

# special research report

## Cancer care in Jordan



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Cancer is the second leading cause of death in Jordan after cardiovascular diseases. Due to increase in life expectancy and prolonged exposure to risk factors, cancer mortality and morbidity are expected to increase as the young population ages. This increase will constitute a challenging burden on healthcare systems in Jordan and many other neighboring countries. Planning is 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.

Over the past decade, cancer care in Jordan has witnessed remarkable improvement through access to advanced diagnostics and therapeutics. In this review, we address the history of cancer care in Jordan, including cancer statistics, infrastructure, workforce as well as cancer care outcomes. We also discuss many of the challenges that we face and offer suggestions for the improvement of cancer management in Jordan and the region.

**KEYWORDS:** Cancer care; Jordan; Middle East

### JORDAN AS A COUNTRY

Jordan is an Arab country located in southwest Asia. It occupies an area of 89,000 km<sup>2</sup> with an estimated population of 6.5 million<sup>1</sup> and a population growth rate of 2.2%.<sup>2</sup> In 2011, 12.7% of the population were under five years of age; 37.2% were under 15 years; and only 3.3% of the total population were above 65 years of age (Figure 1).

Jordan is divided administratively into central, north, and south regions in which 82.6% of the population is urban with almost two thirds residing in the central region. Only 10% of the population live south of the capital, Amman.<sup>2</sup>

According to the World Bank classification, Jordan is an upper middle-income country.<sup>3</sup> The Kingdom suffers from insufficient supplies of water, oil and other natural resources, poverty, unemployment, and inflation. In 2011, gross domestic product (GDP) was estimated at \$28.84 billion with annual growth of about 2.6%. The country's budget deficit has been increasing in recent years, and the cash surplus/deficit (% of GDP) was

–6.8 in 2011. Gross national income (GNI) per capita is \$4,380.<sup>3</sup>

### PUBLIC HEALTH PERSPECTIVE

Jordan's health performance is among the better Arab states in terms of life expectancy, infant and child mortality rates, as well as maternal mortality rates. Table 1 summarizes the basic public health indicators.<sup>4</sup>

Despite an epidemiological shift towards non-communicable diseases, infectious diseases remain the major causes of morbidity, including diarrhea diseases, acute respiratory infections, and hepatitis.<sup>5</sup> Vaccination coverage for most infectious diseases exceeds 95%, and the Ministry of Health (MOH) recommends vaccinating all health workers with three doses of hepatitis B vaccine. Furthermore, Jordan is considered among low prevalence countries for HIV/AIDS, with an estimated prevalence of less than 0.1%.<sup>5</sup>

Non-communicable diseases (NCD) are the leading cause of death. The latest mortality report issued by MOH for 2009 indicates that more than one third

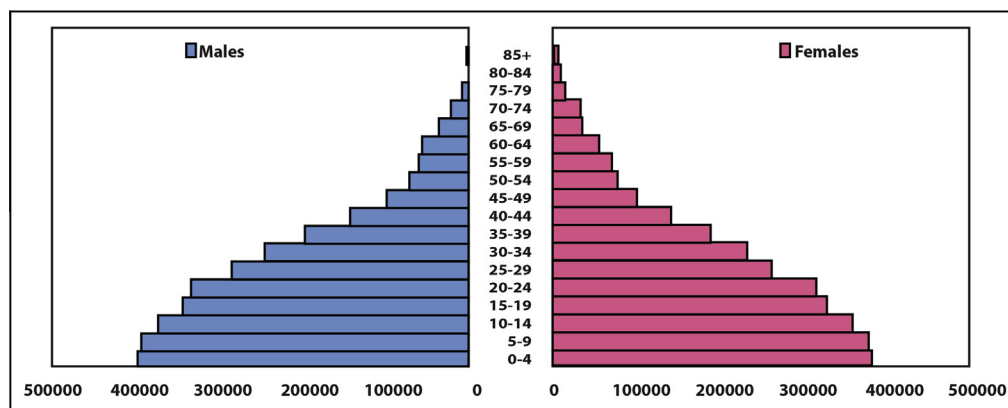


Figure 1. Population of Jordan.

Table 1. Basic public health indicators for Jordan (2011).

| Indicator                                     | 2011    |
|---|---------|
| Population                                    | 624,900 |
| Life expectancy at birth (years): male/female | 72/74   |
| Crude death rate (per 1000 population)        | 7       |
| Infant mortality (per 1000 live births)       | 23      |
| Maternal mortality (per 100,000 live births)  | 19      |
| MOH budget as (%) of total government budget  | 6.3     |

MOH: Ministry of Health.

of deaths are attributed to cardiovascular diseases and 14.6% to cancer.<sup>4</sup> Smoking, especially among the young, physical inactivity, obesity, and unhealthy diets are considered serious public health problems in Jordan, as reported in the Jordan Behavioral Risk Factor Surveillance Survey of 2007.<sup>6,7</sup>

### CANCER AS PUBLIC HEALTH PROBLEM

Cancer is the second leading cause of death in Jordan after cardiovascular diseases.<sup>5</sup> Cancer mortality and morbidity are expected to increase as the young population ages with longer life expectancy. The latter is coupled with prolonged exposure to risk factors such as tobacco use, the consumption of unhealthy food, sparse physical activity, as well as exposure to environmental, industrial, and agricultural carcinogens.

In Jordan, the government bears the cost of treating cancer patients. Cancer treatment is offered at no cost to all Jordanian citizens through public hospitals

including the MOH, Royal Medical Services (military), university hospitals and King Hussein Cancer Center (KHCC). Recently, King Hussein Cancer Center and King Hussein Cancer Foundation (KHCF) took the lead in changing the insurance landscape for cancer patients, introducing a nonprofit cancer insurance program that partially covers the cost of cancer care at KHCC for program participants who pay affordable premiums. The major private insurance companies do not cover cancer screening or treatment.

Cancer care in Jordan is focused on treatment, with less effort being placed on other elements of the cancer continuum. Despite several initiatives, Jordan does not have a national cancer control plan as of 2014. In countries where cancer control programs have been implemented, the burden of cancer is decreasing and treatment outcomes are improving, supporting the need for Jordan to pursue this strategic goal.<sup>8</sup> Organized cancer control, as promoted by international organizations such as the World Health Organization (WHO), its Eastern Mediterranean Regional Office (EMRO) and 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. For cancer patients, it enhances cure rates, relieves pain, and improves quality of life.

### CANCER ETIOLOGY

The high prevalence of smoking is associated with high incidence of lung cancer, which is the leading cause of cancer death in Jordan. Besides lung cancer, tobacco use also increases the risk of cancers of the head and neck, colon, bladder, and acute leukemia; all are among the most common neoplasms in Jordan. Viral-

associated cancers have low prevalence in Jordan. Only 41 cases of cervical cancer were registered in 2010, representing 1.6% of all female cancers.<sup>9</sup> Cancer of the liver and biliary passages are not common, with 113 (2.3%) cases registered in 2010.<sup>9</sup> Worldwide, cancer-causing viral infections such as HBV/HCV and HPV are responsible for up to 20% of cancer deaths in low and middle-income countries.<sup>10</sup>

There is no published work on the incidence of inherited familial cancer syndromes, like hereditary breast and ovarian cancer syndrome (HBOC) that is associated with mutations in BRCA1 and BRCA2, or familial adenomatous polyposis in colon cancer. However, work is ongoing to study the prevalence of BRCA1 and BRCA2 mutation in high risk breast cancer patients (H. Abdel-Razeq, MD. Chief Medical Officer, King Hussein Cancer Center, Date: Jan 01, 2015, Hikmat N. Abdel-Razeq, M.D. Chief Medical Officer, Deputy Director General, personal communication).

## CANCER STATISTICS

National cancer registration began in 1996 with the establishment of the Jordan Cancer Registry (JCR) as a population-based registry under the jurisdiction of the MOH, which publishes an annual incidence report. The number of new cancer cases diagnosed among Jordanians has increased 44% in the past decade, from 3362 cases in 2000 to 4849 in 2010 (Figure 2). The male to female ratio was 0.92:1 and the overall median age at diagnosis was 56 (60 years for males and 52 years for females).<sup>9</sup> The crude incidence rate of all cancers among Jordanians was 79.4 per 100,000 (74 for males and 85.1 for females). The Age Standardized Incidence Rate (ASR) adjusted to the world standard population was 135.1 per 100,000, which represents an increase by 8.5% from the ASR in 2000 (124.5 per 100,000 population). Nevertheless, Jordan's ASR for cancer is similar to other Arab countries in the region and much lower than the ASR in Europe and North America. The top five cancers among Jordanian males and females are detailed in Figure 2. This ranking has not significantly changed in the past ten years.<sup>9</sup>

Data on mortality due to cancer shows that lung cancer is the most common cause of death in males, accounting for 30.2% followed by colorectal (10.3%) and prostate cancers (6.2%). In females, breast cancer is the most common (22.4%) followed by colorectal (8.9%), and lung (7.0%). However, it should be noted that the last rapid assessment of Jordan's civil registration and vital statistics system by WHO echoed concerns about the accuracy of cause of death data reported by JCR.<sup>11</sup>

## HISTORY OF CANCER CARE

During the nineties, cancer care in Jordan was delivered in a fragmented approach, with lack of coordination in the plan of care between pathologists, radiologists, surgeons, and clinical oncologists. Patients were insured by the government and were referred, upon diagnosis with cancer, to public and private hospitals in or even outside Jordan. There was severe deficiency in patient support services such as palliative care, nutrition, psychosocial support and rehabilitation.

In 1997, the King Hussein Cancer Foundation and Center (KHCF/KHCC) were established as stand-alone independent non-governmental, not-for-profit institutions founded by royal decree to combat cancer in Jordan and the region. The foundation signed a cooperative agreement with the National Cancer Institute of the United States (National Institutes of Health) and began a journey to transform the hospital into a comprehensive cancer center for cancer care, training and education as well as research.<sup>12</sup>

Following intense efforts, KHCC gained accreditation by Joint Commission International (JCI) in 2006, and accreditation as an oncology center equipped to treat all types of adult and pediatric cancers followed in 2008. Currently, KHCC treats around 60% of cancer cases in Jordan, in addition to treatment of patients from neighboring countries.

## CANCER CARE INFRASTRUCTURE AND WORKFORCE

The major cancer treatment modalities (surgery, radiation, chemotherapy) are generally available, and most services are concentrated in the capital Amman, except for King Abdullah University Hospital in the north. KHCC is the only specialized tertiary hospital that provides all treatment modalities and services for cancer care, in addition to a bone marrow transplantation unit for both adults and pediatrics.

Most of the institutions offer multiple diagnostic and clinical specialties. However, across these institutions, variable gaps exist with regard to the availability or sufficiency of equipment and staff in certain disciplines. Psychological and palliative care services are significantly scarce. In the absence of certain medical services within an institution, referral to other institutions is common and can help address certain gaps. However, such referrals have implications with regard to interruption of patient care, and furthermore may influence patient load and waiting times in the institution providing supplemental care. The effect of such

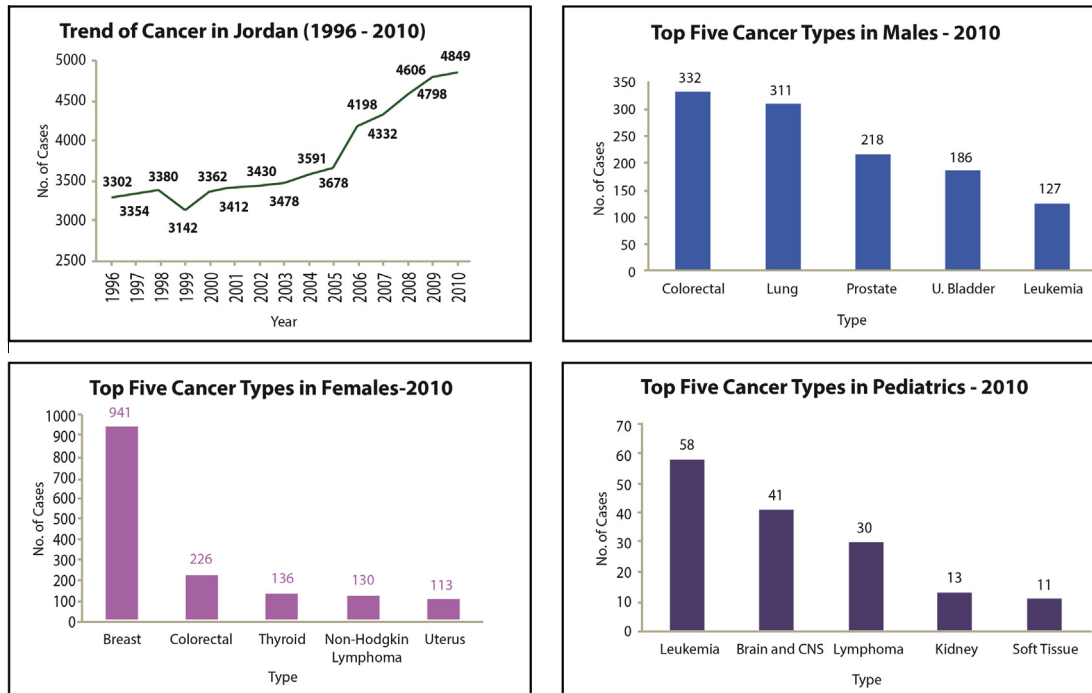


Figure 2. Cancer incidence.

discontinuity of care and/or overload on the outcome of care has not been analyzed.

Jordan hosts an adequate number of specialized medical, surgical, and radiation oncologists who have been trained in medical schools in the Kingdom and abroad. In addition, advanced diagnostic methods are available through pathologists and radiologists in addition to adult and pediatric critical care specialists, which collectively enhance the ability to diagnose and treat complex cases of cancer.

On the other hand, there is a shortage of nurses, especially females, who are trained to meet the complex needs of cancer patients, and there are few specialized ancillary support personnel who can deliver advanced support services to enhance quality of life as well as treatment outcomes.

### CANCER CLINICAL CARE

Cancer care in Jordan is advanced in comparison to most neighboring countries, and the country hosts many local and western-trained physicians who can deliver various cancer treatment modalities. Nevertheless, coordinated multidisciplinary management of cancer patients is weak, and can be seen as routine practice only at KHCC through multidisciplinary organized teams (MDT) or clinics (MDC). Many of these MDTs or MDCs routinely discuss their cases through telemedicine with colleagues at reputable

cancer centers like M.D. Anderson Cancer Center, St. Jude’s Children Research Hospital in the USA, and Hospital for Sick Children in Canada.<sup>13</sup>

### CANCER CARE OUTCOMES

Data on cancer care outcomes are not available at a national level. However, the recent introduction of a hospital-based cancer registry and research unit at KHCC has made treatment outcomes for all cancer types available to clinicians, researchers, and policy makers. Examples of the five-year survival data for patients treated at KHCC are shown in Figure 3. Despite concerns among treating physicians regarding limited access to new targeted chemotherapeutics and the increasing use of generics, survival data are comparable to those observed in more developed countries. This further validates the ability of health-care systems with limited resources to combat cancer.

### CANCER CARE CONTINUUM

#### Prevention

Cancer prevention is an essential component of the fight against cancer. Over one third of all cancers can be prevented through the control of known risk factors.<sup>14</sup> Unfortunately, many cost-effective and inexpensive prevention measures have yet to be widely implemented in many countries, including Jordan.

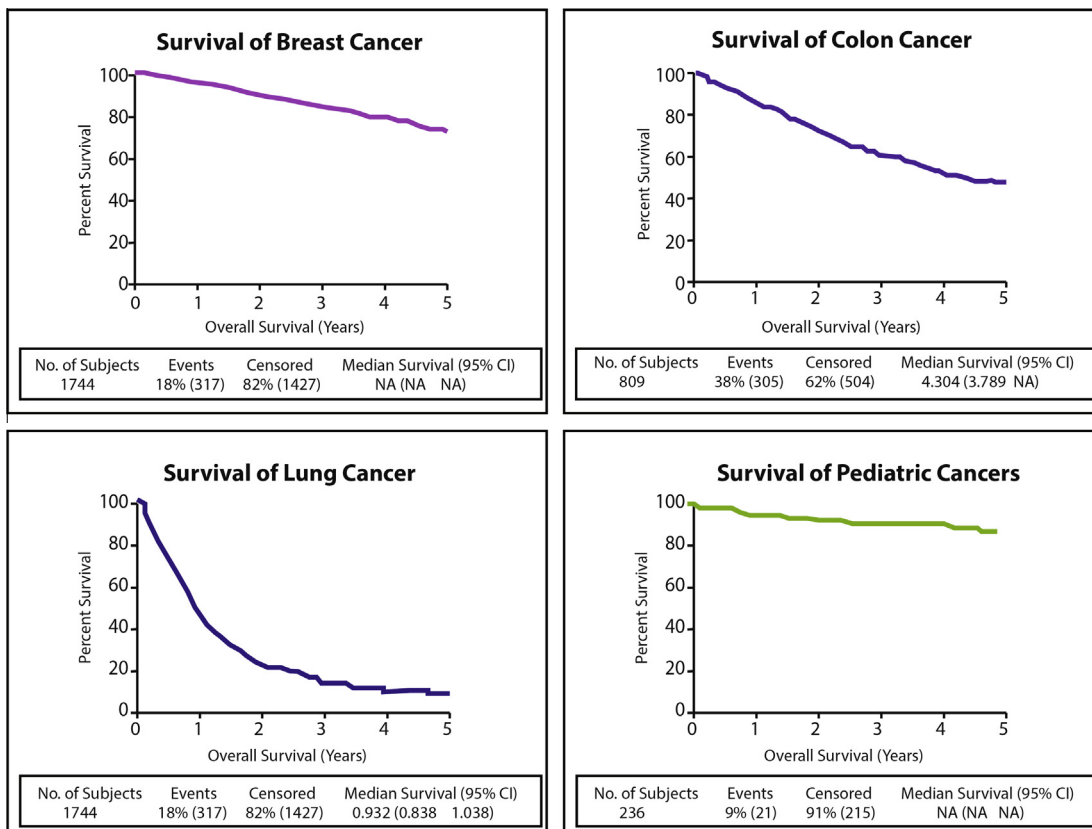


Figure 3. Cancer survival.

Four out of the ten most common cancers in Jordan are eligible for primary prevention, namely: lung, colorectal, urinary bladder, and stomach cancers.<sup>9</sup>

Lung cancer is the most preventable form of cancer death in Jordan. Tobacco use remains a major public health problem; both cigarette smoking and the use of water pipes, called shishas or nargileh, are common, even among Jordanian youth. The 2009 WHO Global Tobacco Youth Survey reported a smoking rate of 11.5% among youth (13–15 years old).<sup>15</sup> A recent cross-sectional study in a convenient sample of adults 18 years or older showed that an average of 71% of males and 21% of females reported use of cigarettes in the past 30 days.<sup>16</sup> Passive smoking is also a major issue with up to 80% of people being exposed to second-hand smoke.<sup>17</sup>

Jordan signed the Framework Convention on Tobacco Control (FCTC) and swiftly ratified it in 2004. Public Health Law No. 47/2008 prohibits the sale of tobacco products to minors (under the age of 18) and provides the legislative framework for 100% smoke-free public places, public transport and healthcare facilities. The smoking ban, however, is

not yet adequately enforced as it lacks effective mechanisms for implementation and for the adequate training of responsible staff. Smoking cessation clinics are currently available at MOH and KHCC, providing counseling and antismoking drugs. Moreover, KHCC is an active partner in the Global Bridges, a healthcare alliance for tobacco dependence treatment in collaboration with Mayo Clinic.<sup>18</sup>

Jordanians are moving towards a western lifestyle with increased consumption of processed food and decreased levels of physical activity; an estimated 30% of the population are overweight and 35% obese. The National Youth Strategy for Jordan promotes recreation and encourages youth to become more physically active and lead healthier lifestyles, but implementation and impact are yet to be determined.<sup>19</sup>

Larger population-based surveys on detailed elements of knowledge, attitudes, and practices associated with cancer are needed to better understand how preventive efforts can be successful. Similarly, the level of knowledge in cancer prevention and early detection among first line health workers needs to be



ascertained, so that they may become effective and active partners in cancer prevention.

### Screening

In a population where the majority of the cancers amenable to early detection are diagnosed in late stages, the establishment of an early detection program may be the most feasible strategy. The Jordan Breast Cancer Program (JBCP) is a national program established in 2005 that includes major stakeholders. JBCP aims to downstage the current state of breast cancer diagnosis from its late stages (III and IV) to its earlier stages (0, I and II) where the disease is most curable, survival rates are highest, and treatment costs are lowest. Recently, KHCC and JBCP introduced a mobile mammography unit with centralized reading at KHCC to aid in increasing access of patients to breast cancer screening.

To help unify and standardize the diagnostic approach for breast cancer, JBCP developed breast cancer screening and diagnosis guidelines (based on the National Comprehensive Control Network guidelines), which were published in 2008.<sup>20</sup> However, the feasibility of developing and sustaining a national screening program in a resource-constrained setting such as Jordan remains questionable.

### Psychosocial care

This area is underdeveloped in Jordan and, with the exception of KHCC, most cancer care facilities in the Kingdom lack structured programs for psychosocial support. The Psychosocial Oncology Program at KHCC provides emotional and spiritual support to improve quality of life for patients and families and to facilitate the best possible outcome of the treatment process. Social workers, alongside healthcare management teams, interact with and address the emotional and social needs of patients and their families to facilitate patient access to treatment and their compliance with treatment.

### Palliative care

Palliative care is an emerging specialty in Jordan, and faces many challenges. It is estimated that more than 20% of newly diagnosed cancer patients present to healthcare systems in advanced stages, and most of these patients are incurable at presentation, making palliative care the only option to relieve their suffering. In 2001, the Jordan Palliative Care Initiative was established, aiming to promote and develop national palliative care in Jordan. In 2004, the palliative care program at KHCC was established as the first comprehensive service in the country, in which

an interdisciplinary team provides care at multiple settings, including outpatient, inpatient, and home care.<sup>21</sup>

In a recent review of palliative care development levels around the globe, Jordan was classified within the category of “generalized provision of palliative care”.<sup>22</sup> This group of countries is characterized by the development of palliative care activism in several locations, multiple sources of funding, the availability of morphine, several hospice-palliative care services from a community of providers who are independent of the healthcare system, and the provision of some training and education initiatives by hospice organizations. However, many barriers continue to hamper the development and availability of palliative care in the country, including negative professional and public attitudes towards palliative care, lack of specialized human resources, in addition to interrupted opioids supply and availability.

## CANCER RESEARCH

Despite the advanced care delivered to cancer patients in Jordan, such care is not integrated with clinical research. Publications emphasizing bench-to bedside or bedside-to-bench applications are rarely encountered. In many of our local institutions, physicians are not required to conduct research, and recognition at the national and regional level is not tied to the “publish or perish” rule widely known elsewhere. In addition, residency and fellowship programs are mainly dependent on clinical care and continuing medical education hours with weak emphasis on research methodologies. In 2011–2012, Jordanian researchers published a total of 105 original articles that were mainly retrospective reviews of patient data in addition to a few basic research projects. The government does not have generous funds to support research, and the ability of physicians to compete for international research grants is limited due to inexperience and frail collaborative networks among individuals and institutions.

Understanding the peculiarities of cancer development and treatment in the era of personalized medicine will require commitment and coordinated effort among all stakeholders to promote and facilitate research.

## FUTURE DIRECTIONS

With approximately 14 million new cases and 8.2 million cancer-related deaths in 2012, cancer continues to be among the leading causes of morbidity

and mortality worldwide. The number of new cases is expected to rise by about 70% over the next two decades.<sup>10</sup> Cancer cases in Jordan are also expected to increase, reaching levels that will challenge public and private healthcare systems and that may hinder access of patients to life-saving treatment. The cost of the many recently introduced targeted cancer drugs and sophisticated radiation therapy and surgical techniques will create significant challenges for the current insurance system. This should alert policymakers into planning strategies and discussing alternatives. Stakeholders should collaborate in planning for the era of personalized cancer care, which requires upgrading local laboratory capabilities, funding access to targeted therapies and molecular diagnostics as well as to patient-centered research.

Shortage in cancer care providers will be a challenge at all levels as Jordan experiences significant difficulties in attracting and retaining highly specialized Jordanian graduates. Financial compensation

and political uncertainty in neighboring countries and the region add to the problem. Current structured training programs for physicians, nursing and other highly needed paramedical specialties can be strengthened through partnerships with medical and nursing schools, both in the Kingdom and abroad. Last but not least, the healthcare system in Jordan must progress towards integrated clinical care and clinical research including research on quality, access, and treatment outcomes with emphasis on survivorship programs.

## CONFLICT OF INTEREST

There is no conflict of interest to declare.

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