State of Palestine

Ministry of Health

# Cancer in Palestine

## West Bank

**Five - Year Cancer Report 2017-2021**

**Annual Cancer Report 2022**

PHIC

Oct 2023

## Forward

It is my pleasure to write this message for the publication of the first five years report "Cancer in Palestine 2017-2021" , prepared by The National Cancer Registry/ Palestinian Health Information Center.

The cancer registry database is dynamic, and the data are continually updated in the light of the most recent available information. Accordingly, the numbers in this report for the earlier years may vary slightly from those in previous publications.

Cancer is a major health problem, which not only affects the health and wellbeing of patients and their loved ones, but also incur huge health cost for the country. As an increasing incidence of cancers are observed in Palestine, the accurate and timely epidemiological data of Cancer of at most importance.

One of the Palestinian ministry of health goals is reducing the nation's Cancer burden, which requires the cooperation of many stakeholders, public health providers, patients, researchers, public health professionals, policy makers and advocates, among others.

**Dr.Mai Salem Al-Kaila**

**Minister of Health**

5-Year cancer report 2017-2021

Annual cancer report 2022

can be obtained from the Ministry of Health's website

www.moh.ps

**October 2023**

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**Health Policy & Planning Unit**
**Ministry of Health**

# Cancer in Palestine
## West Bank

**5-Year cancer report 2017-2021**
**Annual cancer report 2022**

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## List of abbreviation

| | |
|---|---|
| ASIR | Age-standardised incidence rate |
| ASMR | Age-standardized mortality rate |
| BC | Breast Cancer |
| CI5 | Cancer Incidence in Five Continents |
| CIR | Crude Incidence Rate |
| CMR | Crude Mortality Rate |
| CRC | Colorectal Cancer |
| CumR | Cumulative Risk |
| DCO | Death Certificate Only |
| DLBCL | Diffuse large B cell lymphoma |
| FL | Follicular lymphoma |
| HDI | Human Development Index |
| HL | Hodgkin Lymphoma |
| HR | Hazard Ratio |
| IACR | International Association of Cancer Registries |
| ICD-O-3 | International Classification of Diseases for Oncology, Third Edition |
| MoH | Ministry of Health |
| MV | Morphological Verified |
| NCR | National Cancer Registry |
| NMSC | Non-Melanoma Skin Malignancy |
| NHL | Non-Hodgkin Lymphoma |
| NSCLC | Non-small Cell Lung Cancer |
| PHIC | Palestinian Health Information Center |
| SCLC | Small Cell Lung Cancer |
| SEER | Surveillance Epidemiology and End Results |
| WHO | World Health Organisation |
| YLL | Years of Life Lost |

# Demographic situation and health system

# 1.1 Demographic situation

## Palestinian Population in the world

The estimated number of the Palestinians at the mid. of 2022 was about 14.3 million: 5,354,656 living in the State of Palestine (3,188,387 in the West Bank WB 2,166,269 in Gaza Strip GS), 1.7 million in the 1948 occupied territories, and nearly 7.2 million in the Diaspora (6.4 million live in Arab countries and 800 thousands in foreign countries). This is based on population estimates prepared by the Palestinian Central Bureau of Statistics PCBS.

## Palestinians living in state of Palestine

There are 5,354,656 Palestinians living in the State of Palestine (referred to the areas of historic Palestine that are controlled by the Palestinian authority) at the mid of 2022, of whom 2,721,171 are males and 2,633,485 are females. In the last years, the estimated percentage of population of the WB was 59.5% of the state of Palestine population, while the percentage of population estimation of GS was is 40.5% of the total population. Of the total population, males presenting 50.8% of total population, while females were 49.2% of total population.

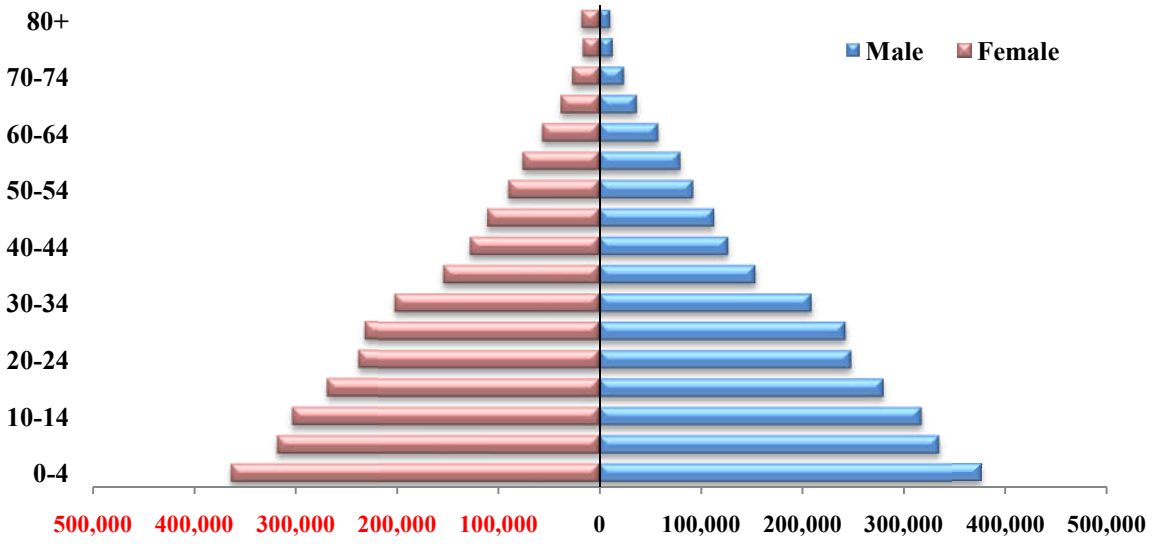
**Table (1) Distribution of estimated mid-year population by sex, region, and year, Palestine, 2017-2022**

| Year | West Bank* | | Gaza Strip | | Palestine | |
|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female |
| 2017 | 1,443,492 | 1,386,792 | 950,735 | 924,582 | 2,394,227 | 2,311,374 |
| 2018 | 1,489,371 | 1,431,799 | 979,791 | 953,052 | 2,469,162 | 2,384,851 |
| 2019 | 1,522,334 | 1,464,380 | 1,008,632 | 981,338 | 2,530,966 | 2,445,718 |
| 2020 | 1,555,741 | 1,497,442 | 1,037,900 | 1,010,069 | 2,593,641 | 2,507,511 |
| 2021 | 1,589,524 | 1,530,924 | 1,067,545 | 1,039,200 | 2,657,069 | 2,570,124 |
| 2022 | 1,623,618 | 1,564,769 | 1,097,553 | 1,068,716 | 2,721,171 | 2,633,485 |

*It includes population of Jerusalem J1 and J2 areas; in our analysis J1 is excluded.

## Age Structure

**Graph (1) Population Pyramid by Age groups & Sex, Palestine 2022**



The population pyramid above shows that the Palestinian population is still young; more than one-third of the Palestinians are less than 15 years and representing 37.6% of total population (35.5% in the WB and 40.7% in GS). The individuals aged 65 years and above were 3.4%, with a difference between West Bank and Gaza Strip, 3.8% in the WB and 2.9% in GS.

### Population Natural Growth Rate

In 2022, the rate of population natural increase in Palestine was 2.4%; the rate was 2.1% in the West Bank and 2.8% in Gaza Strip.

### Total Fertility Rate

According to PCBS, the total fertility rate has declined (2019-2020) to reach 3.8 births (3.9 in GS, and 3.8 in WB), compared to 4.6 births in 1999-2003.

### Life Expectancy

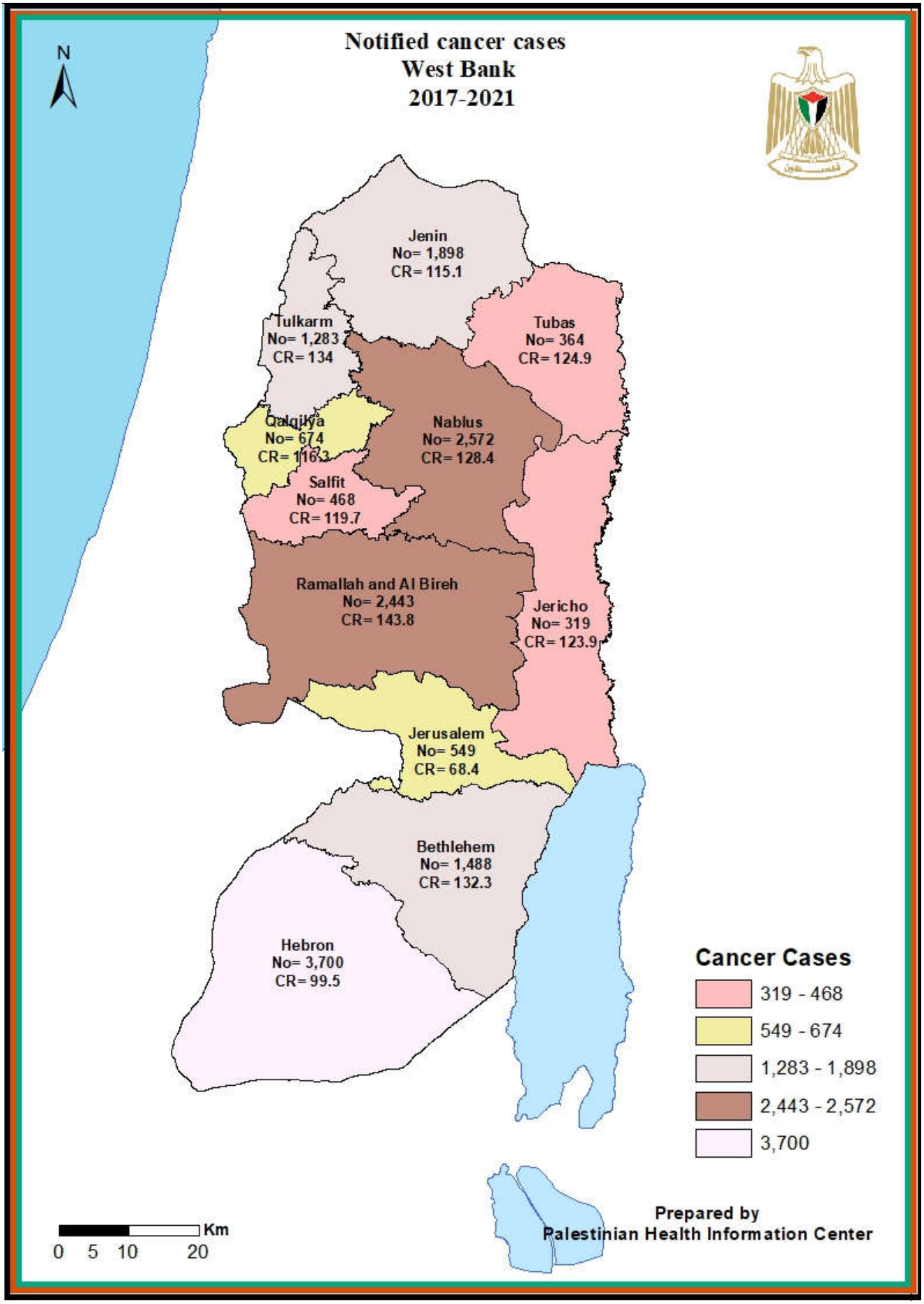
The life expectancy at birth has increased in Palestine due to improvement in the health conditions, and gradual decline of infant, child, and maternal mortality rates. In 2022, the life expectancy rate at Birth was 74.3 years, for males and females were 73.2 years, 75.4 years, respectively.

## 1.2 Health System in Palestine

The Palestinian health system consists of four main sectors: the government health sector (the Palestinian Ministry of Health and Military Medical Services), the United Nations Relief and Works Agency, non-governmental organizations, and the private sector. These different sectors are involved in providing health care services to citizens in all levels: primary health care, secondary and tertiary health care. The Palestinian Ministry of Health pays special and great attention in maintaining the continuity of the Palestinian health system and providing comprehensive health services of high quality to all citizens.

The Palestinian authority bears the cost of treating cancer patients. Cancer treatment is provided at no cost to all the Palestinian patients through governmental, private, and NGOs hospitals.

# Five- Year Cancer Report 2017-2021


Notified cancer cases
West Bank
2017-2021
N
Jenin
No= 1,898
CR= 115.1
Tulkarm
No= 1,283
CR= 134
Tubas
No= 364
CR= 124.9
Qalqilya
No= 674
CR= 116.3
Nablus
No= 2,572
CR= 128.4
Salfit
No= 468
CR= 119.7
Ramallah and Al Bireh
No= 2,443
CR= 143.8
Jericho
No= 319
CR= 123.9
Jerusalem
No= 549
CR= 68.4
Bethlehem
No= 1,488
CR= 132.3
Hebron
No= 3,700
CR= 99.5
Cancer Cases
319 - 468
549 - 674
1,283 - 1,898
2,443 - 2,572
3,700
Km
0 5 10 20
Prepared by
Palestinian Health Information Center

Introduction

Data from the population-based cancer registries are crucial for identifying needs, planning interventions, directing the resources of public health, and evaluating the effectiveness of initiatives aimed at preventing or treating cancer. Therefore, this first five-year report is important to provide information on cancer statistics in an effort to reduce the cancer burden among the Palestinian population.

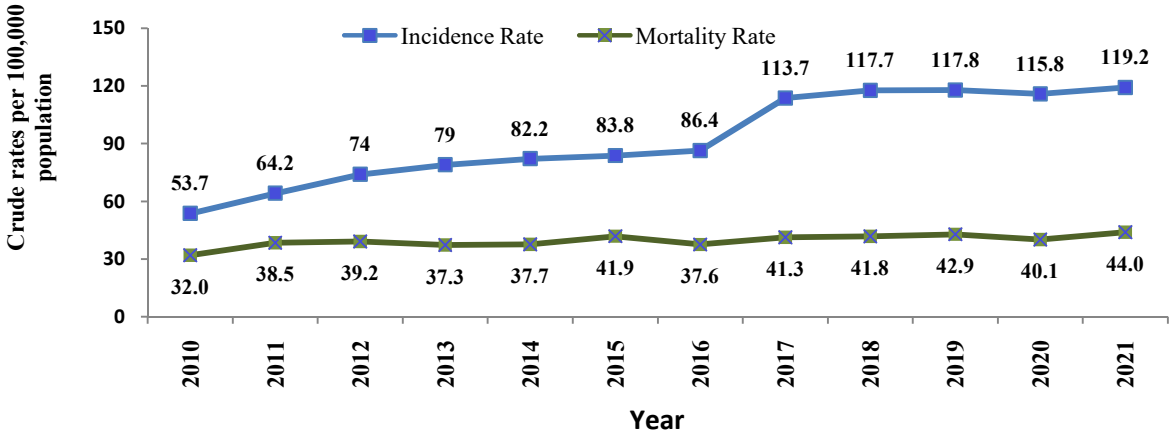
## 2.1 Cancer Incidence 2017-2021

The cancer crude incidence rate doubled from 53.7 per 100,000 population in 2010 to 119.2 per 100,000 population in 2021, which can be attributed to environmental changes and changes in lifestyle, including increasing consumption of fatty foods and fast foods, tobacco smoking, sedentary lifestyle as well as rapidly growing elderly population.

These lifestyle changes have been repeatedly shown to increase the incidence of cancer in addition to improvement achieved in the National Cancer Registry NCR and reporting system.

Moreover, the mortality rates showed no improvement in the last years. Therefore, much work must be done to decrease the incidence and mortality of cancer in Palestine.

**Graph (2) crude incidence and mortality rates per 100,000 population of all cancer types, West Bank, Palestine, 2010-2021**




During the period 2017 to 2021, a total of 15,822 new cancer cases were diagnosed in WB, of which 15,757 cases were invasive cases and 64 cases were non-invasive cases.

The crude incidence rate CIR of invasive cases was 116.7 per 100,000 population, and the age-standardized rate ASIR was 193.4 per 100,000 population. The age-standardised rate is higher than the crude rates because the Palestinian population is on average younger than the standard population. The ASIR was calculated using the world's standard population.

However, when non-melanoma skin cancer NMSC cases were excluded from analysis, the CIR was 111.5 per 100,000 population, and the ASIR was 183.5 per 100,000 population.

**Table (2) Numbers, crude and Age-Standardized Incidence Rates (World) of cancer, West Bank, Palestine 2017 -2021**

| Cancer types | Number | Crude Incidence Rate | Age-standardized incidence rate |
|---|---|---|---|
| **Cancer, All types** | 15,757 | 116.7 | 193.4 |
| **Cancers, excluding NMSC** | 15,051 | 111.5 | 183.5 |

### 2.1.1 Cancer incidence variations by sex

The cancer incidence rate is higher among males than females in most of the countries worldwide. However, the CIR of all cancer types was about 10% higher in females than in males in WB in 2017-2021, as shown in the table below. When excluding NMSC, the CIR was 11.7% higher in females than in males.

In our data, for all cancer types, excluding female sex-specific cancers and predominant female cancers (breast and thyroid cancer), the number of diagnosed cases was higher among males than females. But female sex-specific cancers plus breast and thyroid cancers were representing high percentage 26.5% of the total diagnosed cases.

Moreover, the cumulative risk (CumR) was 19.4% for male and 16.9% for female, representing the probability of being diagnosed with a cancer before the age of 75, in the absence of other causes of death. The lifetime risk (0-74 years of age) was 1 in 5 among males and 1 in 6 among females.

**Table (3) Numbers, Crude and Age-Standardized Incidence Rates (world) of notified Cancer cases (all types) by sex, West Bank, Palestine, 2017-2021**

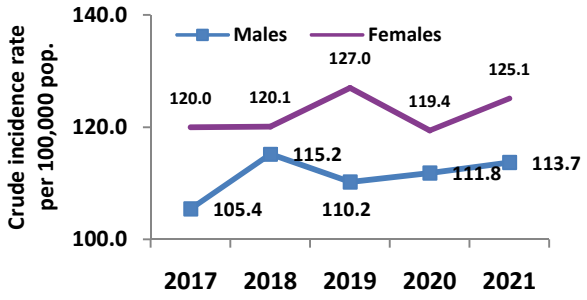
| Sex | Number | % | CIR | ASIR |
|---|---|---|---|---|
| **Males** | 7,658 | 48.6 | 111.0 | 202.1 |
| **Females** | 8,099 | 51.4 | 122.4 | 189.3 |
| **Total** | **15,757** | **100.0** | **116.7** | **193.4** |

**Table (4) Numbers, Crude and Age-Standardized Incidence Rates (world) of notified Cancer cases (all types) by sex (excluding non-melanoma skin cancer), West Bank, Palestine, 2017-2021**

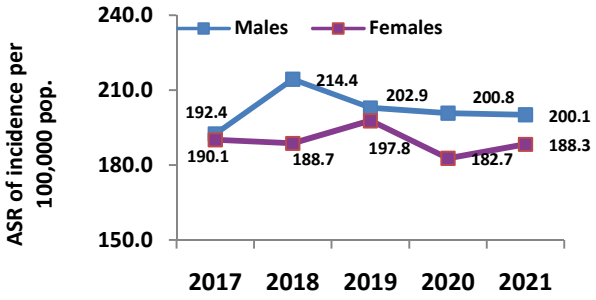
| Sex | Number | % | CIR | ASIR |
|---|---|---|---|---|
| **Males** | 7,258 | 48.2 | 105.5 | 190.5 |
| **Females** | 7,793 | 51.8 | 117.8 | 181.1 |
| **Total** | **15,051** | **100.0** | **111.5** | **183.5** |

The graphs below showed the CIR and ASIR by sex from 2017 to 2021. During this period, the CIR increased by about 4.3% for females and 7.9% for males as shown in graph 3. The largest difference in CIR between males and females was in 2019, which was 15.2% higher in females compared with males. Furthermore, when excluding NMSC, the CIR was 11.6% higher among females than males in WB in 2017-2021.

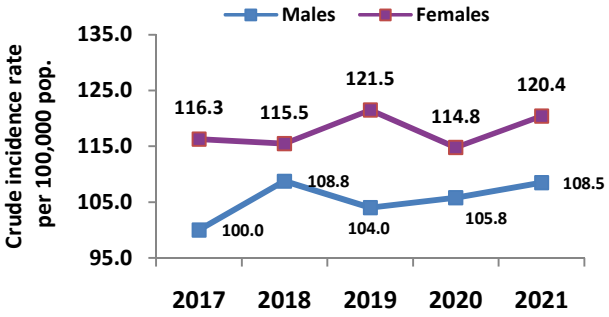
**Graph (3) Crude cancer (all types) incidence rate per 100,000 pop. by sex, West Bank, Palestine 2017-2021**



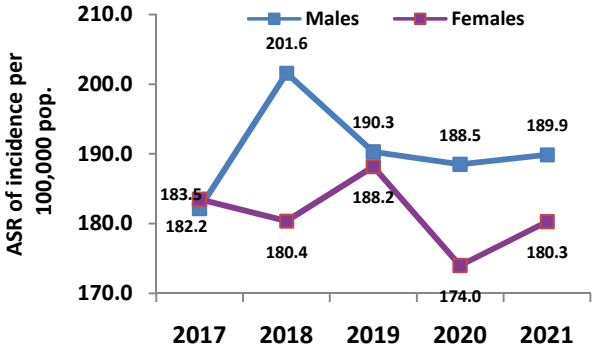

**Graph (4) Age-standardized Cancer (all types) incidence rate per 100,000 pop. (World) by Sex, West Bank, Palestine 2017-2021**




**Graph (5) Crude cancer incidence rate per 100,000 pop. by sex (excluding non-melanoma skin cancer), West Bank, Palestine 2017-2021**



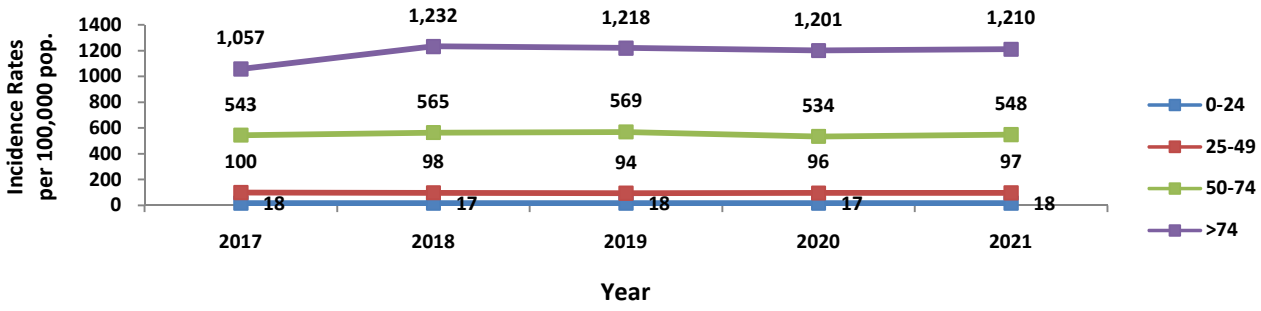

**Graph (6) Age-standardized incidence rate per 100,000 pop. (world) by sex (excluding non-melanoma skin cancer), West Bank, Palestine 2017-2021**




## 2.1.2 Cancer incidence variations by age at diagnosis

Incidence rates are strongly related to age for all cancers combined with the highest incidence rates being in older people. From 2017 to 2021, the increase of the crude cancer incidence rate was about 4.8%. But going deeper with data, it was found that the significant increase was in people aged >74, the increase in incidence rate was about 14.5% in this age group as shown in the graph below.

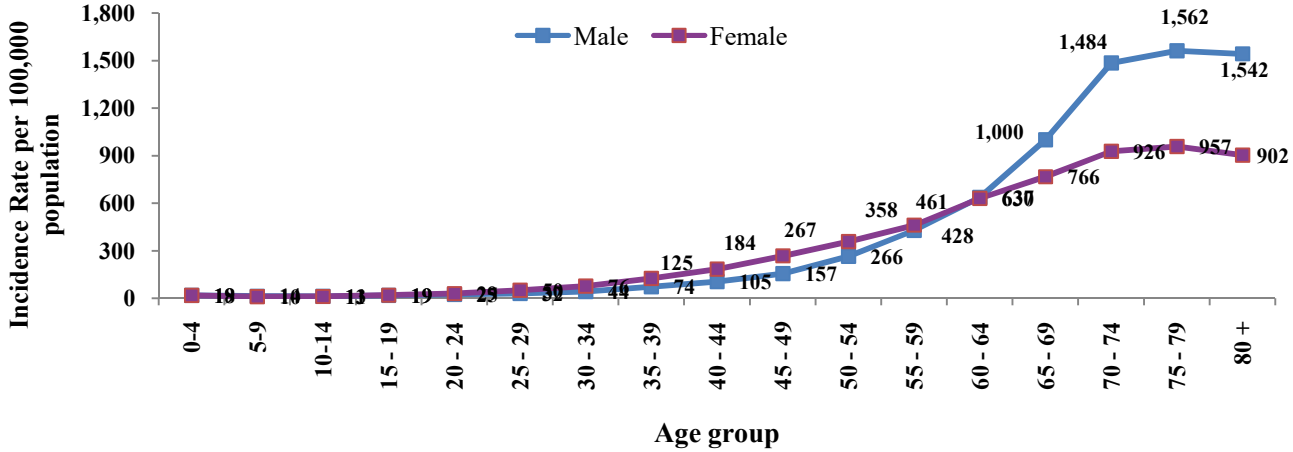
**Graph (7) Incidence rates of cancer (all types) per 100,000 population by age groups and year, West Bank, Palestine, 2017-2021**



Age-specific incidence rates rose obviously from around age 50-54. The highest rates were in the 75 to 79 age group for females and males. Although cancer incidence and death rates for all cancers combined are considerably lower in younger compared with older adults, cancers in younger men and women have important economic and social impact and can result in greater person-years of life lost than cancers occurring later in life.

Incidence rates were higher in females than males in the younger age groups and significantly lower in females than males in the older age groups. As shown in the graph below, before the age of 63 years, there was little sex differential in cancer incidence rates. However, after age 63, the increase in male cancer incidence was substantially greater than the increase in female cancer incidence.

**Graph (8) Age-specific cancer incidence rate (all types) by sex, West Bank, Palestine, 2017-2021**



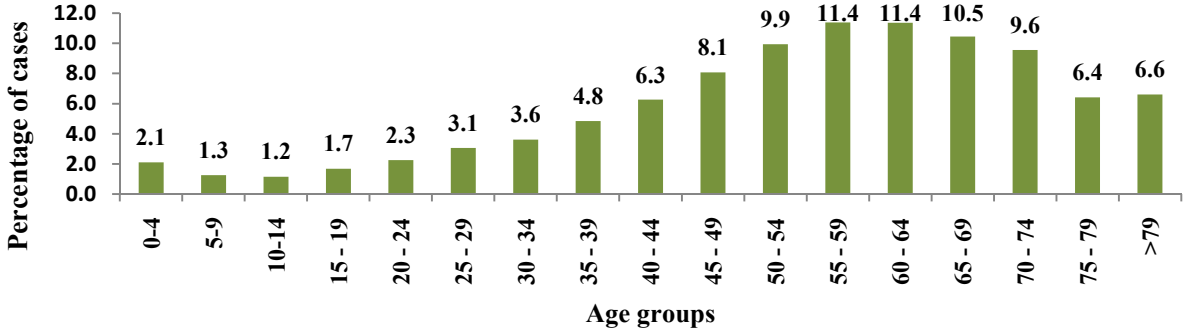

The median age at diagnosis of all cancer types was 57 in the period 2017-2021; this means that half of cancer cases occur in people below this age and half in people above this age. However, the median age differs according to cancer type. For example, the median age at diagnosis is 53 years for breast cancer, 62 years for colorectal cancer, and 71 years for prostate cancer.

Children aged 0-14, and young people aged 15-24, each accounted for less than five per cent of all new cancer cases in the WB in 2017-2021. Adults aged 25-49 contributed around (25.8%) of all new cancer cases, with almost 1.6 times as many cases in females as males in this age group.

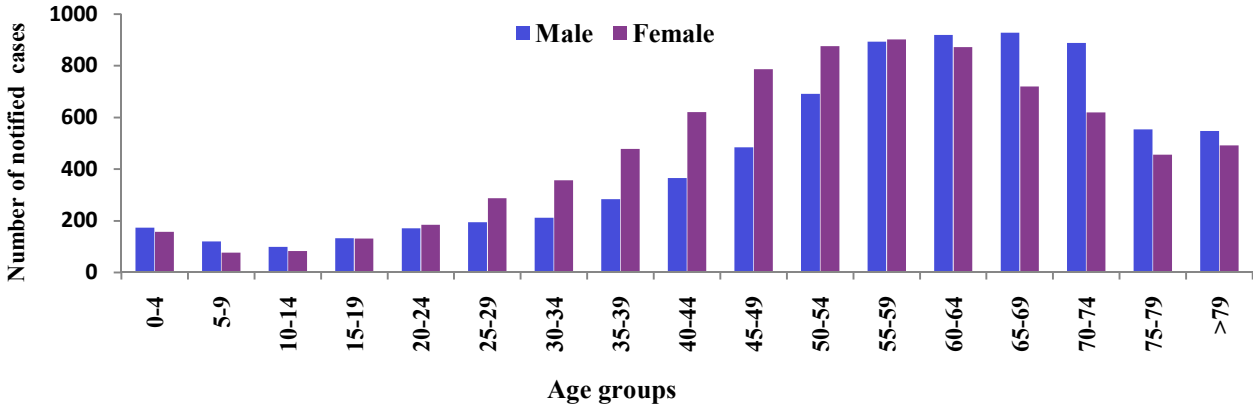
Adults aged 50-74 accounted for more than half (52.7%) of all new cancer cases, and elderly people aged 75+ accounted for about (13.0%), with slightly fewer cases in females than males in both age groups.

There are more people aged 50-74 than aged 75+ in the population overall in Palestine, hence the number of cancer cases is higher in 50-74s, but incidence rates were higher in 75+s.

**Graph (9) Percentage distribution of notified cancer cases (all types) by age groups, West Bank, Palestine, 2017-2021**



**Graph (10) Distribution of the numbers of notified cancer cases (all types), by age groups and sex, West Bank, Palestine, 2017-2021**




## 2.1.3 Cancer incidence variations by governorate

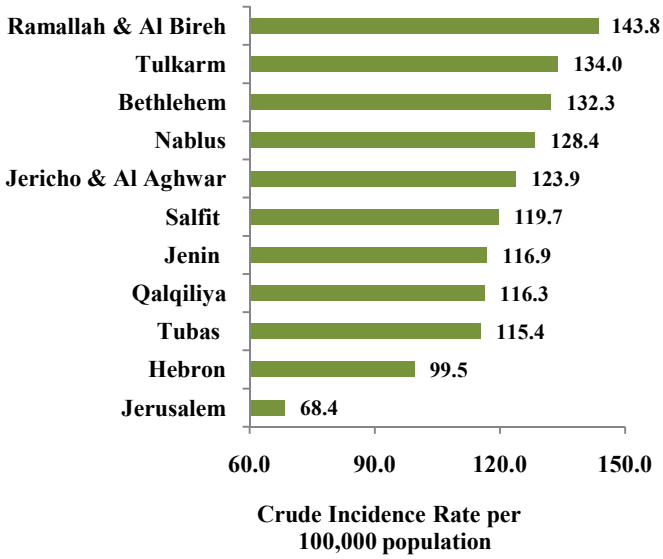
The highest crude incidence rate of all cancer types was in Ramallah & Al-Bireh governorate during the period 2017-2021, the total number of new registered cases was 2,443 cancer cases. Tulkarem governorate ranked second with CIR 134.0 per 100,000 population with 1,283 new registered cases.

The highest notified number of cancer cases was in Hebron governorate with 3,699 cases, followed by Nablus governorate with 2,571 cases. These numbers are very important to be observed and considered in health strategic and planning. For Jerusalem, it is expected to have underreporting of cancer cases in this governorate.

**Table (5) Distribution of numbers of notified cancer cases by governorate, West Bank, Palestine 2017-2021**

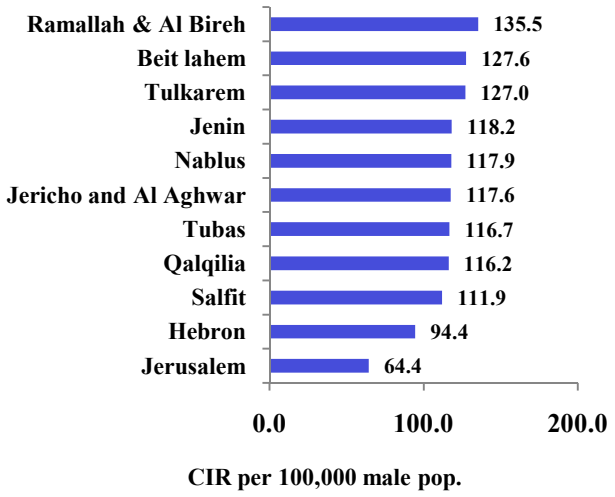
| Governorate | Male | Female | Total |
|---|---|---|---|
| Hebron | 1,790 | 1,909 | 3,699 |
| Nablus | 1,199 | 1,372 | 2,571 |
| Ramallah & Al-Bireh | 1,167 | 1,276 | 2,443 |
| Jenin | 977 | 921 | 1,898 |
| Bethlehem | 728 | 760 | 1,488 |
| Tulkarem | 622 | 661 | 1,283 |
| Qalqiliya | 344 | 330 | 674 |
| Jerusalem | 266 | 283 | 549 |
| Salfit | 223 | 245 | 468 |
| Tubas | 188 | 176 | 364 |
| Jericho & Al-Aghwar | 153 | 166 | 319 |
| Total | 7,658 | 8,100 | 15,757 |

**Graph (11) Distribution of cancer crude incidence rates by governorate, West Bank, Palestine, 2017-2021**

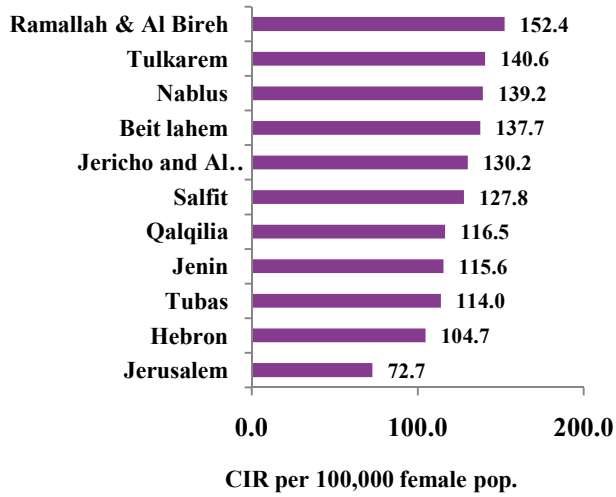


Crude incidence rate was higher among females diagnosed with cancer than males in most governorates, except Jenin and Tubas governorates.

**Graph (12) Distribution male cancer crude incidence rate per 100,000 male population**




**Graph (13) Distribution female cancer crude incidence rate per 100,000 female population**




## 2.1.4 Most common cancers 2017-2021

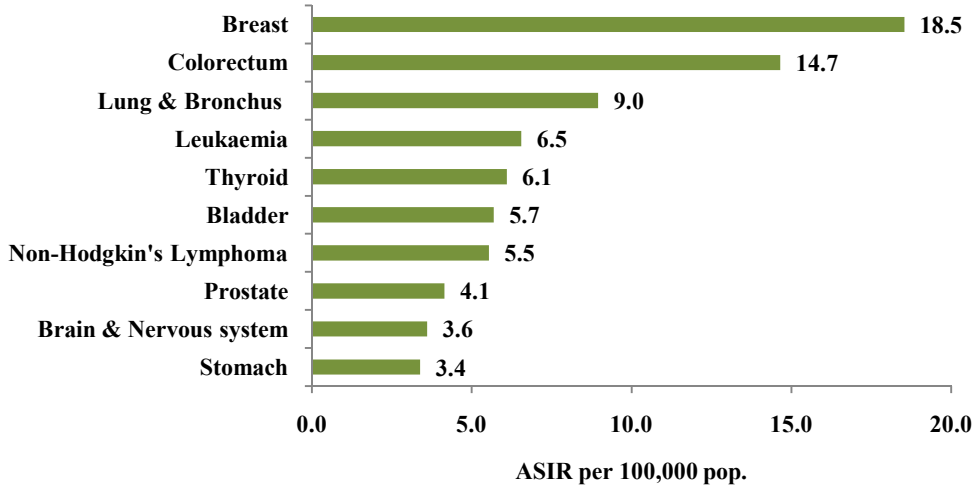
Though there were more than 200 types of cancer, just these five types - breast, colorectal, lung, leukemia, and thyroid - together account for about half (47%) of all new cancer cases in WB 2017-2021. Breast cancer was the most common cancer in the WB with 2,502 cases registered in this period, which represents 15.9% of all registered cancer types, and CIR of 18.5 cases per 100,000 population. This was followed by colorectal cancer with 1,978 cases and CIR 14.7 cases per 100,000 population. Lung cancer ranked 3rd , representing 7.7% of all registered cancer cases.

**Table (6) Distribution of the numbers and percentages of the ten most common cancers*, both sexes, West Bank, Palestine, 2017-2021**

| Site | ICD-10 | Number | % |
|---|---|---|---|
| **Breast** | C50 | 2,502 | 15.9 |
| **Colorectal** | C18-C20 | 1,978 | 12.6 |
| **Lung & bronchus** | C33-C34 | 1,209 | 7.7 |
| **Leukaemia** | C91-C95 | 884 | 5.6 |
| **Thyroid** | C73 | 823 | 5.2 |
| **Bladder** | C67 | 768 | 4.9 |
| **Non-Hodgkin's Lymphoma** | C82-C88, C96 | 748 | 4.7 |
| **Prostate** | C61 | 560 | 3.6 |
| **Brain & Nervous system** | C70-C72 | 487 | 3.1 |
| **Stomach** | C16 | 457 | 2.9 |

*Non-melanoma skin cancer cases were excluded from top ten most common cancers

**Graph (14) Crude incidence rates of the ten most common cancers*, both sexes, West Bank, Palestine, 2017-2021**




*Non-melanoma skin cancer cases were excluded from top ten most common cancers

## Most common cancers by sex

The five most common cancers for males and females make up the majority of all cancers diagnosed in males and females, which were 49.8% of all cases among males and 59.9% of all cases among females.

In addition to the incidence of cancer in sex-specific organs such as prostate and ovary, sex differences have been reported in other cancers. For example, colorectal, lung, and bladder cancers occurred the most in males, while breast and thyroid cancer were predominant in females in the WB 2017-2021.

Thyroid cancer incidence is much higher in females (10 per 100,000 female population ) than in males (2.4 per 100,000 male population). Moreover, bladder cancer incidence among males was 10.0 per 100,000 male population, while it was only 1.2 cases per 100,000 female population. Finally, lung cancer was 14.7 per 100,000 male population and 3.0 per 100,000 female population.

For females, breast cancer was the most common cancer among females and the most common cancer overall, representing 30.4% of registered cancer cases among females in the period 2017-2021. The CIR was 37.2 per 100,000 female population, followed by colorectal cancer ranked 2$^{nd}$ among female population with 14.1 cases per 100,000 female population.

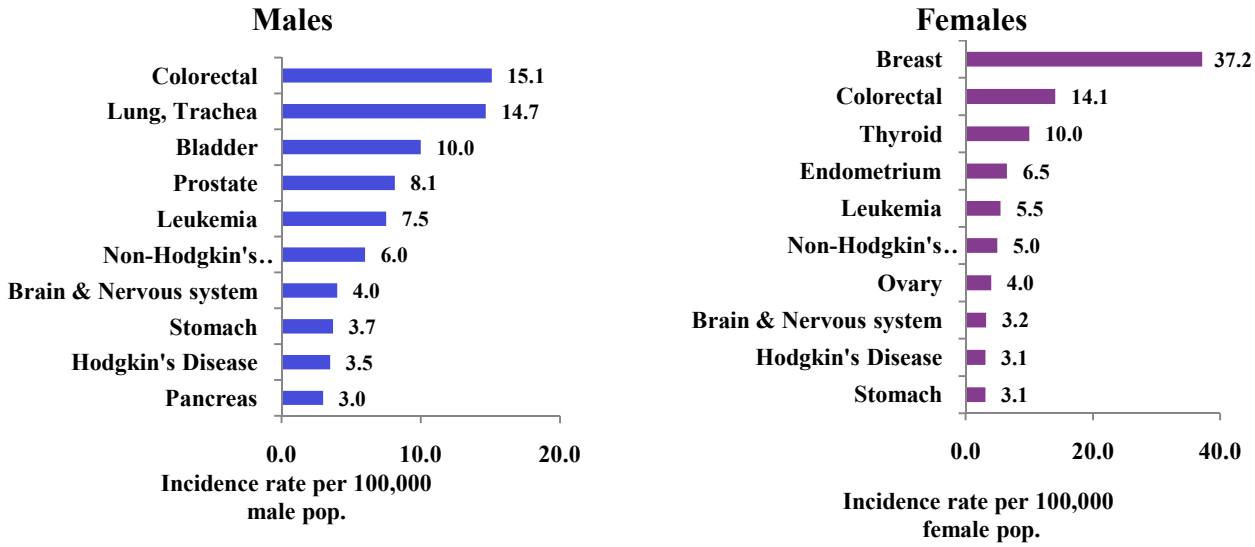
For males, colorectal cancer was the most common cancer among males, representing 13.6% of registered cancer cases among males, and the CIR was 15.1 per 100,000 male population. Lung cancer ranked 2$^{nd}$ with CIR reached 14.7 cases per 100,000 male population.

**Table (7) Distribution of numbers and percentages of the ten most common cancers* by sex, West Bank, Palestine, 2017-2021**

| Males | | | | Females | | | |
|---|---|---|---|---|---|---|---|
| ICD-10 | Sites | No. | % | ICD-10 | Sites | No. | % |
| C18-C20 | Colorectal | 1,040 | 13.6 | C50 | Breast | 2,465 | 30.4 |
| C33-C34 | Trachea & Bronchus & Lung | 1,010 | 13.2 | C18-C20 | Colorectal | 938 | 11.6 |
| C67 | Bladder | 686 | 9.0 | C73 | Thyroid | 659 | 8.1 |
| C61 | Prostate | 560 | 7.3 | C54-C55 | Endometrial | 428 | 5.3 |
| C91-C95 | Leukaemia | 517 | 6.8 | C91-C95 | Leukaemia | 367 | 4.5 |
| C82-C88, C96 | Non-Hodgkin's Lymphoma | 414 | 5.4 | C82-C88, C96 | Non-Hodgkin's Lymphoma | 334 | 4.1 |
| C70-C72 | Brain & Nervous system | 273 | 3.6 | C56 | Ovary | 263 | 3.2 |
| C16 | Stomach | 254 | 3.3 | C70-C72 | Brain & Nervous system | 214 | 2.6 |
| C81 | Hodgkin's Disease | 244 | 3.2 | C81 | Hodgkin's Disease | 209 | 2.6 |
| C25 | Pancreas | 208 | 2.7 | C16 | Stomach | 203 | 2.5 |

* non-melanoma skin cancer are excluded from top ten most common cancer

**Graph (15) Crude incidence rates of the ten most common cancers*, males and females, West Bank, Palestine, 2017-2021**




* Non-melanoma skin cancer are excluded from top ten most common cancer

## Most common cancers by age groups

The five most common cancers in both males and females vary considerably by age group, with particular differences in the cancer types diagnosed in children and young people, compared with the types diagnosed in older people

Childhood cancers are often the result of gene changes that take place very early in life, sometimes even before birth, while cancers in adults are strongly linked to lifestyle and environmental risk factors.

### Childhood cancer 0-14 years

Childhood cancers are rare compared with cancers that occur in adults. The incidence rate of Childhood cancer is estimated by World Health Organization (WHO) as about 100 per million children. In WB, it was found to be 144 per million Palestinian children in 2017-2021, which was higher than the world estimation of global childhood cancer incidence.

The most common types of cancer diagnosed in WB in children ages 0 to 14 years were leukaemias, brain and other central nervous system (CNS) tumors, and lymphomas. And about half of these cases were reported in children ages 0-4 years. In addition, 55% of cancer cases were among childhood males and 45% among childhood females.

Leukemia made up 29% of childhood cancers, and acute lymphoid leukemia was the most common type of leukaemias representing 78% of leukaemias cases in this age group in WB, 2017-2021.

### Young people cancer 15-24 years

Cancer is not common in young people. Among young people in the WB, cancer incidence rates were higher in those aged 20-24 (27 per 100,000 young people aged 20-24 years) than people aged 15-19 (18 per 100,000 young people aged 15-19 years).

The types of cancers that notified in young people were a mix of many of the types that can develop in children, adults, and older adults. They had cancers that typically occur in children, such as leukemia and bone tumors, and they also had cancers that occur in adult like thyroid and testicular cancer, in addition to a high burden of lymphoma.

The risk of thyroid cancer tends to go up as people get older, but it's often found at a younger age than most other adult cancers, and it is much more common in females than in males. In WB, thyroid cancer accounted 25% of all registered cancer cases among females in this age group.

Hodgkin lymphoma accounted for 18% of cancer cases in this age group, which is high compared with other age groups like 25-49 years that was 5% only.

Testicular cancer was only about 1.13% of all registered cancer in 2017-2021, and mostly affected men between 15 and 49 years of age. Moreover, it was found that 20.2% of testicular cancers occur in this age group 15-24 years and 68.5% in people aged 25-49 years.

### Adult cancer 25-49 years

In this age group, colorectal cancer was the most common cancer among males and breast cancer among females.

Lymphoma, both HL and NHL, continued to be one of the five most common cancers in both sex in this age groups representing 11% of cancer in this age group. Similarly, thyroid cancer was common among females 16.8%, while leukemia 8.0% and testicular cancers 7.9% were common among males.

### Older adult 50-74 years

Breast cancer was the most common cancer in this age group representing 15.5% of cancer in this age group in both sexes, and 31.7% of cases among females of the same age group.

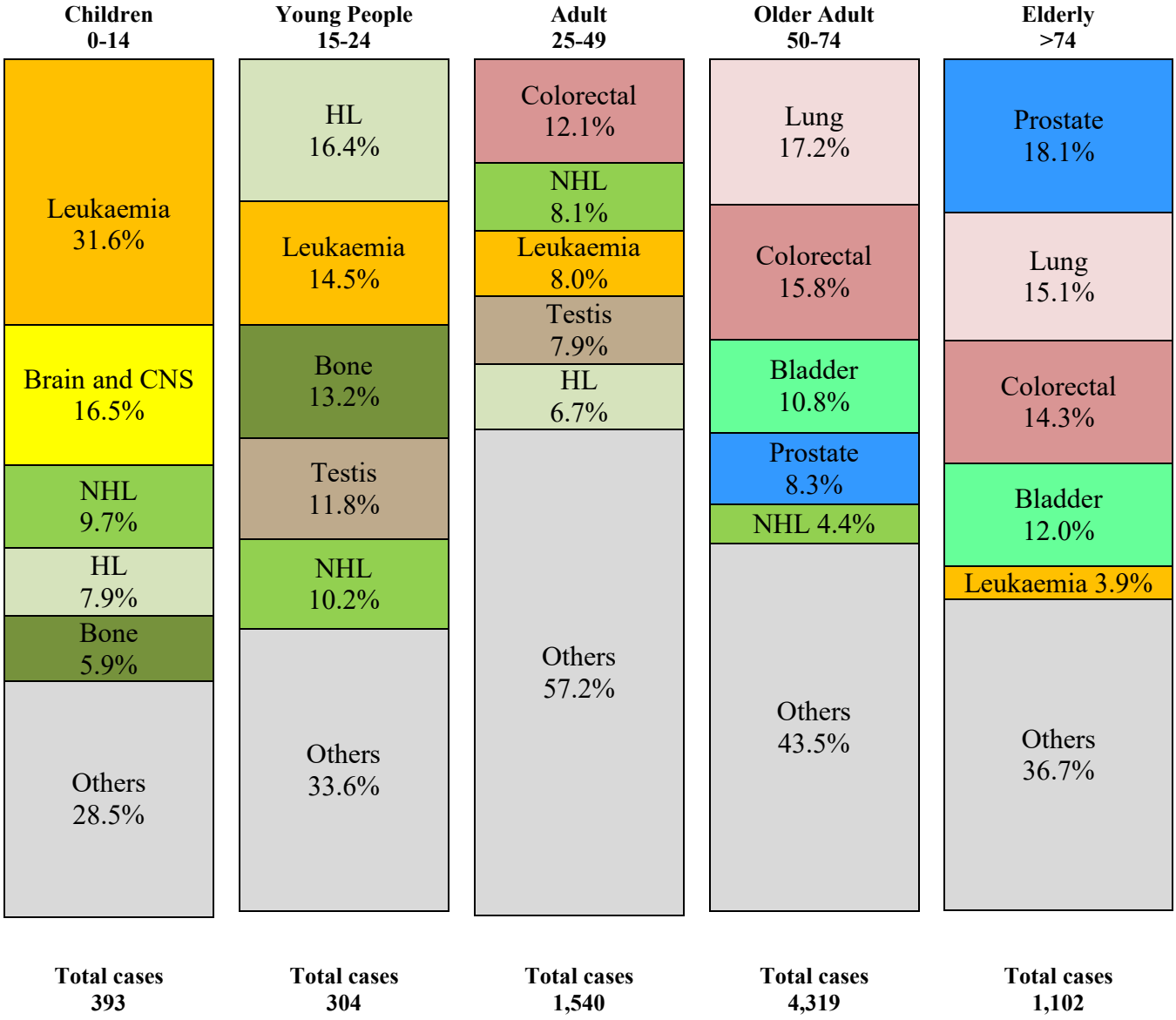
Colorectal cancer was the 2$^{nd}$ most common cancer in this age group and 1$^{st}$ common cancer among males, representing 63% of registered cases in this age group in WB in 2017-2021. This percentage increase was about 35% from 2017 to 2021.

### Elderly >74 years

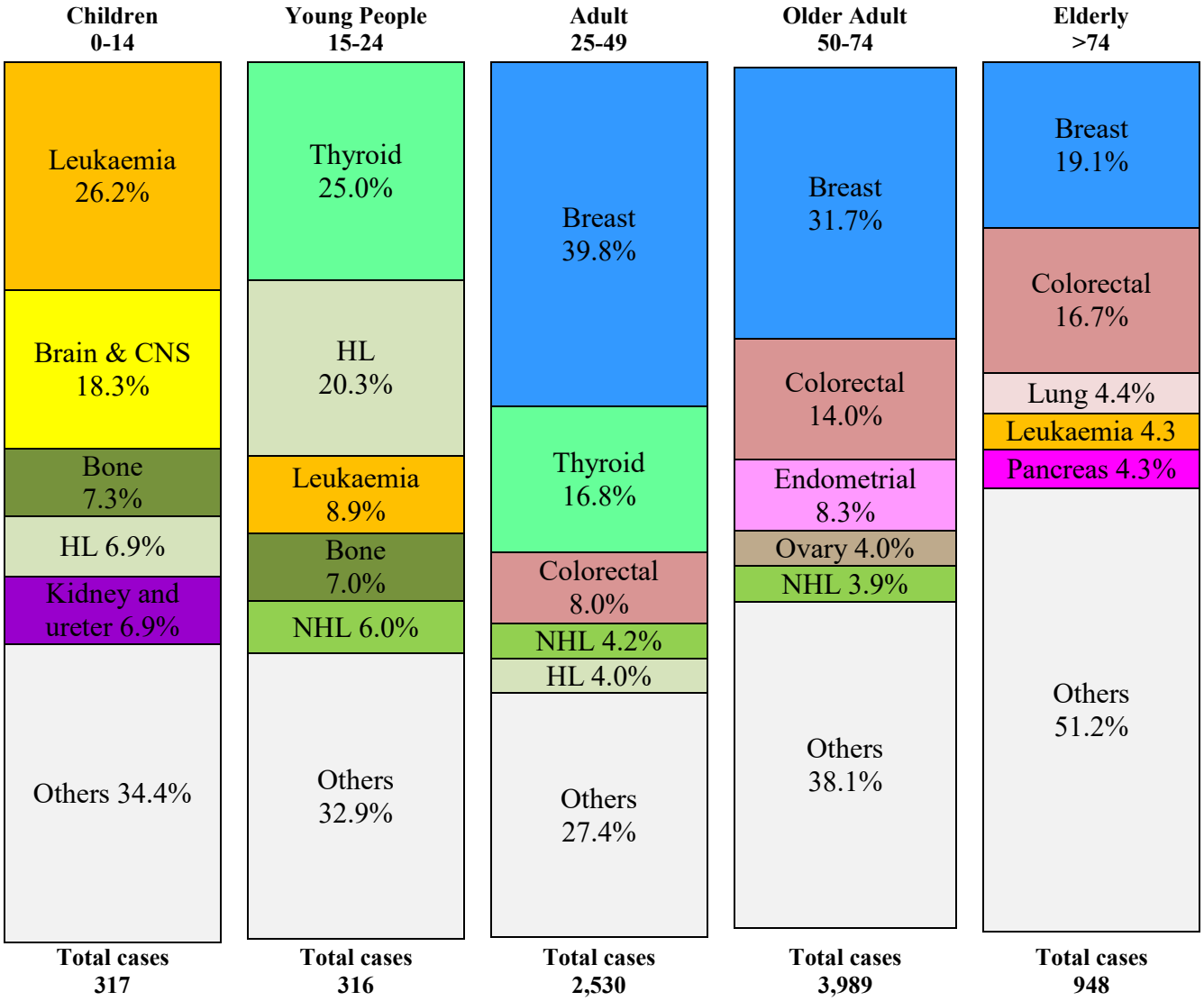
Colorectal cancer was the most common cancer in this age group (15.4%), with equal number of cases in males and females. This was followed with lung cancer (10.1%) of all cases in this age group, of which 80% of cases were among males.

Breast cancer was the 1st most common cancer among females, although it ranked fourth in both sexes. Prostate cancer was the most common cancer among males, accounting 18.1% of all notified cancer cases in this age group.

**Graph (16) The five most commonly diagnosed cancers in males, by age groups, West Bank, Palestine, 2017-2021**



**Graph (17) The five most commonly diagnosed cancers in females, by age groups, West Bank, Palestine, 2017-2021**



## 2.2 Cancer mortality 2017-2021

Cancer continues to be the second most common cause of death in Palestine, after ischemic heart disease.

In WB, the total number of deaths of all causes was 39,848 deaths, of which 5,778 cases were cancer the cause of death, representing 14.5% of all deaths in 2017-2021.

**Table (8) The ten leading causes of death in West Bank, Palestine, 2017-2021**

| Cause of Death | Number of deaths | | Total |
|---|---|---|---|
| | Male | Female | |
| Ischaemic heart diseases | 4,945 | 3,664 | 8,609 |
| Malignant Neoplasm | 3,167 | 2,611 | 5,778 |
| Diabetes mellitus | 2,132 | 2,241 | 4,373 |
| Cerebrovascular diseases | 2,000 | 2,321 | 4,321 |
| COVID-19 | 1,942 | 1,560 | 3,502 |
| Conditions originating in the perinatal period | 1,224 | 994 | 2,218 |
| Hypertensive disease | 747 | 952 | 1,699 |
| Congenital malformations | 776 | 597 | 1,373 |
| Disease of respiratory system | 638 | 531 | 1,169 |
| Diseases of the genitourinary system | 455 | 441 | 896 |
| Others | 3,567 | 2,343 | 5,910 |
| Total | 21,593 | 18,255 | 39,848 |

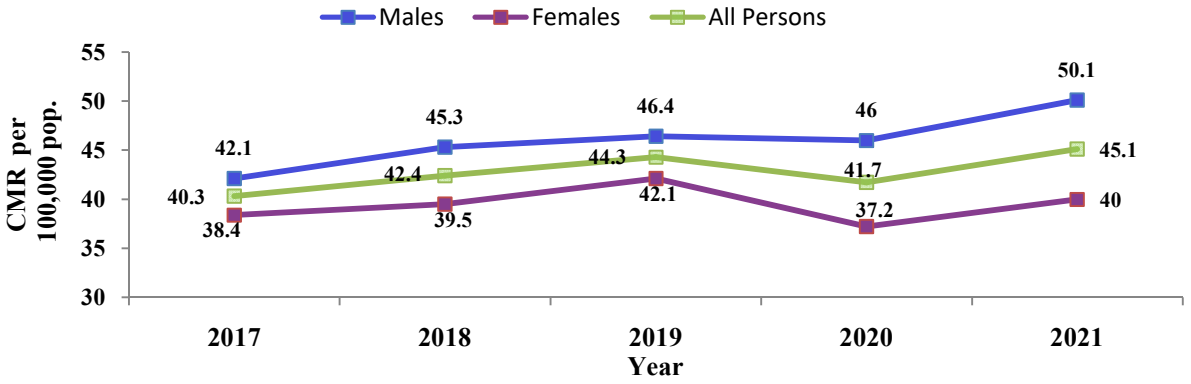
### 2.2.1 Cancer mortality rate

There were 5,778 deaths from cancer, of which 3,167 deaths were among males and 2,611 deaths among females. On average, three patients are dying from cancer everyday in the WB. Furthermore, the crude mortality rate CMR of all cancer types was 42.8 deaths per 100,000 population, and ASMR for all cancer types was 80.3 deaths per 100,000 population.

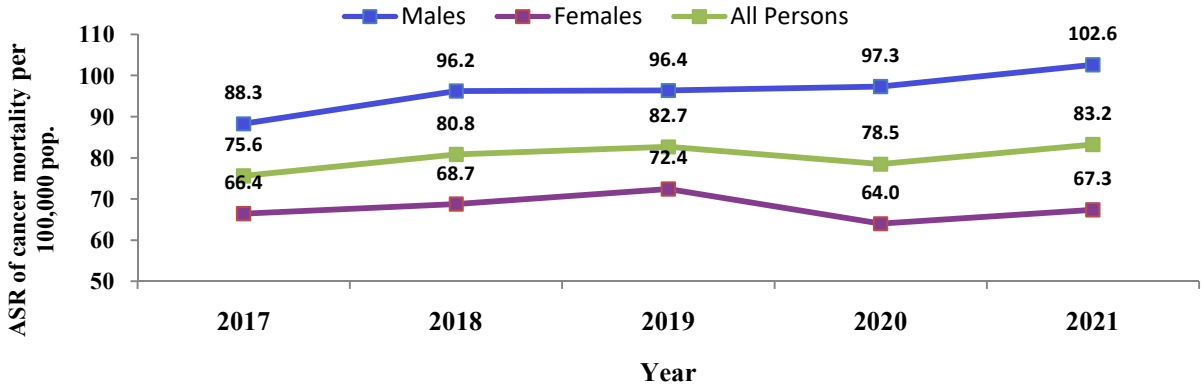
In WB, the cancer mortality rate CMR for all cancer types had increased by 12% over the 5 year period of 2017-2021, with a greater increase in males than in females 19% and 4.2%, respectively.

Moreover, nine of the ten most common causes of cancer deaths were more among males than females. For example, lung cancer was the leading cause of cancer deaths representing 17.8% of all cancer deaths, and 82% of these lung cancer deaths were among males. Likewise, the ASMR among males was 102.6 deaths per 100,000 male population, and it was much lower among females 67.3 deaths per 100,000 female population.

**Graph (18) Trends in crude cancer mortality rates for cancer (excl. NMSC) in West Bank, Palestine 2017-2021**



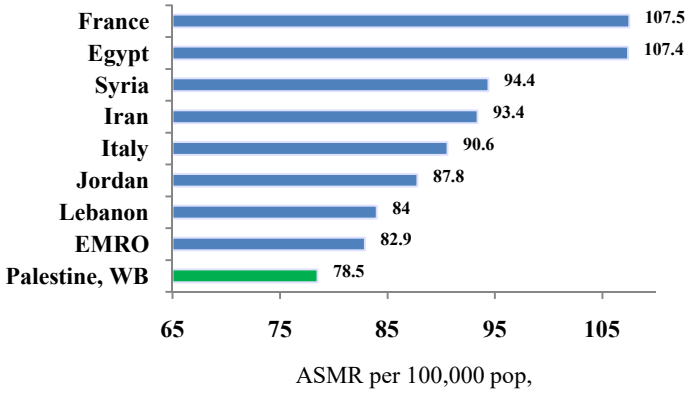

**Graph (19) Trends in Age-Standardized cancer mortality rates (excl. NMSC) for cancer in West Bank, Palestine 2017-2021**




Abstracting the estimates of ASMR from the GLOBOCAN database, it was found that ASMR in the WB was the lowest from the chosen countries for comparison in 2020.

In WB, the ASMR was 78.5 deaths per 100,000 population (97.3 male deaths per 100,000 male population and 64.0 female deaths per 100,000 female population).

**Graph (9) Age-standardized mortality rates of all cancer types (excl. NMSC) by countries, 2020**




## 2.2.2 Cancer mortality variations by age and sex

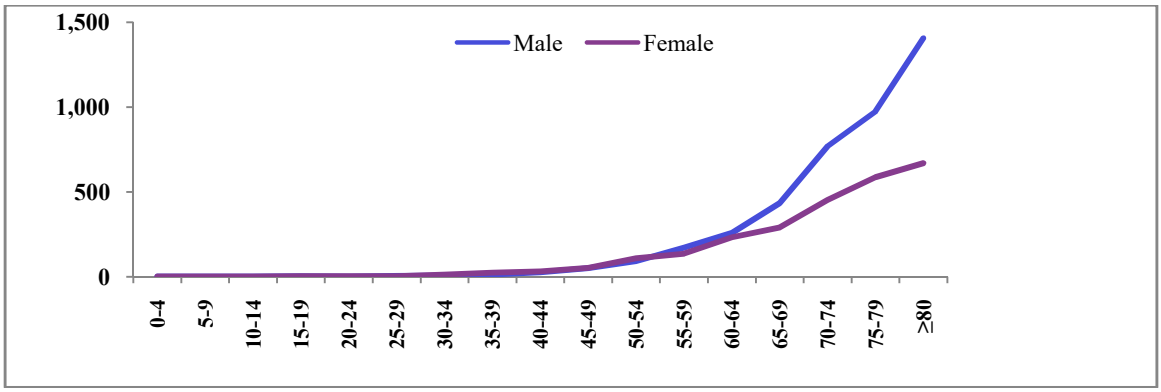
Mortality rates are strongly related to age for all cancers combined, with the highest mortality rates being in older people. In the WB, on average each year more than half (51%) of deaths were in people aged 65 and over in 2017-2021. This largely reflects higher incidence and lower survival for all cancers combined in older people.

Age-specific mortality rates rose steadily from around age 50-54 and more steeply from around age 65-69. The highest rates were in the 80+ age group for females and males. Mortality rates were significantly higher in females than males in the 25-54 age groups and significantly lower in females than males in the older age groups. The gap was widest at age 80+, when the age-specific mortality rate was about two times higher in males than females.

Children aged 0-14 and young adults aged 15-24 accounted for 2.1% and 1.5% of all cancer deaths in the WB, respectively.

Adults aged 25-49 contributed around 14 in 100 (14%) of all cancer deaths, with fewer deaths in males than females in this age group. Adults aged 50-74 account for more than 6 in 10 (57%) of all cancer deaths.

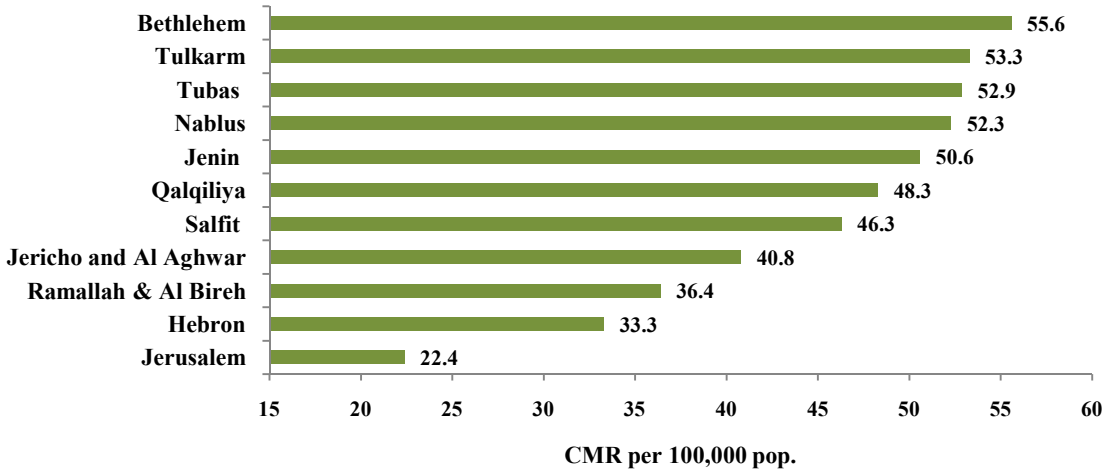
**Graph (20) Age-specific mortality rate of all cancer types per 100,000 population, West Bank, Palestine, 2017-2021**




## 2.2.3 Cancer mortality variations by governorate

The highest CMR was in Bethlehem governorate with 626 cancer deaths in 2017-2021. While the highest number of cancer deaths was in Hebron governorate with 1,240 deaths, representing 21.5% of all cancer deaths in the WB in the same period.

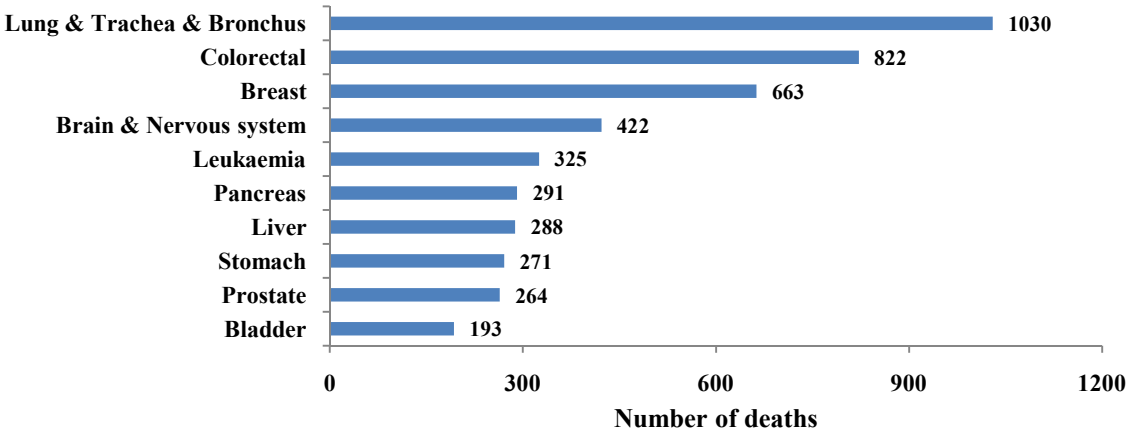
**Graph (21) Crude Mortality rates per 100,000 population by governorate, West Bank, Palestine, 2017-2021**



## 2.2.4 Most common causes of cancer deaths

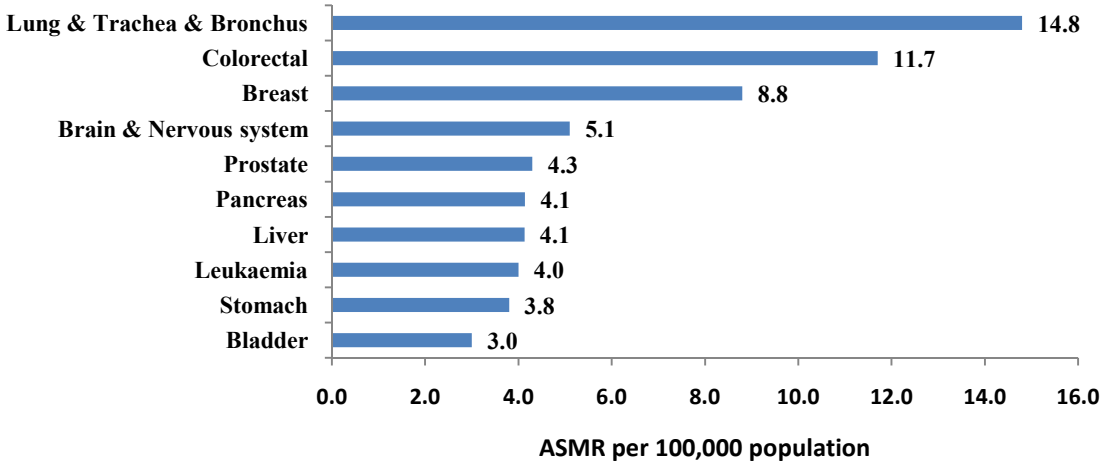
The graph below shows the types of cancer that accounted for the greatest number of deaths in WB in 2017-2021. Cancers of the lung (17.8%), colorectal (14.2%), breast (11.5%), brain and nervous system (7.3%), and leukemia (5.6%) are responsible for more than half (56.4%) of all deaths from cancer.

**Graph (22) Distribution of the numbers of the ten most common causes of cancer death, West Bank, Palestine, 2017-2021**




In WB, lung cancer was the leading cause of cancer-related deaths with ASMR 14.8 per 100,000 population in 2017-2021, this was lower than the global ASMR of lung cancer. Worldwide, there were 2.21 million new cases and 1.8 million deaths due to lung cancer worldwide with ASMR of 18.0/100,000 in 2020.

**Graph (23) Age-standardized mortality rate per 100,000 population of the ten most common causes of cancer death, West Bank, Palestine, 2017-2021**




The common causes of cancer death in both males and females varies considerably by age group, with particular differences in the cancer types diagnosed in children and young people, compared with the types diagnosed in older people.

## Most common causes of cancer death in males by age groups

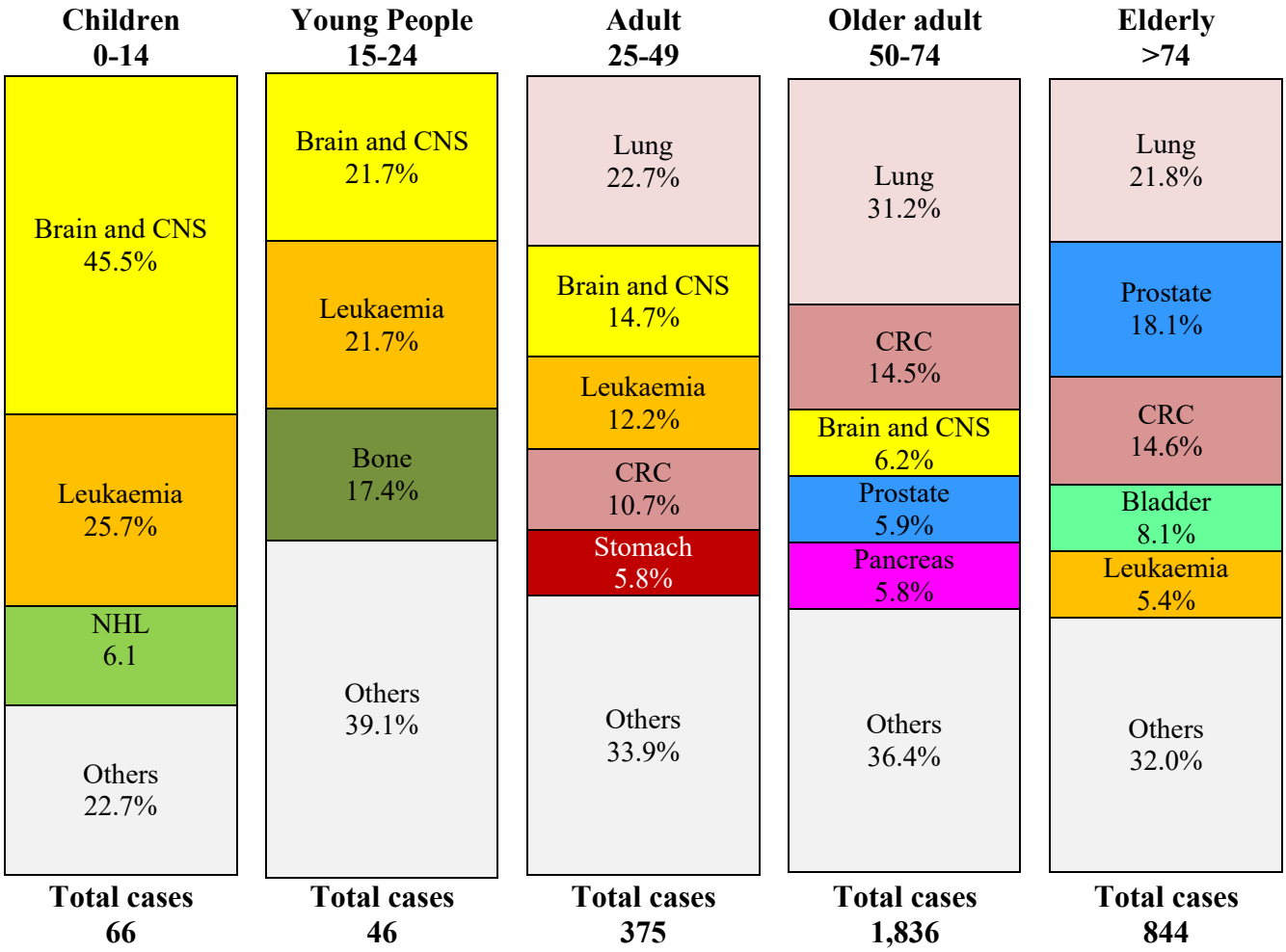
About 26.6% of all male cancer deaths in WB occurred in the elderly aged 75+ in 2017-2021. A further 58% occurred in male adults aged 50-74 and 11.8% occurred in males aged 25-49. Boys (aged 0-14), and male young people (aged 15-24), each accounted for 2.1% and 1.5% of all male cancer deaths in the WB in 2017-2021.

In boys aged 0-14 in the WB, brain and other CNS tumours were the most common cause of cancer death, accounting for 45.5% of all cancer deaths in this group in 2017-2021.

In male young people aged 15-24 in the WB, brain & other CNS tumours and leukaemia were the most common cause of cancer death, accounting each 21.7% of all cancer deaths in this group in 2017-2021.

In males aged 25 and above, lung cancer was the most common cause of cancer death in all groups above 25 years, accounting for about 28% of male cancer deaths in these age groups.

**Graph (24) Percentages of the most common causes of cancer death in males by age groups, West Bank, Palestine 2017-2021**



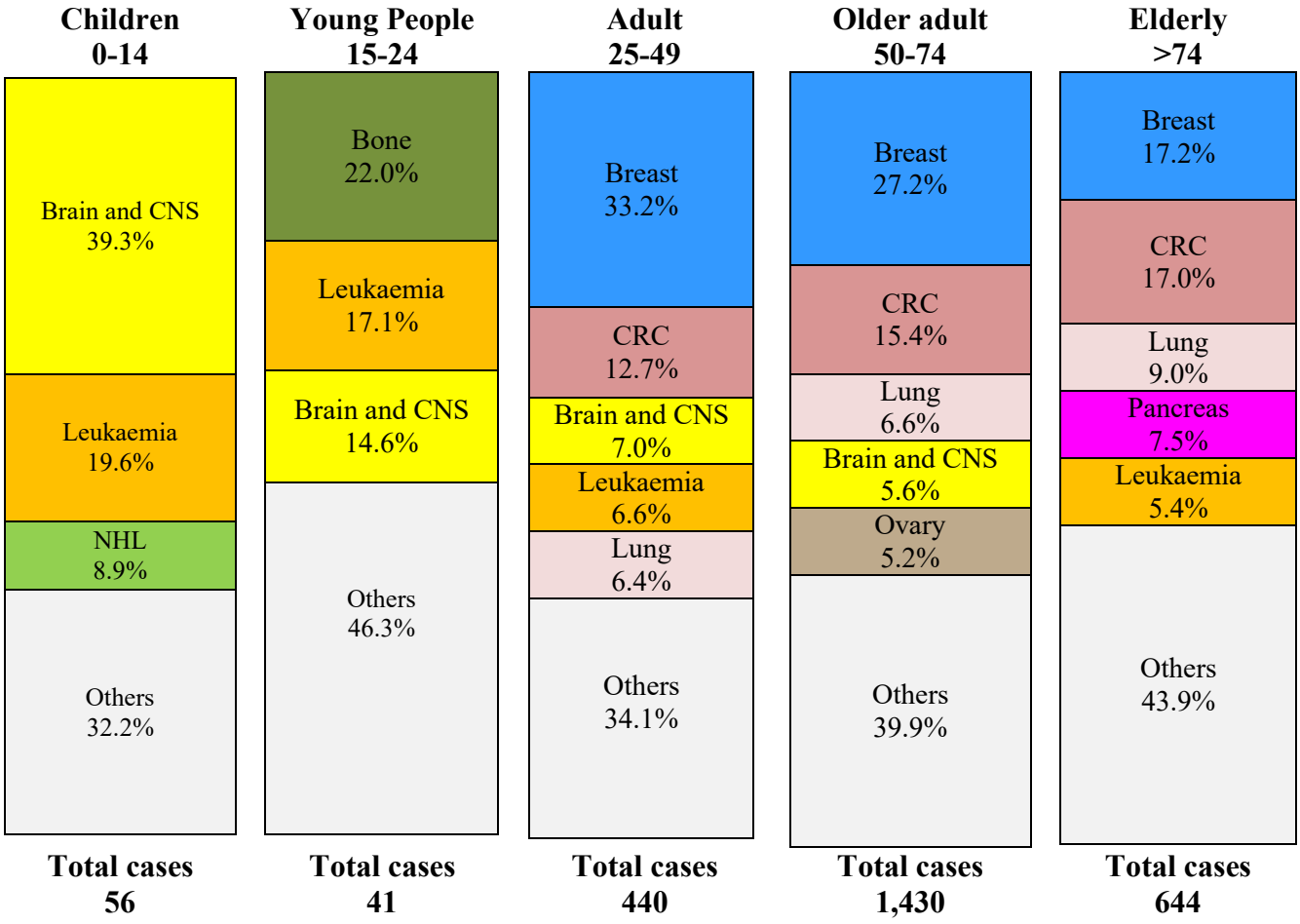
## Most common causes of cancer death in females by age groups

About 24.7% of all female cancer deaths in WB occurred in the elderly aged 75+ in 2017-2021. A further 54.8% occurred in female adults aged 50-74 and 16.8% occurred in males aged 25-49. Girls (aged 0-14), and female young people (aged 15-24), each accounted for 2.1% and 1.6% of all female cancer deaths in the WB in 2017-2021.

In females aged 0-14 in the WB, brain and other central nervous system tumours were the most common cause of cancer death, accounting for 39.9% of all cancer deaths in this group in 2017-2021.

In females aged 25 and above, breast cancer was the most common cause of cancer death, accounting for about 25% of female cancer death, followed by CRC accounting for 15% of female cancer death in these age groups.

**Graph (25) Percentages of the most common causes of cancer death in females by age groups, West Bank, Palestine 2017-2021**



## 2.2.5 Potential years of life lost PYLL

The indicator potential years of life lost (PYLL) has been used as a measure of premature mortality that takes into account both the frequency of deaths and the age at which it occurs in order to estimate the impact of early cancer deaths in relation to the life expectancy. This measure must be used to direct public health efforts and researches funding at preventing premature deaths by enabling a better understanding of its economic and social implications.

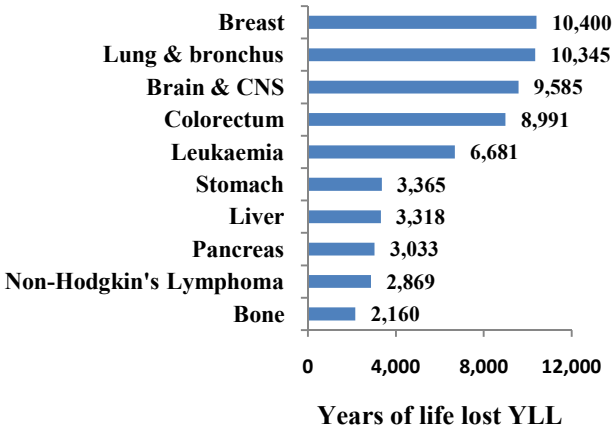
Mortality rates, PYLL and Average years of life lost AYLL, PYLL rates are complementary measures of the burden of deaths due to cancer that should be considered jointly to prioritize public health interventions focused on preventing premature mortality.

In 2017-2021, cancer deaths resulted in 75,282 PYLL, the largest numbers of PYLL were due to deaths from cancers of the breast (10,400, 13.80%), lung/bronchus (10,345, 13.74%), brain & CNS (9,585, 12.73%), and CRC (8,991, 11.9%), totaling 52% of the overall PYLL.

There were differences in rankings based on cancer mortality rates and rankings based on PYLL. For example, the PYLL showed the population burden from cancers of the CNS, NHL, and bone to be rather larger than suggested by crude mortality.

Although lung cancer was the leading cause of cancer mortality, this analysis showed a higher burden of breast cancer compared to lung cancer. This is due to the fact that deaths of breast cancers occurred in lower ages than deaths of lung cancer, similarly for brain and colorectal cancer.

**Graph (26) Top ten causes of potential years of life lost to cancer, both sexes, West Bank, 2017-2021**



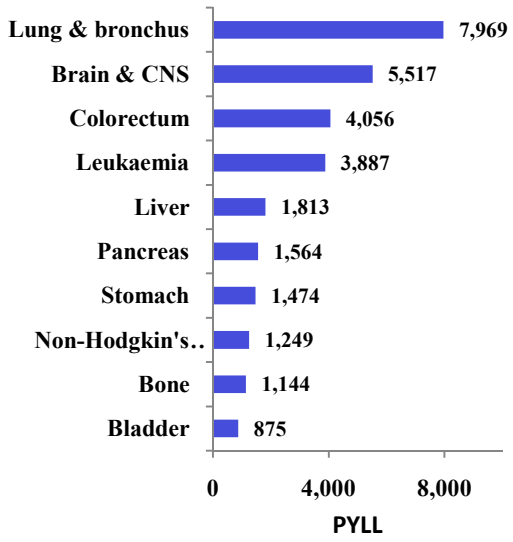

On the other side, prostate and urinary bladder cancers that are common causes of cancer death (rank 9 and 10, respectively), they resulted in fewer PYLL relative to other cancer sites (rank 18 and 15, respectively). This is mostly attributed to advanced ages at diagnosis.

### Potential years of life lost PYLL by sex

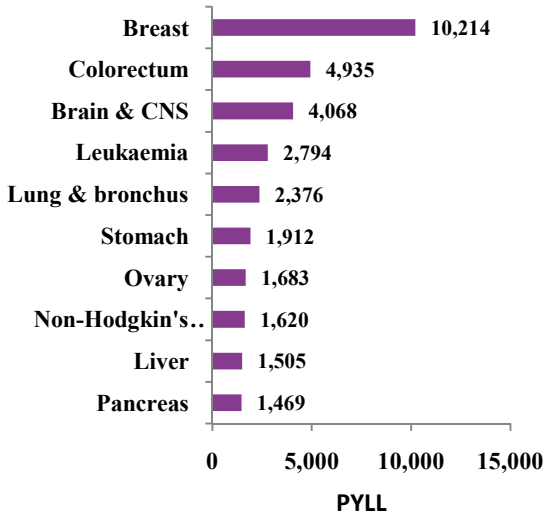
Although the number of cancer deaths was higher among males compared to females, the PYLL of cancers was about 10% higher among females compared to males (35,794 PYLL for males and 39,488 PYLL for females).

The graphs below show that the highest PYLL was lung cancer for males and breast cancer for females. For CRC, the PYLL was higher among females than males because the number of CRC death <50 year was higher among females compared to males. Adding to the fact the life expectancy for females is higher than males by about two years.

**Graph (27)Top ten causes of potential years of life lost to cancer among males, West Bank 2017-2021**




**Graph (28) Top ten causes of potential years of life lost to cancer among females, West Bank 2017-2021**




## Average years of life lost AYLL

This parameter provides a measure of the burden of cancer to the individual patient, rather than the population as a whole. Effectively it shows, on average, how much a patient's life is likely to be shortened by his/her cancer.

In WB, average years of life lost AYLL was 13.03 years for cancer in total (75,282 YLL/5,778 deaths), both sexes combined. However, the AYLL was 11.30 years in males and 15.15 years in females, and there were large variations among cancers which were evident in 2017-2021.

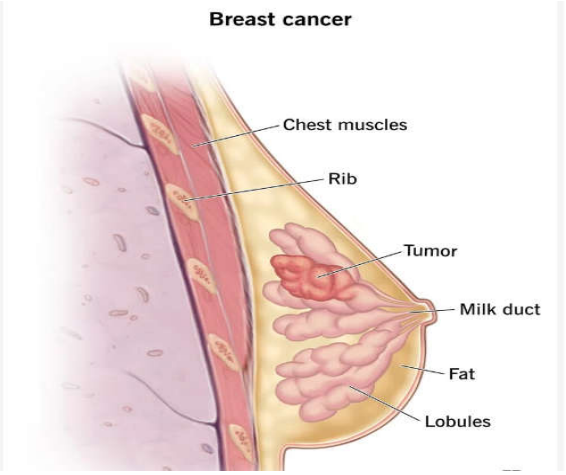
The use of AYLL as an indicator of individual cancer burden considerably changes the ranking of the mortality from different cancers. Prostate cancer was of the lowest AYLL, only 2.87 years; a brain & CNS patients was of the highest, at just over 22 years. Moreover, it was found that both connective and soft tissues cancer, and bone cancer had higher AYLL by about 26.0 years compared to breast colorectal, lung cancer, which were 15.69 years, 10.94 years, and 10.4 years, respectively.

# Breast Cancer 2017-2021

## Introduction

Breast cancer BC is a global cause for concern due to its high incidence around the world. The alarming increase in breast cancer cases emphasizes the need of effective management of disease at multiple levels.

Therefore, the management should start from the beginning that includes cancer screening and cancer registry to effective diagnostic and treatment strategies.




# 3.1 Breast cancer incidence, 2017-2021

Breast cancer is the most common cancer in the WB, with total registered invasive breast cancer cases of 2,502 cases during the period 2017-2021, of which 2,465 were females and 37 were males. In addition, 31 reported cases were non-invasive breast cancer (excluded from analysis).

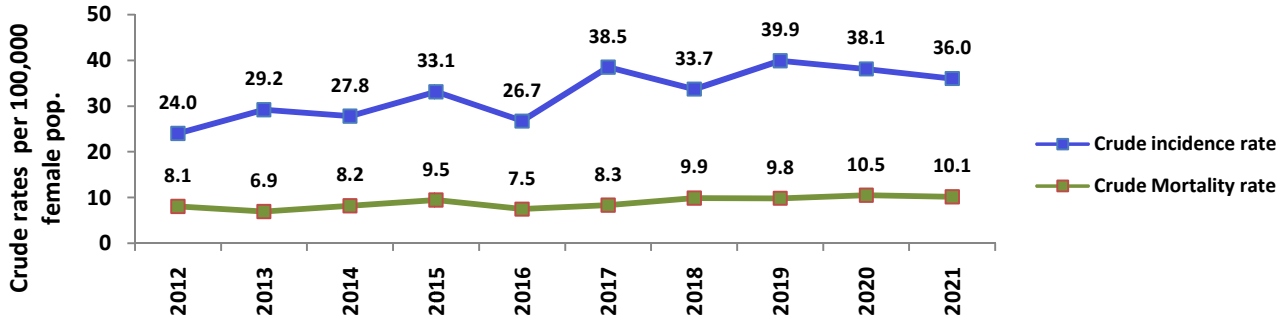
The CIR of breast cancer, both sexes, was 18.5 per 100,000 population, while the ASIR was 29.6 cases per 100,000 population in the WB in 2017-2021.

# 3.2 Female breast cancer, 2017-2021

## 3.2.1 Female breast cancer incidence and mortality rates

The crude incidence rate of breast cancer increased 50% between 2012 and 2021. However, over the last four years the mortality rate remained relatively stable around 10 deaths per 100,000 female population. Therefore, huge efforts are needed to counteract breast cancer growing burden, as its incidence and mortality remain high.

**Graph (29) Crude incidence and mortality rates of breast cancer per 100,000 female population, West Bank, 2012-2021**




During 2017-2021, the total number of registered female breast cancer was 2,465 cases in WB. The CIR was 37.2 cases per 100,000 women, and the ASIR was 57.6 cases per 100,000 female population. Moreover, the cumulative risk CumR was 6.0% (1 in 16 women), representing the probability of being diagnosed with a breast cancer before the age of 75, in the absence of other causes of death.

In 2020, although Palestine is one of the countries of high level of Human Development Index HDI, the CumR of developing female breast cancer was higher in the WB 6.1% compared with the CumR in many countries with the same HDI level which is 4.6% in 2020. The CumR ranged from 3.9 to 3.0% in low and medium HDI countries, respectively, to 4.6 and 8.2% in high and very high HDI countries, respectively, source GLOBOCAN 2020.

**Table (10) Distribution of female breast cancer cases and incidence summary by year, West Bank, Palestine, 2017-2021**

| Year | No. | CIR | CumR 74* | ASIR |
|---|---|---|---|---|
| 2017 | 490 | 38.5 | 6.3% | 61.1 |
| 2018 | 436 | 33.7 | 5.3% | 52.6 |
| 2019 | 527 | 39.9 | 6.5% | 62.6 |
| 2020 | 515 | 38.1 | 6.1% | 58.8 |
| 2021 | 497 | 36.0 | 5.5% | 53.9 |
| 2017-2021 | 2,465 | 37.2 | 6.0% | 57.6 |

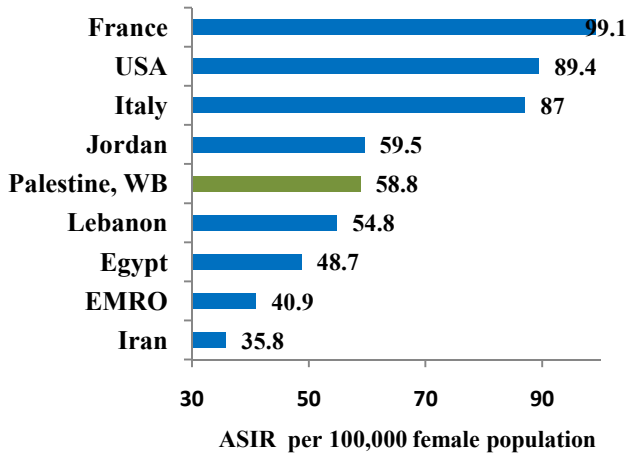
* The cumulative risk of developing cancer in 0-74 yr of age

Breast cancer incidence and mortality rates vary considerably across geographic regions. Therefore, we abstracted the estimates of ASIR and ASMR of female breast cancer in different countries from GLOBCAN database, 2020.

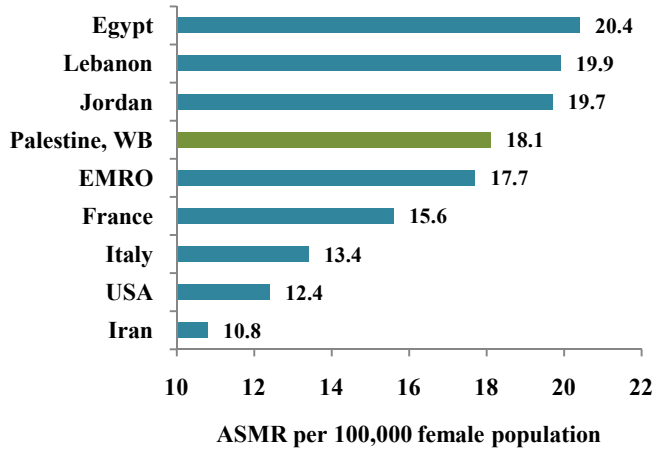
In our data, the ASIR of female breast cancer in the WB was higher than most EMRO countries but lower than in Western countries. These high ASIRs in western countries reflect a longstanding higher prevalence of reproductive and hormonal risk factors, (e.g., advanced age at first birth, fewer number of children, less breastfeeding), lifestyle risk factors (e.g., alcohol intake) as well as increased detection through organized or opportunistic mammographic screening.

For ASMR, it was found that ASMR was higher in WB than Western countries and the average of EMRO countries, but it was slightly lower than nearby Arab countries. Therefore, a lot of work must be done to reduce the mortality of breast cancer and save lives. According to the global breast cancer initiative, breast cancer mortality reduction can be achieved by health promotion for early detection, timely breast cancer diagnosis, and comprehensive breast cancer management.

**Graph (30) Age- Standardised incidence rates of female breast cancer by countries 2020**




**Graph (31) Age- Standardised mortality rates of female breast cancer by countries, 2020**



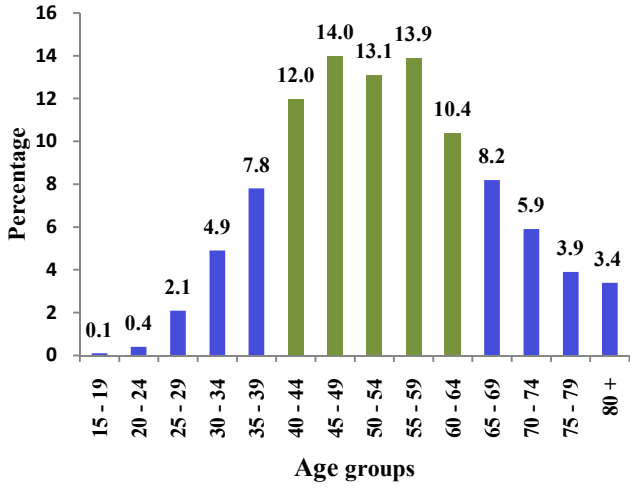

**Source: GLOBOCAN database**

### 3.2.2 Female breast cancer incidence variations by age at diagnosis

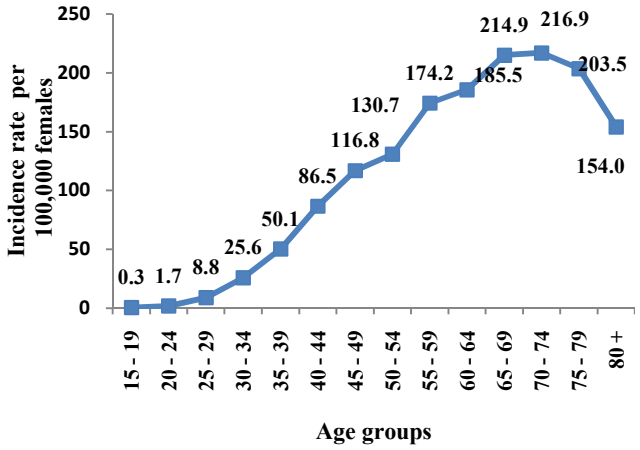
During 2017-2021, the median age of breast cancer diagnosis was 53 years. This means that half of women who developed breast cancer were 53 years of age or younger at the time of diagnosis.

Breast cancer incidence increased with age until the seventh decade of life as shown in the graph below. The decrease in incidence that occurred in women 75 years of age and older likely reflects lower rates of diagnosis and screening. Maximum age-specific incidence rate of breast cancer was 216.9 per 100.000 in 70-74 age group and decreased thereafter. The majority of cases were between age group 40 and 64 years (63.4% of cases).

**Graph (32) Percent distribution of female breast cancer by age groups, West Bank 2017-2021**




**Graph (33) Age-specific incidence rate of breast cancer per 100,000 female population, West Bank, 2017-2021**



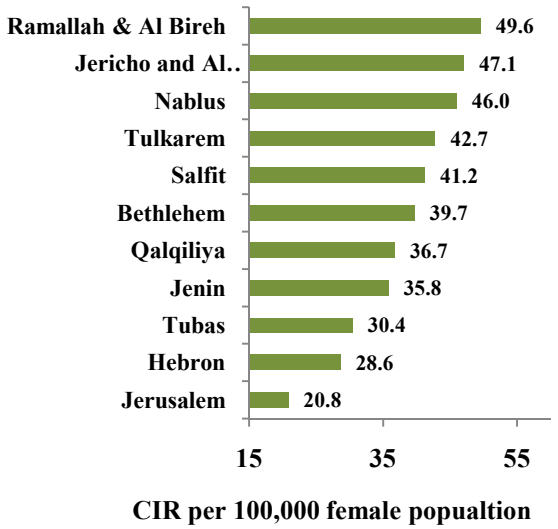

### 3.2.3 Female breast Cancer incidence variations by governorate

Ramallah and Al-Bireh had the highest CIR of breast cancer in women in 2017-2021, followed by Jericho and Al Aghwar. However, 21% of diagnosed cases were in Hebron governorate and 18.4% of cases were in Nablus governorate.

**Table (11) Distribution of numbers of notified female breast cancer by governorate, West Bank, 2017-2021**

| Governorate | Frequency |
|---|---|
| Hebron | 521 |
| Nablus | 453 |
| Ramallah & Al-Bireh | 415 |
| Jenin | 285 |
| Bethlehem | 219 |
| Tulkarem | 201 |
| Qalqiliya | 104 |
| Jerusalem | 81 |
| Salfit | 79 |
| Jericho and Al Aghwar | 60 |
| Tubas | 47 |
| Total | 2,465 |

**Graph (34) Distribution of CIRs of notified breast cancer per 100,000 female pop. by governorate, West Bank, 2017-2021**




## 3.3 Breast cancer morphology

Breast cancer is highly heterogeneous at morphology as well as molecular levels. The histological subtype invasive ductal carcinoma (IDC-NST) was the most common, constituting about 79.3% of all invasive breast carcinomas.

Invasive lobular carcinoma was the second largest biologically distinct carcinoma, representing about 7.1% of all newly diagnosed cases. Inflammatory breast carcinoma is an uncommon but aggressive subtype, representing 0.4% of invasive breast cancers.

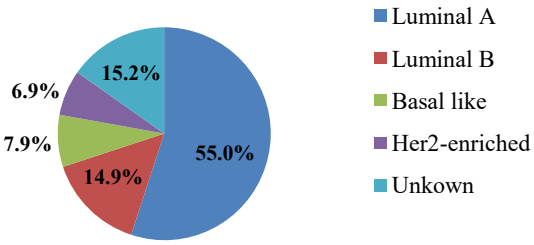
## 3.4 Breast cancer molecular subtypes

Breast cancer is further classified by molecular characteristics that are associated with clinical presentation, response to therapy, and prognosis. The four broad molecular subtypes are Luminal A, Luminal B, basal-like, and HER2-enriched. Hormone receptor positive (HR+) cancers are those that test positive for ER or PR, or both.

**Luminal A** was the most common type of breast cancer 55.0% in WB in 2017-2021. This type tends to grow slowly and is less aggressive than other types

**Luminal B** was much less common than luminal A, making up only 14.9% of breast cancer cases, its outcomes usually tend to be poorer.

**Graph (35) Distribution of percentage of female breast cancer subtypes; West Bank, Palestine, 2021**




**Luminal A: HR+/HER2-**
**Luminal B: HR+/HER2+**
**Basal Like (Triple negative): HR-/HER2-**
**HER2-enriched: HR-/HER2+**

**Basal like (triple negative):** about 7.9% of cases, which is characterized by an aggressive clinical outcome.

**Her2-enriched**: 6.9% of cases, which are usually characterized by aggressive invasion and high recurrence rate.

## 3.5 Grade at diagnosis of breast cancer

The grade of the cancer describes what the cancer cells look like compared to normal cells. In general, a lower grade indicates a slow-growing cancer and a higher grade indicates a faster-growing one. The table blow shows that half of breast cancer cases are highly graded, while the low grade cases representing a very low percentage compared to other grades.

**Table (12) Distribution of number and percentages of breast cancer cases by grade, West Bank, Palestine, 2017-2021**

| Grade | Number | Percentage |
|---|---|---|
| Grade 1 (Low grade) | 93 | 3.7% |
| Grade 2 (Intermediate grade) | 946 | 37.8% |
| Grade 3 (High grade) | 1,124 | 45.0% |
| Unknown | 339 | 13.5% |
| Total | 2,502 | 100% |

## 3.6 Stage at diagnosis of breast cancer

Stage at diagnosis is one of the most important factors affecting prognosis because treatment is typically more effective when the cancer is less extensive.

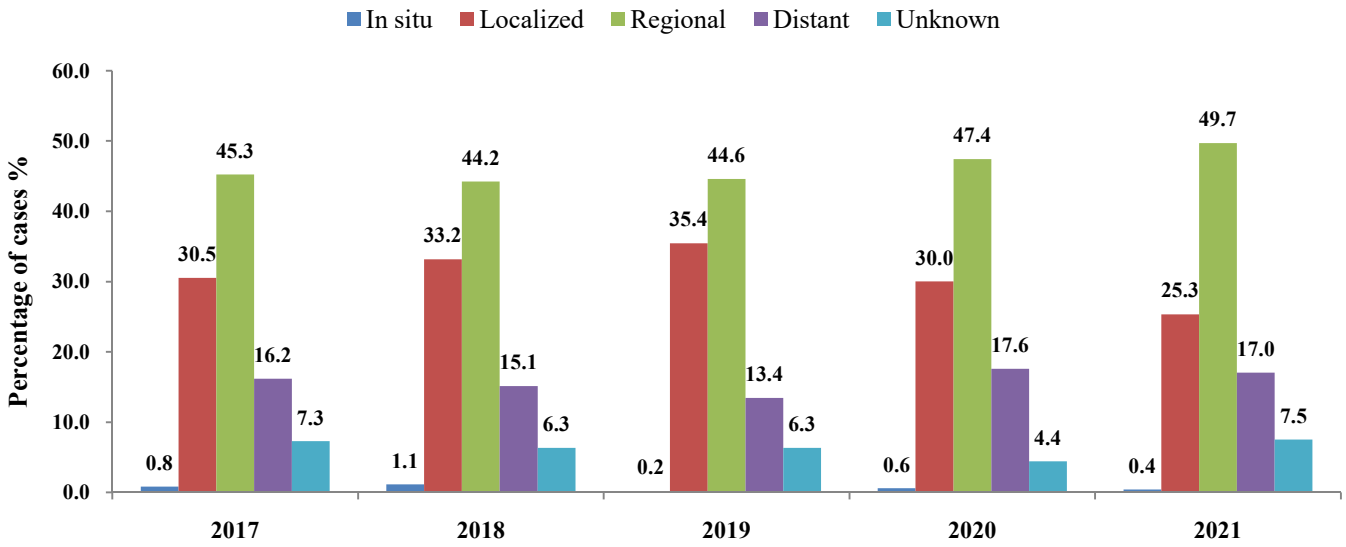
Several staging systems are used to classify cancer. A system of summary staging is used for descriptive and statistical analysis of population based cancer registry data and is particularly useful for looking at trends over time. According to this system, if cancer cells are present only in the layer of cells where they developed and have not spread, the stage is in situ. If cancer cells have penetrated beyond the original layer of tissue, the cancer has become invasive and is categorized as local, regional, or distant based on the extent of spread.

- Localized: There is no sign that the cancer has spread outside of the breast.
- Regional**:** The cancer has spread outside the breast to nearby structures or lymph nodes.
- Distant: The cancer has spread to distant parts of the body such as the lungs, liver or bones.

In WB, it is found that 31% of registered breast cancer cases were diagnosed at localized stage and 16% were diagnosed at distant stage. The full distribution of all stages (local, regional, distant and unknown) is shown in the graph below in the WB, 2017-2021. The graph shows that there was an improvement in the percentage of early diagnosis cases (localized and regional stage) till 2019. Then the percentage of localized stage breast cancer cases gradually dropped in the years 2020–2021, and the percentage of breast cancer diagnosed at a distant stage increased about 4% in 2020 and 2021 compared with 2019. The most common site of metastases for breast cancer was the bone (36% of metastases cases) in addition to other sites like liver, lung and brain.

A rise in advanced breast cancer cases following the COVID-19 pandemic was reported in Palestine and many other countries worldwide. During the pandemic, the number of screening mammograms in the WB dropped by 50% compared with 2019.

**Graph (36) Percentage distribution of breast cancer cases by stage at diagnosis and year, West Bank 2017-2021**




## 3.7 Mammography and breast ultrasound

The Ministry of health keens to provide mammography and breast ultrasound services at MoH facilities which are free of charge. However, the examined women represent only 3.0% of the target women for mammography screening (women aged 40-64). This low percentage of examined women is affecting the MoH efforts for early detection of breast cancer and decreasing breast cancer mortality.

**Table (13) Distribution of Beneficiaries of Mammography and breast ultrasound, Ministry of Health, West Bank, Palestine, 2017-2021**

| Year | No. of female population Aged 40-64 | No. of Beneficiaries Mammography | No. of Beneficiaries Breast Ultrasound |
|---|---|---|---|
| 2017 | 257,020 | 9,721 | 2,899 |
| 2018 | 272,022 | 10,287 | 1,195 |
| 2019 | 280,820 | 10,339 | 2,999 |
| 2020 | 289,470 | 5,131 | 1,948 |
| 2021 | 297,944 | 5,864 | 1,944 |

## 3.8 Breast cancer survival rate

Survival time is one of the indicators used for evaluation of the quality of care in different types of malignancies, including breast cancer.

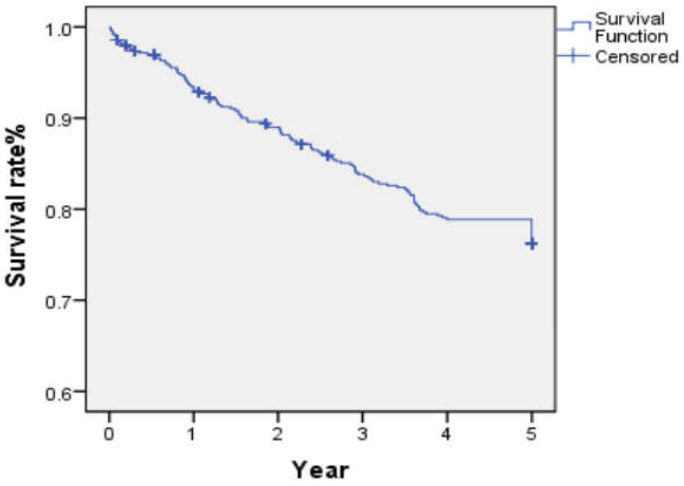
In our analysis, Kaplan Meier method was used to estimate survival rates. Univariate analysis using log-rank test was used to examine the differences in survival between groups. Multivariate analysis using Cox proportional hazards regression was used to estimate hazard of death and obtain significant predictors that influence cancer patients' survival.

## Survival rate

From the NCR, the total number of diagnosed cases with breast primary cancer, between 1st Jan/2017 and 31st Dec/2017, was 490 cases. To estimate the 5-years survival rate of breast cancer, this cohort was followed up retrospectively for 5 years from the date of diagnosis.

In our analysis to estimate the cause-specific survival rate, date of death was collected from medical records, death registry/MoH (also for cause of death), and where unavailable, telephonic contact of the patient's relatives was conducted to ascertain the present status of the subject. When contact could not be established in spite of three attempts, patients were classified as lost to follow up (censored).

**Graph (37) Kaplan-Meier curves of breast cancer survival rate, West Bank, 2017-2021**




Using Kaplan Meier analysis, the estimated 5-years survival rate was 74%, which means 74 out of 100 people with breast cancer have survived the first five years after their diagnosis in 2017. Moreover, the 1- and 3-year survival rates were 93%, 84%, respectively.

From the literature, various prognostic factors impact the 5-yr survival of breast cancer patients, including age at diagnosis, luminal subtypes, and stage at diagnosis, etc. These factors were analyzed using cox proportional hazards regression, univariate and multivariate.

### Breast cancer survival by age at diagnosis

The 5-year breast cancer-specific survival rates for patients <53years and patients ≥53 years were 83%, 66%, respectively. There was a significant difference in breast cancer survival between age groups ($P$<.001).

### Breast cancer survival by stage at diagnosis

Survival differed by stage at diagnosis, patients diagnosed at localized stage had about 92% five-year survival probability and those diagnosed at a regional stage at 78% ; while those diagnosed at distant stage had only 28% survival probability, log-rank test $P$ < .001.

The median survival time is the time point at which the probability of survival equals 50%. The median survival time for localized stage exceeded the 5.0 years, while it was 3.45 years for distant stage. So, undoubtedly breast cancer screening is too important. The earlier it is detected, the better the survival rate and quality of life will be.

### Breast cancer survival by molecular subtype

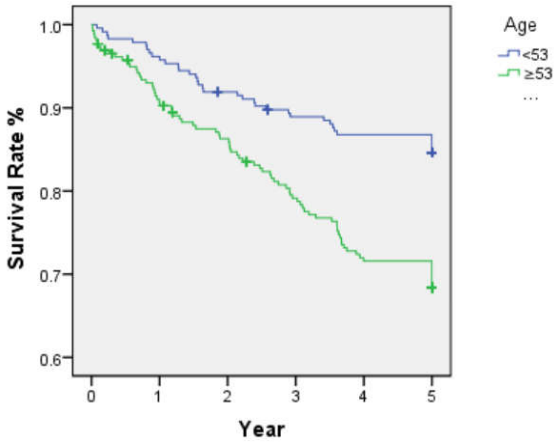
Univariate analysis showed significant differences in survival between the molecular subtypes ($P$=0.008). Patients with luminal A subtype experiencing the highest survival rate by about 80% followed by those with the luminal B subtype by about 68% and HER2-enriched subtype about 64%. The poorest survival was observed among patients with the triple-negative subtype.

## Breast cancer survival by type of treatment

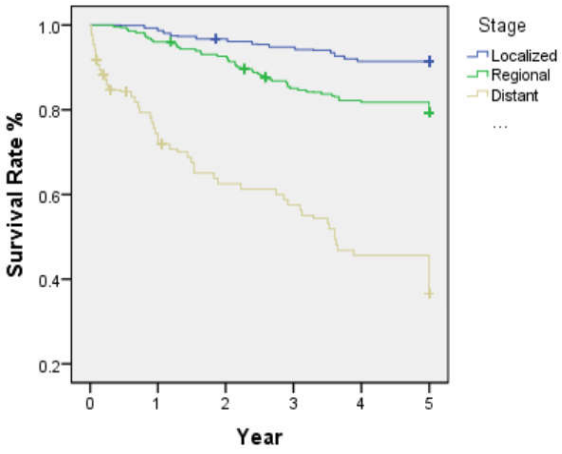
The 5-year survival was 76% for patients received chemotherapy compared with 68% for patients not treated with chemotherapy (*P*<0.015). Similarly, the 5-year survival was 82% for patients underwent surgery compared with 56% for patients did not undergo surgery (*P*<.001).

For radiotherapy, the 5-year survival was 76% for patients receiving radiotherapy compared with 72% for patients did not receive radiotherapy, the difference was not statistically significant (P=.321).

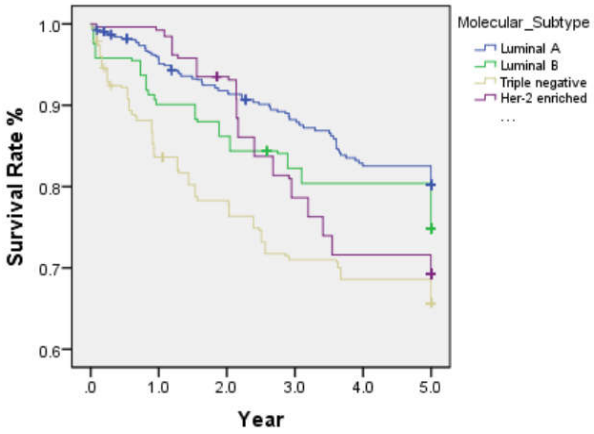
**Graph (38) Kaplan-Meier plot of breast cancer survival rate by age at diagnosis, West Bank, 2017-2021**



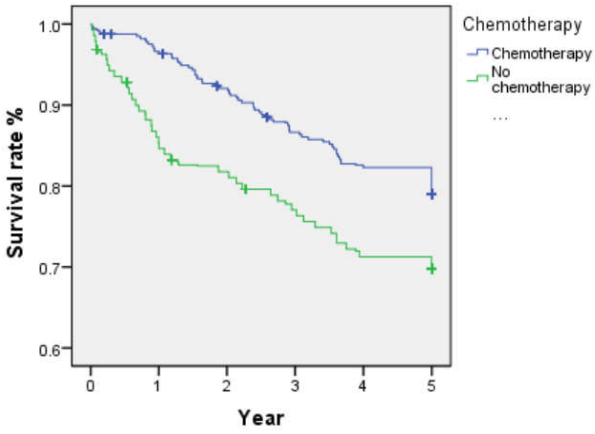

**Graph (39) Kaplan-Meier plot of breast cancer survival rate by stage at diagnosis, West Bank, 2017-2021**



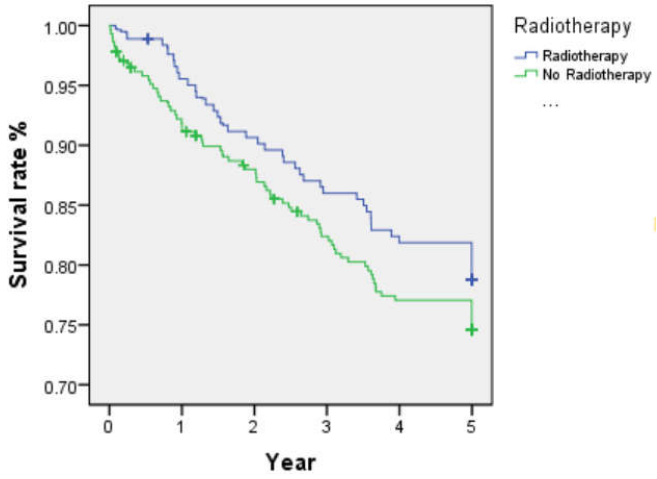

**Graph (40) Kaplan-Meier plot of breast cancer survival rate by molecular subtype, West Bank, 2017-2021**



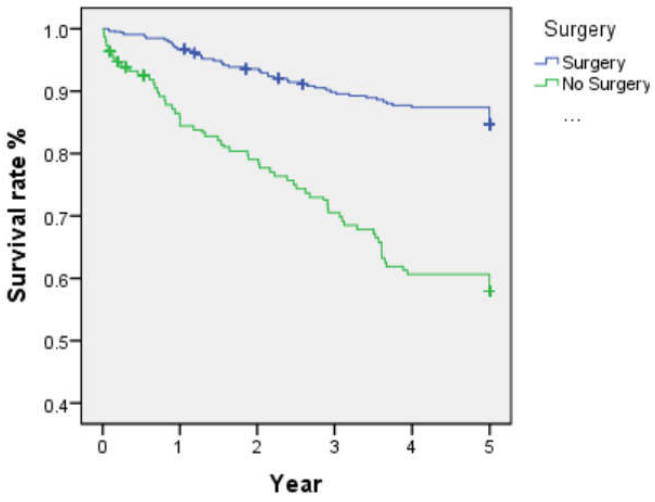

**Graph (41) Kaplan-Meier plot of breast cancer survival rate with and without chemotherapy, West Bank, 2017-2021**



**Graph (42) Kaplan-Meier plot of breast cancer survival rate with and without radiotherapy, West Bank, 2017-2021**




**Graph (43) Kaplan-Meier plot of breast cancer survival rate with and without surgery, West Bank, 2017-2021**




## Prognostic Factors for breast cancer survival rate

Cox proportional hazards model was applied to evaluate the prognostic factors. Variables that were found to be significant on univariate analysis were then run through this multivariate analysis, computing the hazard ratio (HR) and corresponding 95% confidence intervals (95%CI)

The major independent prognostic factors associated with increased risk of death from breast cancer are shown in the table below, which were all statistically significant except for Luminal B patients.

Age 53 and above was a prognostic factor for death compared with patient below 53, *P*=.012. The hazard of dying from BC in five years was 76% higher in patients aged 53 years and above than patients aged below 53 years.

Stage at diagnosis is always one of main prognostic factors for cancer patients. In WB, the hazard of death is 8.6 times higher among patients with a distant stage at diagnosis compared with patients with localized stage.

Hazard Ratios of the different molecular subtypes were compared with a baseline of luminal A patients. Patients with triple negative and Her-2 enriched breast cancer had higher risk of death compared with Luminal A patients.

The Hazard ratio was 1.70 (95% CI 1.10-2.74) for patients did not receive chemotherapy compared with patients received chemotherapy, *P*=.03. Similarly, the hazard ratio was 2.10 (95% CI 1.35-3.20) for patients did not undergo surgery compared with patients underwent surgery, which was statistically significant in univariate and multivariate analysis. This could be partially attributed to the fact that surgery is often indicated for early stage cancer cases.

**Table (14) Univariate and multivariate cox proportional hazards analysis of factors affecting survival in patients with breast cancer, West Bank 2017-2021**

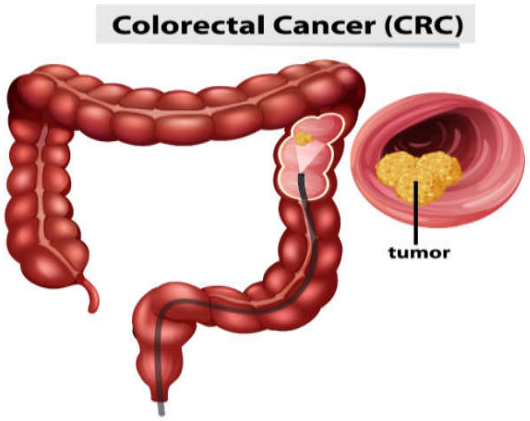
| Prognostic factors | | Univariate analysis | | Multivariate analysis | |
|---|---|---|---|---|---|
| | | Hazard Ratio (95% CI) | P-value | Hazard Ratio (95% CI) | P-value |
| Age at diagnosis | | | | | |
| | < 53 | Reference | | Reference | |
| | ≥ 53 | 2.25 (1.52-3.34) | .000 | 1.76 (1.13-2.73) | .012 |
| Stage at diagnosis | | | | | |
| | Localized | Reference | | Reference | |
| | Regional | 2.50 (1.35-4.62) | .007 | 2.96 (1.54-5.67) | .001 |
| | Distant | 11.48 (6.19-21.29) | .000 | 8.61 (4.59-16.16) | .000 |
| Molecular subtype | | | | | |
| | Luminal A | Reference | | Reference | |
| | Luminal B | 1.29 (0.69-2.41) | .414 | 1.12 (0.51-2.47) | .770 |
| | Triple negative | 1.96 (1.90-3.53) | .025 | 2.40 (1.28-4.51) | .008 |
| | Her-2 enriched | 1.56 (0.82-3.96) | .175 | 2.58 (1.31-5.10) | .006 |
| Chemotherapy | | | | | |
| | Yes | Reference | | Reference | |
| | No | 1.66 (1.08-2.54) | .020 | 1.70 (1.10-2.74) | .030 |
| Surgery | | | | | |
| | Yes | Reference | | Reference | |
| | No | 3.39 (2.32-4.94) | .000 | 2.10 (1.35-3.20) | .001 |

# Colorectal cancer 2017-2021

## Introduction

Colorectal cancer CRC incidence has been steadily rising worldwide, especially in developing countries that are adopting the "Western" way of life. Obesity, sedentary lifestyle, red meat consumption, and tobacco are considered the driving factors behind the growth of CRC.

According to many studies conducted to estimate the CRC burden, CRC is projected to increase to 3.2 million new cases and 1.6 million deaths by 2040 with most cases predicted to occur in high or very high HDI countries.

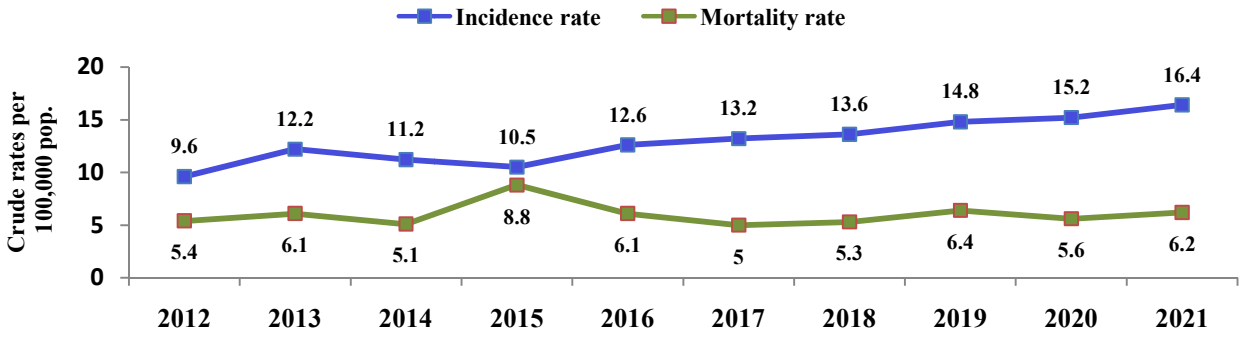



# 4.1 Colorectal cancer incidence and mortality rates

In 2017-2021, the total number of notified CRC cases was 1,978 cases with CIR 14.7 per 100,000 population and ASIR was 26.4 per 100,000 population in the WB. The CIR increased from 9.6 per 100,000 in 2012 to 16.4 per 100,000 population in 2021. This goes with projection of CRC increase in high or very high HDI countries, including Palestine. Therefore, CRC could represent a problem of growing impact for health services in Palestine.

The mortality rate remained relatively stable; the highest during the last ten years was in 2015 with 8.8 deaths per 100,000 population. This constant mortality trend was found despite increasing incidence rate, this could be a direct consequence of increasing survival overtime.

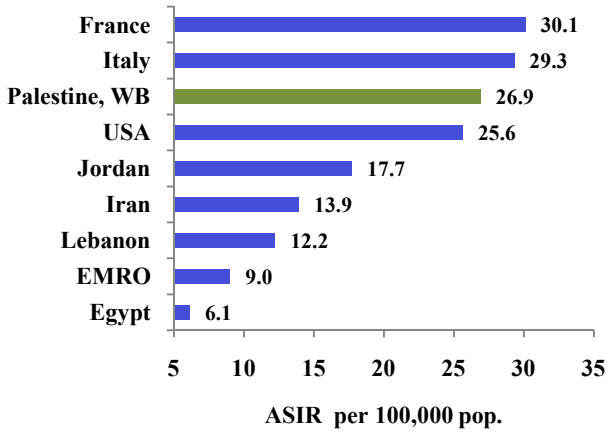
**Graph (44) Crude incidence and mortality rates of colorectal cancer per 100, 000 population, West Bank, 2012-2021**



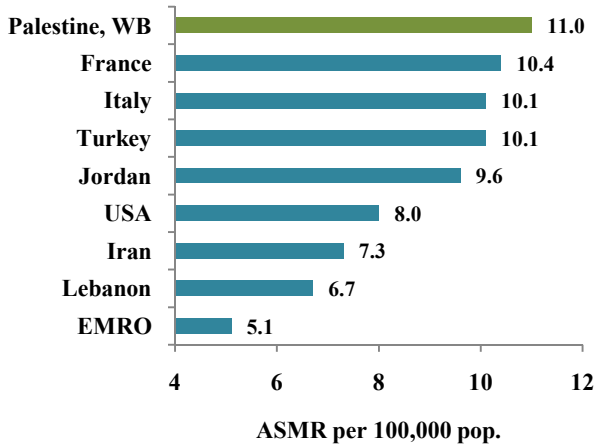

To compare incidence of CRC with other countries, we abstracted the estimates of ASIR of CRC in different countries from GLOBOCAN database. In 2020, the ASIR of CRC in the WB for both sexes was 26.9 per 100,000 population, which is considered high when compared with other countries, especially EMRO countries which was 9.0 cases per 100,000 population.

Moreover, the ASMR is considered high in WB when compared with other countries, especially countries with high ASIR (e.g., USA, Italy and France). This can be interpreted by the fact that developed countries have achieved advances in early detection screening, genetic testing, and treatment. These reduced the mortality rates even with high incidence rates of CRC.

**Graph (45) Age- Standardised Incidence rates of colorectal cancer by countries 2020**




**Graph ( 46) Age- Standardised mortality rates of colorectal cancer by countries 2020**




**Source: GLOBOCAN database**

## 4.2 Colorectal cancer incidence variations by sex

CRC was the most common cancer in male and second in female. The cumulative risk (CumR) was 3.3 for males and 2.6 for females, representing the probability of being diagnosed with a CRC before the age of 75, in the absence of other causes of death. The lifetime risk (0-74 years of age) was 1 in 30 among males and 1 in 39 among females

In 2017-2021, more males develop CRC, with ASIRs of 29.3 per 100,000 males compared to 24.0 per 100,000 female in the WB. Moreover, the increase of CIR of CRC from 2017 to 2021 was much higher in females than in males, which was 36.3%, 15.3%, respectively.

**Table (15) Colorectal cancer incidence summary by year and sex, West Bank, 2017-2021**

| Year | Males | | | | Females | | | |
|---|---|---|---|---|---|---|---|---|
| | No. | CIR | CumR* | ASIR | No. | CIR | CumR* | ASIR |
| **2017** | 181 | 13.7 | 2.9 | 27.3 | 158 | 12.4 | 2.5 | 21.6 |
| **2018** | 207 | 15.4 | 3.4 | 30.8 | 156 | 12.1 | 2.3 | 21.0 |
| **2019** | 192 | 14.0 | 3.2 | 27.1 | 209 | 15.8 | 3.1 | 26.8 |
| **2020** | 234 | 16.7 | 3.7 | 32.2 | 182 | 13.5 | 2.4 | 22.3 |
| **2021** | 226 | 15.8 | 3.2 | 29.1 | 233 | 16.9 | 2.9 | 28.1 |
| **2017-2021** | **1,040** | **15.1** | **3.3** | **29.3** | **938** | **14.2** | **2.6** | **24.0** |

* The cumulative risk of developing cancer in 0-74 yr of age

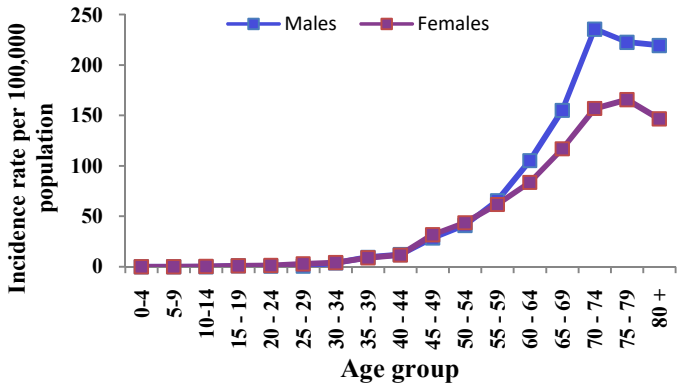
## 4.2 Colorectal cancer incidence variations by age at diagnosis

Colorectal cancer is very much a cancer of the elderly and with increasing aging of the population the number of cases in the population may be expected to rise, which pose an additional public health challenges.

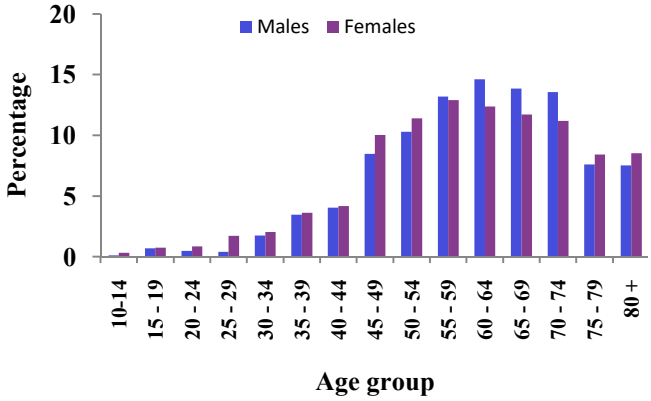
The median age at diagnosis of CRC varies from one geographical region to another. In WB, the median age for CRC patients was 62 year, which is lower than Westernized countries like Sweden (71 years) but higher than the median age at diagnosis in India (47.2 years.). This could be partially attributed to differences in population structure. However, lower median age indicated a higher burden of young CRC cases compared with countries with higher median age.

In WB, the incidence rates in adults aged 55 and over were higher for males than females and this gap was widest at ages 70–74.

**Graph (47) Age-specific incidence rates of colorectal cancer per 100,000 population by sex, West Bank 2017-2021**




**Graph (48) Percentages distribution of colorectal cancer cases by age groups and sex, West Bank 2017-2021**



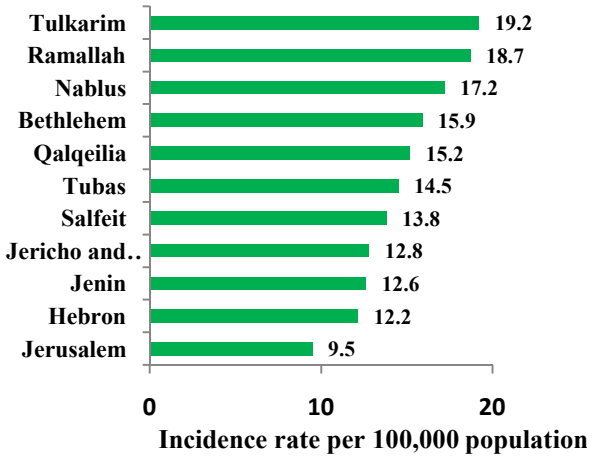

## 4.3 Colorectal cancer incidence variations by governorate

In 2017-2021, the highest crude incidence rate was in Tulkarem governorate with 19.2 cases per 100,000 population, followed by Ramallah and Al-Bireh governorate. However, 23% of diagnosed CRC cases were in Hebron governorate and 17.4% of cases were in Nablus governorate.

**Table (16) Distribution of numbers of notified CRC cases by governorate, West Bank, 2017-2021**

| Governorate | Male | Female | Total |
|---|---|---|---|
| Hebron | 245 | 208 | 453 |
| Nablus | 186 | 159 | 345 |
| Ramallah & Al-Bireh | 169 | 148 | 317 |
| Jenin | 112 | 93 | 205 |
| Tulkarem | 94 | 90 | 184 |
| Bethlehem | 94 | 85 | 179 |
| Qalqeilia | 40 | 44 | 84 |
| Jerusalem | 41 | 35 | 76 |
| Salfeit | 20 | 34 | 54 |
| Tubas | 24 | 24 | 48 |
| Jericho & Al-Aghwar | 15 | 18 | 33 |
| Total | 1,040 | 938 | 1,978 |

**Graph (49) Distribution of CIR per 100,000 population of notified CRC cases by governorate, West Bank, 2017-2021**




## 4.4 Stage at diagnosis of colorectal cancer

For staging CRC at diagnosis, we used the SEER staging groups: localized, regional, and distant stages

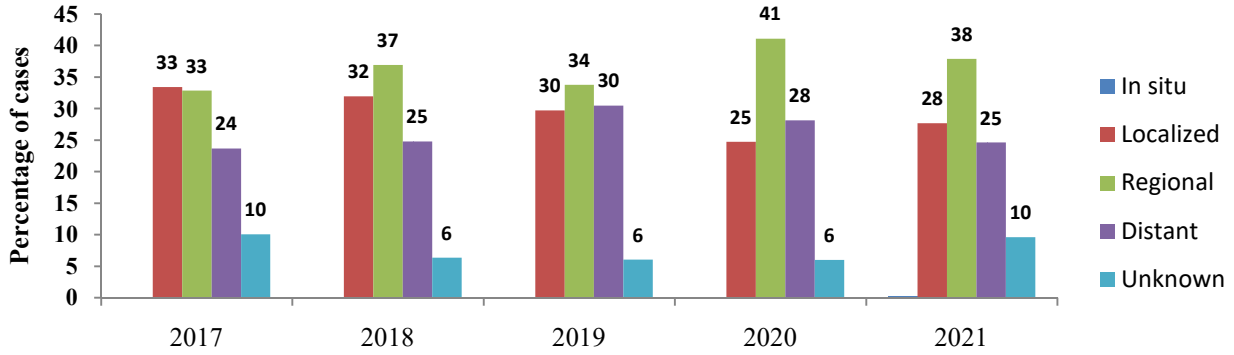
- **Localized:** There is no sign that the cancer has spread outside of the colon or rectum.
- **Regional:** The cancer has spread outside the colon or rectum to nearby structures or lymph nodes.
- **Distant:** The cancer has spread to distant parts of the body such as the liver, lungs, or distant lymph nodes.

In our data, we found that there was a little improvement of the percentage of early diagnosis stages in 2021 compared to stages in 2020, but still lower than previous years.

In 2017-2021, about 26% of CRC cases were diagnosed at distant stage, and 36% of cases diagnosed at regional stage. The most common site of metastases for colorectal cancer was the liver (48% of cases),

followed by lung and bones. These CRC patients were diagnosed late when the tumor had already grown into a clinically detectable size causing alarming symptoms and signs. It has been usually attributed to lack of screening and poor awareness of the disease early symptoms. Therefore, screening tests can help prevent CRC or find it early, when it may be easier to treat.

**Graph (50) Distribution of Colorectal Cancer stages at diagnosis by year, West Bank, 2017-2021**

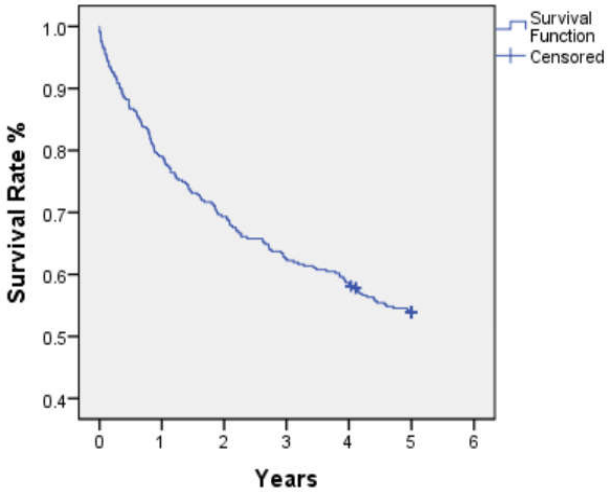



## 4.5 Colorectal cancer survival rate

From the NCR, the total number of diagnosed cases with CRC primary cancer, between 1st Jan/2017 and 31st Dec/2017, was 339 cases. To estimate the 5-years survival rate of CRC cancer, this cohort was followed up retrospectively for 5 years from the date of diagnosis.

In our analysis to estimate the survival rate, date of death was collected from medical records, death registry/MoH, and where unavailable, telephonic contact of the patient's relatives was conducted to ascertain the present status of the subject. When contact could not be established in spite of three attempts, patients were classified as lost to follow up (censored).

**Graph (51) Kaplan-Meier curves of colorectal cancer survival rate, West Bank 2017-2021**




Using Kaplan Meier analysis, the estimated 5-year survival rate of colorectal cancer was about 54%. Moreover, the 1- and 3-year survival rates were 79%, 63%, respectively.

The 5-year survival for colorectal cancer in the WB (54%) was comparable even with some developed countries but it is far from the rates in those with advanced health care systems, or community-based screening programs. Thus on the policy level, application of an appropriate national cancer control program and management guidelines should be under consideration.

From the literature, different prognostic factors can influence the survival rates of CRC like age, sex, histology type, tumor grade, tumor stage, etc..

### Colorectal Cancer survival by age at diagnosis

Our data indicated that people diagnosed with young-onset aged <50 colon cancer had better survival rate than older patients aged ≥50, the 5-year survival rate for patients <50 years was 63%, while it was 51% for patients ≥50 years, $P = .047$.

## Colorectal Cancer survival by sex

The graph below shows the differences in 5-years survival rate between males and females. Although the 5-year survival rate was better in females 58% compared to males 51%, the differences was not statistically different, *P* =.29. In addition, males were about 20% more likely to die from CRC than females.

## Colorectal Cancer survival by stage at diagnosis

The 5-year survival rate for localized, regional and distant stages were 77%, 68%, and 14%, respectively, log rank *P*<.001.

Tumors that are only in the colon or rectum have always a better prognosis than those that have grown through the wall of the colon or rectum, or have spread to other organs.

Since survival is lowest among CRC patients diagnosed at stage IV, particularly in elderly patients, it reinforces the need for early diagnosis and continuous availability of innovative late stage therapies for the patients,

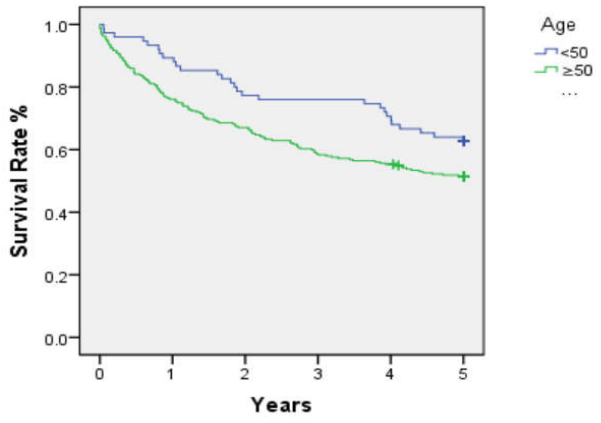
## Colorectal Cancer survival by grade

The 5-year survival rate was 79% for low grade CRC, 60% for moderate grade CRC, and 30% for high grade CRC, and the differences were statistically significant.

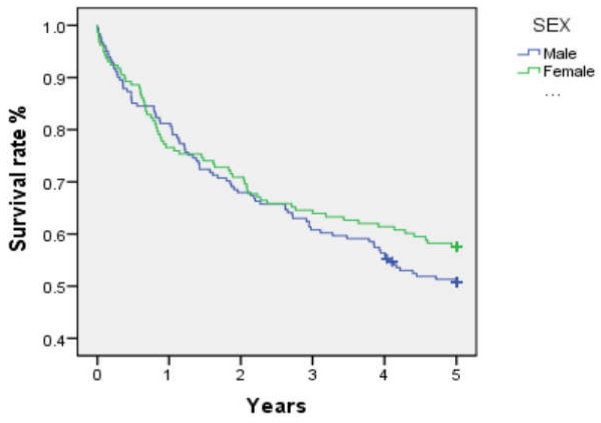
## Colorectal Cancer survival by type of treatment

We observed a higher percentage of patients who survived the 5-years with the combined therapy 58% than patients who received only one therapy 48%, *P* = .25. Moreover, the 5-year survival rate for patients received radiotherapy was 62%, chemotherapy 54%, and surgery 55%. However, there was no statistically significant difference between patients received chemotherapy or not, and patients received radiotherapy or not, and those received surgery or not.

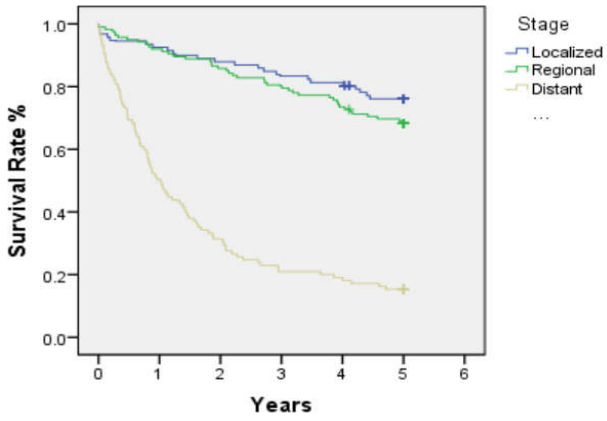
**Graph (52) Kaplan-Meier plot of colorectal cancer survival rate by age at diagnosis, West Bank, 2017-2021**



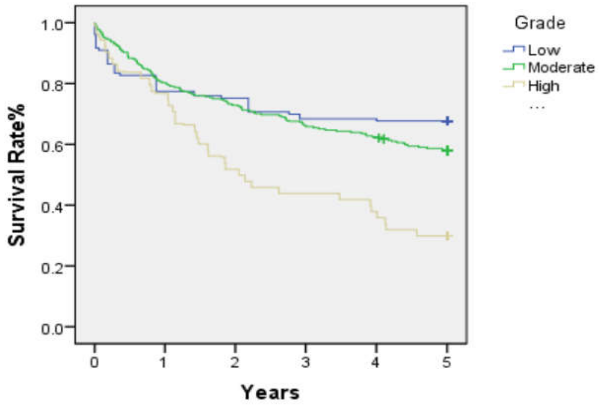

**Graph (53) Kaplan-Meier plot of colorectal cancer survival by sex, West Bank, 2017-2021**



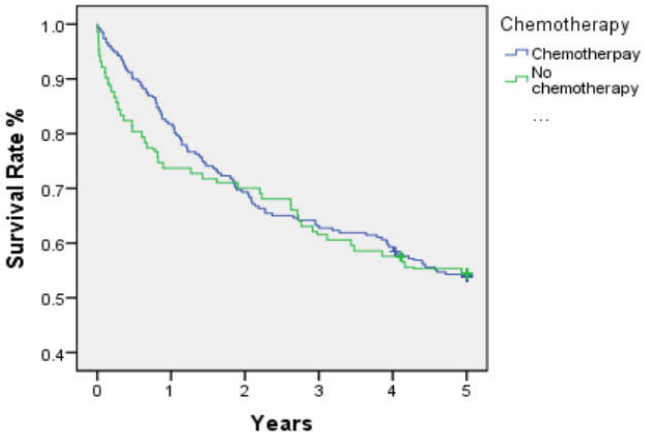
**Graph (54) Kaplan-Meier plot of colorectal cancer survival rate by stage st diagnosis, West Bank, 2017-2021**



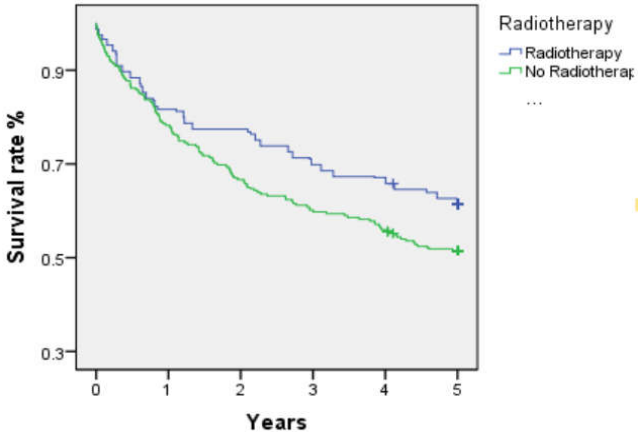

**Graph (55) Kaplan-Meier plot of colorectal cancer survival rate by grade at diagnosis, West Bank, 2017-2021**



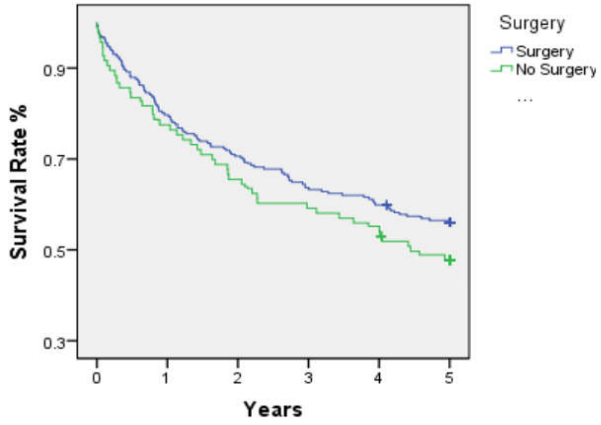

**Graph (56) Kaplan-Meier plot of colorectal cancer survival rate with or without chemotherapy, West Bank, 2017-2021**



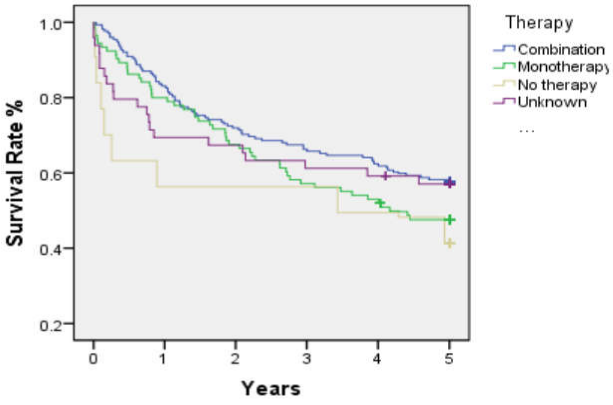

**Graph (57) Kaplan-Meier plot of colorectal cancer survival rate with or without radiotherapy, West Bank, 2017-2021**




**Graph (58) Kaplan-Meier plot of colorectal cancer survival rate with or without surgery, West Bank, 2017-2021**




**Graph (59) Kaplan-Meier plot of colorectal cancer survival rate by therapy type, West Bank, 2017-2021**



## Prognostic factors affecting survival in colorectal cancer

Variables that were found to be significant on univariate analysis were then run through multivariate analysis, which were age at diagnosis, stage at diagnosis, and grade. Cox regression analysis revealed that the significant variables were age at diagnosis, stage at diagnosis, and grade.

There was a strong correlation between the age of patients diagnosed with CRC and their survival rates. In this analysis, it is shown that older patients have lower life expectancies compared to younger patients. The risk of dying from CRC is 63% higher for patients ≥50 years compared to patients <50 years, HR= 1.63 (95% CI 1.10-2.50).

As expected, more advanced stage and late presentation were important predictors for colorectal cancer survival. Patients with distant colorectal cancer (HR: 7.67; 95% CI: 4.71-, 12.50) had about eight times risk of dying as compared to localized stage. Therefore, the availability of population based colorectal screening program could improve the survival rate of CRC cases. High grade CRC also remained a significant predictor even after adjustment for stage and age. The hazard of death was significantly higher for those with high grade (poorly differentiated) cancer compared to those with low grade (well differentiated) cancer, HR = 3.25(95% CI: 1.03-10.25), *P* =.045.

**Table (17) Univariate and multivariate cox proportional hazards analysis of factors affecting survival in patients with colorectal cancer, West Bank, Palestine, 2017-2021**

| Prognostic factors | | Univariate analysis | | Multivariate analysis | |
|---|---|---|---|---|---|
| | | Hazard Ratio (95% CI) | P-value | Hazard Ratio (95% CI) | P-value |
| Age at diagnosis | | | | | |
| | < 50 | Reference | | Reference | |
| | ≥ 50 | 1.51 (1.01-2.27) | .047 | 1.63 (1.10-2.50) | .025 |
| Stage at diagnosis | | | | | |
| | Localized | Reference | | Reference | |
| | Regional | 1.40 (0.82-2.41) | .217 | 1.33 (0.80-2.20) | .27 |
| | Distant | 7.23 (4.53-11.73) | <.001 | 7.67(4.71-12.50) | <.001 |
| Grade at diagnosis | | | | | |
| | Low | Reference | | | |
| | Moderate | 1.3 (0.50-3.40) | .58 | 1.59 (0.54-4.66) | .39 |
| | High | 2.66 (1.01-7.01) | .049 | 3.25 (1.03-10.25) | .045 |

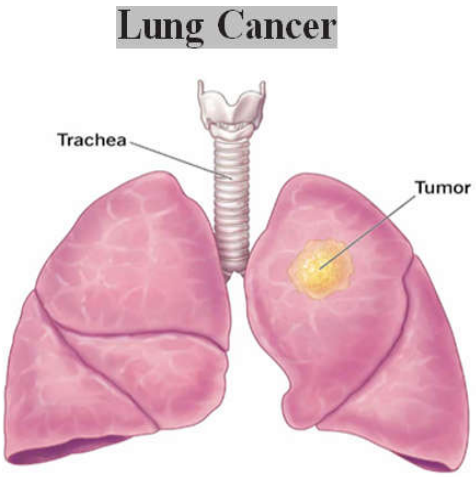
# Lung Cancer 2017-2021

## Introduction

With increasing access to tobacco and industrialization in developing countries, lung cancer incidence is rising globally. Lung cancer is the leading cause of cancer mortality worldwide, among both sexes, and men and women separately.

In Palestine, lung cancer is the 3rd most common cancer in all persons in 2017-2021, and the second most common cancer among males after CRC cancer.

In 2017-2021, lung cancer was the leading cause of cancer deaths among all persons, and men only, as breast cancer was the leading cause of death among women.

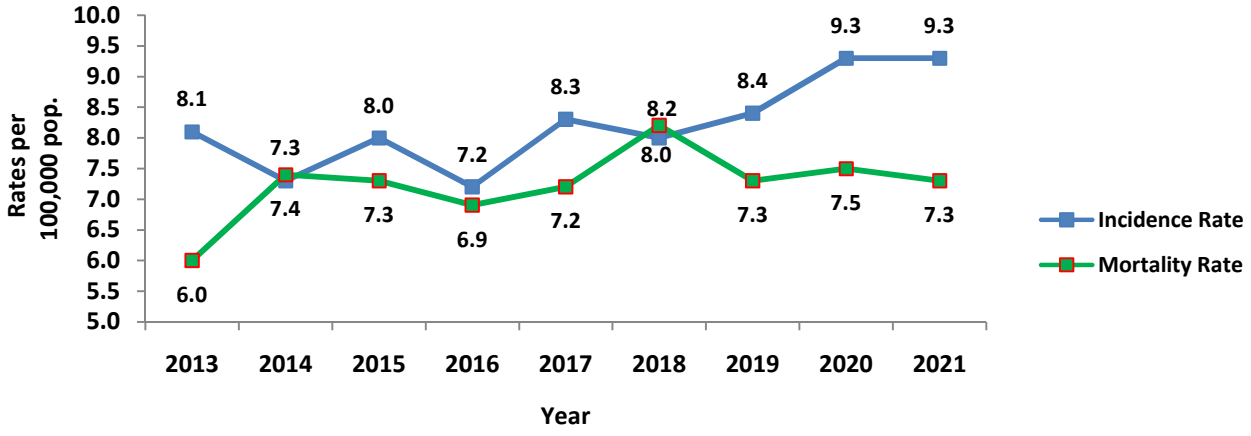



## 5.1 Lung cancer incidence and mortality rates

In the WB, the total number of notified lung cancer was 1,209 cases with CIR 9.0 per 100,000 population in 2017-2021. When compared the CIR in 2013, it was found that there was 15% increase in the CIR in 2021. The ASIR was 16.9 per 100,000 population in the WB in 2017-2021. Moreover, the highest lung CMR was in 2018 with 8.2 deaths per 100,000 population as shown in the graph below.

The trends in lung cancer mortality closely tracked trends in incidence especially for cases diagnosed before 2019. However, in 2014 and 2018, the mortality rate appears slightly higher than the incidence rate, which can be justified by the latency between incidence and mortality, as mortality often reflects deaths from cases diagnosed one or more years before the current year.

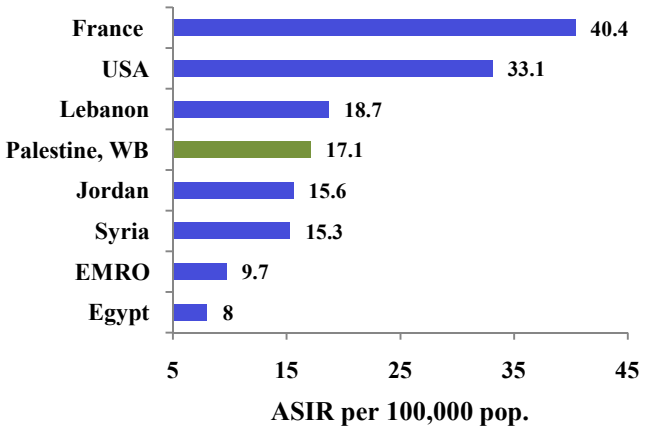
**Graph (60) Crude incidence and mortality rates of lung cancer per 100, 000 population, West Bank, 2013-2021**



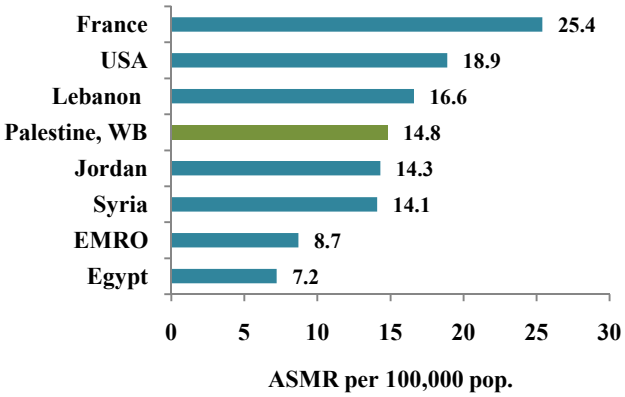

In 2020, there were 2.21 million new cases and 1.8 million deaths due to lung cancer worldwide with ASIR of 22.4/100,000, and ASMR of 18.0/100,000. In the WB, the ASIR of lung cancer was lower than world ASIR and many Western countries but higher than ASIR in many Arab countries.

In WB, the ASMR was within the range of most Arab countries but lower than the ASMR in Western countries due to the high incidence of lung cancer in these countries. The mortality to incidence ratio of lung cancer was much lower in the Western countries compared with Arab countries in general.

**Graph (61) Estimated age-standardized incidence rate of lung cancer by countries, 2020**




**Graph (62) Estimated age-standardized mortality rate of lung cancer by countries, 2020**




Source: GLOBOCAN, 2020

## 5.2 Lung cancer incidence variations by sex and age

Lung cancer was the second most common cancer in male and the incidence rate was much higher in males than females as shown in the table below, which largely reflects differences in tobacco consumption in males and females.

The cumulative risk (CumR) was 3.4 for male and 0.6 for female, representing the probability of being diagnosed with lung cancer before the age of 75, in the absence of other causes of death. The lifetime risk (0-74 years of age) was 1 in 29 among males and 1 in 166 among females.

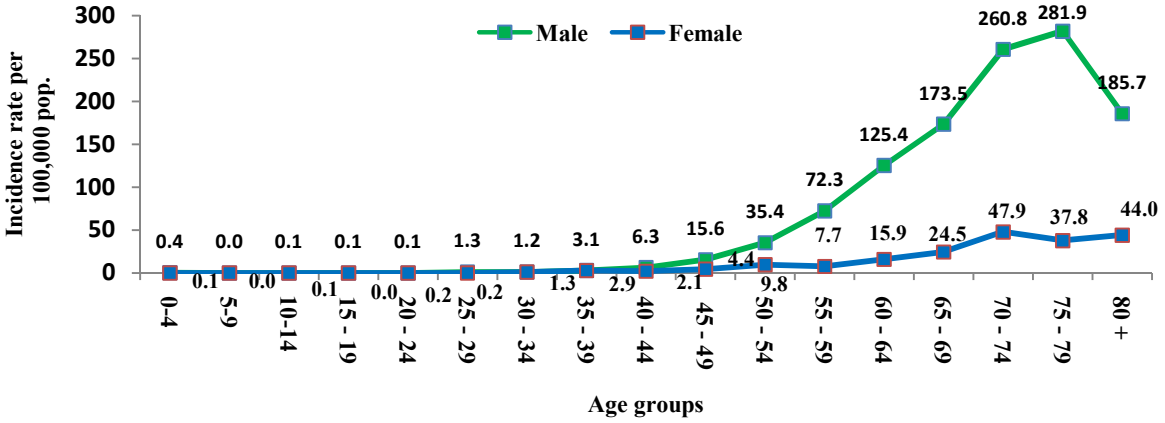
**Table (18) Lung cancer Incidence summary by year and sex, West Bank, Palestine 2017-2021**

| Year | Males | | | | Females | | | |
|---|---|---|---|---|---|---|---|---|
| | No. | CIR | CumR74* | ASIR | No. | CIR | CumR74* | ASIR |
| **2017** | 175 | 13.2 | 2.9% | 27.8 | 38 | 3.0 | 0.6% | 5.2 |
| **2018** | 209 | 15.5 | 3.9% | 32.7 | 42 | 3.3 | 0.6% | 5.9 |
| **2019** | 194 | 14.1 | 3.5% | 29.3 | 36 | 2.7 | 0.4% | 4.9 |
| **2020** | 211 | 15.0 | 3.3% | 29.5 | 43 | 3.2 | 0.6% | 5.4 |
| **2021** | 221 | 15.4 | 3.4% | 28.9 | 40 | 2.9 | 0.6% | 5.0 |
| **2017-2021** | **1,010** | **14.7** | **3.4%** | **29.7** | **199** | **3.0** | **0.6%** | **5.2** |

*The cumulative risk of developing cancer in 0-74 yr of age

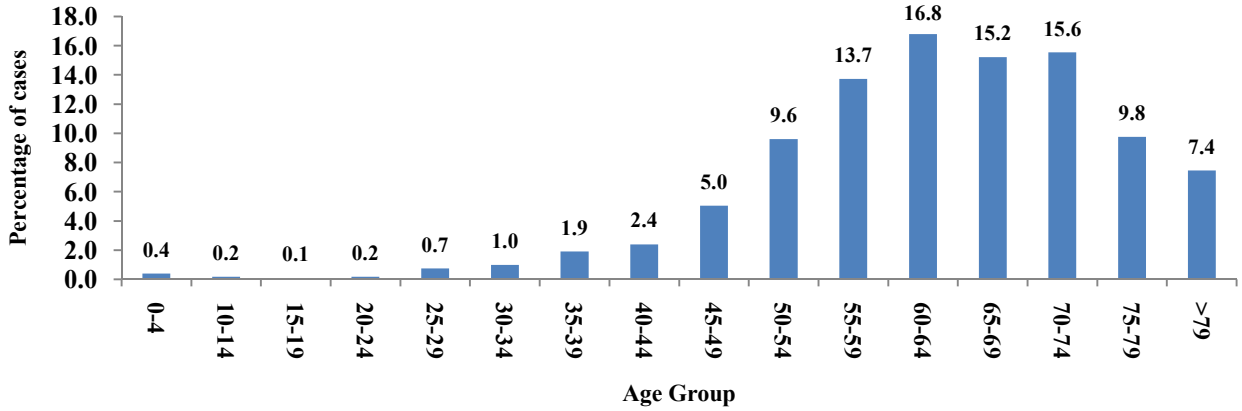
Lung cancer CIR increases dramatically with age and mainly occurs in older people. In WB, the incidence rates peaked among males aged 75–79 years, while incidence rates peaked among females aged 70-74 years.

**Graph (63) Age-specific incidence rates of lung cancer per 100,000 population by sex, West Bank 2017-2021**




The median age of lung cancer was 64 years in the period 2017-2021 in WB, and most people diagnosed with lung cancer were 55 or older (79% of cases), a very small number of people diagnosed were younger than 40.

**Graph (64) Percentages of notified cases of lung cancer by age group, both sexes, West Bank 2017-2021.**



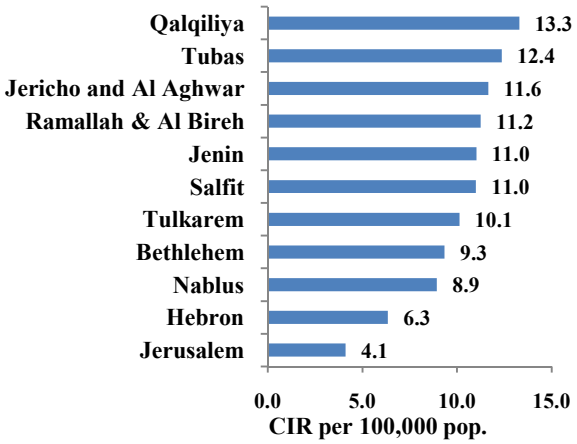

## 5.3 Lung cancer incidence variations by governorate

In 2017-2021, the highest lung cancer incidence rate was in Qalqilia governorate with 13.3 cases per 100,000 population, followed by Tubas governorate with 12.4 cases per 100,000 population. However, 19.5% of diagnosed lung cancer cases were in Hebron governorate and 15.8% of cases were in Ramallah and Al-Bireh governorate.

**Table (19) Distribution of numbers of notified lung cancer cases by governorate, West Bank, Palestine 2017-2021**

| Governorate | Male | Female | Total |
|---|---|---|---|
| Hebron | 192 | 44 | 236 |
| Ramallah & Al-Bireh | 166 | 25 | 191 |
| Jenin | 159 | 20 | 179 |
| Nablus | 145 | 34 | 179 |
| Bethlehem | 74 | 31 | 105 |
| Tulkarm | 80 | 17 | 97 |
| Qalqiliya | 64 | 13 | 77 |
| Salfit | 40 | 3 | 43 |
| Tubas | 36 | 3 | 39 |
| Jerusalem | 27 | 6 | 33 |
| Jericho & Al Aghwar | 27 | 3 | 30 |
| Total | 1,010 | 199 | 1,209 |

**Graph (65) Distribution of crude incidence rate of notified lung cancer cases by governorate, West Bank, 2017-2021**




## 5.4 Lung cancer histology

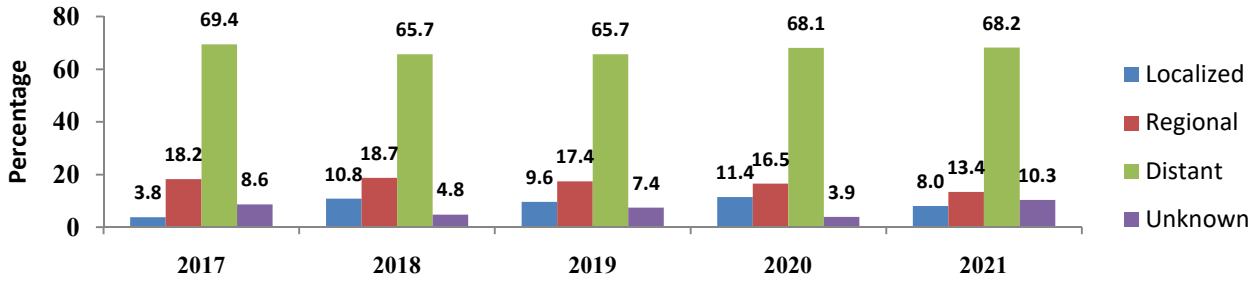
Lung cancer is defined based on the histology of the cancer cells, which is how they look under a microscope. Lung cancer is divided into two main types: small cell lung cancer (SCLC) and non–small cell lung cancer (NSCLC).

In the WB, it was found that 8.6% of diagnosed lung cancer cases were SCLC in 2017-2021, and the most common NSCLC were adenocarcinoma (31% of diagnosed cases) and squamous cell carcinoma (20% of diagnosed cases).

## 5.6 Stage at diagnosis of lung cancer

Unfortunately, lung cancer grows fast, and may not be noticed any symptoms early on. In WB, about 66% of lung cancer patients were diagnosed at distant stage in 2017-2021, additional 18% of cases was diagnosed at regional stage. Therefore, the prognosis of lung cancer remains poor. A greater percentage of males than females were diagnosed at distant stage.

**Graph (66) Percentages of lung cancer stages at diagnosis by year, West Bank, 2017-2021**

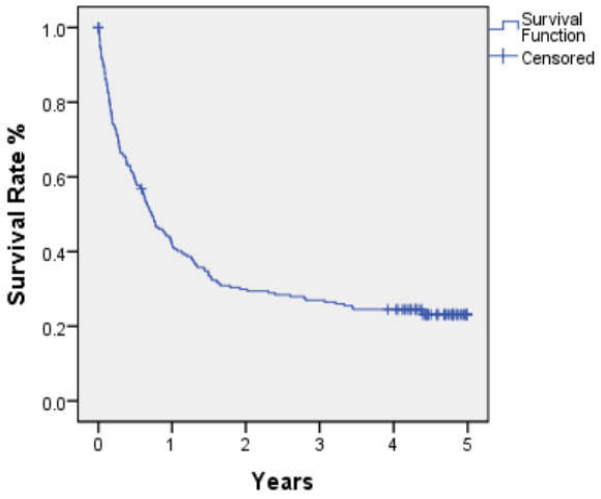


## 5.7 Lung Cancer survival rate

From the NCR, the total number of diagnosed cases with lung primary cancer, between 1st Jan/2017 and 31st Dec/2017, was 213 cases. To estimate the 5-years survival rate of breast cancer, this cohort was followed up retrospectively for 5 years from the date of diagnosis.

In our analysis to estimate the survival rate, date of death was collected from medical records, death registry/MoH, and where unavailable, telephonic contact of the patient's relatives was conducted to ascertain the present status of the subject. When contact could not be established in spite of three attempts, patients were classified as lost to follow up (censored).

**Graph (67) Kaplan-Meier curves of lung cancer survival rate, West Bank, 2017-2021**




In WB, the estimated 5-years survival rate of all types of lung cancer was about 23%, which means that only 23 out of 100 people with lung cancer have survived the first five years after their diagnosis in 2017. Moreover, the 1- and 3-year survival rates were 42%, 27%, respectively. The median survival time was 8.64 month, which is considered very low, compared with other cancer.

Despite improvement in diagnostics, staging and treatment modalities the prognosis of lung cancer remains poor. From the literature, various prognostic factors impact the 5-yr survival of lung cancer patients, including age at diagnosis, sex, stage at diagnosis, treatment, co-morbidities, etc.

Evaluating the factors associated with survival in lung cancer patients are useful as the data on prognostic variables, could be used to develop models to predict treatment response and survival in newly detected lung cancer patients.

### Lung cancer survival rate by sex

The 5-year survival rate was 22% for males and 28% for females, $P$ <.001. The median survival time was 7.9 months for males and 15.5 months for females.

### Lung cancer survival rate by age at diagnosis

The Kaplan-meier curve shows the differences in 5-years survival rate between patients aged 64 and below and patients above 64, which were 30%, 15%, respectively, $P$ <.001. The median survival was 12.8 months for patients aged 64 and below and 5.6 year for patients above 64.

### Lung cancer survival rate by stage at diagnosis

The highest 5-years survival rate was 59% among patients diagnosed in localized stage, followed by regional and distant stage, which were 39%, 16%, respectively. The median survival time was 58 month for localized stage cancer, 28.1 month for regional stage cancer, and 6.3 month for distant stage cancer.

### Lung cancer survival rate by smoking

Tobacco smoking is a major risk factor for lung cancer. However, the occurrence of lung cancer in patients with no smoking history has been increasing. It was found that 16% of lung cancer cases were among never-smoker in the WB, 2017. Moreover, the risk of dying from lung cancer was 40% higher

among ever-smoker than never-smoker, the median survival years for lung cancer patients were 17.3 month, 7.9 month, for never- and ever- smoker patients, respectively.

The 5-years survival rate were 26%, 21%, for never- and ever-smokers lung cancer patients, respectively, *P*<.001.

Moreover, in our data, 72% of ever-smoker lung cancer patients were diagnosed at distant stage, which probably affected the prognosis and survival of ever-smoker patients.

## Lung cancer survival rate by type of treatment

As shown in the graphs below, the 5-year survival rate were 25%, 20% for patient received chemotherapy and patient did not receive chemotherapy, respectively, P<.001.

The differences in 5-year survival rate was statistically different between patients underwent surgery and patients did not, 53%, 19%, respectively, P<.001. The median survival time of patients undergoing surgery was longer than that of patients who did not undergo surgery (59.0 vs. 7.5 months). Surgery is usually indicated for localized tumors which have high survival rate.

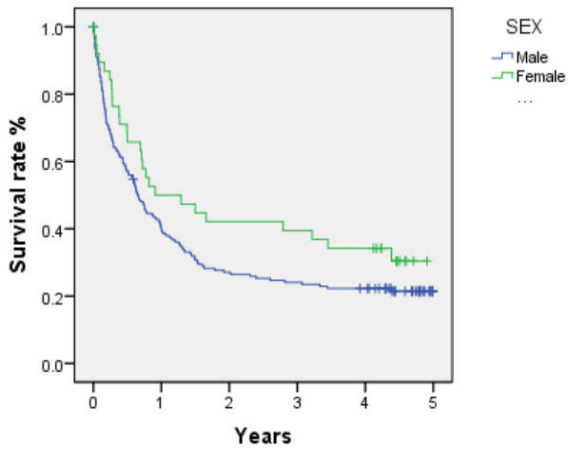
Moreover, there were statistically differences in 5-year survival rates between patients received radiotherapy and patients did not, 30%, 19%, respectively. The median survival time of patients received radiotherapy was longer than that of patients who did not (10.0 vs. 7.8 months). However, further analysis must be done for combined therapy.

## Lung cancer survival rate by morphology

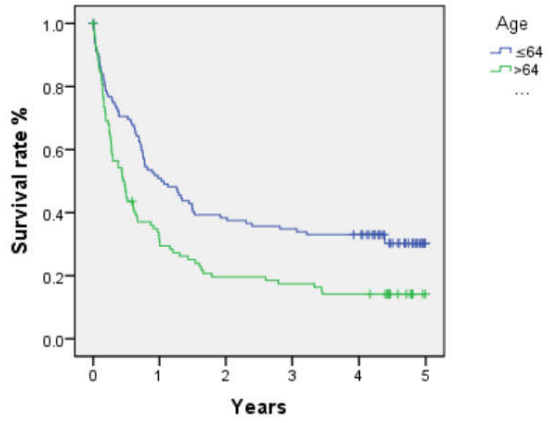
We classified lung cancer morphologically into three subtypes, non-small cell lung cancer NSCLC, small cell lung cancer SCLC, and other or unspecified types. The most common types of NSCLC were squamous cell carcinoma, large cell carcinoma, and adenocarcinoma, but there were several other types that occur less frequently.

In WB, the 5-year survival rate was 27% for NSCLC and 15% for SCLC for cases diagnosed in 2017. The differences in survival was statistically significant, P<.001. The median survival times for NSCLC, SCLC, and others or unspecified cases were 12.8, 6.0, and 2.5 month, respectively.

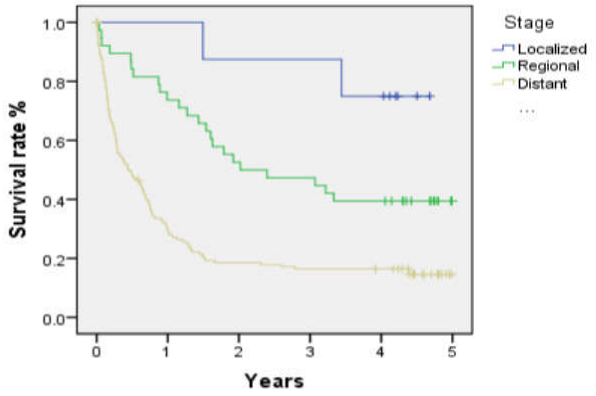
**Graph (68) Kaplan-Meier plot of lung cancer survival rate by sex, West Bank, 2017-2021**



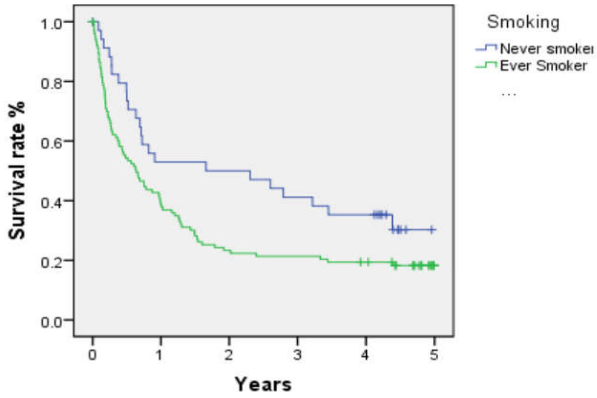

**Graph (69) Kaplan-Meier plot of o lung cancer survival rate by age at diagnosis, West Bank, 2017-2021**



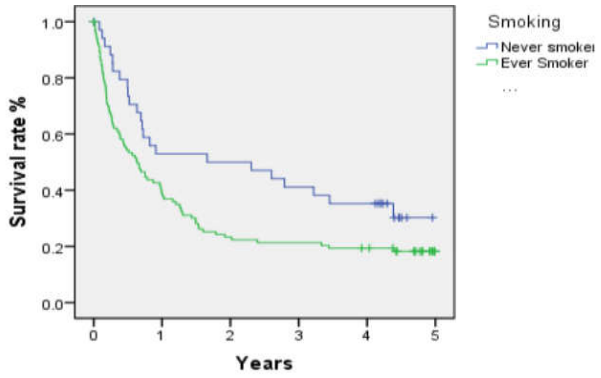
**Graph (70) Kaplan-Meier plot of lung cancer survival rate by stage at diagnosis, West Bank, 2017-2021**



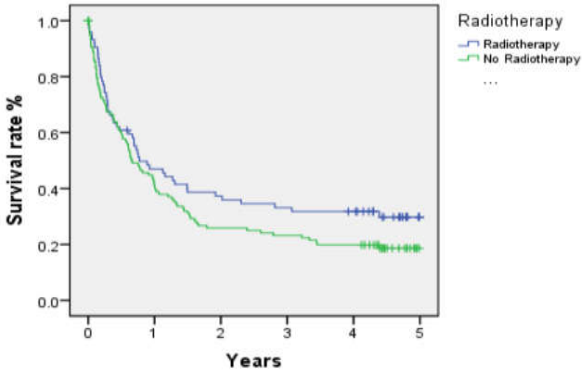

**Graph (71) Kaplan-Meier plot of lung cancer survival rate by smoking, West Bank, 2017-2021**



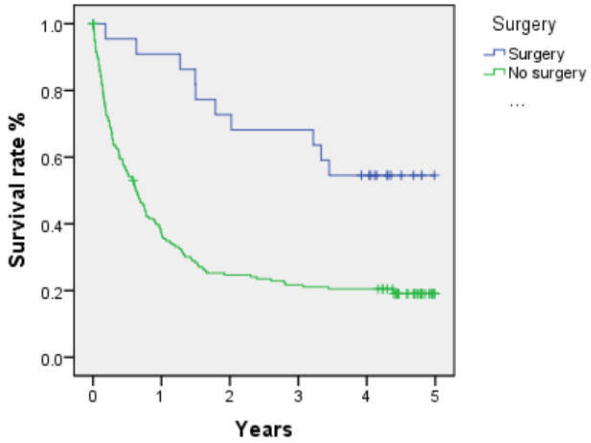

**Graph (72) Kaplan-Meier plot of lung cancer survival rate with and without chemotherapy, West Bank, 2017-2021**



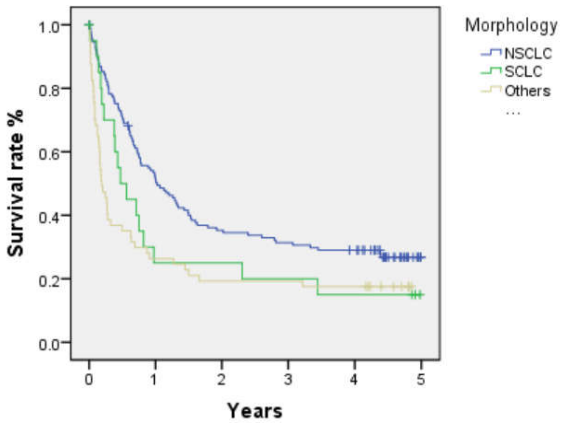

**Graph (73) Kaplan-Meier plot of o lung cancer survival rate with and without radiotherapy, West Bank, 2017-2021**




**Graph (74) Kaplan-Meier plot of lung cancer survival rate with and without surgery, West Bank, 2017-2021**




**Graph (75) Kaplan-Meier plot of lung cancer survival rate by morphology, West Bank, 2017-2021**



## Prognostic factors affecting survival in lung cancer

Variables that were found to be significant on univariate analysis were then run through multivariate analysis, which were age at diagnosis, sex, stage at diagnosis, smoking, chemotherapy, radiotherapy, and surgery. All studied factors were significantly associated with survival, except regional stage at diagnosis.

Our data demonstrated significant survival benefits in females as compared with males at all time points (males had 38% more risk of dying from lung cancer compared to females). The difference in survival remained even after adjusting for other factors.

Age at diagnosis was an important prognostic factor affecting survival. Every year increase in age resulted in approximately 2.4% increase in hazard of dying from lung cancer in five years after diagnosis (age also analyzed as a continuous variable).

Increasing in stage has been found to deleteriously affect survival with an increasing in HR of dying with increasing stage as compared to localized stage lung cancer. Almost all SCLC cases were diagnosed at distant stage and about 60% of NSCLC cases diagnosed at distant stage. The difference in survival between NSCLC and SCLC was at distant stage, and there were no differences in survival in early stage diagnosed cases between NSCLC and SCLC. Therefore, early diagnosis is extremely important for lung cancer patients, which means early treatment and better prognosis and survival.

Smoking not only increases the risk of lung cancer but adversely impacts prognosis once lung cancer is diagnosed. In this multivariate analysis, smoking remained a prognostic factor for hazard of dying of lung cancer. Moreover, the comparison in this analysis of ever-smokers and never-smokers was limited to active smoking only, and there were no details of presence of exposure, duration and degree of exposure to passive smoking and exposure to other noxious gases.

Analysis of 5-year survival analysis will be more informative if done for combined therapy and including new targeted therapy and immunotherapy. However, the risk of dying was higher for patients did not receive chemotherapy, radiotherapy, or underwent surgery, HR= 1.19, 1.18, 1.33, respectively.

**Table (20) Univariate and multivariate cox proportional hazards analysis of factors affecting survival in patients with lung cancer, West Bank, Palestine, 2017-2021**

| Prognostic factors | | Univariate analysis | | Multivariate analysis | |
|---|---|---|---|---|---|
| | | Hazard Ratio (95% CI) | P-value | Hazard Ratio (95% CI) | P-value |
| **Sex** | | | | | |
| | Female | Reference | | Reference | |
| | Male | 1.40 (1.18-1.66) | <.001 | 1.38 (1.13-1.70) | .002 |
| **Age at diagnosis** | | | | | |
| | ≤64 | Reference | | Reference | |
| | > 64 | 1.66 (1.46-1.88) | <.001 | 1.52 (1.32-1.76) | <.001 |
| **Stage at diagnosis** | | | | | |
| | Localized | Reference | | Reference | |
| | Regional | 1.66 (1.10-2.48) | .015 | 1.37 (0.90-2.10) | .141 |
| | Distant | 3.38 (2.62-5.58) | <.001 | 2.88 (1.19-4.33) | <.001 |
| **Smoking** | | | | | |
| | Never smoker | Reference | | Reference | |
| | Ever smoker | 1.40 (1.19-1.63) | <.001 | 1.57 (1.28-1.91) | <.001 |
| **Chemotherapy** | | | | | |
| | Yes | Reference | | Reference | |
| | No | 1.8 (1.30-1.68) | <.001 | 1.19 (1.031.38) | .021 |
| **Radiotherapy** | | | | | |
| | Yes | Reference | | Reference | |
| | No | 1.31 (1.15-1.51) | <.001 | 1.18 (1.01-1.37) | .033 |
| **Surgery** | | | | | |
| | Yes | Reference | | Reference | |
| | No | 2.93 (2.31-3.74) | <.001 | 1.33 (1.01-1.77) | .048 |
| **Morphology** | | | | | |
| | NSCLC | Reference | | Reference | |
| | SCLC | 1.53 (1.24-1.89) | <.001 | 1.62 (1.29-2.03) | <.001 |
| | Others | 1.90 (1.65-2.20) | <.001 | 1.69 (1.43-1.99) | <.001 |

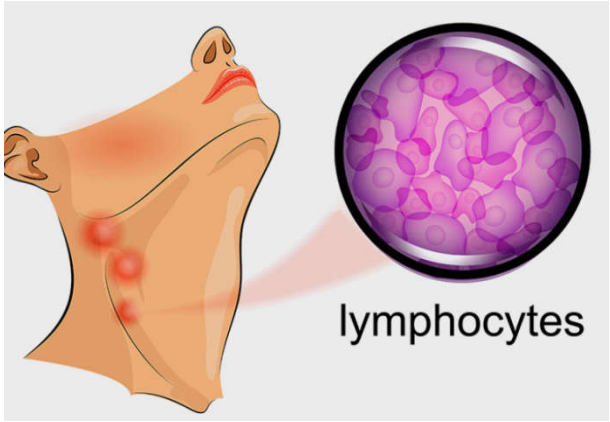
# Lymphoma 2017-2021

## Introduction

Lymphoma is the malignancies of the lymphoid system.

Worldwide, the incidence of lymphoma has rapidly grown during the past few decades, principally due to the increase in the number of immunocompromised hosts.

There are two main types of lymphoma, the Hodgkin lymphoma HL and non-Hodgkin lymphoma NHL (most common).The differentiating among types is important for prognosis and treatment.



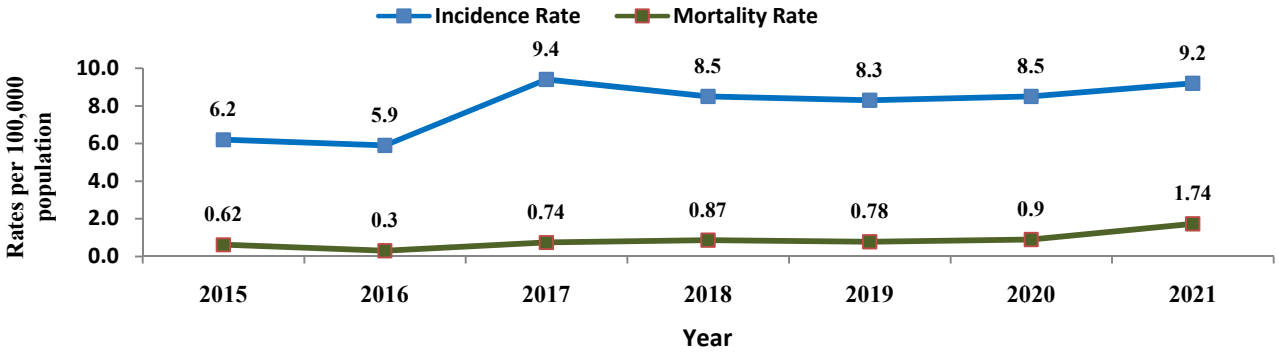

There are four main types of Hodgkin lymphoma. The most common forms in WB was nodular sclerosis representing 38% of cases, while there are more than 30 types of NHL and the most common type was diffuse large B cell lymphoma representing 42% of NHL cases in WB in 2017-2021.

# 6.1 Lymphoma incidence and mortality rates

A total of 1,201 cases of lymphoma were registered in the period of 2017-2021 in the WB with CIR 8.9 per 100,000 population. The number of registered HL cases was 453 cases representing 37.7% of lymphoma cases, while the number of registered NHL was 748 cases representing 62.3% of lymphoma cases.

The increase in both the CIR and CMR has started in 2017. Moreover, in each year, both the incidence and mortality rates were double or more in NHL compared to HL.

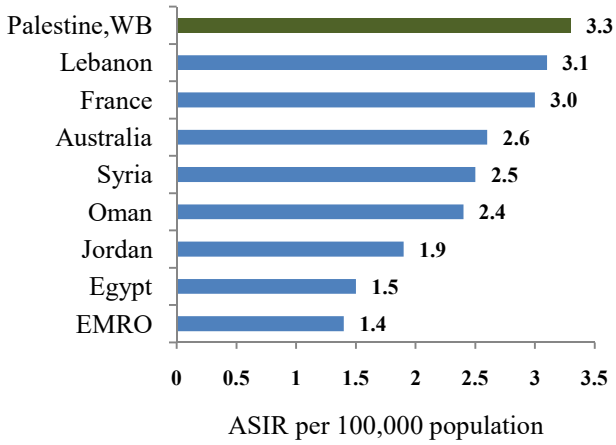
**Graph (76) Crude incidence and mortality rates of lymphoma per 100,000 population, West Bank, 2012-2021**



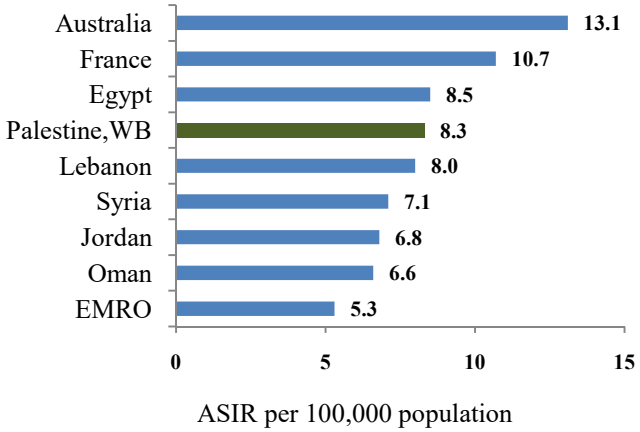

It is obvious from the graph below that the ASIR of HL was high in the WB compared with the estimated rates in different countries; these estimated rates were abstracted from GLOBOCAN database. So this issue must be studied elaborately to figure out the reasons for this high incidence, taking into consideration that the number of diagnosed HL cases was 80 cases in WB in 2020.

For NHL, the ASIR in the WB was lower than the rates in the Western countries but within the range of Arab and nearby countries' rates.

**Graph (77) Age-standardized incidence rate of Hodgkin lymphoma by countries, 2020**




**Graph (78) Age-standardized incidence rate of non-Hodgkin lymphoma by countries, 2020**




Source: GLOBOCAN database

## 6.2 Lymphoma incidence variations by sex

The incidence of lymphomas as a whole was higher among men. The underlying reasons for sex differences in lymphoma incidence remain unknown but have been suggested to reflect different exposures to environmental carcinogens and/or intrinsic disparities. NHL ranked sixth in males and females, while HL ranked ninth in males and females in WB in 2017-2021.

The cumulative risk (CumR) was 1.3 for male and 1.0 for female, representing the probability of being diagnosed with lymphoma before the age of 75, in the absence of other causes of death. The lifetime risk (0-74 years of age) was 1 in 77 among males and 1 in 100 among females.

**Table (21) Lymphoma incidence summary by year and sex, West Bank 2017-2021**

| Year | Males | | | | Females | | | |
|---|---|---|---|---|---|---|---|---|
| | No. | CIR | CumR74* | ASIR | No. | CIR | CumR74* | ASIR |
| **2017** | 151 | 11.4 | 1.34 | 15.8 | 97 | 7.6 | 1.0 | 10.4 |
| **2018** | 118 | 8.7 | 1.30 | 13.2 | 104 | 8.0 | 1.2 | 11.5 |
| **2019** | 122 | 8.9 | 1.20 | 11.6 | 110 | 8.3 | 1.1 | 11.1 |
| **2020** | 127 | 9.0 | 1.20 | 13.1 | 112 | 8.2 | 0.88 | 10.3 |
| **2021** | 140 | 9.8 | 1.30 | 13.2 | 120 | 8.7 | 0.95 | 10.8 |
| **2017-2021** | **658** | **9.6** | **1.30** | **13.4** | **543** | **8.2** | **1.0** | **10.8** |

* The cumulative risk of developing cancer in 0-74 yr of age

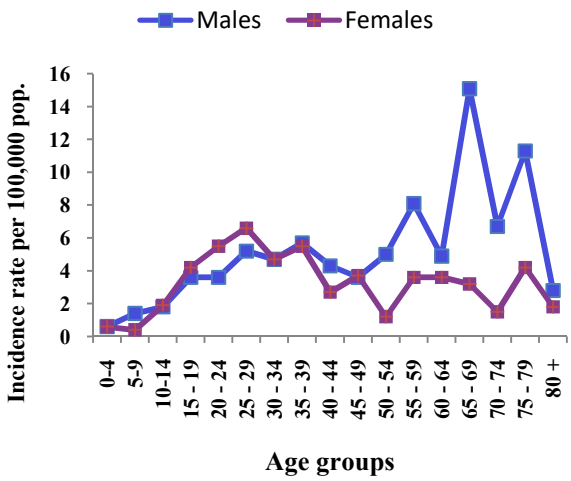
## 6.3 Lymphoma incidence variations by age

**Hodgkin lymphoma** incidence showed a clear bimodal age distribution, with the first peak in incidence rates in young adults (both males and females), and the second peak in older males.

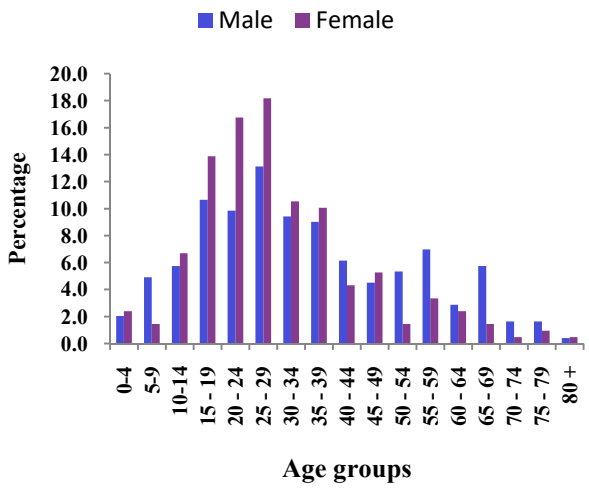
Age-specific incidence rates amounted sharply during childhood and peaked first in young adults aged 25-29. Rates then decreased until middle age before rising again to reach a second peak for males at around age 65-69. The highest rates were in the 25 to 29 age group for females and the 65 to 69 age group for males.

Incidence rates are significantly lower in females than males in a number of age groups (mainly older). The gap is widest at age 65 to 69, when the age-specific incidence rate is more than four times higher in males than females. Moreover, HL had a lower proportion of cases in older age groups compared with most cancers.

**Graph (79) Age-specific incidence rates of Hodgkin lymphoma per 100,000 population by sex, West Bank, 2017-2021**




**Graph (80) Distribution of percentages of Hodgkin lymphoma cases by age (at diagnosis) groups, West Bank, 2017-2021**

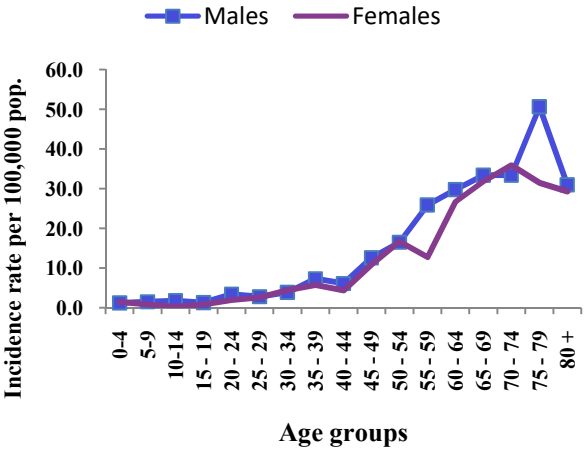



**Non-Hodgkin lymphoma** incidence is strongly related to age, with the highest incidence rates being in older people. In WB, more than a third of new cases were in people aged 60 and over

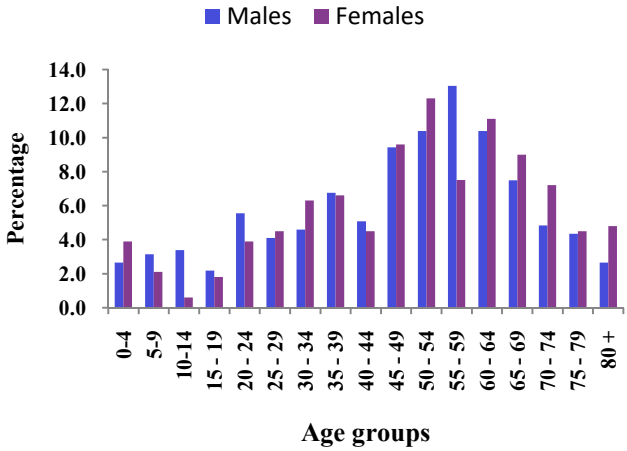
Age-specific incidence rates rise steadily from around age 45-49 and more steeply from around age 55-59. The highest rates are in the 70 to 74 age group for females and the 75 to 79 age group for males.

Incidence rates are significantly lower in females than males in most age groups. The gap is widest at age 75 to 79, when the age-specific incidence rate was about 50% lower in females than males.

**Graph (81) Age-specific incidence rates of non-Hodgkin lymphoma per 100,000 population by sex, West Bank, 2017-2021**




**Graph (82) Distribution of percentages of non-Hodgkin lymphoma cases by age (at diagnosis) groups, West Bank, 2017-2021**



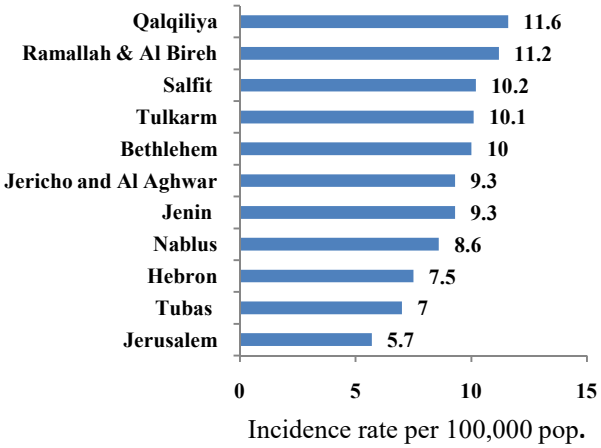

## 6.4 Lymphoma incidence variations by governorates

In 2017-2021, the highest lymphoma incidence rate was in Qalqilia governorate with 11.6 cases per 100,000 population, followed by Ramallah & Al-Bireh governorate with 11.2 cases per 100,000 population. However, 23.1% of diagnosed lymphoma cases were in Hebron governorate and 15.9% of cases were in Ramallah and Al-Bireh governorate.

**Table (22) Distribution of numbers of notified lymphoma cases by governorate, West Bank 2017-2021**

| Governorate | Male | Female | Total |
|---|---|---|---|
| Hebron | 162 | 116 | 278 |
| Ramallah & Al Bireh | 96 | 95 | 191 |
| Nablus | 97 | 75 | 172 |
| Jenin | 76 | 75 | 151 |
| Bethlehem | 60 | 53 | 113 |
| Tulkarem | 48 | 49 | 97 |
| Qalqiliya | 41 | 26 | 67 |
| Jerusalem | 30 | 16 | 46 |
| Salfit | 24 | 16 | 40 |
| Jericho and Al Aghwar | 13 | 11 | 24 |
| Tubas | 11 | 11 | 22 |
| Total | 658 | 543 | 1,201 |

**Graph (83) Distribution of crude incidence rate of lymphoma cases by governorate, West Bank, 2017-2021**




## 6.5 Stage at diagnosis of lymphoma

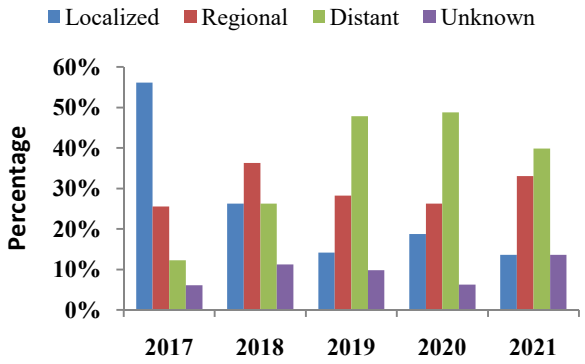
While Hodgkin and non-Hodgkin lymphoma progress at different rates and each grow in their own specific type of lymphocyte, the stages of lymphoma are the same. Using seer staging, we have the following stages for lymphoma:

**Localized:** The cancer is limited to one lymph node area, one lymphoid organ, or one organ outside the lymph system.
**Regional:** The cancer reaches from one lymph node area to a nearby organ, is found in two or more lymph node areas on the same side of (above or below) the diaphragm, or is considered bulky disease.
**Distant:** The cancer has spread to distant parts of the body, such as the lungs, liver, or bone marrow, or to lymph node areas above and below the diaphragm.

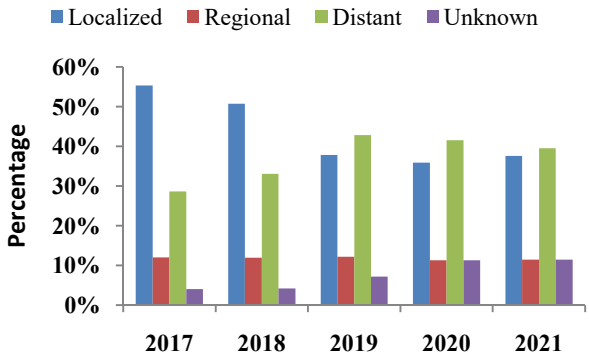
As shown in the graphs below, for both HL and NHL, the cases diagnosed in early stage decreased from 2017 to 2021, this decline especially for Hodgkin lymphoma cases. More cases of NHL were diagnosed in distant stage compared to HL cases in WB.

Although no screening test is available, some cases of lymphoma can be found early by paying attention to possible signs and symptoms (e.g., enlargement of one or more lymph nodes).

**Graph (84) Percentage distribution of Hodgkin lymphoma by stages at diagnosis and year, West Bank, 2017-2021**




**Graph (85) Percentage distribution of non-Hodgkin lymphoma by stages at diagnosis and year, West Bank, 2017-2021**



## 6.6 Lymphoma survival rate

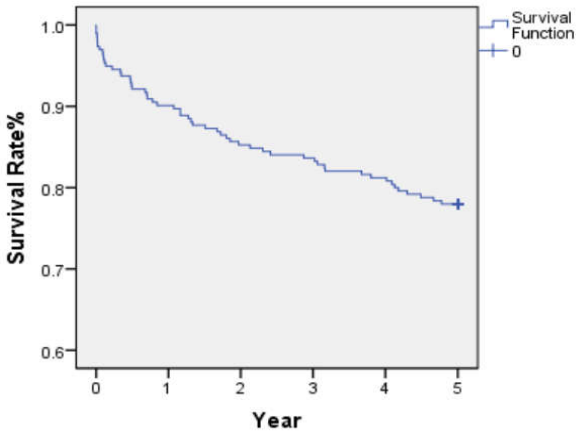
From the NCR, the total number of diagnosed cases with lymphoma cases, between 1st Jan/2017 and 31st Dec/2017, was 248 cases. To estimate the 5-years survival rate of lymphoma, this cohort was followed up retrospectively for 5 years from the date of diagnosis.

In our analysis to estimate the survival rate, date of death was collected from medical records, death registry/MoH, and where unavailable, telephonic contact of the patient's relatives was conducted to ascertain the present status of the subject. When contact could not be established in spite of three attempts, patients were classified as lost to follow up (censored).

In 2017-2021, the using Kaplan-Meier analysis, the estimated survival rate for lymphoma (all types) was 78%, which means 78 out of 100 patients with lymphoma survivor the first five years after their diagnosis in 2017. In addition, the 1- and 3-year survival rates were 84% and 81%, respectively.

From the literature, several factors can influence the survival rates of lymphoma, and the main factors are stage at diagnosis, type of lymphoma, patient's age and general health (co-morbidities), biological features, and treatment options (advancement in treatment modalities, adding immunotherapy and target therapies).

**Graph (86) Kaplan-Meier curves of lymphomas survival rate, West Bank, 2017-2021**




Unfortunately, the NCR has started collecting data about co-morbidities and treatment protocols in 2020. So, here we analyzed the five year survival rate by type of lymphoma, age and stage at diagnosis.

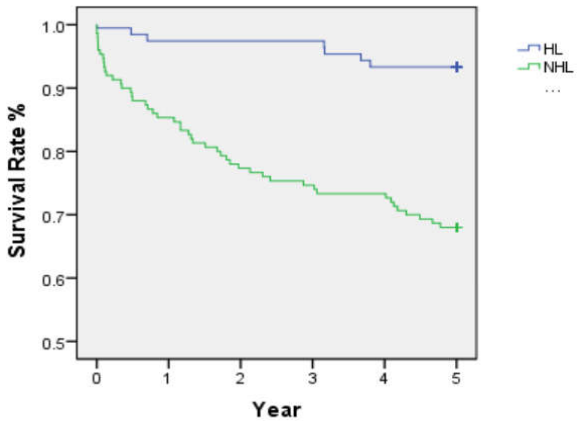
### Survival rate by type of lymphoma

Survival data regarding Hodgkin vs. non-Hodgkin lymphoma depends on each patient's specific situation, but in general, the five-year relative survival rate for Hodgkin lymphoma was higher than that of non-Hodgkin lymphoma. One reason may be that non-Hodgkin lymphoma is often diagnosed when the cancer is more advanced.

For Hodgkin lymphoma, the estimated survival rate for the first five years was 93% and the 1- and 3-year survival rates were 97% and 93%, respectively, WB, 2017-2021.

For non-Hodgkin lymphoma, the estimated survival rate for the first five years was 68% and the 1- and 3-year survival rates were 77% and 73%, respectively. Moreover, the risk of dying in five years was estimated to be more than five times for NHL patients compared to HL patients, HR= 5.6 (95% CI: 4.0-7.9), *P*<.001.

**Graph (87) Kaplan-Meier curves of Hodgkin and non-Hodgkin lymphoma survival rate, West Bank, 2017-2021**

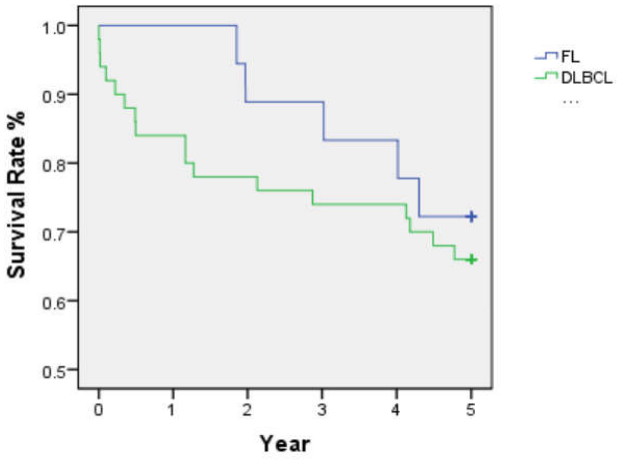


## Survival rate by type of non-Hodgkin lymphoma

Comparing the survival rates between diffuse large B cell lymphoma DLBCL and follicular lymphoma FL, it was found that the estimated survival rate for the first five years for FL was 72%, which was higher than survival of DLBCL which was 66%, the differences was not statistically significant, P=.53. Moreover, the risk of dying in the first five years after diagnosis was 37% higher among DLBCL patients compared with FL patients, HR=1.37 (95% CI: 0.51-3.7).

It is expected to have a higher survival for FL. But 44% of FL cases were diagnosed at distant stage in addition to the small number of FL cases in this analysis.

**Graph (88) Kaplan-Meier curves of DLBCL and FL survival rate, West Bank, 2017-2021**



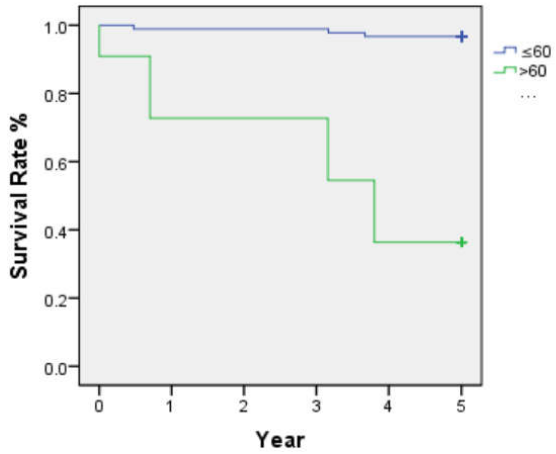

## Lymphoma survival by age at diagnosis

For both HL and NHL, our data showed that patients diagnosed with young-onset lymphoma aged ≤60 had better survival rates than older patients aged >60.

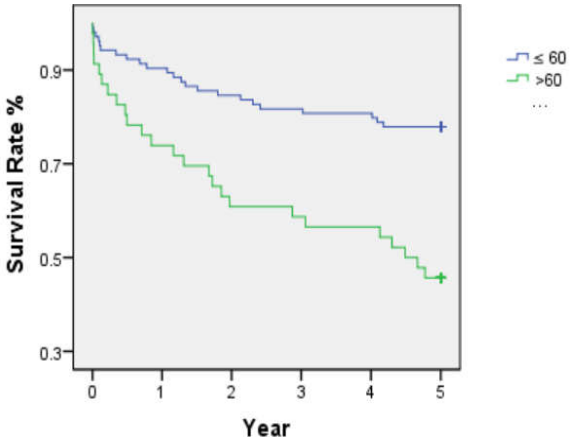
For HL, the estimated five-year survival rate was 97% for patients aged < 60, while it was 40% for patients aged >60, *P*<.001. Moreover, the risk of dying in the first five years was so much higher in aged patients compared to younger patients, HR=24.3(95% CI: 4.8-121.6), *P*<.001.

For NHL, the estimated five-year survival rate was 78% for patients aged < 60, while it was 46% for patients aged >60, *P*<.001. Moreover, the risk of dying in the first five years was higher in aged patients compared to younger patients, HR=3.0 (95% CI: 1.7-5.3), *P*<.001.

**Graph (89) Kaplan-Meier curves of Hodgkin lymphoma survival rate by age at diagnosis, West Bank, 2017-2021**



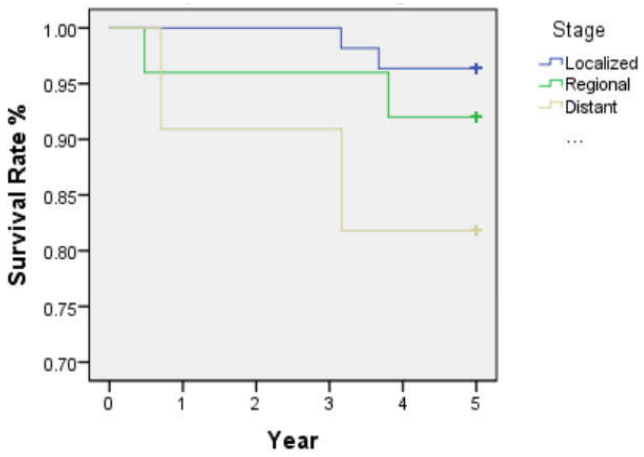

**Graph (90) Kaplan-Meier curves of non-Hodgkin lymphoma survival rate by age at diagnosis, West Bank, 2017-2021**



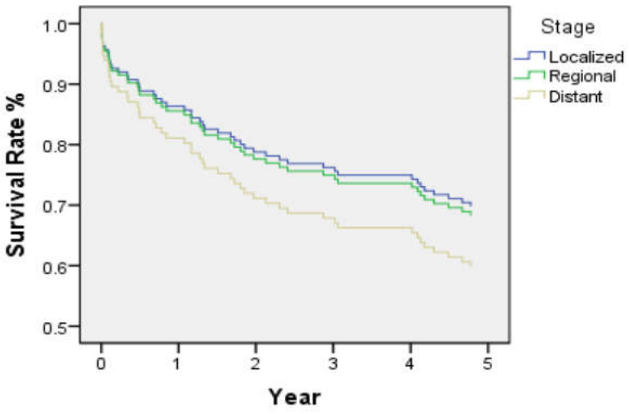
## Lymphoma survival by stage at diagnosis

Lymphoma patients diagnosed with localized stage had a higher five-year survival rates compared to patients diagnosed at regional or distant stages. For HL, the five-year survival rates for localized, regional, distant stages were 96%, 92%, and 82%, respectively, *P*=.18. While for NHL, the survival rates for localized, regional, and distant stages were 70%, 67%, and 60%, respectively, *P*=.51.

**Graph (91) Kaplan-Meier curves of Hodgkin lymphoma survival rate by stage at diagnosis, West Bank, 2017-2021**




**Graph (92) Kaplan-Meier curves of non-Hodgkin lymphoma survival rate by stage at diagnosis, West Bank, 2017-2021**




## Prognostic factors affecting survival in lymphoma patients

Finally, in our studied available variables, age was the most important predictor for survival in both HL and NHL, because it was the only studied factors that showed statistically significant difference between age groups. Age impacts survival as older age often is associated with co-morbidity and reduced tolerability of chemotherapeutic regimens used in younger patients.

However, more analysis must be done with more variables to identify other prognostic factor affecting lymphoma patients' survival.

# Cancer Annual Report 2022

## Cancer incidence rate 2022

In 2022, the total number of new reported cancer cases in Palestine was 5,455 cases, with incidence rate 108.2 per 100,000 population. Comparing cancer cases diagnosed in 2022 with cases diagnosed in 2021 (5,320 cases), it turns out that there is a 2.5% increase of cancer cases in 2022.

In WB, 3,408 new cancer cases were reported. For all cancer sites combined, the crude incidence rate was 118.4 per 100,000 populations in WB.

In GS, 2,047 new cancer cases were reported. For all cancer sites combined, the crude incidence rate was 94.5 per 100,000 populations in GS. The table below shows that the cancer incidence rates were higher in WB than the cancer incidence rate in GS in the last years.

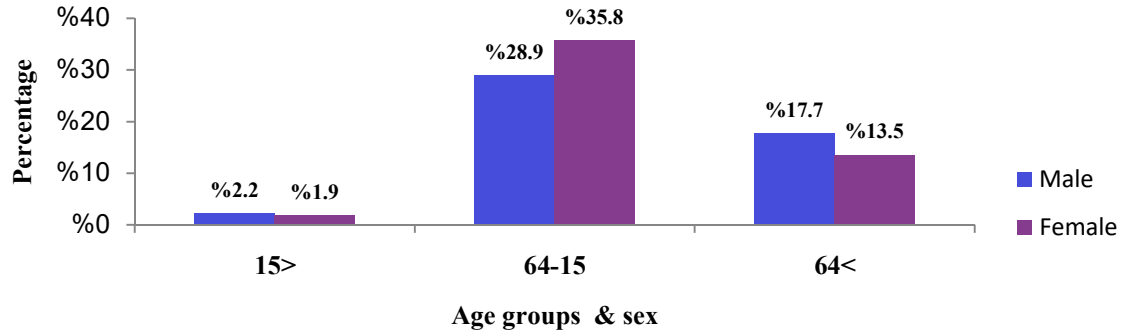
Note: this report "Cancer 2022" is also available in the Annual Health Report, 2022

## Distribution of reported cancer cases by sex and age groups

In 2022, the total number of reported cancer cases among female patients was 2,876, which were 52.7% of all reported cancer cases. While in male patients, 2579 cancer cases were reported, representing 47.3% of all reported cancer cases in Palestine.

The incidence of cancer increases with age. For patients above 64 years old in WB, 1,062 cancer cases were reported, which are 31.2% of all reported cancer cases. Taking into consideration that this age group proportion of total population is only 3.8%. Moreover, it is found that 141 cases were reported among population below 15 year old group; which are 4.1% of all reported cancer cases. This age group is 35.5% of total population.

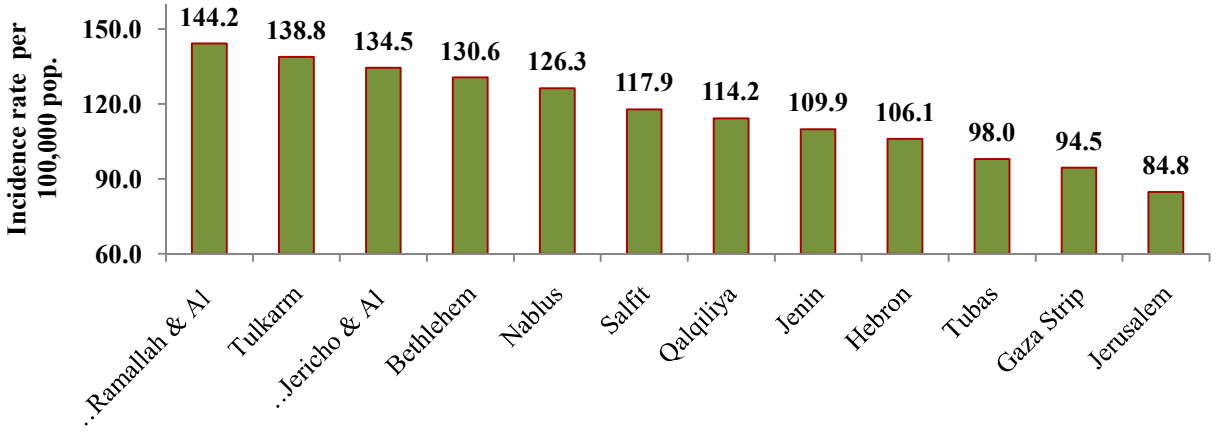
**Graph (93) Percentage of Reported Cancer Cases by Sex and Age Groups, West Bank, Palestine 2022**




## Reported cancer cases by governorate

The geographical distribution of reported cancer cases shows that Ramallah & Al-Bireh governorate reported the highest figure with an incidence rate 144.2 per 100,000 population, while Tulkarem governorate ranked second with incidence rate138.8 per 100, 000 population. Jericho & Al Aghwar ranked third with incidence rate 134.5 per 100,000 population. For Jerusalem, there is underreporting of cancer cases to the national cancer registry.

**Graph (94) Cancer Incidence Rate per 100,000 of Population by Governorate, Palestine 2022**




## Most Common Cancer Cases

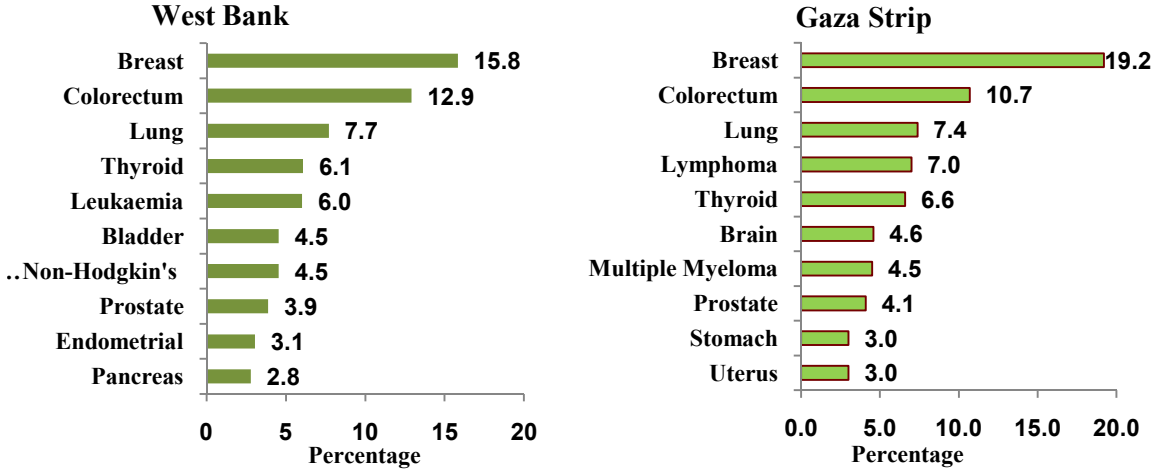
Breast cancer is always the most common cancer in Palestine. In 2022, the number of new breast cancer cases were 934 cases, with CIR 18.5 case per 100, 000 of total population, while the CIR was 37.4 case per 100,000 female population. Colorectal cancer ranked second followed by lung cancer.

**In WB**, 540 new breast cancer cases were registered in 2022, which were 15.8% of all new registered cancer cases, with CIR 18.8 cases per 100,000 population. Colorectal cancer ranked second with 440 new cases, with CIR 15.3 per 100,000 population, and lung cancer in the third place with 263 cases and CIR 9.1 cases per 100, 000 population.

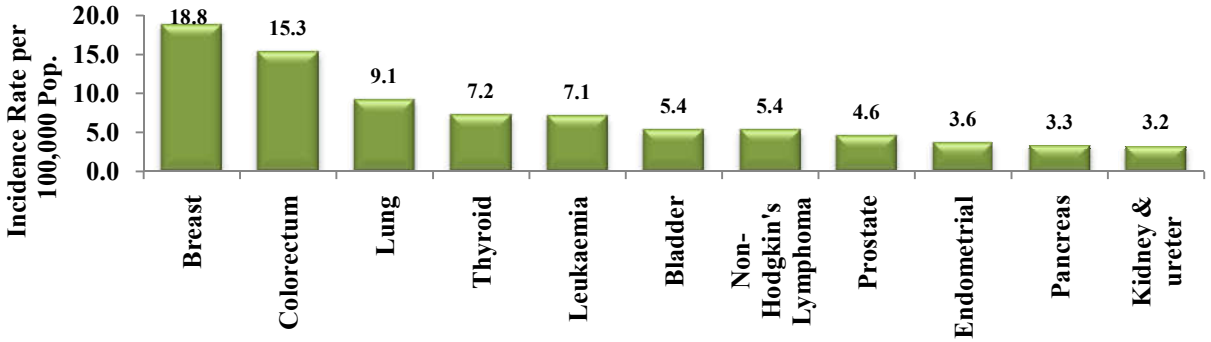
**In GS**, breast cancer was also the most common cancer with 394 new registered breast cancer in 2022, which is 19.2% of all new cancer cases with CIR 18.2 cases per 100,000 population. Colorectal cancer ranked second with 220 new cases, with CIR 10.2 per 100,000 population, and lung cancer in the third place with 152 cases and CIR 7.0 cases per 100, 000 population.

**In Palestine**, breast cancer is always the most common cancer among females, while colorectal cancer was the most common among males, and leukaemia was the most common among children.

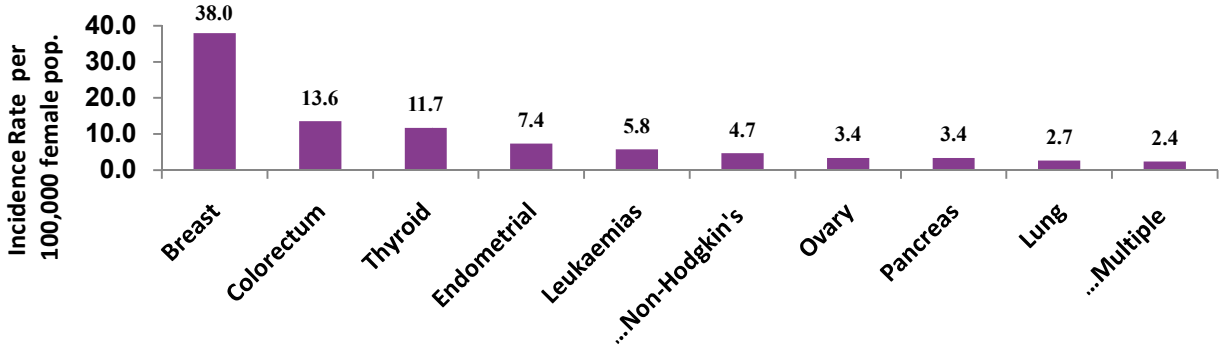
**Graph (95) Percentages of Top Ten Reported Cancers in all population, Palestine 2022**



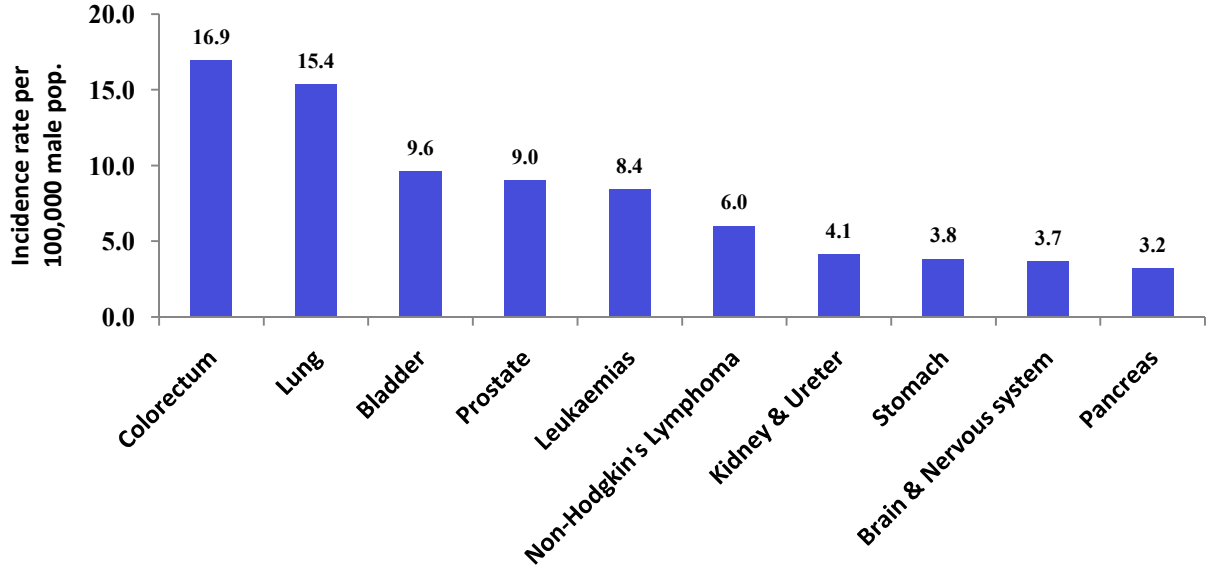
## Graph (96) Incidence Rate of Top Ten Reported Cancers per 100,000 of population, West Bank, Palestine 2022




## Graph (97) Incidence Rate of Top Ten Reported Cancers among Females per 100,000 Female populations, West Bank, Palestine 2022




## Graph (98) Incidence Rate of Top Ten Reported Cancers among Males per 100,000 Male populations, West Bank, Palestine 2022



## Pediatric cancer cases

Pediatric cancer is considered rare, representing 5% of all registered cases of all ages in WB. The total number of cancer cases diagnosed for patients aged below 18 was 180 cases in WB in 2022, of which 54% of these cases among males. Leukemia was the most common representing 32% of all registered cases, followed by lymphoma by 14% of registered cases.

**Table (23) Distribution of Pediatric Cancer Cases by Age Group, Sex & Site, West Bank, Palestine 2022**

| Site | ICDO | 0 - 4 | | | 5 - 9 | | | 10 - 14 | | | 15 - 17 | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | M | F | T | M | F | T | M | F | T | M | F | T | M | F | T |
| Lip & oral *cavity* | C00-C08 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 2 |
| Oro- & Naso-, Laryngo-pharynx | C10-C11 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 0 | 0 | 0 | 1 | 2 | 3 |
| Stomach | C16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| Colorectum | C18-C20 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 3 | 1 | 4 | 5 | 1 | 6 |
| Liver | C22 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 3 |
| Pancreas | C25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| Lung | C34 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Adrenal Gland | C37, C74-C75 | 3 | 2 | 5 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 4 | 3 | 7 |
| Mediastinum | C38 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 |
| Bone | C40-C41 | 0 | 0 | 0 | 3 | 1 | 4 | 1 | 2 | 3 | 3 | 2 | 5 | 7 | 5 | 12 |
| Skin | C44 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| Connective & Soft Tissues | C49 | 0 | 4 | 4 | 2 | 1 | 3 | 1 | 1 | 2 | 3 | 0 | 3 | 6 | 6 | 12 |
| Ovary | C56 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 2 | 2 |
| Testis | C62 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Kidney & Renal Pelvis | C64-C66 | 5 | 6 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 6 | 11 |
| Eye and Adnexa | C69 | 4 | 2 | 6 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 2 | 7 |
| Brain & Nervous system | C70-C72 | 3 | 1 | 4 | 0 | 5 | 5 | 3 | 1 | 4 | 1 | 2 | 3 | 7 | 9 | 16 |
| Thyroid | C73 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 4 | 1 | 3 | 4 | 2 | 6 | 8 |
| Hodgkin's Disease | C81 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 5 | 3 | 2 | 5 | 6 | 7 | 13 |
| Non-Hodgkin's Lymphoma | C82-C88, C96 | 3 | 0 | 3 | 2 | 2 | 4 | 3 | 0 | 3 | 2 | 1 | 3 | 10 | 3 | 13 |
| Leukaemia | C91-C95 | 12 | 7 | 19 | 11 | 9 | 20 | 3 | 5 | 8 | 6 | 5 | 11 | 32 | 26 | 58 |
| West Bank | | 33 | 24 | 57 | 23 | 20 | 43 | 19 | 22 | 41 | 22 | 17 | 39 | 97 | 83 | 180 |

## Cancer Mortality 2022

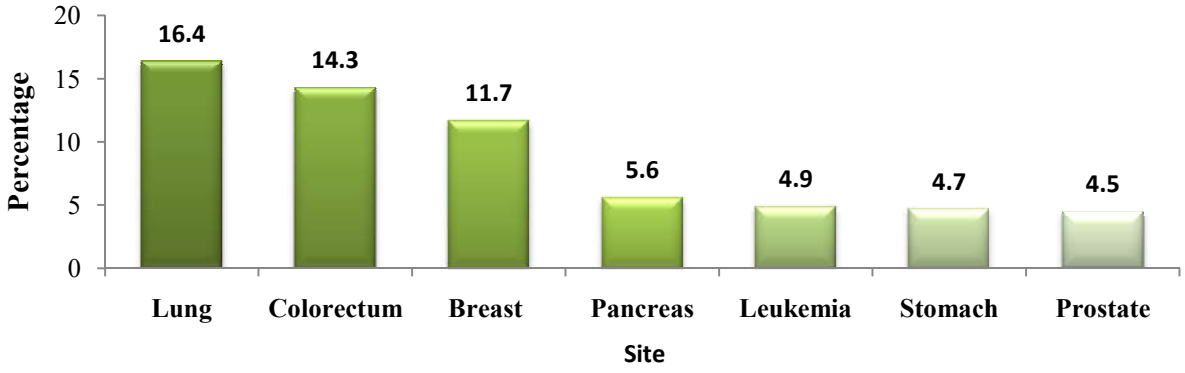
Cancer is the second cause of death in Palestine in 2022, the total number of reported cancer deaths were 2,147, with crude mortality rate CMR 42.6 per 100,000 population.

In GS, the total reported cancer deaths were 914 deaths, which was 15.1% of all deaths in GS, with CMR 42.2 per 100,000 population.

The total number of cancer deaths in WB was 1,233 cases, which was 13.8% of all deaths in WB, with CMR 42.9 per 100,000 population.

Cancer deaths were more among males (55% of cancer deaths) than female cancer deaths (45% of cancer deaths). The high percentage of deaths among males is due to the fact that lung cancer is more prevalent among males. In 2022, 86% of the incident cases were among males, and lung cancer is the most common cause of death among cancer patients.

**Graph (99) Proportional Distribution of the most Reported Cancer Deaths of all Reported Cancer Deaths, West Bank, 2022**



# The National Cancer Registry NCR

### Introduction

Cancer registry started in Palestine in 1998, which was a hospital-based cancer registry (one hospital in WB and one hospital in GS). In 2008, the population-based cancer registries PBCRs were established in Palestine. PBCRs seek information from multiple sources, all those in which cancer cases may be diagnosed or treated.

In WB, NCR provides information on the incidence, mortality and recently on survival of cancers classified according to their site of origin, histology, stage at diagnosis and the nature of treatment received. These aspects are very important and relevant to planning and evaluating cancer-control activities.

Data on topography and morphology were coded according to the third edition of the International Classification of Disease for Oncology (ICDO-3). For data management, CanReg5 is used at the Palestinian Health Information Center/MoH. CanReg5 is an open-source tool developed by the International Agency for Research on Cancer (IARC) specially designed to input, store, check, and analyse population-based cancer registry data.

## 6.1 Quality of data/ NCR

To ensure comparability, the NCR adheres to the established international standards and guidelines in cancer registration (e.g., ICD-O-3, incidence date, multiple primaries). Similarly for completeness, several evaluations have been done to examine this important component. For validity, the NCR has used the same five common indices as indicated in the Cancer Incidence in Five Continents (CI5), Vol XI, as below:

Internal consistency: The IARC/IACR CHECK program used to perform consistency checks. All cases queried are checked by the registry staff, using the software program, before incorporating relevant items into the database.

Histological verification: The accuracy of the stated diagnosis is likely to be higher if there is histological confirmation by a pathologist or cytology/haematology confirmation. For cancers with specified sites, the morphologically verified proportion was 95.9% of all cases for both sexes.

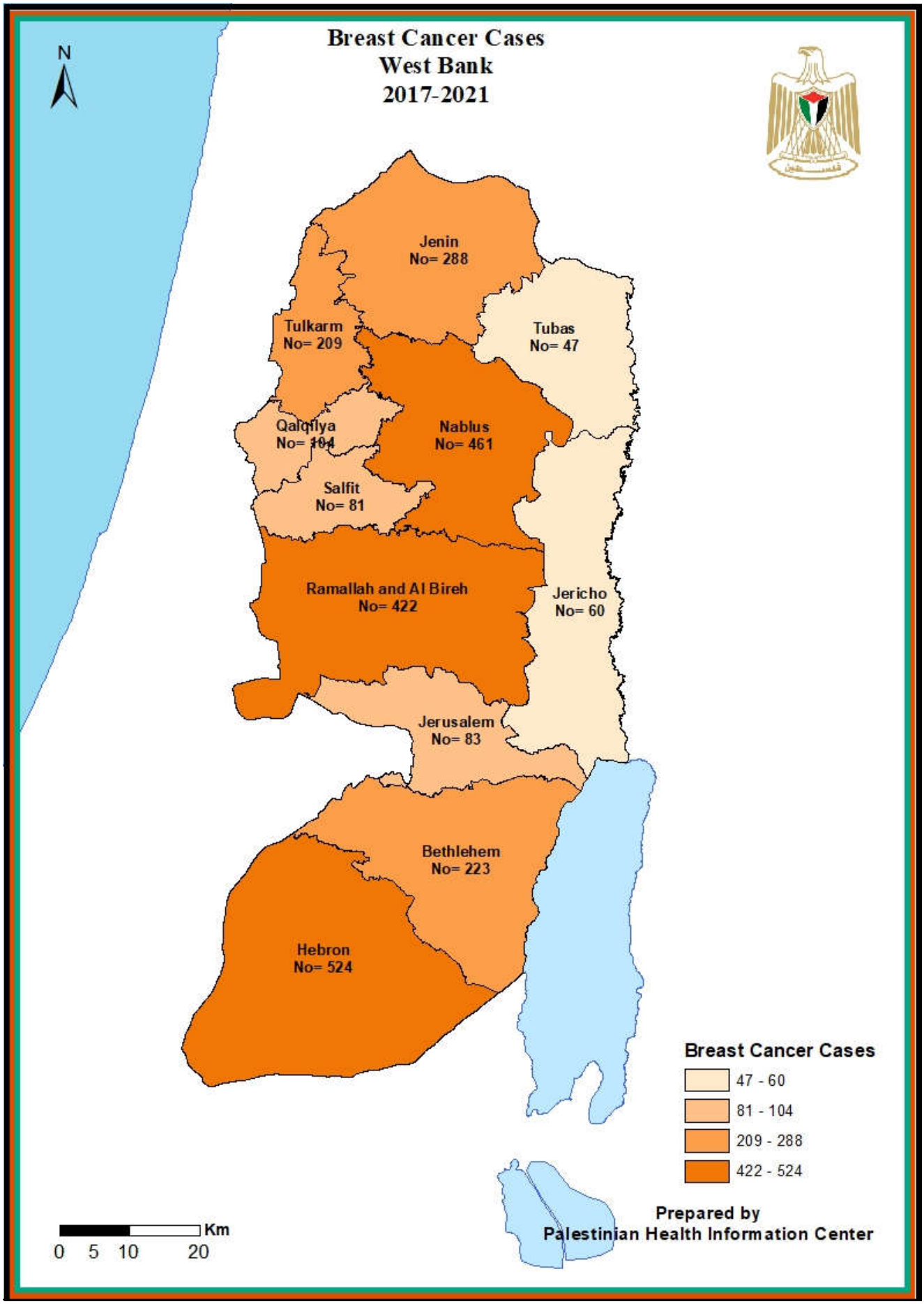
Death Certificate Only (DCO): All the death notified by the public, private health facilities to the registry was traced and checked with the National Registry Departments. There were 218 cases classified as DCO, representing 1.4% of all notified cases in the WB in 2017-2021 as shown in the table below. This indicates a huge improvement in quality of data, as this percentage was above 10% before 2017.

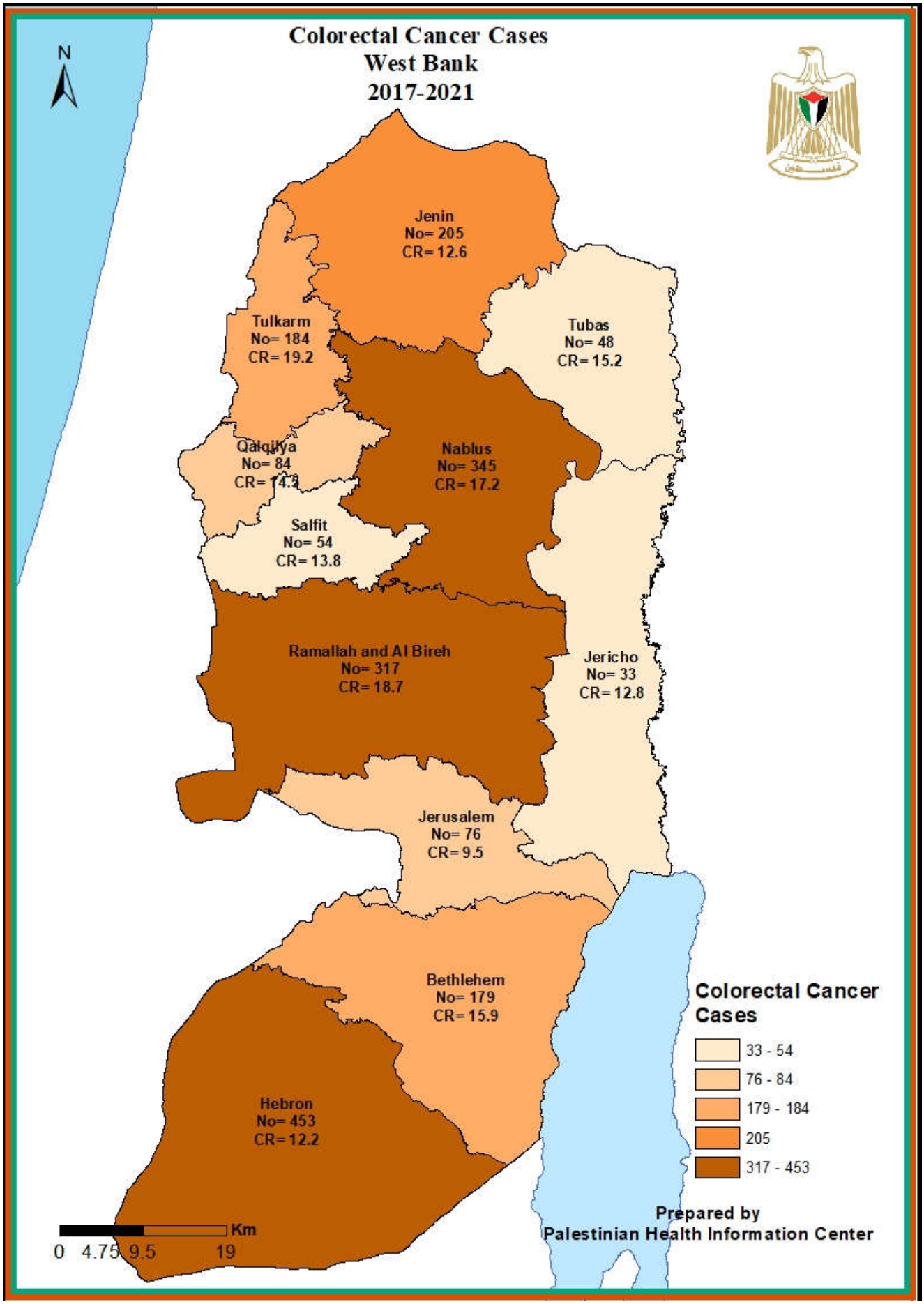
Other and unspecified cases (ill-defined cases): For this category, the percentage was 0.7%. This low proportion of cases that were assigned to this category implies a better diagnostic precision in determining the site of primary cancer.

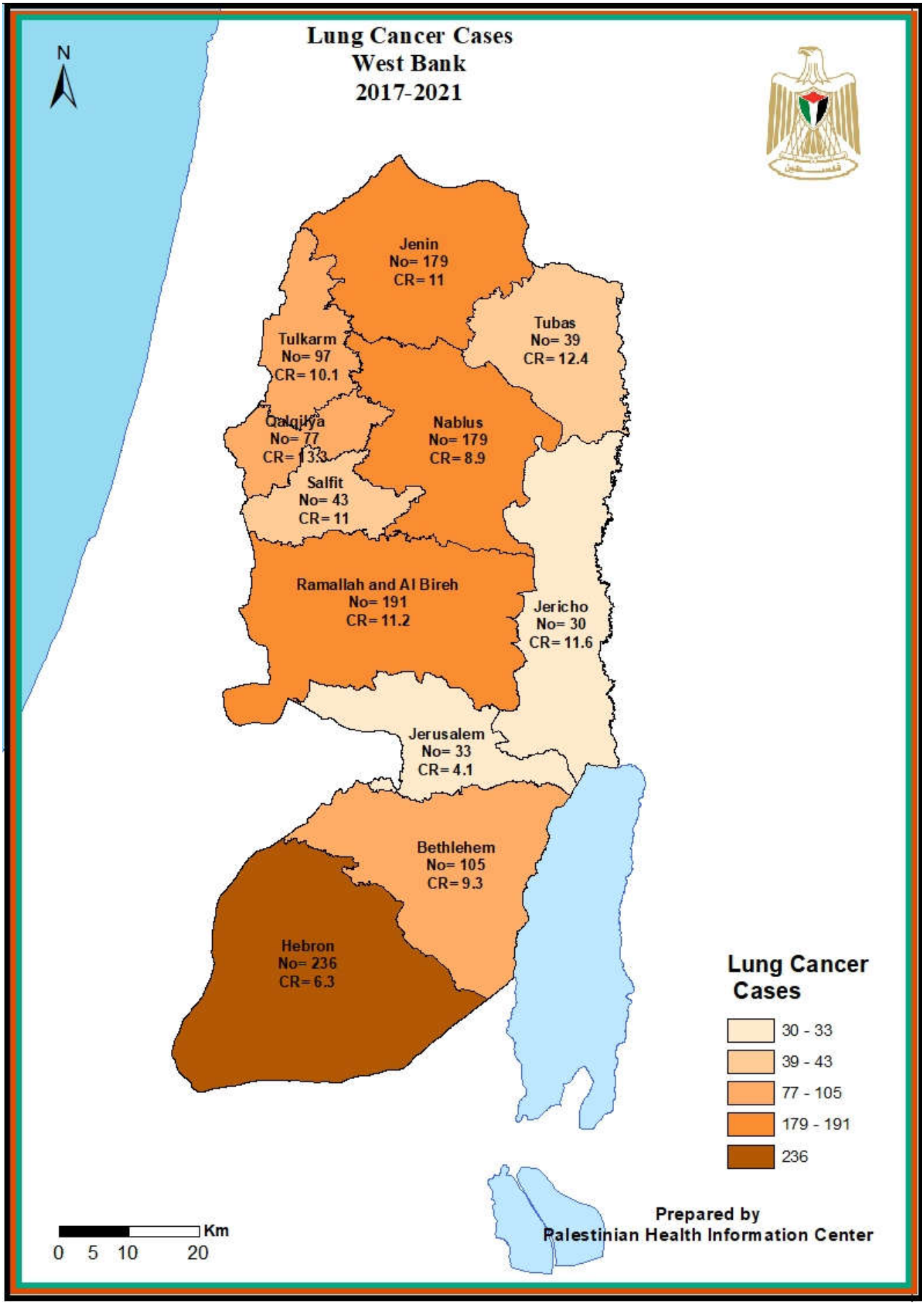
Age unknown: in this report, all the ages were known.

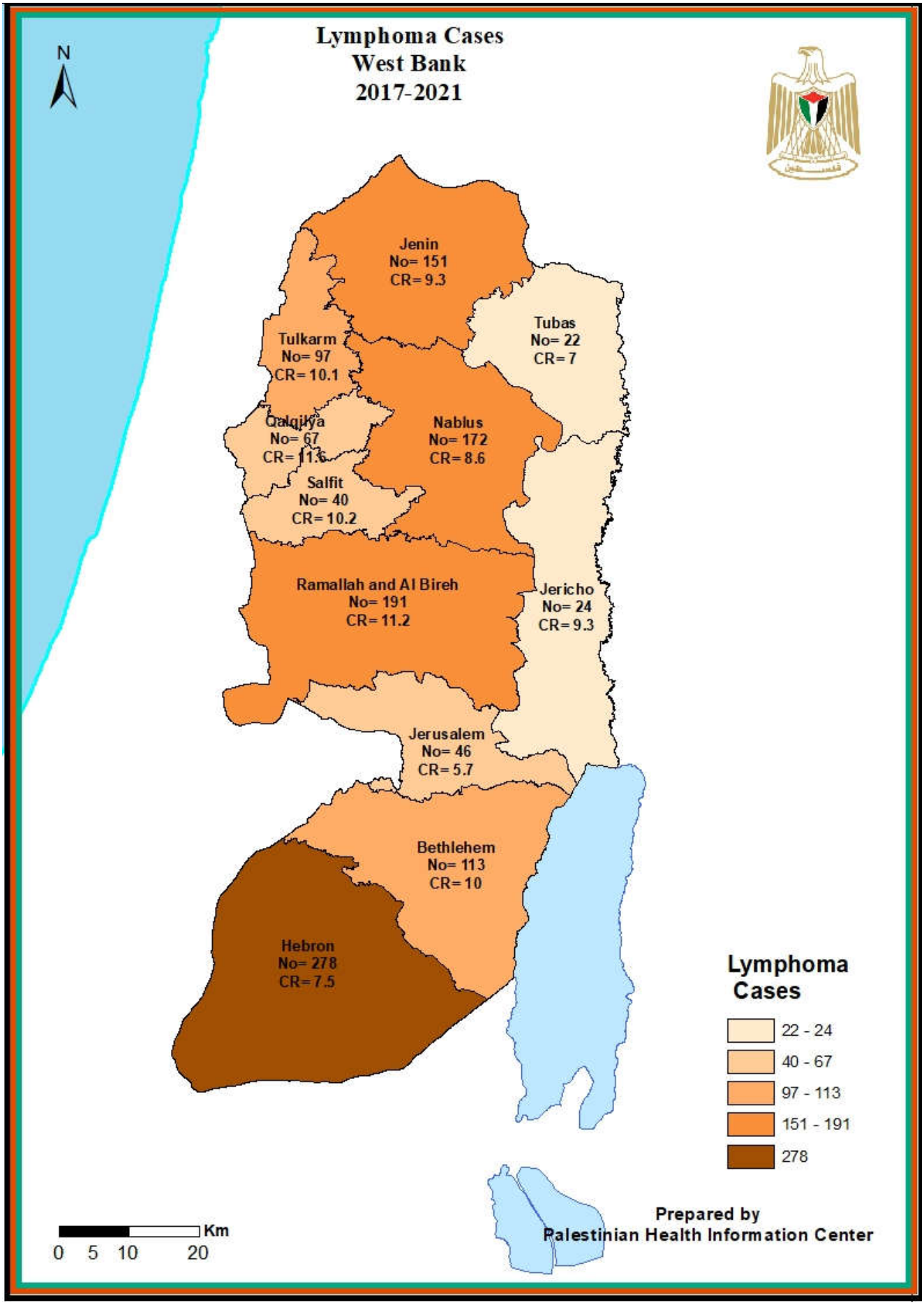
## Table (24) Quality indicators for all cancer types, West Bank, Palestine, 2017-2021

| Site | Code | Frequency | MV | | DCO | |
|---|---|---|---|---|---|---|
| | | | Number | % | Number | % |
| Lip & oral cavity | C00-C08 | 179 | 176 | 98.3 | 1 | 0.6 |
| Tonsil | C09 | 1 | 1 | 100 | 0 | 0 |
| Oro- & Naso-, Laryngo-pharynx & Pharynx | C10-C14 | 70 | 69 | 98.6 | 0 | 0 |
| Oesophagus | C15 | 67 | 62 | 92.5 | 0 | 0 |
| Stomach | C16 | 457 | 433 | 94.7 | 12 | 2.6 |
| Small Intestine | C17 | 66 | 66 | 100 | 0 | 0 |
| Colorectum | C18-C20 | 1978 | 1909 | 96.5 | 21 | 1.1 |
| Anus | C21 | 31 | 31 | 100 | 0 | 0 |
| Liver | C22 | 235 | 197 | 83.8 | 16 | 6.8 |
| Gallbladder, other Biliary | C23-C24 | 154 | 144 | 93.5 | 6 | 3.9 |
| Pancreas | C25 | 389 | 321 | 82.5 | 23 | 5.9 |
| Ill-Defined Digestive Organs | C26 | 37 | 35 | 94.6 | 1 | 2.7 |
| Nose & Nasal Sinuses | C30-C31 | 34 | 33 | 97.1 | 0 | 0 |
| Larynx | C32 | 178 | 171 | 96.1 | 0 | 0 |
| Trachea & Bronchus & Lung & | C33-34 | 1209 | 1053 | 87.1 | 50 | 4.1 |
| Thymus, Adrenal Gland, other endocrine | C37, C74-C75 | 87 | 86 | 98.9 | 1 | 1.1 |
| Mediastinum | C38 | 29 | 28 | 96.6 | 1 | 3.4 |
| Ill-defined sites within respiratory sys | C39 | 1 | 1 | 100 | 0 | 0 |
| Bone | C40-C41 | 207 | 202 | 97.6 | 1 | 0.5 |
| Melanoma | C43 | 59 | 59 | 100 | 0 | 0 |
| Skin | C44 | 706 | 700 | 99.2 | 4 | 0.6 |
| Mesothelioma | C45 | 17 | 16 | 94.1 | 0 | 0 |
| Kaposi Sarcoma | C46 | 4 | 4 | 100 | 0 | 0 |
| Peripheral nerves | C47 | 4 | 4 | 100 | 0 | 0 |
| Retroperitonium | C48 | 19 | 16 | 84.2 | 1 | 5.3 |
| Connective & Soft Tissues | C49 | 167 | 166 | 99.4 | 0 | 0 |
| Breast | C50 | 2502 | 2450 | 97.9 | 11 | 0.4 |
| Vulva & Vagina | C51-C52 | 35 | 34 | 97.1 | 1 | 2.9 |
| Cervix Uteri | C53 | 67 | 64 | 95.5 | 3 | 4.5 |
| Endometrial | C54 | 428 | 420 | 98.1 | 4 | 0.9 |
| Uterus | C55 | 46 | 37 | 80.4 | 6 | 13 |
| Ovary | C56 | 263 | 252 | 95.8 | 2 | 0.8 |
| Other female genital organs | C57 | 5 | 5 | 100 | 0 | 0 |
| Placenta | C58 | 2 | 2 | 100 | 0 | 0 |
| Penis | C60 | 1 | 1 | 100 | 0 | 0 |
| Prostate | C61 | 560 | 517 | 92.3 | 14 | 2.5 |
| Testis | C62 | 178 | 178 | 100 | 0 | 0 |
| Scrotum | C63 | 3 | 3 | 100 | 0 | 0 |
| Kidney & Ureter | C64-C66 | 342 | 329 | 96.2 | 4 | 1.2 |
| Bladder | C67 | 768 | 744 | 96.9 | 9 | 1.2 |
| Urethra | C68 | 2 | 2 | 100 | 0 | 0 |
| Eye and Adnexa | C69 | 32 | 31 | 96.9 | 1 | 3.1 |
| Brain & Nervous system | C70-C72 | 487 | 442 | 90.8 | 20 | 4.1 |
| Thyroid | C73 | 823 | 816 | 99.1 | 0 | 0 |
| Ill defined site of Head, face or neck | C76 | 2 | 0 | 0 | 0 | 0 |
| Unknown primary site | C80 | 75 | 64 | 85.3 | 1 | 1.3 |
| Hodgkin's Disease | C81 | 453 | 451 | 99.6 | 1 | 0.2 |
| Non-Hodgkin's Lymphoma | C82-C88, C96 | 748 | 741 | 99.1 | 0 | 0 |
| Multiple Myeloma | C90 | 314 | 310 | 98.7 | 1 | 0.3 |
| Leukaemia | C91-C95 | 884 | 879 | 99.4 | 1 | 0.1 |
| Other Haematologic Disorders | | 352 | 349 | 99.1 | 1 | 0.3 |
| Total | | 15,757 | 15,104 | 95.9 | 218 | 1.4 |


Breast Cancer Cases
West Bank
2017-2021
N
Jenin
No= 288
Tulkarm
No= 209
Tubas
No= 47
Qalqilya
No= 104
Nablus
No= 461
Salfit
No= 81
Ramallah and Al Bireh
No= 422
Jericho
No= 60
Jerusalem
No= 83
Bethlehem
No= 223
Hebron
No= 524
Breast Cancer Cases
47 - 60
81 - 104
209 - 288
422 - 524
Prepared by
Palestinian Health Information Center
Km
0 5 10 20


Colorectal Cancer Cases
West Bank
2017-2021
N
Jenin
No= 205
CR= 12.6
Tulkarm
No= 184
CR= 19.2
Tubas
No= 48
CR= 15.2
Qalqilya
No= 84
CR= 14.2
Nablus
No= 345
CR= 17.2
Salfit
No= 54
CR= 13.8
Ramallah and Al Bireh
No= 317
CR= 18.7
Jericho
No= 33
CR= 12.8
Jerusalem
No= 76
CR= 9.5
Bethlehem
No= 179
CR= 15.9
Hebron
No= 453
CR= 12.2
Colorectal Cancer Cases
33 - 54
76 - 84
179 - 184
205
317 - 453
Km
0 4.75 9.5 19
Prepared by
Palestinian Health Information Center


Lung Cancer Cases
West Bank
2017-2021
N
Jenin
No= 179
CR= 11
Tubas
No= 39
CR= 12.4
Tulkarm
No= 97
CR= 10.1
Qalqilya
No= 77
CR= 13.3
Nablus
No= 179
CR= 8.9
Salfit
No= 43
CR= 11
Ramallah and Al Bireh
No= 191
CR= 11.2
Jericho
No= 30
CR= 11.6
Jerusalem
No= 33
CR= 4.1
Bethlehem
No= 105
CR= 9.3
Hebron
No= 236
CR= 6.3
Lung Cancer Cases
30 - 33
39 - 43
77 - 105
179 - 191
236
Km
0 5 10 20
Prepared by
Palestinian Health Information Center


Lymphoma Cases
West Bank
2017-2021
N
Jenin
No= 151
CR= 9.3
Tubas
No= 22
CR= 7
Tulkarm
No= 97
CR= 10.1
Qalqilya
No= 67
CR= 11.6
Nablus
No= 172
CR= 8.6
Salfit
No= 40
CR= 10.2
Ramallah and Al Bireh
No= 191
CR= 11.2
Jericho
No= 24
CR= 9.3
Jerusalem
No= 46
CR= 5.7
Bethlehem
No= 113
CR= 10
Hebron
No= 278
CR= 7.5
Lymphoma Cases
22 - 24
40 - 67
97 - 113
151 - 191
278
Km
0 5 10 20
Prepared by
Palestinian Health Information Center