is important to minimize time until diagnostic confirmation (see Figure 30). For example, 44% of lung cancer patients in Europe who reported symptoms had three or more visits with a general practitioner before being referred to a specialist (390).

4.4.1.1 Situation in MEA

Presentation with late-stage disease is common in countries in the Middle East and North Africa (327, 391, 392). This indicates low health literacy in the general population. In addition, cultural factors such as concerns and fear of social stigmatization and risk of divorce (e.g., for female breast cancer patients) influence health seeking behavior and contribute to late diagnosis of cancer; see also Info Box 10.

Info Box 10 – Socio-cultural effects on early diagnosis and treatment in Morocco

A recent study at the National Institute of Oncology in Rabat examined the socio-cultural and religious aspects of Moroccan cancer patients between 2010 and 2020 (105). Even though the study authors note that the results are not necessarily generalizable to the rest of the country, several findings are noteworthy:

- Illiteracy among the cancer population is still common, and four times higher in women than in men, which leads to lack of knowledge of medical information.
- In the Arab-Amazigh-Muslim culture, cancer is considered a divine test and an opportunity to improve for practicing believers, while for non-practicing believers, cancer is regarded as a divine punishment coming from outside.
- Spiritual therapy ("roquia") might be adopted as an anti-cancer remedy by some patients. It involves recitations of Qur'anic verses and the invocations taught by the Prophet Muhammad.
- There is widespread self-administered use of medical plants (phytotherapy). They are used either simultaneously to medical anticancer treatment (and undisclosed to treating physicians) or as actual anticancer treatment. Some of these plants are seriously harmful and endanger the patient's life.
- Damage to the body image (alopecia, mastectomy, hysterectomy) caused by cancer treatment can lead to stigmatization, harm the marital relationship, and lead to divorce.

To improve the quality of cancer care, basic medical education needs to be improved among the population. This will benefit both early diagnosis of cancer, treatment uptake, and treatment adherence.

Local experts have generally confirmed the challenge with late-stage presentation of patients and its causes. Some of the experts have also offered additional perspectives, as described below.

Algeria: Late-stage presentation of patients is a big challenge, especially in the southern part of the country. General physicians do not know the symptoms of cancer well enough, and the early symptoms therefore overlooked. General physicians only give patients some medication to soothe their pain.

Jordan: Many patients are diagnosed at a late stage. Cancer awareness among the population is low. There are public efforts focusing on the promotion of a healthy lifestyle related to NCDs, but a more structured approach is needed to also encompass early diagnosis.

Lebanon: Prevention campaigns are being run, e.g., in October usually a breast cancer awareness campaign is being run (not in 2020 due to COVID-19).

Morocco: Early diagnosis of cancer is hindered by multiple socio-cultural effects; see Info Box 10.

Saudi Arabia: Many patients do not seek medical advice from the health care system. For cultural reasons, patients may initially opt for herbal medications if they experience symptoms. As a result, patients present at a late stage of disease to the health care system.

South Africa: A priority should be to diagnose patients as early as possible and offering treatment, as it is much cheaper to treat early-stage than late-stage cancer. In addition, previous studies have shown that there are differences between ethnicities, e.g. with black women presenting much later with breast cancer than their non-black counterparts (393).

UAE: A main challenge is making sure patients access health care. Many patients lack knowledge on where to seek care and how to navigate through the health care system. Part of this is also low awareness and health literacy. The Abu Dhabi health authority runs an annual cancer awareness campaign – “Simply Check” – that includes general information on cancer risk factors, prevention, and full information on cancer screening centers (394).

4.4.2 Screening

Screening for cancer aims to detect abnormal cells among healthy people without any symptoms as early as possible. The ideal situation would be to detect abnormal cells at the earliest possible stage (stage 0, also known as cancer in situ or pre-cancer) when there is only a group of cells that are still localized at the place where they originated. These abnormal cells may become cancer and spread to nearby normal tissue. They are usually removed by surgery. The detection and treatment of in-situ cases can help to reduce the number of cancer incidence in a population, because in-situ cases are usually not counted as real cases of cancer.

In reality, cancer is many times only detected when it has already turned into a malignant tumor (ranging from stage I = localized cancer to stage IV = metastasized cancer). Screening can help to increase the share of people diagnosed at earlier stages of cancer (e.g., stage I) and decrease the share of people diagnosed at later stage (e.g., stage IV). This will improve survival of patients (and thereby reduce the number of people dying from cancer), because the earlier stage at diagnosis, the better the chances to survive (395). Notably, the benefits of screening can only be reaped if detected cancer cases are followed up and receive appropriate treatment.

Programs to screen for certain cancer types have been implemented by many countries around the world over the last decades (389). Several factors determine the quality and success of a cancer screening program:

- **Type of organization**. Three types of programs can be distinguished (395, 396):
    - Organized population-based programs: They address a healthy population segment eligible for screening and actively urge the whole target population to participate. The WHO emphasizes that only organized screening programs are likely to be fully successful in reaching a high proportion of the at-risk population (397).
    - Non-organized programs: They define a healthy population segment eligible for screening which has a right to receive screening at the request of an individual.
    - Opportunistic programs: Screening is offered to an individual without symptoms of cancer when they present to health care for unrelated reasons.
- **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 (398, 399). Involving NGOs such as patient organizations can increase the changes to reach a wide audience.
- **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) (397).[19]
- **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

[19] 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).

or too narrowly. The WHO notes that screening that concentrates solely on a high-risk group is rarely justified, as identified risk groups usually represent only a small proportion of the cancer burden in a country (397). However, defining the target group too broadly will increase the number of people subject to false positive diagnosis and negatively impact on the cost-effectiveness of the screening program.

- **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.
- **Follow-up actions**. Mechanisms for referral and treatment of abnormalities have to be put in place (397). There is little sense in spending money on screening if all patients with a diagnosis are not also offered appropriate treatment.
- **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 (395). 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.

Screening programs are an integral part of the measures that governments can take to tackle the growing disease burden of cancer. The WHO currently recommends three cancer screening programs for breast, cervical, and colorectal cancer (389). These are also the same three programs that have been recommended already in 2003 by the Council of the European Union (400), and that remain the only recommended ones as of 2021. Prostate cancer screening has been practiced since the 1990s but remains controversial. Lung cancer screening has been trialed in the 2010s but is not yet widely implemented.

An overview of the status of screening for breast, cervical, colorectal, prostate, and lung cancer in the MEA-9 countries is provided below. In general, all MEA-9 countries have implemented breast cancer screening for women, albeit to varying extents. Cervical cancer screening for women is also implemented to some extent in all countries, whereas other screening programs are less common. Local experts also highlighted some general considerations for the introduction of screening programs:

- **Prioritization of screening programs**. The kind of screening programs to be introduced needs take into account the local context, because the cancer epidemiology differs from country to country. For example, colorectal cancer screening is more urgent in the Gulf countries, because of comparatively high rates of colorectal cancer. Local experts in Jordan

remarked that there are few cases of cervical cancer in the country, which negatively affects the cost-effectiveness of a cervical cancer screening program.

- **Entities providing screening**. Cancer screening services are usually always provided on an outpatient basis. Local experts in Kuwait stated that there were considerations in the past to include screening and prevention activities at the KCCC, the only tertiary cancer care facility in the country. In order for cancer care facilities to focus on their core competences, it might be easier to leave screening activities to primary care polyclinics or secondary outpatient clinics. These clinics are geographically closer to the patient, which can increase participation rates. Yet such a system requires a clear referral system to tertiary care.
- **Fragmentation of health care systems**. In countries with fragmented health care systems, such as Saudi Arabia, it is difficult to establish truly nationwide programs that cover all population segments.

4.4.2.1 Breast cancer screening

The WHO recommends breast cancer screening (389). The Council of the European Union (400) also recommends it since 2003, and it is part of the European Code Against Cancer (322). The initial recommendation in Europe was to screen women aged 50–69 years with mammography. The fourth edition of the European Guidelines for Quality Assurance in Breast Cancer Screening and Diagnosis, published by the European Commission in 2013, further specified that screening should take place every 2 years (401). Currently, the United States Preventive Services Task Force (USPSTF) recommends mammography screening every 2 years for women aged 50–74 years (402). A is a physical examination of the breast (clinical breast examination, CBE) by a health professional without a mammography is not recommended.

Breast imaging technology has evolved since the introduction of mammography, from film to digital image receptors. Both technologies use X-ray radiation to produce an image of the breast. Digital mammography has a performance similar to that of film-screen mammography in women aged 50–79 (403). Currently, full-field digital mammography, also known as two-dimensional (2D) mammography, is being replaced by digital breast tomosynthesis, also known as three-dimensional (3D) mammography (404). A large prospective trial has been launched to determine whether digital 3D mammography is superior to digital 2D mammography (405, 406).

Some general points are noteworthy in relation to breast cancer screening in MEA.

- **Starting age for screening**. Women in the Middle East and North Africa tend to develop breast cancer at a younger age (407, 408). Based on data from the UAE national cancer

registry, a study showed that local women develop breast cancer at least a decade earlier than women in Western countries (409). Table 19 shows that screening programs in most MEA-9 countries already start at the age of 40.

- **Cultural barriers**. There are barriers that can cause delay or prevent women from accessing breast cancer screening programs. In the UAE, a study showed that the time interval between initial breast cancer symptoms and seeking medical help was between three months to three years (391). Concerns and fear of social stigma and lack of awareness about breast cancer signs and symptoms influence women's attitudes towards breast cancer screening (391, 410). Financial considerations were also one of the barriers in the UAE, especially among non-nationals (410).
- **Refugees.** 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 (196, 411). 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 (411).

In the MEA-9 countries, breast cancer screening is practiced to varying extents in all countries; see Table 19. Country-specific challenges described in the literature or by local experts are provided below.

Algeria: As part of national cancer plan (2015–2019), pilots projects for organized breast screening programs were established in five selected provinces in 2018 (412). They are yet to be evaluated before decisions will be made to introduce an organized country-wide program, according to local experts. 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. In the past, many uncoordinated or screening campaigns have been carried out by scientific societies, associations of cancer patients, union and/or professional structures, private initiatives. Despite the absence of a country-wide 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, 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 president's "Women's Health Initiative" was launched to establish a country-wide breast cancer screening program (270). The

initiative offers free screening to women aged 35 or older, which corresponds to around 28 million women (413, 414). The initiative was implemented in three bi-monthly phases over the whole country. By October 2020, 8.5 million women had been screened (414). The program is coupled to a referral system that guarantees screened women with a positive diagnosis access to treatment at MoHP hospitals. Local experts judged the willingness to participate in the initiative to be a success, which can be attributed to the previous year's "100 Million Healthy Lives" initiative that focused on HCV and NCDs. According to local experts, the program is now an ongoing continuous one with recurring annual visits, mainly screening via 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.

Jordan: A national breast cancer screening and early detection program, called the Jordan Breast Cancer Program, was established under the directive of the MoH in 2006 (160). It provides universal access to mammography for all women aged 40 years and older. National guidelines recommend mammography every 1–2 years for women aged 40–52 years, and every 2 years for older women at normal risk (415). Several barriers to achieving organized population-based screening remain, including limited resources, access challenges, and ensuring periodic screening of already screened women. To reach women in remote areas, two mobile mammography units connected to the KHCC have been used. This home visit program targets women between the age of 25–65 years and provides free mammography. For women who get diagnosed, the programs offers the required medical services and support at the KHCC (416).

Kuwait: A country-wide organized screening program was launched in 2014 for women aged 40–69 years (277). The program was supported by the Memorial Sloan Kettering Cancer Center in the US as part of a two-year agreement with the MoH in Kuwait. Screening services are provided at polyclinics, one in each health care region (417). The program used to notify women with their screening results through SMS and facilitates women with abnormal screening results to move through the diagnostic stage and arrange any additional imaging or tissue sampling required (417).

Lebanon: There is no organized screening program yet. Mammography is offered at a reduced price through government subsidies. National awareness campaigns are regularly run with support by the Lebanese Breast Cancer Foundation, an NGO established in 2011 (418). The campaigns provide a list of public and private hospitals that provide mammography either free of charge or at a reduced price (419). Refugees cannot access these services free of charge (420).

Morocco: An organized screening program targeting women aged 40–69 years (initially 45–69 years) was established in 2010 (421). Women are screened every two years at primary health centers

where trained nurses, midwives, and general practitioners perform CBE and refer the screen-positive women to one of 27 early detection centers across the country for further assessment, including digital mammography.

Saudi Arabia: A non-organized screening program offering mammography every two years to women aged 40–69 years exists (422). 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 (423).

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-breast examination and regularly go for further screening (424).

UAE: A non-organized screening program offering mammography every two years to women aged 40 and older exists (294). The MOHAP launched guides to raise awareness among the public and to provide details and locations of all screening centers for each cancer type as well as support groups (294). Qualitative studies showed that women have positive attitudes towards breast cancer screening but wanted more breast cancer awareness campaigns year-round and better access to screening (425).

Table 19: Screening programs for breast cancer

	Year of launch	Type of organization	Target group (sex, age)	Interval	Test method
Algeria (112, 426, 427)	2018 (pilot in 5 provinces)	Organized	Women aged 40-70	Unknown	Mammography
Egypt (414)	2019	Non-organized	Women aged ≥35	1 year	CBE and mammography
Jordan (160, 415)	2006	Non-organized	Women aged ≥40	1-2 years	Mammography and CBE
Kuwait (417, 428)	2014	Organized	Women aged 40-69	2 years	Mammography
Lebanon (429-431)	2002	Non-organized	Women aged ≥40	Annual awareness campaigns	Mammography
Morocco (421)	2010	Organized	Women aged 40-69	2 years	CBE
Saudi Arabia (432)	N/A	Non-organized	Women aged 40-69, or ≥30 with a family history of cancer	2 years	Mammography
South Africa (245, 433, 434)	N/A	Opportunistic	Group 1: women aged 40-54 Group 2: women aged ≥55	Group 1: 1 year Group 2: 2 years	CBE, mammography and ultrasound
UAE (294, 435)	N/A	Non-organized	Women aged ≥40, or younger with a family history of cancer	2 years	Mammography

4.4.2.2 Cervical cancer screening

The WHO recommends cervical cancer screening (389). The Council of the European Union (400) also recommends it since 2003, and it is part of the European Code Against Cancer (322). The initial recommendation in Europe was to start screening women not before the age of 20 and not later than the age of 30 with a Papanicolaou (Pap) smear. The second edition of the European Guidelines for Quality Assurance in Cervical Cancer Screening, published by the European Commission in 2008, further specified that screening should continue at 3–5-year intervals until the age of 60 (436). Currently, the USPSTF in the US recommends screening for cervical cancer every 3 years with Pap smear alone in women aged 21–29 years. For women aged 30–65 years, the recommendation is screening every 3 years with Pap smear alone, every 5 years with high-risk HPV testing alone, or every 5 years with high-risk HPV testing in combination with Pap smear (437). High-risk HPV testing alone is expected to replace the Pap smear in women aged 30–65 in the future, but it remains unclear whether and how soon this will become broadly acceptable and accessible (438, 439). The impact of HPV vaccination programs on cervical cancer will in the future also influence screening approaches.

The Pap smear is a simple and cost-effective test that investigates the presence of precancerous lesions on the cervix that might become cervical cancer if they are not treated (440). Pap smear is also the only test that has been used in large populations and that has shown to reduce cervical cancer incidence and mortality (441). Visual inspection with acetic acid (VIA) and with Lugol's iodine (VILI) test have shown to be effective in poor regions with lack of resources and high incidence of cervical cancer (442).

In the MEA-9 countries, cervical cancer screening is practiced to varying extents in all countries; see Table 20. It is very restricted in Jordan, where a Pap smear may only be performed in high-risk women, and in Saudi Arabia, where there are no plans to introduce an organized screening program according to local experts.

Table 20: Screening programs for cervical cancer

	Year of launch	Type of organization	Target group (sex, age)	Interval	Test method
Algeria (443)	1999/2000	Opportunistic	Women aged 25-65	3 years	Pap smear
Egypt (444, 445)	2020 (in governorates covered by UHIS)	Non-organized	Married women	Unknown	Pap smear
Jordan (446)	Unknown	Opportunistic	Women at high risk	Annually	Pap smear
Kuwait (447, 448)	2019	Opportunistic (organized is planned)	Unknown	Unknown	Pap smear

Lebanon (449)	2018	Opportunistic	Unknown	Unknown	Pap smear
Morocco (205, 450)	2010	Organized	Women aged 30-49	Unknown	Pap smear and VIA
Saudi Arabia (451)	Unknown	Opportunistic	Unknown	Every 1-2 year	Pap smear
South Africa (46)	2000	Organized but not fully implemented	Women aged ≥30	10 years (up to 3 tests per women)	Liquid-based cytology
UAE (294, 435)	Unknown	Non-organized	Women aged 25-65	Age 25-49: 3 years Age 50-65: 5 years	Pap smear

In Algeria, an opportunistic screening program with Pap smear has existed since 1999/2000 and local experts noted that the program generally works well nowadays. As part of the Algerian national cancer plan (2015–2019), two pilot areas (one with a high incidence and the other with a low incidence of cervical cancer) were chosen to test the use of high-risk HPV testing and subsequent colposcopic examination, and an evaluation of the pilots is currently in progress. In Morocco, screening is performed in primary health care (452), and the current caner plan (2020–2029) aims to increase the participation rate of the existing screening program, which is currently also characterized by geographic inequities (cervical screening is not done in all provinces). According to local experts, the high incidence of cervical cancer in Morocco results in high treatment costs and increasing the screening rate could help to save treatment costs. In South Africa, a screening program has been in place since 2000 (312). Local experts noted that the implementation and provision of screening is difficult, and that there is great patchiness in how well screening is really done across the country. Liquid-based cytology is used rather than Pap smear or HPV testing in South Africa. In the UAE, previous studies pointed to a lack of awareness among women regarding cervical cancer and benefits of screening (453). The MOHAP launched guides to raise awareness among the public and to provide details and locations of all screening centers for each cancer type as well as support groups (294).

4.4.2.3 Colorectal cancer screening

The WHO recommends colorectal cancer screening (389). The Council of the European Union (400) also recommends it since 2003, and it is part of the European Code Against Cancer (322). The initial recommendation in Europe was to screen men and women aged 50–74 years with fecal occult blood test (FOBT). The first edition of the European Guidelines for Quality Assurance in Colorectal Cancer Screening and Diagnosis, published by the European Commission in 2010, added the fecal immunochemical test (FIT) as a recommended test method (454). The interval between two negative screening examinations with FOBT should not exceed two years, whereas the interval for FIT screening should not exceed three years. It was noted that there is evidence showing that FIT is superior to FOBT with respect to detection rates and positive predictive value for adenomas and

cancer. It was also noted that there exists some evidence that FIT is a cost-effective alternative to FOBT (454). Currently, the USPSTF in the US recommends screening for men and women aged 45–74 years (previously 50–74 years). Several screening methods are recommended: stool-based tests (FOBT ever year, FIT every year, FIT-DNA every 1–3 years) and direct visualization tests (CT colonography every 5 years, flexible sigmoidoscopy every 5 years, flexible sigmoidoscopy every 10 years with FIT every year, colonoscopy every 10 years) (455).

There is broad consensus and well-established evidence that colorectal cancer screening reduces mortality (456-458). A study of colorectal cancer mortality in 34 European countries over a 40-year period showed that mortality decreased the most in countries with better access to screening services (459). Studies have also shown that colorectal cancer screening – both via stool-based tests and direct visualization tests – is highly cost-effective and can even be cost saving (460, 461).

In the MEA-9 countries, colorectal cancer screening is practiced to some extent in many countries; see Table 21. In Saudi Arabia, there is no organized screening program despite expert calls for an introduction since 2015 (462). In the UAE, the MOHAP launched guides to raise awareness among the public and to provide details and locations of all screening centers for each cancer type as well as support groups (294). In Lebanon, there is no organized screening program yet, but a national colon cancer awareness campaign was run by the MOPH together with SAID NGO in March 2019 (463). A major challenge was to reach people with this campaign and not offering free or reduced-price screening during the campaign, according to local experts.

Table 21: Screening programs for colorectal cancer

	Year of launch	Type of organization	Target group (sex, age)	Interval	Test method
Algeria (464, 465)	2018 (pilot in 4 provinces)	Organized is planned	Men and women aged 50-75	Unknown	Unknown
Egypt	N/A	-	-	-	-
Jordan	N/A	-	-	-	-
Kuwait (466, 467)	2015	Non-organized	Men and women	Unknown	FOBT and colonoscopy
Lebanon (468)	2019 (guidelines)	Opportunistic	Men and women aged 50-75	Annually or every 2/3/5 years based on the risk	FIT for average-risk and colonoscopy for high-risk group
Morocco	N/A	-	-	-	-
Saudi Arabia (462)	Unknown	Opportunistic	Men and women aged 45-75	Annually (FIT), 10 years (colonoscopy)	FIT for average-risk and colonoscopy for high-risk group
South Africa	N/A	Opportunistic	High risk including family history	3–5 years	Colonoscopy
UAE (294, 435)	Unknown	Non-organized	Men and women aged 40-75	2 years (stool test), 10 years (colonoscopy)	Stool test or colonoscopy

Previous studies have explained the absence of screening programs in most countries in the Middle East and North Africa with the comparatively lower incidence of colorectal cancer compared to Europe or the US (469, 470). Local experts also noted that there are cultural barriers in respect to taking stool samples. In Algeria, pilot projects in certain provinces have been set up to study the feasibility of colorectal cancer screening and identify strengths and dysfunctions (412). Local experts indicated that a country-wide implementation will be a goal in the upcoming second cancer plan for Algeria. In Jordan, local experts also indicated that there are plans to introduce colorectal cancer screening. By contrast, the latest cancer plan in Morocco (2020–2029) does not foresee the introduction of colorectal cancer screening. Local experts noted that this was due to limited budgets, but otherwise it would be the next program in line to be introduced in Morocco. In South Africa, screening with colonoscopies is only done opportunistically in high-risk patients, especially those with a strong family history, and there are no plans for an introduction of a routine program.

4.4.2.4 Prostate cancer screening

The most common method for prostate cancer screening is the prostate-specific antigen (PSA) test, a blood test. The WHO does not recommend "*systematic prostate cancer screening of all men above a certain age using prostate-specific antigen (PSA)*" (389). In Europe, the European Commission also currently does not recommend the introduction of prostate cancer screening with PSA testing. PSA testing had received FDA approval as a screening tool in 1986 and had been widely used in the US, but in 2011 the USPSTF recommended against its use (471). Currently, the USPSTF recommends only selective offering of PSA testing for men aged 55–69 years (472). The American Cancer Society is also against mass screening with PSA in men aged over 50 years and recommends that the decision to use PSA testing should only be made after providing information about the uncertainties, risks, and potential benefits of prostate cancer screening (473).

The impact of PSA screening on prostate cancer mortality is ambiguous (474), and the evidence for and against screening is highly controversial (475). The main challenge with PSA screening is the high risk of a false positive diagnosis which increases the risk of overdiagnosis and overtreatment (476, 477). It is not possible to identify which of the prostate tumors detected will be life-threatening to the patient during their lifetime and which will not. Screening for prostate cancer has increased the number of cancers detected in Europe and the US, generating expense and morbidity from detection and treatment of cancers that pose minimal risk (478). The overdiagnosis due to PSA screening results in overtreatment with many men receiving unnecessary radical treatment (479). The harm of prostate cancer treatment encompasses impotence, incontinence, and other side effects that can severely affect quality of life of patients.

In the MEA-9 countries, opportunistic screening is performed in some countries; see Table 22. According to local experts, there are no plans to introduce an organized program in the near future in Saudi Arabia. In Algeria, there have been calls in 2019 for introducing organized screening for men aged 45–50 (480), but local experts confirmed that no organized prostate cancer screening is currently performed or planned. Only men with a family history might be screened on an opportunistic basis. In Lebanon, local experts noted that prostate cancer may be the largest cancer type among men, but the incidence fluctuates depending on whether PSA testing was promoted during a certain year, as there is no organized program. In South Africa, PSA testing only occurs to a limited extent in high-risk patients, especially those with medical insurance, and there is often a self-generated excessive PSA screening in some men.

Table 22: Screening programs for prostate cancer

	Year of launch	Type of organization	Target group (sex, age)	Interval	Test method
Algeria	N/A	Opportunistic	Men with a family history	Unknown	PSA
Egypt	N/A	-	-	-	-
Jordan	N/A	-	-	-	-
Kuwait (481)	2020	Opportunistic	Men aged ≥50	Unknown	PSA
Lebanon	N/A	Opportunistic	Unknown	Unknown	PSA
Morocco	N/A	-	-	-	-
Saudi Arabia (482)	2006	Opportunistic	Men aged ≥50	Unknown	PSA
South Africa	N/A	Opportunistic	Men at high risk	Ad hoc	PSA
UAE	N/A	-	-	-	-

4.4.2.5 Lung cancer screening

Lung cancer screening with low-dose computed tomography (LDCT) has been trialed in the recent decade, but its use is still very limited worldwide. The WHO and the European Commission do not currently recommend its introduction. However, clinicians in Europe have called for the implementation of lung cancer screening in the coming years (483-485). Similarly, the USPSTF in the US currently recommends LDCT lung cancer screening in adults aged 50–80 years who have a 20 pack-year smoking history and currently smoke or have quit within the past 15 years (486).

The cost-effectiveness of LDCT lung cancer screening is an important barrier to its implementation. Convincing evidence on the cost-effectiveness is still scarce, with some results indicating cost-effectiveness (at a rather high cost-effectiveness ratio) in European countries with high smoking prevalence (487), similar to findings for the US (488), but unlike findings for Australia (489). In Europe, Croatia is thus far the only country that has started to roll out a national lung screening program in October 2020 (490).

Lung cancer screening in the Middle East and North Africa is also controversial because of lack of evidence on cost-effectiveness in the region (327). As of 2021, none of the MEA-9 countries has a screening program for lung cancer of any form. Local experts in Jordan noted that a lung cancer screening program might make sense in the future due to the country's high number of male smokers. In South Africa, the new lung cancer treatment policies do not recommend lung cancer screening even in smokers due to difficulties in widespread implementation although this is being considered at some centers.

4.4.2.6 Participation rates

Despite the availability of screening programs in the MEA-9 countries, the biggest challenge is to ensure sufficient participation in these programs. Participation requires that people are aware of the opportunity to get screened and understand the benefits of getting screened. Participation rates, i.e., the proportion of the target population that participates in a screening program, are the key indicator to measure the success of a screening program.

Data on participation rates is not systematically available for all MEA-9 countries; see Figure 39. In Lebanon, the breast cancer screening rate in 2019 stood at 50%, up from 11% in 2002 and 44.5% in 2014 (430, 431). The prevalence of "ever-use" of the Pap smear test for cervical cancer screening purposes was 35% in Lebanon (449). For breast cancer screening in the three Gulf countries, the proportion of women aged 40–75 years who had a mammography in 2008–2009 were 15% in Kuwait, 5% in Saudi Arabia, and 9% in the UAE.[20] More recent studies found continued low participation rates in breast cancer screening in the Gulf region in general (425). The proportion of women aged 25–49 years who had a Pap smear test in 2008–2009 were 18% in Kuwait, 8% in Saudi Arabia, and 28% in the UAE (491). In Morocco, the latest numbers covering the period after 2015 indicate a 60% breast cancer screening rate and a 25% rate for cervical cancer screening. By comparison, the latest participation rates in Sweden are over 80% for breast cancer screening, over 70% for cervical cancer screening, and around 70% for colorectal cancer screening (for those regions that introduced the latter program) (492).

[20] Local experts in Saudi Arabia indicated that it is unclear if more recent data on participation rates exist.

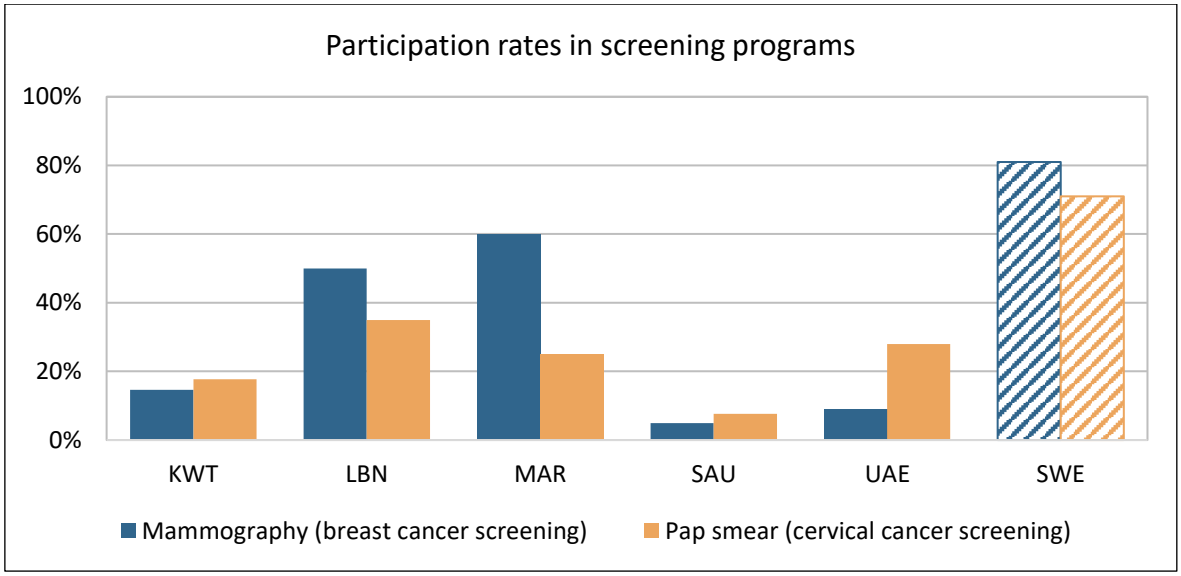


Figure 39: Participation rates in screening programs (latest available estimate)

Notes: Rates for KWT, SAU, UAE are from 2008–2009 (491). Rates for LBN are from 2018–2019 for breast cancer screening and from around 2015 for "ever-use" of Pap smear screening (431, 449). Rates for MAR are based on the screened number of women since 2015 (205). Rates for SWE are from 2019 for breast cancer screening and from 2018 for cervical cancer screening (492).

4.5 Diagnosis and treatment

The diagnosis and treatment of a patient's cancer are at the core of the care process. This requires adequate infrastructure in terms of hospital beds and care places in outpatient clinics as well as adequate numbers of qualified medical staff (e.g., oncologists, radiologists, hematologists, surgeons, nurses). The diagnostic workup (of solid tumors) typically requires imaging analysis (e.g., X-ray, CT, MRI, PET scans) and blood analysis. Afterwards a biopsy is performed to obtain tumor tissue. This enables a pathological confirmation of the cancer. Biomarker testing of the tumor tissue is nowadays also a cornerstone of high-quality care. Depending on the cancer type, the treatment modalities include either surgery to remove the tumor (especially in non-metastatic stages), radiation therapy, drug therapy, or a combination thereof.

The different steps in the provision of diagnosis and treatment require a well-functioning referral system. Swift referral keeps the time from first suspicion of the cancer to initial treatment as short as possible so as to avoid further progression of the cancer; see Figure 30. Local experts in several countries have highlighted patient referral as a major challenge in their local setting. In Jordan, patient data are not properly transferred when patients are referred. Once patients make it to the KHCC, there is good internal coordination along the whole patient pathway though. In South Africa, there may be delays in accessing services due to difficulties with referral pathways as patients in the public sector usually have to go through three tiers of care (primary care → secondary care → tertiary care) to access cancer care services. In the private sector, the referral system is functioning better due

to direct referrals and better resources. In the UAE, especially expatriates lack knowledge on where to seek care and how to navigate through the health care system. A patient might go and see a general physician in primary care and needs to go to a different care provider with the right specialty for further consultation, upon which surgery takes place in hospital X and then medical oncology treatment is received in hospital Y in a different city. Patients may fall between the cracks when being referred, and a system with patient navigators would be needed in absence of a better care pathway model. There is also a need to improve electronic referral and how different hospitals work and communicate with each other.

Clinical guidelines and quality control can help to ensure an equitable provision of care across the whole country. Local experts in several countries have highlighted clinical guidelines and quality control as major challenges in their local setting. In Jordan, there are no national treatment guidelines except for breast cancer. While the KHCC has its own guidelines and compliance is monitored at a real-time basis, there is a lack of quality standards and monitoring in the rest of the country. In Saudi Arabia, 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.

4.5.1 Medical staff and treatment facilities

Modern cancer care is highly specialized and requires competences from different medical fields. This includes pathologists and diagnostic radiologists involved in the diagnosis and surgeons, radiologists, medical oncologists, and hematologists involved in the treatment. Nurses assist the medical doctors and are involved in all activities surrounding the care process. Figure 40 and Figure 41 compare the number of medical doctors and nurses, respectively. The three Gulf countries, Jordan, and Lebanon all have over 200 medical doctors per 100,000 inhabitants compared to only around 70–80 in Egypt, Morocco, and South Africa. The difference in the number of nurses is even greater between the countries, ranging from around 150 per 100,000 inhabitants in Algeria, Egypt, Lebanon, Morocco, South Africa to over 500 in the three Gulf countries. The EU-3 countries have higher numbers of medical doctors than all MEA-9 countries and especially higher numbers of nurses. The EU-3 countries have also a larger proportion of specialized medical doctors – which includes all medical doctors involved in cancer treatment – than general medical doctors.

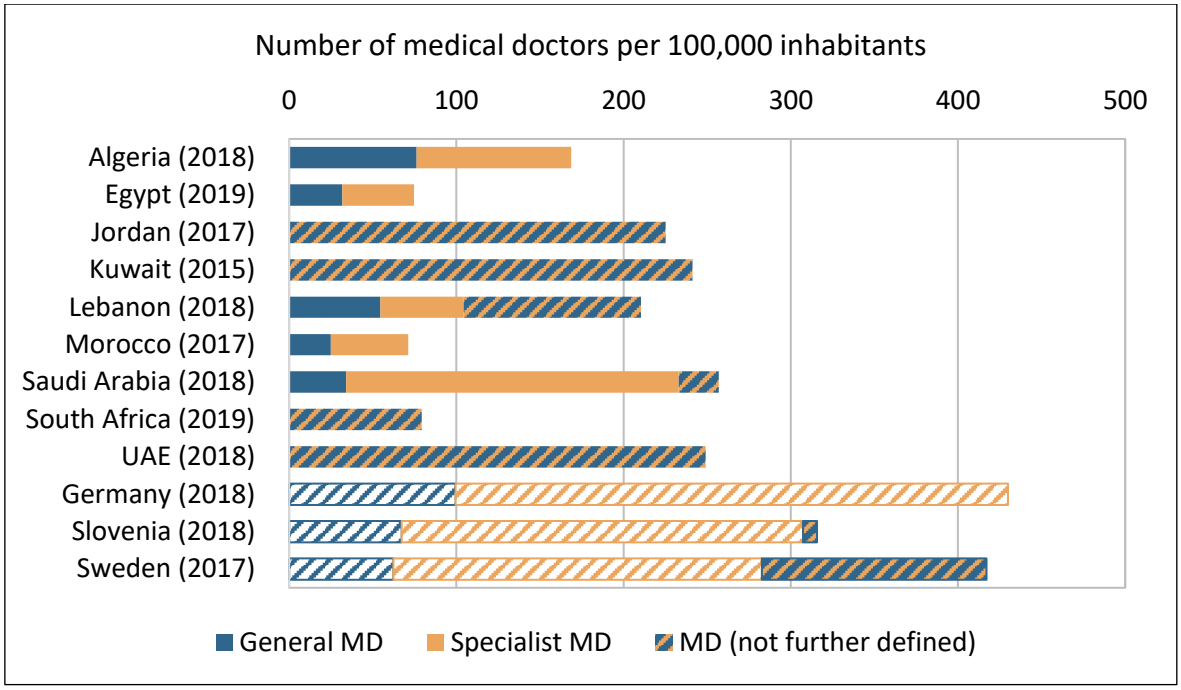


Figure 40: Number of medical doctors per 100,000 inhabitants

Notes: Physicians involved in the treatment of cancer are typically classified as "specialist medical doctors".
Source: WHO (493).

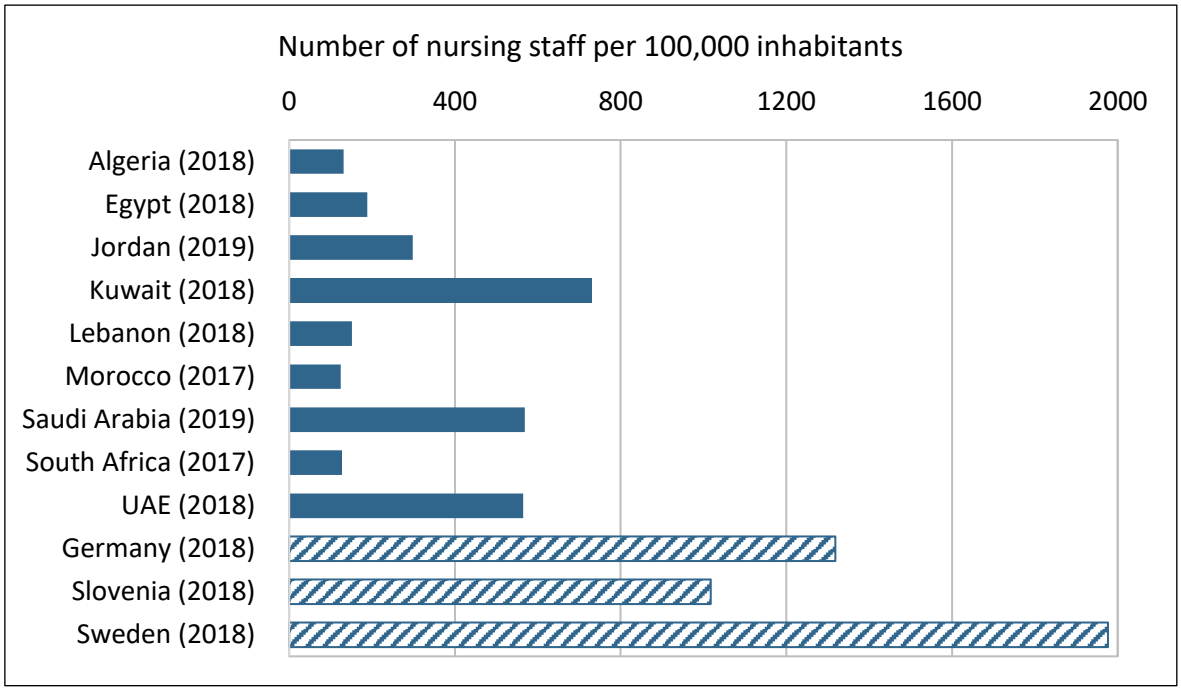


Figure 41: Number of nursing staff per 100,000 inhabitants

Source: WHO (493).

The diagnosis and treatment of cancer patients takes places in various facilities. This can include primary care facilities, specialized outpatient clinics (either hospital-based or detached), and inpatient clinics (hospitals). Cancer patients may be treated in all of these facilities at some point during their

patient journey, depending on the organization of the health care system. Comparable statistics are only available for hospital beds. Figure 42 shows that the number of hospital beds ranges from 10 beds per 10,000 inhabitants in Morocco to 27 beds in Lebanon among the MEA-9 countries. Even though such a comparison provides some information on the general capacity to treat cancer patients, it would ideally also need to be complemented by an analysis of outpatient care places. For example, Germany has a high number of hospital beds per 10,000 inhabitants in Figure 42, but the country is known for having a health care system that relies heavily on inpatient care, whereas Sweden is the opposite and has relatively few hospital beds and instead treats patients in outpatient clinics.

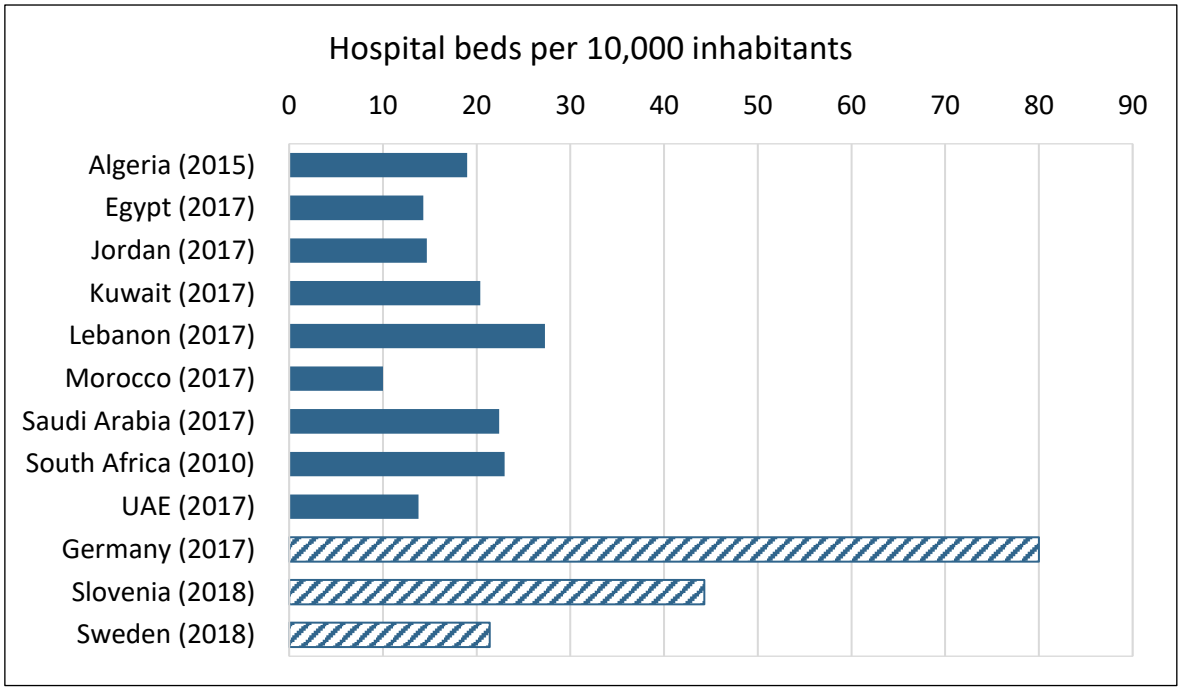


Figure 42: Number of hospital beds per 10,000 inhabitants
Source: WHO (493).

It is also important to consider the availability of treatment facilities (Figure 42) jointly with human resources (Figure 40 and Figure 41). Building additional hospitals and oncology clinics in view of the increasing number of cancer patients is surely required in all MEA-9 countries, but this needs to occur in tandem with an increase in the number of trained medical staff. Planning activities in this area need to take into account that proper training of medical staff takes time. Lastly, since cancer care is specialized, it needs to be concentrated in areas with a sufficient number of patients, creating a geographical access challenge in countries with large rural areas. The geographic location of new treatment facilities needs to be geared to the (future expected) patient population living in the catchment area.

4.5.1.1 Additional challenges identified by local experts

Algeria: Even though many new cancer centers have been established in recent years, adequate staffing is a challenge. For example, in the southern part of the country a new center was opened only staffed with young surgeons who lack experience and who cannot provide good quality care. The MSPRH would need to facilitate videoconferences so that experienced surgeons in urban areas can help and train young surgeons remotely. On the upside, the number of medical oncologists has increased enormously. In 2000, the country only had a single medical oncologist, but in mid-2021 there were 1000 medical oncologists (including in peripheral regions in the south) and lots of training is being done.

Jordan: The health care infrastructure is good in the Amman urban area, which encompasses 50% of the population, but not in the regions outside. There is a significant brain drain of young and trained oncologists happening. Around 20% of all newly trained oncologists are lost to the Gulf countries every year. There is also a lack of long-term planning in the supply of cancer care services for the projected demand.

Kuwait: Geographic accessibility within Kuwait is not a problem, as most patients do not have to travel longer than 30 minutes to reach the KCCC. A challenge is adequate staffing. Large improvements have been made over the last 10 years, especially in terms of the number of specialized oncologists. These are generally well-trained local Kuwaitis who often have received post-graduate training abroad, such as in Canada. The biggest challenge is currently a lack of specialized nursing staff and general administration staff.

Lebanon: There were no shortages of medical staff before the start of the economic crisis in 2019. Since then, things have deteriorated. Young physicians are leaving the country for financial reasons, as the payment has become much worse; e.g., before the crisis a physician could get $100 per counselling, while at the end of 2020 it was $10 per counselling. It remains to be seen how many physicians will return once the crisis abates.

Morocco: The lack of medical staff is a challenge. The plan is to increase the number of medical staff through education and training. There has already been a big jump in training in the last 20 years. Before 2000, there were only six medical oncologists in the country, while in mid-2021 there were more than 200 medical oncologists. All kinds of trained specialists, such as breast cancer specialist, prostate cancer specialists, or surgical oncologists, are still needed. Geographic disparities in the availability of trained specialists also exist. A lack of data managers is also a challenge.

Saudi Arabia: For cancer surgery and radiation therapy, the main challenge is the geography of the country, with poor access in rural areas. The country is training its own oncologists, but oncologists are also recruited from abroad. Yet, it is not always the case that oncologists from Egypt or Jordan meet the higher qualification standards of the country, and thus they cannot work as consultant oncologists but rather only in a lower ranked profession.

South Africa: Health disparities exist across the country, with patients in urban areas frequently being better off than patients in rural areas due to large distances and poor referral pathways. Cancer service delivery is better in the urban provinces of Gauteng and Western Cape, which has historical roots in the old Apartheid system but has not improved adequately since 1994. Church-based missionaries used to provide health care in rural areas in the past but this has disappeared in the last two decades.

UAE: The UAE has state-of-the-art treatment facilities and well-trained medical staff. However, a challenge is to continuously train medical staff to be equipped with the right skills to handle new technologies, such as immunotherapy, CAR-T cell therapy, or applications relying on artificial intelligence, or generally technologies requiring IT skills.

4.5.2 Medical equipment for diagnosis

Medical equipment is needed to locate the cancer and to determine its spread (e.g., locally restricted cancer or metastatic cancer). CT and MRI scanners were originally used for diagnostic imaging and in the 2000s the first PET scanners (later combined with CT or MRI) came into use in Europe and the US. The initial investment costs for installing modern scanners are high. Their availability is thus restricted by the limited health care resources and also in terms of geographic access. Apart from during diagnosis, scanners are also used to ascertain therapeutic response and for monitoring disease progression.

Figure 43 summarizes information on the availability of imaging equipment. Apart from Lebanon, all MEA-9 countries with available data used to have exceptionally low numbers of all types of scanners. Lebanon used to match the EU-3 countries, driven by a high number of CT scanners.[21] Benchmarks regarding the ideal number of diagnostic imaging equipment per inhabitant or per cancer patient do not exist (494). Nonetheless, the low numbers in most MEA-9 countries point to an undersupply which leads to access problems in terms of waiting times and/or geographic proximity.

[21] It should be noted that CT and MRI scanners are widely used in non-cancer patients as well.

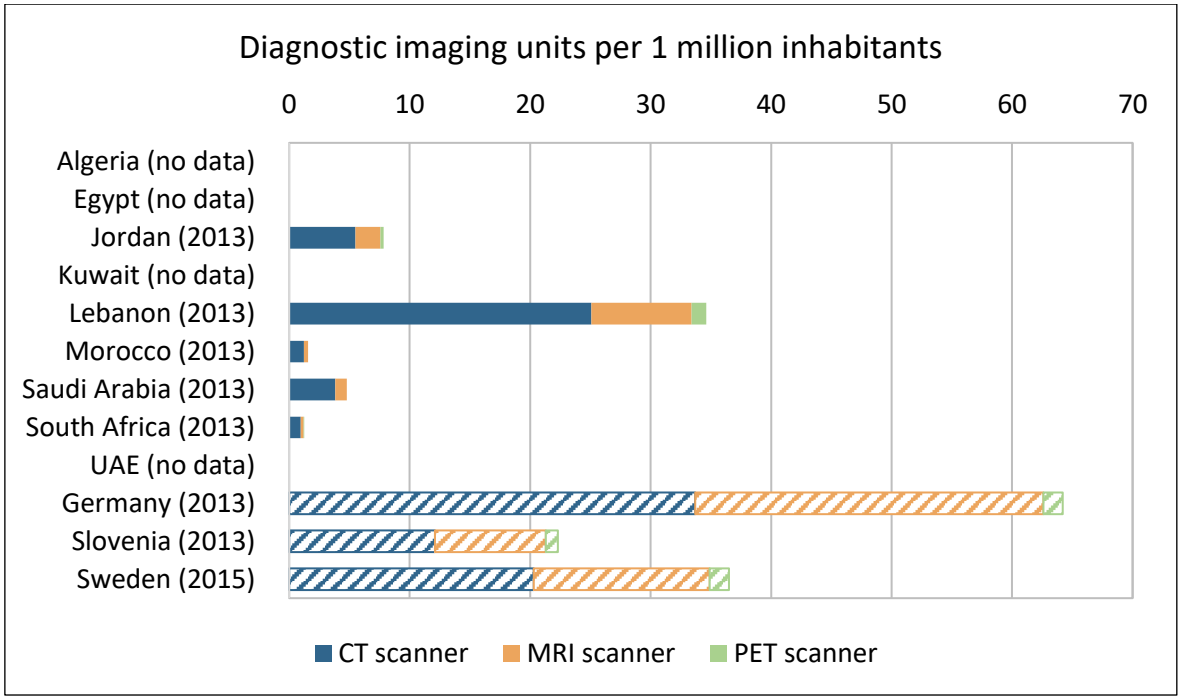


Figure 43: Diagnostic imaging units per 1 million inhabitants
Source: WHO & Eurostat (493, 495).

Apart from imaging equipment, equipment for molecular diagnostic testing has become a prerequisite for administering modern cancer drugs in the move towards personalized/precision medicine. HER2 status in breast cancer was the first widely used biomarker to guide the administration of trastuzumab (US FDA approval in 1998) (496). Many biomarkers in different cancer types have subsequently started to guide the administration of targeted therapies. PD-1 and PD-L1 biomarker testing have guided the administration of immunotherapies since their launch in the 2010s (497). The increasing number of specific mutations that can be targeted by modern cancer drugs has made it tedious to test for these mutations individually. In response, next generation sequencing (NGS) testing has emerged as a tool to test for multiple mutation simultaneously, although this type of testing takes more time and is also considerably more expensive (498). When modern cancer drugs are reimbursed, it is important to also reimburse the costs of testing, as the lack of cost coverage for testing would impede access to personalized treatment. Information on the availability of biomarker testing across the MEA-9 countries is not systematically available, but local experts were asked about this in the workshops. The analysis of the use of modern cancer drugs in the latter part of this section indirectly suggests that extensive biomarker testing is likely not performed, because there is little need for testing in the absence of drug reimbursement.

4.5.2.1 Additional challenges identified by local experts

Algeria: The first PET scanner became operational in the private sector in 2015, and the first two PET scanners in the public sector became operational in early 2021 in Algiers. HER2 testing has been done regularly since 2005. PD-L1 testing has started in a pilot study and checkpoint inhibitors could be administered once they become available locally. However, a big challenge is that there is no molecular diagnostic laboratory in the country.

Egypt: Most (but not all) breast cancer patients are tested for HER2 status nowadays, and they would receive anti-HER2 therapy in both early stage and metastatic disease.

Jordan: At the KHCC, almost all patients receive biomarker testing. But outside of the KHCC, this number is probably close to zero.

Kuwait: All patients receive biomarker testing at the KCCC. The KCCC has its own molecular diagnostics laboratories, one for solid tumors and one for hematology. NGS testing has been used for the past five years.

Morocco: Basic biomarker testing, such as HER2 in breast cancer and EGFR and ALK in lung cancer, is performed in all patients, whereas BRCA testing in breast cancer is not yet available everywhere. Molecular testing labs exist in the biggest cities and biopsy samples of patients treated in rural areas are sent to these labs, whereas 10 years ago, biopsy samples were sent to France or Spain for analysis. NGS testing exists only in the private sector and not yet in the public cancer centers.

Saudi Arabia: There are CT scanner and MRI units across the whole country. The biggest barrier is the need for well-trained radiologists who can analyze the imaging results. There are plans to establish a central radiology center that analyzes imaging results from different units across the country – this would also make it easier to have the best-trained radiologists evaluate the results. PET-CT scanning is mostly limited to the three main cancer centers, but more such scanners are planned to be purchased. There is one cyclotron in the country that can manufacture radioisotopes, but the transportation of the radioisotopes across the whole country is difficult. NGS testing is already performed, but not in every patient, and it is also concentrated to the three main cancer centers.

South Africa: There are CT scanners and MRI units across the country at all major hospitals with academic radiologists reporting at the teaching hospitals. PET/CT Scanning is also available at the major centers throughout the country. Indeed, it is often easier to get a PET/CT scan than an MRI scan. Most radioisotopes are available at centers having PET/CT scanners for diagnostic and

therapeutic purposes. NGS testing is widely available in the private sector and has been introduced in the public sector for hematological malignancies with solid tumor NGS under development.

4.5.3 Medical equipment for treatment

Solid cancer types are usually initially treated with surgery or radiation therapy if there is a curative treatment intent. In many cases this is succeeded by adjuvant systemic therapy (i.e., chemotherapy, hormonal therapy, immunotherapy, targeted therapy), and in some cases it might be preceded by neoadjuvant systemic therapy. Systemic therapy and radiation therapy are extensively used if there is a palliative treatment intent in solid cancer types. Systemic therapy and radiation therapy are also used for hematologic cancers. Use of systemic therapy is described in section 4.5.4. In radiation therapy, the most commonly used type of machine are medical linear accelerators (linacs), which are used to perform external beam radiation therapy in the megavoltage (MV) range. Brachytherapy is another common type of radiation therapy where the radiation source is placed inside the body and close to the tumor.

The availability of different types of radiation therapy machines is shown in Figure 44. Most MEA-9 countries have around 1.5 radiation therapy machines per 1 million inhabitants, ranging from less than 1 machine in the UAE to over 3 machines per 1 million inhabitants in Lebanon. The EU-3 countries have around six times higher numbers of machines. In relation to meeting patient needs, the International Atomic Energy Agency (IAEA) has published a recommendation of one accelerator (linac) per 450 cancer patients per year (499). For Europe, this translates into a target of 7 linacs per million inhabitants according to the European Coordination Committee of the Radiological, Electromedical and Healthcare IT Industry (COCIR) (500). As cancer patient numbers per inhabitants are lower in the MEA-9 countries than in Europe, the target recommendation would be around 1.5 linacs per million inhabitants. All MEA-9 countries except Lebanon and South Africa fall just short of this lower benchmark of 1.5 linacs per million inhabitants. However, the age of the equipment (the age of linacs or the use of older cobalt-60 machines instead of linacs) as well as the availability of trained professionals to operate the machines would also need to be taken into account to infer the quality of care available.

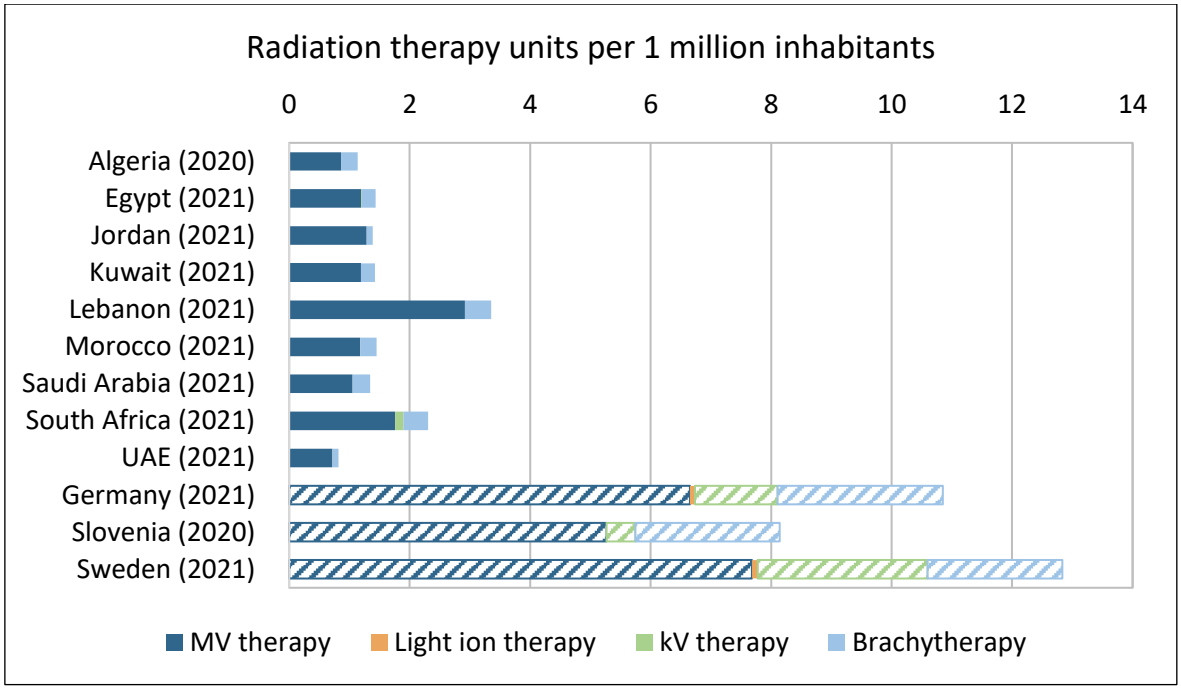


Figure 44: Radiation therapy units per 1 million inhabitants

Notes: MV therapy includes medical linear accelerators (linacs) and cobalt-60 machines. Source: DIRAC database (501).

4.5.3.1 Additional challenges identified by local experts

Algeria: Many cancer treatment centers have been established over the last decades that are equipped with modern radiation therapy units. In 2020, the number of radiation therapy machines was around 60, equivalent to a fairly good per capita ratio by IAEA-recommendation standards. However, there are still long waiting times for receiving radiation therapy - whereas in some regions patients only have to wait for a few weeks, in the southern parts of Algeria they wait for six months and in the eastern part for three months. Meeting the continuously growing demand for radiation therapy is a current challenge, and to ensure there is enough well-trained medical staff for safe use of radiation therapy is another challenge.

Egypt: Unequal geographic distribution is a challenge with around half of all radiotherapy machines concentrated around Cairo. Patients in rural areas need to travel long distances and long waiting lists in some areas are an additional challenge. The price of radiation therapy is generally beyond reach for the uninsured population (502).

Jordan: Radiation therapy units are available at a reasonable per capita ratio.

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. Until 2021, this number had grown

to 46 linacs spread across all regions, and now they are available at a good per capita ratio by IAEA-recommendation standards.

Saudi Arabia: For radiation therapy, the main challenge is the geography of the country, with poor access in rural areas.

South Africa: Radiation therapy is included in the PMBs and available at all the major public hospitals throughout the country. Not all modern radiation techniques (such as stereotactic body radiation therapy) are available at all centers but are being introduced. There are long waiting lists for definitive treatments and waiting times are not ideal, although this varies from facility to facility. The recent advances in hypofractionation in breast and rectal cancer are helping reduce waiting times for radiation therapy.

4.5.4 Cancer drugs

Cancer drugs are an integral part of modern cancer care and are essential for improving patient outcomes (503, 504). Chemotherapy drugs and hormone therapy drugs were first introduced in the 1940s–1970s and constitute a standard-of-care treatment modality during the treatment course of many cancer types even today (505). Chemotherapy can cause toxic side effects as it may damage normal healthy cells alongside malignant cells in the body (506). Targeted therapy drugs, introduced toward the end of the 1990s, use a different mode of action and act on specific molecules that are involved in the growth and survival of cancer cells (9, 507). They have now become one of the main treatment options for some tumors. During the 2010s, immunotherapy drugs, such as checkpoint inhibitor therapies and more recently CAR-T cell therapies that help the body's immune system to recognize and attack cancer cells, have been added to the drug arsenal (8).

Since around 2010, there has been a distinct increase in the number of newly launched cancer drugs worldwide. For example, 92 new cancer drugs received marketing authorization in Europe between 2011 and 2020 compared to 35 new cancer drugs between 2001 and 2010; see Figure 45. These drugs offer new treatment options to patients and have rapidly advanced the standard of care in certain cancer types, yet they also represent a challenge for health care system. Limited health care budgets call for an assessment of the costs and benefits of new drugs. In addition, medical staff needs to be trained continuously to ensure safe administration, clinical guidelines need to be updated regularly, and the care process might need to be modified.

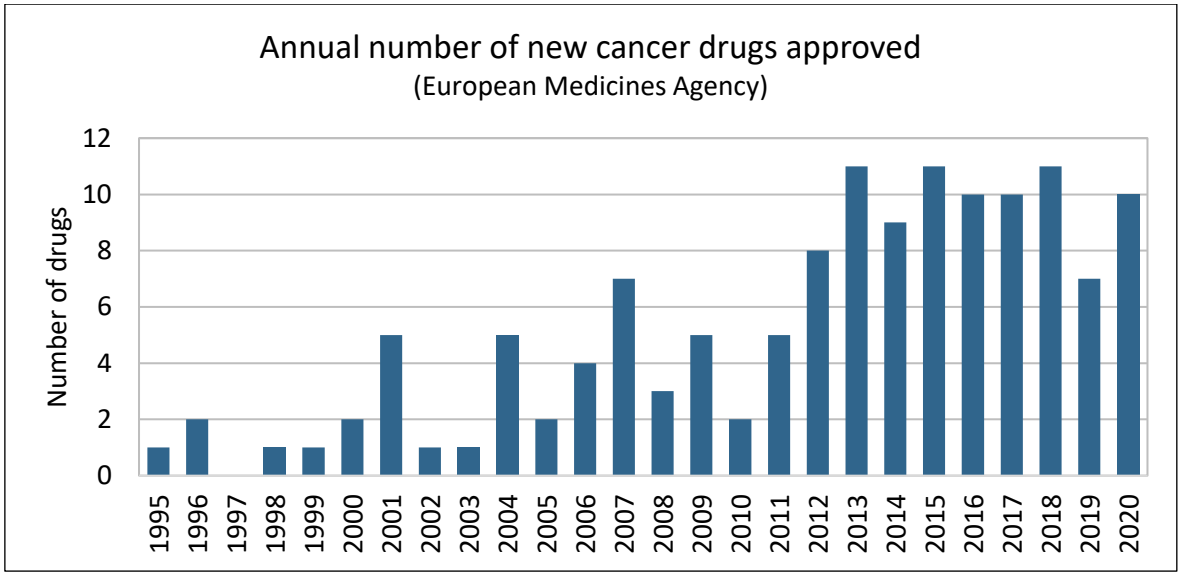


Figure 45: Annual number of new cancer drugs approved by the European Medicines Agency between 1995 and 2020
Source: EMA (508).

The continuous launch of new cancer drugs poses a challenge to health care systems and policy makers with constrained resources. Both the price of individual new cancer drugs as well as the budget impact of all cancer drugs jointly are frequently debated. In Europe, the debate focuses more on the sustainability of increasing public health expenditure on cancer drugs, because public payers (governments or sickness funds) cover the vast majority of the cost of cancer care (including cancer drugs) for the whole population (509, 510). In the Asia-Pacific region, the debate is characterized by considerations of financial toxicity, especially in countries without comprehensive universal health coverage, as well as of sustainability of publicly-funded health systems (511). The latter region reminds of the situation in many poorer MEA-9 countries.

In the debate on the cost of cancer drugs several additional features and additional perspectives ought to be considered. Many cancer drugs launched during the recent decade are administered in combination with already existing drugs, and some new cancer drugs allow patient groups to be treated for which there was no drug treatment before. This development makes it difficult to maintain the same level of spending on cancer drugs per patient over time. In Europe, health expenditure on cancer drugs (based on list prices) tripled between 2005 and 2018, yet health expenditure on cancer care as a whole remained stable in relation to total health expenditure (around 6%) during these years (512). The increasing expenditure on cancer drugs seem to have been offset by reductions in expenditure on inpatient care. These reductions might have stemmed from a transformation of cancer care from an inpatient to an outpatient setting, partly enabled by new cancer drugs that can lead to reductions in hospitalization due to better effectiveness, easier management of side effects with reduced toxicity, and/or more convenient mode of administration (oral vs. intravenous).

4.5.4.1 Patient access to new cancer drugs

For new cancer drugs to reach patients in a country, several hurdles have to be overcome. The first hurdle is to receive marketing authorization by the regulatory body. The regulatory body (e.g., the Food and Drug Administration (FDA) in the US, the European Medicines Agency (EMA) in Europe) typically evaluates the safety, quality, and efficacy of new drugs before granting marketing authorization (regulatory approval). After overcoming this hurdle, the drug can be sold in the private sector. Few (wealthy) patients with a comprehensive private health insurance might be able to access newly approved cancer drugs through their insurance or afford to pay for them out-of-pocket, whereas the high drug prices make them unaffordable to all other patients.

The second hurdle is pricing and reimbursement of the drug by the health care payer and/or a health technology assessment (HTA) body. This process typically involves an analysis of the costs of a new drug compared to the current standard of care as well as of the additional health benefits. A key purpose of HTA in decision making is to achieve greater value for money (cost-effectiveness). The comprehensiveness and nature of this process might differ widely between countries, ranging from an informal analysis coupled with direct pricing negotiations between payers and manufacturers to a formal (and publicly published) analysis and decision. A positive outcome of the pricing and reimbursement process means that patients covered by public health insurance can access the new drug.

The third hurdle is market uptake, i.e., patients being treated with new drugs. Despite reimbursement, new drugs often take time – months or years – until they are used on a broad scale, as clinical routines need to be adapted and medical staff needs to be trained on how to use the drugs. Testing infrastructure also needs to be built up, as many modern cancer drugs have a companion diagnostic. University hospitals or leading cancer treatment centers may often be earlier adopters whereas other hospitals are typically slower. Limited budgets of the public health care payer may restrict the number of eligible patients who can receive new drugs. High patient co-payments on reimbursed drugs will also restrict the number of patients with limited financial means to access new drugs.

The following sub-sections provide a quantitative analysis of the availability (regulatory approval), reimbursement, and market uptake of new cancer drugs in the MEA-9 countries.

4.5.4.2 Availability and reimbursement of cancer drugs

For the purpose of this report, the current regulatory and reimbursement environment for new cancer drugs in the MEA-9 countries was assessed through a survey. As a first step, “new cancer drugs” were defined as all 58 cancer drugs (new chemical entities) approved by the US FDA between Jan

1, 2017 and Nov 30, 2020 (see Table A2 in the Appendix for the full list). In the second step, a survey was sent to all members of the PhRMA MEA Oncology Working Group. Every member was supposed to provide information about their own drugs in all MEA-9 countries. The two main questions were:

- Did the drug have a valid marketing authorization on December 1, 2020?
- Was the drug reimbursed on December 1, 2020?

Survey answers covering 21 of the 58 cancer drugs were received. The results to the main questions are summarized in Figure 46 and Figure 47.

The regulatory approval of new cancer drugs differed widely between the MEA-9 countries; see Figure 46. Out of the 21 drugs approved by the US FDA, Algeria had approved none and Jordan and Morocco only one. The UAE had the highest number of approved drugs with 11. Achieving an equally high number of approved drugs as the US FDA is difficult in practice (unless US FDA decisions would be made directly binding locally), as international pharmaceutical companies typically submit applications for regulatory approval initially in the US and then expand to other countries. A more attainable benchmark for the MEA-9 countries could be the EMA in Europe. Figure 46 shows that 16 out of 21 drugs had received regulatory approval by the EMA by Dec 1, 2020.

As described in section 4.5.5, some regulatory bodies in the MEA-9 countries consider (or even require) a positive regulatory approval by the US FDA and/or the EMA before making a positive decision. The survey answers by the PhRMA MEA Oncology Working Group also provided information on the typical length of the process from file submission to positive regulatory approval (although this is based on few answers in most countries). In the UAE, the process may take 1–6 months using the so-called fast-track pathway. In Lebanon, it takes around 9 months, in Egypt, Jordan, and Saudi Arabia around 12 months, in Kuwait 3–23 months, in Morocco around 18 months, and in South Africa 14–24 months (although local experts noted that approval times have decreased recently and are now in the range of 9–18 months), while no information was obtained for Algeria and Jordan.

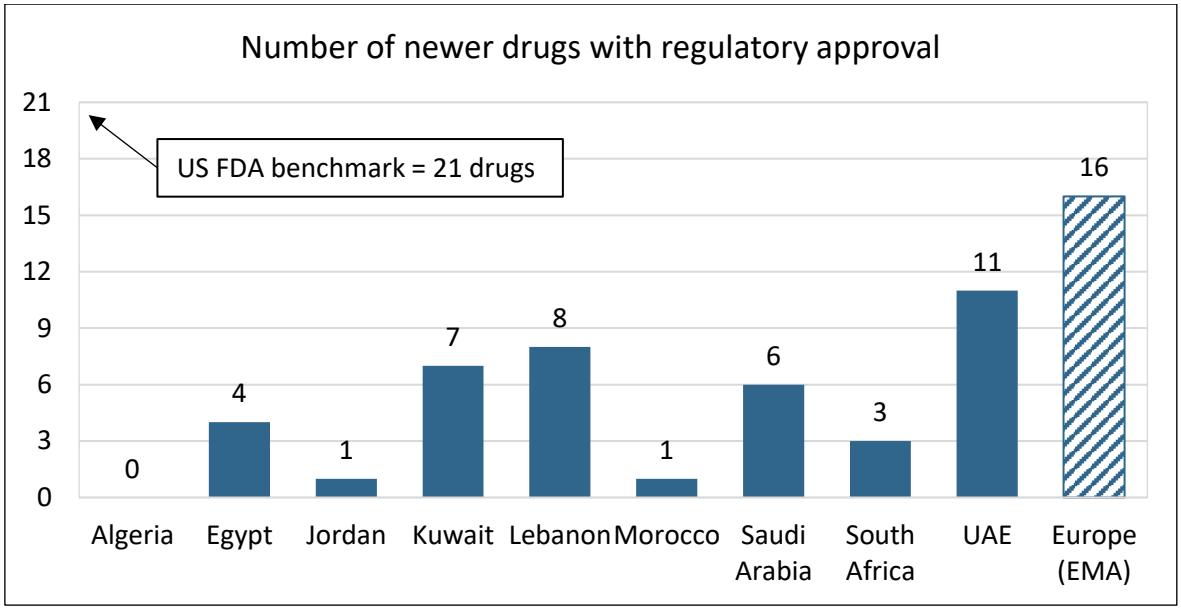


Figure 46: Number of cancer drugs with US FDA approval between 2017–2020 with local regulatory approval until December 2020

Source: Original data based on survey results and data from the EMA.

The reimbursement approval of new cancer drugs differed widely between the MEA-9 countries; see Figure 47. Out of the 21 drugs approved by the US FDA and for which survey answers were obtained, Algeria reimbursed none (since none had received regulatory approval), as did Egypt and Morocco. Jordan reimbursed its only drug with regulatory approval, while South Africa reimbursed two drugs (only in the private sector). Lebanon reimbursed half of the approved drugs, and Saudi Arabia and Kuwait reimbursed five each. The UAE reimbursed the most drugs.

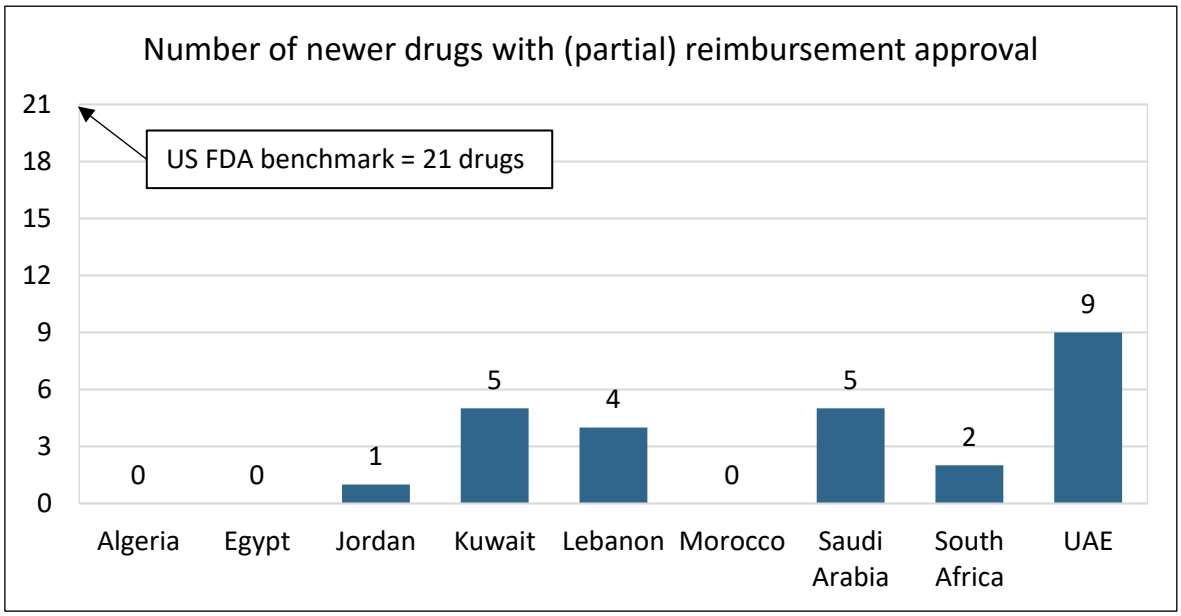


Figure 47: Number of cancer drugs with US FDA approval between 2017–2020 with local reimbursement approval until December 2020

Source: Original data based on survey results.

The survey results also indicated that the initial positive reimbursement decision seldomly ensures access for the whole population; see also to section 4.5.5 for additional information. Apart from Algeria and Egypt, survey respondents indicated the following:

- **Jordan:** Drugs are initially only reimbursed by the KHCC and the RMS covering up to 70% of the population, and after around two years the rest of the population gets covered through reimbursement by the Jordanian Joint Procurement Department (JPD).
- **Kuwait:** The reimbursement may initially either only cover local citizens (around 50% of patients) or also expatriates under government coverage, with expatriates also being partially aided by patient support programs.
- **Lebanon:** Around 40% of the population are covered once the NSSF grants reimbursement, and a smaller share are covered through private insurance.
- **Morocco:** Upon regulatory approval, a drug will be reimbursed by private insurance covering up to 7% of the population, while the ANAM might reimburse the drug in exceptional circumstances corresponding to about 8% of the population.
- **Saudi Arabia:** Population coverage depends on how many sectors (e.g., only National Guard hospitals) reimburse a drug, and reimbursement might also be restricted to local citizens through the MoH.
- **South Africa:** The two reimbursed drugs in Figure 47 are only reimbursed for around 3% of the population who have a top-tier private insurance.
- **UAE:** Reimbursement covers local citizens and expatriates, although the Abu Dhabi Health Services (SEHA) and the Dubai Health Authority (DHA) might make a reimbursement decision at different times. The few expatriates without private health insurance (at most 5% of the population) will not be covered, and also among expatriates with private health insurance there are insurance coverage limitations (premium vs. basic plans, where basic plans provide the minimum mandatory coverage for low salaried workers) that can prevent mostly blue-collar expatriates from receiving certain drugs.

4.5.4.3 Uptake of cancer drugs

Full access to cancer drugs is attained when every patient that may benefit also receives the relevant drug (513). If individual patient records are available, the degree of access can be studied based on information about the patient, the diagnosis, and drug usage. A representative sample of patient records could then be aggregated to the country level providing knowledge on therapy patterns, length of usage, doses used, side effects of treatment, etc. However, this kind of data is not easily

available in any country. Studying patient access based on patient records at the international level is even more challenging due to comparability issues of recorded variables. In the absence of patient-level data, country-level measures can serve as a proxy for patient access to cancer drugs. This approach has been used in previous reports in Europe (8, 9, 507), and is also adopted in this report. In this sense, access to cancer drugs is here equated with market uptake, with drug use measured as annual sales (in volume and value) in a country.

Data on drug sales – measured both in value (US-dollars) and volume (milligrams) – were obtained from IQVIA, a global provider of pharmaceutical sales data.[22] They cover the period from 2010 to 2020.[23] Cancer drugs within the ATC groups L01 (antineoplastic agents), L02 (endocrine therapy), and L04 (immunosuppressants) were included.[24] The fragmented health care systems hamper the provision of complete data in some MEA-9 countries by IQVIA. The data presented in this section are close to complete (>95% coverage of the oncology market) in Egypt (only since Q4 2017 and only for value-sales), Kuwait (only since Q4 2015), Saudi Arabia, and South Africa, less complete in the UAE (>50% coverage only since Q4 2015) and in Jordan and Lebanon (both <30% coverage), and mostly incomplete in Algeria and Morocco (<5% coverage of the oncology market). It is important to note that IQVIA sales data measured in value (US-dollars) are based on list prices, which often do not represent actual final sales prices, since drugs are granted confidential rebates to public and private payers. Consequently, the use of sales data based on list prices overestimates the cost of cancer drugs. Sales measured in volume (milligrams) do not suffer from this problem.

Figure 48 shows total cancer drug sales in the MEA-9 countries between 2010 and 2020 (at 2020 price levels and exchange rates). In countries with more complete data coverage, per-capita spending has gone up during this period. Spending in Saudi Arabia doubled between 2014 and 2020 from $10 to $20 per capita. In the latter period with more complete data, Kuwait has been the top-spending country between 2016 and 2019 and was narrowly surpassed by the UAE in 2020 with spending levels of around $35 per capita. In South Africa, spending remained at around $2 per capita between 2010 and 2020 and in Egypt it also remained stable at around $4 per capita between 2018 and 2020. However, the magnitudes of spending in the MEA-9 countries are far below the ones observed in Europe. For example, spending was $60 per capita in Slovenia and $109 in Germany in 2018.

[22] Data come primarily from IQVIA's MIDAS database and are complemented by other internal IQVIA sources in Egypt, Kuwait, and the UAE.
[23] Sales in 2010 cover only Q4 and were multiplied by 4 to get an estimate of the entire year 2010, while sales in 2020 cover only Q1 to Q3 and were multiplied by 1.33 to get an estimate of the entire year 2020.
[24] This selection of drugs does not cover all drug used in the treatment of cancer patients. Drugs used for control of pain and side effects of cancer drugs (e.g., antiemetic drugs) are not included. However, many of these drugs have a very low price and are readily available.

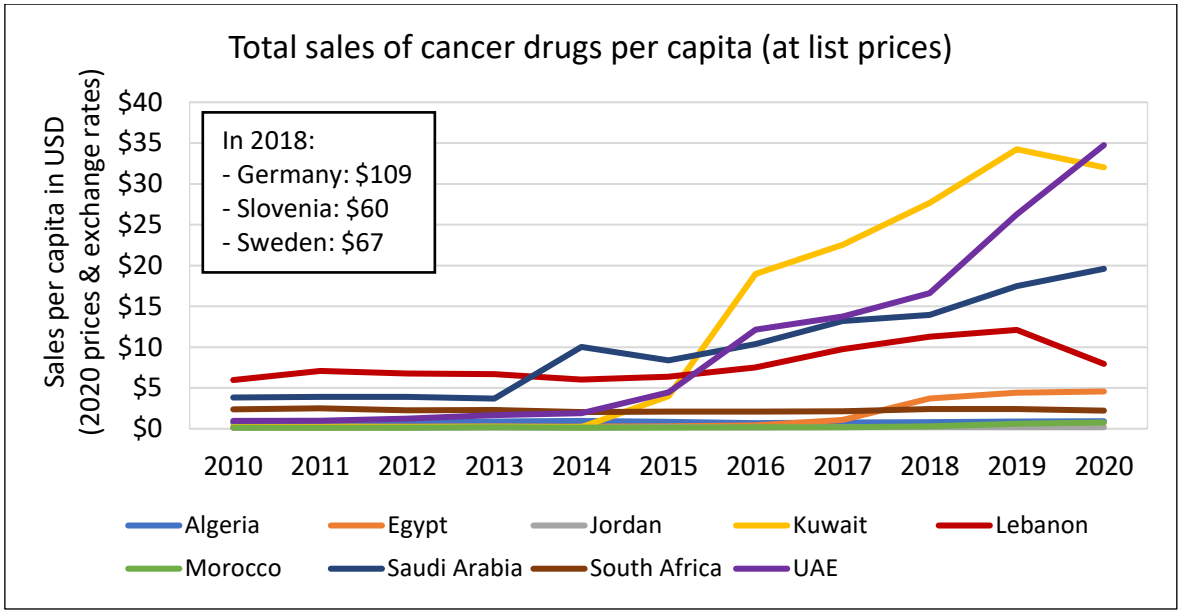


Figure 48: Total sales of cancer drugs per capita (at list prices) in USD (inflation-adjusted to 2020 price levels and constant exchange rates with base year 2020)

Notes: Sales data in Algeria (<5%), Jordan (<30%), Lebanon (<30%), Morocco (<5%), UAE (>50%) do not cover the whole local oncology market. List prices do not contain confidential rebates. Source: Sales data from IQVIA and data on population, inflation, and exchange rates from the World Bank.

The increase in cancer drug sales between 2010 and 2020 in the MEA-9 countries resembles the increase seen in Europe. In general, this increase is a product of factors relating to prices and volume:

- Higher prices of newly introduced drugs, i.e., cost per treatment
- Extended universal health coverage, allowing a greater proportion of patients to access already reimbursed drugs by public payers
- Rising number of cancer patients, i.e., incidence crude rate (see Figure 8)
- Increasing number of approved cancer drugs and indications (see Figure 45)
- Increasing number of lines of therapy (e.g., two lines of therapy in lung cancer whereas in the past most patients had died after the first line)
- Increasing use of combination therapies (i.e., more than one drug administered at the same time)
- Increasing use of cancer drugs in an adjuvant setting instead of just in a palliative setting
- Introduction of cancer medicines for previously untreated patient groups (e.g., metastatic castration-resistant prostate cancer)

To eliminate the problem of varying drug prices, rebates, and exchange rates between countries and over time, the drug volume sold is considered below. A limitation of this approach is that drugs

would need to be compared one-by-one, because the dose of the active ingredient (milligrams) of drugs varies. However, an aggregation of different drugs used in a certain cancer type is possible by calculating the dose required per patient and per time period. For the analysis below, the standard monthly dose (SMD) per patient was calculated for a number of drugs (see Table A3 in the Appendix). Sales measured in milligrams were divided by the SMD for every drug to get the number of monthly doses sold. Afterwards, the number of standardized doses was divided by the number of cancer patients, here defined as number of deaths from a certain cancer type, as most modern cancer drugs are used in the palliative setting.

The following drugs used in the treatment of four major solid cancer types in the MEA-9 countries and of multiple myeloma as well as a separate category for immunotherapies were used to illustrate the uptake of newer cancer drugs:

- Breast cancer (HR-positive, HER2-negative): abemaciclib, palbociclib, ribociclib
- Breast cancer (HER2-positive): pertuzumab, trastuzumab, trastuzumab emtansine
- Colorectal cancer: aflibercept, bevacizumab, cetuximab, panitumumab, ramucirumab
- Lung cancer (EGFR-positive or ALK-positive): afatinib, alectinib, brigatinib, ceritinib, crizotinib, dacomitinib, erlotinib, gefitinib, lorlatinib, necitumumab, osimertinib
- Prostate cancer: abiraterone acetate, apalutamide, darolutamide, enzalutamide
- Multiple myeloma: bortezomib, carfilzomib, daratumumab, elotuzumab, isatuximab, ixazomib, lenalidomide, pomalidomide, selinexor
- Immunotherapy: atezolizumab, avelumab, cemiplimab, durvalumab, ipilimumab, nivolumab, pembrolizumab

Figure 49 to 55 show drug volume sold per patient in the MEA-9 countries. Unfortunately, this volume data is less complete than the value data shown in Figure 48, and hence all numbers should be interpreted with caution (in particular Kuwait seems to lack valid data). In all four solid cancer types, multiple myeloma, and immunotherapy, Saudi Arabia had the highest uptake of cancer drugs. The UAE also had almost as high uptake as Saudi Arabia, despite the data being incomplete, meaning the true uptake likely exceeds the one in Saudi Arabia. In Egypt and South Africa, uptake of modern drugs was close to zero – the only exception is colorectal cancer and multiple myeloma in South Africa. Lebanon has at least some modest drug uptake in breast cancer, lung cancer, prostate cancer, and multiple myeloma.

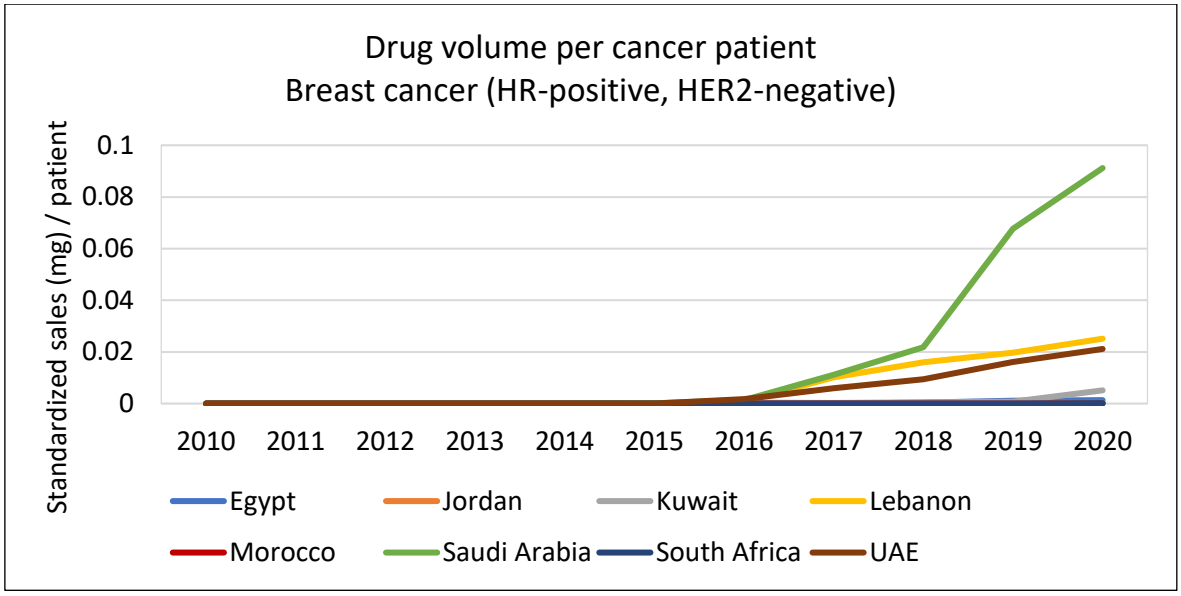


Figure 49: Drug volume of breast cancer drugs (part 1) per cancer patient

Notes: Cancer patient is defined as number of breast cancer deaths. No data for Algeria available. Data in Jordan, Lebanon, Morocco, UAE might be incomplete. Included drugs are abemaciclib (US FDA approval in 2017), palbociclib (2015), ribociclib (2017). Source: IQVIA.

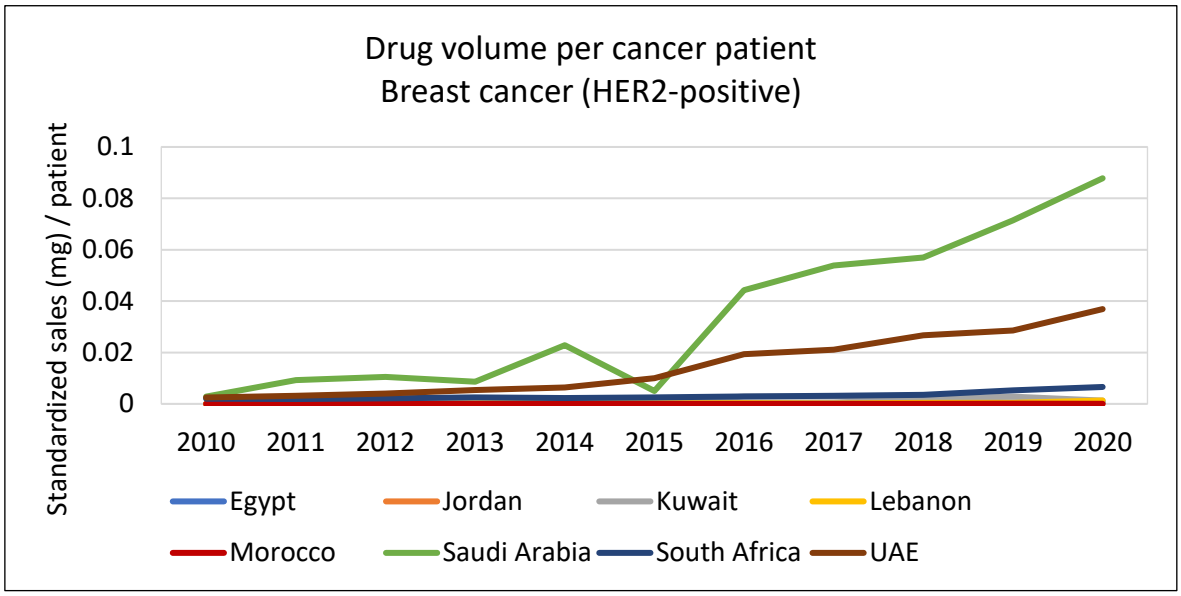


Figure 50: Drug volume of breast cancer drugs (part 2) per cancer patient

Notes: Cancer patient is defined as number of breast cancer deaths. No data for Algeria available. Data in Jordan, Lebanon, Morocco, UAE might be incomplete. Included drugs are pertuzumab (US FDA approval in 2012), trastuzumab (1998), trastuzumab emtansine (2013). Source: IQVIA.

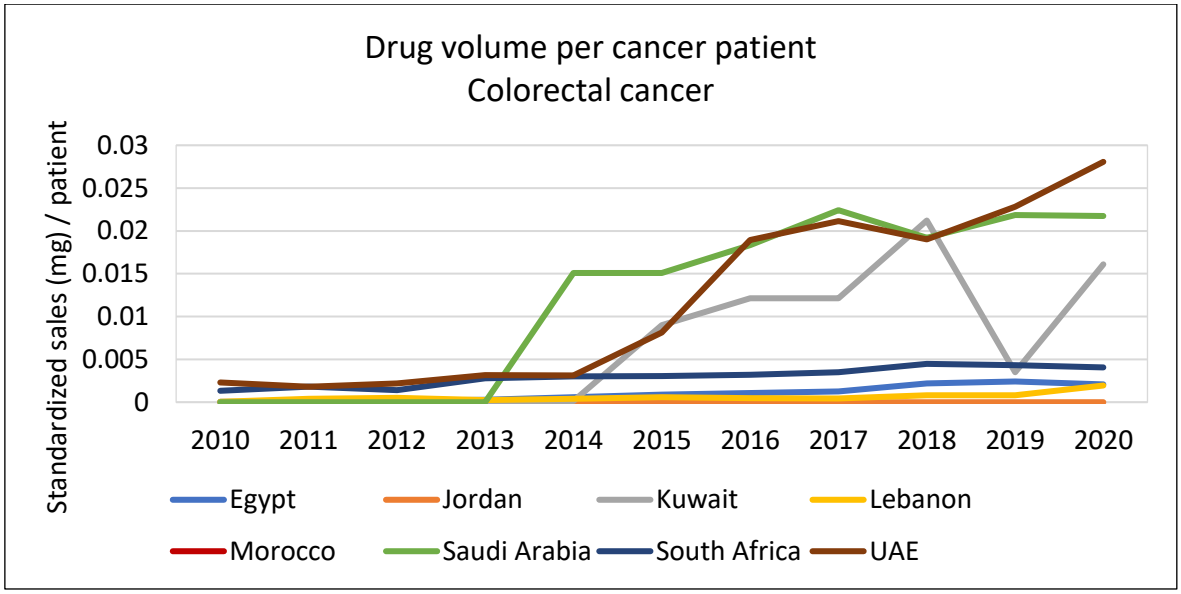


Figure 51: Drug volume of colorectal cancer drugs per cancer patient

Notes: Cancer patient is defined as number of colorectal cancer deaths. No data for Algeria available. Data in Jordan, Lebanon, Morocco, UAE might be incomplete. Included drugs are aflibercept (US FDA approval in 2012), bevacizumab (2004), cetuximab (2004), panitumumab (2006), ramucirumab (2014). Source: IQVIA.

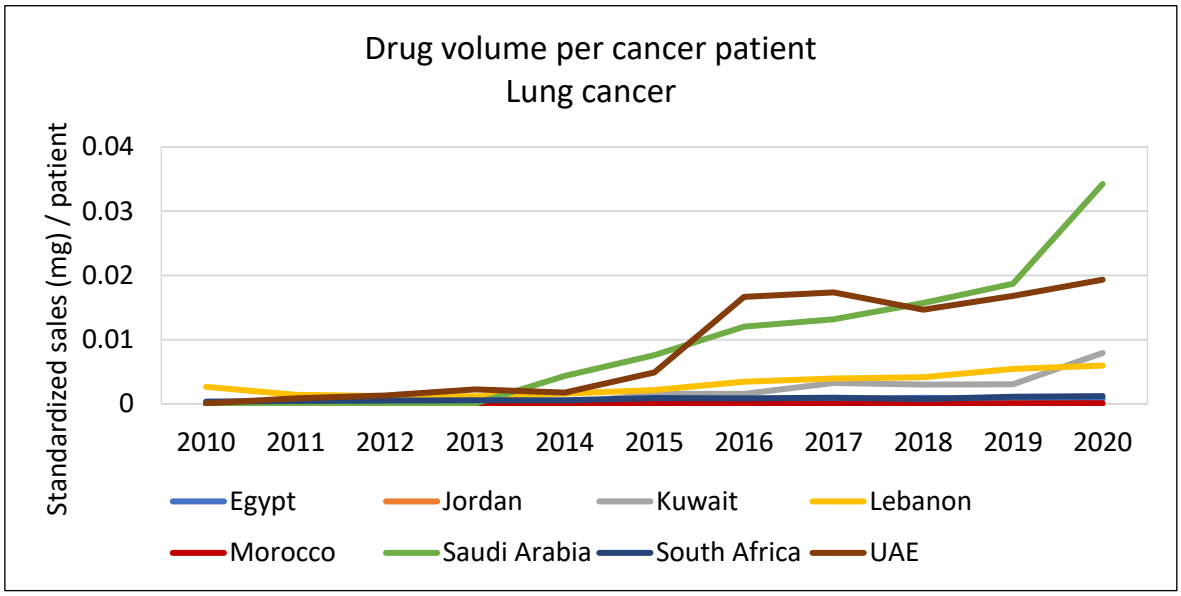


Figure 52: Drug volume of lung cancer drugs per cancer patient

Notes: Cancer patient is defined as number of lung cancer deaths. No data for Algeria available. Data in Jordan, Lebanon, Morocco, UAE might be incomplete. Included drugs are afatinib (US FDA approval in 2013), alectinib (2015), brigatinib (2017), ceritinib (2014), crizotinib (2011), dacomitinib (2018), erlotinib (2004), gefitinib (2003), lorlatinib (2018), necitumumab (2015), osimertinib (2015). Source: IQVIA.

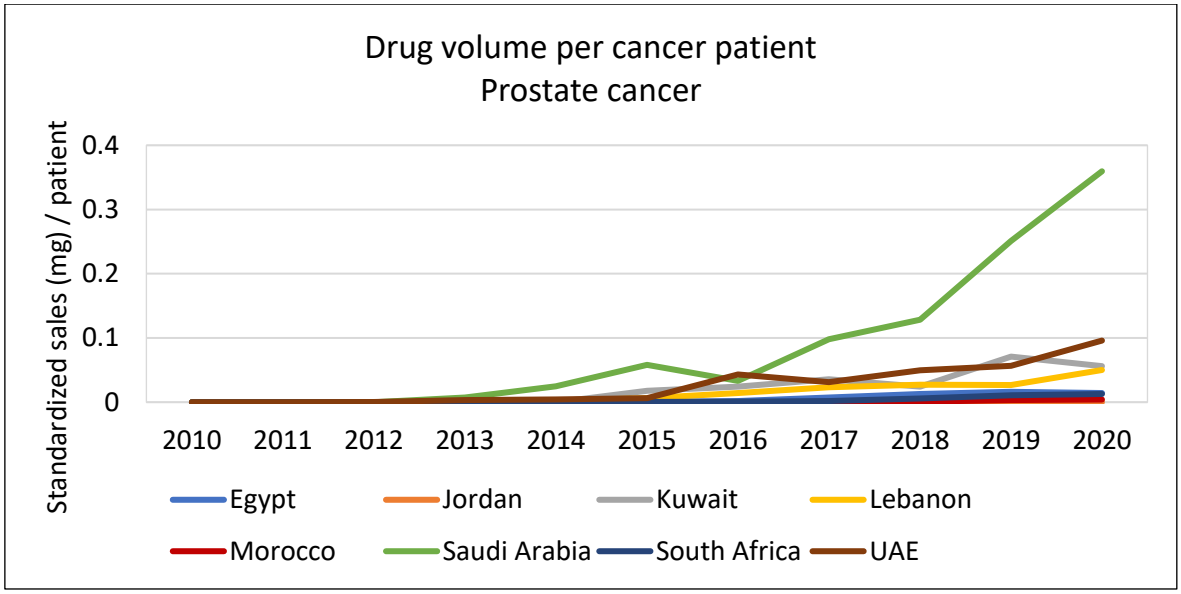


Figure 53: Drug volume of prostate cancer drugs per cancer patient

Notes: Cancer patient is defined as number of prostate cancer deaths. No data for Algeria available. Data in Jordan, Lebanon, Morocco, UAE might be incomplete. Included drugs are abiraterone acetate (US FDA approval in 2011), apalutamide (2018), darolutamide (2019), enzalutamide (2012). Source: IQVIA.

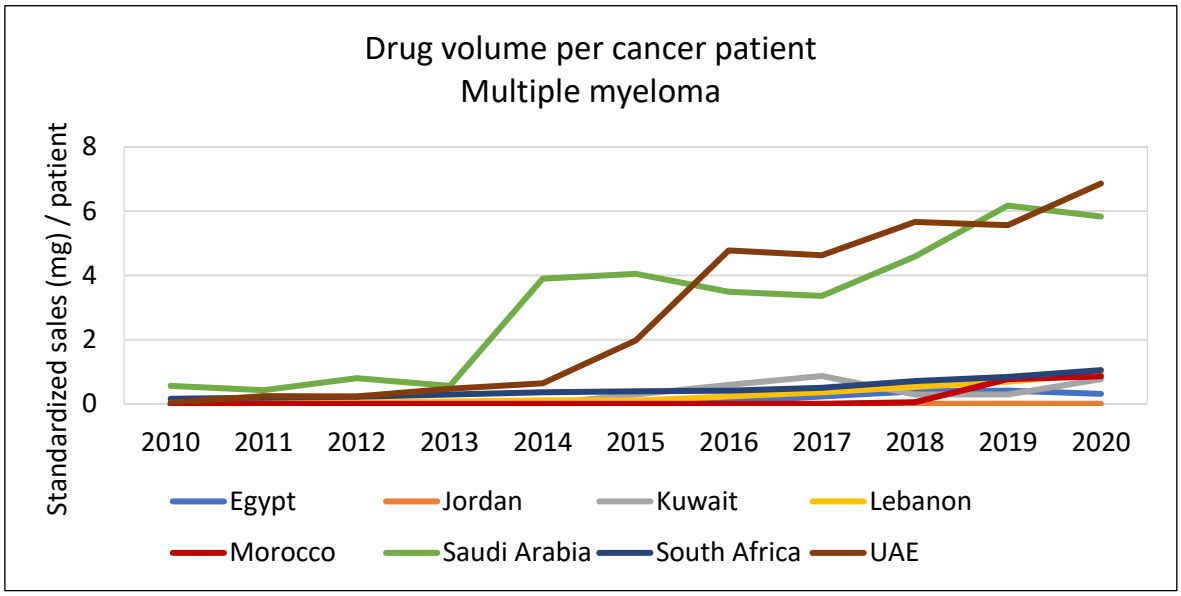


Figure 54: Drug volume of multiple myeloma drugs per cancer patient

Notes: Cancer patient is defined as number of multiple myeloma deaths. No data for Algeria available. Data in Jordan, Lebanon, Morocco, UAE might be incomplete. Included drugs are bortezomib (US FDA approval in 2003), carfilzomib (2012), daratumumab (2015), elotuzumab (2015), isatuximab (2020), ixazomib (2015), lenalidomide (2005), pomalidomide (2013), selinexor (2019). Source: IQVIA.

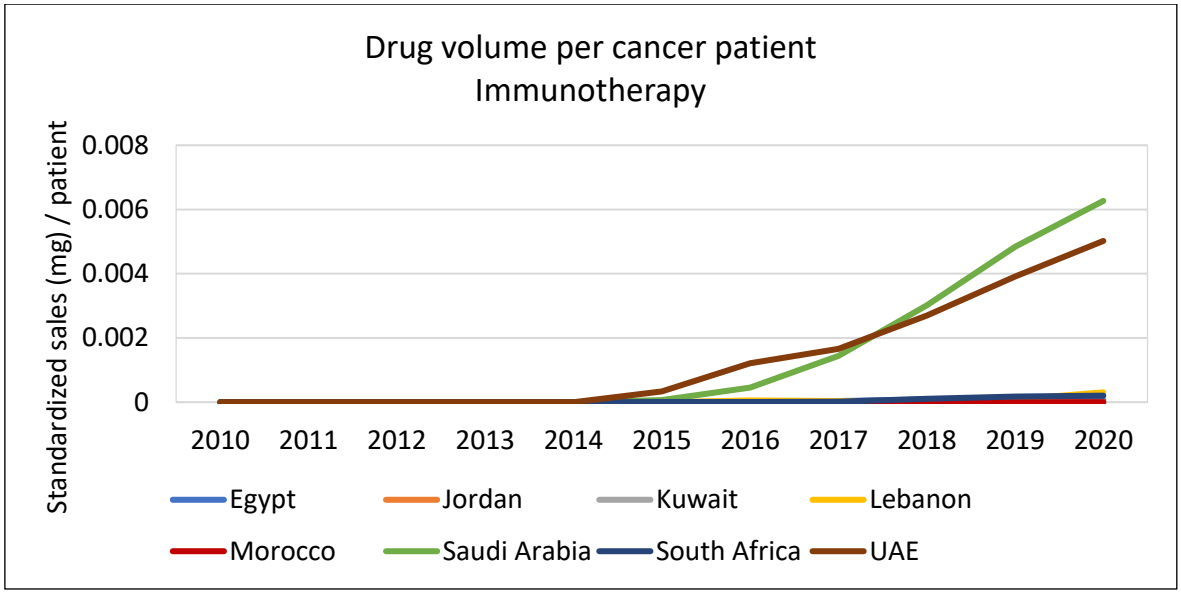


Figure 55: Drug volume of immunotherapy drugs per cancer patient

Notes: Cancer patient is defined as number of all cancer deaths. No data for Algeria available. Data in Jordan, Lebanon, Morocco, UAE might be incomplete. Included drugs are atezolizumab (US FDA approval in 2016), avelumab (2017), cemiplimab (2018), durvalumab (2017), ipilimumab (2011), nivolumab (2015), pembrolizumab (2014). Source: IQVIA.

4.5.4.4 Additional challenges identified by local experts

Algeria: Most modern cancer drugs were not available in mid-2021, including most targeted therapies and no immunotherapies. Wealthier people travel to Morocco, Turkey, or France to buy and receive these drugs. The situation might change at the end of 2021. In general, local experts noted that granting modern cancer drugs regulatory approval without delay, so that they become available in the private sector, would be a solution to stop patients from traveling abroad. Another current challenge, also related to the availability of cancer drugs, is that patients start medical treatment, but they cannot finish it. This scenario became more pronounced in 2020 and even affected old drugs with generic availability, such as methotrexate, which meant that some children with cancer could not be treated adequately. The first experiences with biosimilars (e.g., for trastuzumab) were good, and the price drops achieved meant that more patients could be treated with the same budget. There is however no functioning local generics/biosimilar production to stimulate competition even further. The recently created Ministry of Pharmaceutical Industry has tasked a Special Cancer Committee to review cancer drug access. The aim is to rationalize the prescription of modern high-cost drugs and to encourage the use of generics/biosimilars though putting in place treatment guidelines with new lists of "essential drugs" which are supposed to be followed by all medical oncologists. Another route to access modern cancer drugs is through clinical trials. They reduce the budget for drugs and provide physicians with training in addition to the potential benefits for patients. Legislation to facilitate clinical trials has been in place since 2006. But there are cultural barriers

(feelings of mistrust in the population) and bureaucracy problems that restrict clinical trial activity. The new Ministry of Pharmaceutical Industry and also the benefits of trials witnessed by the general public in conjunction with COVID-19 might change things.

Egypt: OOP account for a large amount of the price patients need to pay for modern cancer drugs, which makes them unaffordable for most patients. The newly established Egyptian Drug Authority (EDA) and the Egyptian Authority for Unified Procurement, Medical Supply and the Management of Medical Technology (UPA) will work on improving accessibility to cancer drugs and to minimize OOP. The EDA is also placing emphasis on ensuring high quality of generics produced by local manufacturers.

Jordan: The lack of financial resources of the MoH are the main bottleneck for patient access to modern cancer drugs. The introduction of personalized medicine, which entails additional costs for diagnostics on top of drug costs, as well as high costs of combination treatments are a major challenge. The burden to decide which patients gets treated or not is on the physician. Wealthy patients might seek to receive immunotherapy in the private sector.

Kuwait: Essential drugs are provided for free to all patients, and patients also have good access to modern drugs. There is some delay in providing the most recent drugs because approval processes are bureaucratic and take time. CAR-T cell therapy is not available yet, because the KCCC did not meet the qualification criteria at the last evaluation, but it is actively pursuing accreditation by the Foundation for the Accreditation of Cellular Therapy (FACT). There are sometimes challenges in the reliable supply of (older) drugs. For example, daunorubicin which has generic availability was not readily available in May 2021 with waiting times of 5–6 weeks compared to usual waiting times of 1–2 weeks.

Lebanon: Before the economic crisis, Lebanon followed the FDA and the EMA in terms of drug approvals. The leading university hospitals could offer a standard of care in relation to drug treatment on a par with France. The economic crisis led to a gradual decrease in the drug budget which required a prioritization of cancer drugs in terms of (i) younger patients vs. older more fragile patients, (ii) palliative drug treatment only with less expensive drugs. Only essential drugs can still be provided.

Morocco: The availability of modern cancer drugs is a challenge because of their high costs. For example, the National Institute of Oncology in Rabat has immunotherapy drugs and administers them, but in the first months of 2021 it could only treat around 20 patients with immunotherapy compared to an actual clinical need of 60 patients. A broader insurance coverage would help solve this access challenge. The use of generics and biosimilars is a priority to ensure access for more patients.

Saudi Arabia: In the three big centers, there are no concerns with the provision of modern cancer drugs, including immunotherapy and targeted therapy. Even the smaller satellite centers provide these drugs. CART-cell therapy is only provided at the King Faisal Hospital, but two more hospitals in Riyadh will also be able to do this soon. Yet the main barrier in drug provision is the budget. There are some missed opportunities of treating eligible patients because of budget restraints. The prioritization of the budget is important – patients most likely to benefit from a treatment should get it – and increased use of HTA is supposed to ensure this in the future. Three developments have recently helped to address the budget barrier; (i) increased competition between manufacturers of (patent-protected) immunotherapy drugs and other drug classes with similar products which reduces prices, (ii) savings potentials from using generics and biosimilars have been capitalized on, (iii) negotiation of value-based agreements for new drugs. There is also a desire to expand local drug manufacturing, which currently only comprises generics. Biologics and more advanced therapies such as CAR-T cells should be manufactured locally to enhance self-sufficiency in drug provision and also to lower the overall costs of drugs in the long term.

South Africa: The availability of cancer drugs for the vast majority of the population is dependent on listing on the EML. The level of care being offered at public hospitals used to be "late 1990s medical oncology". This has improved in recent years but still has a long way to go. Waiting times to receive drug treatment is generally not a concern, although the situation is patchy across the country especially since the advent of the COVID-19 pandemic.

4.5.5 Regulatory approval, pricing and reimbursement of drugs

Given the increasing importance of cancer drugs in the treatment of many cancer types, this section provides an overview of the regulatory process as well as the pricing and reimbursement process for new drugs and generic versions. Table 23 provides an overview. In general, the main principle for the pricing of new drugs is external reference pricing (ERP)[25] and the price serves as the main criterion for the reimbursement decision. The main focus is on achieving the lowest possible price for drugs instead of also taking into account the value that drugs provide to patients. Some countries (e.g., Egypt, Kuwait, Saudi Arabia) might move away from this principle in the coming years with the increasing role of HTA of new drug therapies to guide decisions of pricing and reimbursement.

[25] ERP is the practice of using the price of a drug in a basket of countries as a reference price (a benchmark) for setting or negotiating the price of the drug in the local country (514).

Table 23: Regulatory approval, pricing, and reimbursement of drugs

	Body responsible for regulatory approval	Body responsible for pricing	Main principle for pricing in-patent drugs	Main principle for pricing generics	Body responsible for reimbursement	Main criteria for reimbursement decision
Algeria	National Agency for Pharmaceutical Products (ANPP)	Economic committee of the ANPP	ERP (lowest price)	Price capping	ANPP+CNAS/ CASNOS for retail drugs; PCH for hospital drugs	Price and relative medical benefit
Egypt	Egyptian Drug Authority (EDA)	Pricing unit of the EDA	ERP (lowest price)	Price capping	Egyptian Authority for Unified Procurement (UPA)	Price
Jordan	Jordan Food and Drug Administration (JFDA)	Drugs pricing committee at the JFDA	ERP (median price)	Price capping and ERP	Rational Dug Use Department at the JFDA	Cost-effectiveness
Kuwait	Pharmaceutical and Herbal Medicines Registration and Control Administration at the MoH	Medicines Pricing Department at the MoH	ERP (lowest price)	Price capping	MoH	Price
Lebanon	Drug Registration Technical Committee at the MOPH	Pricing committee at the MOPH	ERP (lowest price)	Price capping	Public social insurance schemes and MOPH	Negotiations, tendering and formulary management
Morocco	Drugs and Pharmacy Department at the MoH	Drugs and Pharmacy Department at the MoH	ERP (lowest price)	Price capping	ANAM	Price (budget impact)
Saudi Arabia	Saudi Food and Drug Authority (SFDA)	SFDA	ERP (lowest price)	Price capping	MoH	Price
South Africa	South African Health Products Regulatory Authority (SAHPRA)	Pricing committee at the NDoH	Public: tendering every 2 years Private: Single exit price (SEP) based on ERP	Reference price groups	Public: NDoH Private: medical aid schemes	Clinical evidence and cost-effectiveness
UAE	Higher committee for drug pricing at the MOHAP	Higher committee for drug pricing at the MOHAP	ERP (median price)	Price capping	MOHAP, regional health authorities	Formulary management and negotiations
Germany	EMA	Federal Association of the Statutory Health Insurance Funds (GKV-SV) after negotiations with manufacturer	Combination of free pricing, ERP, and (in a broad sense) VBP	Reference price clusters of similar drugs imposing maximum reimbursement prices; Price capping	G-BA	The drug must not belong to one of the categories excluded from reimbursement by the regulations of the G-BA

Slovenia	EMA	Public Agency for Medicinal Products and Medical Devices (JAZMP)	ERP	Therapeutic reference pricing of similar drugs imposing maximum reimbursement prices	Health Insurance Institute (ZZZS)	Effectiveness, costs, cost–effectiveness
Sweden	EMA	Dental and Pharmaceutical Benefits Agency (TLV) for outpatient drugs; regional councils after negotiations with manufacturer for inpatient drugs	VBP	Period-of-the-month system (lowest bidding manufacturer wins the whole market for a month)	TLV	Cost-effectiveness; need and solidarity and human value principles

4.5.5.1 Algeria

The body responsible for the regulatory approval of new drugs is the National Agency for Pharmaceutical Products (ANPP, Agence Nationale des Produits Pharmaceutiques), an independent institution established in 2018 under the MSPRH but since 2020 under the new Ministry of Pharmaceutical Industry (515, 516).

The pricing of new drugs is done by the economic committee of the ANPP. It is primarily based on ERP and the selection of the lowest price among countries in the basket, but it also takes into account the drug's country of origin and medical benefit (108, 517). Prices of generics have to be at least 30% lower than the price of the originator drug (517).

Reimbursement of drugs differs between retail drugs (dispensed through pharmacies) and hospital drugs (this includes most cancer drugs). The ANPP takes part in defining the list of reimbursed drugs along with the two public insurance funds, CNAS and CASNOS (516). The drug reimbursement committee of the ANPP proposes a list of registered drugs to be reimbursed (517). In addition to the reference price of the drug, the assessment of the drug reimbursement committee is based on the analysis of a drug's medical benefit and relative medical benefit, benchmarking other countries such as the French Health Authority, but no formal health-economic evaluation is conducted (517). Hospital drugs do not go through the same process for reimbursement. The Central Hospital Pharmacy (PCH) purchases hospital drugs, which are listed on a separate commercial list defined by the MSPRH (412). The purchases are based on prescriptions received by physicians and paid through general government funding. Local experts noted that the Ministry of Pharmaceutical Industry and the PCH are characterized by outdated drug management systems, which often leads to drug supply problems, as described in the previous section.

4.5.5.2 Egypt

The body responsible for the regulatory approval of new drugs is the Egyptian Drug Authority (EDA) since 2020, replacing the former Central Administration of Pharmaceutical Affairs (CAPA) (518).

The pricing of new drugs is compulsory since 2012 and carried out by the drug pricing unit of the EDA (519-521). ERP is generally used for pricing of in-patent drugs (108). Manufacturers are free to suggest a price, which is then reviewed and either approved or reduced by the drug pricing unit based on the lowest price among countries in the basket (519). For high-technology drugs, such as biologic drugs and other types of modern cancer drugs, the EDA has the right to request a pharmacoeconomic comparative study (519). This has been possible already since 2013 and is a growing development, according to local experts. Currently, the EDA trials value-based assessment of two drugs. This assessment does not only include cost-effectiveness and budget impact but also the level of innovation and unmet need as well as taking a societal perspective. The key challenge for conducting such studies is the lack of local data, according to local experts. The pharmacoeconomic unit within EDA is responsible for the evaluation of these studies (522). Generics are generally priced at 35% less than the originator drug's price for the first five generics and at 40% less for any additional generic product (519).

In 2020, the Egyptian Authority for Unified Procurement, Medical Supply and the Management of Medical Technology (UPA; also known as UMPA or AUPP) was established (518). The UPA is now responsible for purchasing drugs and medical equipment on behalf of all public entities (i.e., MoHP, HIO, etc.). Direct purchases of drugs from manufacturers by public primary health care facilities or hospitals are no longer allowed (518). The UPA controls the tender drug list that contains all drugs approved for reimbursement. It runs central tenders for procurement. Private sector entities tend to follow the UPA standards, but they can have their own separate reimbursement process and drug formularies (124, 521).

According to local experts, the UPA plans to make systematic use of HTA based on the submitted dossiers by manufactures in the near future. The HTA would be done in cooperation with the EDA but also the HIO and other stakeholders, in order to make a joint decision on adequate reimbursement. Value-for-money would become a guiding principle. As a reimbursement threshold for cost effectiveness, the UPA might use three times GDP/capita. But instead of only using a single threshold, factors such as disease severity and rarity of the disease would justify a flexible threshold, following what NICE in England does. Performance-based risk-sharing arrangements are also a potential option in the future, but currently this is hindered by the lack of ability of documentation of patient outcomes. Without a good cancer registry in place, there is no data that could be utilized, according to local experts.

4.5.5.3 Jordan

The body responsible for the regulatory approval of new drugs is the Jordan Food and Drug Administration (JFDA), which was established in 2003 and is affiliated to the MoH (523).

The drugs pricing committee of the JFDA is responsible for drug pricing (524). ERP is used for pricing of in-patent drugs and the median price among countries in the basket is used (108). Generics are priced at 20-30% less than the originator drug's price or based on the price observed in the Saudi market if the latter is lower than former (108).

The Rational Dug Use Department of the JFDA is responsible for deciding on the Jordan National Drug Formulary (JNDF) (524). Drugs on the JNDF are reimbursed in the public sector (525). The reimbursement decision is based on a review of the cost-effectiveness of a drug (525). Even though a cost-effectiveness study needs to be submitted, there is no need to for the study to be based on local data. Any study that shows that the drugs is cost-effective in any country in the world, such as NICE in England, can be used. No real cost-effectiveness threshold exists, but "the lower the ICER, the better the drug" is the main criterion for inclusion in the JNDF (525). The KHCC has its own drug formulary and its own advisory committee that decides on the inclusion in the formulary, which contains more modern cancer drugs than the JNDF, according to local experts.

The Integrated Purchasing Unit (IPU) of the MoH procures the drugs on the JNDF for the public sector by running central tenders on an annual basis (108). In case of in-patent drugs with a single supplier, the IPU purchases the drugs directly from manufactures after price negotiations (526). The RMS hospitals and university hospitals pay a mark-up on the price obtained from the tender of the IPU, according to local experts.

4.5.5.4 Kuwait

The body responsible for the regulatory approval of new drugs is the Pharmaceutical and Herbal Medicines Registration and Control Administration at the MoH Drug and Food Control Administration (527). New drugs need to have been previously authorized by another authority, such as the US FDA or the EMA (528). Local experts noted that the regulatory approval process is lengthy because of the bureaucracy.

The Medicines Pricing Department at the MoH Drug and Food Control Administration is responsible for drug pricing (529). In-patent drug pricing is based on ERP and the lowest price among countries in the basket is used (108). Originator drugs are subject to price capping equal to 20% after patent loss (108). The pricing of generics is based on price capping and sequence of entry. After the

originator drug loses its patent and faces a 20% price cut, the first generic entering the market is priced at 15% below the reduced price of the originator drug. Prices of the second to fifth generics are further reduced by 10%, prices of the sixth to eight generics by another 5%, and after that prices remain fixed unless a manufacturer undercuts the price (108).

The MoH decides on the reimbursement of new drugs and inclusion in the national drug formulary. The decision to reimburse a drug is based on negotiations between the manufacturer and the MoH, in which the ERP-derived price serves as the starting point for the negotiations (108). According to local experts, cost-effectiveness considerations are not part of the current system. However, the establishment of an HTA system is on its way which would then lead to considerations of cost-effectiveness in the reimbursement decision.

The drug procurement process is centralized and organized by the MoH Central Medical Stores. Public tenders are used to stimulate competition between drug providers (530).

4.5.5.5 Lebanon

The body responsible for the regulatory approval of new drugs is the Drug Registration Technical Committee in the Department of Pharmacy at the MOPH (531).

New drugs are priced within one month from regulatory approval by the pricing committee at the MOPH (531). ERP is used for pricing of in-patent drugs and the lowest price among countries in the basket is used (108). Generics and biosimilars are priced at less than 30% of the originator drug's price in case the drugs are imported from comparison countries and by 40% otherwise (532). The prices of all approved drugs are published publicly in the Lebanon National Drugs Database by the MOPH (533, 534).

The reimbursement decision for new drugs is made individually by the public social insurance schemes (531). Decisions are based on negotiations, tendering, and formulary management (108). Already before the start of the economic crisis in 2019, the NSSF – the biggest public scheme – faced challenges relating to reimbursement, including limited financial resources, increasing costs in health care budgets, high cost therapies, defining the cut-off between therapeutic utility and cost of a new medicine, and the lack of an HTA body to assist decision making (535). The MOPH has a shorter list of essential drugs which is only updated every few years and which the uninsured population can access (536).

4.5.5.6 Morocco

The body responsible for the regulatory approval of new drugs is the Drugs and Pharmacy Department at the MoH (537, 538).

The Drugs and Pharmacy Department at the MoH is also responsible for drug pricing (537, 538). ERP is used for pricing of in-patent drugs and the lowest price among countries in the basket is used (108). The price of generics are generally set at 50% less than the originator drug's price for the first nine generics, and at an additional 20% less for any additional generics (108).

Reimbursement decisions of new drugs are taken by the ANAM (and formally to be approved by the MoH) (108, 538). Within the ANAM, the transparency committee first assesses the medical value (mainly benchmarking the opinion of the French transparency committee) (539). Then the economic committee assesses the budget impact (based on list prices) without clear cost-effectiveness requirements, and it will negotiate a lower price if the estimated total costs are beyond the scope of the planned budget (539). The process generally entails delays in the reimbursement timeline due to lack of clarity regarding the steps and final decision date given by the ANAM.

4.5.5.7 Saudi Arabia

The body responsible for the regulatory approval of new drugs is the Saudi Food and Drug Authority (SFDA) (540). The SFDA follows the US FDA closely and is usually quick to approve the same treatments, according to local experts.

The SFDA is also responsible for drug pricing (541). The pricing of in-patent drugs is primarily based on ERP and the lowest price among countries in the basket is used (108). The pricing of generics is based on price capping and sequence of entry. The first generic entering the market is priced at 30% below the originator drug's price, and any additional generics are priced at 10% below the first generic's price (108).

The MoH decides on the reimbursement of new drugs and inclusion in the Saudi National Formulary (542). The decision to reimburse a drug is based on negotiations between the manufacturer and the MoH, in which the ERP-derived price serves as the starting point for the negotiations (108). However, as part of the Saudi Vision 2030, the aim is to move from the current system to a value-based pricing system using HTA to inform pricing and reimbursement decisions (543). To this end, the MoH has already conducted work on HTA and there have been projects to derive a cost-effectiveness threshold based on willingness-to-pay for a quality-adjusted life year (QALY) and to obtain health utilities of cancer patients (544, 545). There is currently also a project about obtaining

an EQ-5D value set for Saudi Arabia, according to local experts. The MoH also already runs budget impact models for the inclusion of new drugs in the Saudi National and it has started to implement value-based agreements that link patient outcomes to payments for certain new drugs. In the near future, new high-priced drugs will have to go through an HTA. In support of this, the HTA Unit at the King Saud University was established in 2021 (546).

4.5.5.8 South Africa

The body responsible for the regulatory approval of new drugs is the South African Health Products Regulatory Authority (SAHPRA), which was established in 2017 and succeeded the Medicines Control Council (547).

There are different systems for drug pricing in the public and the private sector. The NDoH's Affordable Medicines Directorate procures drugs for the public sector through an open centralized tender system (548). The price obtained in the tender grants the winner(s) two-year exclusivity but requires guaranteed access (549, 550). Tenders may be split for drugs that have extensive usage. In the private sector, drug prices are regulated by the Single-Exit-Price (SEP) legislation (551, 552). The SEP is the sum of the ex-factory price, an additional dispensing fee or logistics fee, and value added tax (548). The ex-factory price is determined through ERP (551, 552). Pricing of generics is determined by reference pricing, in which reference pricing groups with therapeutically similar drugs are defined and a maximum reference price for each group is set (553).

Drugs reimbursed in the public sector are listed on the Essential Medicine List (EML), which are formally included in the PMBs (548). Clinical evidence (quality, safety, and efficacy) and cost-effectiveness are the main criteria in the decision-making process to include a drug on the EML (229, 548). The review process is done by expert committees appointed by the NDoH in collaboration with the Affordable Medicines Directorate. According to local experts, the process to include a new drug on the EML is lengthy. The NDoH has started to place more focus on including drugs to tackle NCDs, including cancer, in recent years. In the private sector, the medical aid schemes must reimburse at least all EML drugs covered by the PMBs, but additional drugs can be added depending on the scheme and the affordability of the drug (548). Most medical aid schemes cap or put co-payments on their oncology benefits which restricts access to many novel drugs.

4.5.5.9 UAE

The body responsible for the regulatory approval of new drugs is the higher committee for drug pricing at the MOHAP (554).

The higher committee for drug pricing at the MOHAP is also responsible for drug pricing (554). ERP is used for pricing of in-patent drugs and the median price among countries in the basket is used (108). The pricing of generics is based on price capping and sequence of entry. The first generic entering the market is priced at 40% below the originator drug's price, the second one at 50% below and the third one at 60% below the originator drug's price (108).

The MOHAP manages a central drug formulary (555). The reimbursement of in-patent drugs is based on negotiations and formulary management (108). The Dubai Health Authority follows the decisions by the MOHAP (556), but the health authority in Abu Dhabi might make a reimbursement decision at a different time, due to the decentralized health system.

4.6 Survivorship

A successful treatment is not the end of the care process for cancer patients (557). Cancer survivors face different challenges; see Table 24. Firstly, cancer survivors require follow-up care. This includes rehabilitation aiming to improving physical and psychological strength, as well as the detection and management of treatment-related adverse health effects – both physical effects (e.g., chronic fatigue) and mental effects (e.g., feelings of anxiety) – that impair survivors in various ways in their daily lives. It also includes the detection of cancer recurrence and preventive health.

Secondly, cancer survivors face the struggle to get their normal lives back. For working-age patients this includes reintegration in the labor market after the treatment-related hiatus. It also includes the right against discrimination in the acquisition of certain services (e.g., health insurance, life insurance, loans, mortgages) because of a previous cancer diagnosis. This is especially important for younger survivors who might have had cancer ten or more years ago during childhood, but then face discrimination in adulthood.

Table 24: Activities of cancer survivors

Activity	Possible provider/facilitator
Follow-up care	
- Rehabilitation	Health care system / social care / patient support groups / informal care givers
- Detection and management of treatment-related adverse (physical and mental) health effects	Health care system / social care / informal care givers
- Detection of cancer recurrence	Health care system
- Preventive health	Health care system
Return to normal life	
- Reintegration in the labor market	Civil law
- Right against discrimination in the provision of certain services (e.g., health insurance, loans) because of a previous cancer diagnosis ("Right to be forgotten")	Civil law

Follow-up care can be in the hands of different providers and its organization and comprehensiveness depends on the local context. Indicators to measure the activities of follow-up care are generally not well-defined and international statistics not readily available. This makes it difficult to quantify the state of survivorship management in the MEA-9 countries.

Local experts indicated that rehabilitation services only exist to a limited extent – both in terms of types of services offered and how long after treatment these services are offered. It is mostly only the leading cancer clinics that offer some professional psycho-oncology counseling. For example:

- In Algeria, psycho-oncology services are one area of the national cancer plan. But there are very few services in reality.
- The KHCC in Jordan has an accredited survivorship program for children and adults, but it is not integrated with primary care.
- The KCCC in Kuwait has a clinic with psychiatrists and psychologists. NGOs are also attached to it and look after the well-being of patients, but rehabilitation services are still an area under progress.
- In Lebanon, there are no (government-funded) services.
- In Saudi Arabia, only some hospitals provide psycho-social support in survival clinics.
- In South Africa, palliative care clinics and survivorship programs are limited to certain centers, but the NDoH in collaboration with Bristol Meyers Squibb Foundation is developing a national program for supportive care in cancer. Many NGOs including the CANSA also play a major role in providing supportive care programs for cancer patients.

Patient support groups fill this void only to a limited extent. Local experts in all MEA-9 countries agreed that the largest burden falls on the patient's family. They act as informal caregivers and provide emotional support and hands-on help with daily household chores. Often these tasks fall on female household/family members. Indeed in the Middle East and North Africa, family is an important social structure and families are tightly knit even beyond the closest relatives, which provides access to a greater support system (219).

Just as in the MEA-9 countries, the role of informal caregivers is also very important in European countries (558). To support informal caregivers, a new EU directive will establish 5 working days per year of carers' leave for each worker providing personal care or support to a relative or person living in the same household as of August 2022 (559). The same EU directive also gives all working parents of children up to at least 8 years and all carers a right to request flexible working arrangements (e.g., reduced working hours, flexible working hours, and flexibility in place of work) (559). The

MEA-9 countries could use these legal regulations as examples of how to support informal caregivers.

Regular follow-up visits to detect possible cancer recurrence and instructions for preventive health measures require continued contact with the health care system after successful treatment (557). It is important to provide patients with a treatment history summary and a follow-up care plan. This includes instruction for lifestyle changes, such as engaging in regular physical activity, maintaining a healthy body weight or losing weight if one is overweight, smoking cessation, or minimizing alcohol intake. Adopting a healthy lifestyle can minimize the risk of cancer recurrence (560).

The return to a normal life can be aided by certain legal requirements. For working-age patients who are fit enough to return to work, a smooth transition back into work is important. The reintegration can be helped by a legal right to necessary flexibilities, such as the right to part-time work or other flexible work arrangements. Discrimination and stigma at the workplace such as being passed over for a promotion, getting demoted, or being forced to resign upon disclosure of the cancer diagnosis also negatively affects the lives of cancer survivors (561).

Another beneficial legal requirement is the so-called “right to be forgotten”, i.e., the right against discrimination in the acquisition of certain services (e.g., health insurance, life insurance, loans, mortgages) because of a previous cancer diagnosis. In Europe, the first country to introduce the “right to be forgotten” was France in 2016, followed by Belgium, Luxembourg, and the Netherlands (562, 563). The French law stipulates that people diagnosed with cancer before the age of 18 are exempt from disclosure to insurers five years after the end of treatment. For people diagnosed after the age of 18, the exemption period begins ten years after the end of treatment. Even when insurers know about a person’s cancer diagnosis (e.g., from previous insurance claims), they are not allowed to use this information (564). The MEA-9 countries could adopt similar legal regulations to support cancer survivors. In South Africa, at least for private health insurance, the fees paid are only determined by the level of cover provided by the medical aid scheme with no loading allowed, according to local experts. In addition, when underwriting a new health insurance policy, the only restrictions allowed are a hold of cover for a pre-existing illness for up to a maximum of 12 months but may be only 3 months depending on the situation.

5. Policy recommendations

Cancer is a growing challenge for health systems around the world. Making the fight against cancer a priority requires political leadership. Instructive examples are the Nixon administration's "War on Cancer" in 1971 in the US, the Delors Commission's first "Europe Against Cancer" program in 1987, or the von der Leyen Commission's "Europe's Beating Cancer Plan" in 2021 in the European Union (565-567). Policy makers in the Middle East and Africa can learn from these examples and start prioritizing effective and comprehensive cancer control efforts to address the many challenges ahead.

Measuring and understanding the magnitude and the development of the challenge is the first step. The disease burden of cancer is growing. The annual number of newly diagnosed cancer cases has increased since 2000. In 2018, almost 400,000 new cancer cases were reported and over 230,000 deaths from cancer were recorded in all MEA-9 countries. The proportion of people dying from cancer is also increasing and cancer is now the second-leading or third-leading cause of death in all MEA-9 countries. The main drivers behind this development are (i) population aging and the fact that cancer is an aging-associated disease, and (ii) unfavorable trends in major risk factors of cancer (such as smoking and obesity). Until 2040, the annual number of new cancer cases might almost double compared to 2018 and reach 720,000 cases, solely due to the expected demographic changes.

The demographic changes cut both ways, however. Even though there will be more cancer patients in the future, the MEA-9 countries will also have a slightly growing share of the working-age population (15–64 years) in the coming decades. The latter trend is favorable for building a strong economy ("the demographic window of opportunity"). This creates budget room to invest in health care and cancer care. The health returns from spending will reinforce the economy because healthy people can contribute more than sick people. The notion that "public spending on health care and cancer care is an investment and not just a cost" needs to be recognized.

The results in this report suggest that success in the treatment of cancer is associated with the amount of spending on cancer care, with the Gulf countries achieving better outcomes for their cancer patients than the other countries. Spending on cancer care – and on health care in general – is vital for achieving universal health coverage, offering covered patients more modern health services, and lowering co-payments on covered health services so as to prevent patients and their families from financial hardship.

The planning, coordination, and implementation of – financial and non-financial – actions to address cancer is the second step. To this end, the WHO advocates national cancer control programs to tackle cancer in a strategic and comprehensive way. Most of the MEA-9 countries have either active cancer control programs or have had them in the past. However, these programs outline varying goals and

are not always fully comprehensive in terms of defining actions to address all core areas of cancer control – prevention, early detection, diagnosis and treatment, survivorship. Almost all programs lack dedicated funding plans for the defined actions. The lack of financial commitment casts some doubt on the actual implementation, as many actions require funding.

The implementation of public measures to improve cancer care has to be done against the backdrop of constrained public health care budgets. This calls for a prioritization of the measures. It is essential that decisions on prioritization are evidence-based. HTA is being used by many health policy makers worldwide to support evidence-based decision-making. HTA is especially used in the evaluation of new (cancer) drugs, but it can be applied more generally to the evaluation of all kinds of measures, for example the design of screening programs. A consistent use of HTA can aid the allocation of constrained health resources to maximize patient outcomes and value-for-money for patients, taxpayers, and society at large. None of the MEA-9 countries has yet adopted HTA for drugs on a full scale, but there is a growing interest. This can help to improve the situation for cancer patients, who are currently denied much of the last decades' progress in medical oncology in many MEA-9 countries. A broader, societal perspective in the evaluation of drugs and other health interventions that takes into account indirect costs of patient's productivity loss and informal care costs in addition to treatment-related health care costs could improve the allocation of health care resources from a societal perspective.

The monitoring and evaluation of cancer control measures is the third step. This necessitates good local data. Without good cancer registration of new cases and a linkage to cause of death registration, it is not possible to assess the most basic patient-related outcome – survival. This inhibits the assessment of the effectiveness of cancer control measures. In addition, the absence of concrete data on health spending on cancer makes it impossible to assess the cost-effectiveness of the measures.

In addition to the general recommendations above, this section brings together country-specific recommendations based on the analysis in chapters 2 to 4 and input from local experts.

5.1 Algeria

ALGERIA – Recommendations
Governance of cancer care
• The first cancer plan for 2015–2019 led to improvements in many different areas of cancer care and succeeded in achieving many of its objectives. This was facilitated by a dedicated funding plan for all actions. The planned evaluation of the first plan needs to be finished and then made publicly available. Based on the lessons drawn from the evaluation, the establishment of a second cancer plan needs to be a priority. The local research community and cancer patient representatives could also be involved in this process. The second plan needs a clear aim to reduce incidence and improve survival and also once again include a funding plan for all planned actions. • Improving health system performance and monitoring of all actions is important. The current situation is that hospitals are allocated with a budget, but there is no follow-up of how the budget has been spent. The cancer registries could be developed further so that they can be utilized to analyze treatment patterns and efficient use of resources. • Institutions such as the National Institute of Public Health (INSP) within the MSPRH could support local competence development in fields such as health economics, HTA, payment models, etc. to support the growing challenges of access and management of new cancer drugs.
Organization and financing of health care and cancer care
• Public spending on health care amounts to around 4% of GDP, which falls short of the informal WHO spending target of 5% of GDP. Additional spending to bring the country closer to the benchmark would be needed. • Around 90% of the population are covered by two public insurance funds (CNAS and CASNOS). Ways to cover the remaining uninsured population need to be explored. • CNAS/CASNOS only cover medical services at public health facilities. Many insured patients seek certain services in the private sector due to perceived lower quality of care in the public sector. This leads to high out-of-pocket expenditure, as few patients have a private health insurance that covers services in the private sector. Expanding the role of private health insurance could be considered. • CNAS/CASNOS could start covering certain medical services at private institutions. One suggestion is to perform all cancer screening activities in private health facilities and have public health facilities focus on cancer treatment instead. • CNAS/CASNOS usually do not cover the full price of medical services at public health facilities. This leads to rather high out-of-pocket expenditure of patients. Higher reimbursement rates by CNAS/CASNOS for medical services could be considered. • Patient referral needs to shift from a paper-based to an electronic system.
Cancer registration
• Continuing to improve cancer registration and its analysis is important. There is no nationwide population-based cancer registry, although the recent establishment of three networks covers now 70–90% of the population. Remaining regions need to be encouraged to establish registries. • Only cancer incidence is captured in the cancer registries, while information on cancer mortality is missing. Linking information on mortality to the registries and assessing survival needs to be prioritized.
Prevention
• The fight against tobacco consumption needs to be stepped up. A special focus needs to be placed on children and young people and existing age limits need to be enforced. Existing smoking bans in public indoor places also need to be enforced. Cigarette smuggling also needs to be put a stop to. Excise taxes on cigarettes could be increased further. • Obesity needs to be addressed. Measures need to be taken to encourage changing dietary habits back from a Western diet with fast food to a Mediterranean diet. Excise taxes on sugary drinks could be introduced. Ways to increase physical activity also need to be encouraged.

- A strategy to roll out a vaccination program against HPV in children could be considered, as cervical cancer is the fourth most common cancer type in women.

Early detection

- General physicians need to be better trained to recognize common early symptoms of cancer. Health literacy in the general population on early symptoms of cancer also needs to be improved.
- Screening has become a priority in recent years. The ongoing pilot projects for organized breast cancer screening and colorectal cancer screening need to be evaluated, before deciding on country-wide expansion.
- Steps to turn opportunistic cervical cancer screening into an organized program could be taken to improve participation.

Diagnosis and treatment

- Achieving a balanced workforce and a balance between infrastructure and workforce needs to be prioritized. While the number of medical oncologists has increased greatly, there are very few nurses. Many new cancer centers have been established in recent years, but adequate staffing with trained personnel is a challenge.
- There are few modern diagnostic imaging units, with the first two PET scanners becoming available only in 2021 in the public sector, which limits accurate diagnosis for the vast majority of patients. Investment in additional scanners could be considered to enable greater patient access.
- Molecular diagnostic laboratories need to be established to enable the administration of modern cancer drugs.
- Multi-disciplinary team meetings to find the best treatment decisions could be introduced.
- The treatment guidelines currently developed by the Special Cancer Committee need to be published and applied consistently to ensure more equitable care all over the country.
- The number of radiation therapy machines has improved and is now not too far below recommended standards, but the geographic distribution is inadequate. Waiting times of three to six months for treatment in the eastern and southern parts of the country compared to only a few weeks in the rest of the country call for the installation of additional machines in these regions.
- The availability of modern cancer drugs (targeted therapies and immunotherapies) is very limited. The Special Cancer Committee is tasked to review cancer drug access and improve the situation. The criteria applied in this review are unclear. Previous drug assessments were focused on the price of drugs instead of also taking into account the value that they provide to patients. A shift towards a more value-based assessment – as part of a transparent process – could help in the prioritization of introducing modern cancer drugs.
- Clinical trial activity could be promoted to create another route for patients to access modern cancer drugs. The current clinical trial regulation hampers clinical trial activities. The regulation would need to be revised to make it less bureaucratic.
- The regulatory approval of drugs could be accelerated – at least for those with high clinical benefits. This would make them at least available in the private sector and would stop wealthy patients from traveling abroad to receive modern cancer drugs.
- The drug management systems need to be improved. The current systems of the Ministry of Pharmaceutical Industry responsible for purchase of retail drugs and the PCH responsible for hospital drugs are not functioning well. Cancer patients face breaks in their drug treatment or cannot finish it all, because the supply of even old drugs with generic availability is not working properly.
- The first positive experiences with biosimilars should be built on and greater use of biosimilars and generics could be encouraged. Local production of generics/biosimilar could stimulate competition and reduce prices further to create budget headroom for new drugs.

Survivorship

- The few existing psycho-oncology services could be extended to more facilities and offered to more patients.

- Informal caregivers with regular jobs could be better supported, such as through a right to flexible working arrangements and paid leave.
- The reintegration in the labor market of cancer survivors could be supported by flexible working arrangements.
- Cancer survivors could be protected from discrimination in the acquisition of certain services (e.g., health insurance, life insurance, loans, mortgages), by imposing time limits up to which a previous cancer diagnosis needs to be disclosed.

5.2 Egypt

EGYPT – Recommendations
Governance of cancer care
• The cancer plan for 2016–2020 had encompassing goals. The achievement of these goals has not been evaluated yet, but the absence of a dedicated funding plan for all planned actions might have limited their implementation. An evaluation would need to be done. Afterwards, the creation of a new cancer plan should be priority. This plan would need to draw on the lessons of the first plan and also include a dedicated funding plan. • The 100 Million Healthy Lives initiative in 2018 to eradicate HCV and reduce NCDs and the spin-off Women's Health Initiative in 2019 to perform breast cancer screening along with examining other health-related risk factors were successful in reaching a large proportion of the population. A thorough evaluation of how the breast cancer screening campaign has affected (i) treatment uptake by patients, (ii) stage distribution, (iii) treatment outcomes, (iv) treatment outcomes in relation to costs for the campaign is needed.
Organization and financing of health care and cancer care
• Public spending on health care amounts to around 1.5% of GDP, which is exceptionally low even in the MEA region and falls greatly short of the informal WHO spending target of 5% of GDP. Additional spending to bring the country closer to the benchmark and as part of implementing UHC would be needed. • Efforts to achieve UHC until 2027 are underway. This also hopes to overcome the fragmentation and complexity of the health system. The current uncoordinated system with multiple providers and payers results in duplication and inefficiencies in the allocation of financial and human resources and in capital investment. The ongoing UHC rollout needs to address these challenges. • The rollout of UHC also needs to ensure that this results in a significant reduction in the out-of-pocket payments by patients. Currently, low quality and long waiting lists for services offered by the HIO to insured patients force many patients to seek care in the private sector instead, resulting in high out-of-pocket payments. The MoPH services offered to the uninsured population face the same challenges. To reduce the need for out-of-pocket payments for cancer care services accessed in the private sector, the quality of care provided in HIO and MoHP hospitals needs to be improved so that patients regain confidence in these providers. • The patient referral system between hospitals needs to be improved. • Moving towards a system with comprehensive primary health care facilities (instead of hospitals) as the main point of entry to the health care system could be considered but would require a complete overhaul of the health system.
Cancer registration
• A national centralized and integrated cancer registry is still lacking, despite being one of the goals of the latest cancer plan. The fragmentation of health care providers remains an obstacle to achieve this. Renewed efforts to establish a national cancer registry are needed. • Only cancer incidence is captured in the regional and hospital-based cancer registries, while information on cancer mortality is missing. Linking information on mortality to the registries and assessing survival needs to be prioritized.
Prevention
• The fight against tobacco consumption needs to be stepped up. Recent awareness campaigns have not been successful. Existing smoking bans in public indoor places and age limits for purchase of cigarettes need to be enforced. Excise taxes on cigarettes could be increased further. • Obesity needs to be addressed. Recent awareness campaigns have not been successful. Utilizing the data collected from the 100 Million Healthy Lives initiative in 2018 to direct public health campaigns and preventive interventions could be considered. Measures need to be taken to encourage changing dietary habits and to increase physical activity. Excise taxes on sugary drinks could be introduced.

- Repeated epidemiological studies to monitor the prevalence of HPV could be conducted. This would help to assess the optimal timing for a rollout of a vaccination program against HPV in children.
- After the successful HCV screening and treatment campaign in 2018, reinfection with HCV can still be a challenge. Epidemiological studies to monitor the development and/or a renewal of the campaign (in conjunction with another major health campaign) could be considered.

Early detection

- Health care staff in primary health care need to be better trained to recognize common early symptoms of cancer. Health literacy in the general population on early symptoms of cancer also needs to be improved.
- The breast cancer screening campaign as part of the Women's Health Initiative in 2019 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.
- Cervical cancer screening could be extended faster to the whole country than at the speed of the UHC rollout until 2027.
- Given the increasing obesity rates, the introduction of a colorectal cancer screening program could be considered.

Diagnosis and treatment

- Many challenges in accessing diagnostic and treatment services are tied to the organization of care. This includes the absence of UHC, the small range of services and low quality of these services in HIO and MoPH hospitals, and high co-payments for radiation therapy and cancer drugs even in the public sector.
- Training additional medical staff to remedy the lack of oncologists and nurses needs to be prioritized. This will need to be done along with increasing investment in new health care infrastructure to meet increasing patient numbers.
- The inequity in the geographic distribution of cancer care centers needs to be addressed.
- Establishing common treatment guidelines could be considered, but this is difficult due to the fragmentation of the health care providers.
- Molecular diagnostic testing needs to be improved in order to establish the prerequisites to administer modern cancer drugs. Testing all breast cancer patients for HER2 status could be a first step.
- The number of radiation therapy machines is fairly close to recommended standards, but the geographic distribution 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.
- The availability of modern cancer drugs (targeted therapies and immunotherapies) is very limited. This applies also to the private sector, as few of these drugs have received regulatory approval. Accelerating regulatory approval of drugs – focusing on those with high clinical benefits – could be a first step to increase the availability in the private sector at least.
- High co-payments for modern cancer drugs make them unaffordable for most patients. The EDA and the UPA together with the public care providers need to seek ways to reduce out-of-pocket payments.
- The plans of the EDA and the UPA to make use of HTA in the assessment of new drugs is a step in the right direction to move from pure consideration of prices to consideration of value-for-money. The EDA and the UPA show also interest in performance-based risk-sharing arrangements, but the current poor state of the cancer registries blocks this.

Survivorship

- Formal psycho-oncology services could be established or public support to NGOs for providing these services could be increased.
- Informal caregivers with regular jobs could be better supported, such as through a right to flexible working arrangements and paid leave.
- The reintegration in the labor market of cancer survivors could be supported by flexible working arrangements.

- Cancer survivors could be protected from discrimination in the acquisition of certain services (e.g., health insurance, life insurance, loans, mortgages), by imposing time limits up to which a previous cancer diagnosis needs to be disclosed.

5.3 Jordan

JORDAN – Recommendations
Governance of cancer care
• There is no current or recent national cancer plan and neither a current NCD plan that includes cancer. Establishing a national cancer plan needs to be a priority. 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. The plan would need clear aims to reduce incidence and improve survival as well as include a funding plan for all planned actions. The actions would need to be monitored including using the national cancer registry to analyze treatment patterns and efficient use of resources.
Organization and financing of health care and cancer care
• Public spending on health care amounts to close to 4% of GDP, which falls short of the informal WHO spending target of 5% of GDP. Additional spending to bring the country closer to the benchmark and as part of implementing UHC would be needed. • UHC still needs to be achieved, with 68% of Jordanian citizens covered by public and private health insurance in 2015. Since 2015, the civil health insurance fund by the MoH has already been expanded to cover young children and older citizens. Ways to cover the remaining uninsured citizens need to be explored. • Access of UNHCR-registered refugees to public health care facilities has worsened in recent years. A permanent solution that is both financially sustainable and allows good access needs to be found in collaboration with international stakeholders. • All – insured and uninsured – Jordanian receive free cancer care in the public sector. But there is unequal access to cancer care services. Cancer patients treated at the KHCC (around 60–70% of patients) receive better care than those treated at small non-specialized hospitals with a low expertise in treating cancer. Funding cuts by the government to the KHCC also meant that fewer patients could have been referred to the KHCC in recent years. Ways to ensure more equal care provision need to be explored. • Long-term planning of the supply of cancer care services for the projected growing demand needs to be made. This would also need to ensure the sustainability of covering costs of cancer treatment. • A new integrated model of cancer care could be considered which regulates the competences of cancer centers and primary care clinics. Structured primary care programs and services that aim to address treatment-related complications and co-morbidities during and after treatment would need to be introduced in the whole country. A greater role of primary care clinics in engaging in cancer prevention activities and also in providing screening services could be considered. This would reduce the burden on cancer centers and help them focus on their core competences.
Cancer registration
• Continuing to improve cancer registration and its analysis in the national cancer registry is important. The long delays in the public publication of aggregated data needs to be addressed. • Only cancer incidence is captured in the national registry, while information on cancer mortality is missing. Linking information on mortality to the registries and assessing survival needs to be prioritized.
Prevention
• Work on prevention currently lacks financial resources. Investment in prevention needs to be increased. • The fight against tobacco consumption needs to be stepped up, given that smoking rates in men are the highest in the world. A special focus needs to be placed on children and young people and existing age limits need to be enforced. The newly introduced smoking bans in public indoor places also need to be enforced. Excise taxes on cigarettes could be increased further.

- Obesity needs to be addressed. Measures taken so far to change dietary habits away from unhealthy fast food and to increase physical activity have not been successful so far. New strategies need to be explored. One measure could be the introduction of excise taxes on sugary drinks.
- Repeated epidemiological studies to monitor the prevalence of HPV could be conducted. This would help to assess the optimal timing for a rollout of a vaccination program against HPV in children.

Early detection

- Health literacy in the general population on early symptoms of cancer needs to be improved.
- As part of a new integrated model of care (see recommendation above), primary care clinics could be tasked with the responsibility for screening programs.
- The existing breast cancer screening program needs to be turned into an organized program to address access challenges and to ensure that women regularly return to screening.
- The introduction of a colorectal cancer screening program could be considered, given the increasing obesity rates.
- The cost-effectiveness of the introduction of a lung cancer screening program could be assessed, given the exceptionally high smoking rates.

Diagnosis and treatment

- Imbalances in the quality of care – high quality at the KHCC and lower quality elsewhere – need to be addressed. This is partly a question of lower availability of modern health care infrastructure in all areas outside of Amman.
- There are no national treatment guidelines except for breast cancer. The KHCC could be tasked to develop national treatment guidelines for more cancer types which are then to be applied consistently to ensure more equitable care all over the country.
- There is no good quality management of cancer care across the whole country. There is a lack of quality standards. There is also no monitoring system in place in hospitals (except in the KHCC). The lack of outcome data in the national cancer registry also inhibits proper monitoring. The establishment of a quality management system and the recording of relevant data need to be prioritized.
- Time to treatment for patients diagnosed outside of the KHCC and later referred to the KHCC is long, because patient data are not properly transferred when patients are referred. The referral system to the KHCC needs to be defined more clearly and address inconsistencies.
- Ways to stop the significant brain drain of young and trained oncologists need to be explored.
- The number of modern diagnostic imaging units is limited, which restricts accurate diagnosis for the vast majority of patients. Investment in additional scanners could be considered to enable greater patient access.
- Molecular diagnostic testing needs to be improved in all hospitals apart from the KHCC to establish the prerequisites to administer modern cancer drugs.
- The number of radiation therapy machines is fairly close to recommended standards. An assessment of underserved areas could be conducted to determine where the installation of additional machines is of greatest benefit.
- The availability of modern cancer drugs (targeted therapies and immunotherapies) is very limited. More modern drugs are available at the KHCC due to its own reimbursement process compared to the rest of the country. The main bottleneck for reimbursement of more modern drugs is the lack of public financial resources. Ways to create budget headroom for new drugs such as through a review of the generic pricing policy and mandatory generic substitution could be explored.
- The reimbursement decision of drugs is based on a review of their cost-effectiveness. No cost-effectiveness studies with local data are required and no real cost-effectiveness threshold exists though. The establishment of an HTA unit along with a transparent HTA process relying on more local data analysis and with clear decision criteria could be considered.

Survivorship

- There is a survivorship program at the KHCC, but it is not integrated with primary care. As part of a new integrated model of care (see recommendation above), these activities could be

considered to be shifted to primary care and thus also to ensure greater access of patients across the country to psycho-oncology services.

- Informal caregivers with regular jobs could be better supported, such as through a right to flexible working arrangements and paid leave.
- The reintegration in the labor market of cancer survivors could be supported by flexible working arrangements.
- Cancer survivors could be protected from discrimination in the acquisition of certain services (e.g., health insurance, life insurance, loans, mortgages), by imposing time limits up to which a previous cancer diagnosis needs to be disclosed.

5.4 Kuwait

KUWAIT – Recommendations
Governance of cancer care
• The latest cancer plan for 2013–2018 was developed by the MoH together with the KCCC. The KCCC as the sole provider of cancer treatment in the country was responsible for its implementation. There was no dedicated funding plan for all planned actions and an evaluation of the cancer plan after its conclusion has not been published publicly. A thorough evaluation of the plan would be needed to draw lessons from it. Afterwards, the establishment of a new cancer plan needs to be a priority.
Organization and financing of health care and cancer care
• Public spending on health care exceeds 4% of GDP and is almost in line with the informal WHO spending target of 5% of GDP. Additional spending on cost-effective measures to increase the quality of care needs to be done. A closer analysis of health spending by disease category could help the MoH to evaluate priorities in its health budget. • All local citizens are covered by health insurance, while expatriates need to obtain a public or a private health insurance. The minimum care package covered by different insurance schemes for expatriates could be raised to bring it more in line with the one available for local citizens. • Expatriates may be required to be at their workplace physically and find it difficult to get time off for cancer treatment. More flexible work arrangements to enable expatriates to get their treatment during regular working hours could be considered.
Cancer registration
• Continuing to improve cancer registration and its analysis in the national cancer registry is important. The annual cancer reports by the KCCC should be made publicly available. • The provision of survival estimates based on the national registry needs to be prioritized. This would need to help monitor the quality of care.
Prevention
• The fight against tobacco consumption needs to be stepped up. The recent establishment of smoking cessation clinics in all regions is a move in the right direction. Existing age limits for tobacco purchase need to be enforced. Existing partial smoking bans in public indoor places also need to be extended and enforced. Excise taxes on cigarettes could be increased further. • Obesity needs to be addressed. Existing media campaigns by the MoH to raise awareness do not reached enough people. Partnering with NGOs and use of social media could be ways to increase outreach. Measures need to be taken to encourage changing dietary habits away from a Western diet with fast food. Excise taxes on sugary drinks could be introduced. Ways to increase physical activity also need to be encouraged. • A strategy to roll out a vaccination program against HPV in children could be considered, as cervical cancer is the eighth most common cancer type in women.
Early detection
• Health literacy in the general population on early symptoms of cancer needs to be improved. • The separation of breast cancer screening activities in polyclinics and treatment activities at the KCCC works well. Future screening programs need to follow this example of separation of competences. • Ways to improve the low participation rate in the breast cancer screening program need to be explored. • The introduction of an organized cervical cancer screening program is planned, but its cost-effectiveness would need to be evaluated first – also in relation to a possible introduction of an HPV vaccination program. • Given the increasing obesity rates, steps to turn opportunistic colorectal cancer screening into an organized program could be taken to improve participation.
Diagnosis and treatment

- The KCCC as the sole provider of cancer treatment in the country occupies a central role in shaping cancer care. Participation in international accreditation programs is important to ensure that local care provision and treatment guidelines advance in line with global standards.
- A current challenge is adequate staffing of cancer treatment services at the KCCC. While the number of specialized oncologists has improved considerably, there is a lack of specialized nursing staff and general administration staff. Recruiting the latter staff categories needs to be prioritized.
- The number of radiation therapy machines has improved and is now close to recommended standards. The increasing patient numbers require planning for the installation of additional machines to meet patient needs.
- The regulatory approval process for new drugs can be lengthy and bureaucratic. Ways to streamline this process could be considered.
- The availability of modern cancer drugs (targeted therapies and immunotherapies) is good and similar as in Saudi Arabia but lower than in the UAE. Current drug assessments are focused on the price of drugs instead of also taking into account the value that they provide to patients. A shift towards a more value-based assessment using HTA is on its way to support reimbursement decisions.
- Some challenges exist in the steady supply of already reimbursed drugs, even for older drugs with generic availability. A review of the drug procurement process could be considered to avoid long waiting times for patients to start treatment.

Survivorship

- Rehabilitation with psycho-oncology services exist at the KCCC, but this is still an area under progress and ways to increase access for more patients could be considered.
- Informal caregivers with regular jobs could be better supported, such as through a right to flexible working arrangements and paid leave.
- The reintegration in the labor market of cancer survivors could be supported by flexible working arrangements.
- Cancer survivors could be protected from discrimination in the acquisition of certain services (e.g., health insurance, life insurance, loans, mortgages), by imposing time limits up to which a previous cancer diagnosis needs to be disclosed.

5.5 Lebanon

LEBANON – Recommendations
Economic crisis
• The main challenge in cancer care is the ongoing economic crisis. The crisis affects every aspect of life, including the functioning of the health care system. Until the crisis is resolved, the following recommendations are only of secondary priority.
Governance of cancer care
• There is no current or recent national cancer plan that addresses all areas of cancer care. Cancer was only among the NCDs mentioned in the NCD plan for 2016–2020, which focused mainly on prevention and early detection. The National Plan for the Awareness and Early Detection of Colorectal Cancer from 2018 also focused on these areas of cancer control for colorectal cancer. Establishing a comprehensive national cancer plan needs to be a priority. The plan would need clear aims to reduce incidence and improve survival as well as include a funding plan for all planned actions. The actions would need to be monitored including using the national cancer registry to analyze treatment patterns and efficient use of resources.
Organization and financing of health care and cancer care
• Before the economic crisis, public spending on health care amounted to around 4% of GDP, which fell short of the informal WHO spending target of 5% of GDP. Additional spending to bring the country closer to the benchmark and as part of implementing UHC would be needed. • Around 47% of local citizens are covered by social insurance schemes or private schemes. The remaining citizens lack coverage and the MOPH has to act as an "insurer of last resort". Ways to either cover the uninsured citizens through existing schemes or to bring the limited health care package offered to them more in line with what insured citizens receive need to be explored. • Access of UNHCR/UNRWA-registered refugees to health care services is continuing to rely on international support. Despite the support, most refugees cannot afford cancer treatment as a large share of treatment services still needs to be covered out-of-pocket. A permanent solution that is both financially sustainable and allows good access needs to be found in collaboration with international stakeholders. • 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. • The MOPH-provided cancer care services to the uninsured patients faced financing problems already before the economic crisis, in particular in relation to cancer drugs. A financially sustainable solution needs to be found.
Cancer registration
• Continuing to improve cancer registration is important. This includes foremost a better registration of cancer cases among the large refugee population. The long delays in the public publication of aggregated data also needs to be addressed. • The national cancer registry does not publish data on cancer mortality, although some hospital-based registries are able to record this information. Improper cause of death registration is an obstacle and needs to be addressed to provide more reliable cancer mortality data. • Experience in assessing survival in some leading hospitals could be shared with other hospitals to get a better picture of differences in the quality of care provided across the country.
Prevention
• The fight against tobacco consumption needs to be stepped up. Existing age limits for tobacco purchase need to be enforced. Existing smoking bans in public indoor places also need to be enforced. Cigarette smuggling needs to be put a stop to. Excise taxes on cigarettes could be increased much further, given the exceptionally low cigarette prices. • Obesity needs to be addressed. Although awareness campaigns have been run by the MOPH, outreach is limited. A better partnership between the MOPH and NGOs could increase outreach, including by using more social media. Measures need to be taken to encourage changing dietary

habits back from a Western diet with fast food to a Mediterranean diet. Excise taxes on sugary drinks could be introduced. Ways to increase physical activity also need to be encouraged.
- A strategy to roll out a vaccination program against HPV in children could be considered, as cervical cancer is the tenth most common cancer type in women.
- The hepatitis B immunization coverage in infants needs to be improved in line with the WHO target.

Early detection

- Health literacy in the general population on early symptoms of cancer needs to be improved. Awareness campaigns are being run for breast cancer, but they would need to cover common symptoms of other cancer types as well.
- Steps to turn the non-organized breast cancer screening program into an organized one could be taken to improve participation. Mammography could also be provided for free to encourage participation.
- Given the increasing obesity rates and following the National Plan for the Awareness and Early Detection of Colorectal Cancer from 2018, opportunistic colorectal cancer screening could be turned into an organized program and/or free screening services could be offered to improve participation.

Diagnosis and treatment

- There were no shortages of medical staff before the crisis. Since then, there has been a brain drain of young physicians who left the country for financial reasons. Depending on how many of those return, recruiting and training more medical staff will be necessary.
- The availability of modern cancer drugs (targeted therapies and immunotherapies) for cancer patients covered by public or private insurance used to be good and comparable to Western European standards before the crisis. Uninsured cancer patients only had access to older cancer drugs. Making up for lost ground both in terms of regulatory approval and reimbursement approval of newer drugs will be necessary after the crisis.
- Reimbursement decisions by the public social insurance schemes used to focus mainly on the price of drugs instead of also taking into account the value that they provide to patients. A shift towards a more value-based assessment could help in the prioritization of introducing modern cancer drugs.

Survivorship

- Formal psycho-oncology services could be established or public support to NGOs for providing these services could be increased.
- Informal caregivers with regular jobs could be better supported, such as through a right to flexible working arrangements and paid leave.
- The reintegration in the labor market of cancer survivors could be supported by flexible working arrangements.
- Cancer survivors could be protected from discrimination in the acquisition of certain services (e.g., health insurance, life insurance, loans, mortgages), by imposing time limits up to which a previous cancer diagnosis needs to be disclosed.

5.6 Morocco

MOROCCO – Recommendations
Governance of cancer care
• The first cancer plan for 2010–2019 led to progress in many different areas of cancer care. This was facilitated by a dedicated funding plan for all actions and good collaboration of all involved stakeholders – foremost the MoH, the National Institute of Oncology, and the Lalla Salma Foundation. Due to the general satisfaction with the first plan of all involved stakeholders, a second plan for 2020–2029 was put in place. The plan defines actions in all areas of cancer care and once again includes a funding plan for all planned actions. Implementation of all actions in the aftermath of COVID-19 will be vital. • Improving quality assurance and monitoring of all planned actions in the new cancer plan is important. This would help to ensure an efficient use of resources in cancer care. The cancer registries could be developed further so that they can be utilized for these purposes.
Organization and financing of health care and 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% of GDP. Additional spending to bring the country closer to the benchmark and as part of implementing UHC would be needed. • Around 68% of citizens were covered by public health insurance in 2020 and efforts to achieve UHC until 2025 are underway. The rollout of UHC also needs to ensure that the quality of the health services in the public health system can be maintained or even increased despite the probable increase in patient numbers. • The rollout of UHC needs to ensure that this results in a significant reduction in the out-of-pocket payments by cancer patients. Currently, cancer patients on the RAMED scheme and uninsured patients have to cover all costs out-of-pocket. For cancer patients on the two AMO schemes, there are no co-payments in the public cancer care centers.
Cancer registration
• Continuing to improve cancer registration and its analysis is important. There are two regional population-based cancer registry, covering together around 14% of the population, and also additional hospital-based registries. The two regional registries produce representative estimates for the whole country. Additional registries – at least hospital-based registries – would be needed to analyze care patterns across the country. • The two regional population-based registries do not publicly publish cancer statistics on a regular basis. Previous reports only cover the years around 2005 to 2008. They also only published estimates for cancer incidence, while information on cancer mortality was missing. Producing more up-to-date estimates and linking information on mortality to the registries as well as assessing survival needs to be prioritized.
Prevention
• The fight against tobacco consumption needs to be stepped up. Rather than introducing new laws, the enforcement of existing laws needs to be prioritized. Existing age limits for tobacco purchase need to be enforced. Existing smoking bans in public indoor places also need to be enforced and could be extended to public transport. Excise taxes on cigarettes could be increased further. • Obesity needs to be addressed. Measures need to be taken to encourage changing dietary habits back from a Western diet with fast food to a Mediterranean diet. Excise taxes on sugary drinks could be introduced. Ways to increase physical activity also need to be encouraged. • Given that cervical cancer is the second most common cancer type in women, the national HPV vaccination program for girls to be rolled out in 2021 is a step in the right direction. Efforts need to be made to ensure high participation.
Early detection

- Health literacy in the general population on early symptoms of cancer needs to be improved. More generally, knowledge of the effects of modern medical therapy as opposed to effects of spiritual therapy or self-administered phytotherapy needs to be improved.
- The organized breast cancer screening program has comparatively high participation rates. A gradual transition from clinical breast examination as the main screening method to mammography would be needed to increase accuracy.
- The organized cervical cancer screening program needs to focus on increasing participation rates as well as extending the program to all provinces. Using Pap smear as the primary screening method as well as a gradual transition to high-risk HPV testing could be considered.
- Even though the latest cancer plan does not foresee the introduction of a colorectal cancer screening program until 2029, a pilot program could be run to test its feasibility in the local context given increasing obesity rates.

Diagnosis and treatment

- The lack of medical staff is a challenge and spans across all kinds of trained oncologists, surgeons, radiologists, and other specialties as well as nurses, even though improvements in the number of medical oncologists have been achieved. A lack of data managers is also a challenge. Additional education and training of new staff needs to be prioritized. Geographic disparities in the availability of trained medical staff also need to be addressed.
- The required increase in medical staff needs to go hand in hand with additional infrastructure. Currently, the number of hospital beds is exceptionally low.
- There are few modern diagnostic imaging units available, which limits accurate diagnosis for the vast majority of patients. Investment in additional scanners could be considered to enable greater patient access.
- The number of radiation therapy machines has improved greatly and is now fairly close to recommended standards. An assessment of underserved areas could be conducted to determine where the installation of additional machines is of greatest benefit.
- The availability of modern cancer drugs (targeted therapies and immunotherapies) is very limited, particularly in the public sector. Even once a modern drug is reimbursed, the drug budget is not large enough to ensure that most eligible patients receive treatment. Ways to create budget headroom for new drugs such as through a review of the generic/biosimilar pricing policy and mandatory generic/biosimilar substitution could be explored.
- The reimbursement process by the ANAM needs to be reviewed to avoid long delays. Drug assessments are focused on the price and budget impact of drugs instead of also focusing on cost-effectiveness. A shift towards a more value-based assessment could help in the prioritization of introducing modern cancer drugs.

Survivorship

- Formal psycho-oncology services could be established or public support to the Lalla Salma Foundation for providing these services could be provided.
- Informal caregivers with regular jobs could be better supported, such as through a right to flexible working arrangements and paid leave.
- The reintegration in the labor market of cancer survivors could be supported by flexible working arrangements.
- Cancer survivors could be protected from discrimination in the acquisition of certain services (e.g., health insurance, life insurance, loans, mortgages), by imposing time limits up to which a previous cancer diagnosis needs to be disclosed.

5.7 Saudi Arabia

SAUDI ARABIA – Recommendations
Governance of cancer care
• There is a cancer plan for 2014–2025 with overall objectives focusing on most areas of cancer care. Despite this plan, many activities in cancer care are overshadowed and affected by the fundamental changes of the health care system as part of the Saudi Vision 2030. The absence of a dedicated funding plan for all planned actions in the cancer plan might also limit the commitment to implementation. A revision of the current cancer plan to bring it in line with the Saudi Vision 2030 could be considered.
Organization and financing of health care and cancer care
• Public spending on health care amounts to around 4% of GDP, which falls short of the informal WHO spending target of 5% of GDP. Additional spending on cost-effective measures to increase the quality of care in all regions of the country needs to be done. A closer analysis of health spending by disease category could help the MoH to evaluate priorities in its health budget. • The Saudi Vision 2030 is currently transforming the governance and organization of the health system. Up until now, the fragmentation of the health system with multiple public providers and private providers is a challenge, as the public providers are not looking at each other and act independently. Patients might be treated differently by different providers. The aim to put all public providers under one umbrella needs to ensure greater provision of equitable care. • While all local citizens and public-sector expatriates have free access to public health care services, the employer-provided insurance of private-sector expatriates only covers a basic level of care. Blue-collar private-sector expatriates may not be able to afford a private health insurance to extend their coverage. This limits their access to health care in general and to cancer care services in particular. The minimum care package covered by employer-provided insurance could be raised to bring it more in line with the one available for local citizens and public-sector expatriates.
Cancer registration
• Continuing to improve cancer registration and its analysis is important. The national cancer registry needs to be revived to provide up-to-date data. Underreporting of new cancer cases needs to be addressed and collaboration between health providers needs to be improved. • Only cancer incidence is captured in the national registry, while information on cancer mortality is missing. Linking information on mortality to the registry and assessing survival needs to be prioritized. This will allow more real-time monitoring and performance assessment of cancer care.
Prevention
• The fight against tobacco consumption has been a priority in recent years, but not yet achieved a turnaround in smoking rates. Excise taxes on cigarettes could be increased further and existing age limits for tobacco purchase need to be enforced to deter young people from starting to smoke. • Obesity needs to be addressed. Measures need to be taken to encourage changing dietary habits away from a Western diet with fast food. Excise taxes on sugary drinks could be increased further. Ways to increase physical activity also need to be encouraged. • A strategy to roll out a vaccination program against HPV in children could be considered, as cervical cancer is the eighth most common cancer type in women. • Implementing an HCV screening program for adults along with offering antiviral therapy could be considered to eliminate HCV.
Early detection
• Health literacy in the general population on early symptoms of cancer needs to be improved. More generally, patients need to be encouraged to seek medical advice in the health care system instead of opting for herbal medications upon experiencing symptoms.

- The implementation of nationwide cancer screening programs is currently hampered by the fragmented health system and a lack of coordination between providers. The ongoing transformation of the health system as part of the Saudi Vision 2030 needs to improve this.
- Steps to turn the non-organized breast cancer screening program into an organized one could be taken to improve participation.
- Given the increasing obesity rates, opportunistic colorectal cancer screening could be turned into an organized program to improve participation.

Diagnosis and treatment

- Cancer care provision, in particular cancer surgery and radiation therapy, is highly concentrated in Riyadh, Jeddah, and Dammam. Access to cancer care outside these regions is limited. Few oncologists are available in rural areas, which results in poor quality of care. The current establishment of smaller cancer treatment centers (satellite centers) in more regions is a step in the right direction to overcome geographic disparities and to raise the quality of care.
- 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.
- The most modern diagnostic imaging units, such as PET-CT scanners, are limited to the three main urban regions. Investment in additional scanners could be considered to enable greater patient access to accurate diagnosis. There is also a need to recruit more trained radiologists to analyze the imaging results.
- Access to modern molecular diagnostic testing with NGS outside of the three main urban regions needs to be improved to enable the administration of modern cancer drugs.
- The number of radiation therapy machines is fairly close to recommended standards, but the geographic distribution is inadequate with poor access in rural areas. The planned establishment of smaller cancer treatment centers in more regions could improve the situation.
- The lack of availability of modern cancer drugs has been a long-standing issue, but the situation has improved in recent years. Current availability of modern drugs (targeted therapies and immunotherapies) is good and similar as in Kuwait but lower than in the UAE. Budget constraints still mean that some eligible patients might not receive the latest approved drugs.
- A major shift towards a more value-based assessment of new drugs using HTA to inform reimbursement decisions is underway. This can help in the prioritization of introducing modern cancer drugs by focusing on value-for-money instead of narrowly focusing on prices.
- Clinical trial activity could be promoted to create another route for patients to access modern cancer drugs. Research centers with dedicated drug discovery units could also capitalize on these activities.
- Local drug manufacturing could be expanded and upgraded to be able to produce high-technology drugs such as biologics and CAR-T cell therapies. This could stimulate competition and lower overall drug costs in the long term as well as increase self-sufficiency.

Survivorship

- The few existing psycho-oncology services at certain hospitals could be extended to more facilities and offered to more patients.
- Informal caregivers with regular jobs could be better supported, such as through a right to flexible working arrangements and paid leave.
- The reintegration in the labor market of cancer survivors could be supported by flexible working arrangements.
- Cancer survivors could be protected from discrimination in the acquisition of certain services (e.g., health insurance, life insurance, loans, mortgages), by imposing time limits up to which a previous cancer diagnosis needs to be disclosed.

5.8 South Africa

SOUTH AFRICA – Recommendations
Governance of cancer care
• There is a cancer plan for 2017–2022 with overall objectives focusing on most areas of cancer care. Despite this plan, all activities in cancer care have been overshadowed by COVID-19 since the outbreak of the pandemic. Before the pandemic, cancer had gradually moved up on the priority list of the NDoH. This was possible as the HIV/AIDS epidemic started to be controlled, and greater focus could be put on cancer and other NCDs. The main challenge in the coming years will be to get cancer back on the agenda of the NDoH. • Cancer plans (or NCD plans that include cancer) need to be further developed. An evaluation of the first cancer plan and lessons from it should inform the planning of new plans. New plans will also need to include a dedicated funding plan for all planned actions to improve the commitment to implementation. The newly established population-based cancer registry in Ekurhuleni could be used to monitor the effects of the implementation of different actions.
Organization and financing of health care and cancer care
• Public spending on health care amounts to around 4% of GDP, which falls short of the informal WHO spending target of 5% of GDP. Additional spending to bring the country closer to the benchmark would be needed and should be used to extend the range of care services and improve the quality of care. • Achieving UHC has been a priority. The National Health Insurance proposed in 2012 and submitted as a government bill to the parliament in 2019 has not been enacted yet, which delays moving towards UHC. Currently, most people only have access to a defined set of health care services in public facilities. People with a private health insurance (medical aid scheme) have access to the same or a broader set of services at private facilities. Increasing the health insurance coverage has not been achieved so far, as the population share covered by a medical aid scheme remained unchanged at 17% between 2012 and 2019. Different strategies are needed to break the situation and move towards UHC. • Progress towards UHC is hampered by capacity problems in the public sector driven by shortages of medical staff and equipment. Education and training of new staff needs to be prioritized and go hand in hand with investment in additional medical equipment. • Apart from differences in the cancer care services accessible in the public and the private sector, there are also geographical differences in the quality of cancer care. Part of these differences have historical roots in the old Apartheid system, but they are also caused by differences in the governance of the provincial health authorities. Efforts to ensure a more equitable health care provision all over the country need to be enhanced.
Cancer registration
• Continuing to improve cancer registration is important. The establishment of the population-based cancer registry in Ekurhuleni was a step in the right direction, as it is regarded to provide a representative picture of the whole country. Cancer statistics are now published at yearly intervals and delays in publication have been shortened. Underreporting of new cancer cases still needs to be improved and a switch from a paper-based data collection system to electronic records would help facilitate this. • The registry in Ekurhuleni captures incidence and partly also mortality. A next step would be to get a complete dataset of mortality with identifiable information. This necessitates a linkage to the mortality data collected by the Vital Statistics Department. Due to current confidentiality laws, it is not possible to share this data with the National Cancer Registry. Once full mortality data can be linked to the registry, survival rates would need to be estimated in order to measure and monitor the performance of cancer care.
Prevention
• The fight against tobacco consumption has already borne some fruit with smoking rates starting to decline. Existing age limits for tobacco purchase and smoking bans in public places need continued enforcement. Excise taxes on cigarettes could be increased further.

- Obesity needs to be addressed. Measures need to be taken to encourage changing dietary habits away from fast food. Excise taxes on sugary drinks could be increased further. Ways to increase physical activity also need to be encouraged.
- The launch of the HPV vaccination program for girls in 2014 was a step in the right direction, as cervical cancer is the second most common cancer type in women. The drop in the participation rates since the advent of COVID-19 is a matter of concern and needs to be addressed.
- The hepatitis B immunization coverage in infants needs to be improved in line with the WHO target.

Early detection

- General practitioners need to be better trained to recognize common early symptoms of cancer.
- Health literacy in the general population, and in particular among the rural population, on early symptoms of cancer also needs to be improved.
- Steps to turn opportunistic breast cancer screening into an organized program could be taken to improve participation.
- The current cervical cancer screening program needs to be improved to ensure a more uniform implementation across the whole country. Ways to improve participation also need to be explored.
- The introduction of a colorectal cancer screening program could be considered, given the increasing obesity rates.

Diagnosis and treatment

- In the public sector, there are delays in accessing cancer care services, because patients have to go through a complex referral process from primary to secondary to tertiary care to get access. In the private sector, the referral system functions better. The referral system in the public sector needs to be improved and could draw on learnings from the private sector.
- There is a lack of medical staff, especially in the public sector and in rural areas. Additional education and training of new health care professionals needs to be prioritized. Geographic disparities (both urban vs. rural areas and disparities between provinces) in the availability of trained medical staff also need to be addressed.
- The number of radiation therapy machines meets recommended standards, but there can still be long waiting times in certain areas. The availability of machines capable of providing modern radiation techniques is limited and these techniques are also not included in the PMBs. An assessment of underserved areas could be conducted to determine where the installation of additional machines is of greatest benefit.
- The availability of modern cancer drugs is predominantly (for targeted therapies) or exclusively (for immunotherapies) limited to the private sector. Whether a cancer drug is available in a public hospital depends on listing on the EML. The process to include a new drug on the EML is lengthy. Until recently, the current standard-of-care available on the EML resembled global standards from 20 years ago but this has improved now. Cancer drugs will need continued priority in the development of the EML in the future.
- The decision-making process for listing new drugs on the EML already includes the cost-effectiveness of drugs as one of the main criteria, which contributes to a value-based assessment. A shift towards a more systematic assessment using HTA could be considered to help prioritize modern cancer drugs.

Survivorship

- Existing survivorship programs could be extended to more centers and public support to NGOs already active in the provision of supportive care services could be increased.
- Informal caregivers with regular jobs could be better supported, such as through a right to flexible working arrangements and paid leave.
- The reintegration in the labor market of cancer survivors could be supported by flexible working arrangements.
- Cancer survivors could be protected from discrimination in the acquisition of certain services (e.g., life insurance, loans, mortgages), by imposing time limits up to which a previous cancer diagnosis needs to be disclosed.

5.9 United Arab Emirates

UNITED ARAB EMIRATES – Recommendations
Governance of cancer care
• One priority of the UAE Vision 2021 National Agenda is to achieve a world-class health care system. This has affected all areas of health care, including cancer care and a specific goal to reduce cancer mortality until 2021 has been defined. A national cancer plan prepared by the MOHAP is currently also in place. On the emirate level, there are some additional cancer control plans. Several actions related to improving different areas of cancer care are also part of the national NCD plan for 2017–2021. After 2021, an evaluation of all goals specified in these different plans needs to be carried out. Afterwards, the creation of a new cancer plan should be a priority. This plan would need to draw on the lessons of all previous initiatives.
Organization and financing of health care and cancer care
• Total spending on health care amounts to around 4% of GDP, half of which comes from public sources and the other half from private sources (mostly private insurance expenditure and not out-of-pocket payments). This falls short of the informal WHO spending target of 5% of GDP (which refers to public expenditure, but in the case of the UAE private health insurance expenditure by expatriates should be included here as well). Additional spending on cost-effective measures to increase the quality of care in the country needs to be done. A closer analysis of health spending by disease category could help to evaluate priorities in health spending. • All local citizens have public health insurance coverage, and all expatriates should have compulsory health insurance coverage through their employer. Despite the comprehensive coverage, some people (mostly expatriates in blue-collar jobs) may still remain without coverage. Improving the health insurance to cover really all residents would be important. • Despite health insurance coverage, there is typically an annual cap in insurance payments for health services. Reaching this cap has been a challenge for cancer patients. At least in Dubai, a special fund has solved this issue for patients with certain cancer types. The adequacy of having an annual cap for a highly resource-consuming disease like cancer should be rethought. • Expatriates may be required to be at their workplace physically and find it difficult to get time off for cancer treatment. More flexible work arrangements could be considered to enable expatriates to get their treatment during regular working hours without the risk of losing their jobs and hence their resident status.
Cancer registration
• Cancer registration has been improved in recent years and all health care providers are now linked to the national cancer registry. Cancer statistics for incidence are published at regular intervals but delays in publication are still long and this could be an area for improvement. • Statistics for cancer mortality are available but usually not published alongside incidence. This would need to be changed to get a better idea of the quality of cancer care. A more crucial step that would need to be done is to assess survival (at least for local citizens). This would allow more real-time monitoring and performance assessment of cancer care.
Prevention
• Many efforts have been made in recent years to raise awareness on risk factors and encourage people to adopt a healthy lifestyle. Collaboration between all stakeholders has been good. This work needs to continue and best-practice examples from other countries could be explored further. • The fight against tobacco consumption needs to be stepped up. Early intervention among young people and the enforcement of existing age limits for tobacco purchase are important. Excise taxes on cigarettes could be increased further. • Obesity needs to be addressed. Early interventions among children in school and off school are important. Measures need to be taken to encourage changing dietary habits away from a Western diet with fast food. Excise taxes on sugary drinks could be increased further. Ways to increase physical activity also need to be encouraged.

- The nationwide HPV vaccination program for girls is only free for local citizens. To increase participation, extending the coverage to children of expatriates could be considered.
- Implementing an HCV screening program for adults (possibly only for expatriates) along with offering antiviral therapy could be considered to eliminate HCV.

Early detection

- A main challenge for early detection of cancer is making sure patients access health care when they experience symptoms. Part of this hesitancy to seek care relates to low health literacy in the general population on early symptoms of cancer. Another part relates to cultural barriers in terms of concerns and fear of social stigma of getting diagnosed with cancer. Financial concerns of expatriates in view of losing their job upon diagnosis also contribute to late diagnosis. Ways to overcome all of these barriers need to be explored.
- Steps to turn the three non-organized screening programs for breast cancer, cervical cancer, and colorectal cancer into organized programs could be taken to improve participation. Awareness campaigns, greater use of social media, and providing the screening services for free could be done to promote participation.

Diagnosis and treatment

- Many cancer patients (especially expatriates) lack knowledge on where to seek care and how to navigate through the health care system. Different providers may be involved in the referral process from primary care to specialized care and tertiary care and patients may fall between the cracks. A system with patient navigators would be needed. In addition, a more streamlined pathway model of cancer care could be considered. This includes also improved electronic referral and better communication between hospitals.
- The quality of cancer care services is high and there are comparatively few challenges. Cancer care clinics are staffed with qualified medical personnel and equipped with modern infrastructure, including modern diagnostic imaging and molecular testing facilities, and also the number of radiation therapy machines meets recommended standards. One challenge is the need to continuously train medical staff of all ages to be equipped with the right skills to handle new technologies, both new medical technologies and new IT applications. Continuing medical education and other training needs to be prioritized.
- The regulatory approval process for drugs is fast compared to Kuwait and Saudi Arabia. More modern drugs (targeted therapies and immunotherapies) are also approved and reimbursed than in the other two Gulf countries. While local citizens and white-collar expatriates have full access to reimbursed drugs, the few expatriates without private health insurance have no access at all. Access is restricted among blue-collar expatriates with only basic health insurance coverage.
- Current drug assessments for reimbursement approval do not necessarily focus on cost-effectiveness and the value that drugs provide to patients. Following the examples of Kuwait and Saudi Arabia, a shift towards a more value-based assessment using HTA could be considered to support reimbursement decisions.

Survivorship

- Formal psycho-oncology services could be established or public support to NGOs for providing these services could be increased.
- Informal caregivers with regular jobs could be better supported, such as through a right to flexible working arrangements and paid leave.
- The reintegration in the labor market of cancer survivors could be supported by flexible working arrangements.
- Cancer survivors could be protected from discrimination in the acquisition of certain services (e.g., health insurance, life insurance, loans, mortgages), by imposing time limits up to which a previous cancer diagnosis needs to be disclosed.

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Appendix

Table A1: Exchange rates and PPP factor in 2018 used in the calculation of direct and indirect costs

Country	Exchange rate (Local currency per USD)	PPP conversion factor (International $ per USD)
Algeria	116.59	3.76
Egypt	17.77	4.89
Jordan	0.71	2.23
Kuwait	0.30	2.14
Lebanon	1507.50	1.58
Morocco	9.39	2.67
Saudi Arabia	3.75	2.37
South Africa	13.23	2.15
UAE	3.67	1.75

Notes: PPP = purchasing power parity. Source: WHO (67).

Table A2: List of FDA-approved cancer drugs from January 1, 2017 to November 30, 2020

Date	Year	Active ingredient	ATC code
2017-03-13	2017	ribociclib	L01XE42
2017-03-23	2017	avelumab	L01XC31
2017-03-27	2017	niraparib	L01XX54
2017-04-28	2017	brigatinib	L01XE43
2017-04-28	2017	midostaurin	L01XE39
2017-05-01	2017	durvalumab	L01XC28
2017-07-17	2017	neratinib	L01XE45
2017-08-01	2017	enasidenib	L01XX59
2017-08-17	2017	inotuzumab ozogamicin	L01XC26
2017-08-30	2017	tisagenlecleucel	L01XX71
2017-09-14	2017	copanlisib	L01XX61
2017-09-28	2017	abemaciclib	L01XE50
2017-10-15	2017	axicabtagene ciloleucel	L01XX70
2017-10-31	2017	acalabrutinib	L01XE51
2018-02-14	2018	apalutamide	L02BB05
2018-06-27	2018	binimetinib	L01XE41
2018-06-27	2018	encorafenib	L01XE46
2018-07-20	2018	ivosidenib	L01XX62
2018-08-08	2018	mogamulizumab	L01XC25
2018-09-13	2018	moxetumomab pasudotox	L01XC34
2018-09-24	2018	duvelisib	L01EM04
2018-09-27	2018	dacomitinib	L01XE47
2018-09-28	2018	cemiplimab	L01XC33

2018-10-16	2018	talazoparib	L01XX60
2018-11-02	2018	lorlatinib	L01XE44
2018-11-21	2018	glasdegib	L01XX63
2018-11-26	2018	larotrectinib	L01XE53
2018-11-28	2018	gilteritinib	L01XE54
2018-12-20	2018	calaspargase pegol	L01
2018-12-21	2018	tagraxofusp	L01XX67
2019-04-12	2019	erdafitinib	L01EX16
2019-05-24	2019	alpelisib	L01XX65
2019-06-10	2019	polatuzumab vedotin	L01XC37
2019-07-03	2019	selinexor	L01XX66
2019-07-30	2019	darolutamide	L02BB06
2019-08-02	2019	pexidartinib	L01EX15
2019-08-15	2019	entrectinib	L01XE56
2019-08-16	2019	fedratinib	L01XE57
2019-11-14	2019	zanubrutinib	L01EL03
2019-12-18	2019	enfortumab vedotin	L01XC36
2019-12-20	2019	trastuzumab deruxtecan	L01XC41
2020-01-09	2020	avapritinib	L01EX18
2020-01-23	2020	tazemetostat	L01XX72
2020-03-02	2020	isatuximab	L01XC38
2020-04-10	2020	selumetinib	L01EE04
2020-04-17	2020	tucatinib	L01EH03
2020-04-17	2020	pemigatinib	L01EX20
2020-04-22	2020	sacituzumab govitecan	L01
2020-05-06	2020	capmatinib	L01EX17
2020-05-08	2020	selpercatinib	L01EX22
2020-05-15	2020	ripretinib	L01EX19
2020-06-15	2020	lurbinectedin	L01XX69
2020-07-07	2020	decitabine/cedazuridine	L01
2020-07-24	2020	brexucabtagene autoleucel	L01
2020-07-31	2020	tafasitamab	L01XC35
2020-08-05	2020	belantamab mafodotin	L01XC39
2020-09-04	2020	pralsetinib	L01EX23
2020-11-25	2020	naxitamab	L01

Table A3: Standard monthly dose (SMD) in milligrams of cancer drugs considered in section 4.5

Drug	SMD
Abemaciclib	9,000
Abiraterone acetate	30,000
Afatinib	1,200
Aflibercept	600

Alectinib	36,000
Apalutamide	7,200
Atezolizumab	1,800
Avelumab	1,714
Bevacizumab	1,500
Bortezomib	13
Brigatinib	5,400
Carfilzomib	405
Cemiplimab	500
Ceritinib	13,500
Cetuximab	1,929
Crizotinib	15,000
Dacomitinib	1,350
Daratumumab	2,400
Darolutamide	36,000
Durvalumab	1,500
Elotuzumab	1,500
Erlotinib	4,500
Enzalutamide	4,800
Gefitinib	7,500
Ipilimumab	300
Isatuximab	1,500
Ixazomib	13
Lenalidomide	563
Lorlatinib	3,000
Necitumumab	2,286
Nivolumab	514
Osimertinib	2,400
Palbociclib	2,813
Panitumumab	900
Pembrolizumab	286
Pertuzumab	600
Pomalidomide	90
Ramucirumab	1,000
Ribociclib	13,500
Selinexor	429
Trastuzumab	600
Trastuzumab emtansine	360

Notes: The SMD is based on the recommended dose in milligrams (mg) for a standard patient (70 kg body weight and body surface of 1.8 m^2).

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