

# Chapter 6

## General Oncology Care in Jordan



Sami Khatib and Omar Nimri

### 6.1 Jordan Demographics

The Hashemite Kingdom of Jordan is an Arab country in the levant region of western asia. Jordan is bordered by Syria on the North, Palestine (west bank) to the west and Iraq, Saudi Arabia on the east south frontiers. The Dead Sea is located along its western borders and it is the deepest inhabitation on earth below sea level. Jordan is advantageously located at the crossroads of Asia, Africa, and Europe. The country was allocated into 12 governorates. Amman, the capital of the country, is the most populous city as well as the country's economic, political, and cultural center.

After experiencing a period of fast population growth from 2000 to 2020, which increased the population by over five million people, the Jordan population is expected to continue growing. The population is expected to peak at 14.15 million people by 2050. In 2015, a true census showed Jordan inhabited with around nine and half million dwellers, where three million are non-Jordanians and refugees [1]. Jordan is home to Palestine refugees given Jordanian citizenship; Jordan also hosts around 1.4 million Syrian refugees who fled to the country due to the Syrian Civil War since 2011. Yemenis, Libyan, and thousands of Lebanese refugees live in Jordan. Up to one million Iraqis came to Jordan following the Iraq War in 2003; their counts are much less now [2].

Figures 6.1 and 6.2 show Jordan's demographic figures and health indicators [2]. Jordan is classified as a country of “high human development” with an “upper middle income” economy. In the most recent update, Jordan has been reclassified from upper-middle-income to lower-middle-income [3].

---

S. Khatib  
Clinical Oncologist, Arab Medical Association Against Cancer (AMAAC), Amman, Jordan

O. Nimri (✉)  
Cancer Prevention Department, Jordan Cancer Registry, Ministry of Health, Amman, Jordan  
e-mail: [onimri@moh.gov.jo](mailto:onimri@moh.gov.jo)

		Sex ratio	
Population	2015 census: 9,531,712 2019 estimate: 10,392,309	Total	1.02 male(s)/female (2016 est.)
Density	116/km <sup>2</sup> (300/sq mi)	At birth	1.06 male(s)/female
Growth rate	2.05% (2017 est.)	Under 15	1.05 male(s)/female
Birth rate	23.9 births/1,000 population (2017 est.)	15-64 years	1.00 male(s)/female
Death rate	3.4 deaths/1,000 population	65 and over	0.89 male(s)/female
Life expectancy	74.8 years (2017 est.)	Nationality	
- male	73.4 years	Nationality	Jordanians
- female	76.3 years	Major ethnic	Arab
Fertility rate	2.7 children born/woman (2018 est.)	Minor ethnic	Armenians, Chechens, Circassians
Age structure		Language	
0-14 years	34.68%	Official	Arabic
15-64 years	61.87%	Spoken	Arabic, English
65 and over	3.45%		

Fig. 6.1 Demographics of Jordan [2]. Copyright to Demographics of Jordan, [wikipedia.org/wiki/Demographics\\_of\\_Jordan#Population\\_growth\\_rate](https://www.wikipedia.org/wiki/Demographics_of_Jordan#Population_growth_rate)

Health الصحة				
مؤشرات صحية مختارة، 2017-2019 Selected Health Indicators, 2017-2019				
Indicator	2019	2018	2017	المؤشر
No. of Hospitals	118	116	116	عدد المستشفيات
No. of Beds	14,536	14,701	14,779	عدد الأسرة
Population Per Bed	726	701	680	عدد السكان لكل سرير
No. of Pharmacies	3,176	3,019	2,838	عدد الصيدليات
Population Per Pharmacy	3,323	3,415	3,542	عدد السكان لكل صيدلية
**Physicians Per (0000)	24.8	19.8	22.5	**الأطباء لكل (10000) مواطن
** Source: Jordanian Medical Syndicate. ** المصدر: نقابة الأطباء الأردنيين.				
الإدخالات في مستشفيات وزارة الصحة، 2017-2019 Admissions at the Ministry of Health Hospitals, 2017-2019				
Particulars	2019	2018	2017	التفاصيل
Admissions (000)	412.1	401.6	388.2	الإدخالات (بالألف)
Discharged Alive (000)	404.7	394.8	381.7	الإخراجات أحياء (بالألف)
Surgical Operations (000)	99.1	97.9	90.6	العمليات الجراحية (بالألف)
Deliveries (000)	74.6	78.8	80.5	حالات الولادة (بالألف)
Beds Annual Occupancy Rate	69.0	69.2	66.2	معدل إشغال الأسرة السنوي

Fig. 6.2 Selected health indicators [1]. Copyright to [dos.gov.jo/DataBank/JordanInFigures-Jorinfo\\_2019.pdf](https://dos.gov.jo/DataBank/JordanInFigures-Jorinfo_2019.pdf) (dos.gov.jo)

المشتغلون في المهن الطبية والمساعدة في وزارة الصحة، 2016-2019\*  
**Medical and Related Professional Employees at the Ministry of Health, 2016-2019**

Particulars	2019	2018	2017	2016	التفاصيل
No. of Physicians	5,694	5,838	4,924	4,798	عدد الأطباء
No. of Dentists	725	743	752	782	عدد أطباء الأسنان
No. of Pharmacists	827	805	734	723	عدد الصيادلة
No. of Nurses (Male & Female)	8,336	8,578	7,571	7,987	عدد الممرضين والممرضات
No. of Midwives	1606	1612	1,467	1,531	عدد القابلات القانونيات

\*Source: Ministry of Health.

Department of Statistics, Jordan

\*المصدر: وزارة الصحة.  
 دائرة الإحصاءات العامة، الأردن

**Fig. 6.2** (continued)

## 6.2 Cancer Statistics in Jordan

Jordan cancer statistics were obtained from the hospital-based registry; the only data source on cancer patients was from the main Ministry of Health referral hospital, “Basheer Hospital” where cancer patients were treated.

Later, Jordan Cancer Registry (JCR), a population-based cancer registry, was established in 1996 under the jurisdiction of the Ministry of Health (MOH), by the order of His Excellency the Minister of Health. JCR is a unit of the Cancer Prevention Department in the Non-Communicable Disease Directorate. Cancer notification has been compulsory since 1996 through a ministerial decree. JCR monitors cancer incidence rates and cancer trends in Jordan. The aim of JCR is to provide national cancer incidence data to the public in a timely and accurate manner. JCR also provides data for clinical and epidemiological research. The JCR cancer data collected from all health sectors in the country have more than 95% coverage.

Annual cancer incidence report for both Jordanian and non-Jordanians is released showing the epidemiology of the cancer burden in the kingdom for a specific period (1 year), and the last issued report is of the 2016 data, which shows the following cancer figures in Fig. 6.3.

The total number of cancer cases registered for the year 2016 was 8152 cases; out of them, 5999 cases were Jordanian (73.6%) and the other 2153 were among the non-Jordanian population (26.4%). The crude incidence rate among males was 80.2 and in females, it was 94.5; and it was 87.2 for both genders/100,000 population [4]. Standard rates were 135.6 for both genders. 131 for males and 138.2 for females/100,000. The median age at diagnosis was 59 for males and 53 years for females. Pediatric cancers accounted for 236 of both genders, which is 3.9% of the total cancers registered among the Jordanian population [4]. The crude incidence

No of cases	Male	Female	Total
Total cases	3889	4263	8152
Jordanian.	2815	3184	5999
Non-Jordanian.	1069	1084	2153
Pediatric age group o < 15 years-Jor.	138	98	236
Crude incidence Rate-Jor.	80.2	94.5	87.2
Age standardized Rate-Jor.	131	138.2	135.6
Median age at diagnosis-Jor.	59	53	56

**Fig. 6.3** Summary of Number of cancer cases in Jordan –2016 data. (Jordan Cancer Registry) [4]. The 21st annual report of 2016 data. Copyright of this figure to Jordan cancer Registry, Report

**Table 6.1** Number of cancer and crude incidence rates by governorates and gender, 2016 [4]

Governorate	Male		Female		Total		
	N	CR	N	CR	N	CR	%
Amman	1600	72.3	1863	97.7	3463	84.1	57.7
Balqa	159	58.6	177	75.6	336	66.5	5.6
Zarka	317	42.7	330	49.9	647	46.1	10.8
Madaba	66	64.2	67	73.1	133	68.4	2.2
Central region	2142	64.4	2437	84.2	4579	73.6	76.3
Irbid	351	37.3	381	43.3	732	40.2	12.2
Mafraq	80	27.4	61	22.3	141	24.9	2.4
Jarash	40	31.6	70	59.8	110	45.1	1.8
Ajloun	36	38.6	51	58.1	87	48.1	1.5
North Region	507	34.9	563	41.5	1070	38.1	17.8
Karak	64	37.6	78	50.2	142	43.6	2.4
Tafiela	25	48.3	25	53.0	50	50.5	0.8
Maan	24	31.0	25	35.4	49	33.1	0.8
Aqaba	37	33.8	38	45.2	75	38.8	1.3
South Region	150	36.7	166	46.5	316	41.3	5.3
Out side	16		18	97.7	34		0.6

Crude incidence Rate (CR, crude rate)/100,000 pop

The 21st annual report of 2016 data. Copyright of this table to Jordan cancer Registry Report

rates in the different governorates by gender are shown in Table 6.1 which shows the high rates in the central region compared with both northern and south regions of the Jordanian population. The top 10 cancers and their ranks among the male and female population are shown in Figs. 6.4 and 6.5. The top 10 pediatric cancers are shown in Fig. 6.6.

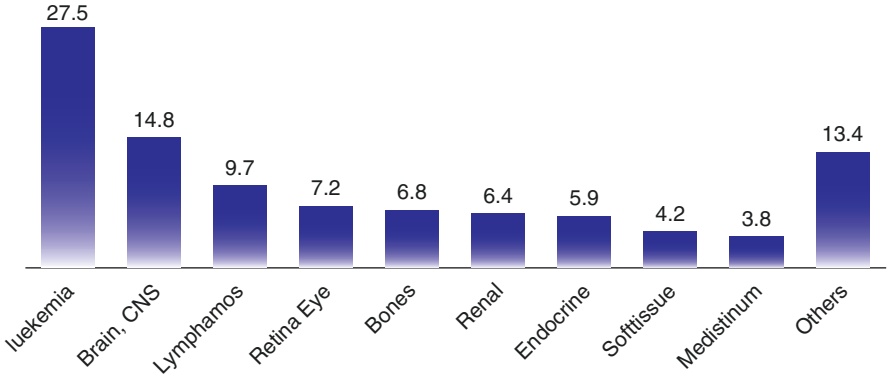
The number of deaths due to cancer was 3084 (16.2%) out of the 19,676 registered mortalities. The male-to-female ratio was 1.2:1. The median age for mortality due to cancer was 63 years (65 years for males and 61 for females) [4].

No	Site	Freq	%
1	Trachea, Bronchus, Lung	362	12.9
2	Colorectal	335	11.9
3	Prostate	234	8.3
4	Bladder	226	8.0
5	Non-Hodgkin lymphoma	153	5.4
6	Leukemia	127	4.5
7	Stomach	91	3.2
8	Larynx	85	3.0
9	Kidney	82	2.9
10	Brain, Nervous system	82	2.9

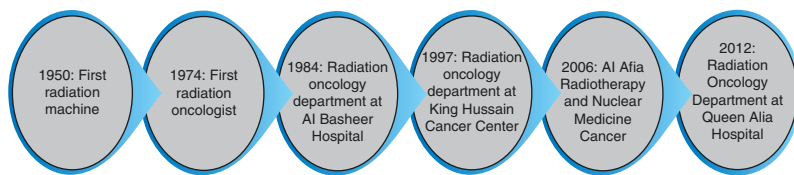
**Fig. 6.4** Top 10 cancers among males. Jordan 2016. (Jordan Cancer Registry) [4]. The 21st annual report of 2016 data. Copyright of this fig to Jordan cancer Registry, Report

No	Site	Freq	%
1	Breast	1263	39.7
2	Colorectal	308	9.7
3	Thyroid	202	6.3
4	Corpus Uteri	134	4.2
5	Non-Hodgkin lymphoma	111	3.5
6	Ovary	96	3.0
7	Trachea, Bronchus, Lung	86	2.7
8	Hodgkin disease	79	2.5
9	Brain, Nervous system	65	2.0
10	Stomach	58	1.8

**Fig. 6.5** Top 10 cancers among females. Jordan 2016. (Jordan Cancer Registry) [4]. The 21st annual report of 2016 data. Copyright of this fig to Jordan cancer Registry, Report



**Fig. 6.6** Top 10 pediatric cancers among both genders. Jordan 2016 (Jordan Cancer Registry) [4]. The 21st annual report of 2016 data. Copyright of this fig to Jordan cancer Registry, Report



**Fig. 6.7** Stage in development the milestones of radiation oncology in Jordan since 1950 [5]. Copyright to, History and Current State of Radiation Oncology Services and Practice in Jordan

Since the late 1950s, efforts have resulted in an ever-growing RT practice in Jordan. As a result, four cancer care facilities with cutting-edge technology has been successfully established as shown in Fig. 6.7 [5].

In 1967, the radiology department at the Ashrafef hospital (AL Basheer Now) was expanded with the arrival of its first external beam radiotherapy machines that used gamma rays from cobalt-60 to treat cancer cells [5]. The MOH had no qualified radiation oncologists until 1974 when the International Atomic Energy Agency (IAEA) hired a Polish radiation oncologist to work at Al Basheer Hospital (Ashrafef at that time). In 1987, the first resident joined the newly created radiation residency program.

The initiation and foundation of the King Hussein Cancer Center (KHCC) in 1997 was a major boost to the already growing radiation and oncology practice in Jordan. Currently, in Jordan, there are four Radiation Therapy Facilities, in the public sector (Ministry of Health) and the royal military services, private sector, and the KHCC (Non-Governmental Organizations NGOs) with a short new installment in the King Abdullah Hospital in the northern city, Irbid.

### 6.3 Healthcare System in Jordan

The healthcare system in the country is covered by different health sectors, public, military, private, and teaching hospitals as well as some NGOs and nonprofit health facilities. The whole spectrum of healthcare is available in Jordan, inequality, and inequity of those services to the vast public is one of the major obstacles and challenges faced by the health system sector that echoed on the population health.

### 6.4 Oncology Care in Jordan

Cancer care and treatment are provided in the different health sectors with diverse plans; in Jordan, the King Hussein Cancer Center (KHCC), a specialized cancer center with accreditation and moral reputation delivers a standard cancer treatment protocol.

Diagnosis and treatment of cancer are costly, though Jordanian citizens holding a national number are being treated in the Ministry of Health hospitals. Furthermore, references to other health facilities can be made including the King Hussein Cancer Center if service is needed. On government financial coverage, or cost exemptions granted by the royal court to the cancer patients as well as other diseases too. These dispensation canons can be applied to non-national in selected incidents.

## 6.5 Cancer Risk Factors

The major well-known risk factor is the consumption of the most incriminated cause i.e., tobacco smoking. Tobacco use, not only the cigarettes but also all different tobacco types and other forms like oriental tobacco narghile, shisha or cigars, and the electronic cigarettes recently among many others are risk factors for different cancers and other diseases too [6–8]. According to the Stepwise Survey conducted in 2019, Jordanian males' smokers are about 58–68% of the population, while in females it is 12–18% are smokers in the age group 18–69 years [9].

*“The highest global smoking rates in Jordan have been blamed on tobacco manufacturers’ interference by health officials, following an investigation by British newspaper The Guardian”* [10, 11]. Obesity and overweight seem to be a public disorder among adult Jordanians, as it was revealed by the 2019 Stepwise figures, which showed more than 30% of the population is obese, while more than 60% are overweight [9].

Obesity, poor unhealthy diet, and physical inactivity create a major chronic disease burden including cancer in Jordan that is likely to increase substantially in the next coming years due to the westernization of the lifestyle and the unhealthy food and physical inactivity especially among the young population [12]. Alcohol consumption in Jordan is not alarming as three-step surveys 2004, 2007, and recently 2019 showed the drinking habit is less than 2% among the Jordanian population [13].

## 6.6 Cancer Screening Programs

Since the establishment of the Jordan Cancer Registry more than 20 years ago, breast cancer among females in Jordan ranks first and tops all registered cancers nationwide. Based on the national cancer registry epidemiological disseminated figures and data, national early diagnosis and screening strategies were in progress in the year 2006–2007.

The national program was started with the intention of screening goals. This was not achieved at that time and the program was modified to down-staging activities

on the national level. “Jordan Breast Cancer Program” adopted three main lines of activities, expanding awareness between two main target groups, one in the public and female communities. The other target group is the medical staff increasing skills and raising awareness of the disease and its early diagnosis. The third activity is, improving the availability and standards of making mammograms with better qualities and qualified mammogram-readers [14].

The program is a success story and it has been going on for more than 10 years with good outcomes as a comprehensive service for the early detection and screening of breast cancer among both Jordanian and non-Jordanian women in Jordan. The screening is available in both selected primary and tertiary levels as well as two mobile units. Currently, a comprehensive report is being edited and prepared about the breast program; unfortunately, no statistical data from the program is released yet. While the data of breast cancer in the National Cancer Registry show some downstage and more cases are being discovered in early stages and little reduction in the late-stage numbers.

In Jordan, there is no established national screening program for cervical cancer. Nevertheless, there are scattered efforts of screening in the Ministry of Health, the screening is performed at the maternity clinics. As well as at the Jordan Association for Family planning (JAFP), and the private sector, limited opportunistic Pap smear screening activities are done. The screening services are not institutionalized yet, and no database is available. Still, no other screening programs are available. Plans have been pulled and brought to the table for the colorectal cancer screening program [15] as it is on the top of the list between both males and females’ cancers in the country. Numerous local and national committees have been formed for such purposes and goals. The void and non-availability of endorsed NCCP besides the absence of financial support and funds backing such screening or other cancer activities make it hard to implement and carry on.

## 6.7 Cancer Prevention Programs

Disease prevention and control is not the task of the government alone, rather it is a collaboration of communities and society members in sharing, planning such activities, and adopting reliable prevention strategies and solutions [16]. For participation in such activities, some changes are required that includes the inclusion of programs geared toward various factors, such as socio-economic and behavioral patterns as well community and life alterations, in addition to environmental and appropriate legislative changes, especially if we knew that approximately 30–40% of cancers are preventable and can be reduced [17].

The Ministry of Health paid attention to creating a national plan to control cancer by preparing a comprehensive national plan with the participation of all medical and academic sectors in the Kingdom; a national committee was formed. Activities in the field of prevention and early detection of cancer with the aim of increasing awareness of the importance of early detection; urges citizens to get this service



with the lowest costs, the least suffering, and the best guarantee of International standards according to the available capabilities.

The concept of prevention and healthy life starts from infancy and childhood. The national vaccine program covers the basic vaccines including the hepatitis B vaccine. The importance of early exercise and proper lifestyle with healthy nutrition, lower obesity figures, and the lack of physical activity along with many negative habits such as smoking. Smoke cessation program and law supporting smoke prohibition was passed banning smoking in public places with penalties and fines [18, 19]. Jordan was one of the first countries who joined the international community in this regard as well as the youth programs for stopping smoking. The Ministry of Health and the Jordan breast cancer program have joint activities regarding the awareness and prevention of breast cancer in Jordan. A drafted National Cancer Control Plan (NCCP) was written and prepared but unfortunately, it was not endorsed nor implemented in the country [20, 21].

## 6.8 Cancer Diagnosis

Cancer care and services in Jordan mainly focus on treatment, with less effort being put on other elements of the cancer continuum [22, 23]. Cancer care infrastructure and workforce are well available but with the inequity of such services. The major cancer treatment modalities (surgery, chemotherapy, and radiation) are generally available, and most services are focused on the capital, Amman. Most of the institutions offer multiple diagnostic and clinical specialties. However, across these institutions, variable gaps exist regarding the availability or sufficiency of equipment and staff in certain disciplines [22]. The King Hussein Cancer Center is the only specialized tertiary hospital that provides all treatment modalities and services for cancer care. With other functional nuclear medicine departments in Al Basheer Hospital (MOH), the Royal Medical Services (RMS), the teaching hospital of King Abdulla the founded in the northern part of the country, and some of the private sector in Amman. Other laboratories (private sector and the university) are present with the capacity of performing cytogenetic and molecular testing along with the genetic ones [24].

## 6.9 Treatment

The government bears the cost of treating Jordanian cancer patients. Cancer treatment is offered at no cost to all Jordanian citizens through public hospitals of the MOH, or any other referred facility if required and needed, but the services are not available in the MOH facilities. A full range of diagnosis and treatment is provided by other health sectors in the private and the military services as well. The King Hussein Cancer Center provides a specialized updated cancer care and treatment not only to the Jordanian citizens but to many from the neighboring and surrounding countries [23].

### **6.9.1 Medical Oncology**

Jordan has several medical oncology facilities, which provide treatment of chemotherapy and stem cell transplant along with other oncological surgery services. The King Hussein Cancer Centre located in the capital city of Amman is a center of excellence with a regional reputation in the field. Nevertheless, not yet the robotic surgery. The stem cell transplantation is also done in the specific specialized center at the Jordan university hospital.

### **6.9.2 Radiation Therapy**

Jordan has four sites or locations that provide radiation therapy and other spectra of cancer treatments. The country has eight linear accelerators with more than 130 registered radiation oncologists, who can provide services with other types of radiation being provided like Three-Dimensional Conformal Radiotherapy (3D-CRT)/Intensity Modulated Radiation Therapy (IMRT)/Volumetric Modulated Arc Therapy (VMAT)/Stereotactic Radiosurgery (SRS)/Stereotactic Body Radiation Therapy (SBRT). The major centers that provide radiation oncology treatment are The King Hussein Cancer Center, Basheer Hospital, Al Afia Center.

### **6.9.3 Surgery**

Understanding the challenges and beyond medical care, surgery services of high experience and with great proficiency for all types of cancers are available and provided to cancer patients in Jordan, and to many more out comers from outside the kingdom, whom they seek the treatment and cure for their diseases and illness. Some locations or centers have specialized and trained staff for such services with the proper settings and equipment. The other services like Brachytherapy and the Cyberknife and the Hyperthermic Intraperitoneal Chemotherapy (HIPEC) procedures are available in many locations and centers for oncological surgery while the robotic surgeries for cancer in Jordan are still not presented nor available currently.

### **6.9.4 Pediatric Oncology**

Pediatric oncology has about 5.6% of the total cancers of the Jordanian population [4]. These cases are served and treated mainly in the KHCC center where comprehensive pediatric treatment and services are provided [13]. Other services are of limited numbers in some other locations in the private sector or the military services.

### **6.9.5 Survivorship Track**

Surveillance of cancer survival by central analysis of population-based registry data to 5-year survival statistics can be calculated with the number of patients diagnosed with cancer still alive 5 years later after diagnosis. This data was obtained from the national Jordan Cancer Registry (JCR) and analyzed with Jordan cancer data. It was included in the international concord studies parts 2 and 3 as one of the participating countries in this international study of cancer survivals of different cancers [25].

### **6.9.6 Palliative Care Track**

The palliative care initiative was launched in Jordan as the WHO demonstration project in 2003 to implement palliative care through training and education, changing policies related to opioids and drug availability. Palliative care is an approach that improves patients' and their families quality of life [26, 27].

There were improvements in the practice of palliative care. A national palliative care committee was formed with different stakeholders from different health and medical sectors in the kingdom. A national guideline was prepared and printed, a society for palliative care was established and courses in collaboration with local universities were founded and established. Certified nurses are graduating from university after 6 months of palliative training (study). Two international conferences were held in Amman, under the patronage of the Minister of Health. The legislation amendments were made regarding narcotics dispensing to the patients to facilitate prescription. The service of palliation is mainly provided at the KHCC and some private hospices. Recently home palliative care services have been made available with a trained team making home visits by qualified personnel [28].

## **6.10 Research and Education**

The medical education and teaching programs in Jordan are considered the strongest in the region. Jordan had six advanced medical schools with a strong presence in the region. Some of these universities have postgraduate oncology programs, like master's and PhD degrees not for the physicians only but the nurses as well [29]. In addition, residency programs are available in almost all cancer-related specialties, including residency programs in radiation oncology and fellowship training programs in both pediatric and adult medical and surgical oncology, more recently in palliative care. In addition, many programs combined the training programs in radiology, cancer imaging, breast imaging, nuclear medicine, pathology, and anesthesia with those of many local hospitals or abroad. At KHCC, it introduces the opportunity for young pediatricians from Jordan and neighboring counties to specialize in

pediatric hematology/oncology as this center is the first and only pediatric hematology/oncology training hub in Jordan [30, 31]. There are oncology fellowships to get the Jordanian board certificate.

Research is still limited due to many reasons, while the financial support and funds top the list of such obstacles. Many papers and descriptive types of research have been published in many peer-review magazines on the international levels. Many establishments of national and international collaborations programs in cancer research, of higher studies, at the University Science and Technology, and the University of Jordan as well as more studies and research and trials in collaboration with the King Hussein Cancer Center. Not to forget the activities and conferences managed by the Jordan Oncology Society, Jordanian Society of Pediatric Oncology, and the Jordan Cancer Society.

## **6.11 Cost-Effective Cancer Care**

The new generation of treatments and available medications are quite expensive and are a huge burden to both the government and individuals. Increasing cancer prevalence rate, high new costly pharmaceuticals, physician's and facility's fees have all been added to the expenditure and therefore, it is raised in the cancer care issue. In Jordan, most of the cancer patients are treated at the expense of a third party, mainly the MOH or the royal court, which is a spot-on motive to have a very good and authentic cost-effective for such provided services to strengthen and improve as well as continue this benefit. However, most of the essential cancer drugs are available, and to some extent, the newly FDA-approved ones as well, but one of the biggest challenges in this country will be how to tackle the increasing cancer care cost, the increase in the utilization of expensive medications, radiation, chemo, etc. [32–35].

## **6.12 Challenges and Advantages**

### ***6.12.1 Medical Tourism in Jordan***

Medical tourism in Jordan has seen an increase over the years, mainly due to the high level of services and the expertise provided by hospitals and the medical staff in the country. The International Medical Travel Journal (IMTJ) shows the increasing interest in medical tourism to Jordan and the healthcare provided in the country. Service quality, patient safety, levels of care, and experience to ensure that patient expectations are met and taken care of [22, 36].

Cancer treatment in Jordan is one of the main panels in the country, especially to the King Hussein Cancer Center “KHCC,” one of the best comprehensive cancer centers in the region as well as many other clinics and specialized doctors in the private sector. Many patients seek services provided and the quality of the

high standard and effective outcomes and results. Patients from the Gulf and Saudi Arabia, Yemen, Iraq, Syria, Libya, and many others are being treated in Jordan [26]. The high-quality standards in healthcare in Jordan vouched for by the numerous international and domestic accreditations that most hospitals in the country have earned. The healthcare facilities in Jordan ensure that visitors get only the best.

### 6.13 The Future of Cancer Care in Jordan

Over the past decade, cancer care in Jordan has witnessed a remarkable improvement through access to advanced diagnostics and therapeutic cancer care in the country, which focused on treatment, with less effort being employed on other elements of the cancer continuum. Cancer continues to be among the leading cause of morbidity, and mortality and the number of new cases are expected to rise, reaching levels that will challenge public and private healthcare systems and that may hinder access of patients to life-saving treatment.

Despite several initiatives, Jordan does not have a national cancer control plan, nor does organize cancer control, as promoted by international organizations such as the World Health Organization (WHO), International Agency for Research on Cancer (IARC), the Union for International Cancer Control (UICC), offers the best approach for healthcare systems to be more integrated, cost-effective, and efficient in preventing cancer. The cost of the recently introduced cancer drugs, sophisticated radiation therapy, and surgical techniques will create significant challenges for the current and future care providers. Scarcity in cancer care providers will be another challenge as Jordan experiences significant difficulties in attracting and retaining highly specialized Jordanian graduates.

This increase will constitute a challenging burden on healthcare systems in Jordan and many other neighboring countries. Planning is the key to managing the expected rise in the demand for cancer care, and this will require public health initiatives to guarantee access to quality cancer care [13, 16, 22, 23].

### 6.14 Conclusion

The healthcare system in Jordan is one of the best reputable and trustworthy prominent healthcare systems in the Middle East & North Africa (MENA) region, if not, it is globally well known. Wide-range oncology care is available in many public and private hospitals, healthcare facilities, and clinics. Twinning with many western and well-known cancer and oncology facilities, patients and doctors have the advantage of such collaborations, in both directions.

Cancer treatment in Jordan is one of the main sites and country for the health tourism in the region and this can be reflected highly on the cost of the treatment to

the visiting patients compared if they seek the services in the west or the USA, still delivering quality of high standard and effective results.

Jordan will be always open to all its Arab fellows, at the same time open for new and up-to-date innovations, cooperation, and collaboration with other scholars so the best available treatment can be presented to the patients.

**Conflict of Interest** Authors have no conflict of interest to declare.

## References

1. Jorinfo\_2019.pdf ([dos.gov.jo](https://dos.gov.jo))
2. Demographics of Jordan—Wikipedia.
3. Jordan Home ([worldbank.org](https://worldbank.org))
4. 05bd5575-f7e2-4943-8e66-2dd1510196cc.pdf ([moh.gov.jo](https://moh.gov.jo)). <https://wasel.moh.gov.jo/Echobusv3.0/SystemAssets/05bd5575-f7e2-4943-8e66-2dd1510196cc.pdf>.
5. Khader J, Al Mousa A, Al-Kayed S, Mahasneh H, Mubaidin R, Al Nassir N, Khatib S, Qasem A, Haddadin I, Elayan E, Al Khatib S. History and current state of radiation oncology services and practice in Jordan. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7328116/>.
6. Narghile, water pipe smoking associated with earlier development of oral cancer. *Asia Pac J Clin Oncol*. 2014.
7. Kofahi MM, Haddad LG. Perceptions of lung cancer and smoking among college students in Jordan. 2005. [sagepub.com](https://sagepub.com)
8. Water pipe smoking among bladder cancer patients: a cross sectional study of Lebanese and Jordanian Populations-HDJSC\_6615832 1..8 ([hindawi.com](https://hindawi.com))
9. <http://moh.gov.jo/Echobusv3.0/SystemAssets/aa28955c-cdef-4f8b-8b30-8f2f82ab3203.pdf>
10. [https://www.thelancet.com/journals/lanres/article/PIIS2213-2600\(19\)30077-3/fulltext](https://www.thelancet.com/journals/lanres/article/PIIS2213-2600(19)30077-3/fulltext)
11. <https://en.royanews.tv/news/21332/Highest-global-smoking-rates-in-Jordan-amid-concerns-of-big-tobacco-interference>
12. <https://www.liebertpub.com/doi/abs/10.1089/met.2007.0030>
13. Cancer care for adolescents and young adults in Jordan. <http://www.emro.who.int/emhj-volume-24-2018/volume-24-issue-7/cancer-care-for-adolescents-and-young-adults-in-jordan.html>
14. Breast cancer screening and diagnosis guidelines. Amman 2008.
15. Dietary and lifestyle characteristics of colorectal cancer in Jordan: a case-control study. *Asian Pac J Cancer Prev* 2011;12
16. Health challenges and access to health care among Syrian refugees in Jordan. *East Mediterr Health J* 2018;24(7):680. Review.
17. The WHO site –Preventing cancer ([who.int](https://who.int)).
18. The Public Health Law, passed in 2008/Three coffee shops closed for violating smoking ban | Jordan Times.
19. [https://en.wikipedia.org/wiki/List\\_of\\_smoking\\_bans](https://en.wikipedia.org/wiki/List_of_smoking_bans)
20. <https://www.almadenahnews.com/article/45784>
21. <http://www.jordanzad.com/print.php?id=15782>
22. Cancer Care in Jordan. <https://www.sciencedirect.com/science/article/pii/S1658387615000230>.
23. jordan\_national\_health\_sector\_strategy\_2015-2019.pdf. [https://extranet.who.int/country-planningcycles/sites/default/files/planning\\_cycle\\_repository/jordan/jordan\\_national\\_health\\_sector\\_strategy\\_2015-2019\\_.pdf](https://extranet.who.int/country-planningcycles/sites/default/files/planning_cycle_repository/jordan/jordan_national_health_sector_strategy_2015-2019_.pdf).

24. The molecular genetics center at the Specialty Hospital is one of the best and most specialized academic molecular genetics labs in Jordan and in the Middle East.
25. Cancer survival: the CONCORD-2 study. [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(15\)61442-8/fulltext?rss%3Dyes=](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)61442-8/fulltext?rss%3Dyes=).
26. Jordan palliative care initiative: a WHO demonstration project. <https://www.sciencedirect.com/science/article/pii/S0885392407001534>
27. [https://www.who.int/ncds/surveillance/steps/2007\\_Fact\\_sheet\\_Jordan.pdf?ua=1](https://www.who.int/ncds/surveillance/steps/2007_Fact_sheet_Jordan.pdf?ua=1)
28. <https://www.khcc.jo/en/palliative-care>
29. [http://graduatedstudies.ju.edu.jo/Lists/OurPrograms/School\\_Master.aspx](http://graduatedstudies.ju.edu.jo/Lists/OurPrograms/School_Master.aspx)
30. Oncology medical training and practice. <https://ascopubs.org/doi/full/10.1200/GO.20.00141>
31. <https://www.poemgroup.org/TrainingandActivities/TrainingSites/2/king-hussein-cancer-center>
32. Fact Sheets.indd (moh.gov.jo) Jordan STEPS Survey 2019/. <https://kaa.moh.gov.jo/Echobusv3.0/SystemAssets/256a175e-9de8-43a2-87a0-fc121aff76d4.pdf>.
33. Cancer prevention and care. [https://www.researchgate.net/publication/263712568\\_Cancer\\_Prevention\\_and\\_Care\\_a\\_National\\_Sample\\_from\\_Jordan](https://www.researchgate.net/publication/263712568_Cancer_Prevention_and_Care_a_National_Sample_from_Jordan)
34. When is cancer care cost-effective? <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2808348/>
35. Importance of cost-effectiveness and value in cancer care and healthcare policy. J Surg Oncol. 2016 Sep;114(3):275–80.
36. Cancer Care Program (CCP) for Cancer Coverage | King Hussein Cancer Foundation ([khcf.jo](http://khcf.jo)).
37. Jordan Population (2021) [worldometers.info](http://worldometers.info)



**Sami Khatib** is working as a senior Clinical Oncologist in Amman, Jordan. He graduated from Barcelona, Spain. He is the Secretary-General of the Arab Medical Association Against Cancer and the president of the Jordan Oncology Society. Khatib was deputy D.G. at King Hussein Cancer Center. He is a member of the regional and International Oncology Associations. He is the deputy Editor-in-Chief for The Pan Arab Journal of Oncology.



**Omar Nimri** is the Head of the Cancer Prevention Department/ MOH, as well as the Director-PI, Jordan Cancer Registry. Nimri obtained his medical bachelor's degree from Pakistan and went on to obtain several higher degrees and diplomas, including Korean Acupuncture from Sri Lanka in 1991, Community medicine from Jordan in 2002, A two-year Comprehensive Postgraduate Training Program in Applied Epidemiology (FETP), Cancer Prevention and Control Diploma from the NIH; USA-2006. Cancer registration from IARC France in 2005/2007 and Cancer prevention and Etiology Diploma from the UM School of Public Health, University of Michigan, USA 2008. Master Public Health, Jordan University, 2017–2019.

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

