

3 Results

3.0 Overview of incident cancer cases and cancer deaths

Table 3.0.1

Estimated numbers of incident cancer cases and numbers of deaths from cancer in Germany 2016

Source for numbers of deaths from cancer: Official cause of death statistics, Federal Statistical Office, Wiesbaden

Cancer site	ICD-10	No. of incident cases		Incidence rate ¹		No. of deaths		Mortality rate ¹	
		Women	Men	Women	Men	Women	Men	Women	Men
Oral cavity and pharynx	C00–C14	4,180	9,720	6.5	17.6	1,387	4,070	1.8	7.0
Oesophagus	C15	1,740	5,540	2.4	9.4	1,245	4,434	1.5	7.2
Stomach	C16	5,840	9,300	7.3	14.8	3,861	5,370	4.4	8.2
Small intestine	C17	1,270	1,350	1.8	2.2	325	341	0.4	0.5
Colon and rectum	C18–C20	25,990	32,300	31.8	50.7	11,391	13,411	11.8	19.8
Anus	C21	1,320	830	2.1	1.5	308	204	0.4	0.3
Liver	C22	2,750	6,220	3.5	9.8	2,625	5,411	3.0	8.2
Gall bladder and biliary tract	C23, C24	2,740	2,550	3.2	3.9	2,113	1,562	2.2	2.3
Pancreas	C25	9,190	9,180	10.9	14.4	9,044	9,008	10.1	13.7
Larynx	C32	510	3,130	0.8	5.4	227	1,247	0.3	2.0
Lung	C33, C34	21,500	35,960	31.4	57.5	16,481	29,324	22.6	45.7
Malignant melanoma of the skin	C43	11,150	12,090	19.9	21.0	1,226	1,700	1.5	2.7
Non-melanoma skin cancer	C44	107,020	122,730	143.0	184.1	378	520	0.3	0.7
Mesothelioma	C45	280	1,060	0.4	1.5	287	1,193	0.3	1.7
Soft tissue without Mesothelioma	C46–C49	1,970	2,270	3.2	4.1	901	859	1.2	1.4
Breast	C50	68,950	710	112.2	1.1	18,570	166	23.4	0.3
Vulva	C51	3,330		4.5		937		1.0	
Cervix	C53	4,380		8.7		1,562		2.4	
Uterus	C54, C55	11,090		16.5		2,600		3.0	
Ovaries	C56	7,350		11.1		5,486		6.9	
Prostate	C61		58,780		91.6		14,417		19.5
Testis	C62		4,120		10.2		140		0.3
Kidney	C64	5,360	9,280	7.5	15.7	2,074	3,280	2.1	4.9
Bladder	C67	4,250	12,220	5.0	18.4	1,897	4,049	1.8	5.7
Central nervous system	C70–C72	3,460	3,970	5.9	7.6	2,816	3,320	4.1	5.9
Thyroid gland	C73	5,280	2,500	11.1	5.1	390	286	0.4	0.4
Hodgkin lymphoma	C81	1,060	1,430	2.4	3.2	143	178	0.2	0.3
Non-Hodgkin lymphoma	C82–C88	8,540	9,830	12.0	16.5	3,152	3,701	3.2	5.4
Multiple myeloma	C90	3,000	3,910	3.8	6.1	1,987	2,243	2.1	3.2
Leukaemia	C91–C95	6,010	7,900	8.6	13.5	3,710	4,542	4.0	6.6
Other cancer sites		11,080	12,400	13.9	20.1	8,474	10,152	9.1	15.3
Total cancer	C00–C97	340,590	381,280	491.3	607.1	105,597	125,128	125.5	189.0
Total cancer ²	C00–C97 w/o C44	233,570	258,520	348.3	422.9	105,219	124,608	125.1	188.3

¹ per 100,000 persons, age-standardised (old European Standard)

² not including non-melanoma skin cancer (C44)

Figure 3.o.1
Most frequent tumour sites as a percentage of all new cancer cases in Germany 2016
 (not including non-melanoma skin cancer)

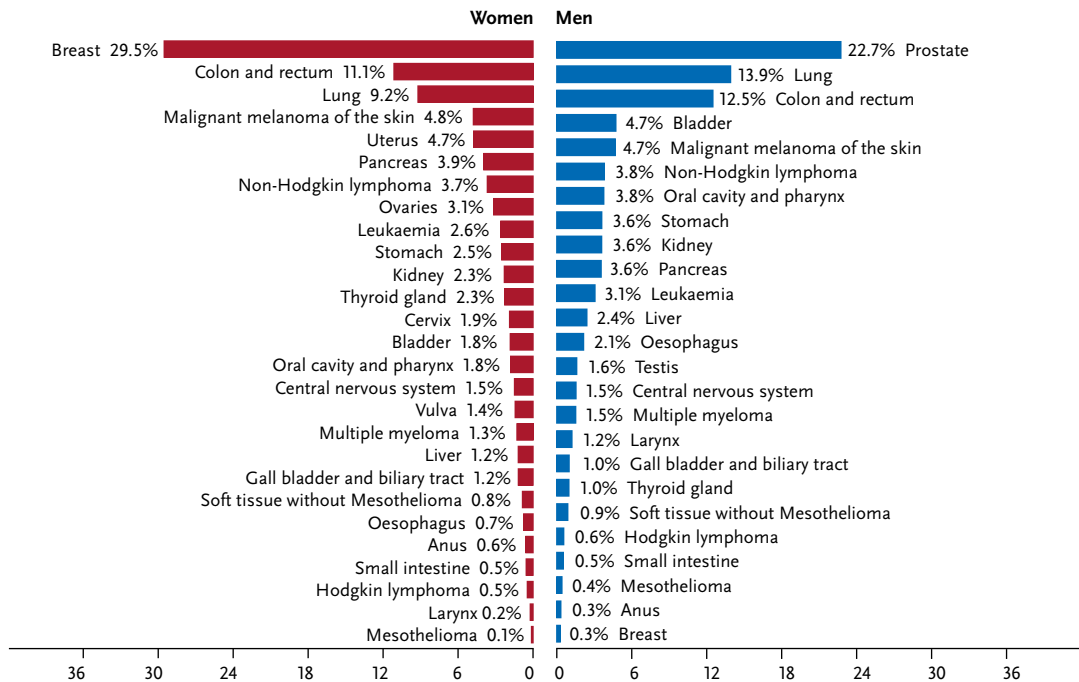
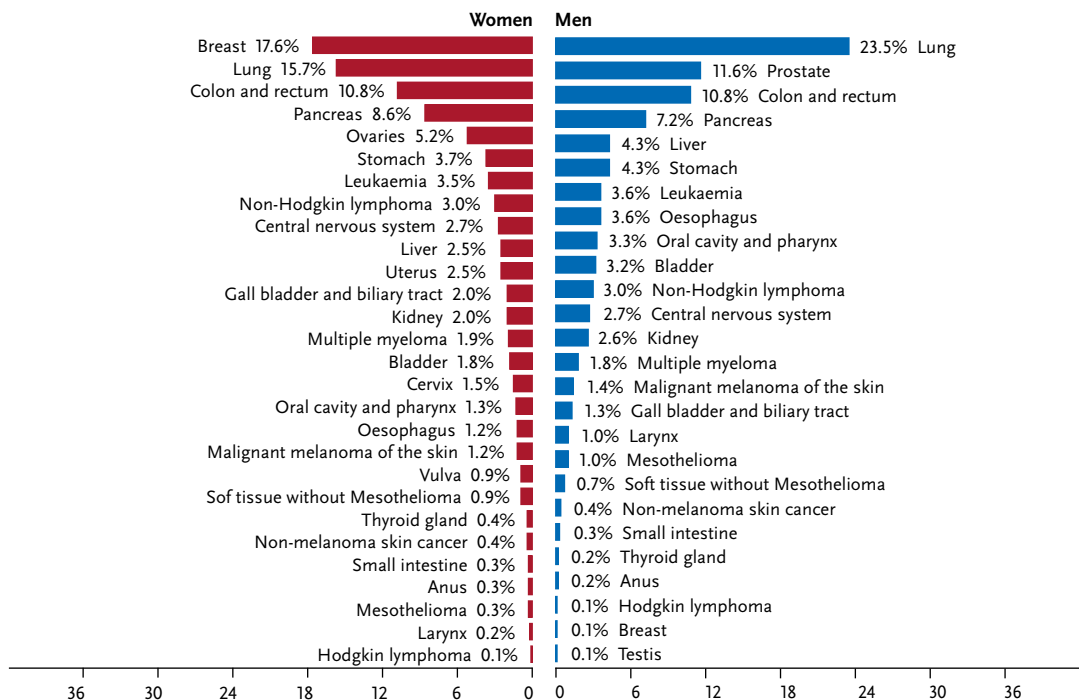


Figure 3.o.2
Most frequent tumour sites when cancer was cause of death in Germany 2016



3.1 All cancer sites

Table 3.1.1
Overview of key epidemiological parameters for Germany, ICD-10 C00–C97 without C44

Incidence	2015		2016		Prediction for 2020	
	Women	Men	Women	Men	Women	Men
Incident cases	235,410	259,320	233,570	258,520	242,260	267,520
Crude incidence rate ¹	567.1	645.5	559.6	636.7	582.8	661.3
Age-standardised incidence rate ^{1,2}	353.0	430.4	348.3	422.9	354.0	414.3
Median age at diagnosis	69	70	69	70		
Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	103,071	122,452	105,219	124,608	104,077	122,603
Crude mortality rate ¹	248.3	304.8	252.1	306.9	248.5	300.7
Age-standardised mortality rate ^{1,2}	124.2	189.1	125.1	188.3	123.0	181.4
Median age at death	76	74	76	75	76	75
Prevalence and survival rates	5 years		10 years			
	Women	Men	Women	Men		
Prevalence	824,800	840,200	1,444,100	1,437,300		
Absolute survival rate (2015–2016)	58	50	47	38		
Relative survival rate (2015–2016)	65	59	61	54		

¹ per 100,000 persons ² age-standardised (old European Standard)

► Additional information under www.krebsdaten.de/cancer-sites

Epidemiology

In this publication, ›all cancer sites‹ refers to all types of malignant neoplasms, including lymphomas and leukaemias. As such, malignant neoplasms, which are tumours that invade the surrounding tissue and spread via the blood and lymphatic systems, are defined in accordance with the International Statistical Classification of Diseases and Related Health Problems (ICD-10, Chapter II). The ICD-10 system divides tumours into benign and malignant neoplasms depending on their growth patterns. However, this differentiation does not always reflect the clinical course followed by a particular condition. Some tumours, such as non-invasive papillary carcinomas of the bladder and certain haematopoietic neoplasms (such as myelodysplastic syndromes) are associated with significantly greater risks and heavier burdens than some other types. These include certain thyroid tumours, which, despite the fact that they are malignant, come with a highly favourable prognosis. Similarly, the dangers associated with neoplasms of the central nervous system are less related to the growth patterns of these tumours than to their localisation. Finally, the division of neoplasms into benign, malignant and tumours with uncertain or unknown behaviour has in some cases changed over time, as is the case with bladder tumours.

This publication follows international conventions by not including non-melanoma skin cancer in the definition of ›all cancer sites‹. Non-melanoma skin cancers occur relatively frequently, but are only responsible for a relatively small number of deaths (see Chapter 3.14).

Although malignant neoplasms can occur in all kinds of organs throughout the body and originate from different cell types, most develop on the internal or external linings of the body (epithelia). Approximately 70 % of tumours are adenocarcinomas and originate in glandular tissue. A further 15 % of tumours are squamous cell carcinomas, malignant tumours of the transitional epithelium (urothelial carcinoma) and small-cell carcinomas, which can occur, for example, in the lungs. Other cancers are leukaemias and lymphomas, which develop in blood-forming bone marrow and lymphoid tissues. Finally, malignant tumours can also originate in the connective and supportive tissues (including sarcomas), in the supporting cells of the nervous system (glial cells) and from pigment-producing cells (melanomas).

The German Centre for Cancer Registry Data (ZfKD) estimates that approximately 492,100 new cases of cancer were diagnosed in Germany in 2016. Of these, approximately 258,500 occurred in men and 233,600 in women. About half of these cases affected

the mammary gland (68,900), the prostate (58,800), the large intestine (58,300) and the lungs (57,500) (Table 3.0.1).

Between 2006 and 2016, the absolute number of new cases of cancer increased by around 2% in men and 5% in women. Nevertheless, this increase was less than would have been expected if age-specific incidence rates among women and men had remained at the level found in 2006 for all cancers. Since the risk of developing nearly all types of cancer increases with age, population aging would currently be expected to lead to an increase in cancer incidence of around 1% per year. If age standardisation is used to account for this demographic change, the cancer incidence rate has actually decreased by 12% among men and 1% among women over the last 10 years. The difference between the sexes is primarily due to contrasting trends in lung cancer and other cancers associated with cigarette smoking (see Chapter 3.12). The favourable developments that have occurred with regard to stomach and colorectal cancer, which have decreased by over 20% within the last 10 years, have also played a significant role in the overall drop in cancer incidence.

Around 1.7 million people living in Germany have been diagnosed with cancer within the last 5 years. It is not possible to provide a precise estimate of the proportion of the population in Germany that has ever developed cancer because cancer registries in most federal states have only existed for less than 20 years. In Denmark, where cancer registries have been operating since the late 1940s, just over 5% of the population currently has or has ever had cancer. Extrapolating these figures for Germany would mean that more than 4 million people in Germany have or have had cancer.

Between 2007 and 2017, age-standardised mortality rates decreased by 12% among men and 5% among women. In 2016, cancer mortality in Germany was 2% higher among women and 6% lower among men than the EU average.

Relative 5-year survival rates measure the survival prospects of people with cancer compared with the general population of the same age and sex. These rates are highly dependent on the type of tumour that a person has and they range from below 20% for malignant tumours of the lungs, liver and pancreas to over 90% for malignant melanomas of the skin, and tumours of the testes and prostate (Figure 3.1.0).

Risk factors and early detection

In many cases, the aetiology of cancer remains unknown; moreover, even when risk factors for a particular cancer are known, it may not always be possible to influence them. Nevertheless, effective prevention strategies can still be put in place for cancers that

affect large numbers of people. The World Health Organization (WHO) estimates that 30 to 50% of all cancers worldwide could be avoided through preventive measures. Similarly, the German Cancer Research Center (DKFZ) estimates that at least 37% of all new cancer cases in Germany are linked to avoidable risk factors or at least risk factors that can indeed be influenced.

Tobacco consumption is the most important avoidable risk factor. Around 19% of annual cancer incidence in Germany is attributable to smoking. Furthermore, observational, epidemiological studies have also demonstrated the impact that obesity and lack of exercise have had on cancer risk for some time. Recent research into metabolic syndrome has partially explained the potential biological mechanisms behind this association. Metabolic syndrome is a chronic ›metabolic imbalance‹ that is characterised by high blood pressure, blood lipid and blood sugar levels. Inflammatory processes in adipose tissue are also suspected of promoting the development of cancer. Alcohol consumption plays an important role among dietary-related risk factors. Observational studies have also identified a low dietary intake of fruit, vegetables and fibre, which is often combined with a high dietary intake of red and processed meat, as a risk factor for several common types of cancer. However, these studies are unable to separate the possible impacts of particular foodstuffs or their individual ingredients from the impact of overall energy balance and other possible factors on cancer risk. Finally, ultraviolet (UV) radiation from sunlight has also been identified as a further avoidable risk factor.

Many people in Germany overestimate the role played by pollutants, food contaminants, environmental factors and workplace pollution in causing cancer. In some individual cases, however, these factors may play a significant role in the development of cancer. Examples include radon and past occupational exposure to asbestos. Radon is a naturally occurring noble gas found in certain regions that is responsible for around 6% of lung cancer cases in Germany. Past occupational exposure to asbestos is associated with pleural and peritoneal mesothelioma. These two conditions have a long latency period, thus, cases are still being diagnosed. Medical procedures such as diagnostic and therapeutic procedures involving exposure to radiation, cytostatic drugs as part of chemotherapy, and hormone therapy, a risk factor for breast cancer in menopausal women, can also increase the risk of cancer in some cases.

Chronic infections have also been identified as risk factors for a number of common cancers, causing about 4% of new cancer cases in Germany. As such, vaccination against and treatment of infections can reduce cancer risk. This includes vaccinations against

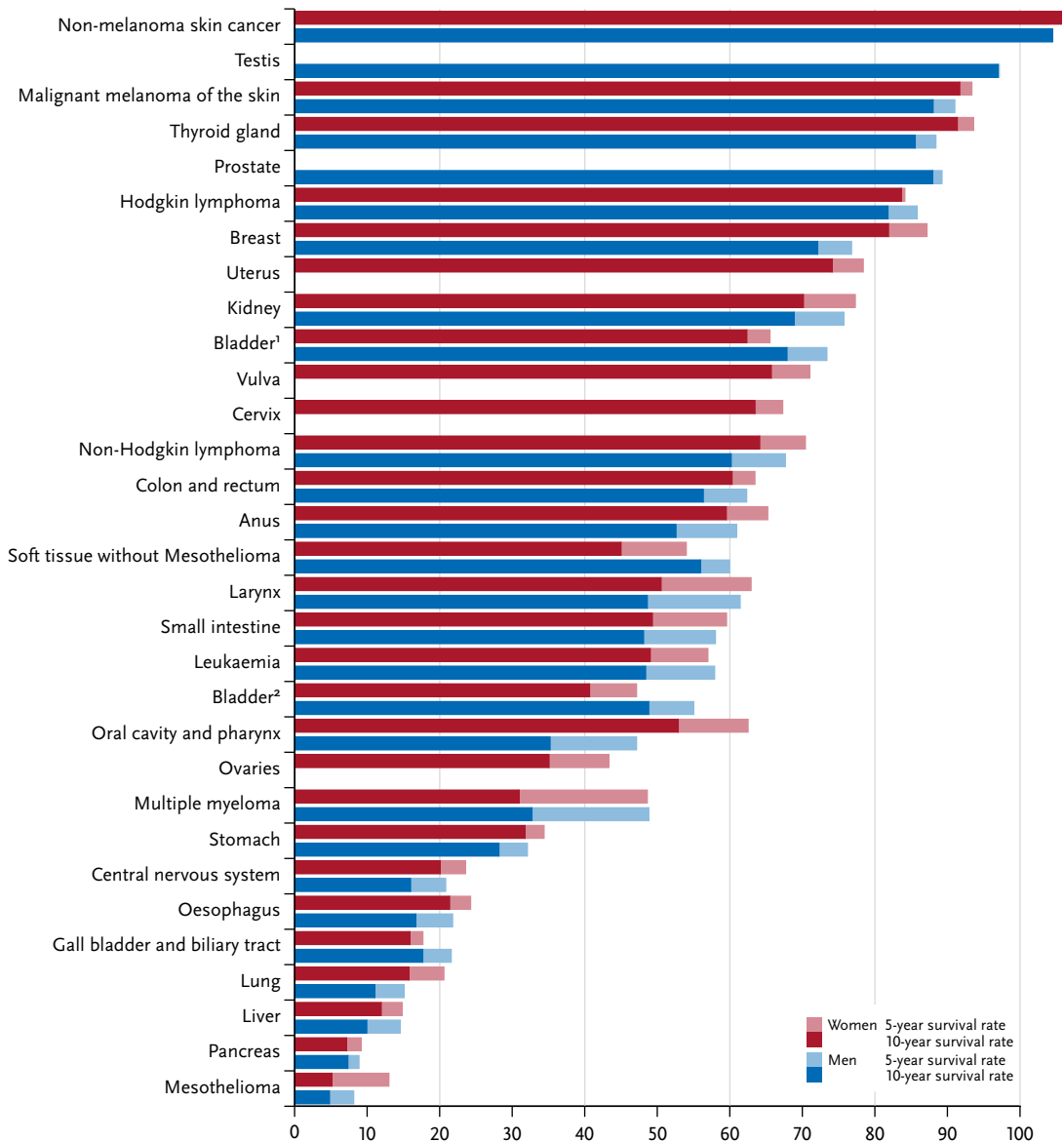
hepatitis B viruses, a protective factor against liver cancer, and vaccination against human papillomaviruses, which is expected to reduce the incidence of cervical carcinoma and tumours of the oropharynx, penis, anus, vulva and vagina. Although these vaccinations can only have an impact if they are taken up by enough young people, studies have already identified a significant reduction in precancerous conditions of the cervix among vaccinated women.

In addition to avoidable risk factors, genetics may also increase the risk of developing cancer. Only a small number of genetic mutations have been clearly

identified as leading to certain types of tumours such as breast, ovarian and colorectal cancer. The relevant risk factors in each case are described in more detail in the individual chapters.

Finally, the cancer screening programmes in Germany that are funded by the statutory health insurers cover malignant tumours of the skin and colon, as well as breast and cervical cancer for women and prostate cancer for men. These programmes are also described in more detail in the respective chapters.

Figure 3.1.0
Relative 5-/10-year survival rates, by tumour sites and sex, Germany 2015–2016 (period analysis)



¹ Including in situ tumours and neoplasms of uncertain or unknown behavior (C67, D09.0, D41.4) ² Invasive forms only (C67)

Figure 3.1.1a
 Age-standardised incidence and mortality rates by sex, ICD-10 C00–C97 without C44, Germany 1999–2016/2017, projection (incidence) through 2020 per 100,000 (old European Standard)

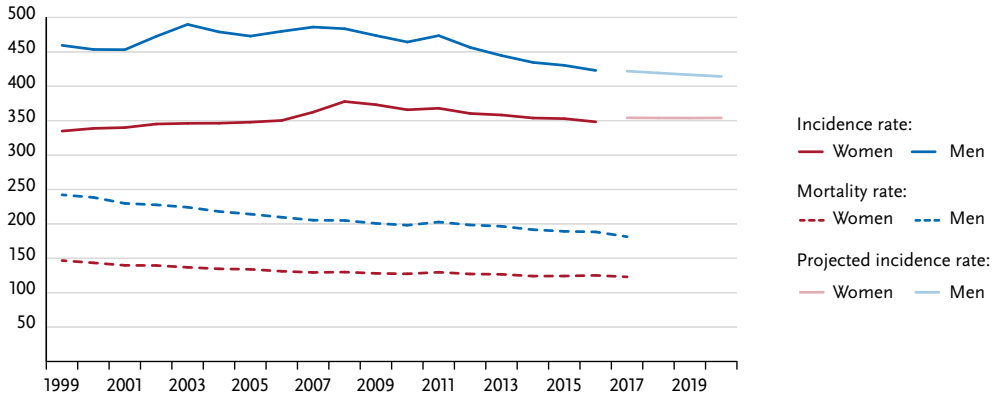


Figure 3.1.1b
 Absolute numbers of incident cases and deaths by sex, ICD-10 C00–C97 without C44, Germany 1999–2016/2017, projection (incidence) through 2020

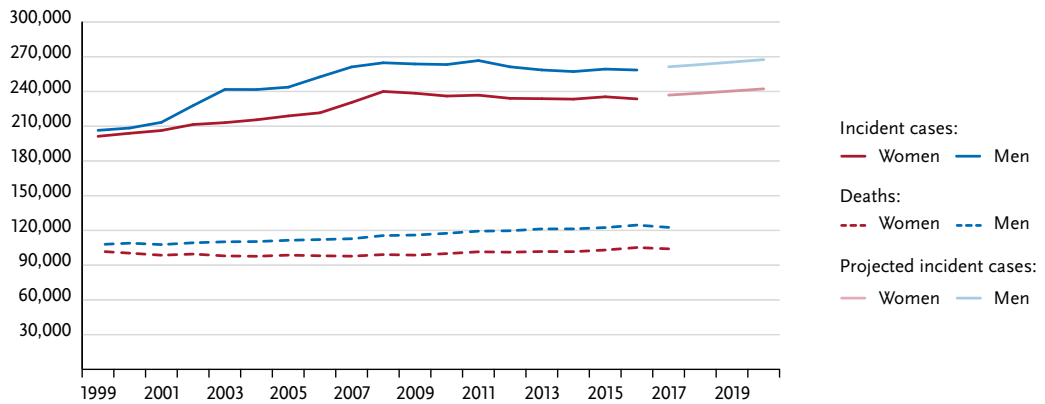


Figure 3.1.2
 Age-specific incidence rates by sex, ICD-10 C00–C97 without C44, Germany 2015–2016 per 100,000

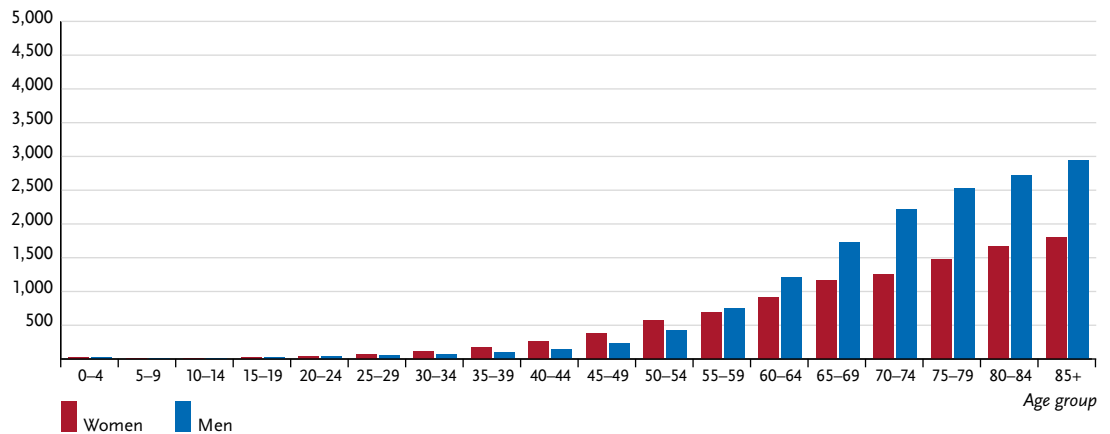


Table 3.1.2
Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C00–C97 without C44, database 2016

Women aged	Risk of developing cancer				Mortality risk			
	in the next ten years		ever		in the next ten years		ever	
35 years	2.2%	(1 in 45)	42.5%	(1 in 2)	0.3%	(1 in 340)	20.9%	(1 in 5)
45 years	4.8%	(1 in 21)	41.4%	(1 in 2)	1.0%	(1 in 100)	20.8%	(1 in 5)
55 years	8.4%	(1 in 12)	38.8%	(1 in 3)	2.7%	(1 in 38)	20.2%	(1 in 5)
65 years	13.0%	(1 in 8)	34.1%	(1 in 3)	4.8%	(1 in 21)	18.5%	(1 in 5)
75 years	16.4%	(1 in 6)	26.2%	(1 in 4)	8.5%	(1 in 12)	15.4%	(1 in 6)
Lifetime risk			42.6%	(1 in 2)			20.7%	(1 in 5)
Men aged	in the next ten years		ever		in the next ten years		ever	
35 years	1.2%	(1 in 82)	48.1%	(1 in 2)	0.2%	(1 in 450)	26.1%	(1 in 4)
45 years	3.4%	(1 in 30)	47.9%	(1 in 2)	1.0%	(1 in 97)	26.2%	(1 in 4)
55 years	9.7%	(1 in 10)	47.3%	(1 in 2)	3.7%	(1 in 27)	26.1%	(1 in 4)
65 years	19.5%	(1 in 5)	44.6%	(1 in 2)	7.5%	(1 in 13)	24.8%	(1 in 4)
75 years	25.9%	(1 in 4)	36.4%	(1 in 3)	13.2%	(1 in 8)	21.7%	(1 in 5)
Lifetime risk			47.5%	(1 in 2)			25.6%	(1 in 4)

Figure 3.1.3
Distribution of UICC-stages at first diagnosis by sex
Not included because UICC-stages are site-specific.

Figure 3.1.4
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C00–C97 without C44, Germany 2015–2016

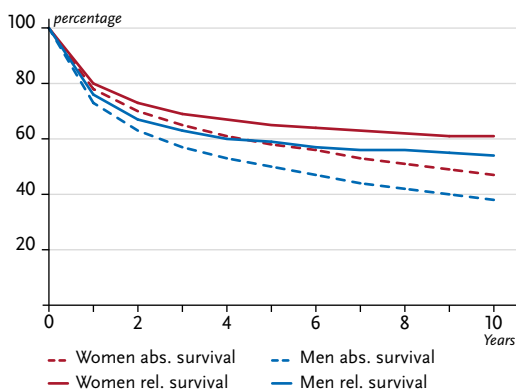


Figure 3.1.5
Relative 5-year survival by UICC-stage and sex, ICD-10 C00–C97 without C44, Germany 2015–2016
Not included because UICC-stages are site-specific.

Figure 3.1.6
 Age-standardised incidence and mortality rates in German federal states by sex, ICD-10 C00–C97 without C44, 2015–2016
 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
 per 100,000 (old European Standard)

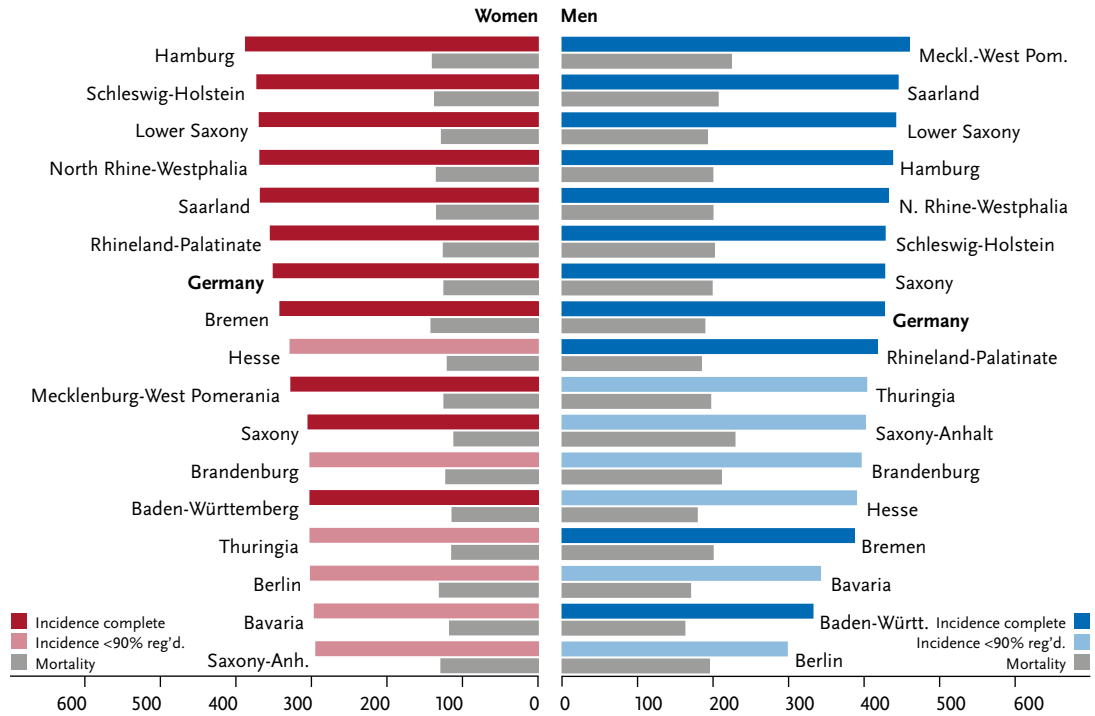
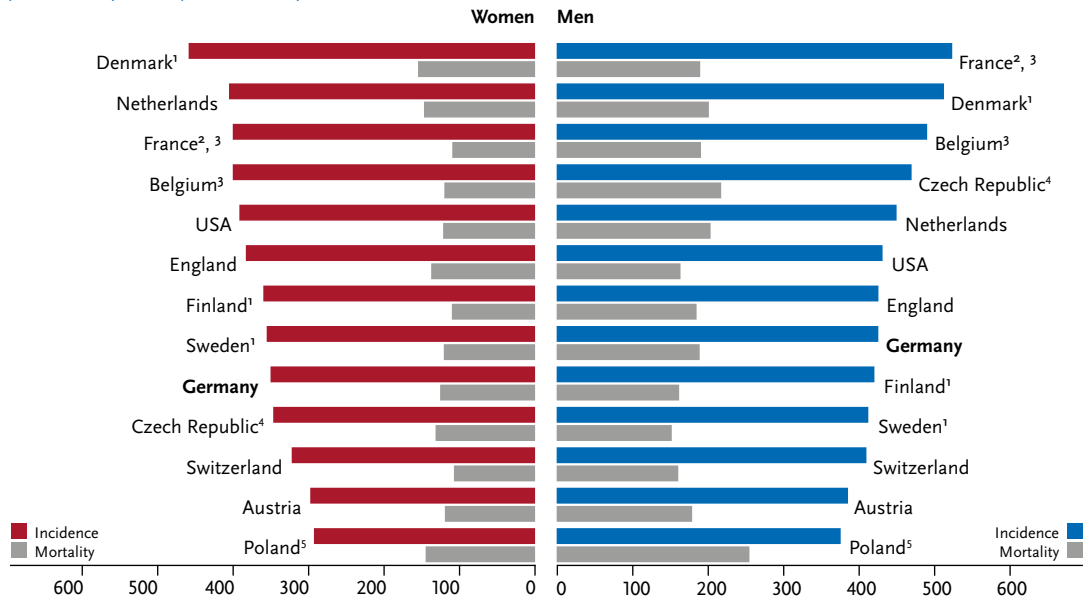


Figure 3.1.7
 International comparison of age-standardised incidence and mortality rates by sex,
 ICD-10 C00–C97 without C44, 2015–2016 or latest available year (details and sources, see appendix)
 per 100,000 (old European Standard)



¹ Data incl. D09.0–1, D30.1–9, D35.2–4, D41.1–9, D32–D33, D42–D43, D44.3–5, D46–D47 but excl. C44 and C46.0
² Projection for 2018, incidence (according to ICD-O-3 topography) for C00 to C80 including haematopoietic and lymphatic neoplasms, excluding non-melanoma skin cancer
³ Data for mortality for C00 to C97
⁴ Data only for 2015
⁵ Data for C00 to C97