Statistical Analysis Data of Cancer Patients in a 5 Year Period in Strumica, Republic of North Macedonia

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Abstract

A neoplasm is an abnormal mass whose growth exceeds and is uncoordinated with that of normal tissues. Tumors are divided into benign and malignant. To obtain the results, a large number of registered cases of cancer were analyzed for the purpose of this article. For this research was used data from the Center for Public Health Strumica in the period of 2016 to 2019 ie within 4years and from the Center for Public Health of R. N. Macedonia. The results of the conducted research indicate that in Strumica in 2016 293 people were diagnosed with cancer, in 2017, 266 people were diagnosed, in 2018 304 people were diagnosed and in 2019 were diagnosed 211 people. Of the total number, 20% were diagnosed in 2019, 25% in 2017, 27% in 2016, in 2018 28% were diagnosed with cancer, which is the biggest number of patients in the last 4 years. The cancer diagnosis and treatment plan are a key component of cancer control. Early detection of cancer is necessary so that it can be treated at an early stage of disease development when treatment is more effective and there is a greater chance of cure.

Keywords - oncology, cancer, statistics, Strumica

Introduction

A neoplasm is an abnormal mass whose growth exceeds and is uncoordinated with that of normal tissues. The origin of all neoplasms occurs as a result of genetic changes which allow extensive and unregulated cell proliferation that is independent of the physiological stimuli that regulate growth. In everyday life, neoplasms are called tumors, they are divided into benign and malignant.

Benign tumors are those tumors when their microscopic and macroscopic features are considered as safe, which indicates that the tumor itself will remain localized, cannot spread to other places, and is surgically removed. Characteristics of benign tumors are: They consist of well-differentiated cells that look like their normal duplicates, have slow growth, they remain localized to their place of origin, and are incapable of invading or metastasizing to remote locations, in these tumors a fibrous capsule forms which separates the tumor from the host tissue.

Malignant tumors are commonly called cancers. Malignant neoplasms indicate that the lesion may invade and destroy adjacent structures and metastasize to distant locations and cause death. Characteristics of malign tumors are: Malignant tumors have a wide range of parenchymal cell differentiation which ranges from well-differentiated to completely undifferentiated, malignant

tumors grow rapidly (depends on the degree of differentiation), malignant tumors grow through advanced infiltration, invasion, penetration, and destruction into surrounding tissue and they do not develop well-defined capsules. Malignant tumors give metastases or secondary implants discontinued with the primary tumor, in distant tissues. Malignant neoplasms are spread through one of three possible ways: Dispersion into bodily cavities, lymphatic spread, and haematogenous spread.

Tumors occur as a result of genetic damage. Such genetic damage can occur as a result of the action of environmental agents like chemicals, radiation, viruses or inherited from a parent. The main targets of genetic damage are four classes of normal regulatory genes, namely protoncogenes responsible for growth stimulation, tumor suppressor genes that inhibit growth, genes that regulate programmed cell death or apoptosis, as well as the genes that are responsible for DNA repair.

Most cases of cancer are initially diagnosed on the basis of medical history, physical examination including the patient's signs or symptoms. The tests that are necessary for the diagnosis of cancers are: Laboratory tests, visualization methods, biopsy which in most cases is the only way to diagnose cancer.

There are many options for treating cancer. Treatment depends on the type of cancer, its location, whether it has spread to surrounding tissue, and the general health of the patient. Cancers are treated with: chemotherapy, radiation therapy (radiotherapy), surgery, immunotherapy, monoclonal antibody therapy (genetic therapy) and hormone therapy. The goal of treatment is to completely remove the cancer without causing damage. Cancer can be classified according to the type of cell where it starts. There are five main types: Cancer, sarcoma, lymphoma and myeloma, leukemia, cancer of the brain and spinal cord. [1-9]

Material and methods

For the purposes of the research, data were taken on patients diagnosed with cancer from the Center for Public Health Strumica in the period of 2016 to 2019 ie within 4 years and from the Center for Public Health of R. N. Macedonia. To obtain the results, a large number of registered cases of cancer were analyzed.

Results and discussions

The study included patients diagnosed with cancer. The results obtained from the research are systematized in tabular form, with tabular numerical representation, and the data is presented graphically with a graph.

Year	Total number of patients
2016	293
2017	266
2018	304
2019	211

Table 1. Number of patients diagnosed with cancer in Strumica in 2016, 2017, 2018 and 2019

Percentage expression of the number of people diagnosed with cancer
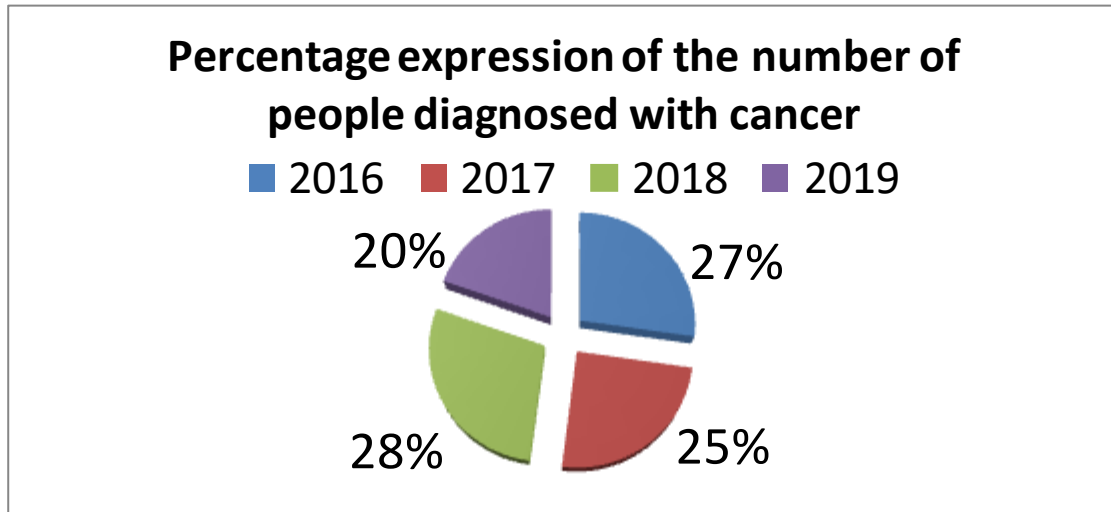
■ 2016 ■ 2017 ■ 2018 ■ 2019

20% 27%

28% 25%

Chart 1. Percentage expression of the number of people diagnosed with cancer per year in Strumica in 2016, 2017, 2018 and 2019 year.

Table 1and Chart 1 show the total number of people diagnosed with lung cancer in a period of four years in Strumica, the data are taken from the Center for Public Health in Strumica. In Strumica, in a period of four years, a total of 1074 people were diagnosed with cancer. From this number in the Center for Public Health in Strumica in 2016 293 people were diagnosed with cancer, in 2017 266 people were diagnosed, in 2018 304 people were diagnosed and in 2019 were diagnosed 211 people. From the total number of data it can be noticed that the difference between the number of diagnosed patients during four years is not large. The the number of diagnosed patients with cancer in 2016 and 2017 and 2018 is increasing, while in 2019 is decreasing. Of the total number, 20% of the patients were diagnosed in 2019, 25% were diagnosed in 2017, 27% were diagnosed in 2016 and in 2018 were diagnosed 28% of patients with cancer, which is the largest number in the last 4 years.

Year	Gender	
	Машки	**Женски**
2016	**185**	**108**
2017	**159**	**107**
2018	**155**	**149**
2019	**110**	**101**

Table 2. Number of diagnosed people with cancer by gender in Strumica in 2016, 2017, 2018 and 2019 year.

Table 2shows the number of people diagnosed with cancer by years and gender over a period of four years, data from the Center for Public Health in Strumica. The results of the division of diagnosed with lung cancer by year and gender gave the ratio:

- In 2016, a total of 293 patients were diagnosed with cancer, of which 185 people are male and 108 people are female.
- In 2017, a total of 266 patients were diagnosed, of which 159 were male and 107 were female.
- In 2018, a total of 304 patients were diagnosed, of which 155 are male and 149 are female.
- In 2019, a total of 211 patients were diagnosed, of which 110 were male and 101 were female.

According to the obtained data, from the male-female ratio diagnosed with some type of cancer, it can be seen that the prevalence of cancer during the four years is higher in males - the total number is 609 patients and the total number of female patients is 465 in a period of four years.
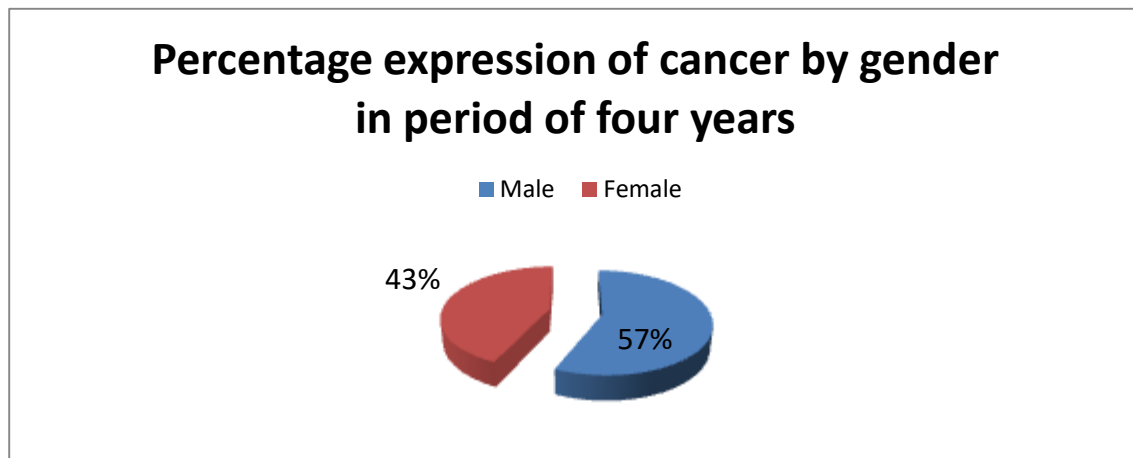
Chart 3. Percentage expression of cancer by gender in period of four years in Strumica.

Chart 3 shows the percentage of cancers by gender, over a period of four years. According to the presented data, we can see that the cancer is more and more present in males, ie 57% belong to males and 43% to females diagnosed with some type of cancer.

Age	Number of patients
<18	3
18-24	6
24-30	11
31-37	63
38-44	68
45-51	127
52-58	164
59-65	191
66-72	189
73-79	125
80-86	90
>87	84

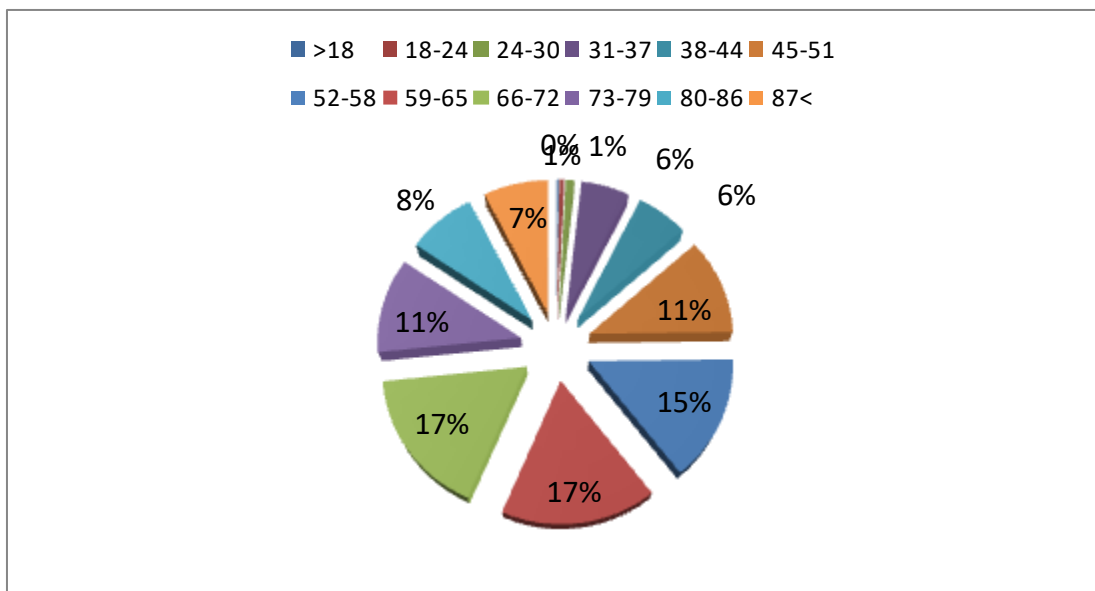*Table 3. Number of diagnosed patients with cancer by age in Strumica in period of fouryears.*

Chart 4. Percentage expression of cancer by age in Strumica in period of four years.

In table 3 and chart 4are shown the number of people diagnosed with cancer in Strumica in a period of four years and the age groups. According to the analyzed data were obtained the following results:

3 patients or 0.2% aged less than 18 years old were diagnosed with cancer

6 patients or 0.5% aged 18-24 years old were diagnosed with cancer

11 patients or 1% aged 24-30 years old were diagnosed with cancer

63 patients or 5.8% aged 31-37 years old were diagnosed with cancer

68 patients or 6.3% aged 38-44 years old were diagnosed with cancer

127 patients or 11.8% aged 45-51 years old were diagnosed with cancer

164 patients or 15.2% aged 52-58 years old were diagnosed with cancer

191 patients or 17.7% aged 59-65 years old were diagnosed with cancer

189 patients or 17.5% aged 66-72 years old were diagnosed with cancer

125 patients or 11.6% aged 73-79 years old were diagnosed with cancer

90 patients or 8.3% aged 80-86 years old were diagnosed with cancer

84 patients or 7.8% aged above 86 were diagnosed with cancer

From the results above, it can be concluded that most patients diagnosed with cancer are at the age of 59-65 years and 66-72 years. Least affected were patients aged under the age of 18 and 18-24.

Type of cancer	Number of patients
Lung cancer	173
Prostate cancer	125
Skin cancer	74
Ovarian cancer	58
Malignant neoplasm of the breast	55
Pancreatic cancer	55
Rectal cancer	45
Gastric cancer	44
Brain cancer	13

Table 4. The most common types of cancer in the Strumica region over a period of four years

In table 4 are shown the results from the highest incidence of lung cancer in the region of Strumica, ie in a time frame of four years 2016, 2017, 2018 and 2019. The total number of diagnosed patients with lung cancer in this period is 173. Prostate cancer is the most common type of cancer in men and in the region of Strumica in a period of 4 years has affected a total of 125 people, followed by skin cancer - 74 people. The number of patients with ovarian cancer (58 patients) and breast cancer (55 patients) is similar, which is the same value as those with pancreatic cancer (55). The total number of patients with rectal cancer is 45, then gastric cancer 45 and the least of this excerpt of the most common types of cancer are patients with brain cancer, ie a total of 13 patients over a period of four years in Strumica.

Mortality from malignant neoplasms in R.N. Macedonia

Malignant neoplasms are among the most common causes of death in the world. In R.N. Macedonia after the diseases of the circulatory system malignant neoplasms are the second most common cause of death. In the period 2010-2018, the mortality rate ranges from 180.3 per 100,000 population in 2010 to 179.8 per 100,000 in 2018. The mortality rate in men is higher than in women.

Diagram 1: Mortality rate from malignant neoplasms in R.N. Macedonia, 2010 - 2018
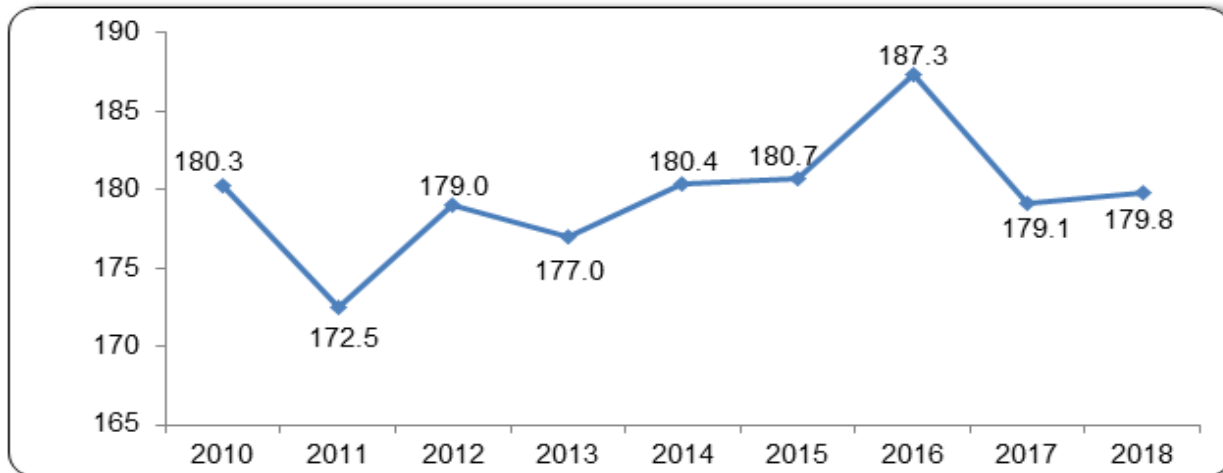
Diagram 2: Mortality rate from malignant neoplasms by gender in R.N. Macedonia, 2010 - 2018
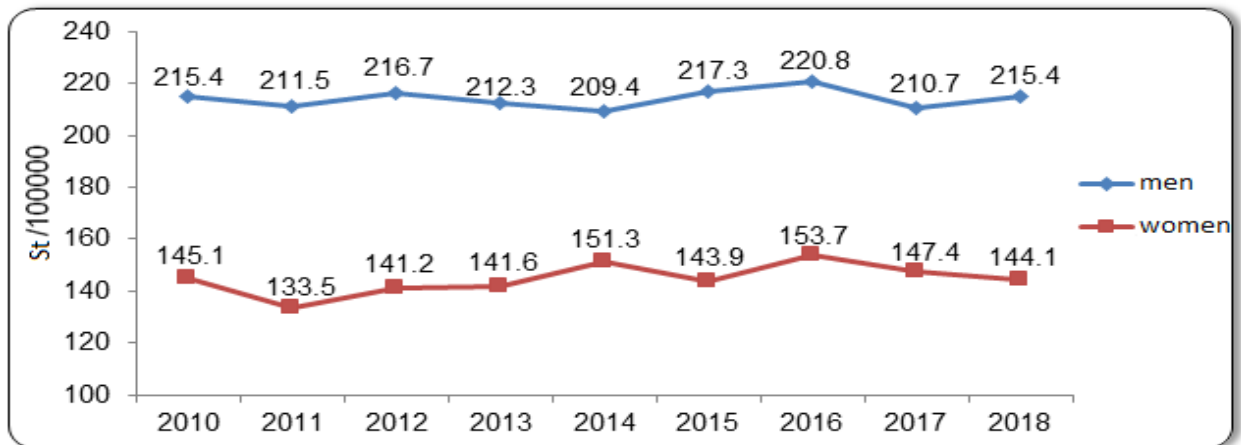
Mortality from malignant neoplasms over the age of 65 years

In the period 2010-2018, the mortality rate from malignant neoplasms over the age of 65 has a downward trend and ranges from 881.1 in 2010 to 805.1 in 2018 per 100,000 population. The mortality rate from malignant neoplasms in the age group over 65 years is higher in the male population.

Diagram 3: Mortality rate from malignant neoplasms in R.N. Macedonia over the age of 65, 2010 – 2018
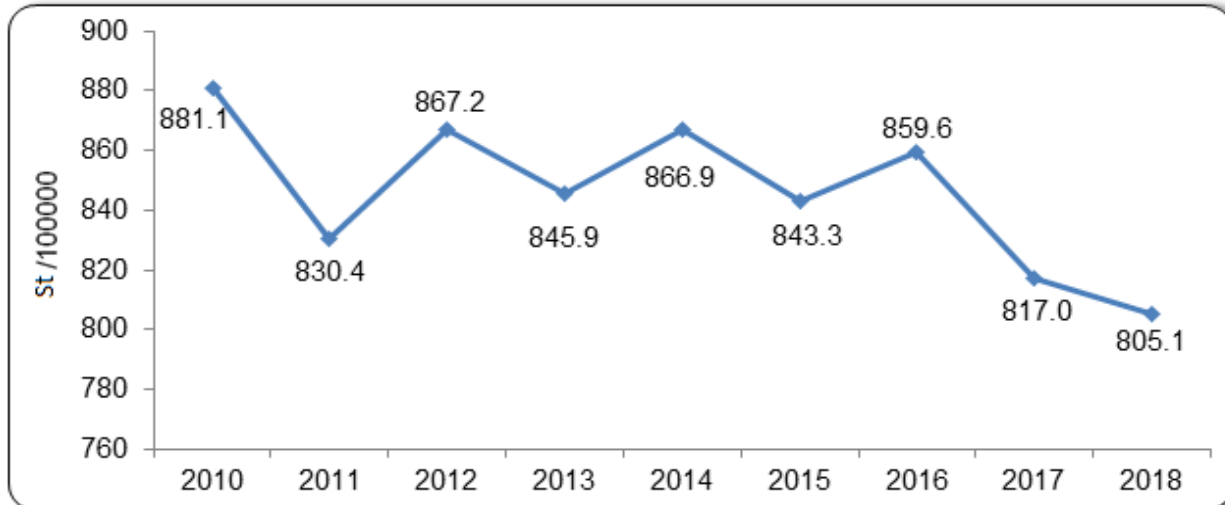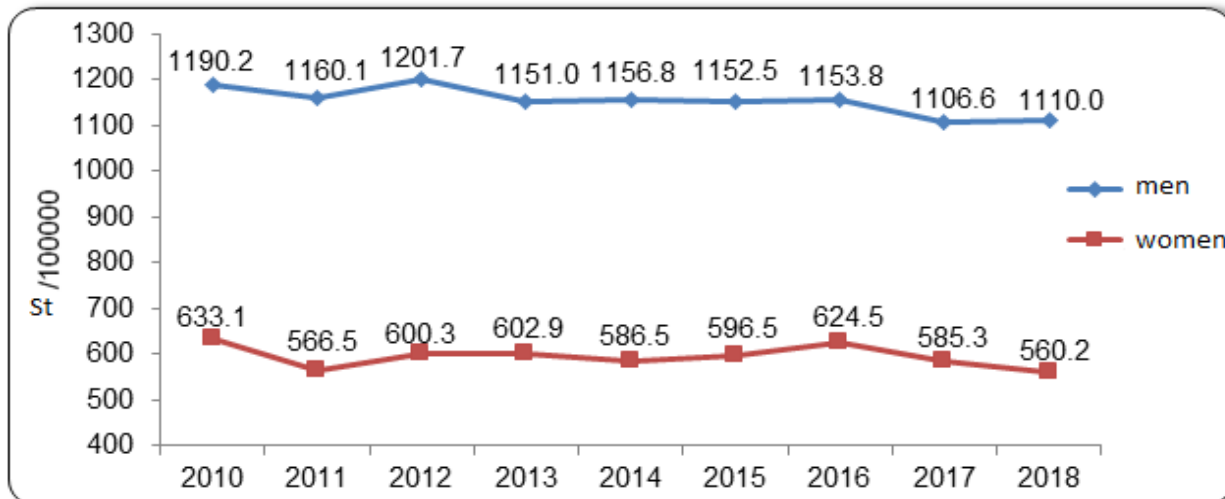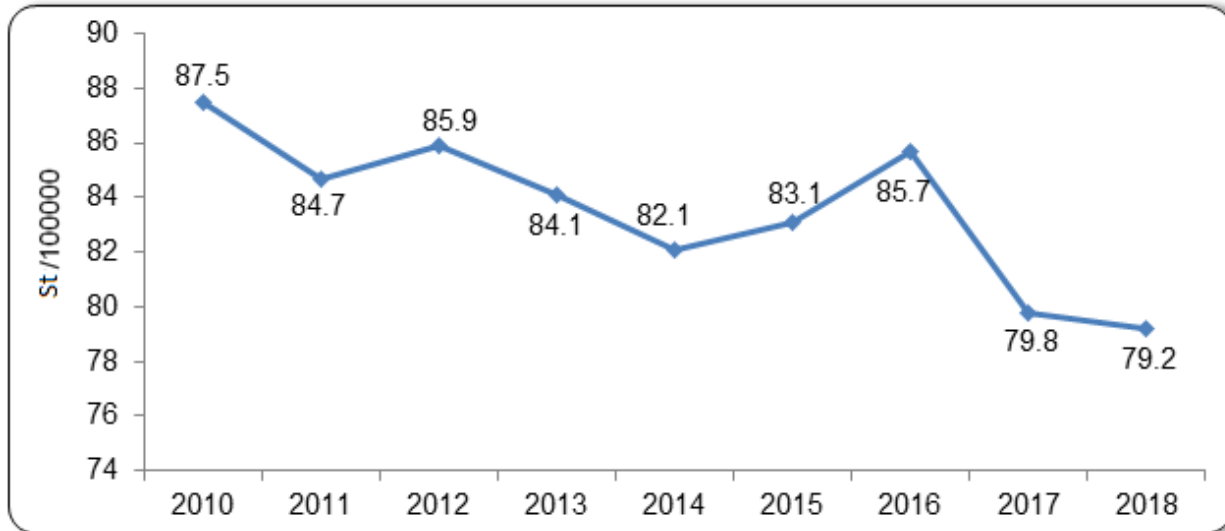

Diagram 4: Mortality rate from malignant neoplasms in RS Macedonia over the age of 65 by sex, 2010 – 2018

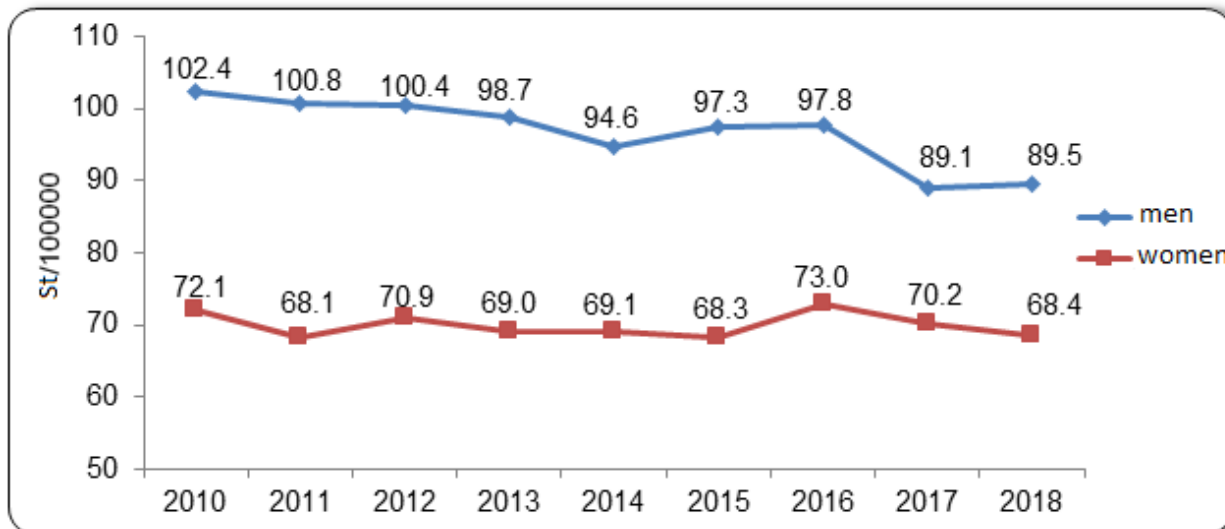**Mortality from malignant neoplasms aged 0-64 years**

The mortality rate from malignant neoplasms in the age group 0-64 years is significantly lower than the mortality rate over the age of 65 years.

Diagram 5: Mortality rate from malignant neoplasms in R.N. Macedonia aged 0 - 64 years, 2010 – 2018

In the age group of 0-64 years, mortality is higher in men than in women.

Diagram 6: Mortality rate from malignant neoplasms in R.N. Macedonia at the age of 0 - 64 years by gender, 2010 - 2018

**The most common primary localizations of malignant neoplasms**

In men, the most common cause of death from malignant neoplasms in the period 2010-2018 is malignant neoplasm of the bronchus and lungs with a mortality rate ranging from 64.8 in 2010 to 66.9 in 2014 and 67, 3 per 100,000 men in 2018.

Diagram 7: Mortality rate from malignant neoplasm of bronchus and lungs in R.N. Macedonia for men, 2010 - 2018
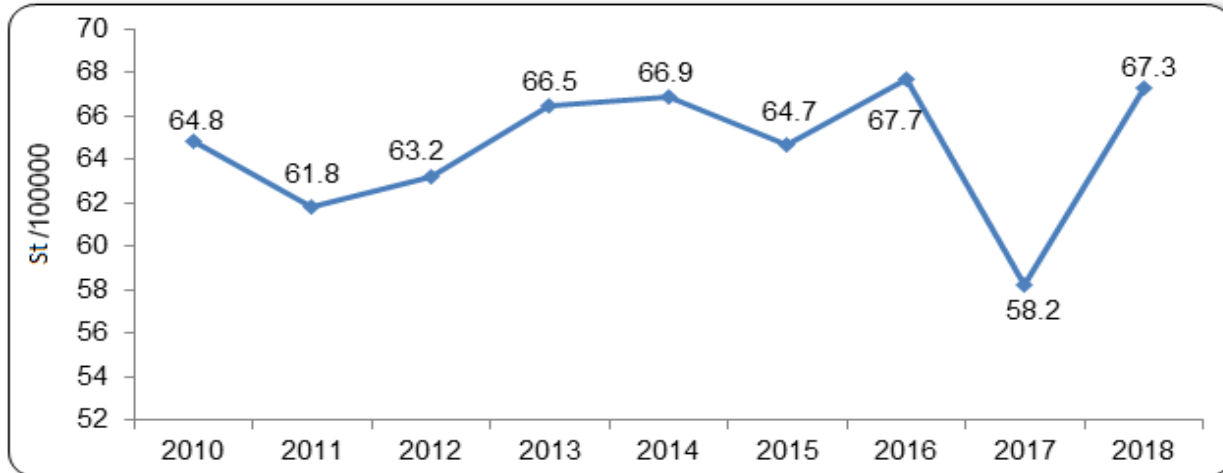
In women, the most common cause of death from malignant neoplasms in the period 2010-2018 is malignant breast neoplasm. The mortality rate ranges from 30.0 in 2010 to 26.4 in 2018 per 100,000 women.

Diagram 8: Mortality rate from malignant breast neoplasm in R.N. Macedonia for women, 2010 – 2018
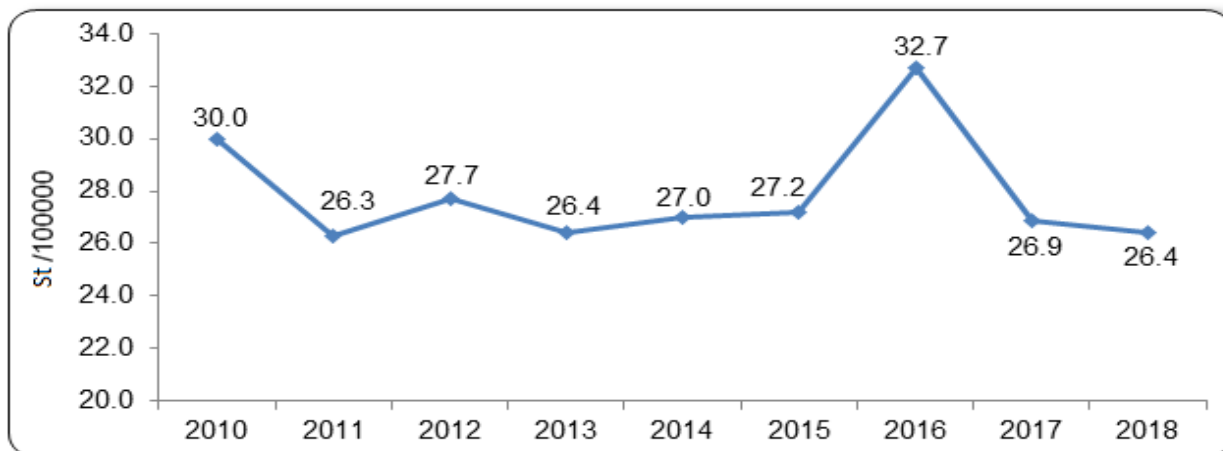
- 9.6 million people die of cancer each year.
- At least one-third of common cancers can be prevented.
- Cancer is the second leading cause of death in the world.
- 70% of cancer deaths occur in low- and middle-income countries.
- Up to 3.7 million lives can be saved each year by implementing appropriate prevention, early detection and treatment strategies.
- Total annual cancer spending is estimated at $ 1.16 trillion.

Cancer causes 20% of deaths in the European region. Each year, with more than 3 million new cases and 1.7 million deaths, cancer is the leading cause of death and morbidity in Europe after cardiovascular disease. It is estimated that the number of cancer deaths will double in the next 20 to 40 years, with the highest increase in low- and middle-income countries, ie those countries that have less opportunity to cope with the social and economic impact of the disease. Regardless of the level of resources, all countries can implement the four basic components of cancer control - prevention, early detection, diagnosis and treatment, as well as palliative care - and thus avoid the emergence of many new cases of cancer, many cases to be cured, as well as to reduce the suffering of cancer patients. Like many other diseases, most cancers are the result of exposure to various risk factors. More than a third of all cancers can be prevented by reducing exposure to risk factors such as tobacco, obesity, physical inactivity, infections, alcohol, environmental pollution, occupational carcinogens and radiation.

Conclusion

In the region in Strumica in a time period of four years, ie 2016, 2017, 2018 and 2019 there are a total of 1074 people diagnosed with cancer of which 57% are men and 43% women. Most patients diagnosed with cancer are at the age of 59-65 years and 66-72 years. Lung cancer is the most common type of cancer in the region.

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