Cancer Estimates in Brazil Reveal Progress for the Most Lethal Malignancies

Leonardo L.G. Ferreira¹ and Adriano D. Andricopulo¹,*

¹Laboratory of Medicinal and Computational Chemistry, Center for Research and Innovation in Biodiversity and Drug Discovery, Physics Institute of Sao Carlos, University of Sao Paulo, Av. Joao Dagnone 1100, Sao Carlos – SP, 13563-120, Brazil

Cancer is the main public health problem in the world, and its burden has increased sharply. In 2012, 12.6 million new cases were estimated. This figure is expected to grow by 60% from 18.1 million new cases per year in 2018 to 29.4 million in 2040 [1]. In low- and middle-income countries (LMICs), the situation is even worse: the cancer burden will increase by 80%, and 19.6 million new cases are expected each year [2]. Cancer continues to be a deadly condition, as it causes one in every six deaths. The disease killed 9.6 million people in 2018 and ranked first or second as the cause of premature death in 134 countries [3]. In most countries with a high or very high human development index (HDI), cancer is the leading cause of premature death.

In Brazil, China, and Eastern European countries such as Russia and Ukraine, cancer is the second leading cause of death. Neuroblastomas (14.5% of all cases in men), prostate (13.5%), colorectal (10.9%) and stomach (7.2%) tumors. In women, the most common cancer types are breast (24.2% of all cases in women), colorectal (9.5%), lung (8.4%) and cervical (6.6%) malignancies. The number of new cases in women has reached 316,140, mostly featuring NMSC (29.5% of all cases in women), breast (21%), colorectal (6.5%) and cervical (5.2%) tumors. Worldwide, lung cancer is the most common cancer and accounted for 11.6% of all new cancer cases in 2018 (Fig. 1b) [3, 9]. Breast neoplasms rank second (11.5%) and are followed by colorectal (10.2%) and prostate (7%) tumors. In total, 9.5 million men were diagnosed with cancer in 2018, and the most common types are lung (14.5% of all cases in men), prostate (13.5%), colorectal (10.9%) and stomach (7.2%) tumors. In women, the most common cancer types are breast (24.2% of all cases in women), colorectal (9.5%), lung (8.4%) and cervical (6.6%) malignancies. The leading causes of death from malignancies in Brazil are lung (13.1% of all deaths), colorectal (10%) and breast (7.6%) cancers (Fig. 2a) [8]. In the world, lung (18.4%), colorectal (9.2%) and stomach (8.2%) tumors are the most fatal (Fig. 2b) [3, 9].

NMSC, the most common cancer in Brazil, will reach 176,930 new cases and will affect 83,770 men and 93,160 women in each year of the 2020-2022 period according the Brazilian National Cancer Institute (INCA) [7]. This number represents a 10.5% increase in the total incidence of the disease compared to the 2018 estimate. The 2018 data for Brazil was collected using the “Cancer today data visualization tools for exploring the global cancer burden in 2018”, which was developed by the International Agency for Research on Cancer (IARC) [8]. Non-melanoma skin cancer (NMSC) will be the most common (28.3% of all cases), followed by breast (10.6%), prostate (10.5%) and colorectal (6.6%) tumors (Fig. 1a). The number of new cases in men has reached 309,230, mostly featuring NMSC (27.1% of all cases in men), prostate (21.3%), colorectal (6.6%) and lung (5.7%) malignancies. The number of new cases in women has reached 1,140, mostly featuring NMSC (29.5% of all cases in women), breast (21%), colorectal (6.5%) and cervical (5.2%) tumors. Worldwide, lung cancer is the most common cancer and accounted for 11.6% of all new cancer cases in 2018 (Fig. 1b) [3, 9]. Breast neoplasms rank second (11.5%) and are followed by colorectal (10.2%) and prostate (7%) tumors. In total, 9.5 million men were diagnosed with cancer in 2018, and the most common types are lung (14.5% of all cases in men), prostate (13.5%), colorectal (10.9%) and stomach (7.2%) tumors. In women, the most common cancer types are breast (24.2% of all cases in women), colorectal (9.5%), lung (8.4%) and cervical (6.6%) malignancies. The leading causes of death from malignancies in Brazil are lung (13.1% of all deaths), colorectal (10%) and breast (7.6%) cancers (Fig. 2a) [8]. In the world, lung (18.4%), colorectal (9.2%) and stomach (8.2%) tumors are the most fatal (Fig. 2b) [3, 9].
Stomach malignancies rank sixth in incidence globally, with 1.03 million new cases estimated in 2018. In Brazil, the incidence of stomach cancer will increase by 1.4%, reaching 13,360 and 7,870 cases among men and women, respectively (2% of the total cancer incidence) [3, 9]. Oral cavity cancer affects mainly low and medium HDI countries in Asia, Africa, and Latin America, and is particularly critical in Papua New Guinea, Pakistan, Bangladesh, and India [6, 14]. Another highly prevalent neoplasm that affects women, cervical cancer, is expected to reach 16,590 new cases in Brazil, an increase of 1.8% compared to the 2018 data [7, 8]. Cervical cancer was the fourth most frequent cancer in women worldwide, with 569,000 new cases in 2018 [3, 9]. Notably, the incidence of breast cancer in Brazil will decrease by 22.6% in 2020-2022 compared to the 2018 estimate and will amount to 66,280 new cases [7, 8]. Globally, breast cancer is the most common cancer among women (2.09 million new cases) and the leading cause of cancer mortality in women, with 626,700 deaths registered in 2018 [3, 9, 12]. Another highly prevalent neoplasm that affects women, cervical cancer, is expected to reach 16,590 new cases in Brazil, an increase of 1.8% compared to the 2018 data [7, 8]. Cervical cancer was the fourth most frequent cancer in women worldwide, with 569,000 new cases in 2018 [3, 9]. Another type of neoplasm of the uterus, corpus uteri cancer, will affect 6,540 women in Brazil (2.1% of all cancer cases in women), which represents an important reduction of 28.2% [7, 8]. In 2018, 382,100 new cases of corpus uteri cancer were estimated worldwide [3, 9]. This type of cancer has been shown to be the most frequent gynecologic neoplasm in women, and 295,400 new cases were estimated in 2018 [3, 9]. Ovarian cancer is the ninth most common cancer among women in the world, and 295,400 new cases were estimated in 2018 [3, 9].

The burden of oral cavity tumors will have a concerning rise of 45.3% in Brazil, amounting to 11,180 and 4,010 cases in men and women, respectively [7, 8]. Globally, 246,400 and 108,400 new cases were estimated in 2018 in men and women, respectively (2% of the total cancer incidence) [3, 9]. Oral cavity cancer affects mainly low and medium HDI countries in Asia, Africa, and Latin America, and is particularly critical in Papua New Guinea, Pakistan, Bangladesh, and India [6, 14]. Another malignancy of the digestive tract, esophageal cancer, will remain steady in 2020-2022 in Brazil, with 8,690 and 2,700 new cases estimated in men and women, respectively [7, 8]. Worldwide, 572,000 new cases were estimated in 2018, with 399,700 and 172,300 cases in men and women, respectively [3, 9]. Esophageal cancer ranks sixth as the most lethal cancer type in the world, and developing countries concentrate more than 80% of the deaths from esophageal cancer [2, 15]. Highly prevalent in Brazil, the incidence of stomach cancer will increase by 1.4%, reaching 13,360 and 7,870 cases among men and women, respectively [7, 8]. Stomach malignancies rank sixth in incidence globally, with 1.03 million new cases estimated in 2018 –

Fig. (1). Distribution of the incidence of the leading 10 cancer types. (a) Distribution in Brazil for each year of the 2020-2022 triennium estimated by the Brazilian National Cancer Institute (INCA); (b) Distribution in the world according to the GLOBOCAN estimate for 2018. NMSC, non-melanoma skin cancer; NHL, non-Hodgkin’s lymphoma. (A higher resolution / colour version of this figure is available in the electronic copy of the article).
683,800 of these cases occurred in men, and 349,900 occurred in women [3, 9]. A remarkably lethal neoplasm of the digestive tract, colorectal cancer, is estimated to reach 40,990 cases in Brazil, affecting 20,520 men and 20,470 women [7, 8]. These numbers represent a significant 20.8% decrease in the burden of this neoplasm. Colorectal cancer is the third most frequent and the second cause of death from cancer globally; the incidence in 2018 reached 1.8 million new cases worldwide, affecting 1.03 million men and 823,200 women [3, 9].

![Fig. (2). Distribution of the 10 leading causes of deaths from cancer according to the GLOBOCAN estimate for 2018; (a) Distribution of mortality from cancer in Brazil; (b) Distribution of mortality from cancer in the world. CNS, central nervous system; NHL, non-Hodgkin's lymphoma. (A higher resolution / colour version of this figure is available in the electronic copy of the article).](image)

The most lethal type of cancer, lung cancer, will have its incidence reduced by 12.5% in Brazil and will amount to 17,760 and 12,440 cases in men and women, respectively [7, 8]. Worldwide, lung cancer is the most common cancer, with 2.1 million new cases estimated in 2018, ranking first among men (1.4 million cases) and third among women (725,400 cases) [3, 9, 16]. Globally, 2.4 million cancer deaths per year are attributed to tobacco, and as a result of tobacco control policies, the prevalence of smoking in Brazil decreased from 35% in 1989 to 10% in 2017 [17, 18]. Another malignancy of the respiratory system, laryngeal cancer, will have its incidence decreased by 3.7% in Brazil, affecting 6,470 men and 1,180 women (1.2% of all cases) [7, 8]. The 177,400 cases estimated worldwide in 2018 represented 1% of the total incidence – 155,000 men and 22,400 women were affected [3, 9]. Laryngeal cancer occurs mainly in men over 40 years old in LMICs, and in 2018, this type of cancer caused 95,000 deaths globally [6]. Countries that implemented measures to control the use of tobacco and alcohol have had a decrease in the incidence and mortality from laryngeal cancer [19].

A significant reduction of 35.8% in the incidence of thyroid cancer is estimated for Brazil. The total burden will amount to 1,830 new cases in men and 11,950 in women [7, 8]. In 2018, 567,200 people were affected worldwide, and the number of cases in women (436,300) was higher than the number of cases in men (130,900) [3, 9]. The incidence of thyroid cancer is higher in HICs compared to LMICs. Prostate cancer incidence in Brazil will have a significant reduction of 22.5% compared to the 2018 incidence. This type of malignancy is the second most common in Brazilian men, and the number of new cases will total 65,840 [7, 8]. In the world, prostate cancer is the second most common cancer in men, and 1.3 million cases were esti-
mated in 2018 [3, 9]. Another important reduction will occur in the burden of bladder cancer in Brazil, which is estimated to fall by 21.4% and amount to 7,590 and 3,050 cases in men and women, respectively (1.7% of all cases) [7, 8]. Bladder cancer is one of the most common neoplasms that affect the urinary tract, and is more frequent in men than in women [20]. Globally, bladder cancer is estimated to affect 424,100 and 125,300 men and women, respectively (3% of all cases) [3, 9]. A further promising trend in Brazil is the incidence of central nervous system neoplasms, which will fall by 9.9%, affecting 5,870 men and 5,220 women (1.8% of all cases) [7, 8]. In 2018, 162,500 and 134,300 new cases were estimated worldwide in men and women, respectively, representing 1.6% of all cases [3, 9]. The highest incidence rates occur in high and very high HDI countries, mainly in Central-North Europe, in men, and in South Europe and North America, in women; in general central nervous system tumors are more common in men than in women [9, 21].

Among cancers of the immune system, the incidence of leukemia will decrease by 3.3%, and this cancer will affect 5,920 men and 4,890 women in Brazil, representing 1.7% of the total incidence [7, 8]. The 2018 global survey estimated 249,500 and 187,600 new cases in men and women, respectively, which accounted for 2.4% of all cases [3, 9]. Non-Hodgkin's lymphoma will have a 6.6% reduction in its incidence in Brazil and is expected to affect 6,580 men and 5,450 women [7,8]. In 2018, 284,700 and 224,900 cases were estimated worldwide in men and women, respectively, accounting for 2.8% of the total incidence [3, 9]. Notably, the incidence of Hodgkin's lymphoma in Brazil is expected to decrease by 30.4%, and 1,590 cases in men and 1,050 in women are expected [7, 8]. These numbers will account for 0.4% of all cancer cases. Worldwide, Hodgkin's lymphoma affects 46,600 men and 33,400 women and represents 0.4% of the total cancer incidence [3, 9].

Brazil has shown remarkable progress in the control of several types of cancer, as demonstrated by the 2018 GLOBOCAN estimate and the data by INCA. Among the 19 types of malignancies that had their incidences estimated for 2020-2022, 14 are predicted to have reduced numbers of cases compared to the incidence registered in 2018. Notably, prostate, breast, colorectal, thyroid, bladder and corpus uteri tumors will have considerable reductions, by more than 20%, in the number of new cases. It is worth noting that these significant reductions will occur for relatively lethal cancer types, namely, colorectal, breast, prostate, and lung cancers; lung cancer will have its incidence reduced by 12.5%. On the downside, the total incidence will increase by 10.5%, which will be driven by the alarming 451% rise in the number of NMSC cases: from 32,107 new cases in 2018 to 176,930 new cases in each year of 2020-2022. Adverse trends are also estimated for the incidences of oral cavity cancers and melanoma of skin, which will increase substantially by 45.6% and 14.1%, respectively. On the upside, without considering NMSC, the total incidence of cancer in Brazil will be reduced by 19.8%. In general, the 2020-2022 estimates position Brazil on the path to reducing cancer burden and mortality for most of the concerning cancer types, which is consistent with the trend for high HDI countries. However, the increasing NMSC incidence will require special attention from the Brazilian health authorities, and strong measures will be needed to strengthen early diagnosis and raise awareness regarding the risk factors for this cancer. Additionally, focused investment based on the prospective data will be critical to implementing effective policies to control cancer and work toward a consistent reduction in cancer burden in the forthcoming years.

REFERENCES


**Leonardo L.G. Ferreira and Adriano D. Andricopulo**

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Laboratory of Medicinal and Computational Chemistry
Center for Research and Innovation in Biodiversity and Drug Discovery
Physics Institute of Sao Carlos, University of Sao Paulo
Av. Joao Dagnone 1100
Sao Carlos – SP, 13563-120
Brazil
Tel.: + 55 16 3373-8095
E-mail: aandrico@ifsc.usp.br