

Cancer incidence and mortality in Poland in 2023

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Introduction. Cancers are a real global health problem. Europe accounts for 1/10 of the world's population, but 1/4 of all cancer cases occurs in this region. Poland is in the group of countries where cancer mortality is the highest. The aim of this article is to present a summary of the epidemiological indicators of malignant neoplasms in Poland in 2023.

Material and methods. This report presents observed morbidity and mortality data for 2010–2021, and also estimated values two years ahead (2022–2023). Data aggregation was carried out according to sex, age, cancer site, or administrative division of Poland. Time trends were determined using joinpoint regression. The Polish National Cancer Registry is responsible for gathering cancer morbidity data in Poland; mortality data came from Statistics Poland.

Results. The Polish National Cancer Registry reported about 171,558 new cases and 93,652 cancer deaths in 2021. The most common cancers in men were prostate, lung, and colon cancer. The most common cancers in women were breast, lung, and colorectal cancers. The prediction of morbidity and mortality for 2023 indicates a continuation of long-term trends.

Conclusions. The increase in the number of cases (approximately 25,000) and the number of deaths (by approximately 6000) observed in 2021 compared to 2020 indicates the huge impact of the COVID-19 pandemic on health indicators in Poland. However, the year 2021 shows the characteristics of the previous trend among cancer data.

Key words: mortality, morbidity, neoplasms, Poland

Introduction

Cancers are a real global health problem. Europe accounts for 1/10 of the world's population, but 1/4 of all cancer cases occurs in this region [1]. In addition, 23% of deaths in Europe are caused by cancers (data from 2020) [2–4]. Poland is in the group of countries where cancer mortality is the highest [1]. The impact of COVID-19 on the mortality rate of the Polish population continues. Deaths from COVID accounted for almost the same percentage as deaths from cancer (17.0% vs. 18.7%). In 2021, for every 100,000 inhabitants, 452 people were diagnosed with cancer [5].

The purpose of the article is to present a summary of the epidemiological indicators of malignant neoplasms in Poland in 2021.

Materials and methods

Source of data and identification of cancer cases

The Polish National Cancer Registry (PNCR) is the source of cancer morbidity data. In Poland, the entire country has a unified protocol, allowing us to maintain the same principles of cancer registration in every region. Cancer mortality data comes from

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Statistics Poland [3]. All the data presented were collected during the 10th revision of the International Classification of Diseases and Health Problems [6].

Statistical analysis

The basic statistical measurements presented in this report are absolute numbers, percentages, crude and age-standardized (revised European Standard Population (ESP2013) [7]) rates. The projected data for 2022–2023 were estimated based on linear regression. Time trends were determined using Joinpoint regression [2] using Joinpoint Trend Analysis Software.

Results

Overall national analysis

In Poland, cancer is still a growing social problem and a challenge to both economic and health systems. The most common cancers in men in 2021 were (listed as the most common):

- prostate (21%),
 - lung (15%),
 - colon (7%),
 - bladder cancers (6%).
- In women, these were:
- breast (24%),
 - lung (9%),
 - corpus uteri (7%),
 - colon (6%),
 - thyroid gland (4%),
 - ovarian (4%) cancers.

Skin cancers also constitute a high percentage in both groups, in each sex they constitute approximately 8% of cases (tab. I).

Among the main causes of death, the most common cancer sites were in men: lung cancer (27%) and prostate cancer (11%), in women: breast cancer (16%) and lung cancer (18%) (tab. II). Detailed data on morbidity and mortality in women and men are presented in tables I and II, respectively.

Table I. Cancer incidence in Poland in 2021

| Site | ICD-10 | Absolute number | Crude rate | | Stand. rate (ESP2013) | | |
|-------------------------------|-------------------------------|-----------------|------------|---------|-----------------------|-----------------------|-------|
| | | | Males | Females | Absolute number | Stand. rate (ESP2013) | |
| all cancers | C00–C97, D00–D09 | 84,275 | 458.9 | 549.5 | 87,283 | 444.7 | 419.7 |
| all cancers but skin | C00–C97, D00–D09 excluded C44 | 77,610 | 422.6 | 499.3 | 80,408 | 409.7 | 386.9 |
| oral cavity and pharynx | C00–C14 | 3,173 | 17.3 | 18.7 | 1,357 | 6.9 | 6.5 |
| lip | C00 | 171 | 0.9 | 1.2 | 85 | 0.4 | 0.4 |
| tongue | C01–C02 | 618 | 3.4 | 3.6 | 239 | 1.2 | 1.1 |
| pharynx | C10–C13 | 780 | 4.2 | 4.4 | 173 | 0.9 | 0.8 |
| digestive organs | C15–C26 | 17,696 | 96.4 | 116.3 | 13,749 | 70.1 | 65.6 |
| oesophagus | C15 | 1,046 | 5.7 | 6.4 | 324 | 1.7 | 1.5 |
| stomach | C16 | 3,010 | 16.4 | 19.8 | 1,747 | 8.9 | 8.3 |
| small intestine | C17 | 224 | 1.2 | 1.4 | 215 | 1.1 | 1.0 |
| colon | C18 | 5,607 | 30.5 | 38.1 | 4,990 | 25.4 | 24.0 |
| rectosigmoid junction | C19 | 901 | 4.9 | 6.0 | 649 | 3.3 | 3.1 |
| rectum | C20 | 3,428 | 18.7 | 22.2 | 2,133 | 10.9 | 10.2 |
| anus and anal canal | C21 | 73 | 0.4 | 0.5 | 226 | 1.2 | 1.1 |
| colorectum | C18–C21 | 10,009 | 54.5 | 66.6 | 7,998 | 40.8 | 38.4 |
| liver | C22 | 828 | 4.5 | 5.3 | 534 | 2.7 | 2.5 |
| gallbladder and biliary tract | C23–C24 | 595 | 3.2 | 4.1 | 880 | 4.5 | 4.2 |
| pancreas | C25 | 1,864 | 10.2 | 11.9 | 1,923 | 9.8 | 9.1 |
| respiratory system | C30–C39 | 14,417 | 78.5 | 91.9 | 8,791 | 44.8 | 41.0 |
| larynx | C32 | 1,743 | 9.5 | 10.6 | 316 | 1.6 | 1.5 |
| trachea and lung | C33–C34 | 12,344 | 67.2 | 79.2 | 8,248 | 42.0 | 38.5 |
| bone and articular cartilage | C40–C41 | 214 | 1.2 | 1.2 | 190 | 1.0 | 1.0 |

Table I cont. Cancer incidence in Poland in 2021

| Site | ICD-10 | Absolute number | Crude rate | Stand. rate (ESP2013) | Absolute number | | Crude rate | | Stand. rate (ESP2013) | |
|--|--------------|-----------------|------------|-----------------------|-----------------|-------|------------|--|-----------------------|--|
| | | | | | Males | | Females | | Males | |
| neoplasms of skin | C43–C44 | 8,541 | 46.5 | 62.2 | 9,093 | 46.3 | 43.5 | | | |
| melanoma | C43 | 1,876 | 10.2 | 11.9 | 2,218 | 11.3 | 10.8 | | | |
| other neoplasms of skin | C44 | 6,665 | 36.3 | 50.2 | 6,875 | 35.0 | 32.8 | | | |
| mesothelial and soft tissue | C45–C49 | 926 | 5.0 | 5.7 | 842 | 4.3 | 4.1 | | | |
| breast | C50 | 167 | 0.9 | 1.1 | 21,079 | 107.4 | 102.2 | | | |
| female genital organs | C51–C58 | – | – | – | 12,662 | 64.5 | 61.0 | | | |
| vulva and vagina | C51–C52 | – | – | – | 620 | 3.2 | 2.9 | | | |
| cervix uteri | C53 | – | – | – | 2,160 | 11.0 | 10.4 | | | |
| corpus uteri | C54 | – | – | – | 6,024 | 30.7 | 29.0 | | | |
| ovary | C56 | – | – | – | 3,624 | 18.5 | 17.6 | | | |
| male genital organs | C60–C63 | 19,416 | 105.7 | 124.9 | – | – | – | | | |
| penis | C60 | 259 | 1.4 | 1.6 | – | – | – | | | |
| prostate | C61 | 17,832 | 97.1 | 116.7 | – | – | – | | | |
| testis | C62 | 1,303 | 7.1 | 6.5 | – | – | – | | | |
| urinary tract | C64–C68 | 8,662 | 47.2 | 57.1 | 3,940 | 20.1 | 18.8 | | | |
| kidney and renal pelvis | C64–C65 | 3,235 | 17.6 | 20.0 | 2,107 | 10.7 | 10.2 | | | |
| bladder | C67 | 5,301 | 28.9 | 36.3 | 1,742 | 8.9 | 8.2 | | | |
| eye | C69 | 238 | 1.3 | 1.5 | 260 | 1.3 | 1.2 | | | |
| central nervous system | C70–C72 | 1,469 | 8.0 | 8.7 | 1,300 | 6.6 | 6.4 | | | |
| brain | C71 | 1,375 | 7.5 | 8.1 | 1,195 | 6.1 | 5.8 | | | |
| endocrine glands | C73–C75 | 950 | 5.2 | 5.3 | 4,019 | 20.5 | 19.9 | | | |
| thyroid gland | C73 | 842 | 4.6 | 4.6 | 3,871 | 19.7 | 19.1 | | | |
| ill-defined, secondary and unspecified sites | C76–C80 | 1,014 | 5.5 | 6.6 | 1,094 | 5.6 | 5.2 | | | |
| lymphoid, haematopoietic and related tissue | C81–C96 | 5,295 | 28.8 | 33.8 | 4,871 | 24.8 | 23.7 | | | |
| Hodgkin lymphoma | C81 | 372 | 2.0 | 2.0 | 378 | 1.9 | 2.0 | | | |
| non-Hodgkin lymphoma | C82–C86, C96 | 1,863 | 10.1 | 11.8 | 1,768 | 9.0 | 8.5 | | | |
| immunoproliferative diseases | C88 | 69 | 0.4 | 0.4 | 98 | 0.5 | 0.5 | | | |
| multiple myeloma | C90 | 855 | 4.7 | 5.5 | 878 | 4.5 | 4.2 | | | |
| lymphoid leukaemia | C91 | 1,324 | 7.2 | 8.7 | 1,002 | 5.1 | 4.9 | | | |
| myeloid leukaemia | C92 | 681 | 3.7 | 4.4 | 645 | 3.3 | 3.1 | | | |
| all leukaemias | C91–C95 | 2,136 | 11.6 | 14.0 | 1,749 | 8.9 | 8.5 | | | |
| carcinoma <i>in situ</i> | D00–D09 | 1,504 | 8.2 | 10.5 | 3,486 | 17.8 | 17.0 | | | |

Predictions for 2023

The publication of PNCr data has two-year intervals compared to the current year, the last year reported is 2021. Precise data for 2022 and 2023 are incomplete due to the data collection process. We have made forecasts for these years to illustrate the situation in Poland. The basis for these predictions was

the years 2010–2021. Tables III and IV present the observed cases in 2021 and expected in 2023.

It is estimated that in 2023 the number of cancer cases will increase and the most frequently diagnosed cancer cases in men will remain prostate (23%), lung (14%), and colorectal cancer (12%); in women, breast (24%), lung (10%),

Table II. Cancer deaths in Poland in 2021

| Site | ICD-10 | Absolute number | Crude rate | Stand. rate (ESP2013) | Absolute number | Crude rate | Stand. rate (ESP2013) |
|-------------------------------|-------------------------------|-----------------|------------|-----------------------|-----------------|------------|-----------------------|
| | | | Males | Females | | | |
| all cancers | C00–C97, D00–D09 | 50,581 | 275.4 | 355.0 | 43,071 | 219.5 | 203.3 |
| all cancers but skin | C00–C97, D00–D09 excluded C44 | 50,484 | 274.9 | 354.1 | 42,988 | 219.0 | 202.9 |
| oral cavity and pharynx | C00–C14 | 2,300 | 12.5 | 13.9 | 789 | 4.0 | 3.7 |
| lip | C00 | 68 | 0.4 | 0.6 | 40 | 0.2 | 0.2 |
| tongue | C01–C02 | 467 | 2.5 | 2.8 | 164 | 0.8 | 0.8 |
| pharynx | C10–C13 | 653 | 3.6 | 3.9 | 145 | 0.7 | 0.7 |
| digestive organs | C15–C26 | 15,101 | 82.2 | 105.3 | 11,640 | 59.3 | 54.9 |
| oesophagus | C15 | 1,157 | 6.3 | 7.3 | 340 | 1.7 | 1.6 |
| stomach | C16 | 2,820 | 15.4 | 19.6 | 1,539 | 7.8 | 7.3 |
| small intestine | C17 | 122 | 0.7 | 0.8 | 115 | 0.6 | 0.5 |
| colon | C18 | 4,262 | 23.2 | 31.3 | 3,491 | 17.8 | 16.5 |
| rectosigmoid junction | C19 | 249 | 1.4 | 1.8 | 176 | 0.9 | 0.8 |
| rectum | C20 | 1,966 | 10.7 | 14.0 | 1,247 | 6.4 | 5.9 |
| anus and anal canal | C21 | 93 | 0.5 | 0.6 | 108 | 0.6 | 0.5 |
| colorectum | C18–C21 | 6,570 | 35.8 | 47.7 | 5,022 | 25.6 | 23.8 |
| liver | C22 | 1,219 | 6.6 | 8.2 | 876 | 4.5 | 4.1 |
| gallbladder and biliary tract | C23–C24 | 575 | 3.1 | 4.0 | 1,035 | 5.3 | 4.9 |
| pancreas | C25 | 2,328 | 12.7 | 15.4 | 2,363 | 12.0 | 11.1 |
| respiratory system | C30–C39 | 14,644 | 79.7 | 97.1 | 8,218 | 41.9 | 38.4 |
| larynx | C32 | 1,220 | 6.6 | 7.8 | 197 | 1.0 | 0.9 |
| trachea and lung | C33–C34 | 13,059 | 71.1 | 86.8 | 7,807 | 39.8 | 36.5 |
| bone and articular cartilage | C40–C41 | 179 | 1.0 | 1.2 | 117 | 0.6 | 0.6 |
| neoplasms of skin | C43–C44 | 758 | 4.1 | 5.8 | 699 | 3.6 | 3.3 |
| melanoma | C43 | 661 | 3.6 | 4.9 | 616 | 3.1 | 2.9 |
| other neoplasms of skin | C44 | 97 | 0.5 | 0.9 | 83 | 0.4 | 0.4 |
| mesothelial and soft tissue | C45–C49 | 601 | 3.3 | 4.1 | 473 | 2.4 | 2.3 |
| breast | C50 | 63 | 0.3 | 0.5 | 6,406 | 32.6 | 30.5 |
| female genital organs | C51–C58 | – | – | – | 6,415 | 32.7 | 30.5 |
| vulva and vagina | C51–C52 | – | – | – | 401 | 2.0 | 1.9 |
| cervix uteri | C53 | – | – | – | 1,361 | 6.9 | 6.5 |
| corpus uteri | C54 | – | – | – | 1,647 | 8.4 | 7.8 |
| ovary | C56 | – | – | – | 2,639 | 13.4 | 12.7 |
| male genital organs | C60–C63 | 5,764 | 31.4 | 47.0 | – | – | – |
| penis | C60 | 138 | 0.8 | 1.0 | – | – | – |
| prostate | C61 | 5,458 | 29.7 | 45.1 | – | – | – |
| testis | C62 | 146 | 0.8 | 0.8 | – | – | – |



Table II cont. Cancer deaths in Poland in 2021

| Site | ICD-10 | Absolute number | Crude rate | Stand. rate (ESP2013) | Absolute number | Crude rate | Stand. rate (ESP2013) |
|--|--------------|-----------------|------------|-----------------------|-----------------|------------|-----------------------|
| | | | | | | | |
| urinary tract | C64–C68 | 4,558 | 24.8 | 34.1 | 1,849 | 9.4 | 8.6 |
| kidney and renal pelvis | C64–C65 | 1,491 | 8.1 | 10.4 | 891 | 4.5 | 4.2 |
| bladder | C67 | 2,978 | 16.2 | 23.1 | 889 | 4.5 | 4.1 |
| eye | C69 | 64 | 0.3 | 0.5 | 56 | 0.3 | 0.3 |
| central nervous system | C70–C72 | 1,471 | 8.0 | 9.3 | 1,376 | 7.0 | 6.6 |
| brain | C71 | 1,369 | 7.5 | 8.5 | 1,285 | 6.5 | 6.2 |
| endocrine glands | C73–C75 | 134 | 0.7 | 0.9 | 273 | 1.4 | 1.3 |
| thyroid gland | C73 | 75 | 0.4 | 0.6 | 200 | 1.0 | 0.9 |
| ill-defined, secondary and unspecified sites | C76–C80 | 2,065 | 11.2 | 14.8 | 2,048 | 10.4 | 9.6 |
| lymphoid, haematopoietic and related tissue | C81–C96 | 2,845 | 15.5 | 20.4 | 2,683 | 13.7 | 12.7 |
| Hodgkin lymphoma | C81 | 64 | 0.3 | 0.4 | 60 | 0.3 | 0.3 |
| non-Hodgkin lymphoma | C82–C85, C96 | 817 | 4.4 | 5.8 | 814 | 4.1 | 3.9 |
| immunoproliferative diseases | C88 | 24 | 0.1 | 0.2 | 19 | 0.1 | 0.1 |
| multiple myeloma | C90 | 604 | 3.3 | 4.3 | 664 | 3.4 | 3.1 |
| lymphoid leukaemia | C91 | 671 | 3.7 | 5.1 | 472 | 2.4 | 2.2 |
| myeloid leukaemia | C92 | 548 | 3.0 | 3.8 | 547 | 2.8 | 2.6 |
| all leukaemias | C91–C95 | 1,336 | 7.3 | 9.7 | 1,126 | 5.7 | 5.3 |
| carcinoma <i>in situ</i> | D00–D09 | 0 | 0.0 | 0.0 | 0 | 0.0 | 0.0 |

Table III. Estimated cancer cases and deaths numbers in 2023 from the most common cancers among men and women

| Males | | | | | |
|-----------------------|-----------------|----------|---------------|-----------------|----------|
| Cancer cases | | | Cancer deaths | | |
| Site | Absolute number | Percents | Site | Absolute number | Percents |
| all cancers | 84,390 | 100% | all cancers | 53,399 | 100% |
| prostate | 19,745 | 23% | lung | 14,525 | 27% |
| lung | 11,525 | 14% | colorectum | 7,375 | 14% |
| colorectum | 10,304 | 12% | prostate | 6,134 | 11% |
| bladder | 5,389 | 6% | bladder | 3,312 | 6% |
| kidney | 3,108 | 4% | stomach | 3,024 | 6% |
| stomach | 2,819 | 3% | pancreas | 2,494 | 5% |
| leukaemias | 1,978 | 2% | leukaemias | 1,543 | 3% |
| melanoma | 1,969 | 2% | kidney | 1,527 | 3% |
| pancreas | 1,836 | 2% | brain | 1,524 | 3% |
| non-Hodgkin lymphomas | 1,757 | 2% | larynx | 1,351 | 3% |



Table III cont. Estimated cancer cases and deaths numbers in 2023 from the most common cancers among men and women

| Females | | | | | |
|---------------|-----------------|----------|---------------|-----------------|----------|
| Cancer cases | | | Cancer deaths | | |
| Site | Absolute number | Percents | Site | Absolute number | Percents |
| all cancers | 86,697 | 100% | all cancers | 46,434 | 100% |
| breast | 20,530 | 24% | lung | 8,872 | 19% |
| lung | 8,835 | 10% | breast | 7,355 | 16% |
| colorectum | 8,097 | 9% | colorectum | 5,358 | 12% |
| corpus uteri | 6,161 | 7% | ovary | 2,783 | 6% |
| thyroid gland | 3,969 | 5% | pancreas | 2,586 | 6% |
| ovary | 3,507 | 4% | corpus uteri | 2,109 | 5% |
| melanoma | 2,223 | 3% | stomach | 1,555 | 3% |
| kidney | 1,994 | 2% | cervix uteri | 1,402 | 3% |
| pancreas | 1,971 | 2% | brain | 1,301 | 3% |
| bladder | 1,916 | 2% | thyroid | 1,301 | 3% |
| cervix uteri | 1,875 | 2% | leukaemias | 1,268 | 3% |
| stomach | 1,733 | 2% | bladder | 1,044 | 2% |

and colorectal cancer (9%). These cancer sites will also be the leading causes of death (tab. III). Based on the crude rate (cases per 100,000), the number of cases primarily of stomach, larynx, and lung cancer in men will be noticeably lower in 2023 than in 2021. Most of the rest of the cancer sites show an increase in incidence in 2023. There will be a reduction in cases of breast and ovarian cancers by comparing crude rates among women. Mortality will increase for every cancer site in both sexes, except gallbladder in women (tab. IV and V).

The number of cancer cases increases throughout the observation period in both sexes. Until 2007, the number of cases among men was higher than among women, after which both became equal. In 2020, due to the COVID-19 pandemic, there was a break in the trend, but the estimated data for 2021 indicate a return to the previous trend. The change in the number of deaths shows a similar trend for both sexes, an increase until 2003 and then a slowdown, although there is a clear difference in the absolute number, approximately 10,000 more deaths in men (fig. 1).

The standardized incidence rate among both sexes increased until 2013, with varying annual percentage changes. Then, among men, this rate began to decline, and among women, the incidence rate remained at a similar level. Among men, the standardized mortality rate showed an increasing trend until 2002, when it became decreasing. Among women, the trend in the standardized mortality rate has remained at a similar level since 1980 (fig. 1). The three cancer sites

with the highest incidence rate in men are: prostate, lungs, and colorectum. This order of occurrence has been maintained since 2013. Previously, lung cancer took first place, followed by prostate cancer. This change was caused by a favorable reversal of the trend in lung cancer incidence and a decrease in the incidence value since 1995 (fig. 2).

The highest incidence rate in women is in breast cancer; the trend has been constantly increasing since 1980. The difference between the incidence of breast cancer and other cancers in women is noticeable (fig. 3). The next cancer sites with the highest incidence rates are the lung and colorectum. For the last 30 years, colorectal cancer has taken second place, but according to predictions, in 2022 this will change and lung cancer will be the second most frequently diagnosed cancer among women (fig. 3).

Since the early 1970s, the most common cause of death among Polish men has been lung cancer. Since the beginning of the 21st century, we have been observing a decline in mortality due to this cancer. Data from 2021 and forecasts indicate that the trend has leveled out in the following years (fig. 4). The next causes of death are colon and prostate cancer. In the case of colorectal cancer, a slowdown in the increasing trend in mortality has been observed since 2003, and a decrease in mortality has been observed since 2018 (annual percentage change – APC = –3.6% [CI: –5.3; –1.1]) (fig. 6). After a period of stabilization of the coefficient values, an increase in mortality due to prostate cancer has been observed since 2012 (APC = 1.5

Table IV. Estimated number of cancer cases in Poland in 2023 comparing to observed data in 2021

| Males | | | | | | | |
|-----------------------|-------------|-----------------|------------|-----------------------|-----------------|------------|-----------------------|
| Site | ICD-10 | 2021 – observed | | | 2023 – expected | | |
| | | Absolute number | Crude rate | Stand. rate (ESP2013) | Absolute number | Crude rate | Stand. rate (ESP2013) |
| all cancers | C00–D09 | 84,275 | 458.9 | 549.5 | 84,390 | 463.9 | 526.4 |
| oesophagus | C15 | 1,046 | 5.7 | 6.4 | 1,083 | 6.0 | 6.4 |
| stomach | C16 | 3,010 | 16.4 | 19.8 | 2,819 | 15.5 | 17.9 |
| colorectum | C18–C21 | 10,009 | 54.5 | 66.6 | 10,304 | 56.6 | 65.4 |
| pancreas | C25 | 1,864 | 10.2 | 11.9 | 1,836 | 10.1 | 11.2 |
| larynx | C32 | 1,743 | 9.5 | 10.6 | 1,514 | 8.3 | 9.0 |
| lung | C33–C34 | 12,344 | 67.2 | 79.2 | 11,525 | 63.4 | 70.9 |
| melanoma | C43 | 1,876 | 10.2 | 11.9 | 1,969 | 10.8 | 12.2 |
| prostate | C61 | 17,832 | 97.1 | 116.7 | 19,745 | 108.6 | 121.1 |
| kidney | C64 | 3,054 | 16.6 | 18.8 | 3,108 | 17.1 | 18.3 |
| bladder | C67 | 5,301 | 28.9 | 36.3 | 5,389 | 29.6 | 35.1 |
| brain | C71 | 1,375 | 7.5 | 8.1 | 1,285 | 7.1 | 7.4 |
| Hodgkin lymphoma | C81 | 372 | 2.0 | 2.0 | 344 | 1.9 | 1.9 |
| non-Hodgkin lymphomas | C82–C86+C96 | 1,863 | 10.1 | 11.8 | 1,757 | 9.7 | 10.8 |
| leukaemias | C91–C95 | 2,136 | 11.6 | 14.0 | 1,978 | 10.9 | 12.4 |
| Females | | | | | | | |
| Site | ICD-10 | 2021 – observed | | | 2023 – expected | | |
| | | Absolute number | Crude rate | Stand. rate (ESP2013) | Absolute number | Crude rate | Stand. rate (ESP2013) |
| all cancers | C00–D09 | 87,283 | 444.7 | 419.7 | 86,697 | 445.5 | 406.1 |
| stomach | C16 | 1,747 | 8.9 | 8.3 | 1,733 | 8.9 | 8.0 |
| colorectum | C18–C21 | 7,998 | 40.8 | 38.4 | 8,097 | 41.6 | 37.5 |
| gallbladder | C23–C24 | 880 | 4.5 | 4.2 | 664 | 3.4 | 3.0 |
| pancreas | C25 | 1,923 | 9.8 | 9.1 | 1,971 | 10.1 | 9.0 |
| lung | C33–C34 | 8,248 | 42.0 | 38.5 | 8,835 | 45.4 | 39.6 |
| melanoma | C43 | 2,218 | 11.3 | 10.8 | 2,223 | 11.4 | 10.6 |
| breast | C50 | 21,079 | 107.4 | 102.2 | 20,530 | 105.5 | 97.3 |
| cervix uteri | C53 | 2,160 | 11.0 | 10.4 | 1,875 | 9.6 | 8.9 |
| corpus uteri | C54 | 6,024 | 30.7 | 29.0 | 6,161 | 31.7 | 28.9 |
| ovary | C56 | 3,624 | 18.5 | 17.6 | 3,507 | 18.0 | 16.7 |
| kidney | C64 | 1,984 | 10.1 | 9.6 | 1,994 | 10.2 | 9.3 |
| bladder | C67 | 1,742 | 8.9 | 8.2 | 1,916 | 9.8 | 8.7 |
| brain | C71 | 1,195 | 6.1 | 5.8 | 1,106 | 5.7 | 5.3 |
| thyroid gland | C73 | 3,871 | 19.7 | 19.1 | 3,969 | 20.4 | 19.7 |
| Hodgkin lymphoma | C81 | 378 | 1.9 | 2.0 | 345 | 1.8 | 1.8 |
| non-Hodgkin lymphomas | C82–C86+C96 | 1,768 | 9.0 | 8.5 | 1,717 | 8.8 | 8.0 |
| leukaemias | C91–C95 | 1,749 | 8.9 | 8.5 | 1,626 | 8.4 | 7.7 |

Table V. Estimated number of cancer deaths in Poland in 2023 comparing to observed data in 2021

| Males | | | | | | | |
|-----------------------|-------------|-----------------|------------|-----------------------|-----------------|------------|-----------------------|
| Site | ICD-10 | 2021 – observed | | | 2023 – expected | | |
| | | Absolute number | Crude rate | Stand. rate (ESP2013) | Absolute number | Crude rate | Stand. rate (ESP2013) |
| all cancers | C00–D09 | 50,581 | 275.4 | 355.0 | 53,399 | 293.6 | 362.6 |
| oesophagus | C15 | 1,157 | 6.3 | 7.3 | 1,249 | 6.9 | 7.6 |
| stomach | C16 | 2,820 | 15.4 | 19.6 | 3,024 | 16.6 | 20.3 |
| colorectum | C18–C21 | 6,570 | 35.8 | 47.7 | 7,375 | 40.5 | 51.4 |
| pancreas | C25 | 2,328 | 12.7 | 15.4 | 2,494 | 13.7 | 15.9 |
| larynx | C32 | 1,220 | 6.6 | 7.8 | 1,351 | 7.4 | 8.3 |
| lung | C33–C34 | 13,059 | 71.1 | 86.8 | 14,525 | 79.9 | 92.7 |
| melanoma | C43 | 661 | 3.6 | 4.9 | 780 | 4.3 | 5.5 |
| prostate | C61 | 5,458 | 29.7 | 45.1 | 6,134 | 33.7 | 47.8 |
| kidney | C64 | 1,418 | 7.7 | 9.8 | 1,527 | 8.4 | 10.2 |
| bladder | C67 | 2,978 | 16.2 | 23.1 | 3,312 | 18.2 | 24.5 |
| brain | C71 | 1,369 | 7.5 | 8.5 | 1,524 | 8.4 | 9.3 |
| Hodgkin lymphoma | C81 | 64 | 0.3 | 0.4 | 86 | 0.5 | 0.5 |
| non-Hodgkin lymphomas | C82–C86+C96 | 817 | 4.4 | 5.8 | 1,038 | 5.7 | 7.0 |
| leukaemias | C91–C95 | 1,336 | 7.3 | 9.7 | 1,543 | 8.5 | 10.8 |
| Females | | | | | | | |
| Site | ICD-10 | 2021 – observed | | | 2023 – expected | | |
| | | Absolute number | Crude rate | Stand. rate (ESP2013) | Absolute number | Crude rate | Stand. rate (ESP2013) |
| all cancers | C00–D09 | 43,071 | 219.5 | 203.3 | 46,434 | 238.6 | 211.9 |
| stomach | C16 | 1,539 | 7.8 | 7.3 | 1,555 | 8.0 | 7.1 |
| colorectum | C18–C21 | 5,022 | 25.6 | 23.8 | 5,358 | 27.5 | 24.5 |
| gallbladder | C23–C24 | 1,035 | 5.3 | 4.9 | 948 | 4.9 | 4.3 |
| pancreas | C25 | 2,363 | 12.0 | 11.1 | 2,586 | 13.3 | 11.8 |
| lung | C33–C34 | 7,807 | 39.8 | 36.5 | 8,872 | 45.6 | 39.8 |
| melanoma | C43 | 616 | 3.1 | 2.9 | 684 | 3.5 | 3.1 |
| breast | C50 | 6,406 | 32.6 | 30.5 | 7,355 | 37.8 | 34.0 |
| cervix uteri | C53 | 1,361 | 6.9 | 6.5 | 1,402 | 7.2 | 6.5 |
| corpus uteri | C54 | 1,647 | 8.4 | 7.8 | 2,109 | 10.8 | 9.6 |
| ovary | C56 | 2,639 | 13.4 | 12.7 | 2,783 | 14.3 | 12.9 |
| kidney | C64 | 848 | 4.3 | 4.0 | 883 | 4.5 | 4.0 |
| bladder | C67 | 889 | 4.5 | 4.1 | 1,044 | 5.4 | 4.7 |
| brain | C71 | 1,285 | 6.5 | 6.2 | 1,301 | 6.7 | 6.1 |
| thyroid gland | C73 | 200 | 1.0 | 0.9 | 228 | 1.2 | 1.0 |
| Hodgkin lymphoma | C81 | 60 | 0.3 | 0.3 | 65 | 0.3 | 0.3 |
| non-Hodgkin lymphomas | C82–C86+C96 | 814 | 4.1 | 3.9 | 893 | 4.6 | 4.1 |
| leukaemias | C91–C95 | 1,126 | 5.7 | 5.3 | 1,268 | 6.5 | 5.8 |

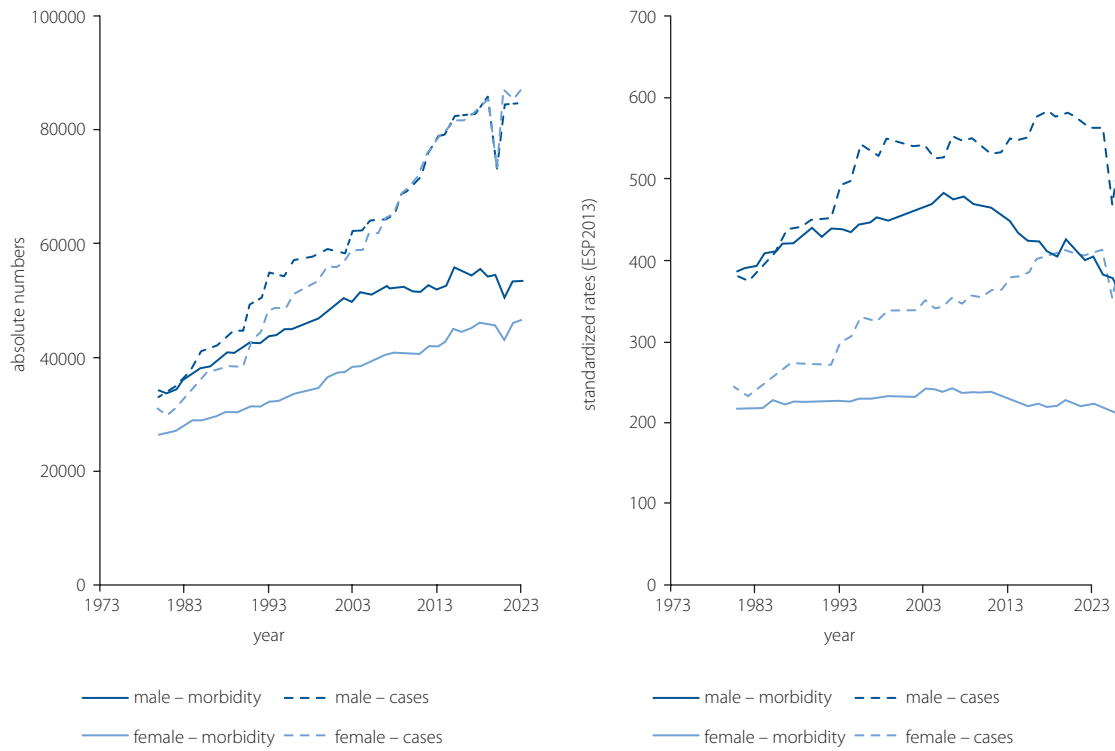


Figure 1. Cancer morbidity and mortality trends in Poland in 1980–2023*

*Values for 2022–2023 estimated based on trends in 2010–2021

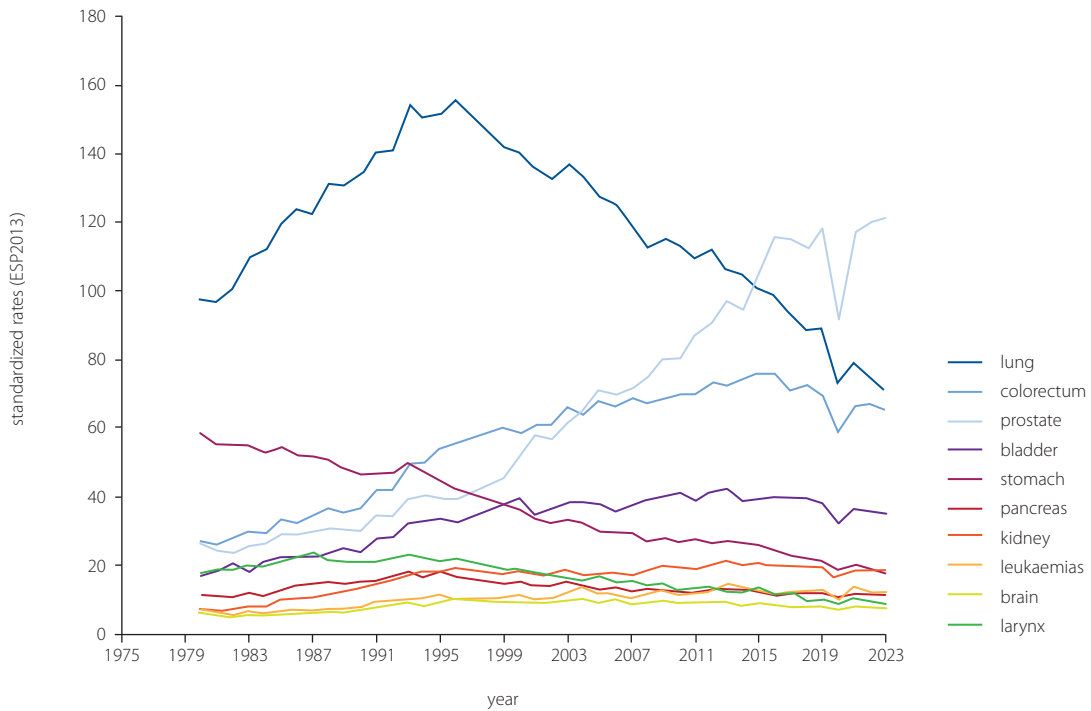


Figure 2. Incidence trends of the leading cancer sites for males, Poland 1980–2023 (2022–2023 estimation)

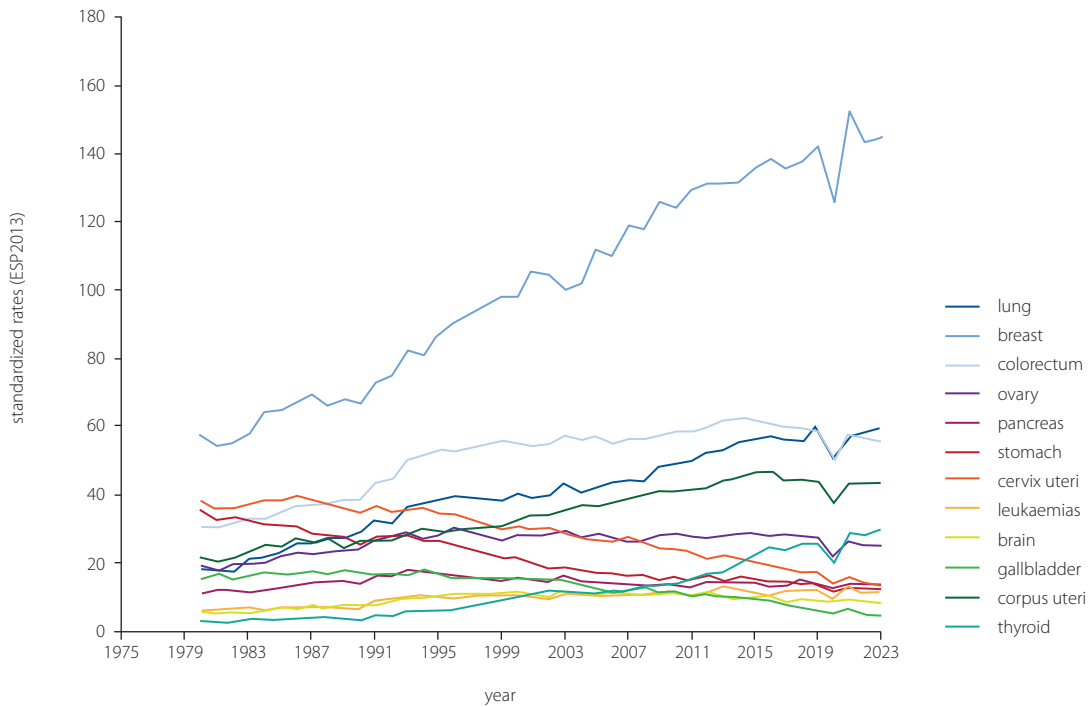


Figure 3. Incidence trends of the leading cancer sites for females, Poland 1980–2023 (2022–2023 estimation)

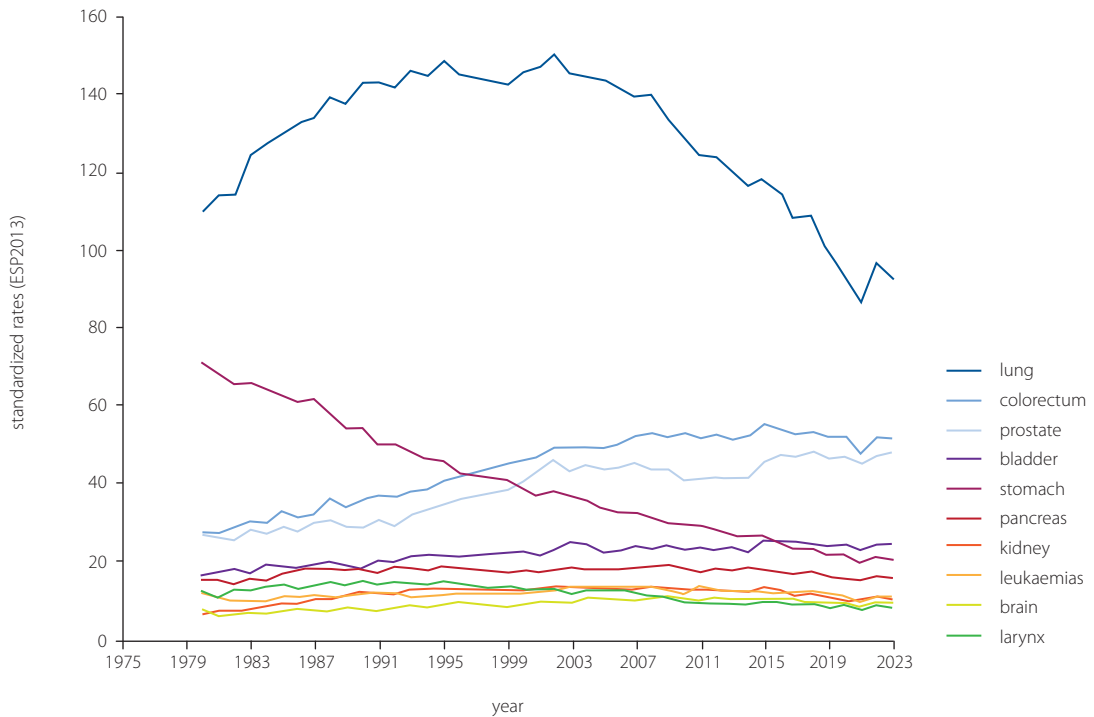


Figure 4. Mortality trends of the leading cancer sites for males, Poland 1980–2023 (2022–2023 estimation)

[CI: 0.6; 3.9]) (chart 6). It is also worth emphasizing the long-term downward trend in the case of stomach cancer, which became the 5th cause of death in 2015 (fig. 4).

In women, as in men, a temporary decrease in cancer mortality can be observed among all analyzed cancers during the COVID-19 pandemic. Data from 2021 and forecasts

indicate that mortality rates will return to pre-pandemic levels in the coming years. Since 2007, lung cancer has been the first cause of cancer death in women. The mortality and incidence rates for lung cancer are very similar. Breast cancer remains the second cause of death, with an increasing trend in mortality since 2010 (APC = 1.1 [CI: 0.6; 2.5]) (fig. 6). Although colorectal

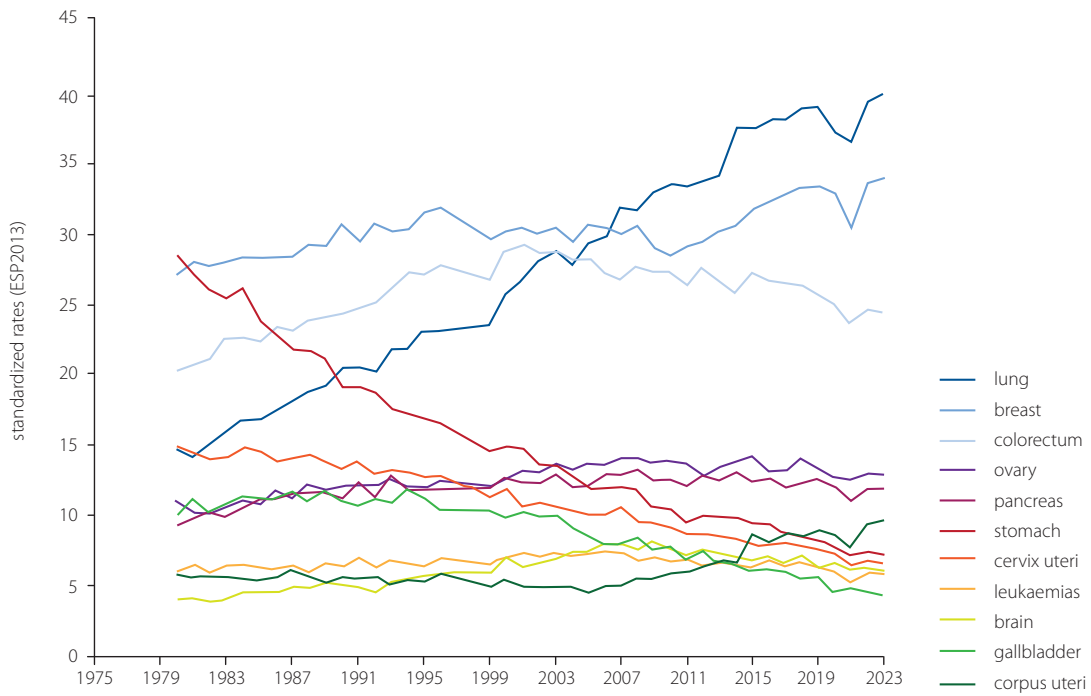


Figure 5. Mortality trends of the leading cancer sites for females, Poland 1980–2023 (2022–2023 estimation)

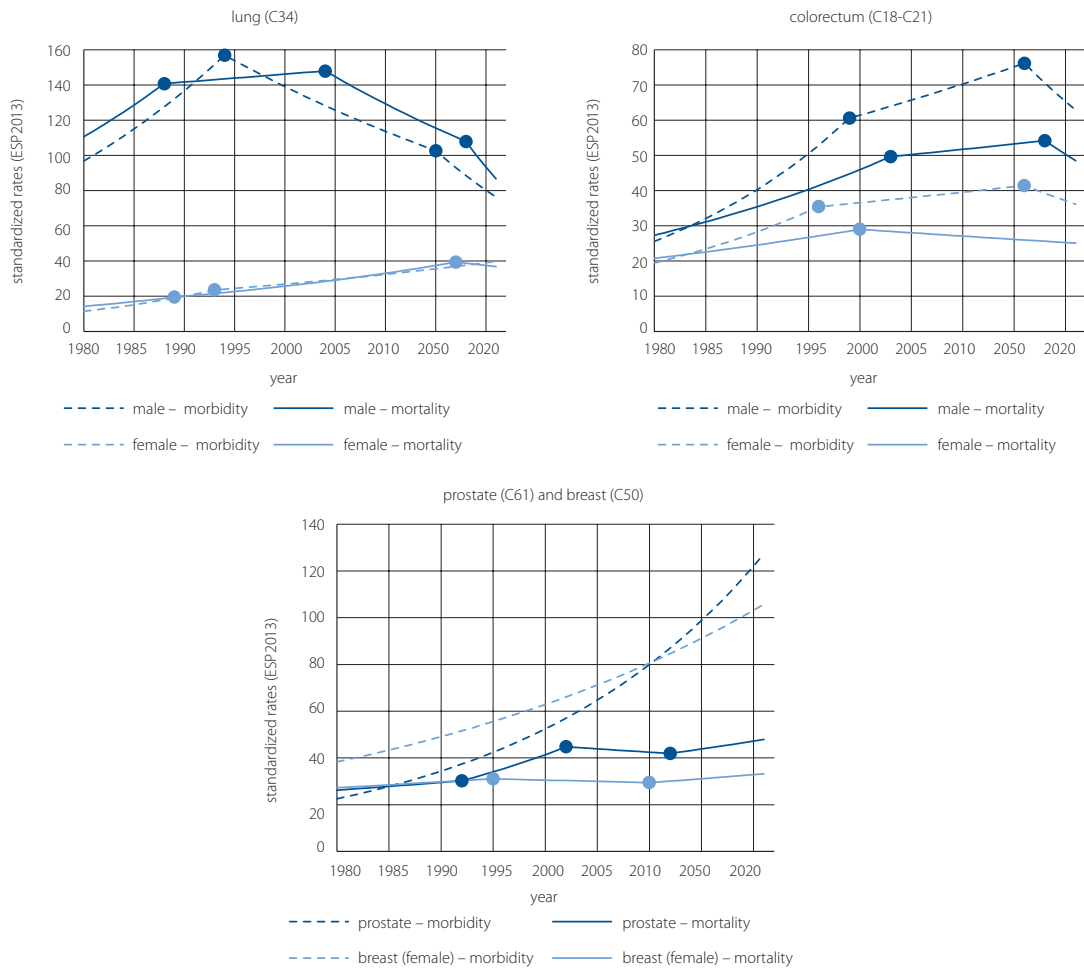


Figure 6. Time trends in incidence and mortality standardized rates (ESP2013) from lung, colorectal, prostate and breast cancer in 1980–2021 based on Joinpoint regression analysis

cancer still ranks third in terms of mortality, a downward trend has been observed since 2000 (APC = -0.7% [CI: -0.9 ; -0.5] (fig. 6). Similarly to among men, a steady decline in stomach cancer mortality has been observed for over 6 decades.

Age group analysis

In both girls and boys (0–19 years of age), the most common cancer diagnoses are leukemia, brain and central nervous system (CNS) tumors. The same cancers are also the most common causes of death in children. In women, breast cancer ranks first among all age groups older than 20 years. In men, the most common diagnoses vary according to age. Testicular cancer is most common in the 20–44 age group (24%), and prostate cancer is most common in older groups (over 45 years). Among the five most common cancers in adult men aged 20 to 44 years, there are also cancers of the thyroid, skin, colorectum, brain, and CNS. In women, these include thyroid cancer, skin cancer, cervix uteri cancer and cancers *in situ*.

In the 45+ age group in men, the first three sites of incidence include prostate, lung, and colorectal cancer, which coincides with the most common causes of death, with the exception of prostate cancer in men aged 45–64, which is characterized by a much lower mortality rate in this group, and its place in the top three in terms of mortality is taken by pancreatic cancer.

In women 45+ years, the most common cancers depend on the age group. In the 45–64 group, the most common breast cancer survivors are corpus uteri and lung cancer, and in the 65+ group, lung and colorectal cancer. The first two causes of cancer death in women over 40 years of age are lung and breast cancer. The exact incidence and mortality values for the most common cancers by sex and age are presented in tables VI and VII, respectively.

Geographical analysis

In 2021, the most cancer cases were recorded in the Śląskie and Mazowieckie Voivodship, which also have the largest population. The fewest cases were recorded in the Lubuskie Voivodship. Among the most common cancers in Poland, especially in the Mazowieckie, Śląskie, and Dolnośląskie Voivodships, lung cancer ranks high, where the highest mortality rate is also observed (tab. VIII).

Breast cancer is the most common form of cancer among women, with the highest incidence in the Mazowieckie, Śląskie, and Wielkopolskie Voivodships, accounting for a total of 35% of cases throughout the country. However, in terms of women's mortality, the leader is lung cancer, which is responsible for 14.6% of deaths in the Mazowieckie Voivodship (tab. IX).

In most voivodships, the most common malignant tumor in men in 2021 was prostate cancer, with the largest share

in the Wielkopolskie Voivodship (27%). Only in the Warmińsko-Mazurskie Voivodship is lung cancer the most common disease, with a share of approximately 18% (tab. X).

The structure of cancer incidence in women by voivodship repeats one pattern: in all voivodships, breast cancer comes first, with its share ranging from 21% (Warmińsko-Mazurskie Voivodship) to 27% (Mazowieckie Voivodship), and the second place is lung cancer, from 7% to 13%, followed by colorectal cancer, 8–10% (tab. XI).

Discussion

In 2021, the number of new cancer cases and deaths was similar to the data for 2019, the year before the COVID-19 pandemic. In 2021, the Polish National Cancer Registry registered 171,558 new cancer incidences and 93,652 deaths, while in 2019 it was 171,218 new cancer cases and 100,324 deaths [8].

The morbidity trends observed over many years and the mortality rate due to malignant tumors in Poland are determined by both the age structure of the population and changes in the Polish population's exposure to carcinogens, mainly associated with smoking (in 2023 the percentage of men and women smoking was equal, 21% of adults smoke). In 2021, the number of women who died of lung cancer exceeded that of women who died of breast cancer by 1389 deaths.

The most common disease in men is prostate cancer with 21%, characterized by a dynamic increase in incidence and a plateau in long-term mortality, which, however, has been increasing since 2004. In the male population, a reduction in the incidence and mortality rate of lung cancer has been observed in the last 15 years, mainly attributable to the reduction in the percentage of men who smoke in recent decades.

In the female population, the main cancer sites are still breast, lung, colorectum, and cervix uteri. Lung cancer is still the leading cause of death in women (18%) and is superior to breast cancer (14.9%). Breast cancer dominates women and has been characterized by ever-increasing incidence over the past half century. The mortality rate of breast cancer has changed several times over the past 30 years. The initial increase in mortality was stopped in the mid-1990s, and a decline in mortality was recorded in the years 1996–2010. During the period 2010–2021, there was an unfavorable change in the trend. Colorectal cancer has been the third most common cause of cancer death in recent years.

Infection with the SARS-Cov2 virus among cancer patients in 2021 caused 11,640 deaths. Most deaths due to COVID-19 were found in patients with digestive system cancers (17%), lymphatic, lymphatic tissue and related tissue cancers (15%), cancers of the respiratory system (14%), and male genital cancers (14%).

Table VI. The incidence of the 5 most common cancer sites in Poland in 2021, depending on sex and age

| Males | | | | | | | |
|--|----------|---------------------------------|----------|--|----------|--|----------|
| 0–19 years | | 20–44 years | | 45–64 years | | 65+ years | |
| Number | Percents | Number | Percents | Number | Percents | Number | Percents |
| all cancers | | all cancers | | all cancers | | all cancers | |
| 691 | 100% | 4,199 | 100% | 23,891 | 100% | 55,494 | 100% |
| leukaemias (C91–C95) | | testis (C62) | | prostate (C61) | | prostate (C61) | |
| 180 | 26% | 1,001 | 24% | 4,091 | 17% | 13,715 | 25% |
| brain and CNS (C71–C72) | | thyroid (C73) | | lung (C33–C34) | | lung (C33–C34) | |
| 117 | 16% | 277 | 7% | 3,571 | 15% | 8,668 | 16% |
| non-Hodgkin lymphomas (C82–C85+C96) | | melanoma (C43) | | colorectum (C18–C21) | | colorectum (C18–C21) | |
| 72 | 10% | 273 | 7% | 2,955 | 12% | 6,783 | 12% |
| Hodgkin lymphoma (C81) | | colorectum (C18–C21) | | kidney and renal pelvis (C64–C65) | | other and unspecified malignant neoplasm of skin (C44) | |
| 56 | 8% | 267 | 6% | 1,271 | 5% | 5,225 | 9% |
| other connective and soft tissue (C49) | | brain and CNS (C71–C72) | | other and unspecified malignant neoplasm of skin (C44) | | bladder (C67) | |
| 45 | 7% | 257 | 6% | 1,231 | 5% | 3,756 | 7% |
| Females | | | | | | | |
| 0–19 years | | 20–44 years | | 45–64 years | | 65+ years | |
| Number | Percents | Number | Percents | Number | Percents | Number | Percents |
| all cancers | | all cancers | | all cancers | | all cancers | |
| 605 | 100% | 8,934 | 100% | 28,912 | 100% | 48,832 | 100% |
| leukaemias (C91–C95) | | breast (C50) | | breast (C50) | | breast (C50) | |
| 148 | 24% | 2,501 | 28% | 9,104 | 31% | 9,472 | 19% |
| brain and CNS (C71–C72) | | thyroid (C73) | | corpus uteri (C54) | | lung (C33–C34) | |
| 92 | 15% | 1,631 | 18% | 2,464 | 9% | 5,969 | 12% |
| thyroid (C73) | | cancer <i>in situ</i> (D00–D09) | | lung (C33–C34) | | colorectum (C18–C21) | |
| 56 | 9% | 1,010 | 11% | 2,190 | 8% | 5,561 | 11% |
| Hodgkin lymphoma (C81) | | melanoma (C43) | | colorectum (C18–C21) | | other and unspecified malignant neoplasm of skin (C44) | |
| 52 | 9% | 503 | 6% | 2,126 | 7% | 5,206 | 11% |
| kidney and renal pelvis (C64–C65) | | cervix uteri (C53) | | ovary (C56) | | corpus uteri (C54) | |
| 34 | 6% | 437 | 5% | 1,533 | 5% | 3,342 | 7% |

Table VII. The mortality of the 5 most common cancer sites in Poland in 2021, depending on sex and age

| Males | | | | | | | |
|--|----------|-------------------------|----------|-------------------------|----------|----------------------|----------|
| 0–19 years | | 20–44 years | | 45–64 years | | 65+ years | |
| Number | Percents | Number | Percents | Number | Percents | Number | Percents |
| all cancers | | all cancers | | all cancers | | all cancers | |
| 107 | 100% | 974 | 100% | 12,665 | 100% | 36,835 | 100% |
| brain and CNS (C71–C72) | | brain and CNS (C71–C72) | | lung (C33–C34) | | lung (C33–C34) | |
| 34 | 32% | 131 | 13% | 3,580 | 28% | 9,419 | 26% |
| leukaemias (C91–C95) | | colorectum (C18–C21) | | colorectum (C18–C21) | | colorectum (C18–C21) | |
| 25 | 23% | 100 | 10% | 1,411 | 11% | 5,057 | 14% |
| bone and articular cartilage (C40–C41) | | testis (C62) | | pancreas (C25) | | prostate (C61) | |
| 12 | 11% | 93 | 10% | 763 | 6% | 4,989 | 14% |
| other connective and soft tissue (C49) | | lung (C33–C34) | | stomach (C16) | | bladder (C67) | |
| 12 | 11% | 60 | 6% | 759 | 6% | 2,008 | 5% |
| liver (C22) | | leukaemias (C91–C95) | | brain and CNS (C71–C72) | | stomach (C16) | |
| 5 | 5% | 58 | 6% | 516 | 4% | 1,815 | 5% |
| Females | | | | | | | |
| 0–19 years | | 20–44 years | | 45–64 years | | 65+ years | |
| Number | Percents | Number | Percents | Number | Percents | Number | Percents |
| all cancers | | all cancers | | all cancers | | all cancers | |
| 75 | 100% | 1,084 | | 9,633 | | 32,279 | |
| brain and CNS (C71–C72) | | breast (C50) | | lung (C33–C34) | | lung (C33–C34) | |
| 31 | 41% | 287 | 26% | 1,830 | 19% | 5,931 | 18% |
| leukaemias (C91–C95) | | cervix uteri (C53) | | breast (C50) | | breast (C50) | |
| 16 | 21% | 114 | 11% | 1,706 | 18% | 4,413 | 14% |
| other connective and soft tissue (C49) | | colorectum (C18–C21) | | ovary (C56) | | colorectum (C18–C21) | |
| 4 | 5% | 96 | 9% | 856 | 9% | 4,070 | 13% |
| kidney and renal pelvis (C64–C65) | | brain and CNS (C71–C72) | | colorectum (C18–C21) | | pancreas (C25) | |
| 4 | 5% | 89 | 8% | 855 | 9% | 1,849 | 6% |
| non-Hodgkin lymphomas (C82–C85+C96) | | ovary (C56) | | cervix uteri (C53) | | ovary (C56) | |
| 4 | 3% | 75 | 7% | 501 | 5% | 1,706 | 5% |

Table VIII. Numbers of incidences and deaths for the most common malignant tumors among men in 2021 by voivodships

| Voivodship | All cancers | Stomach | Colorectum ¹ | Pancreas | Lung | Melanoma | Prostate | Kidney | Bladder | non-Hodgkin lymphomas ² | Leukaemias ³ |
|---------------------|-------------|---------|-------------------------|----------|--------|----------|----------|--------|---------|------------------------------------|-------------------------|
| Incidence | | | | | | | | | | | |
| Dolnośląskie | 6,543 | 215 | 774 | 154 | 1,005 | 200 | 1,275 | 249 | 468 | 152 | 172 |
| Kujawsko-Pomorskie | 5,080 | 197 | 566 | 95 | 893 | 108 | 994 | 195 | 348 | 94 | 68 |
| Lubelskie | 4,667 | 151 | 488 | 81 | 585 | 80 | 1,158 | 197 | 369 | 93 | 125 |
| Lubuskie | 1,939 | 83 | 236 | 48 | 283 | 27 | 458 | 103 | 110 | 29 | 32 |
| Łódzkie | 5,462 | 204 | 665 | 119 | 759 | 150 | 1,067 | 187 | 304 | 139 | 251 |
| Małopolskie | 6,759 | 228 | 749 | 151 | 882 | 142 | 1,321 | 220 | 380 | 201 | 167 |
| Mazowieckie | 9,994 | 370 | 1,193 | 245 | 1,611 | 242 | 1,994 | 345 | 545 | 279 | 249 |
| Opolskie | 2,390 | 75 | 303 | 47 | 309 | 60 | 474 | 89 | 165 | 46 | 55 |
| Podkarpackie | 4,369 | 161 | 541 | 118 | 562 | 122 | 881 | 183 | 200 | 113 | 124 |
| Podlaskie | 2,647 | 65 | 352 | 61 | 312 | 59 | 652 | 110 | 165 | 46 | 53 |
| Pomorskie | 6,018 | 191 | 566 | 88 | 861 | 105 | 1,629 | 225 | 510 | 105 | 73 |
| Śląskie | 10,605 | 427 | 1,447 | 246 | 1,561 | 199 | 2,240 | 320 | 670 | 238 | 314 |
| Świętokrzyskie | 3,368 | 117 | 383 | 76 | 470 | 66 | 802 | 100 | 228 | 80 | 89 |
| Warmińsko-Mazurskie | 2,980 | 98 | 381 | 54 | 533 | 61 | 520 | 104 | 172 | 63 | 111 |
| Wielkopolskie | 8,229 | 292 | 1,025 | 226 | 1,091 | 183 | 1,675 | 313 | 455 | 154 | 209 |
| Zachodniopomorskie | 3,225 | 136 | 340 | 55 | 627 | 72 | 692 | 114 | 212 | 31 | 44 |
| Poland | 84,275 | 3,010 | 10,009 | 1,864 | 12,344 | 1,876 | 17,832 | 3,054 | 5,301 | 1,863 | 2,136 |
| Deaths | | | | | | | | | | | |
| Dolnośląskie | 3,940 | 231 | 497 | 219 | 1,013 | 48 | 426 | 117 | 226 | 55 | 82 |
| Kujawsko-Pomorskie | 2,828 | 158 | 344 | 146 | 860 | 36 | 306 | 59 | 182 | 50 | 75 |
| Lubelskie | 2,657 | 129 | 368 | 112 | 643 | 30 | 290 | 105 | 140 | 36 | 83 |
| Lubuskie | 1,205 | 61 | 142 | 56 | 369 | 16 | 132 | 21 | 65 | 23 | 25 |
| Łódzkie | 3,404 | 198 | 487 | 136 | 926 | 36 | 322 | 83 | 205 | 46 | 98 |
| Małopolskie | 4,283 | 253 | 516 | 179 | 997 | 63 | 510 | 125 | 303 | 65 | 125 |
| Mazowieckie | 6,747 | 358 | 852 | 328 | 1,825 | 94 | 713 | 166 | 399 | 120 | 178 |
| Opolskie | 1,284 | 67 | 186 | 45 | 305 | 18 | 140 | 40 | 83 | 20 | 41 |
| Podkarpackie | 2,395 | 160 | 320 | 97 | 517 | 39 | 297 | 63 | 121 | 47 | 59 |
| Podlaskie | 1,488 | 76 | 198 | 59 | 369 | 23 | 179 | 45 | 88 | 22 | 45 |
| Pomorskie | 3,090 | 169 | 353 | 180 | 816 | 39 | 339 | 86 | 171 | 42 | 90 |
| Śląskie | 6,599 | 404 | 894 | 270 | 1,597 | 83 | 653 | 172 | 372 | 94 | 161 |
| Świętokrzyskie | 1,839 | 98 | 231 | 84 | 454 | 19 | 234 | 61 | 122 | 33 | 43 |
| Warmińsko-Mazurskie | 1,862 | 97 | 257 | 75 | 516 | 28 | 220 | 58 | 89 | 66 | 47 |
| Wielkopolskie | 4,571 | 233 | 636 | 231 | 1,180 | 54 | 461 | 142 | 295 | 63 | 119 |
| Zachodniopomorskie | 2,389 | 128 | 289 | 111 | 672 | 35 | 236 | 75 | 117 | 35 | 65 |
| Poland | 50,581 | 2,820 | 6,570 | 2,328 | 13,059 | 661 | 5,458 | 1,418 | 2,978 | 817 | 1,336 |

¹colorectum C18–C21; ²non-Hodgkin lymphomas C82–C85 + C96; ³leukaemias C91–C95

Table IX. Number of incidences and deaths for the most common malignant tumors among women in 2021 by voivodships

| Voivodship | All cancers | Colorec-tum ¹ | Lung | Breast | Cervix uteri | Corpus uteri | Ovary | Kidney | Bladder | non-Hodgkin lymphomas ² | Leukaemias ³ |
|---------------------|-------------|--------------------------|-------|--------|--------------|--------------|-------|--------|---------|------------------------------------|-------------------------|
| Incidence | | | | | | | | | | | |
| Dolnośląskie | 7,276 | 637 | 720 | 1,808 | 167 | 451 | 313 | 156 | 166 | 142 | 173 |
| Kujawsko-Pomorskie | 5,468 | 445 | 662 | 1,254 | 117 | 317 | 245 | 144 | 116 | 83 | 43 |
| Lubelskie | 4,431 | 375 | 371 | 1,035 | 98 | 335 | 189 | 138 | 97 | 103 | 115 |
| Lubuskie | 1,913 | 171 | 194 | 451 | 55 | 115 | 92 | 73 | 47 | 24 | 33 |
| Łódzkie | 6,162 | 543 | 546 | 1,539 | 156 | 440 | 296 | 119 | 114 | 138 | 207 |
| Małopolskie | 7,376 | 649 | 526 | 1,727 | 147 | 531 | 298 | 124 | 103 | 173 | 141 |
| Mazowieckie | 10,987 | 886 | 1,146 | 2,990 | 258 | 732 | 325 | 207 | 170 | 251 | 242 |
| Opolskie | 2,275 | 241 | 194 | 541 | 63 | 209 | 94 | 49 | 30 | 53 | 42 |
| Podkarpackie | 4,288 | 396 | 277 | 1,014 | 84 | 374 | 192 | 98 | 64 | 113 | 107 |
| Podlaskie | 2,716 | 262 | 189 | 629 | 75 | 193 | 121 | 74 | 54 | 34 | 25 |
| Pomorskie | 5,547 | 471 | 703 | 1,300 | 151 | 309 | 182 | 149 | 178 | 106 | 55 |
| Śląskie | 10,315 | 1,152 | 1,019 | 2,336 | 283 | 768 | 559 | 226 | 240 | 212 | 207 |
| Świętokrzyskie | 3,015 | 293 | 234 | 643 | 90 | 241 | 118 | 94 | 57 | 69 | 71 |
| Warmińsko-Mazurskie | 3,299 | 309 | 353 | 702 | 96 | 169 | 145 | 67 | 66 | 76 | 105 |
| Wielkopolskie | 8,373 | 828 | 663 | 2,137 | 213 | 568 | 324 | 193 | 139 | 151 | 153 |
| Zachodniopomorskie | 3,842 | 340 | 451 | 973 | 107 | 272 | 131 | 73 | 101 | 40 | 30 |
| Poland | 87,283 | 7,998 | 8,248 | 21,079 | 2,160 | 6,024 | 3,624 | 1,984 | 1,742 | 1,768 | 1,749 |
| Deaths | | | | | | | | | | | |
| Dolnośląskie | 3,511 | 403 | 662 | 451 | 91 | 128 | 217 | 79 | 72 | 59 | 80 |
| Kujawsko-Pomorskie | 2,462 | 293 | 570 | 356 | 64 | 76 | 139 | 46 | 30 | 44 | 60 |
| Lubelskie | 2,154 | 255 | 337 | 307 | 83 | 104 | 160 | 31 | 31 | 36 | 69 |
| Lubuskie | 1,053 | 119 | 215 | 143 | 34 | 31 | 66 | 24 | 27 | 21 | 27 |
| Łódzkie | 3,004 | 354 | 553 | 459 | 88 | 97 | 189 | 54 | 54 | 37 | 100 |
| Małopolskie | 3,666 | 410 | 540 | 550 | 117 | 179 | 225 | 74 | 78 | 84 | 110 |
| Mazowieckie | 5,830 | 652 | 1,143 | 895 | 192 | 223 | 335 | 117 | 106 | 116 | 142 |
| Opolskie | 1,140 | 153 | 178 | 184 | 44 | 40 | 58 | 33 | 19 | 20 | 33 |
| Podkarpackie | 1,899 | 221 | 242 | 295 | 62 | 108 | 124 | 40 | 31 | 43 | 63 |
| Podlaskie | 1,214 | 169 | 177 | 196 | 51 | 50 | 73 | 29 | 27 | 22 | 39 |
| Pomorskie | 2,548 | 291 | 540 | 337 | 89 | 75 | 144 | 43 | 57 | 49 | 57 |
| Śląskie | 5,691 | 689 | 938 | 908 | 157 | 227 | 384 | 103 | 122 | 84 | 128 |
| Świętokrzyskie | 1,365 | 153 | 185 | 214 | 49 | 72 | 104 | 28 | 33 | 23 | 46 |
| Warmińsko-Mazurskie | 1,507 | 154 | 305 | 206 | 51 | 58 | 70 | 43 | 43 | 71 | 36 |
| Wielkopolskie | 3,934 | 475 | 745 | 641 | 122 | 114 | 246 | 64 | 106 | 64 | 81 |
| Zachodniopomorskie | 2,093 | 231 | 477 | 264 | 67 | 65 | 105 | 40 | 53 | 41 | 55 |
| Poland | 43,071 | 5,022 | 7,807 | 6,406 | 1,361 | 1,647 | 2,639 | 848 | 889 | 814 | 1,126 |

¹colorectum C18–C21; ²non-Hodgkin lymphomas C82–C85 + C96; ³leukaemias C91–C95

Table X. Standardized rates of morbidity and mortality for the most common malignant neoplasms in men in Poland in 2021 by voivodships

| Voivodship | All cancers | Stomach | Colorectum ¹ | Pancreas | Lung | Melanoma | Prostate | Kidney | Bladder | non-Hodgkin lymphomas ² | Leukaemias ³ |
|----------------------------------|-------------|---------|-------------------------|----------|-------|----------|----------|--------|---------|------------------------------------|-------------------------|
| Incidence rates (ESP2013) | | | | | | | | | | | |
| Dolnośląskie | 556.3 | 18.5 | 66.9 | 12.9 | 84.7 | 16.3 | 108.1 | 20.4 | 41.0 | 12.6 | 15.6 |
| Kujawsko-Pomorskie | 618.3 | 24.0 | 70.8 | 11.6 | 105.8 | 13.1 | 118.5 | 22.5 | 45.3 | 10.7 | 8.7 |
| Lubelskie | 544.9 | 17.2 | 58.6 | 9.1 | 65.6 | 9.1 | 137.0 | 21.9 | 46.2 | 10.8 | 14.6 |
| Lubuskie | 482.3 | 22.0 | 58.7 | 11.4 | 70.0 | 7.4 | 112.3 | 23.8 | 28.2 | 8.8 | 9.1 |
| Łódzkie | 528.0 | 20.1 | 65.7 | 11.9 | 71.6 | 14.6 | 102.1 | 17.0 | 30.9 | 13.0 | 24.6 |
| Małopolskie | 511.5 | 17.7 | 57.9 | 11.5 | 66.6 | 10.7 | 101.8 | 15.8 | 30.9 | 14.5 | 12.1 |
| Mazowieckie | 469.6 | 17.6 | 56.6 | 11.5 | 75.5 | 10.7 | 94.2 | 15.3 | 26.6 | 13.0 | 12.3 |
| Opolskie | 589.7 | 19.6 | 76.7 | 11.6 | 76.1 | 14.7 | 113.6 | 20.1 | 41.2 | 10.2 | 14.7 |
| Podkarpackie | 528.5 | 19.8 | 67.1 | 14.2 | 69.4 | 14.3 | 109.9 | 20.4 | 25.4 | 13.2 | 14.0 |
| Podlaskie | 565.7 | 14.2 | 76.0 | 11.8 | 66.9 | 12.3 | 141.7 | 22.7 | 36.1 | 9.2 | 10.9 |
| Pomorskie | 674.3 | 20.5 | 65.3 | 9.6 | 95.8 | 11.0 | 182.5 | 23.6 | 61.7 | 11.0 | 8.2 |
| Śląskie | 562.9 | 23.0 | 78.4 | 12.4 | 81.1 | 10.3 | 120.5 | 16.1 | 36.6 | 12.5 | 16.3 |
| Świętokrzyskie | 624.9 | 22.2 | 71.5 | 14.5 | 84.6 | 12.0 | 143.6 | 17.9 | 43.5 | 15.1 | 16.3 |
| Warmińsko-Mazurskie | 553.8 | 17.2 | 70.7 | 9.7 | 93.8 | 11.9 | 98.9 | 17.9 | 34.2 | 11.0 | 21.4 |
| Wielkopolskie | 619.1 | 22.2 | 80.4 | 16.6 | 80.8 | 13.4 | 125.8 | 22.1 | 36.2 | 10.5 | 15.7 |
| Zachodniopomorskie | 455.8 | 19.5 | 49.0 | 7.5 | 85.3 | 10.0 | 99.0 | 14.5 | 30.3 | 4.3 | 6.7 |
| Poland | 549.5 | 19.8 | 66.6 | 11.9 | 79.2 | 11.9 | 116.7 | 18.8 | 36.3 | 11.8 | 14.0 |
| Mortality rates (ESP2013) | | | | | | | | | | | |
| Dolnośląskie | 363.6 | 21.2 | 47.0 | 19.1 | 89.2 | 5.2 | 46.0 | 10.8 | 23.5 | 5.2 | 8.2 |
| Kujawsko-Pomorskie | 371.3 | 19.8 | 47.0 | 18.6 | 108.1 | 5.2 | 48.3 | 7.1 | 27.7 | 5.9 | 10.6 |
| Lubelskie | 331.3 | 15.3 | 47.5 | 13.9 | 76.2 | 4.0 | 42.5 | 13.1 | 19.3 | 4.8 | 10.6 |
| Lubuskie | 331.8 | 17.1 | 39.9 | 13.7 | 94.7 | 5.0 | 46.6 | 5.4 | 19.7 | 5.6 | 7.4 |
| Łódzkie | 352.2 | 20.7 | 51.7 | 13.8 | 90.4 | 3.6 | 38.0 | 8.2 | 24.0 | 4.7 | 10.3 |
| Małopolskie | 352.9 | 20.5 | 43.3 | 14.1 | 78.7 | 5.7 | 48.6 | 10.5 | 27.4 | 5.3 | 10.3 |
| Mazowieckie | 337.5 | 17.7 | 44.3 | 15.7 | 87.4 | 4.8 | 40.9 | 8.1 | 21.8 | 6.1 | 9.1 |
| Opolskie | 337.1 | 17.3 | 50.7 | 11.3 | 75.5 | 4.9 | 42.3 | 10.2 | 22.8 | 5.1 | 11.1 |
| Podkarpackie | 315.0 | 20.3 | 43.0 | 11.5 | 64.0 | 5.0 | 45.6 | 8.1 | 18.2 | 6.8 | 8.0 |
| Podlaskie | 340.3 | 18.3 | 47.3 | 13.4 | 80.6 | 5.7 | 45.1 | 10.0 | 21.2 | 4.6 | 10.8 |
| Pomorskie | 368.8 | 19.5 | 44.3 | 20.3 | 92.6 | 4.5 | 48.8 | 10.4 | 22.4 | 5.1 | 11.1 |
| Śląskie | 374.0 | 23.0 | 52.6 | 13.9 | 86.6 | 5.1 | 43.1 | 9.6 | 22.1 | 5.6 | 9.3 |
| Świętokrzyskie | 368.4 | 20.2 | 47.4 | 15.5 | 83.7 | 3.7 | 54.6 | 12.1 | 27.3 | 7.3 | 9.1 |
| Warmińsko-Mazurskie | 384.9 | 18.9 | 55.5 | 14.2 | 96.7 | 5.3 | 59.5 | 10.9 | 20.8 | 13.2 | 10.6 |
| Wielkopolskie | 368.2 | 18.6 | 53.9 | 17.4 | 89.8 | 4.7 | 44.0 | 11.5 | 26.7 | 5.1 | 9.8 |
| Zachodniopomorskie | 365.2 | 20.2 | 43.8 | 16.2 | 96.1 | 6.3 | 44.3 | 11.6 | 19.9 | 6.0 | 10.0 |
| Poland | 355.0 | 19.6 | 47.7 | 15.4 | 86.8 | 4.9 | 45.1 | 9.8 | 23.1 | 5.8 | 9.7 |

¹colorectum C18–C21; ²non-Hodgkin lymphomas C82–C85 + C96; ³leukaemias C91–C95

Table XI. Standardized rates of morbidity and mortality for the most common malignant neoplasms in women in Poland in 2021 by voivodships

| Voivodship | All cancers | Colorec-tum ¹ | Lung | Breast | Cervix uteri | Corpus uteri | Ovary | Kidney | Bladder | non-Hodg-kin lym-phomas ² | Leuka-emias ³ |
|----------------------------------|-------------|--------------------------|------|--------|--------------|--------------|-------|--------|---------|--------------------------------------|--------------------------|
| Incidence rates (ESP2013) | | | | | | | | | | | |
| Dolnośląskie | 444.9 | 38.6 | 42.1 | 112.0 | 10.0 | 10.0 | 19.2 | 9.8 | 9.7 | 8.8 | 10.9 |
| Kujawsko-Pomorskie | 493.3 | 40.0 | 57.8 | 113.7 | 10.6 | 10.6 | 22.2 | 12.9 | 10.2 | 7.7 | 4.2 |
| Lubelskie | 381.9 | 32.0 | 30.9 | 90.8 | 8.3 | 8.3 | 16.4 | 12.2 | 8.1 | 8.8 | 9.9 |
| Lubuskie | 351.6 | 31.8 | 34.8 | 82.5 | 9.9 | 9.9 | 16.7 | 13.6 | 8.4 | 4.3 | 6.5 |
| Łódzkie | 429.1 | 37.1 | 35.8 | 108.7 | 11.2 | 11.2 | 21.1 | 8.5 | 7.9 | 9.9 | 15.0 |
| Małopolskie | 417.6 | 37.0 | 29.9 | 97.8 | 8.2 | 8.2 | 17.4 | 7.2 | 5.8 | 9.9 | 8.0 |
| Mazowieckie | 373.1 | 30.0 | 38.1 | 102.7 | 8.8 | 8.8 | 11.3 | 7.0 | 5.7 | 8.5 | 8.2 |
| Opolskie | 416.5 | 43.8 | 34.5 | 99.3 | 12.1 | 12.1 | 17.2 | 8.7 | 5.6 | 10.0 | 7.5 |
| Podkarpackie | 390.9 | 36.0 | 25.2 | 92.8 | 7.7 | 7.7 | 17.5 | 8.9 | 5.7 | 10.6 | 9.9 |
| Podlaskie | 426.4 | 41.2 | 29.3 | 99.5 | 12.2 | 12.2 | 19.4 | 11.9 | 8.1 | 5.2 | 3.7 |
| Pomorskie | 462.7 | 39.9 | 57.4 | 109.6 | 12.5 | 12.5 | 15.4 | 12.4 | 15.0 | 8.9 | 4.6 |
| Śląskie | 407.4 | 45.0 | 38.4 | 92.8 | 11.6 | 11.6 | 22.3 | 8.9 | 9.2 | 8.4 | 8.6 |
| Świętokrzyskie | 435.9 | 41.6 | 32.1 | 95.1 | 13.3 | 13.3 | 17.1 | 13.4 | 7.8 | 9.6 | 10.2 |
| Warmińsko-Mazurskie | 444.5 | 42.2 | 46.2 | 95.3 | 12.8 | 12.8 | 19.3 | 8.9 | 8.6 | 10.1 | 14.2 |
| Wielkopolskie | 462.4 | 46.4 | 36.2 | 118.6 | 11.6 | 11.6 | 17.6 | 10.8 | 7.4 | 8.1 | 8.3 |
| Zachodniopomorskie | 413.2 | 36.0 | 45.2 | 105.8 | 11.6 | 11.6 | 14.2 | 8.0 | 11.1 | 4.5 | 3.4 |
| Poland | 419.7 | 38.4 | 38.5 | 102.2 | 10.4 | 10.4 | 17.6 | 9.6 | 8.2 | 8.5 | 8.5 |
| Mortality rates (ESP2013) | | | | | | | | | | | |
| Dolnośląskie | 210.4 | 24.3 | 39.6 | 27.2 | 5.4 | 7.6 | 13.2 | 4.8 | 4.2 | 3.4 | 4.7 |
| Kujawsko-Pomorskie | 219.1 | 26.6 | 50.0 | 31.5 | 5.6 | 6.7 | 12.8 | 3.9 | 2.6 | 3.9 | 5.4 |
| Lubelskie | 180.1 | 21.2 | 28.1 | 25.6 | 7.2 | 8.6 | 13.8 | 2.8 | 2.4 | 3.0 | 5.8 |
| Lubuskie | 195.5 | 22.5 | 39.1 | 25.9 | 6.1 | 5.9 | 12.0 | 4.7 | 5.3 | 4.1 | 5.3 |
| Łódzkie | 198.5 | 23.3 | 35.7 | 31.2 | 5.9 | 6.4 | 12.6 | 3.7 | 3.5 | 2.4 | 6.8 |
| Małopolskie | 203.3 | 22.6 | 30.4 | 30.5 | 6.5 | 10.0 | 12.6 | 4.1 | 4.2 | 4.8 | 6.0 |
| Mazowieckie | 193.2 | 21.3 | 38.0 | 30.0 | 6.5 | 7.4 | 11.5 | 3.9 | 3.4 | 3.8 | 4.5 |
| Opolskie | 204.2 | 27.0 | 31.0 | 33.2 | 8.1 | 7.4 | 10.2 | 5.8 | 3.4 | 3.6 | 6.1 |
| Podkarpackie | 170.4 | 20.1 | 22.0 | 26.9 | 5.5 | 9.4 | 11.2 | 3.6 | 2.6 | 3.8 | 5.4 |
| Podlaskie | 181.9 | 24.9 | 27.3 | 29.3 | 8.0 | 7.2 | 11.1 | 4.2 | 4.0 | 3.3 | 6.0 |
| Pomorskie | 212.3 | 24.8 | 44.3 | 28.2 | 7.3 | 6.1 | 11.9 | 3.6 | 4.6 | 4.1 | 4.7 |
| Śląskie | 220.5 | 26.8 | 35.6 | 35.4 | 6.2 | 8.8 | 15.1 | 3.9 | 4.7 | 3.3 | 5.0 |
| Świętokrzyskie | 187.9 | 20.7 | 25.1 | 29.5 | 6.8 | 9.8 | 14.6 | 3.6 | 4.4 | 3.1 | 6.5 |
| Warmińsko-Mazurskie | 202.8 | 21.0 | 40.2 | 28.1 | 6.9 | 7.7 | 9.4 | 5.5 | 6.0 | 9.6 | 4.7 |
| Wielkopolskie | 218.2 | 26.9 | 40.5 | 35.9 | 6.8 | 6.4 | 13.8 | 3.6 | 5.8 | 3.6 | 4.4 |
| Zachodniopomorskie | 223.4 | 24.5 | 49.9 | 28.6 | 7.1 | 7.1 | 11.3 | 4.3 | 5.5 | 4.5 | 6.2 |
| Poland | 203.3 | 23.8 | 36.5 | 30.5 | 6.5 | 7.8 | 12.7 | 4.0 | 4.1 | 3.9 | 5.3 |

¹colorectum C18–C21; ²non-Hodgkin lymphomas C82–C85 + C96; ³leukaemias C91–C95

Conclusions

Deaths from COVID-19 are still a competitive cause of death compared to cancer. Both data from 2021 and forecasts until 2023 indicate that after a temporary reduction in cancer morbidity and mortality during the COVID-19 pandemic, both values will return to the trends presented before the pandemic.

In Poland in 2021, the most frequently diagnosed cancers among men were prostate, lung, and colorectal cancers. Among women, the main cancer sites remain: breast, lung, and colorectum. Mortality from colorectal cancer has been on downward trend since 2015, and this decreasing trend continues. A still disturbing phenomenon is the higher mortality rate than morbidity for lung cancer among men, and the similar number of lung cancer cases and deaths in women.

Strengths and limitations of the report

The analysis covers the entire population of Poland, and is the best source of cancer incidence data. Cancer registration in the Polish National Cancer Registry (PNCR) is mandatory, ensuring a high level of completeness of the data.

Article information and declarations

Data availability statement

The presented data come from the Polish National Cancer Registry (PNCR) and is available at <https://onkologia.org.pl/>.

Author contributions

Joanna A. Didkowska – devised the project, the main conceptual ideas and proof outline.

Klaudia Barańska – performed the analysis, wrote the manuscript with input from all authors.

Marta J. Miklewska – performed the analysis, wrote the manuscript with input from all authors.

Urszula Wojciechowska – performed the analysis, devised the project, the main conceptual ideas and proof outline.

Conflict of interest

None declared

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