

## Cancer Research

Review Article

# Highest Incidence Cancers Study: A Real Global Analysis

Lamiaa Mohammed<sup>1</sup> , Ashjan Mohammed Hussain<sup>2</sup> , Sura Mouaid Abbas<sup>3</sup> ,  
Tareq Hafdi Abdtawfeeq<sup>4</sup>, and Nathier A. Ibrahim<sup>5</sup> 

<sup>1</sup> Ministry of Education,  
Directorate general of education,  
Baghdad- Rusafa-3, Iraq.  
<sup>2</sup> Iraqi Center for Cancer and  
Medical Genetics Research,  
Mustansiriyah University, Baghdad,  
Iraq.  
<sup>3</sup> Department of biology, Collage  
of Science, Mustansiriyah  
University, Baghdad, Iraq.  
<sup>4</sup> Medical Techniques Department,  
Al-Farahidi University, Baghdad,  
Iraq.  
<sup>5</sup> Department of Radiological  
Techniques, College of Health and  
Medical Techniques, Al-Turath  
University, Baghdad, Iraq.

### Corresponding:

**Sura Mouaid Abbas**

Department of Biology, Collage  
of Science, Mustansiriyah  
University, Baghdad, Iraq.  
Email: [sura.mo.a@uomustansiriyah.edu.iq](mailto:sura.mo.a@uomustansiriyah.edu.iq)

## Abstract

**Background:** According to World Health Organization publications, cancer arises from the transformation of normal cells into tumor cells in a multi-stage process that generally develops from a precancerous lesion to a malignant tumor. These changes result from the interaction between a person's genetic factors and three categories of external factors: physical carcinogenic factors, chemical carcinogenic factors, and biological carcinogenic factors. The incidence of cancer increases sharply with age, and the accumulation of cancer risks is associated with the tendency for the effectiveness of cell repair mechanisms to decline as the person ages. This paper highlights the three main cancers that are most common in the world: female breast, prostate, and lung, accompanied by global statistical indicators by region.

**Methods:** Publications for the year 2024 on the incidence and mortality of the most common cancer diseases in global regions were used. A comparison was made by types of cancer by regions and finding their indicators, illustrated with graphs, for the three cancers.

**Results:** The data analysis indicated that the mortality-to-incidence ratio (MIR) was lowest for female breast cancer (0.29), intermediate for prostate cancer (0.27), and highest for lung cancer (0.73). While Asia had the highest incidence of the three cancers, Africa demonstrated the highest mortality in relation to incidence.

**Conclusion:** Analysis of data on the three most prevalent cancers showed that in the developed countries, despite the high number of cancer cases, mortality was lowest due to well-developed healthcare systems and the availability of diagnostic and treatment factors, unlike the continent of Africa, their death rate was the highest among other continents, despite the low prevalence.

## Keywords

Breast cancer, Lung cancer, Prostate cancer.



© 2025 The Authors.

This article is published by the Iraqi Journal for Cancer and Medical Genetics and is distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

## How to Cite:

Lamiaa mohammed, Ashjan Mohammed Hussain, Abbas, S. M., Tareq Hafdi Abdtawfeeq, & Ibrahim, N. A. (2025). Highest Incidence Cancers Study: A Real Global Analysis. Iraqi Journal of Cancer and Medical Genetics, 18(2). <https://doi.org/10.29409/2hwkzh61>

## Introduction

One of the hallmarks of cancer is the rapid generation of abnormal cells that grow outside their usual boundaries and can then invade neighboring parts of the body and spread to other organs [1]. Cancer is a leading cause of death worldwide, claiming almost 10 million lives in 2022, or approximately 1 in 6 deaths [2]. The most common sites of cancer are breast, lung, prostate, and colorectal. About one-third of cancer deaths are attributable to tobacco use, high body mass index, alcohol use, low intake of fruits and vegetables, and lack of physical activity [3]. Cancer-causing infections, such as human papillomavirus infection and hepatitis, are responsible for approximately 30% of cancer cases in low- and lower-middle-income countries [4]. Cancer develops through multistage genetic–environmental interactions leading to malignant transformation. Based on GLOBOCAN 2022 data, this study is a descriptive epidemiological analysis of the incidence, mortality, and mortality-to-incidence ratios (MIR) of breast cancer worldwide. This analysis offers a thorough breakdown by subregions that highlights patterns of relative mortality across various populations, in contrast to earlier GLOBOCAN summaries that mainly provide raw global and regional statistics. This study evaluates global patterns of incidence, mortality, and MIR for most common cancers; breast, prostate, and lung cancers, as comparative regional analysis of these cancers is essential to identify disparities in early detection and treatment outcome.

## Methods

Data were obtained from WHO GLOBOCAN 2022 and WHO Global Health Observatory (updated 2024). Cancer incidence, mortality, and mortality-to-incidence ratios (MIR) were summarized across regions and subregions using descriptive statistics. While MIR was computed to evaluate relative mortality risk, incidence and mortality are shown as absolute counts. Bar charts and other graphic representations were used to show group differences. Microsoft Excel was used to prepare all analyses and figures.

## Results and Discussion

There are 33 main types of cancer in the world. Table (1) below shows that there are (19976499) incidences and (9743832) mortalities by a rate of (49%). The first one is Lung cancer with a global incidence of (2480673) and mortality (1817469) at a death rate of (74%). The second type is female breast cancer with (2296840) incidence and (66103) mortality with the lowest death rate (3%). The third type was colorectal cancer with (1926425) incidence and (904019) mortality, at (47%). The lowest cancers was vagina with (17908) incidence and (7995) mortality (44%). The highest death rate (91%) was for pancreatic cancer, followed by liver and esophagus cancer (87%). The lowest mortality rate after female breast was thyroid with a rate of (5%), all sites censuses were (9743832) cases with (48.8%) deaths [5, 6], figure (1).

**Table (1):** Global cancer incidence, mortality, and mortality-to-incidence ratio (MIR) based on GLOBOCAN 2022 for 33 cancer

Cancer Site	Incidence	Mortality	MIR
Lung	2480673	1817469	0.73
Breast	2296840	670000	0.29
Colorectum	1926425	904019	0.47
Prostate	1467854	397430	0.27
Stomach	968784	660175	0.68
Liver	866136	758725	<b>0.87</b>
Thyroid	821214	47507	0.05
Cervix Uteri	662301	348874	0.52
Bladder	614298	220596	0.36
NHL	553389	250679	0.45
Esophagus	511054	445391	<b>0.87</b>
Pancreas	510992	467409	<b>0.91</b>
Leukemia	487294	305905	0.63
Kidney	434840	155953	0.36
Corpus Uteri	420368	97723	0.23
Lip, oral Cavity	389846	188438	0.48
Ovary	324603	206956	0.64
Brain CNS	321731	248500	0.77
Larynx	189191	103359	0.54

Multiple Myeloma	187952	121388	0.64
Gallbladder	122491	89055	0.72
Nasopharynx	120434	73482	0.61
Oropharynx	106400	52305	0.49
Hypopharynx	86257	40902	0.47
Hodgkin Lymphoma	82469	22733	0.27
Testis	72040	9068	0.12
Salivary Gland	55083	23942	0.43
Vulva	47336	18579	0.39
Penis	37700	13738	0.36
Kaposi sarcoma	35813	16169	0.45
Mesothelioma	30633	25371	<b>0.82</b>
Vagina	17908	7995	0.44
Melanoma	331722	58667	0.17
All Sites	<b>19976499</b>	<b>9743832</b>	<b>0.49</b>

All data were obtained from GLOBOCAN 2022. Incidence and mortality values represent absolute global counts.

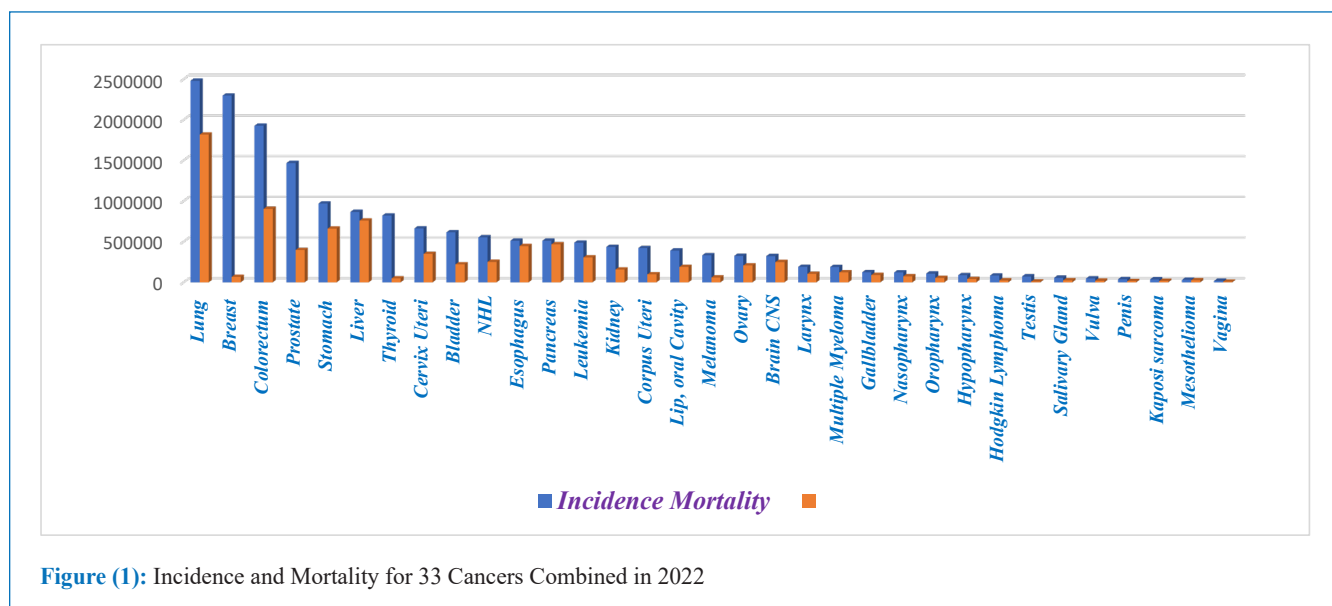


Table (2) shows all types of cancer according to the number of cases for male, female, or combinations. The highest cases are the prostate, which is specific to males, the second type, which is specific to males also, is the testis with an incidence of 72040, and a mortality rate of (12%). As for female cancer, the highest was breast and it was analyzed in table (2), followed by cervix uteri with (662301) incidence and mortality rate of (52%), then (Corpus

Uteri) with mortality rate (23%). The lowest number was for cancer (Vagina) with mortality rate (44%). The highest numbers of all cancer cases were in China (4570000 cases), followed by USA (2280000 cases), and the lowest cases were in South Korea (230000). The highest percentage of mortality was in China (66%), India (64%), Indonesia (59%), Turkey (54%), and Russia (53%). The lowest mortality was in the USA (27%), table (3).

**Table (2):** All Cancers Type Cases for male & female, (000) combined in 2022. This disparity is frequently explained by cultural consid-

Cancer Type	Male	%	Female	%	Total	Cancer Type	Male	%	Female	%	Total
Common Cancers											
Lung	1637	65.9	843	34.1	2480	Melanoma of Skin	179	54	152	46	331
Colorectal	1079	56.1	847	43.9	1926	Brain, Central Nervous System	176	55	144	45	320
Stomach	6499	66.3	329	33.7	6828	Larynx	166	88	22	12	188
Liver	6069	70.1	259	29.9	6328	Multiple Melanoma	105	56	82	44	187
Thyroid	1979	24	624	76	2603	Gallbladder	44	36	78	64	122
Bladder	4739	77	141	23	4880	Nasopharynx	88	73	32	27	120
Non-Hodgkin Lymphoma	310	56.1	243	43.9	553	Oropharynx	86	81	20	19	106
Esophagus	358	70.2	153	29.8	511	Hypopharynx	72	84	14	16	86
Pancreas	276	53.9	235	46.1	510	Hodgkin Lymphoma	48	59	34	41	82
Leukemia	278	57.1	209	42.9	487	Salivary Glands	31	56	24	44	55
Kidney	274	62.9	161	37.1	434	Kaposi Sarcoma	23	68	11	32	34
Lip, Oral Cavity	273	70.2	116	29.8	389	Mesothelioma	206	70	11	30	217
Female Cancers						Male Cancers					
Female Breast			2297		2296	Prostate	1468				1468
Cervix Uteri			662		662	Testis	72				72
Corpus Uteri			420		420	Penis	38				38
Ovary			324		324						
Vulva			47		47						
Vagina			18		18						

Source: GLOBOCAN 2022.

**Table (3):** Top (15) Countries in Breast Cancer Incidence, Mortality, and Mortality-to-Incidence Ratio (MIR), 2022 (Absolute Numbers)

Country	Incidence (cases)	Mortality (deaths)	MIR
China	4570	3000	0.66
USA	2280	612	0.27
India	1320	851	0.64
Japan	1020	420	0.41
Germany	623	252	0.40
Brazil	592	260	0.44
Russia	591	312	0.53
France	468	185	0.40
UK	458	179	0.39
Italy	415	174	0.42
Indonesia	397	234	0.59
Spain	282	113	0.40
Canada	274	86	0.31
Turkey	234	126	0.54
South Korea	230	88	0.38

GLOBOCAN 2022.

### Highest Incidence Cancers

The three highest incidence cancers which are, female breast cancer, lung cancer, and prostate cancer.

#### Female Breast Cancer

Breast cancer affects both males and females, but it is more common among females [7]. Survival rates for breast cancer patients have increased, and the number of deaths associated with this disease has steadily decreased, mostly due to several factors, such as early detection, adopting a new treatment method that considers the condition of each patient, and improving the level of understanding of the nature of this disease [8].

Mortality rate for female breast was the lowest (29%). Asia ranked first in the number of incidence and number of mortalities, the high percentage was in India with a high mortality rate (51%), China with a mortality rate of (28%). Africa ranks fourth in incidence but has the highest mortality rate (46%). This difference is caused by several important factors, including a lack of proper healthcare infrastructure, reduced awareness, and restricted access to sophisticated diagnostic

instruments. Many women in these areas experience delayed diagnosis, which frequently results in therapy at a stage of cancer that is more difficult to cure and has a much lower chance of survival. The lowest continent was Oceania and the highest mortality rate was in the country of Melanesia. Socioeconomic differences, a lack of healthcare resources, and cultural norms that postpone early identification and treatment might all be contributing causes to this oddity. The lowest mortality rate among the five continents was Oceania (19%). The global breast cancer cases were (2296840) cases with (30%) mortality rate. The highest number of cases was in Europe were in Italy (55133) with (23%) mortality rate. In America, the highest cases were in the USA (253465), with (17%) mortality rate. In Asia, China had the highest number of cases (416371) with (28%) mortality rate. South Africa (15491) cases with the highest (30%) mortality rate. In Oceania, Australia (19617) with (16%) lowest mortality rate [6, 9], tables (4) and figure (2). This findings emphasizes the necessity of ongoing initiatives to advance research, treatment, and early detection techniques, especially in areas with high mortality rates.

**Table (4):** Incidence and Mortality of Female Breast Cancer by Region 2022

Region	Incidence (cases)	Mortality (deaths)	MIR
World	2296840	685,000	0.30
<b>Asia</b>	<b>1026171</b>	<b>346009</b>	<b>0.34</b>
<i>Eastern Asia</i>	551636	141421	0.26
<i>South-Central Asia</i>	254881	124975	0.49
<i>South-Eastern Asia</i>	158939	58670	0.37
<i>Western Asia</i>	60715	20943	0.34
<i>China</i>	416371	117174	0.28
<i>India</i>	178361	90408	0.51
<b>Europe</b>	<b>531086</b>	<b>141765</b>	<b>0.27</b>
<i>Western Europe</i>	169016	43706	0.26
<i>Central and Eastern Europe</i>	158708	51488	0.33
<i>Southern Europe</i>	120185	28607	0.24
<i>Northern Europe</i>	83177	17964	0.22
<b>America</b>	<b>491691</b>	<b>106391</b>	<b>0.27</b>
<i>Northern America</i>	281591	48407	0.17
<i>South America</i>	156472	41681	0.27
<i>Caribbean</i>	14712	5874	0.40
<i>Central America</i>	38916	10429	0.27
<b>Africa</b>	<b>186598</b>	<b>85787</b>	<b>0.46</b>
<i>Western Africa</i>	49339	25626	0.52
<i>Eastern Africa</i>	45709	24047	0.53
<i>Northern Africa</i>	57128	21524	0.38
<i>Southern Africa</i>	16526	5090	0.31
<i>Middle Africa</i>	17896	9500	0.53
<b>Oceania</b>	<b>25873</b>	<b>5044</b>	<b>0.19</b>
<i>Australia and New Zealand</i>	23277	3792	0.16
<i>Melanesia</i>	2215	1121	0.51
<i>Polynesia / Micronesia</i>	381	131	0.34

Income Levels			
Very High HDI	1017459	231093	0.23
High HDI	825438	247486	0.30
Medium HDI	307658	147427	0.48
Low HDI	109572	58586	0.53

Source: GLOBOCAN 2022, HDI: Human Development Index

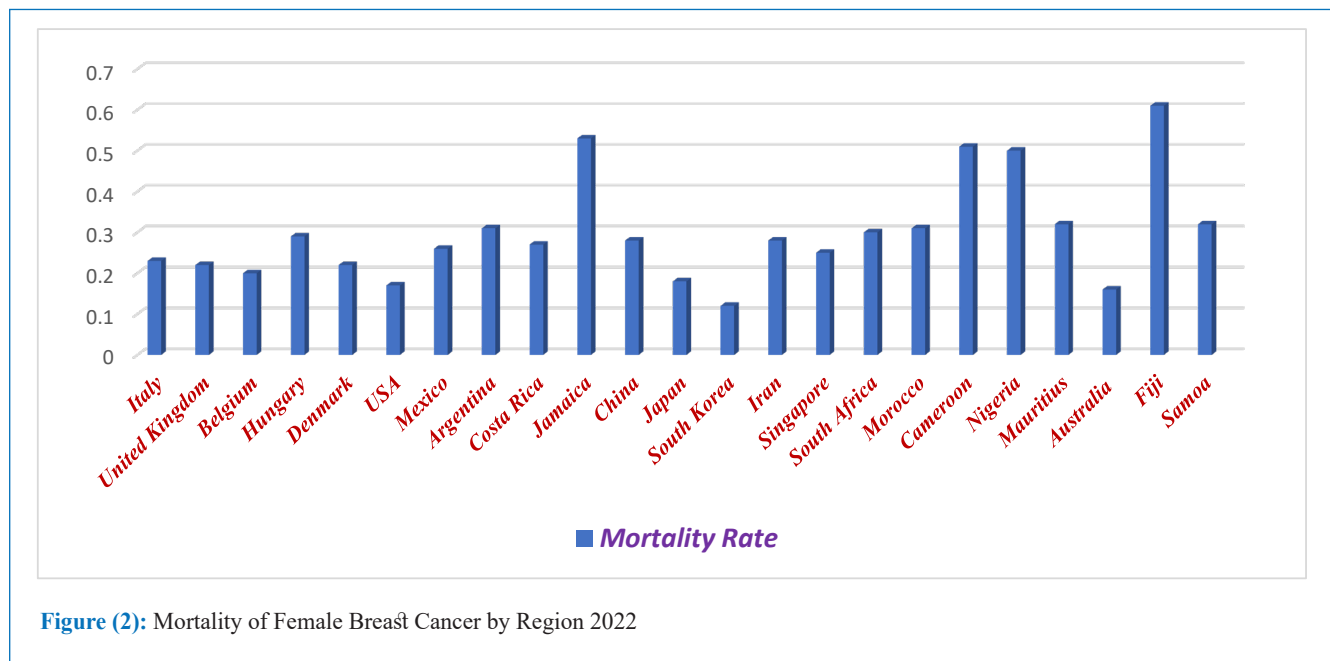


Figure (2): Mortality of Female Breast Cancer by Region 2022

erations, a lack of knowledge, and restricted access to healthcare in some areas. For instance, a large number of women in India receive their diagnoses later in the course of the illness, which reduces the effectiveness of therapy and raises the risk of mortality. The second continent was Europe, with the most cases in Western Europe, followed by America, where the cases were concentrated in North America. Because of early screening systems, more extensive access to healthcare, and efficient treatment plans, European nations—especially those in Western Europe—have higher survival rates. Similarly, due to excellent healthcare and intensive awareness campaigns, breast cancer survival rates have significantly improved in North America, especially the USA. The incidence of female breast cancer is highest in Asia, particularly Eastern Asia, but mortality rates are relatively lower in high-HDI countries due to early detection through mammography and access to multimodal treatment. Conversely, MIR is highest in low-HDI regions (0.53), reflecting limited screening, delayed diagnosis, and reduced treatment availability. The figure emphasizes the strong correlation between HDI and survival outcomes in breast cancer [10, 11]

**Lung Cancer**

The risk of lung cancer increases with the length of smoking time and the number of cigarettes a person uses to smoke. Giving up smoking, even after smoking for many years, can significantly reduce the chances of developing lung cancer [12, 13]. The incidence of lung cancer cases in the world was (2480673) with a mortality rate (73%), The highest was in Asia (1315736) with a mortality rate (85%), then Europe (477543) cases with a mortal-

ity rate (78%), in America (351138) with mortality rate (77%). The high rate of smoking, especially among males, in many Asian nations is a major contributing factor to this. Rapid urbanization and shifting lifestyles in nations like China, India, and Japan have led to higher smoking rates in recent decades. The biggest risk factor for lung cancer is still smoking, especially in men. Because smoking is accepted as a cultural norm in many of these nations, it is challenging to successfully treat the underlying cause. But in some regions of Asia, the high death rate (85%) suggests a serious problem with late-stage diagnoses and restricted access to cutting-edge medical care. Early screening programs are less prevalent and there is a lack of knowledge about the signs of lung cancer in many nations, especially in rural areas [12, 13]. The mortality rate in Africa stands at 93%. Massive disparity between the high death rate and low incidence suggests serious problems with early identification, treatment accessibility, and healthcare infrastructure. Cancer treatment is underfunded in many African nations, and diagnostic equipment like CT scans—which are essential for early lung cancer detection—is not easily accessible. Furthermore, smoking rates are rising in some areas, especially among men, and there is a dearth of knowledge regarding lung cancer. The fact that many patients receive their diagnoses too late to receive adequate therapy further contributes to this high death rate. Lung cancer is often discovered in advanced stages in many African nations, making treatment more difficult and the chance of survival significantly lower. Lung cancer patients’ chances of survival are further reduced by a lack of access to high-quality healthcare, particularly

in rural locations [14]. In Oceania (169075) by mortality rate (71%), lung cancer prevalence in Oceania is rather low when compared to other continents. Strong public health initiatives, smoking cessation programs, and tobacco control regulations have all helped Australia

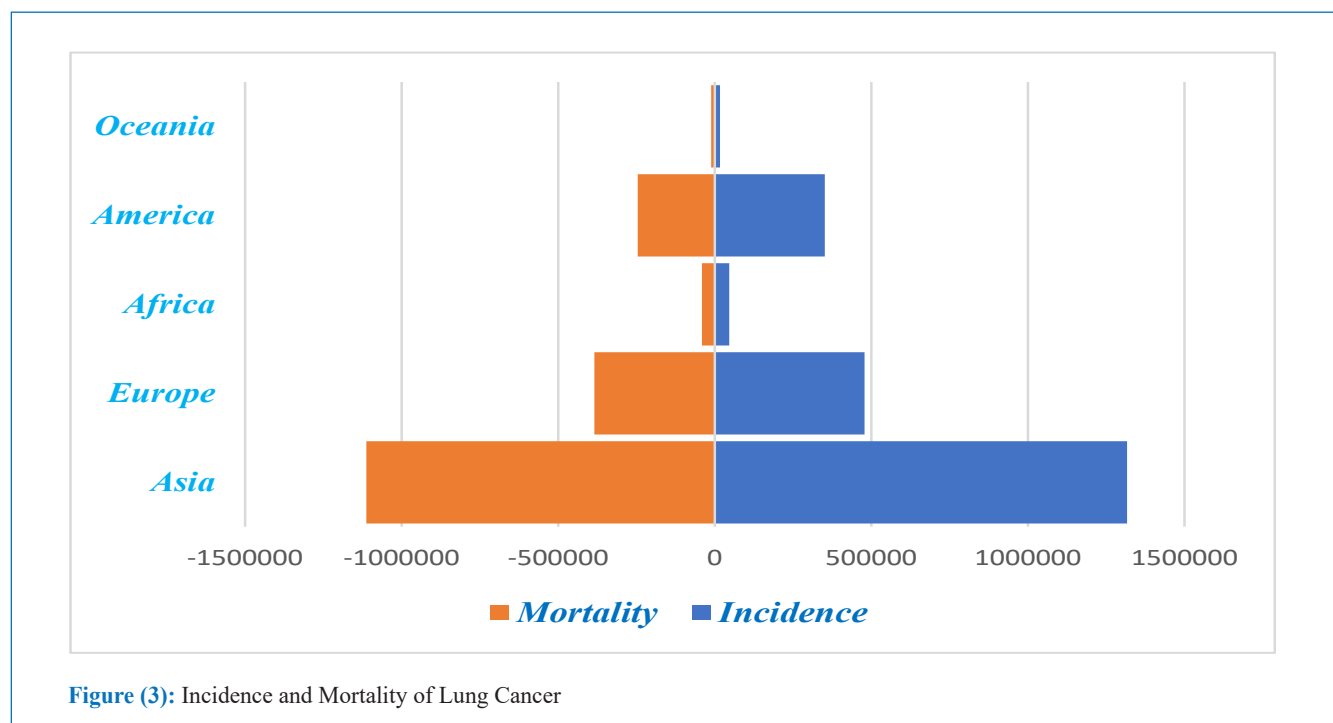
significantly lower its smoking rates. As a result, the death rate is lower than in many other areas, and lung cancer rates have dropped. Thus, the continent of Africa is the region with the highest number of lung cancer deaths, table (5).

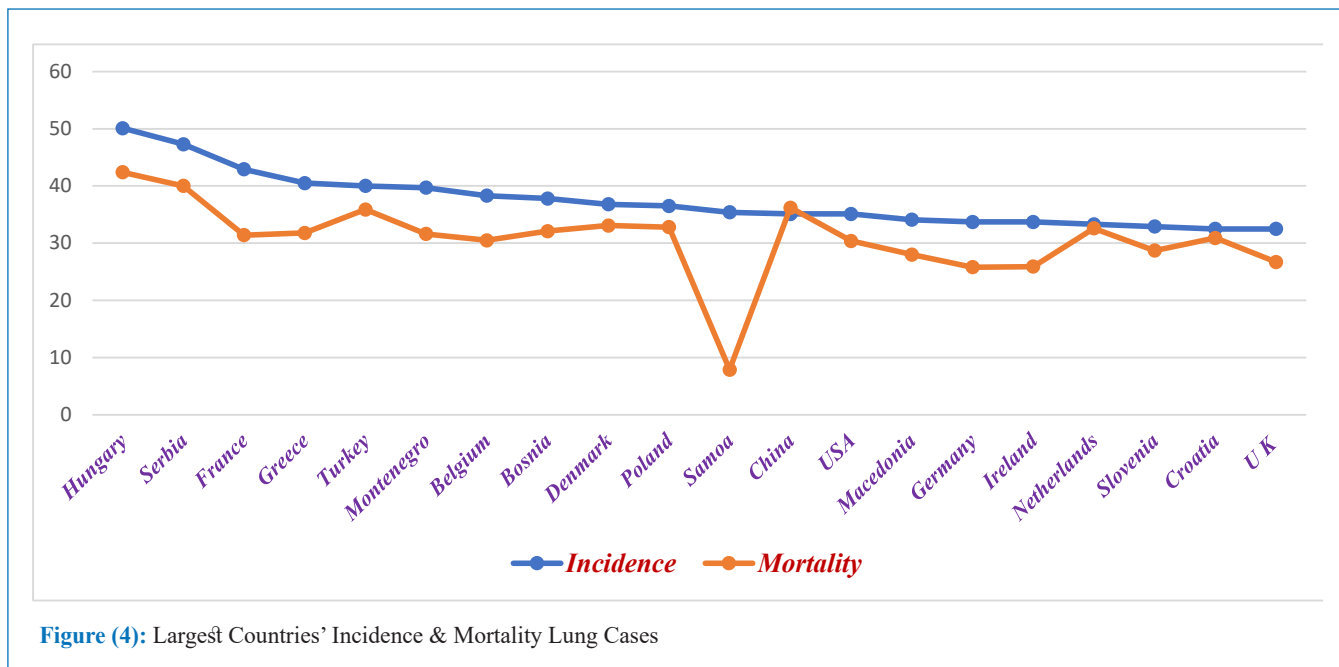
**Table (5):** Lung Cancer Incidence, Mortality, and Mortality-to-Incidence Ratio (MIR) by Region and Income Level, 2022 (Absolute Numbers)

Region	Incidence	Mortality	MIR	Region	Incidence	Mortality	MIR
<i>Asia</i>	<b>1,315,736</b>	<b>1,112,517</b>	<b>0.85</b>	<i>America</i>	<b>351138</b>	<b>246268</b>	<b>0.63</b>
<i>Eastern Asia</i>	1012621	841174	0.83	<i>Northern America</i>	253,537	159,641	0.62
<i>South-Central Asia</i>	121369	109356	0.90	<i>South America</i>	76,609	67,312	0.87
<i>South-Eastern Asia</i>	123309	109520	0.88	<i>Caribbean</i>	11058	10079	0.91
<i>Western Asia</i>	58437	52467	0.89	<i>Central America</i>	9934	9236	0.92
<i>Europe</i>	<b>477534</b>	<b>384176</b>	<b>0.78</b>	<i>Middle Africa</i>	2037	1897	0.93
<i>Western Europe</i>	146460	113524	0.77	<i>Oceania</i>	<b>16975</b>	<b>12012</b>	<b>0.71</b>
<i>Central and Eastern Europe</i>	151632	130596	0.86	<i>Australia and New Zealand</i>	15587	10791	0.69
<i>Southern Europe</i>	104391	85635	0.82	<i>Melanesia</i>	918	798	0.86
<i>Northern Europe</i>	75051	54421	0.72	<i>Polynesia</i>	268	229	0.85
<i>Africa</i>	<b>45988</b>	<b>41171</b>	<b>0.93</b>	<i>Micronesia</i>	202	194	0.96
<i>Western Africa</i>	4175	3849	0.92	<i>Income Levels</i>			
<i>Eastern Africa</i>	7419	6758	0.91	<i>Very High HDI</i>	975665	711630	0.72
<i>Northern Africa</i>	23179	20728	0.89	<i>High HDI</i>	1047707	918661	0.87
<i>Southern Africa</i>	9178	7939	0.86	<i>Medium HDI</i>	165943	149887	0.90
<i>World</i>	<b>2480673</b>	<b>1817469</b>	<b>0.73</b>	<i>Low HDI</i>	16418	15108	0.92

The country with the highest incidence of lung cancer is Hungary (5010000) with a mortality rate (85%) and the lowest country with is the United Kingdom (3250000) with a mortality rate (82%). The table also shows that all countries had a percentage of smokers (which is the main cause of lung cancer) of males. It is higher

than that of females, except for Denmark and Croatia. The highest rate of male smokers was in the United States (44%) and the lowest was in the Netherlands (17%). As for females, the highest rate was Croatia (32.4) and the lowest was China (2%) [15], figure (3, 4).





In most areas, smoking is still the leading risk factor for lung cancer due to its high prevalence, particularly among males. This pattern aligns with the documented association between smoking and the risk of lung cancer. It's interesting to note that smoking rates among women have increased in several nations, especially in Croatia, where 32.4% of women smoke. Concerns over the future burden of lung cancer are raised by this trend, especially as more women start smoking. On the other hand, women in nations like China smoke at a very low rate of 2%, which lowers the risk of lung cancer in women. However, public health initiatives must concentrate on lowering smoking among all demographics because China's high male smoking rates significantly increase the burden of lung cancer in males [16].

#### Prostate Cancer

Prostate cancer is considered the third largest after female breast & and lung cancer, with an estimated (1467854) new cancer cases and (397430) deaths by a percentage of (27%) in 2022. According to published data [2], the highest rates of incidence are in countries with high income, high gross domestic product, and higher human development index, for example, European countries, Australia, New Zealand, and North America despite accurate diagnosis, and treatment being available in these countries. This coincides with the fact that the highest deaths are in low-income countries due to the deterioration of health services provided to treat this type of cancer. The extensive use of prostate-specific antigen (PSA) testing, a blood test used to identify prostate cancer early on, is one of the main causes of the high incidence rates in these nations. Because men in these areas are regularly examined for the condition, particularly those over 50, early discovery and higher reported incidence rates are the results [17]. Receiving a diagnosis that confirms prostate cancer can be a crucial, not only because it is a life-threatening disease but

also because treating prostate cancer can lead to various side effects [18].

The highest prostate cancer cases were on the European continent, with an incidence of (473344) cases. The highest was Western Europe (170032), followed by Central and Eastern Europe (111668), Southern Europe (98213), and Northern Europe (93431). Regular PSA screening and early detection initiatives are directly related to the high incidence rates in Europe. Men over 50 are routinely screened for prostate cancer in several Western European nations, which promotes early detection and increases the number of cases reported. However, it is crucial to emphasize that increased incidence does not always imply higher mortality. This is because these nations have more sophisticated therapies, such as surgery, radiation therapy, and hormone therapy, which increase survival rates, particularly when prostate cancer is identified early. Furthermore, these nations have more effective public health education programs, resulting in a greater percentage of early-stage diagnosis and improved patient outcomes [19]. The second is America (420996), which was concentrated in North America (239574), followed by the Caribbean (21380), and Central America (3628). It most likely reflects a combination of lower screening rates, less awareness, and restricted access to healthcare in some locations.

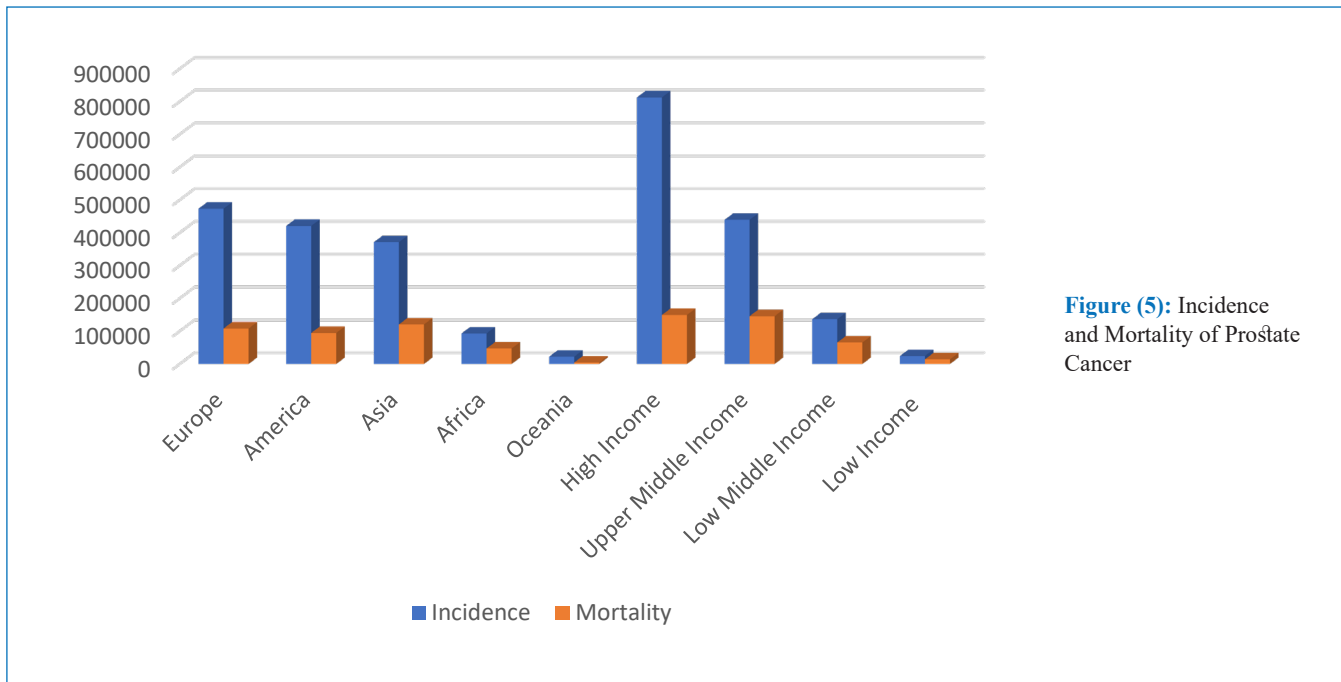
The third region in the incidence cases was in Asia (371225), the majority of which were in East Asia (244102), South Central Asia (54451), Southeast Asia (41878), then West Asia (30794). The significantly greater prevalence in East Asia can be due to better healthcare systems and the widespread use of PSA screening, particularly in metropolitan regions. Japan, for example, has a comprehensive public health system that encourages cancer screenings. In contrast, locations in South and Southeast Asia had lower prostate cancer occurrences, which might be attributed to a lack of comprehensive screen-

ing programs, poor public awareness, and restricted health-care access. Men in these locations may not receive frequent screenings, resulting in late-stage diagnosis [20]. The fourth place was Africa, with several (93173) cases, the most incidence were in West Africa (26392), followed by East Africa (23622), North Africa (15841), South Africa (13932), and Central Africa (13386). The high mortality rate in Africa is due to poor healthcare infrastructure, a lack of early identification, and restricted access to treatment. Because of the lack of routine screening programs, many African prostate cancer patients are detected at an advanced stage. Late-stage diagnosis often have lower survival rates. Many African nations have little public knowledge of prostate cancer, which contributes to delays in seeking medical assistance. Furthermore, cultural influences may impact men's desire to seek treatment for diseases such as prostate cancer [21].

Fifth place was the lowest rank in Oceania (22421), the highest countries being Australia and New Zealand (20911), Melanesia (1176), Polynesia (227), and Micronesia (107). The highest mortality rate was in the continent of Asia (32%), followed by Europe (23%), America (22%), Oceania (21%), and Africa, although the number of incidence ranked third, but the number of deaths was more than half of the cases (51%), this indicates poor health care for the injured, table (8, 9). On the scale of income levels, the highest incidence was among the high-income levels (812585), the mortality rate was the lowest (18%), followed by the high middle (439392) with a mortality rate in second place (33), the third level was for the low middle (136573) with a mortality rate (48%). The last level was for low income (24341) with the highest mortality rate (57%), table (7) and figure (5).

**Table (8):** Prostate Cancer Incidence, Mortality, and Mortality-to-Incidence Ratio (MIR) by Region and Income Level, 2022 (Absolute Numbers)

Region	Incidence	Mortality	MIR	Region	Incidence	Mortality	MIR
<b>Europe</b>	<b>473344</b>	<b>108088</b>	<b>0.23</b>	<b>Africa</b>	<b>93173</b>	<b>47249</b>	<b>0.51</b>
Western Europe	170032	31968	0.19	Western Africa	26392	14903	0.56
Central and Eastern Europe	111668	34800	0.31	Eastern Africa	23622	13199	0.56
Southern Europe	98213	20383	0.21	Northern Africa	15841	7177	0.45
Northern Europe	93431	20937	0.22	Southern Africa	13932	4261	0.31
<b>America</b>	<b>420996</b>	<b>94607</b>	<b>0.22</b>	<b>Middle Africa</b>	13386	7709	0.58
Northern America	239574	37192	0.16	<b>Oceania</b>	<b>22421</b>	<b>4667</b>	<b>0.21</b>
South America	156414	37454	0.24	<b>Australia and New Zealand</b>	20911	4211	0.20
Caribbean	21380	9664	0.45	<b>Melanesia</b>	1176	451	0.38
Central America	3628	10297	0.28	<b>Polynesia</b>	227	70	0.31
<b>Asia</b>	<b>371225</b>	<b>120593</b>	<b>0.32</b>	<b>Micronesia</b>	107	35	0.33
South-Central Asia	54451	26537	0.49	<b>Income Levels</b>			
South-Eastern Asia	41878	16284	0.39	<b>High Income</b>	812585	149445	0.18
Western Asia	30794	8929	0.29	<b>Upper Middle Income</b>	439392	145792	0.33
Eastern Asia	244102	68843	0.28	<b>Low Middle Income</b>	136573	65555	0.48
<b>World</b>	<b>1467854</b>	<b>379430</b>	<b>0.26</b>				

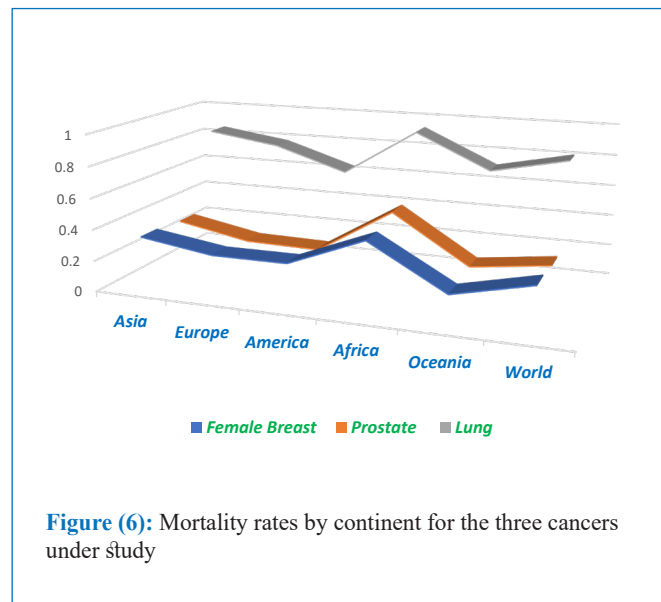


**Figure (5):** Incidence and Mortality of Prostate Cancer

High-income nations reported the most incidence, which may be due to increased access to healthcare, more screening initiatives, and a higher propensity to seek medical attention. These nations usually have the infrastructure in place for early detection, which enables improved illness management and lowers the mortality rate to 18%. When detected early, prostate cancer often has a low death rate, and wealthier nations typically have greater resources to support these early interventions. The death rate for the high-middle-income category is 33%, which is fairly worrying. This may be due to the fact that many nations have healthcare systems that are only moderately successful and still lack the funding necessary to give all of their population the finest care available. Higher death rates could result from either later detection of prostate cancer or less effective treatment compared to high-income nations. The most disturbing statistics come from low-income nations, where the mortality rate is a startling 57% despite a significantly smaller number of incidences. Significant healthcare disparities, restricted access to treatments, delayed diagnosis, and lack of access to healthcare services are probably to blame for this. These high death rates are a result of the high cost of prostate cancer screening and treatment, which may not be accessible in low-income nations [22].

The highest incidence prostate cancer according to the continents were in the Americas continents, Barbados had the highest number (98.5) per (100000) person, and the mortality was (40.3) per (100000) person also the highest, followed by Cuba (60.6) with the mortality (24.7). The second highest continent is Europe. Estonia ranked first with incidence cases (52.7) and mortality, which is also the highest (21.9) followed by Denmark with the incidence cases (48.3) and mortality (15.9). The lowest country in Europe was Switzer-

land with the incidence cases (30.3) and mortality (9.4). On the continent of Asia, the highest incidence cases were in Armenia (24.8) and (16.3) mortality and the lowest was in Thailand (11.3) and mortality (5.9), the lowest mortality in Asia Japan (4.5) per (100000) cases. In the continent of Oceania Australia has the lowest cases (27.2) mortality (10) and New Zealand (31.9) & (12.3) mortality. The continent of Africa in Mauritius (17.5) cases and mortality (11.7), followed by South Africa (13.3) and mortality (22.1). Figure (6) shows the mortality rates by continent for the three cancers under study, which are breast cancer, prostate cancer, and lung cancer. It is evident that the highest mortality rate was in lung cancer, followed by prostate cancer, then breast cancer.



**Figure (6):** Mortality rates by continent for the three cancers under study

The figure highlights significant geographic disparities in cancer outcomes, with higher MIR values in less-developed regions, likely reflecting delayed diagnosis, limited access to healthcare, and suboptimal treatment. Additionally, lung cancer remains the most lethal cancer globally compared with female breast and prostate cancers [23-25]

### Conclusion

Despite higher incidence in developed regions, mortality rates remain lower due to early detection and better healthcare infrastructure. Conversely, African regions show the highest mortality despite lower incidence, underscoring healthcare disparities.

### Author Declarations

#### Funding Statement

This research received no external funding. The authors confirm that no financial support was obtained from any funding agency, commercial entity, or not-for-profit organization for the conduct, analysis, or publication of this study.

#### Conflict of Interest Statement

The authors declare no conflicts of interest, including financial, personal, academic, or institutional relationships that could have influenced the work reported in this manuscript.

#### Ethics Statement

This study was based exclusively on secondary analysis of

publicly available, aggregated data obtained from the WHO Global Cancer Observatory (GLOBOCAN 2022) and other publicly accessible World Health Organization reports.

Ethical approval was not required, as the study did not involve human participants, animal subjects, human biological materials, or identifiable personal data.

### Consent for Publication

Not applicable.

This manuscript does not contain individual-level data, images, or information that could lead to the identification of human participants.

### Data Availability Statement

All data analyzed in this study are publicly available from the Global Cancer Observatory (GLOBOCAN 2022) and the WHO Global Health Observatory.

No new datasets were generated during the current study.

Additional clarification regarding data sources may be requested from the corresponding author.

### Author Contributions

All authors contributed substantially to the study conception, data interpretation, manuscript drafting, and critical revision. All authors have read and approved the final version of the manuscript and agree to be accountable for all aspects of the work in accordance with COPE authorship guidelines.

## References

- Brown JS, Amend SR, Austin RH, Gatenby RA, Hammarlund EU, Pienta KJ. Updating the definition of cancer. *Mol Cancer Res.* 2023;21(11):1142–1147. doi:10.1158/1541-7786.MCR-23-0411.
- World Health Organization; International Agency for Research on Cancer (IARC). GLOBOCAN 2022: Cancer incidence and mortality worldwide. Lyon, France; 2022.
- Rezende LFM, Murata E, Giannichi B, Tomita LY, Wagner GA, Sanchez ZM, Celis-Morales C, Ferrari G. Cancer cases and deaths attributable to lifestyle risk factors in Chile. *BMC Cancer.* 2020;20(1):693. doi:10.1186/s12885-020-07187-4.
- Diakite M, Shaw-Saliba K, Lau CY. Malignancy and viral infections in Sub-Saharan Africa: A review. *Front Virol.* 2023;3:1103737. doi:10.3389/fviro.2023.1103737.
- Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, Bray F. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin.* 2021;71(3):209–249. doi:10.3322/caac.21660.
- Ferlay J, Ervik M, Lam F, Laversanne M, Colombet M, Mery L, Piñeros M, Znaor A, Soerjomataram I, Bray F. Global Cancer Observatory: Cancer Today. Lyon, France: International Agency for Research on Cancer; 2024. Available from: <https://geo.iarc.who.int/today>.
- Łukasiewicz S, Czezelewski M, Forma A, Baj J, Sitarz R, Stanisławek A. Breast cancer: Epidemiology, risk factors, classification, prognostic markers, and current treatment strategies—An updated review. *Cancers (Basel).* 2021;13(17):4287. doi:10.3390/cancers13174287.
- Arnold M, Morgan E, Rumgay H, Mafra A, Singh D, Laversanne M, Vignat J, Gralow JR, Cardoso F, Siesling S, Soerjomataram I. Current and future burden of breast cancer: Global statistics for 2020 and 2040. *Breast.* 2022;66:15–23. doi:10.1016/j.breast.2022.08.010.
- Huang J, Ngai CH, Deng Y, Tin MS, Lok V, Zhang L, Yuan J, Xu W, Zheng ZJ, Wong MCS. Cancer incidence and mortality in Asian countries: A trend analysis. *Cancer Control.* 2022;29:10732748221095955. doi:10.1177/10732748221095955.
- Lim YX, Wong EM, Lee J, Ng S, Chan S, Tan SH, Chong P, Ho W, Chew K, Tan CW. Breast cancer in Asia: Incidence, mortality, early detection, mammography programs, and risk-based screening initiatives. *Cancers (Basel).* 2022;14(17):4218. doi:10.3390/cancers14174218.
- LoPiccolo J, Gusev A, Christiani DC, Jänne PA. Lung cancer in patients who have never smoked—An emerging disease. *Nat Rev Clin Oncol.* 2024;21(2):121–146. doi:10.1038/s41571-023-00844-0.
- National Center for Chronic Disease Prevention and Health Promotion; Division of Cancer Prevention and Control. Cancer data and statistics. Centers for Disease Control and Prevention.
- Shariful Islam M, Rashid M, Sizear MI, Hassan R, Rahman M, Parvez SM, Hore SC, Haque R, Jahan F, Chowdhury S, Huda TMN, Saif-Ur-Rahman KM, Khan A. Cigarette smoking and associated factors among men in five South Asian countries: A pooled analysis of nationally representative surveys. *PLoS One.* 2022;17(11):e0277758. doi:10.1371/journal.pone.0277758. Erratum in: *PLoS One.* 2024;19(12):e0315447. doi:10.1371/journal.pone.0315447.
- Ra CK, Pehlivan N, Kim H, Sussman S, Unger JB, Businelle

- MS. Smoking prevalence among Asian Americans: Associations with education, acculturation, and gender. *Prev Med Rep.* 2022;30:102035. doi:10.1016/j.pmedr.2022.102035.
15. Rey Brandariz J, Rungay H, Ayo-Yusuf O, Edwards R, Islami F, Liu S, Pérez-Ríos M, Rodrigues Pinto Corrêa PC, Ruano-Ravina A, Soerjomataram I. Estimated impact of a tobacco-elimination strategy on lung cancer mortality in 185 countries: A population-based birth-cohort simulation study. *Lancet Public Health.* 2024;9(10):e745–e754. doi:10.1016/S2468-2667(24)00185-3.
  16. David MK, Leslie SW. Prostate-specific antigen. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK557495/>.
  17. Taha DE, Aboumarzouk OM, Koraiem IO, Shokeir AA. Antibiotic therapy in patients with high prostate-specific antigen: Is it worth considering? A systematic review. *Arab J Urol.* 2020;18(1):1–8.
  18. Beyer K, Leenen R, Venderbos LDF, Helleman J, Denijs F, Brammer W, Vasilyeva V, Briers E, Rivas JG, Chloupkova R, Majek O, Annemans L, Vynckier P, Basu P, Chandran A, van den Bergh R, Collen S, van Poppel H, Roobol MJ; The PRAISE-U Consortium. Health policy for prostate cancer early detection in the European Union: PRAISE-U Consortium. *J Pers Med.* 2024;14(1):84. doi:10.3390/jpm14010084.
  19. Ko L-C, Gravina N, Berghausen J, Abdo J. Rising trends in prostate cancer among Asian men: Global concerns and diagnostic solutions. *Cancers (Basel).* 2025;17(6):1013. doi:10.3390/cancers17061013.
  20. Omotoso O, Teibo JO, Atiba FA, Oladimeji T, Paimo OK, Ataya FS, Batiha GE, Alexiou A. Addressing cancer care inequities in sub-Saharan Africa: Current challenges and proposed solutions. *Int J Equity Health.* 2023;22(1):189. doi:10.1186/s12939-023-01962-y.
  21. Gizaw Z, Aštale T, Kassie GM. What improves access to primary healthcare services in rural communities? A systematic review. *BMC Prim Care.* 2022;23:313. doi:10.1186/s12875-022-01919-0.
  22. Allemani C, Matsuda T, Di Carlo V, Harewood R, Matz M, Niksic M, Bonaventure A, Valkov M, Johnson CJ, Estève J, et al. Global surveillance of trends in cancer survival 2000–2014 (CONCORD-3). *Lancet.* 2018;391:1023–1075.
  23. Rawla P. Epidemiology of prostate cancer. *World J Oncol.* 2019;10(2):63–89.
  24. Siegel RL, Miller KD, Fuchs HE, Jemal A. Cancer statistics, 2024. *CA Cancer J Clin.* 2024;74:12–49.
  25. Arnold M, Rungay H, Laversanne M, Vignat J, Ferlay J, Soerjomataram I. Global burden of cancer: Current statistics and projections. *Breast.* 2022;66:15–23. doi:10.1016/j.breast.2022.08.010.