

Introduction

Key observations

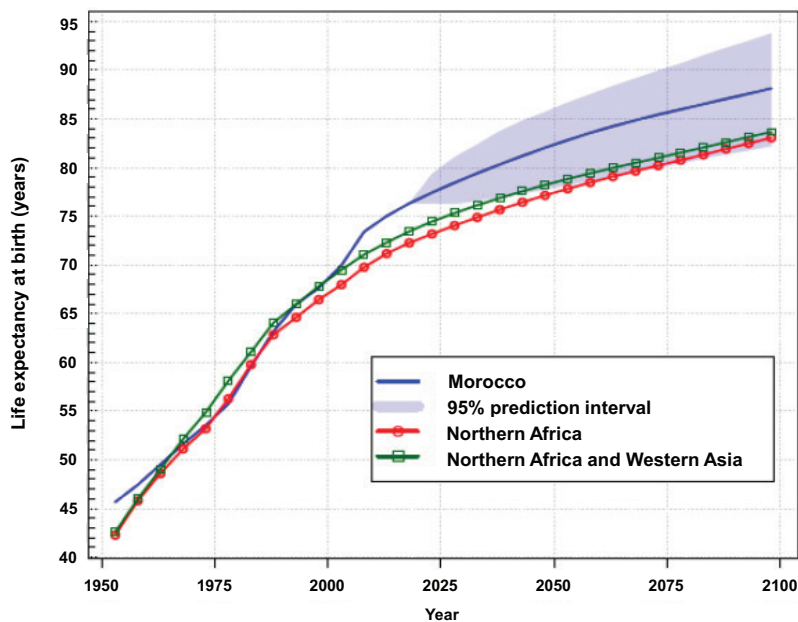
- Several indicators of population health have improved in Morocco in recent years, including maternal and child mortality and life expectancy. High coverage of immunization and other public health measures have eliminated major communicable diseases such as polio, malaria, trachoma, and schistosomiasis in the country.
- Because of changes in the epidemiological profile in Morocco, the disease burden has shifted to noncommunicable diseases (NCDs), including cancer, which are currently responsible for nearly 75% of all deaths.
- The country has also made progress towards universal health coverage (UHC), although with a modest 5.25% of the gross domestic product spent on health in 2017, health-care users are still required to provide a high level of out-of-pocket expenditure.
- Breast cancer is the most commonly diagnosed cancer in Moroccan women, accounting for 35.8% of all new cancer cases in women.
- The first National Plan for Cancer Prevention and Control (2010–2019) enabled major investment in infrastructure and services for the early diagnosis and treatment of cancer. In 2010, Morocco initiated a breast cancer screening programme based on clinical breast examination (CBE).
- In 2016–2017, a quality assurance evaluation of the CBE programme showed that it achieved reasonable coverage of the target population (62.8%), but there was a low breast cancer detection rate (1.0 per 1000 women). Reasons for the low detection rate were identified and interventions put in place to address them.
- Significant efforts have been made under the National Cancer Plan to improve cancer care in general and breast cancer treatment in particular, through the establishment of specialized breast cancer treatment centres, an increase in the number of radiotherapy facilities, improved coverage of health insurance schemes, and the provision of reliable supplies of essential chemotherapeutic drugs.
- This patterns-of-care (POC) study was conducted at the two most prominent publicly funded oncology centres in Morocco: the Centre Mohammed VI pour le traitement des cancers (CM-VI) in Casablanca and the Institut National d’Oncologie Sidi Mohamed Ben Abdellah (INO) in Rabat.

1.1 Demographics, cancer burden, and organization of cancer care in Morocco

Morocco is a lower middle-income country in the Eastern Mediterranean Region with a population of 36.5 million in 2019 (United Nations, 2019). In recent years, several health-care indices have improved significantly in the country after sustained and high investment in health care (WHO, 2018). The life expectancy at birth (both sexes, 2019) is 76.7 years, which is substantially higher than the average life expectancy of 73.8 years reported from other countries in the Northern Africa and Western Asia region (Fig. 1.1) (United Nations, 2019; World Bank, 2020a). High coverage of immunization and other public health measures have eliminated major communicable diseases such as polio, malaria, trachoma, and schistosomiasis in the country. The effectiveness of Morocco's public health programmes is underscored by the accelerated reduction in maternal mortality rates by 78.1% and child (<5 years) mortality rates by 65% between 1990 and 2015. The country has successfully kept the prevalence of HIV/AIDS at a low and relatively stable level (about 0.1% in 2017) in the general population and has a high coverage of antiretroviral therapy for individuals with HIV.

In 2017, Morocco spent 5.25% of its gross domestic product (GDP) on health (World Bank, 2020b). This percentage is modest in comparison with Organisation for Economic Co-operation and Development (OECD) countries, which spend 8.8% on average. The introduction of special health insurance schemes to protect poor and vulnerable people has improved access to health care. Nevertheless, private out-of-pocket expenditure as a proportion of total health expenditure is high (66.1%)

Fig. 1.1. Improvement in life expectancy at birth in Morocco (both sexes combined) compared with neighbouring countries. Source: United Nations (2019). © 2019 United Nations. Reprinted with the permission of the United Nations.



and the private for-profit health sector has a strong presence in the country. In recent years, Morocco has made good progress towards UHC with support from the European Union, World Bank, African Development Bank, and WHO. The Lalla Salma Foundation for Cancer Prevention and Treatment, a major civil society stakeholder, has provided significant support to the Ministry of Health to improve overall cancer care.

1.1.1 Cancer burden in Morocco

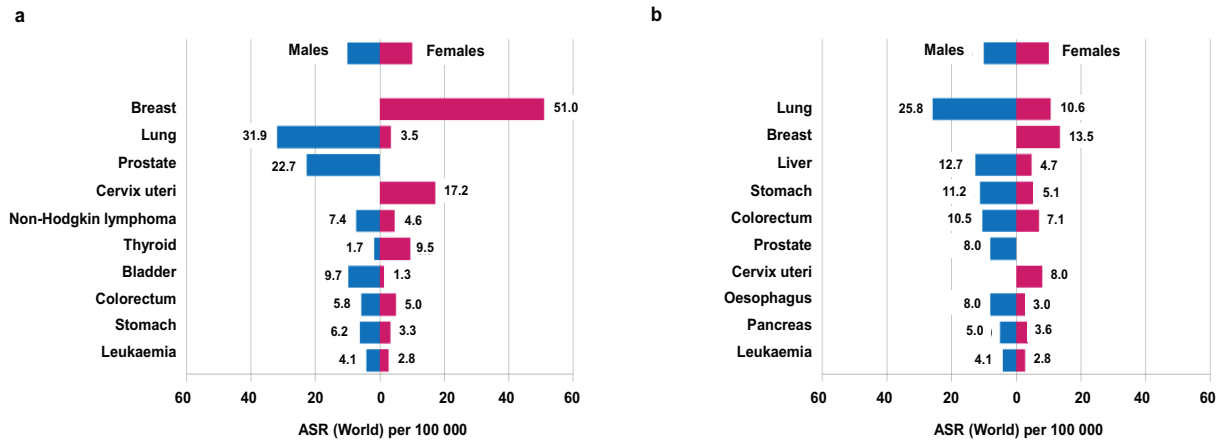
The epidemiological profile of diseases is changing rapidly in Morocco and the burden has shifted to NCDs, which are now responsible for nearly 75% of all deaths. In 2018, IARC estimated that there were 52 783 new cases of cancer and 32 962 cancer deaths (Ferlay et al., 2018). The age-standardized (World) incidence rates of cancer were 140.7 per 100 000 in men and 139.3 per 100 000 in women. The most frequent cancers in men are lung and

prostate cancers, and the most frequent in women are breast and cervical cancers (Fig. 1.2).

1.1.2 Breast cancer burden in Morocco

Breast cancer, the most commonly diagnosed cancer in women, contributes nearly a quarter (24.2%) of all new cancers diagnosed in women worldwide. It is the most frequent of all cancers in 154 of the 185 countries included in GLOBOCAN 2018 (Ferlay et al., 2018). Breast cancer is also the leading cause of cancer death in women worldwide (15.0% of all cancer deaths) (Bray et al., 2018). According to IARC, it is estimated that in 2018 about 2.1 million new cases of breast cancer were diagnosed worldwide and about 627 000 deaths from breast cancer occurred. Nearly 70% of deaths from breast cancer are in low- and middle-income countries (LMICs), where the cancer has a high fatality rate as a result of late diagnosis and

Fig. 1.2. Cancer burden in Morocco (2018). (a) Age-standardized (World) incidence rates per sex, top 10 cancers. (b) Age-standardized (World) mortality rates per sex, top 10 cancers. ASR, age-standardized rate. Source: Reproduced with permission from Ferlay et al. (2018).



suboptimal treatment facilities (Lukong et al., 2017).

The incidence of breast cancer is currently rising, and because of population growth, an ageing population, and increasing adoption of unhealthy lifestyles, countries with the least resources will be hardest hit. For example, the burden of breast cancer is projected to double in Africa by 2030, especially in the absence of effective public health policies and interventions (Ferlay et al., 2010). The existing inequity in access to good-quality cancer diagnostic and treatment services will worsen the situation.

The 5-year survival from breast cancer exceeds 80% in most developed countries but is just 66.3% in sub-Saharan African countries (Joko-Fru et al., 2020).

The poor survival of patients with breast cancer in resource-constrained settings has been ascribed to late presentation, poor health-care infrastructure, and lack of adequate funding because of other competing public health challenges (Pace and Shulman, 2016).

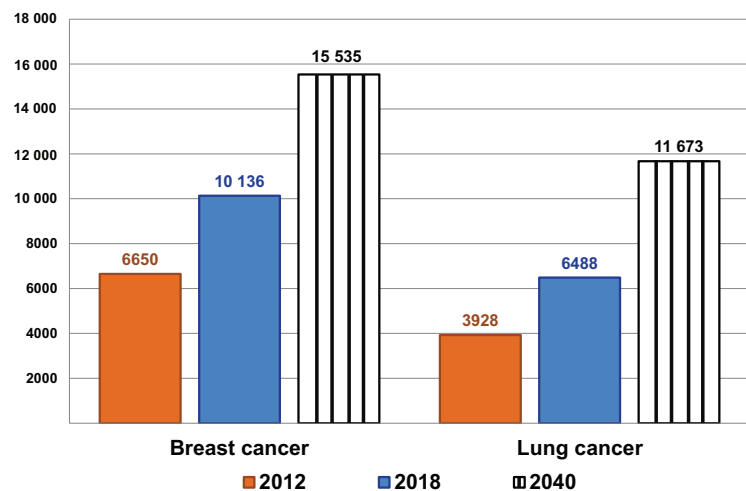
Breast cancer is the most frequent cancer in Moroccan women. According to the Greater Casablanca Cancer Registry report published

in 2016, breast cancer accounted for 35.8% of all new cancer cases in women (Registre des Cancers de la Région du Grand Casablanca, 2016). The age-standardized (World) incidence rate of breast cancer in Moroccan women increased from 35.0 per 100 000 women in 2004 to 43.5 per 100 000 women in 2012 (Registre des Cancers de la Région du Grand Casablanca, 2004, 2016). It has been estimated that by 2040 there will be a further 50% increase

in the number of breast cancers in Morocco, with more than 15 000 new cases detected annually (Fig. 1.3).

Most cases of breast cancer in women (67%) diagnosed between 2005 and 2008 in Rabat, Morocco, were at stages II or III (Mechita et al., 2016). In 2009, the 5-year survival rate reported for patients with breast cancer registered at INO was 81.5% (95% confidence interval [CI], 75.6–86.5%) (Association Lalla Salma de Lutte Contre le Cancer, 2015).

Fig. 1.3. Past and estimated future trends in total new cases detected per year (breast cancer and lung cancer). Source: Reproduced from WHO (2020), © 2020.



1.1.3 Cancer control programme in Morocco and facilities for early detection of breast cancer

The first National Plan for Cancer Prevention and Control (2010–2019) was published by the Moroccan Ministry of Health in 2009 (Association Lalla Salma de Lutte Contre le Cancer, 2009). It aimed to reduce morbidity and mortality rates and improve survival and quality of life of patients with cancer through promotion of prevention and early detection, improvements in diagnosis, treatment, and palliative care services, and building capacity for cancer research. A revised cancer control plan (2020–2029) was published in 2020 (Ministry of Health and Association Lalla Salma de Lutte Contre le Cancer, 2020). The Ministry of Health comprises a central administration located in the capital city of Rabat and regional administrations distributed throughout the country. The Department of Epidemiology and Disease Control, as part of the central administration of the Ministry of Health, is responsible for planning and implementing the National Cancer Plan and oversees the treatment of cancer patients. Seven university hospital centres (in Rabat, Casablanca, Fes, Marrakesh, Oujda, Agadir, and Tangier) and three regional oncology centres (in Meknes, Beni Mellal, and Laayoune) deliver oncology care in the public sector. The university hospital centres are under the auspices of the Ministry of Health with total financial autonomy. The regional oncology centres are under the supervision of regional directors of health.

The first National Cancer Plan enabled major investment in infrastructure and services for the early diagnosis and treatment of cancer. In 2010, a breast cancer screening programme that aimed to screen all

women aged 40–69 years with CBE once every 2 years was launched. Cancer diagnostic centres equipped with digital mammography, breast ultrasound, core biopsy, and fine-needle aspiration cytology (FNAC) were set up to investigate women who had been diagnosed with breast cancer on CBE. Today, 46 such centres have been opened in different regions of the country. A structured evaluation of the programme in 2016–2017 showed that it achieved reasonable coverage of the target population (IARC, 2017). In 2015, 62.8% of the target population was covered, 3.2% were found to be positive on CBE, the compliance of screen-positive women to further assessment was 34.1%, and the breast cancer detection rate was 1.0 per 1000 women (Basu et al., 2018). The low breast cancer detection rate was attributed primarily to the reluctance of screen-positive women to attend for further assessment.

An institute dedicated to cancer research (Institut de Recherche sur le Cancer [IRC]) was established in Fes to improve research capacity, generate scientific data that are more relevant nationally, and promote evidence-based practices in oncology care.

1.1.4 Oncology care facilities in Morocco

Regional oncology centres are the major tertiary-care oncology hospitals in the public sector in Morocco; a total of 11 have been built across the regions. Most of these centres are well equipped with cancer diagnostic and treatment facilities. A recent assessment of cancer control capacities in Morocco by WHO reported that there are 53.0 computed tomography scanners, 22.7 magnetic resonance imaging (MRI) scanners, 8.0 external beam radiation therapy (EBRT) machines, and 2.3 positron

emission tomography (PET) or PET/computed tomography scanners per 10 000 cancer patients (WHO, 2020). There are fewer than two public cancer centres per 10 000 cancer patients in the country. The Ministry of Health has made special efforts to improve access to oncology care and minimize noncompliance to treatment. Free chemotherapeutic drugs are supplied, particularly for uninsured and poorer patients, and 12 special dormitories have been created to accommodate children with cancer and their families. The national chemotherapy guideline, which was first drafted in 2011, is updated every 2 years (most recent version: June 2019) to harmonize cancer treatment across the regional oncology centres (Association Marocaine de Formation et de Recherche en oncologie médicale, 2019).

Although several measures to improve palliative care in the country have been introduced, access to pain medications and palliative care for patients with cancer is still limited. At present, only CM-VI and INO have established palliative care units. A home-based palliative care unit with a mobile team comprising 35 general practitioners and 32 nurses has been piloted in Rabat. The National Health Policies set out a vision for the development of palliative care through the inclusion of pain management and palliative care in the reformed undergraduate medical curriculum and through improving access to opioid analgesics by minimizing regulatory barriers.

1.2 POC studies and their significance

1.2.1 Definition of POC studies

POC studies in oncology examine practice patterns, treatment-related mortality, survival, and their predictors (Moreno et al., 2017). The United

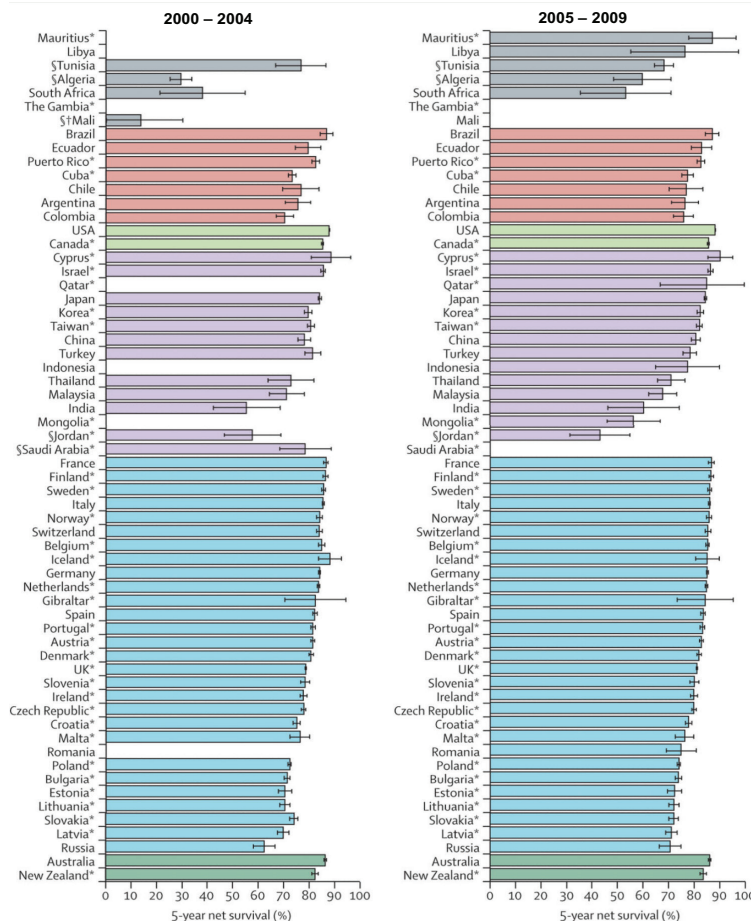
States National Cancer Institute has defined the following primary goals of POC studies (National Cancer Institute, 2020):

- to evaluate how far state-of-the-art cancer diagnostics and therapy have been disseminated into routine oncology practice; and
- to identify patient-, provider-, and health system-level factors associated with receipt and utilization of diagnostic and therapeutic oncology care and palliative services.

Delivering oncology services with quality and equity is essential to avoid cancer health disparities. Oncology centres in LMICs often struggle to provide good-quality care because they have inadequate infrastructure, lack of competent staff, irregular or poor supply of drugs, limited compliance to evidence-based management protocols, and poor record maintenance. A large number of patients disproportionate to the existing infrastructure often overburdens the health facilities and

reduces the efficiency of services. Suboptimal care becomes the status quo because there is no culture of auditing the oncology services and there is no structured plan to improve quality of services. A POC study can highlight these deficiencies and help all relevant stakeholders to review the cancer care continuum in a more objective manner. Documentation of patient profiles, practice patterns, survival rates, and their determinants over a period of time enables the health system to understand the impact of measures taken to improve the quality of cancer care.

Fig. 1.4. Global distribution of age-standardized 5-year net survival for women diagnosed with breast cancer during 2000–2004 and 2005–2009, grouped by continent and country. * 100% coverage of the national population. † National estimate not age-standardized. § National estimate flagged as less reliable because the only estimate or estimates available are from a registry or registries in this category. Source: Copyright © 2015 Allemani et al. (2015). Open Access article distributed under the terms of CC BY. Published by Elsevier Ltd.



1.2.2 POC studies on breast cancer

Breast cancer is an excellent model for POC studies because the treatment is highly standardized, evidence-based, and very effective when delivered following the proper clinical practice guidelines. Stage-appropriate treatment substantially improves not only survival but also quality of life. Depending on the quality of diagnostic and therapeutic care, breast cancer survival may vary widely, as documented in the CONCORD programme for global surveillance of cancer survival. The age-standardized 5-year net survival in women diagnosed with breast cancer during 2005–2009 varied from more than 80% in 34 high-resource countries to less than 60% in Mongolia (57%) and South Africa (53%) (Fig. 1.4) (Allemani et al., 2015).

A systematic review and meta-analysis estimated a pooled 5-year survival rate of 71% (95% CI, 68–73%) for patients with breast cancer in the Eastern Mediterranean Region; substantially higher rates were observed in countries with high Human Development Index (HDI) (Maajani et al., 2020). Survival estimates are not easily available for

African countries, especially those in the sub-Saharan region. In 2011, IARC reported a dramatically low 5-year age-adjusted relative survival rate of only 10% for patients with breast cancer in The Gambia diagnosed between 1990 and 2001 (Sankaranarayanan and Swaminathan, 2011).

A clear improvement in survival has been reported worldwide in the past two decades, thanks to the use of treatment individualized to clinical and molecular profiles of cancer, adjuvant chemotherapy, adjuvant radiotherapy, endocrine therapy, and targeted therapy. A POC study can document the changes in patient characteristics, tumour characteristics, and the system of care over time and across different centres. In a retrospective multicentre study from Europe, the United Kingdom, and Sweden, the authors described the great variation in practices used to treat patients with locally advanced breast cancer and the main factors influencing the treatment strategies (Sinacki et al., 2011). Another POC

study from Norway examined the time trends of availability of estrogen receptor (ER) analysis and tamoxifen use in women with ER-positive stage II breast cancer between 1980 and 1989. This study reported an increased use of tamoxifen over time (from 18% in 1980 to 51% in 1989), but it also found that surgeons were reluctant to follow the national recommendation published in 1981 to treat all women with ER-positive cancer with tamoxifen (Raabe et al., 1997). Only 58% of patients with breast cancer had ER analysis in the study period, and tamoxifen was prescribed to just 75% of the eligible patients. Thus, POC studies identify the gaps between evidence-based recommendations and real-world practices, and by doing so provide specific guidance to policy-makers and care-providers on areas with scope for improvement.

1.3 POC study in Morocco

As part of the efforts to provide high-quality care under the Nation-

al Cancer Plan (2010–2019), specialized gynaecological and breast cancer centres were established at CM-VI and INO. Details of the diagnostic and treatment infrastructure and specialized human resources available for breast cancer management at CM-VI and INO are shown in Table 1.1. IARC, in collaboration with the Ministry of Health and the Lalla Salma Foundation for Cancer Prevention and Treatment, conducted a retrospective POC study on breast cancer at CM-VI and INO from 2008 to 2017. The centres were selected because of their capacity to provide specialized comprehensive care to patients with breast cancer in a public health-care setting. These are the two largest oncology centres in the country by the number of cancer patients registered every year. The outcomes of the POC study conducted in these two centres will enable readers to understand the quality of care achievable for patients with breast cancer in the public sector in Morocco and how practices have changed over time.

Table 1.1. Diagnostic and therapeutic facilities and human resources at the centres selected for the patterns-of-care study in Morocco

Characteristics	CM-VI	INO
General information		
Public or private	Public	Public
Year of establishment	Established in 1929 and renovated in 2008	1985
Specialized breast cancer unit	Yes (inaugurated in 2013)	Yes (inaugurated in 2013)
Diagnostic facilities		
Mammography	Yes (1)	Yes (2)
Computed tomography scanner	No (available at the University Hospital ^a)	Yes (2)
MRI scanner	No (available at the University Hospital ^a)	Yes (1)
PET or PET/computed tomography scanner	No (available at the University Hospital ^a)	No
Histopathology facility	No (available at the University Hospital ^a)	Yes
Immunohistochemistry facility	No (available at the University Hospital ^a)	Yes
Frozen section biopsy facility	No	No
Treatment facilities		
Total number of beds for oncology patients	60	100
Outpatient chemotherapy chairs	30	30
Types of radiotherapy machines (numbers)	3D conformal radiotherapy (3) Intensity-modulated radiation (1) HDR brachytherapy (1)	3D conformal radiotherapy (3) Intensity-modulated radiation (1) Stereotactic radiotherapy (1) HDR brachytherapy (1)
Sentinel node biopsy facilities	No	Yes
MTB and meeting frequency	Yes; held once per week (selected breast cancer cases are referred)	Yes; held once per week (all new breast cancer cases are referred)
Treatment guidelines	Follows national chemotherapy protocol Follows own radiotherapy protocol	Follows national chemotherapy protocol Development of protocol for oncosurgery is in progress
Human resources (number)		
Surgical oncologists	13	8
Medical oncologists	10	10
Radiation oncologists	37	18
Radiation physicists	5	5
Radiotherapy technicians	26	20
Nurses trained in oncology care	7	42

CM-VI, Centre Mohammed VI pour le traitement des cancers; 3D, three-dimensional; HDR, high-dose-rate; INO, Institut National d'Oncologie Sidi Mohamed Ben Abdellah; MRI, magnetic resonance imaging; MTB, multidisciplinary tumour board; PET, positron emission tomography.

^a University Hospital, Casablanca is a public sector tertiary care centre adjacent to CM-VI.

References

- Allemani C, Weir HK, Carreira H, Harewood R, Spika D, Wang XS, et al.; CONCORD Working Group (2015). Global surveillance of cancer survival 1995-2009: analysis of individual data for 25,676,887 patients from 279 population-based registries in 67 countries (CONCORD-2). *Lancet*. 385(9972):977-1010. [https://doi.org/10.1016/S0140-6736\(14\)62038-9](https://doi.org/10.1016/S0140-6736(14)62038-9) PMID:25467588
- Association Lalla Salma de Lutte Contre le Cancer (2009). Plan national de prévention et de contrôle du cancer 2010-2019. Rabat, Morocco: Association Lalla Salma de Lutte Contre le Cancer. Available from: https://www.contrelecancer.ma/site_media/uploaded_files/PNPCC_-_Axes_strategiques_et_mesures_2010-2019.pdf.
- Association Lalla Salma de Lutte Contre le Cancer (2015). Etude de la survie des patientes atteintes du cancer du sein. Rabat, Morocco: Association Lalla Salma de Lutte Contre le Cancer.
- Association Marocaine de Formation et de Recherche en oncologie médicale in partnership with Fondation Lalla Salma-Prévention et traitement des cancers (2019). Guide des protocoles thérapeutiques en oncologie. Rabat, Morocco: Institut National d'Oncologie. Available from: http://www.ressma.com/Documentation/Cours/2015/RESSMAJ6/PROTOCOLES_THERAPEUTIQUESNONCOLOGIE.pdf.
- Basu P, Selmouni F, Belakhel L, Sauvaget C, Abousselham L, Lucas E, et al. (2018). Breast Cancer Screening Program in Morocco: status of implementation, organization and performance. *Int J Cancer*. 143(12):3273-80. <https://doi.org/10.1002/ijc.31749> PMID:30006933
- Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A (2018). Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin*. 68(6):394-424. <https://doi.org/10.3322/caac.21492> PMID:30207593
- Ferlay J, Ervik M, Lam F, Colombet M, Mery L, Piñeros M, et al. (2018). Global Cancer Observatory: Cancer Today. Lyon, France: International Agency for Research on Cancer. Available from: <https://gco.iarc.fr/today>.
- Ferlay J, Shin HR, Bray F, Forman D, Mathers C, Parkin DM (2010). Estimates of worldwide burden of cancer in 2008: GLOBOCAN 2008. *Int J Cancer*. 127(12):2893-917. <https://doi.org/10.1002/ijc.25516> PMID:21351269
- IARC (2017). Programme de dépistage des cancers du sein et du col de l'utérus du Maroc – Etat de la mise en œuvre, organisation et résultats. Lyon, France: International Agency for Research on Cancer. Available from: <https://screening.iarc.fr/doc/MoroccoScreeningReport2019.pdf>.
- Joko-Fru WY, Miranda-Filho A, Soerjomataram I, Egue M, Akele-Akpo M-T, N'da G, et al. (2020). Breast cancer survival in sub-Saharan Africa by age, stage at diagnosis and human development index: a population-based registry study. *Int J Cancer*. 146(5):1208-18. <https://doi.org/10.1002/ijc.32406> PMID:31087650
- Lukong KE, Ogunbolude Y, Kamdem JP (2017). Breast cancer in Africa: prevalence, treatment options, herbal medicines, and socioeconomic determinants. *Breast Cancer Res Treat*. 166(2):351-65. <https://doi.org/10.1007/s10549-017-4408-0> PMID:28776284
- Maajani K, Khodadost M, Fattahi A, Pirouzi A (2020). Survival rates of patients with breast cancer in countries in the Eastern Mediterranean Region: a systematic review and meta-analysis. *East Mediterr Health J*. 26(2):219-32. <https://doi.org/10.26719/2020.26.2.219> PMID:32141601
- Mechita NB, Tazi MA, Er-Raki A, Mrabet M, Saadi A, Benjaafar N, et al. (2016). Survie au cancer du sein à Rabat (Maroc) 2005-2008. [Survival rate for breast cancer in Rabat (Morocco) 2005-2008]. *Pan Afr Med J*. 25:144. <https://doi.org/10.11604/pamj.2016.25.144.10402> PMID:28292106
- Ministry of Health and Association Lalla Salma de Lutte Contre le Cancer (2020). Plan national de prévention et de contrôle du cancer 2020-2029. Rabat, Morocco: Association Lalla Salma de Lutte Contre le Cancer. Available from: <https://www.contrelecancer.ma/en/documents/plan-national-de-prevention-et-de-contrôle-du-cancer/>.
- Moreno AC, Verma V, Hofstetter WL, Lin SH (2017). Patterns of care and treatment outcomes of elderly patients with stage I esophageal cancer: analysis of the National Cancer Data Base. *J Thorac Oncol*. 12(7):1152-60. <https://doi.org/10.1016/j.jtho.2017.04.004> PMID:28455149
- National Cancer Institute (2020). Patterns of care studies. Bethesda (MD), USA: National Cancer Institute. Available from: <https://healthcaredelivery.cancer.gov/poc/>.
- Pace LE, Shulman LN (2016). Breast cancer in sub-Saharan Africa: challenges and opportunities to reduce mortality. *Oncologist*. 21(6):739-44. <https://doi.org/10.1634/theoncologist.2015-0429> PMID:27091419

- Raabe NK, Kaaresen R, Fosså SD (1997). Analysis of adjuvant treatment in postmenopausal patients with stage II invasive breast carcinoma – a pattern of care study and quality assurance of 431 consecutive patients in Oslo 1980-1989. *Acta Oncol.* 36(3):255–60. <https://doi.org/10.3109/02841869709001259> PMID:9208893
- Registre des Cancers de la Région du Grand Casablanca (2004). Registre des Cancers de la Région du Grand Casablanca année 2004. Casablanca, Morocco: Registre des Cancers de la Région du Grand Casablanca. Available from: <https://www.contrelecancer.ma/fr/documents/registre-des-cancers-de-la-region-du-grand-casabla/>.
- Registre des Cancers de la Région du Grand Casablanca (2016). Registre des Cancers de la Région du Grand Casablanca pour la période 2008–2012. Casablanca, Morocco: Registre des Cancers de la Région du Grand Casablanca. Available from: https://www.contrelecancer.ma/site_media/uploaded_files/RCRGC.pdf.
- Sankaranarayanan R, Swaminathan R, editors (2011). *Cancer survival in Africa, Asia, the Caribbean and Central America*. Lyon, France: International Agency for Research on Cancer (IARC Scientific Publication No. 162). Available from: <https://publications.iarc.fr/317>.
- Sinacki M, Badzio A, Wełnicka-Jaśkiewicz M, Bogaerts J, Piccart MJ, Therasse P, et al. (2011). Pattern of care in locally advanced breast cancer: focus on local therapy. *Breast.* 20(2):145–50. <https://doi.org/10.1016/j.breast.2010.08.008> PMID:20870406
- United Nations (2019). *World population prospects 2019, Vol. II: Demographic profiles*. New York (NY), USA: United Nations Department of Economic and Social Affairs, Population Division. Available from: https://population.un.org/wpp/Publications/Files/WPP2019_Volume-II-Demographic-Profiles.pdf.
- WHO (2018). *Country cooperation strategy. Morocco*. Geneva, Switzerland: World Health Organization. Available from: https://apps.who.int/iris/bitstream/handle/10665/136949/ccsbrief_mar_en.pdf?jsessionid=A1C5CD B7542C96EAEEDB79AF9516E99F?sequence=1.
- WHO (2020). *Cancer profile 2020*. Geneva, Switzerland: World Health Organization. Available from: https://www.iccp-portal.org/system/files/plans/MAR_2020.pdf.
- World Bank (2020a). *Life expectancy at birth, total (years)*. Washington (DC), USA: World Bank. Available from: https://data.worldbank.org/indicator/SP.DYN.LE00.IN?name_desc=true.
- World Bank (2020b). *Current health expenditure (% of GDP) – Morocco*. Washington (DC), USA: World Bank. Available from: <https://data.worldbank.org/indicator/SH.XPD.CHEX.GD.ZS?end=2017&locations=MA&start=2017&view=bar>.