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Cancer in Germany 2015/2016

GERMAN CENTRE FOR
CANCER REGISTRY DATA

GEKID

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Preface

The report »Cancer in Germany« is published every two years and is now already in its 12th edition. If one observes the full timeline of the individual reports, beginning in 1997, both a qualitative and a quantitative development becomes apparent. Whereas the early editions could present results only for some cancer types on the basis of individual complete cancer registries, current incidence estimates cover all cancer types and are based on the data of nearly all state cancer registries. The number of pages has increased from an initial 60 pages in A5 format to over 150 larger-format pages. In each of the previous editions of »Cancer in Germany«, the authors of the foreword agreed that cancer registration is an important instrument for drawing attention in the case of rising rates of certain types of cancer, identifying where epidemiological research is needed, revealing prevention potential, describing the effects of established measures and programmes at the population level and thus making an important contribution to public health in Germany. Of course I agree with this. This 12th edition of »Cancer in Germany« is nevertheless a special one: It is being published to mark the 10th anniversary of the entry into force of the Federal Cancer Registry Data Act. Under this law, all German states were obliged to submit their data once a year to the Robert Koch Institute (RKI), to the German Centre for Cancer Registry Data, in order to enable assessments of the state of cancer throughout the entire Federal Republic.

The fact that all German states have now established a nationwide cancer registration system does not mean that the number of new cases of cancer in Germany currently can be determined by adding up the cases reported from the individual states. Case completeness still varies among the individual registries. Therefore, the numbers of new cancer cases published in this report are still based on estimates. This is also due to the logistically extremely complex conversion to clinical cancer registration, which, in addition to the data on new cases and deaths recorded to date, also includes information on therapy and the course of the disease.

The development of cancer registration in Germany is a success story. The clinical cancer registries, in most German states combined with the epidemiological registries, will considerably expand the possibilities for analysing the state of cancer in Germany. More than ever before, cancer registry data are thus the most important source of information on cancer in Germany. In the course of the digitalization of the health care system, other data, including from the statutory health insurance funds, the associations of statutory health insurance physicians and the statistical offices as well as regional information can also be used to complete the picture of cancer in Germany. The central goal of Public Health – »More Health for All« – also means reducing the burden of cancer in the population. In addition to basic, epidemiological and clinical research, the organisation of efficient and quality-assured health care and organised cancer early detection programmes, primary cancer prevention efforts also contribute to this goal. In order to identify progress – but also deficits – in these areas, it is also vital to have data that are comparable at national and regional levels and, as far as possible, also internationally. Together, these sources of information result in a comprehensive cancer surveillance, the central element of which is modern cancer registration. The goal of establishing such a surveillance for cancer and other non-communicable diseases at the Robert Koch Institute is ambitious and requires the networking of all stakeholders. The brochure »Cancer in Germany«, traditionally published by the RKI and GEKID and produced with active contributions from the German Childhood Cancer Registry and the Cancer Information Service at the DFKZ, is a good example of how such cooperation and networking can work.

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1 Population-based cancer registration in Germany

1.1 The aims and purposes of population-based cancer registries

Population-based (epidemiological) cancer registries are used to collect, store, process, analyse and interpret data on cancer incidence, prevalence, survival and, in some cases, treatment in a defined coverage area (such as a federal state). Additionally, data from these registries are indispensable as a basis for conducting detailed studies of the causes of carcinogenesis, for the evaluation of cancer screening programmes and for analysing cancer care in a particular region. Findings from population-based cancer registries include:

Almost 500,000 people are newly diagnosed with cancer in Germany every year.

Population-based cancer registries can provide information on annual cancer incidence – the frequency with which cancer occurs in a given population in a particular year. These statistics are stratified by type of cancer, a person's age and sex, and by other factors. Reliable figures on cancer incidence are essential for assessments of the extent and type of cancer burden that populations are exposed to.

For some years now, a similar incidence of lung cancer in Germany has been identified among women under the age of 45 as among men of the same age.

Reliable studies of time trends in incidence are only possible with data from population-based cancer registries. Consequently, cancer registries play a vital role in health monitoring to identify temporal changes in incidence.

The prevalence of malignant melanoma of the skin differs between regions in Europe and Germany.

Population-based cancer registries can analyse the spatial distribution of cancer and are responsible for monitoring cancers clusters. However, detailed assessments of clusters aimed at developing causal explanations usually require more targeted analytical studies.

In recent years, cancer survival estimates have largely converged in eastern and western Germany.

Population-based cancer registries analyse survival statistics for the cancer patients in their region. Survival rates derived from population-based data are important indicators of the effectiveness of cancer diagnosis, treatment and aftercare. Furthermore, registry data from Germany are also regularly included in large international comparative studies of survival rates.

Between 2015 and 2030, new cancer cases are expected to rise by around 23 % in Germany. This rise will mainly be due to demographics.

Estimates of the future number of new cancer cases play an important role in needs-based health planning, and they can be calculated using data from cancer registries.

Research into the causes of cancer, the evaluation of cancer screening programmes, and healthcare research also rely on data from population-based cancer registries. Studies from these fields focus on answering questions such as:

- What are the causes of childhood leukaemia?
- Do women who receive hormone replacement therapy for menopausal symptoms develop cancer more frequently?
- Are lung cancer rates higher among certain occupational groups?
- Do cancers occur more frequently in the vicinity of oil and gas production facilities?
- Does skin cancer screening lead to a decline in the numbers of advanced tumours in the population?
- Do differences exist in the care provided to oncological patients according to where they live (such as differences between urban and rural areas)?
- How quickly are new or updated healthcare guidelines implemented?

Data from population-based cancer registries enable researchers to study the entire breadth of the cancer cases that have occurred within a particular population. The protection of privacy and patients' rights to informational self-determination, however, mean that robust measures are needed to protect and safeguard personal data. Moreover, legislation is needed at federal-state level to ensure that all epidemiological registries uphold these rights. For certain studies, researchers must acquire the consent of the people affected; this is often the case when additional information must be obtained to supplement the cancer registry data. Such studies that maximise participation generally can provide reliable and robust results. Population-based case-control and cohort studies, for example, use data from population-based cancer

registries to investigate the causes of cancer and the risk of developing the disease.

Data from cancer registries can also be used to conduct research into more detailed and specific issues including:

- Detailed analyses of cancer survival rates
- Studies into quality of life among long-term cancer survivors
- The risk of developing subsequent tumours after surviving a primary tumour
- Evaluations of cancer screening measures, such as mammography and colonoscopy screening
- Studies of the relationship between socioeconomic position and cancer incidence/mortality
- Cooperation with cancer centres, including the assessment of their patients' long-term survival rates

In recent years, cancer survival has become a focus of research using data from population-based cancer registries and is now a key parameter in oncological care. Together with the German Cancer Research Center in Heidelberg, researchers from cancer registries and the German Centre for Cancer Registry Data (ZfKD) have examined cancer survival rates extensively. The results of their research have been published internationally. For the first time, studies have also been conducted into rare tumours in Germany, with findings published on 10-year survival statistics. The researchers have published about 50 papers on this topic and have also compared survival rates in Germany with results from other countries, particularly using data from the SEER registries in the US. Overall, the studies identified very good results for Germany. Nevertheless, the researchers have also found cases, such as breast cancer in women over 75, where the results for Germany were poorer than those for the US. Such differences can have various causes, and in-depth studies can be used to analyse them in more detail.

The evaluation of the organised cancer screening programmes that have been introduced in Germany poses a particular challenge for population-based cancer registries. Data from the registries can be used to demonstrate whether and to what extent screening is leading to the intended decline in advanced-stage cancers in the population. Linking registry data to data from screening programmes can also help show whether mortality is lower among screening participants. Breast cancer screening, which was introduced nationwide in Germany in 2009, is an initial focus in this area. Data from population-based cancer registries are routinely employed to evaluate breast cancer screening (https://fragen.mammo-programm.de/en/), and the findings are used for quality assurance purposes and programme evaluation. The registries are also responsible for identifying interval cancers (the development of breast cancer within two years of a negative screening test result). Initial findings from some federal states have already been published and demonstrate that Germany is meeting the targets set out in the European guidelines.

Cancer registry data are being used to evaluate skin cancer screening. Screening for colorectal and cervical cancer is currently being reorganised according to the Cancer Screening and Registry Act (KFRG). The KFRG calls for the use of cancer registry data in the evaluation of the impact of screening programmes at the population level.

Population-based cancer registries also play a role in the long-term monitoring of the efficacy of the human papillomavirus (HPV) vaccination, which is currently recommended for both girls and boys between the ages of 9 and 14 years. This vaccine aims to reduce all HPV-related cancers and, in particular, is predicted to lead to a significant reduction in the number of new cases of cervical cancer and its precursors among girls.

Population-based cancer registries are also involved in the German National Cohort, a long-term, national health study with 200,000 participants. The cancer registries provide information on the incidence of new cancers among participants who have consented to such data linkage. This supports research into the causes of cancer in a substantial way.

Nationwide coverage of population-based cancer registries is crucial to fulfilling the aims and purposes of cancer registration. Since 2009, nationwide data collection has been established by federal-state law. In addition, the enactment of the 2009 Federal Cancer Registry Data Act (BKRG) and the establishment of the German Centre for Cancer Registry Data at the RKI have provided greater opportunities to analyse anonymous cancer registry data at the national level.

In order to assemble data about individual cancer cases from various sources, data in the cancer registries are recorded in a manner that enables multiple reports to be linked to the same person; this is essential for research purposes.

Reliable studies require a high rate of registry completeness, defined as recoding at least 90 % of all cancers occurring in the population. Therefore, the cooperation of all doctors involved in diagnosis, treatment and aftercare is vital to ensure the quality of data from population-based cancer registries. Patients should also be encouraged to actively participate in cancer registration and can request that their doctors report the relevant data on their illnesses to the respective cancer registry. Doing so enables patients to help improve epidemiological cancer analysis, cancer research and, thus, cancer detection, treatment and aftercare.

1.2 Current developments in cancer registration in Germany

Since 2009, new cancer cases in Germany are systematically reported in accordance with federal-state and national legislation. The 2013 Cancer Screening and Registry Act (KFRG) constituted a further milestone in the development of cancer registration in Germany. In addition to epidemiological cancer registration, the KFRG stipulates that each federal state is to establish an extended system of clinical cancer registration for quality assurance purposes. The resulting registries also record detailed data on treatment and course of the disease. Each federal state in Germany must have established a clinical cancer registry by the end of 2020. Most federal states have already integrated their epidemiological and clinical cancer registries into single institutions.

The establishment of nationwide clinical cancer registration posed major challenges for registries, clinics, practices and doctors. Greatly expanded data collection requirements, not just concerning the primary diagnosis, but also covering the course of the disease – in particular recurrence, progression and changes in treatment – represented new territory for everyone involved. The need to invoice health insurance funds, which cover 90 % of the operating costs of the clinical cancer registries, posed a further hurdle. At the same time, staff had to be recruited and trained, and IT infrastructure adapted. These challenges initially caused delays in data processing in some federal states, and this is reflected in the data pool available for this report (see Chapter 2). By the end of 2019, these problems have been largely overcome. Over the next few years, clinical cancer registration is expected to improve the data available for epidemiological reporting in areas such as the completeness of information on tumour stage.

Population-based cancer registration also receives support from the federal level, as demonstrated by the enactment of the 2009 Federal Cancer Registry Data Act (BKRG) and the establishment of the German Centre for Cancer Registry Data (ZfKD) at the Robert Koch Institute. Since the end of 2011, all regional cancer registries have used a standardised format to provide the ZfKD with pseudonymised data on an annual basis. These data provide the foundation of the analyses undertaken by the ZfKD for this 12th edition of »Cancer in Germany«.

Discussions are currently taking place as to whether and how clinical data on treatment and disease progression can be pooled at the national level. The aim is to enhance health reporting capabilities at the national level as well as to facilitate and improve access to data for research projects spanning multiple regions, such as those in the field of healthcare.

A working group has been established to further standardise cancer registration in Germany and to coordinate the various federal-state regulations. The working group, which includes representatives from all federal states, receives support from the »Platform § 65c«, named after the section of federal code covering clinical cancer registration, which provides experts from the registries. Over the past few years, this platform has assisted with the practical implementation of the KFRG across federal-state borders, sought to develop common registry procedures, set national standards and created synergies in IT implementation. The Association of Population-based Cancer Registries in Germany (GEKID) and the Association of German Tumour Centres (ADT) actively support the platform.

In order to promote further harmonisation and standardisation, GEKID and ADT have published a cancer registration manual that provides detailed guidelines on the collection and analysis of epidemiological and clinical cancer registry data.

Data from the German cancer registries continue to be used at the international level. These data are presented together with those from other European countries on the websites of the European Network of Cancer Registries (ENCR) and the Joint Research Centre (JRC) of the European Commission (see www.encr.eu). The German data can easily be compared with data from other European registries using the European Cancer Information System (ECIS).

Over the last two years, the GEKID, which counts cancer epidemiology researchers in addition to the population-based cancer registries among its members, has continued to focus intensively on improving the use of cancer registry data. Updating GEKID's Interactive Cancer Atlas to reflect current cancer incidence and mortality rates throughout the federal states is just one important result of this work. In addition to data on incidence and mortality, the atlas now provides information about regional cancer survival rates. The atlas can be accessed via GEKID's website at www.gekid.de/home, which provides an inter-active map that can be used to compare data from the federal states for 27 cancer sites.

In addition to presenting cancer registry data, the population-based cancer registries and GEKID have participated in planning and implementing epidemiological cancer research projects. Information on additional projects and recent publications can be found on GEKID's website and in the appendix of this report.

These examples demonstrate that epidemiological cancer registration in Germany is currently shifting away from the mere collection of data towards the

active use of data for scientific research. This development is extremely encouraging because the knowledge gained from such painstakingly collected data would otherwise remain limited if not for their use in scientific investigations. Finally, researchers can also apply to the ZfKD to access the anonymised data compiled by the registries. The number of such applications has continued to increase in recent years. Furthermore, the numerous publications by the cancer registries and the ZfKD represent important contributions to Federal Health Reporting.

The collection of clinical cancer data represents the beginning of a completely new era. In the future, cancer registry data will contribute to comprehensive quality assurance and, increasingly, healthcare research. In turn, this will strengthen the relevance of cancer registries in oncological research and healthcare provision, thus providing further benefits to cancer patients. Overall, the current developments in cancer registration and data use in Germany are favourable and demonstrate considerable potential for the future. Moreover, nationwide clinical cancer registration has placed Germany at the forefront of this field.

1.3 Current priorities of the German Centre for Cancer Registry Data (ZfKD)

The developments in nationwide clinical cancer registration in Germany described above have also had an impact on the ZfKD: far-reaching new responsibilities and duties have led to temporary delays to data processing, which subsequently have resulted in substantially fewer case reports from registries that have otherwise provided many years of robust and reliable data. By the editorial deadline for this report, data from some federal states were only available through 2015 (see Chapter 2.1). Up to that point, the incidence estimation method was predicated on a steady improvement in cancer registration with the goal of transitioning to a pure count of cases in the future. The method was unable to compensate for the temporary underdetection of cases. Therefore, in 2018, the ZfKD postponed publication of new estimates and fundamentally revised the methodology used to estimate incidence (see Chapter 2.2). Nonetheless, the nationwide reorganisation of cancer registration means that the ZfKD's statistics will be based on an improved data pool in the years ahead.

As clinical and epidemiological cancer registration become increasingly integrated, it is important to track the evolution of data quality systematically, thereby promoting the harmonisation of cancer registration in Germany while fostering data usability. This applies not only to the completeness of case and death notification, but also to the completeness and validity of information on diagnoses, including tumour stages and further tumour-related characteristics. In the future, this will also apply to data on the course of disease (including information about recurrence and progression). As the coordinating body for epidemiological cancer registry data, the ZfKD will increasingly undertake comparative analyses to en-sure that data abnormalities are systematically report-ed back to the respective registry.

Over the two years since publication of the previous report, the ZfKD's scientific publication activities have strengthened its work with other institutions. One example is a joint project with the RKI's Social Determinants of Health Unit, which, for the first time, examined the correlation between regional socioeconomic characteristics and cancer incidence across Germany. Further in-depth analyses of this topic are planned for the future. In addition to well-established collaboration with researchers from cancer registries and the German Cancer Research Center (DKFZ), there is increasing demand for cooperation between the RKI and clinicians on scientific publications. These efforts have resulted in publications on rare tumours, such as cholangiocarcinoma. In addition to epidemiological short reports published regularly in the journal »Der Onkologe«, recent scientific publications have also focused on the impact of obesity and HPV infections on cancer incidence, as well as on changes in cancer survival rates since 2002.

Health reporting efforts are focused on the development of new fact sheets and website improvement (www.krebsdaten.de/english). Preparatory work has begun on the second »Report on Cancer Developments in Germany«, which is scheduled for 2021. A particular feature of this series of reports is the analysis of additional data sources and published research in the context of findings from cancer registration. Thus, in addition to epidemiological trends, a wide range of developments, including the fields of oncology care and cancer screening, are identified and discussed in more detail.

Since 2016, the ZfKD has received approximately 10 applications per year for external use of cancer registry data, almost all of which have been approved.

Over the past two years, the ZfKD has also responded to more than 200 inquiries from students, the press, experts, politicians and others from the general public.

The ZfKD's website (www.krebsdaten.de/english) provides information on current projects and activities.

2 Methodological Aspects

2.1 Estimating the completeness of case registration by the epidemiological cancer registries

The utility of population-based data on cancer occurrence largely depends on the level of completeness with which new cancer cases are registered. Since 2010, the German Centre for Cancer Registry Data (ZfKD) has annually estimated the completeness of the data collected by the epidemiological cancer registries in all federal states. This estimate is conducted with the help of an internationally recognized standard indicator: the ratio of mortality to incidence. If there are no significant differences in the survival prospects of cancer patients, for example due to diagnostics or treatment, this ratio (the M/I index) can be assumed to remain largely constant in a particular region for a specific cancer diagnosis. The expected incidence, therefore, is estimated using the M/I index in a reference region (assumed to have complete coverage) and the mortality data from the region being examined. The resulting estimates are then compared with the data reported from the region's registry. These calculations exclude cases that have only been identified via death certificates (DCO cases). The completeness of the data from the reference region is also estimated using this method.

The following criteria were established a number of years ago for the selection of registries for the reference region:

- Comprehensive cancer registration for at least ten years
- An average completeness for total cancers above 90 % over the last ten years and above 80 % for each individual year
- An average of under 15 % DCO cases over the last ten years, excluding the first five years of registration.

These criteria are currently met by Saarland, Hamburg, Schleswig-Holstein and Lower Saxony, as well as by four of the seven registry districts in Bavaria, and the eastern region of North Rhine-Westphalia (Westfalen-Lippe).

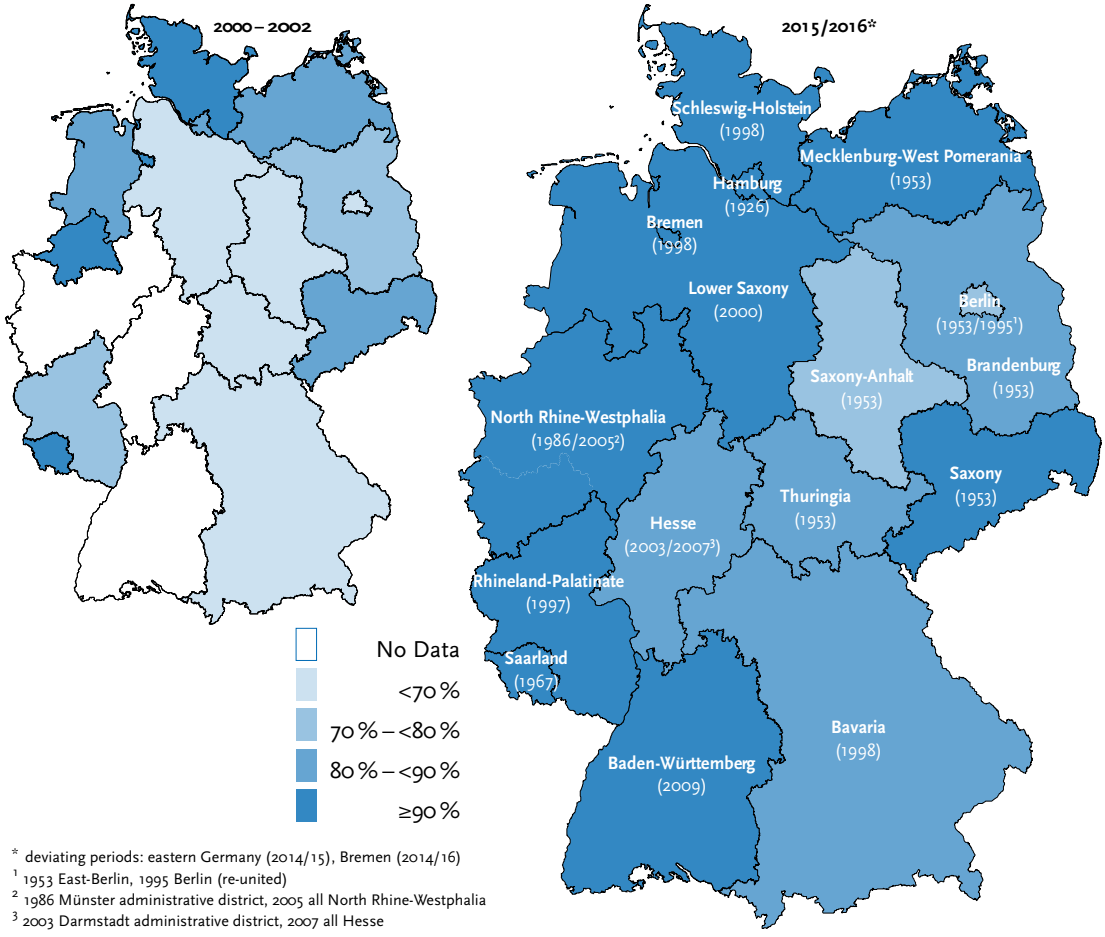
The calculations described above are carried out with data stratified by age group, sex, and 16 or 17 diagnosis groups.

If mortality is particularly low in the area being tested (an average of fewer than five deaths per year), the number of new cases for a particular stratum is estimated using the ratio of incidence to population in the reference region instead of the incidence-to-mortality ratio. Estimated completeness for each diagnosis group is calculated as the ratio of the sum of observed cases to the sum of estimated cases from all age groups for men and women combined. The completeness estimates for »total cancers« are calculated based on the sums of the observed and expected values from all diagnosis groups.

The limitations of this method become apparent particularly when deaths for a certain cancer are either generally low, low in relation to incidence (this applies to testicular cancer, malignant melanoma and thyroid cancer), or if the real ratio of mortality to incidence varies between regions. The latter may be the case, for example, if screening rates differ between federal states or if screening was introduced in different years, as was the case with breast cancer screening. Even a difference in the regional distribution of tumour stages or different cancer subtypes (such as in thyroid cancer) can distort the figures.

Current estimates for the last two available years show that ten federal states achieved an estimated completeness of at least 90 % compared with the reference registries mentioned above; five exceeded 95 % (see Figure 2.1.1). As the Joint Cancer Registry was unable to provide data for 2016 from any of the federal states encompassing former eastern Germany and the city of Berlin, estimates of completeness for these states are based on data from 2014/2015. As most of the 2015 data from Bremen still needs to be processed, data from 2014 and 2016 were used instead. The results published here, therefore, are less robust than those published in the previous issue of »Cancer in Germany«. As described above, the nationwide roll-out of clinical cancer registration and the associated reorganisation of existing registries has led to substantial delays in data processing in some registries. Nevertheless, once the current restructuring phase has been completed, epidemiological reporting will benefit from the nationwide expansion of clinical cancer registration, and the current data gaps for 2015 and 2016 are also expected to be closed.

Figure 2.1.1
Development of the estimated completeness of the population-based cancer registries in Germany 2000 to 2002 and 2015/2016*, by federal state or region (showing start of registration)



* deviating periods: eastern Germany (2014/15), Bremen (2014/16)
[1] 1953 East-Berlin, 1995 Berlin (re-united)
[2] 1986 Münster administrative district, 2005 all North Rhine-Westphalia
[3] 2003 Darmstadt administrative district, 2007 all Hesse

2.2 Estimating cancer incidence in Germany

Since the last issue of »Cancer in Germany«, the circumstances described above have prompted a change in the methods for estimating cancer incidence in Germany. The cancer incidence figures in this report are derived from the results of a mixed Poisson regression model. The model accounts for the respective cancer-specific mortality, population size and year of diagnosis, with variations in incidence between registries modelled as random effects. In order to apply the regression model, data were stratified by sex, registry, diagnosis and age group. The regression model was fitted using data from registries that met the following quality criteria: at least 10 years of operation, an estimated completeness of ≥90 % for »all cancers« for at least five years, and fewer than 15 % DCO cases per year. Data from the first five years of coverage were excluded because they contain a substantial number of DCO cases that correspond to cancers diagnosed before registration began, inclusion of which would result in overestimated incidence. For those federal states that did not meet these criteria for inclusion in the reference region for any diagnosis year (Baden-Württemberg, Berlin, Hesse and Saxony-

Anhalt), incidence was estimated for 2011 to 2013 using the ratio of incidence to mortality in the reference region and the mortality figures in each excluded federal state. These data were then incorporated into the data for the reference region for model fitting. The resulting regression parameters were used to estimate incidence for the various diagnoses and age groups according to the corresponding registry, mortality figures and year of diagnosis. Nationwide incidence was calculated as the sum of these state-specific results. In contrast to the previous procedure, DCO cases were treated in the same manner as regularly reported cases.

Analyses demonstrate that the new model largely compensates for the substantial decline in recorded case numbers as well as for the gaps in the data in some registries. As such, the results appear plausible, particularly with regard to general trends. For diagnosis years 2002 through 2005, the new method resulted in slightly higher estimates, probably because Bavaria and Lower Saxony, both of which have large populations, established their registries during this period.

The estimates for the most recent diagnosis years are based on a more extensive data pool and, therefore, can generally be regarded as more robust than results for earlier years.

Although the incidence of non-melanoma skin cancers (ICD-10 C44) was calculated using the same method, no estimates of completeness are available due to the low mortality associated with this type of cancer. In this case, the reference regions encompassed data from the six federal states used to calculate estimates published in the previous two editions of »Cancer in Germany«: Schleswig-Holstein, Lower Saxony, North Rhine-Westphalia, Saarland, Mecklenburg-West Pomerania (through 2015) and Rhineland-Palatinate. For the first time, this edition presents temporal trends in nationwide incidence of non-melanoma skin cancers in a separate chapter (Chapter 3.14). Due to data limitations, incidence of non-melanoma skin cancers was estimated for a shorter period (2006 to 2016) than for other types of cancer. Furthermore, in line with international conventions, non-melanoma skin cancers are not included in the estimated incidence of »all cancers« (Chapter 3.1).

2.3 Indicators and data presentation

The following provides more information about the statistics, graphs and tables presented in subsequent chapters.

Age-specific rates

Age-specifi c rates were calculated by dividing the number of cancer cases or cancer deaths in a given age group by the corresponding number of women or men from that age group in the population. The graphs depicting these rates demonstrate the relation between age and disease frequency by sex. Age-specific incidence rates are reported as the number of new cases per year per 100,000 residents in a particular age group.

Age-standardised rates

As the age-specific incidence rates in this report demonstrate, cancer risk usually increases substantially with age. Therefore, in order to compare incidence and mortality in different federal states, different regions or within the same region at different times, age standardisation should be used to account for differences in the age structure of these different populations. To this end, the observed age-specific rates are weighted according to the age structure of a (fictitious) »standard population«, and the weighted rates from all age groups are then summed. This results in an age-standardised rate that demonstrates the number of new cases or deaths per 100,000 individuals expected in a population with the age structure of the selected standard population. The »old European standard population« was used to calculate the figures in this report.

Cancer incidence and mortality risks

Age-specific incidence and mortality rates can be interpreted as a measure of the age-specific risk of developing or dying from cancer within a particular year. In order to ensure that this risk is communicated clearly, this report presents the age- and sex-specific risk of developing or dying from cancer within the next ten years or within the remaining expected lifetime. This information is represented both as percentages of age- and sex-specific populations as well as one case per N persons in the corresponding population. These figures also account for »competing risks«, for example, the risk that a 75-year-old man has of dying within the next ten years for reasons other than cancer. The »lifetime risk« – the overall risk of developing cancer throughout a person's lifetime – was calculated in a similar manner. Only the current

rates (incidence, mortality and general life expectancy) are included in these calculations. No prognoses are provided on how these rates may change in the future. In addition, these rates should be treated as average values for the German population; individual risks may differ substantially due to the presence or absence of cancer risk factors. The DevCan software program, developed by the National Cancer Institute in the US, was used to perform the calculations.

International comparison

Current age-standardised incidence and mortality rates from Germany's neighbouring countries as well as from England, Finland, Sweden and the US provide an international context for Germany's cancer statistics. The appendix (Chapter 5.5) lists the sources for these data and whether the data refers to a different calendar period. As the international data were not checked for plausibility or completeness, it is possible that they underestimate rates, particularly regarding incidence. In addition, some countries report slightly different diagnosis groups from those used in this report, thus further limiting comparability (footnotes are provided in these cases).

Average age at diagnosis and death

The median age at cancer diagnosis and death are based on the incidence estimates and the official cause of death statistics available from the Federal Statistical Office. Since these are only available for five-year age groups, an approximation formula was used to calculate the median ages.

Mortality

Cancer mortality was calculated using the annual number of deaths from cancer reported in the official cause of death statistics. These statistics report the underlying cause of death stratified by age group and sex. Mortality rates are calculated as the number of annual deaths per 100,000 residents. This report provides the absolute number of deaths as well as crude and age-standardised mortality rates (using the old European standard population) from 1999 through 2017. The official cause of death statistics are produced by the Federal Statistical Office (www.gbe-bund.de).

Projected cancer incidence in 2020

In order to forecast the number of cases in 2020, current diagnosis-specific incidence rate trends were analysed by sex and age group. The trends were identified using the Joinpoint method, which uses regression models to locate points in time at which statistically significant changes in temporal trends occur (»joinpoints«). The projection was produced by extrapolating the average annual change since the last joinpoint to the year 2020. The resulting age- and sex-specific rates for 2020 were converted into absolute numbers using population figures from the 13th coordinated population projection (variant 4) produced by the Federal Statistical Office. Current trends in prostate cancer and in breast cancer among women aged 50–74 are strongly influenced by use of screening tests (Mammography screening for breast cancer and the PSA-test for prostate cancer). Therefore, it is unrealistic to expect current trends for these diagnoses to continue into the year 2020. Instead, age-specific incidence was assumed to remain constant in these cases, and projections of incident cases between 2016 and 2020 consider only the effects of demographic change.

Regional comparison

Age-standardised mortality rates (old European standard population) for 2015 and 2016 by federal state are presented in graphs alongside nationwide mortality rates. Age-standardised incidence rates for 2015 and 2016 are also depicted by federal state and are based on the number of recorded cases. For comparison, the graphs show corresponding nationwide incidence estimates for Germany. As stated in Chapter 2.1, different periods have been used to depict incidence in the federal states in eastern Germany, Berlin, and Bremen. Incidence from states with estimated completeness below 90 % (< 80 % for malignant melanomas and < 70 % for thyroid cancer) are shown with more lightly coloured bars.

Crude rates

Crude incidence and mortality rates are calculated by dividing the total number of new cancers in a given period (incidence) or the number of deaths from cancer (mortality) by the total number of women or men in the respective population (in this case, Germany's resident population). The result is given as the number of cases or deaths per 100,000 residents per year. In contrast to the age-standardised rate, this rate is strongly dependent on a population's age structure.

Survival rates

This report describes the average survival rate beginning at cancer diagnosis for those 15 years and older at diagnosis. Absolute and relative survival rates up to 10 years after diagnosis are reported. Absolute survival rates represent the proportion of patients who are still alive at a particular time after diagnosis. An

absolute 5-year survival of 80 %, for example, means that 80 out of 100 people with a specific cancer were still alive five years after diagnosis.

Relative survival rates, on the other hand, provide an estimate of how much the cancer diagnosis impacts survival. These are calculated as the ratio of absolute survival among cancer patients to the expected survival rate in the general population of the same age and sex. A relative 5-year survival rate of 100 %, for example, means that during the first five years after diagnosis, the same number of deaths occurred among people with cancer as would be expected in a similar population without cancer. Relative survival rates are always higher than absolute survival rates. Expected survival rates were calculated using the Ederer II method and are based on data from the life tables published by the Federal Statistical Office.

Predetermined quality criteria were fulfilled by the registries in Hamburg, Lower Saxony, Brandenburg, Mecklenburg-West Pomerania, Saxony, Thuringia, Saarland and the administrative district of Münster (North Rhine-Westphalia). Data from these regions were included for the calculation of current survival rates.

Relative 5-year survival rates by tumour stage (and sex) are reported here for the first time. Data from the registries stated above – with the exception of Saarland – were used for these calculations. Survival analyses were stratified by other factors for certain diagnoses, such as leukaemias and lymphomas.

The period method was used to ensure that estimates of survival were as up-to-date as possible. This method takes into account the survival of people alive during a certain period of time (in this case, between 2015 and 2016).

The given ranges of 5- and 10-year survival represent the lowest and highest cancer survival estimates from the regions included in the calculations. Only those regions with a standard error for estimated survival of less than 7.0 were considered for determining the range. No range is reported when this criterion was met by less than four regions. Current findings suggest that only a small amount of the variance indicated by this range is due to differences in quality of care. In addition to random fluctuations, differences in data quality and proportion of DCO cases may play a larger role in these differences, especially in smaller federal states. Furthermore, methodological differences between the registries can also have an impact on the results; this particularly applies to DCO follow-back, which was not undertaken by all registries. 10-year survival rates are based on substantially smaller case numbers than 5-year survival rates. For this reason, registry-specific 10-year survival rates show a greater level of statistical uncertainty than 5-year survival rates. As a result, in some cases, the values within the range of relative 10-year survival rates may be slightly above the corresponding values for 5-year survival.

Overall, the estimated survival rates in Germany, at least in the case of cancers with unfavourable prognoses, may be slightly overestimated, although this is probably the case with most results that have been published internationally.

Tumour stage distribution

The extent of solid malignant tumours diagnosed between 2015 and 2016 as well as survival by cancer stage were assessed using the TNM classification (7th edition). UICC stages (I to IV) are presented in this publication for the first time. In addition to the size or extent of a primary tumour (T), these figures also take into account lymph node status (N) and any distant metastasis (M). The UICC stages were assigned using the SEER TNM Registrar Staging Assistant (version 1.9) (https://staging.seer.cancer.gov/tnm/home/1.9/). Missing information for M was treated as M0 (no metastases), whereas missing information for N generally resulted in no reported UICC stage. To evaluate incidence by stage, data from all registries except Saarland were used.

5- and 10-year prevalence

The 5-year and 10-year prevalence estimates reflect the number of people alive at a particular time (in this case, 31 December 2016) who had developed a new case of cancer within the previous five (or ten) years, i.e., between 2012 (or 2007) and 2016. Prevalence estimates (by age, sex, cancer type and calendar year) were calculated from nationwide incidence estimates using the Pisani method, with absolute survival rates calculated using the Kaplan-Meier method with data from the regions listed under »survival rates«.

Additional analyses

Additional analyses are available for some cancer sites in this report and on the website of the German Centre for Cancer Registry Data (www.krebsdaten.de/english). These include figures on histology and more precise tumour sites. Unless otherwise stated, these evaluations are based on data from all registries.

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

		No. of incident cases		Incidence rate[1]		No. of deaths		Mortality rate[1]	
Cancer site	**ICD-10**	**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 3.0.1
Most frequent tumour sites as a percentage of all new cancer cases in Germany 2016
(not including non-melanoma skin cancer)

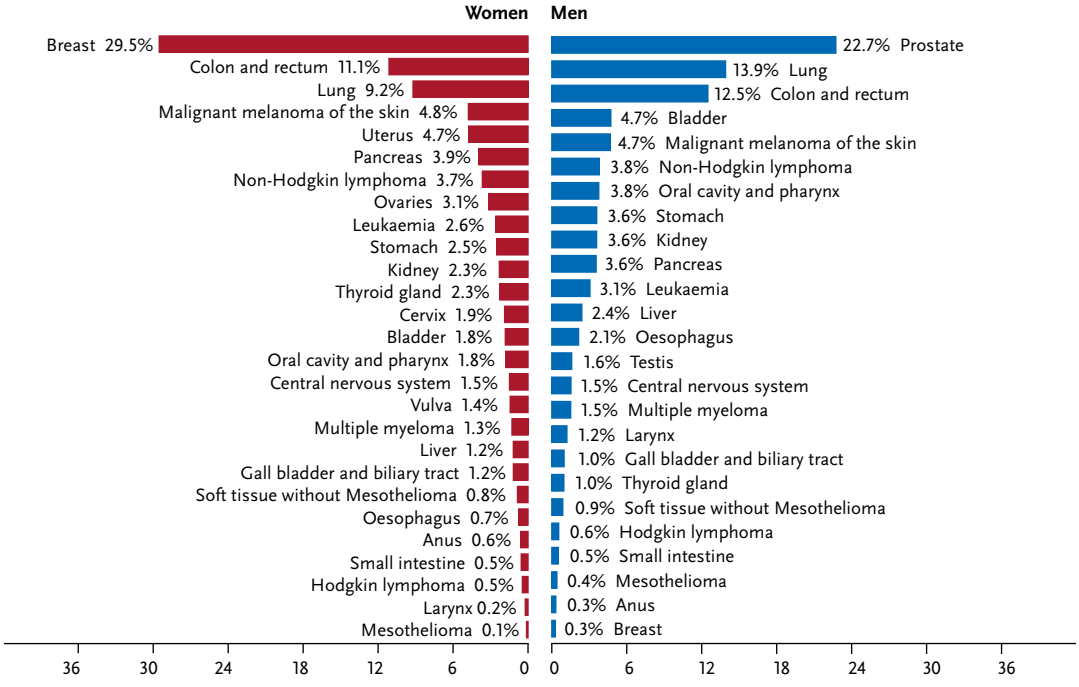
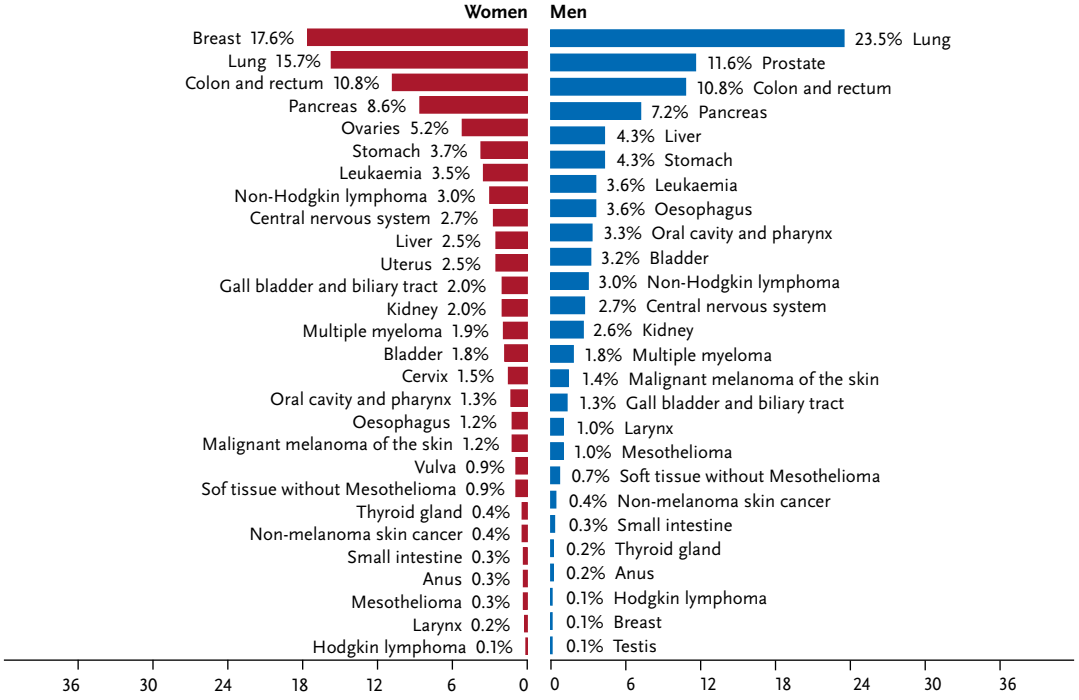


Figure 3.0.2
Most frequent tumour sites when cancer was cause of death in Germany 2016



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.

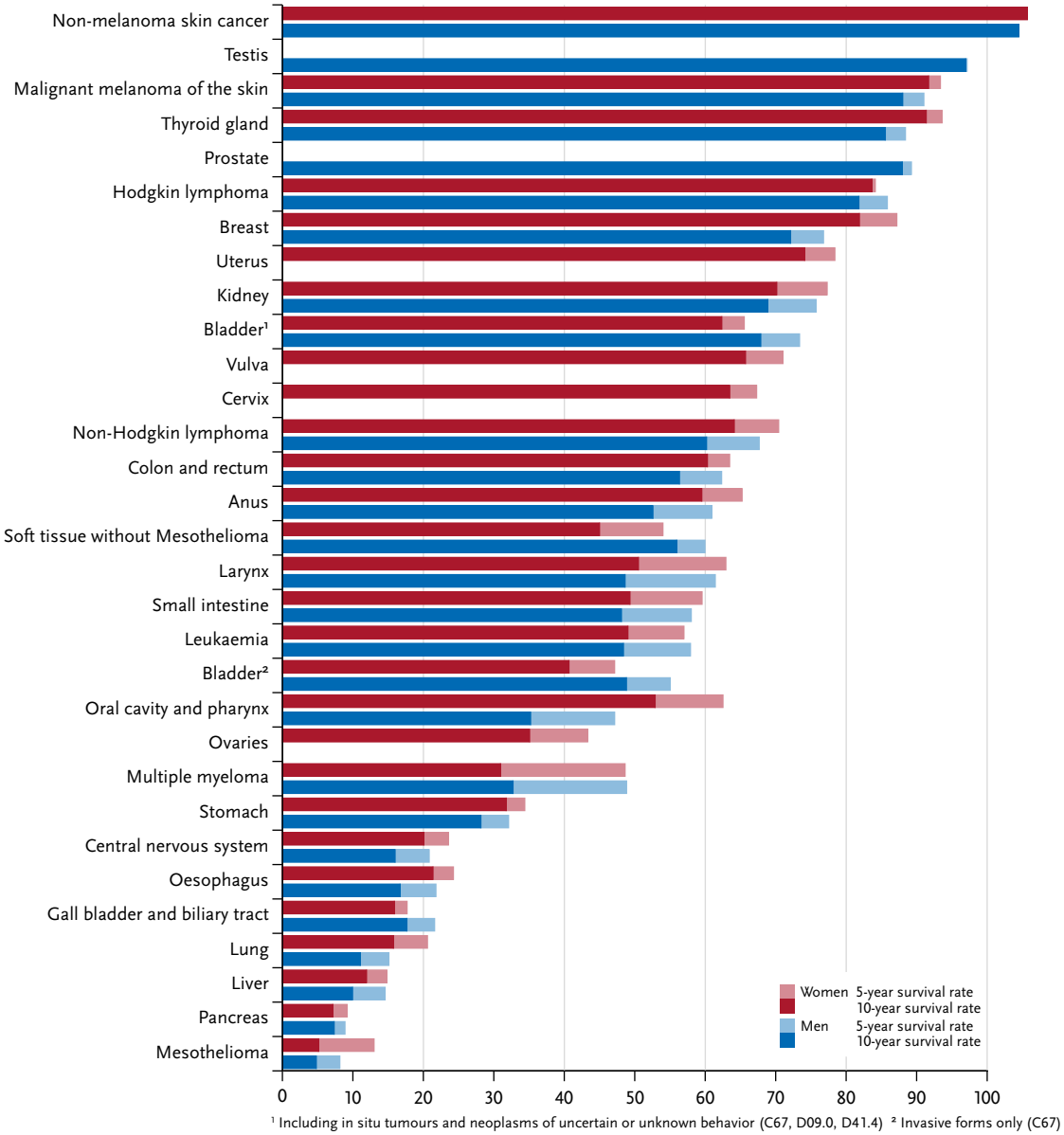
Chronic infections have also been identified as risk factors for a number of common cancers, causing about 4 % of new cancer cases in Germany. As such, vaccination against and treatment of infections can reduce cancer risk. This includes vaccinations against

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)

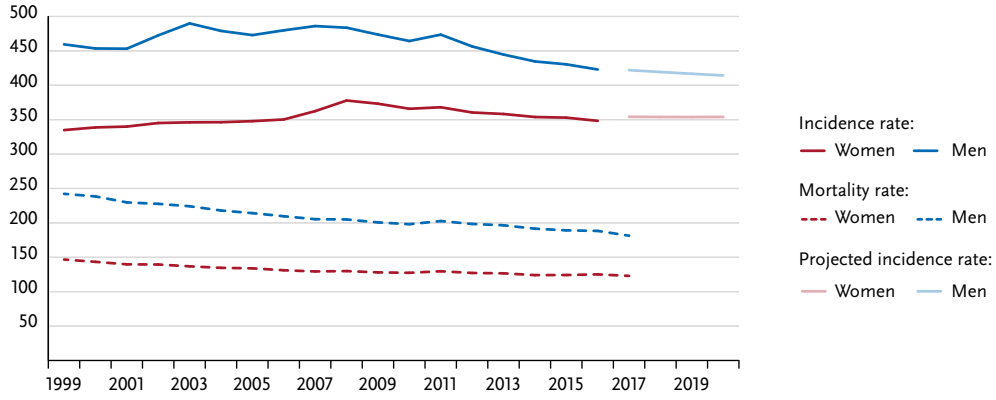


Figure 3.1.1b
Absolute numbers of incident cases and deaths by sex, ICD-10 C00–C97 without C44, Germany 1999–2016/2017, projection (incidence) through 2020

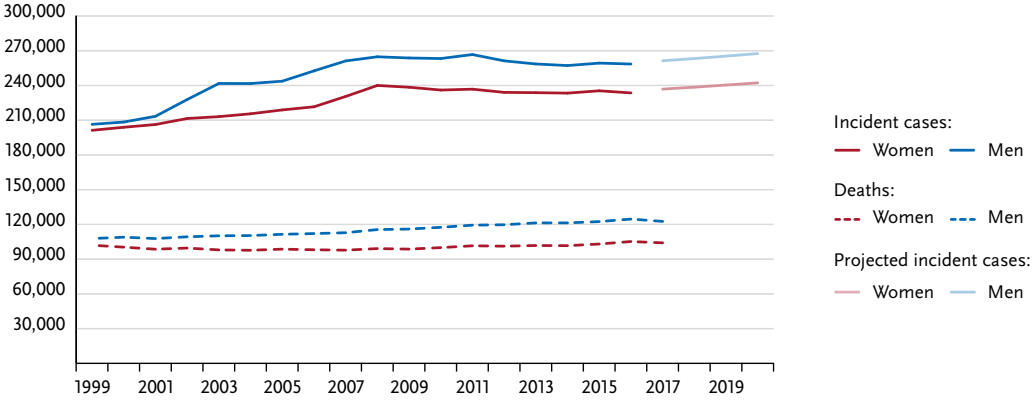


Figure 3.1.2
Age-specific incidence rates by sex, ICD-10 C00–C97 without C44, Germany 2015–2016
per 100,000

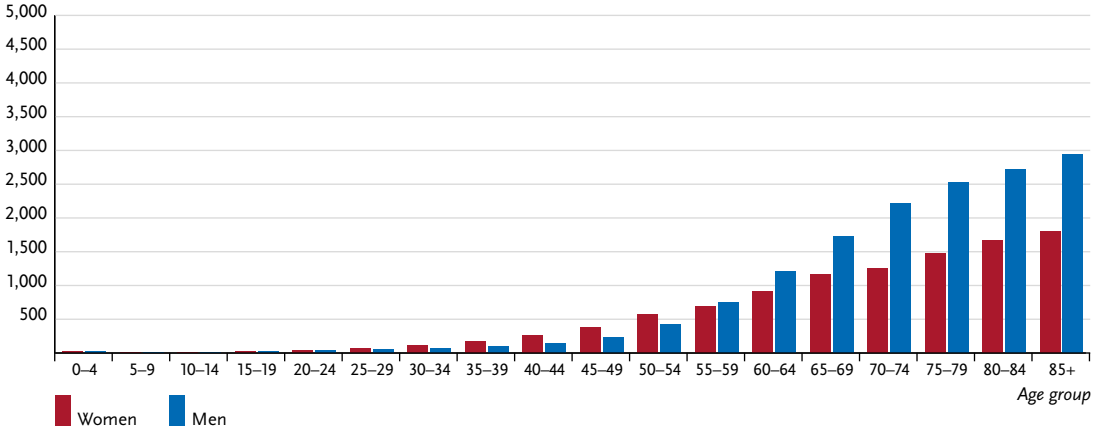


Table 3.1.2
Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C00–C97 without C44, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**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 in12)	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

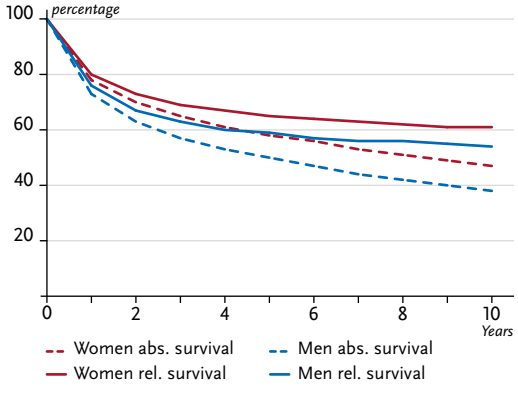


Figure 3.1.5
Relative 5-year survival by UICC-stage and sex, ICD-10 C00–C97 without C44, Germany 2015–2016
Not included because UICC-stages are site-specific.

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)

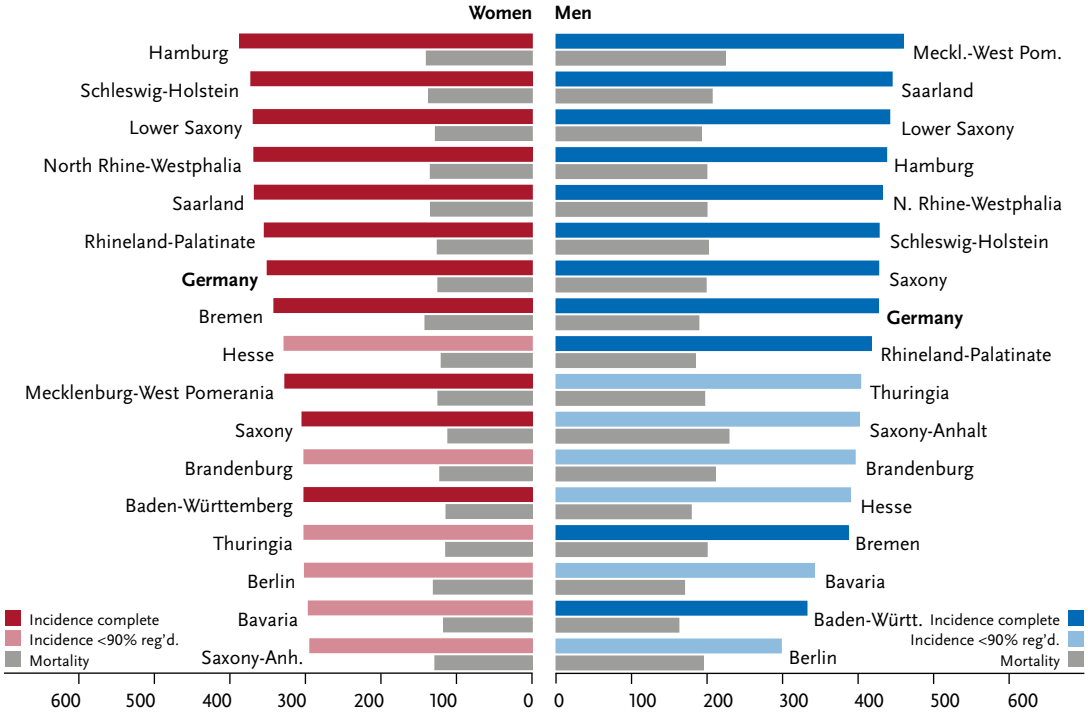
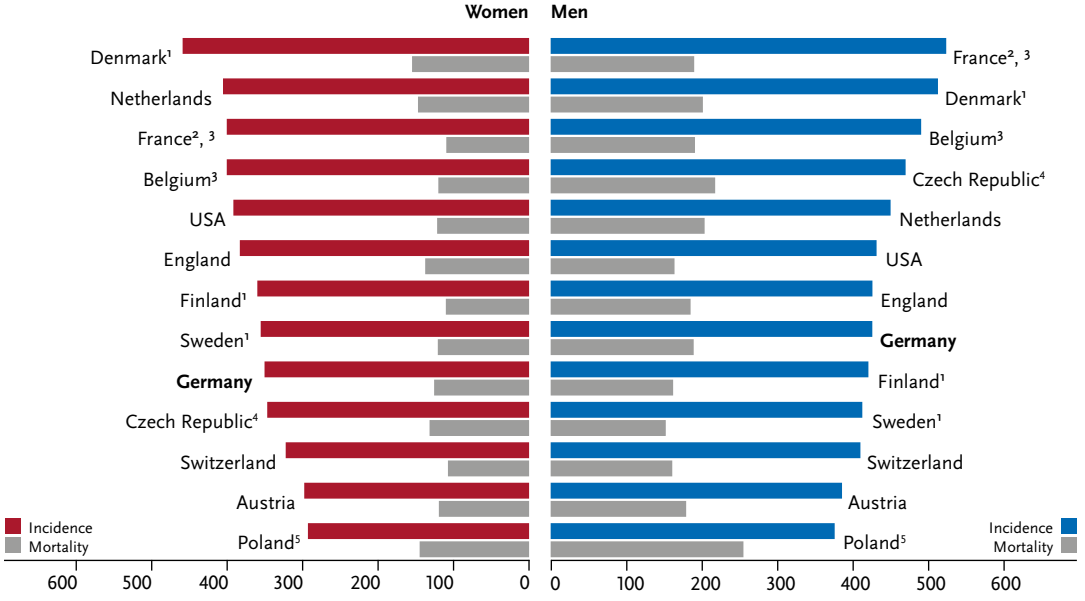


Figure 3.1.7
International comparison of age-standardised incidence and mortality rates by sex, ICD-10 C00–C97 without C44, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



[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

3.2 Oral cavity and pharynx

Table 3.2.1
Overview of key epidemiological parameters for Germany, ICD-10 C00–C14

Incidence	2015		2016		Prediction for 2020	
	Women	Men	Women	Men	Women	Men
Incident cases	4,310	9,620	4,180	9,720	4,600	9,200
Crude incidence rate[1]	10.4	23.9	10.0	23.9	11.1	22.8
Age-standardised incidence rate[1,2]	6.8	17.8	6.5	17.6	6.9	15.9
Median age at diagnosis	65	62	66	63		

Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	1,378	4,086	1,387	4,070	1,402	3,963
Crude mortality rate[1]	3.3	10.2	3.3	10.0	3.5	9.7
Age-standardised mortality rate[1,2]	1.9	7.2	1.8	7.0	1.8	6.7
Median age at death	71	65	72	66	72	66

Prevalence and survival rates	5 years		10 years	
	Women	Men	Women	Men
Prevalence	15,000	31,900	24,400	51,700
Absolute survival rate (2015–2016)[3]	56 (52–60)	42 (39–46)	42 (36–55)	28 (25–31)
Relative survival rate (2015–2016)[3]	63 (58–68)	47 (42–50)	53 (44–69)	35 (30–38)

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

Cancers of the oral cavity and pharynx belong to a heterogeneous group of malignant neoplasms. In terms of their histology, around 87 % are squamous cell carcinomas, with around 4 % of cases developing as adenocarcinomas, particularly of the salivary glands. These cancers occur more often and, on average, three years earlier among men (at age 63) than among women (at age 66). Between 1999 and 2011, age-standardised incidence rates increased among both women and men. Since 2011, however, these rates have remained almost constant for women and have even declined among men. In contrast, mortality rates decreased slightly over the entire period among men and have remained almost unchanged for women.

Overall, women have a higher relative 5-year survival rate (63 %) compared with men (47 %). This difference is due to the fact that a lower proportion of women develop cancer of the mouth, tongue and throat than men, as these conditions are linked to alcohol and tobacco consumption. Importantly, these tumours are associated with a lower survival rate compared with, for example, malignant tumours of the lips and salivary glands. Similarly, UICC cancer staging data, which is available in around 70 % of cases, indicates that more than one in four or five of these tumours is diagnosed at an early stage among women (stage 0/1), whereas only one in every seventh case is identified at a similar stage among men.

Risk factors

Tobacco use and alcohol consumption are the most important risk factors associated with cancer of the oral cavity and pharynx. Moreover, the combination of these risk factors increases risk much more than the sum of their individual effects. Infection with human papillomavirus (HPV), especially with ›high risk‹ viruses, represents a further important risk factor. HPV infections are particularly associated with cancer of the throat (pharynx), and, albeit much less frequently, with cancer of the oral cavity. Infection with Epstein-Barr viruses and a high dietary intake of food containing nitrosamines (such as salted fish) are known risk factors associated with nasopharyngeal carcinoma. Furthermore, exposure to sunlight can contribute to carcinoma of the lips, and there are indications that a vitamin-deficient diet combined with a high intake of red meat and fried food increases the risk of cancer of the oral cavity and pharynx. Similarly, a number of rare pre-existing conditions increase the risk of cancer of the oral cavity and lips. A genetic predisposition to the development of carcinomas in the head and neck area also seems to play a role, since familial clusters have also been observed.

Figure 3.2.1a
Age-standardised incidence and mortality rates by sex, ICD-10 C00–C14, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

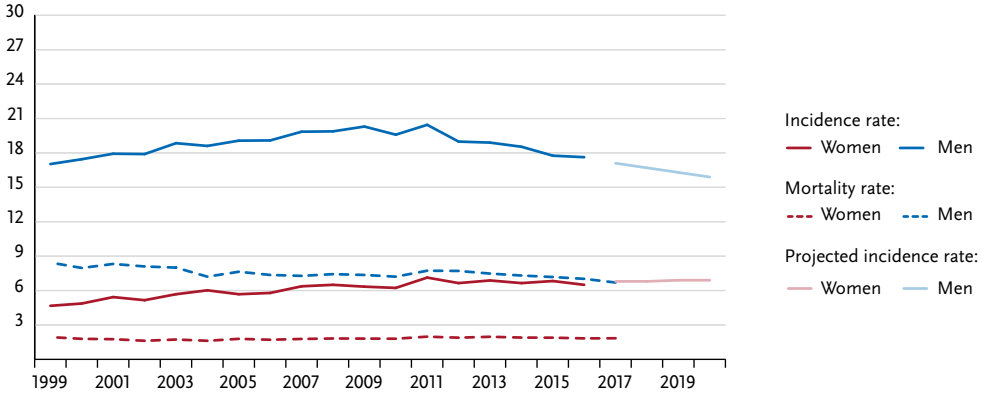


Figure 3.2.1b
Absolute numbers of incident cases and deaths by sex, ICD-10 C00–C14, Germany 1999–2016/2017, projection (incidence) through 2020

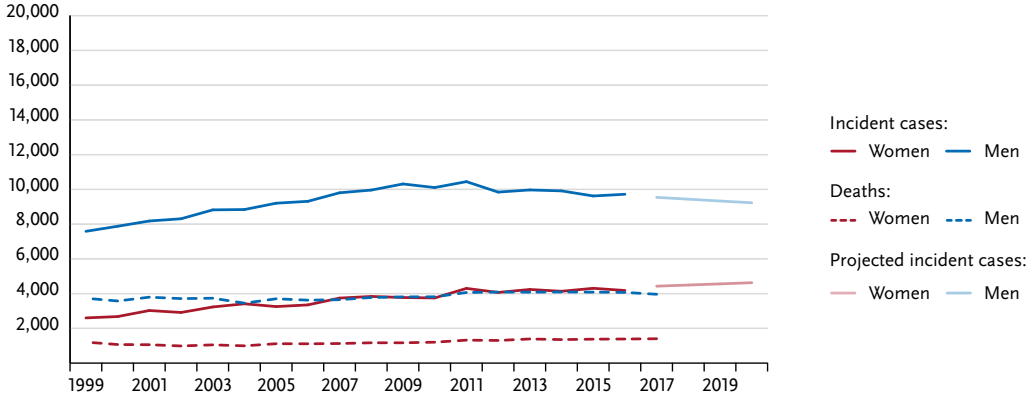


Figure 3.2.2
Age-specific incidence rates by sex, ICD-10 C00–C14, Germany 2015–2016
per 100,000

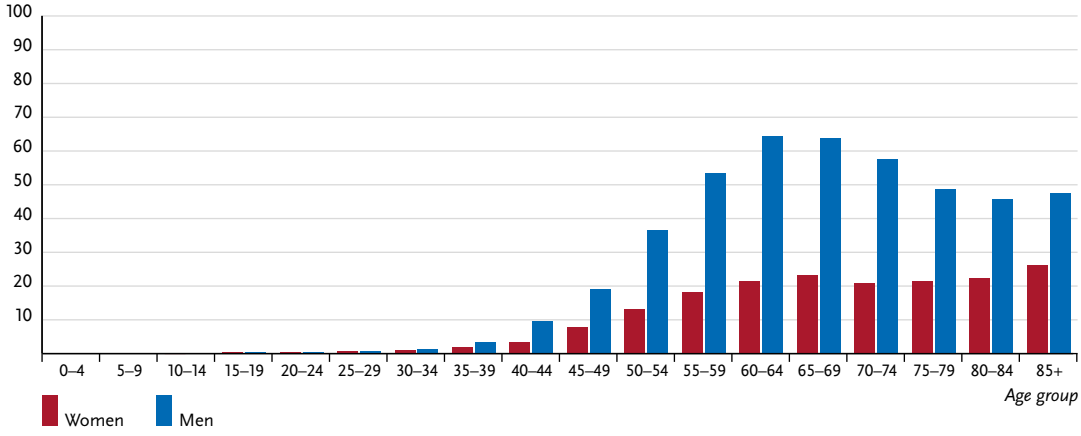


Table 3.2.2
Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C00–C14, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1%	(1 in 3,500)	0.7%	(1 in 130)	< 0.1%	(1 in 27,800)	0.3%	(1 in 370)
45 years	0.1%	(1 in 1,000)	0.7%	(1 in 140)	< 0.1%	(1 in 6,400)	0.3%	(1 in 370)
55 years	0.2%	(1 in 540)	0.6%	(1 in 160)	0.1%	(1 in 2,000)	0.3%	(1 in 390)
65 years	0.2%	(1 in 480)	0.5%	(1 in 210)	0.1%	(1 in 1,300)	0.2%	(1 in 460)
75 years	0.2%	(1 in 530)	0.3%	(1 in 330)	0.1%	(1 in 1,100)	0.2%	(1 in 620)
Lifetime risk			0.7%	(1 in 130)			0.3%	(1 in 380)
Men aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	0.1%	(1 in 1,500)	1.7%	(1 in 59)	< 0.1%	(1 in 9,400)	0.8%	(1 in 130)
45 years	0.3%	(1 in 360)	1.6%	(1 in 61)	0.1%	(1 in 1,300)	0.8%	(1 in 130)
55 years	0.5%	(1 in 180)	1.4%	(1 in 70)	0.2%	(1 in 440)	0.7%	(1 in 140)
65 years	0.6%	(1 in 180)	1.0%	(1 in 100)	0.3%	(1 in 360)	0.5%	(1 in 190)
75 years	0.4%	(1 in 260)	0.5%	(1 in 190)	0.2%	(1 in 450)	0.3%	(1 in 310)
Lifetime risk			1.7%	(1 in 60)			0.7%	(1 in 130)

Figure 3.2.3
Distribution of UICC-stages at first diagnosis by sex, ICD-10 C00–C14, Germany 2015–2016
(top: all cases; bottom: only valid reports)

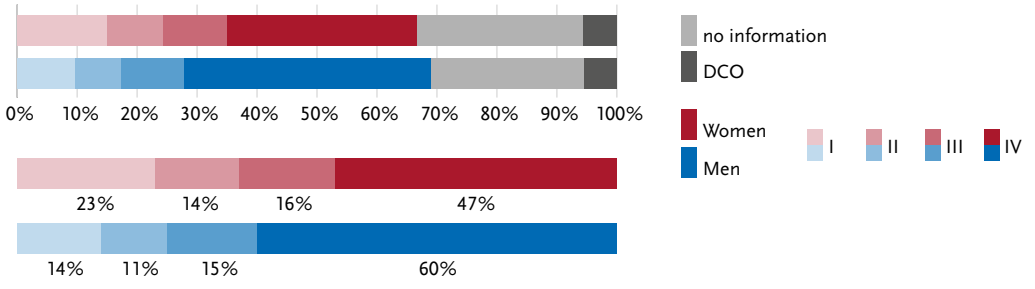


Figure 3.2.4
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C00–C14, Germany 2015–2016

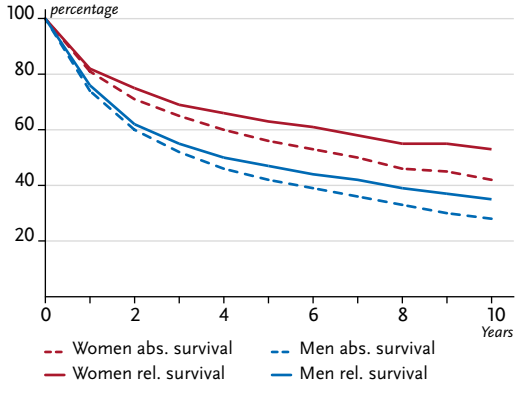


Figure 3.2.5
Relative 5-year survival by UICC-stage and sex, ICD-10 C00–C14, Germany 2015–2016

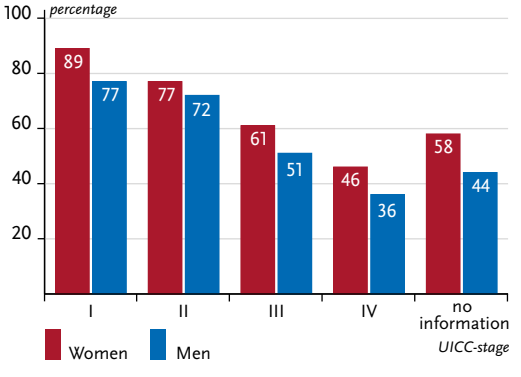


Figure 3.2.6
Age-standardised incidence and mortality rates in German federal states by sex, ICD-10 C00–C14, 2015–2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

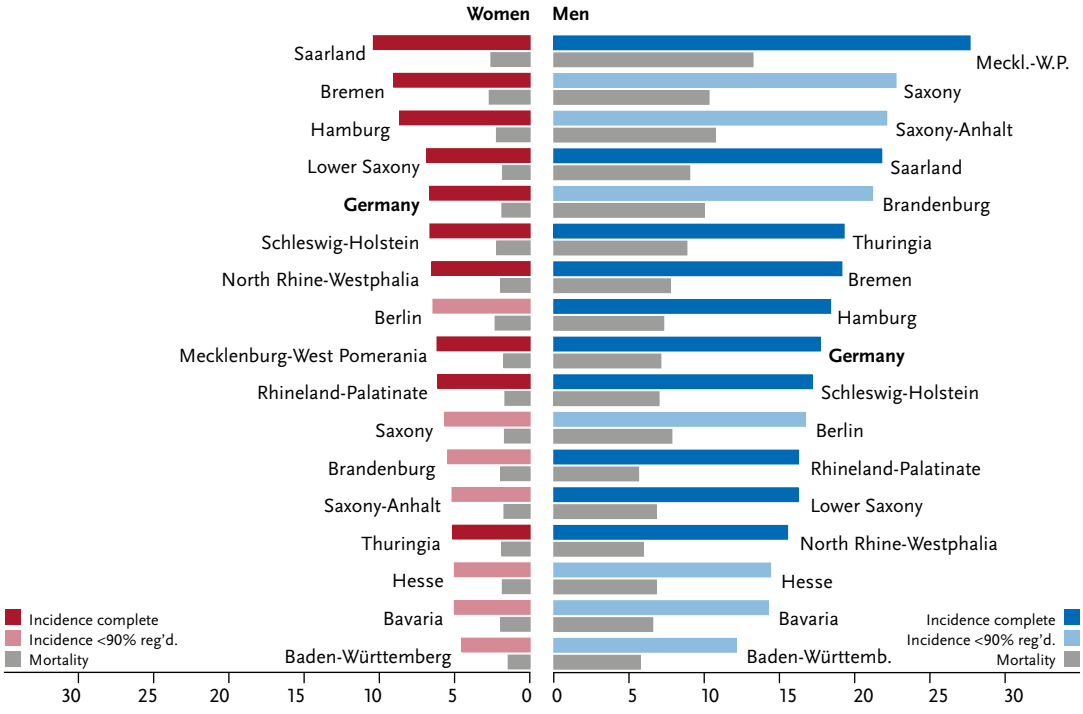
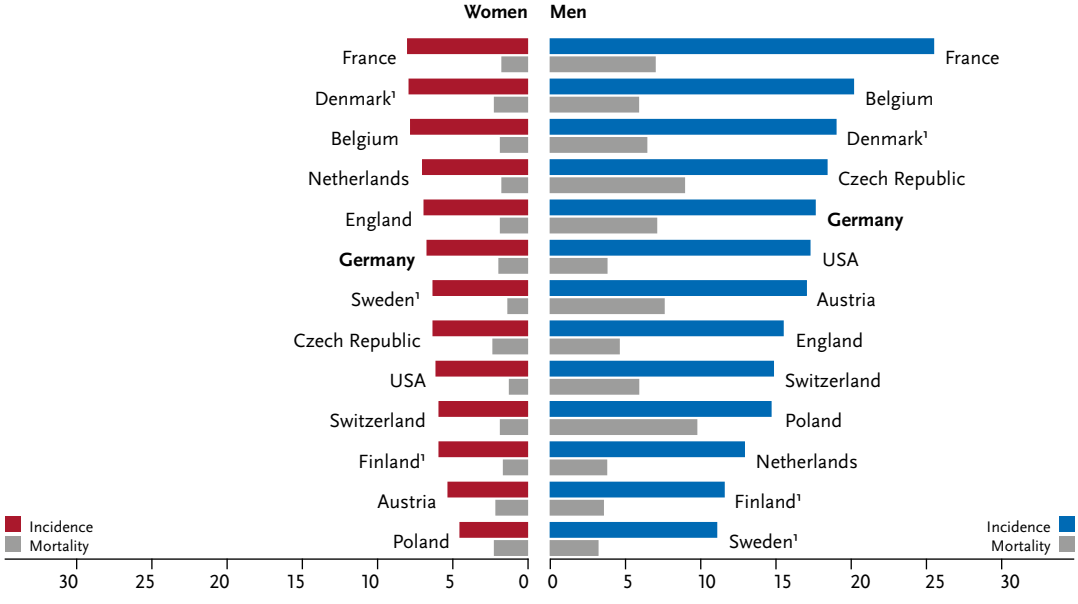


Figure 3.2.7
International comparison of age-standardised incidence and mortality rates by sex, ICD-10 C00–C14, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



¹ Data without C10.1

3.3 Oesophagus

Table 3.3.1
Overview of key epidemiological parameters for Germany, ICD-10 C15

Incidence	2015		2016		Prediction for 2020	
	Women	Men	Women	Men	Women	Men
Incident cases	1,680	5,600	1,740	5,540	1,800	6,100
Crude incidence rate[1]	4.1	13.9	4.2	13.7	4.3	15.1
Age-standardised incidence rate[1,2]	2.3	9.6	2.4	9.4	2.3	9.8
Median age at diagnosis	71	67	71	67		

Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	1,238	4,269	1,245	4,434	1,233	4,266
Crude mortality rate[1]	3.0	10.6	3.0	10.9	2.9	10.5
Age-standardised mortality rate[1,2]	1.5	7.1	1.5	7.2	1.5	6.8
Median age at death	75	69	74	70	74	70

Prevalence and survival rates	5 years		10 years	
	Women	Men	Women	Men
Prevalence	3,000	11,100	4,200	15,100
Absolute survival rate (2015–2016)[3]	22 (10–33)	19 (13–27)	16 (7–25)	12 (8–18)
Relative survival rate (2015–2016)[3]	24 (11–36)	22 (14–31)	21 (11–35)	17 (11–24)

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

Cancer of the oesophagus accounts for about 3.5 % of all deaths from cancer among men and 1.2 % of deaths from cancer among women. Since 1999, age-standardised mortality rates have remained virtually unchanged. In Germany, men are diagnosed with cancer of the oesophagus around three to four times more frequently than women, and, on average, at the age of 67, four years earlier than among women. The incidence among men and women under age 60 is decreasing, whereas it is increasing among older age groups.

Squamous cell carcinomas account for 50 % of all cases of cancer of the oesophagus. In recent years, the proportion of adenocarcinomas, which are almost exclusively found in the transitional zone to the stomach, has risen to over 40 %.

Relative 5-year survival rates of 24 % for women and 22 % for men with oesophageal carcinoma are among the lowest of any cancer type. Only one in three tumours is diagnosed at an early stage (UICC stage I/II).

Risk factors

Oesophageal cancers can be divided into two types: squamous cell carcinomas, which are more common; and adenocarcinomas, which are somewhat less common. Tobacco use and alcohol consumption are the main risk factors associated with squamous cell carcinomas of the oesophagus. Cancer risk increases according to the amount of alcohol consumed daily. When tobacco use is combined with alcohol consumption, the two substances have an even more harmful effect.

Adenocarcinomas often arise due to gastro-oesophageal reflux disease (persistent reflux of gastric contents into the oesophagus – chronic heartburn). These conditions lead to mucosal changes in the lower section of the oesophagus and may develop into what is known as Barrett's oesophagus, a precancerous condition. Overweight and smoking are further important risk factors.

A motility disorder of the oesophagus or the sphincter between the oesophagus and stomach (achalasia) significantly increases the risk of squamous cell carcinomas and adenocarcinomas. Although family clusters have been identified, it remains unclear whether a hereditary disposition or environmental factors play a role in the development of cancer of the oesophagus.

Figure 3.3.1a
Age-standardised incidence and mortality rates by sex, ICD-10 C15, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

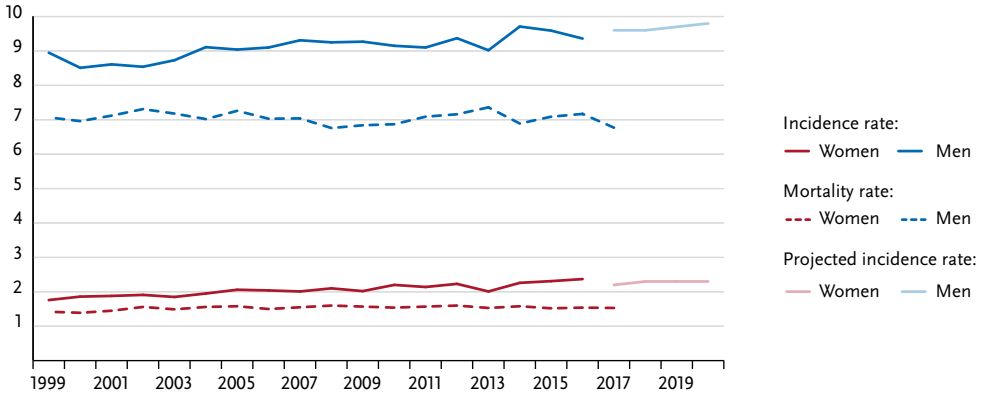


Figure 3.3.1b
Absolute numbers of incident cases and deaths by sex, ICD-10 C15, Germany 1999–2016/2017, projection (incidence) through 2020

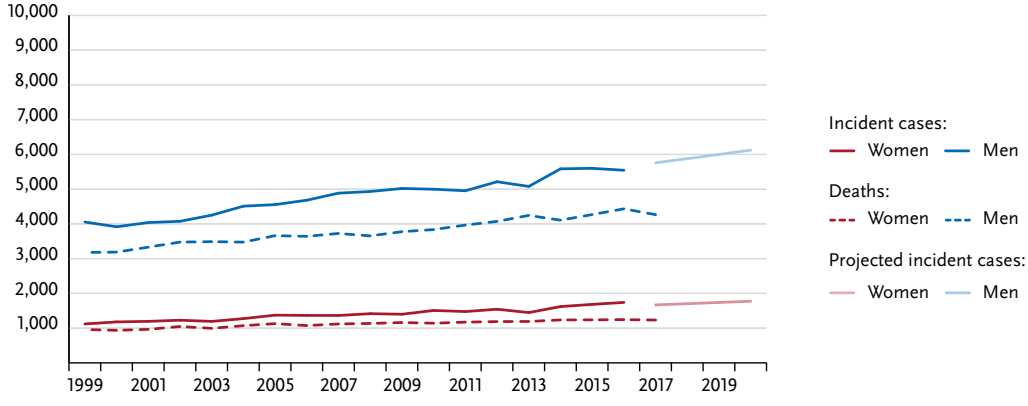


Figure 3.3.2
Age-specific incidence rates by sex, ICD-10 C15, Germany 2015–2016
per 100,000

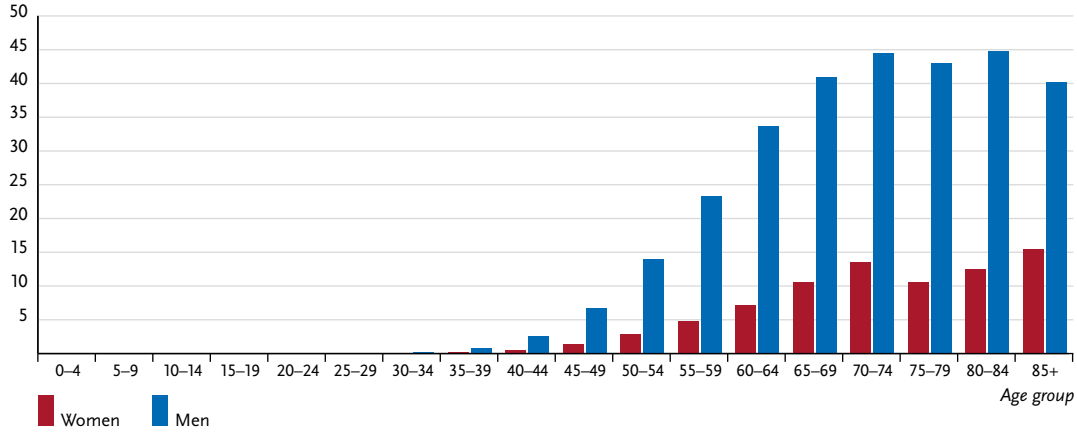


Table 3.3.2
Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C15, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1 %	(1 in 22,100)	0.3 %	(1 in 310)	< 0.1 %	(1 in 60,500)	0.2 %	(1 in 410)
45 years	< 0.1 %	(1 in 4,600)	0.3 %	(1 in 310)	< 0.1 %	(1 in 9,900)	0.2 %	(1 in 410)
55 years	0.1 %	(1 in 1,700)	0.3 %	(1 in 320)	< 0.1 %	(1 in 2,700)	0.2 %	(1 in 410)
65 years	0.1 %	(1 in 870)	0.3 %	(1 in 380)	0.1 %	(1 in 1,400)	0.2 %	(1 in 460)
75 years	0.1 %	(1 in 990)	0.2 %	(1 in 590)	0.1 %	(1 in 1,100)	0.2 %	(1 in 620)
Lifetime risk			0.3 %	(1 in 310)			0.2 %	(1 in 410)
Men aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1 %	(1 in 5,400)	1.0 %	(1 in 99)	< 0.1 %	(1 in 12,500)	0.9 %	(1 in 120)
45 years	0.1 %	(1 in 970)	1.0 %	(1 in 100)	0.1 %	(1 in 1,700)	0.9 %	(1 in 120)
55 years	0.3 %	(1 in 380)	0.9 %	(1 in 110)	0.2 %	(1 in 500)	0.8 %	(1 in 120)
65 years	0.4 %	(1 in 270)	0.7 %	(1 in 140)	0.3 %	(1 in 330)	0.7 %	(1 in 140)
75 years	0.3 %	(1 in 300)	0.5 %	(1 in 220)	0.4 %	(1 in 280)	0.5 %	(1 in 200)
Lifetime risk			1.0 %	(1 in 100)			0.8 %	(1 in 120)

Figure 3.3.3
Distribution of UICC-stages at first diagnosis by sex, ICD-10 C15, Germany 2015–2016
(top: all cases; bottom: only valid reports)

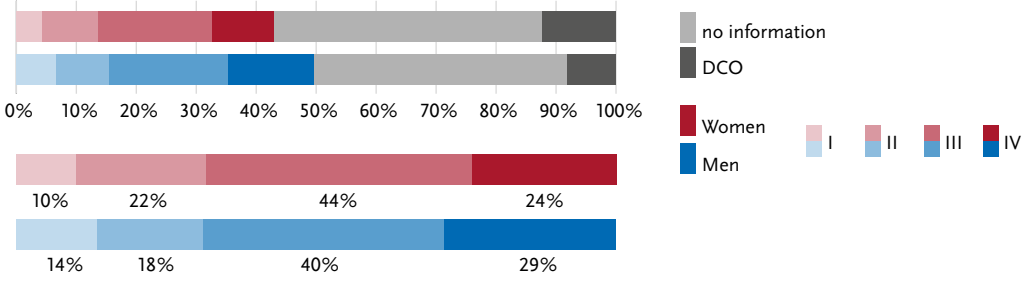


Figure 3.3.4
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C15, Germany 2015–2016

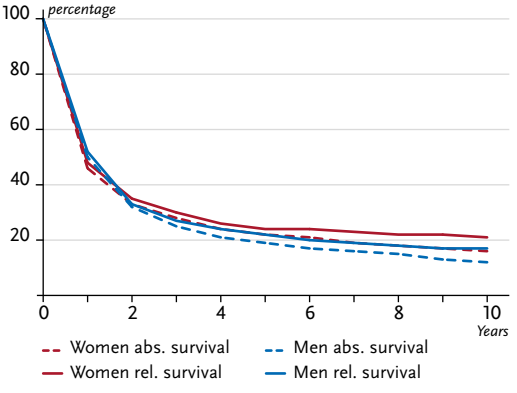


Figure 3.3.5
Relative 5-year survival by UICC-stage and sex, ICD-10 C15, Germany 2015–2016

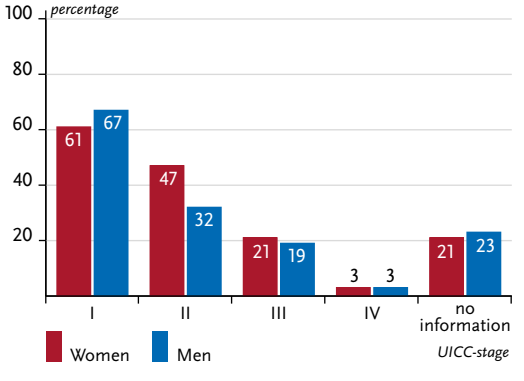


Figure 3.3.6
Age-standardised incidence and mortality rates in German federal states by sex, ICD-10 C15, 2015–2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

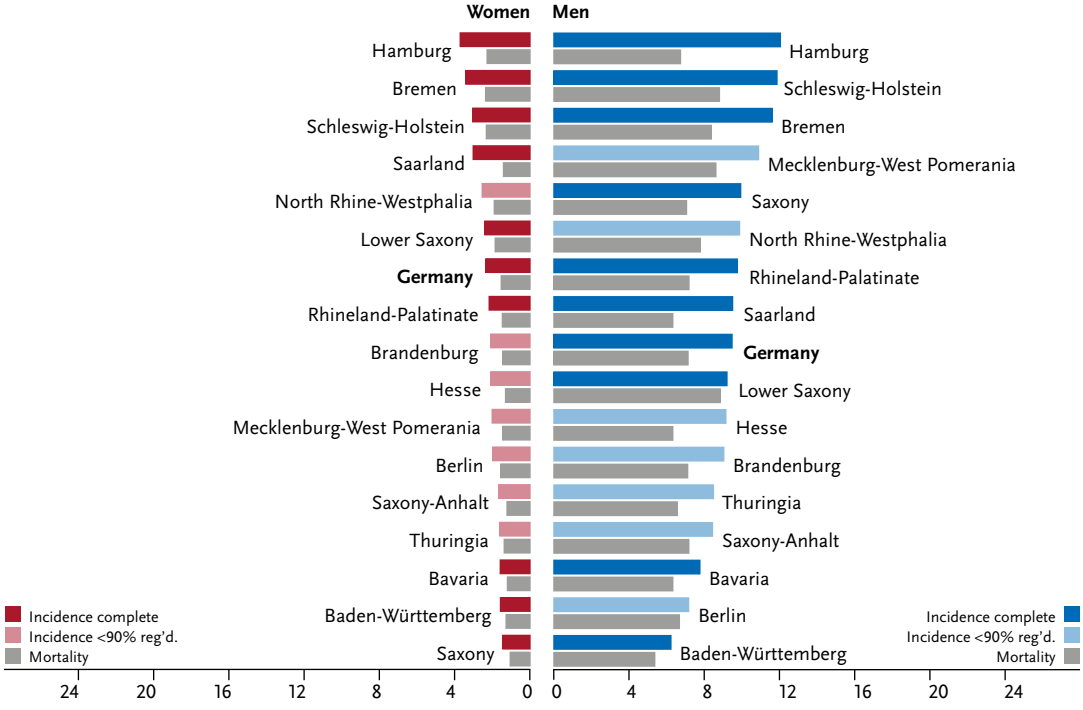
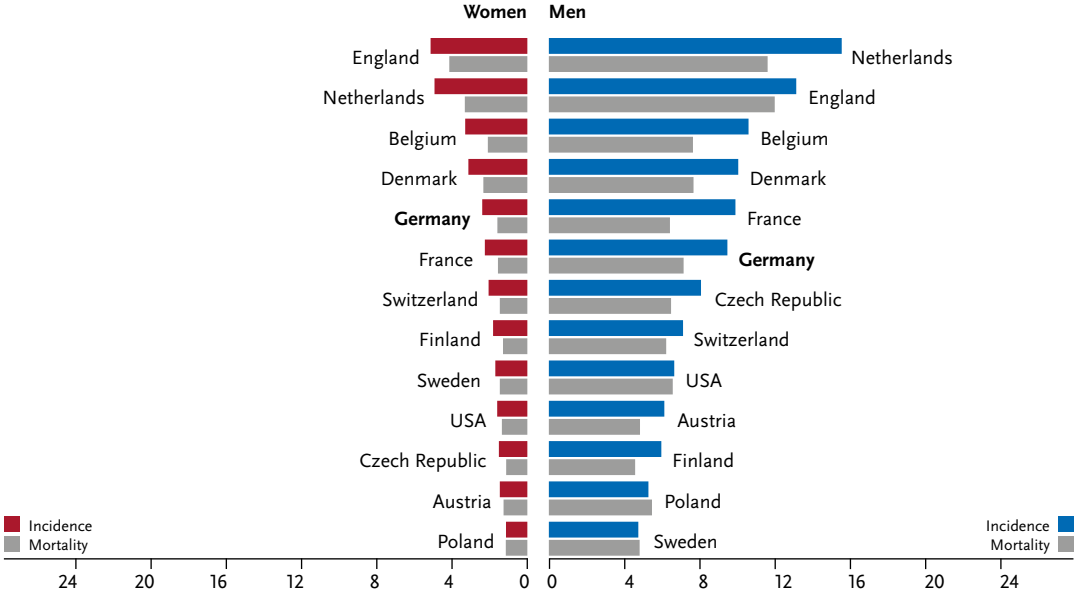


Figure 3.3.7
International comparison of age-standardised incidence and mortality rates by sex, ICD-10 C15, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



3.4 Stomach

Table 3.4.1
Overview of key epidemiological parameters for Germany, ICD-10 C16

Incidence	2015		2016		Prediction for 2020	
	Women	Men	Women	Men	Women	Men
Incident cases	6,050	9,730	5,840	9,300	5,400	8,900
Crude incidence rate[1]	14.6	24.2	14.0	22.9	12.9	22.1
Age-standardised incidence rate[1,2]	7.5	15.5	7.2	14.8	6.5	13.3
Median age at diagnosis	76	72	76	72		

Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	3,829	5,429	3,861	5,370	3,700	5,266
Crude mortality rate[1]	9.2	13.5	9.2	13.2	8.8	12.9
Age-standardised mortality rate[1,2]	4.3	8.4	4.4	8.2	4.1	7.9
Median age at death	79	74	78	75	78	75

Prevalence and survival rates	5 years		10 years	
	Women	Men	Women	Men
Prevalence	13,800	22,100	22,200	33,400
Absolute survival rate (2015–2016)[3]	29 (25–33)	27 (21–35)	21 (15–27)	18 (15–24)
Relative survival rate (2015–2016)[3]	34 (29–40)	32 (24–42)	32 (23–39)	28 (22–37)

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

Most malignant neoplasms of the stomach are adenocarcinomas. Neuroendocrine tumours (NET) and gastrointestinal stromal tumours (GIST) are found in about 4% to 5% of all cases, with the latter being more frequent among women.

As in other industrial nations, a steady decline in incidence and mortality from stomach cancer has been observed in Germany over the last few decades. This trend is continuing and applies to all age groups, and both sexes. Tumours of the gastric outlets (the antrum and pylorus) have decreased the most.

The risk of developing stomach cancer increases steadily with age. On average, men who develop the condition do so at the age of 72, whereas the condition is usually diagnosed among women at the age of 76. Relative 5-year survival rates are 34% for women and 32% for men. Survival prospects have improved recently, although they are still unfavourable compared to other cancers. In about two-thirds of cases with adequate cancer staging data, the cancer had already metastasised by the time it had been diagnosed (stage IV).

Risk factors

Helicobacter pylori infection of the stomach is the most important risk factor associated with stomach cancer. In addition, between 5% and 10% of gastric carcinomas can be attributed to an infection with the Epstein-Barr virus. Smoking and excessive alcohol consumption also increase the risk of stomach cancer. Foods preserved with salt, a diet high in salt, and meat products are further risk factors. There are indications that chronic heartburn and gastro-oesophageal reflux disease increase the risk of certain tumours of the transitional zone between the stomach and the oesophagus. Low socio-economic status and stomach surgery in the past continue to be associated with a higher frequency of stomach cancer.

First-degree relatives of people who have developed stomach cancer are two to three times more likely to develop stomach cancer themselves than the general population. Individuals with more than one first-degree relative who has developed stomach cancer have a 10-fold higher risk. It is unclear whether this risk stems from a shared lifestyle, a shared genetic disposition, or a combination of both. Some hereditary syndromes increase the risk of gastric carcinomas. Pernicious anaemia is a further risk factor, but it affects comparatively few people.

Figure 3.4.1a
Age-standardised incidence and mortality rates by sex, ICD-10 C16, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

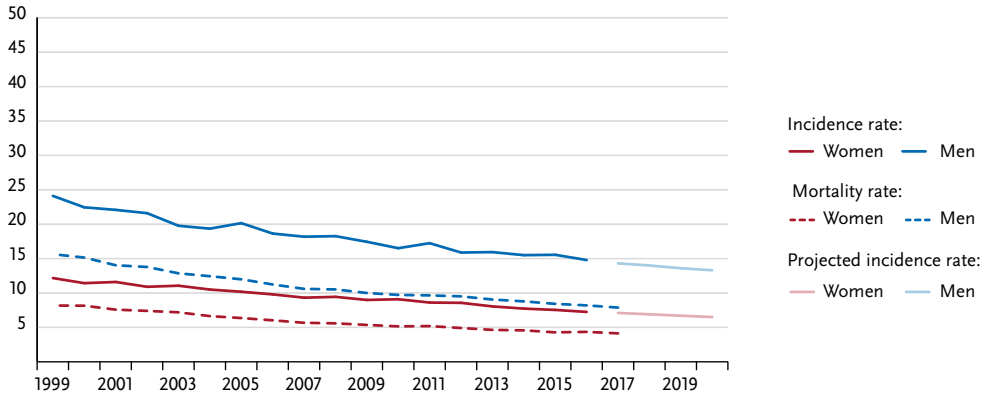


Figure 3.4.1b
Absolute numbers of incident cases and deaths by sex, ICD-10 C16, Germany 1999–2016/2017, projection (incidence) through 2020

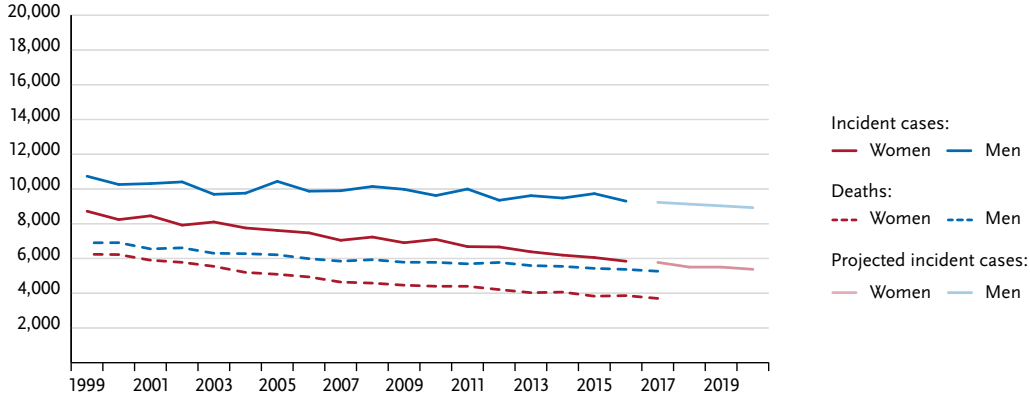


Figure 3.4.2
Age-specific incidence rates by sex, ICD-10 C16, Germany 2015–2016
per 100,000

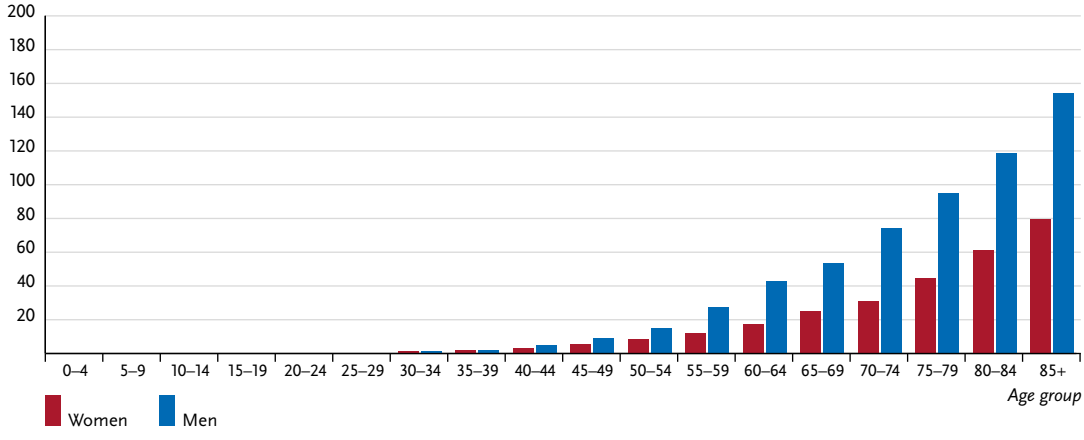


Table 3.4.2
Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C16, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1%	(1 in 3,500)	1.1%	(1 in 90)	< 0.1%	(1 in 6,900)	0.8%	(1 in 130)
45 years	0.1%	(1 in 1,400)	1.1%	(1 in 92)	< 0.1%	(1 in 2,700)	0.8%	(1 in 130)
55 years	0.1%	(1 in 690)	1.0%	(1 in 96)	0.1%	(1 in 1,300)	0.8%	(1 in 130)
65 years	0.3%	(1 in 380)	0.9%	(1 in 110)	0.1%	(1 in 680)	0.7%	(1 in 140)
75 years	0.4%	(1 in 230)	0.8%	(1 in 130)	0.3%	(1 in 300)	0.6%	(1 in 160)
Lifetime risk			1.1%	(1 in 91)			0.8%	(1 in 130)
Men aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1%	(1 in 2,700)	1.8%	(1 in 56)	< 0.1%	(1 in 6,700)	1.1%	(1 in 89)
45 years	0.1%	(1 in 820)	1.8%	(1 in 57)	0.1%	(1 in 1,800)	1.1%	(1 in 89)
55 years	0.3%	(1 in 300)	1.7%	(1 in 59)	0.2%	(1 in 610)	1.1%	(1 in 90)
65 years	0.6%	(1 in 180)	1.5%	(1 in 66)	0.3%	(1 in 330)	1.1%	(1 in 95)
75 years	0.8%	(1 in 130)	1.2%	(1 in 84)	0.5%	(1 in 180)	0.9%	(1 in 110)
Lifetime risk			1.7%	(1 in 58)			1.1%	(1 in 91)

Figure 3.4.3
Distribution of UICC-stages at first diagnosis by sex, ICD-10 C16, Germany 2015–2016
(top: all cases; bottom: only valid reports)

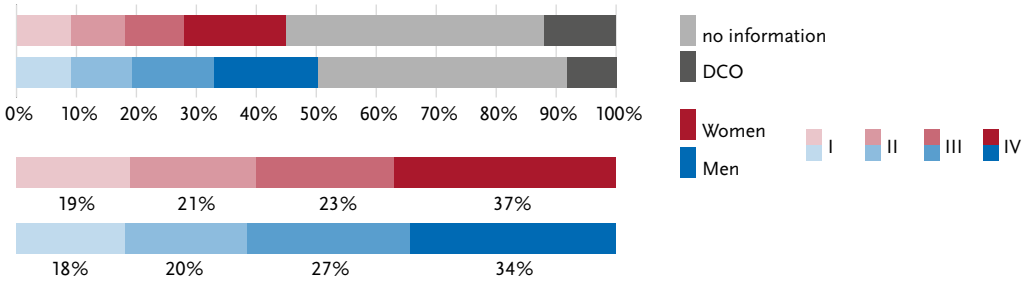


Figure 3.4.4
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C16, Germany 2015–2016

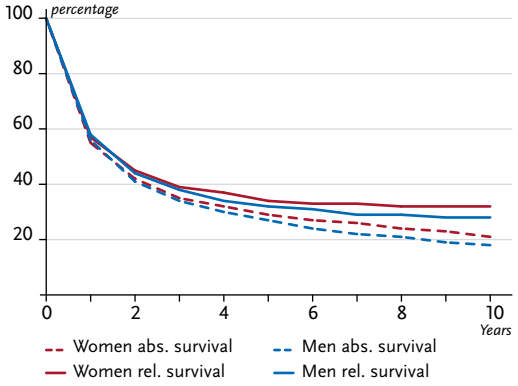


Figure 3.4.5
Relative 5-year survival by UICC-stage and sex, ICD-10 C16, Germany 2015–2016

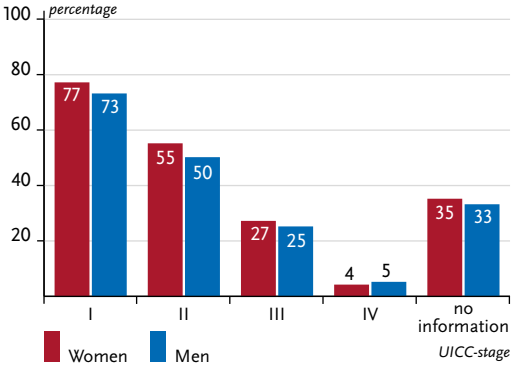


Figure 3.4.6
Age-standardised incidence and mortality rates in German federal states by sex, ICD-10 C16, 2015–2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

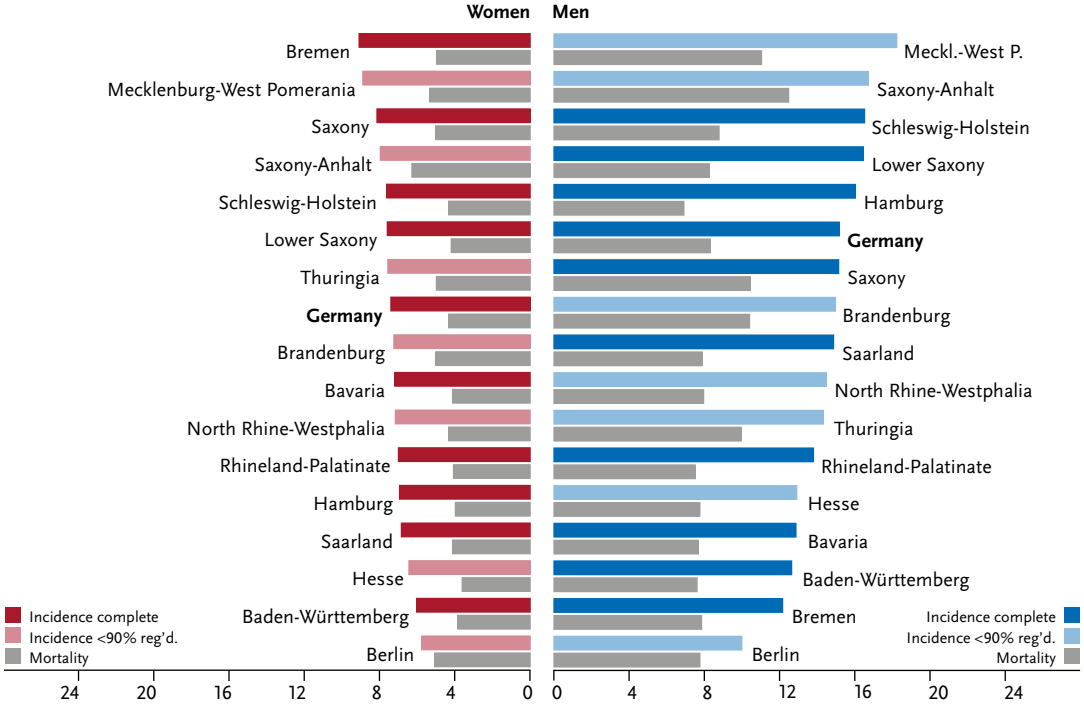
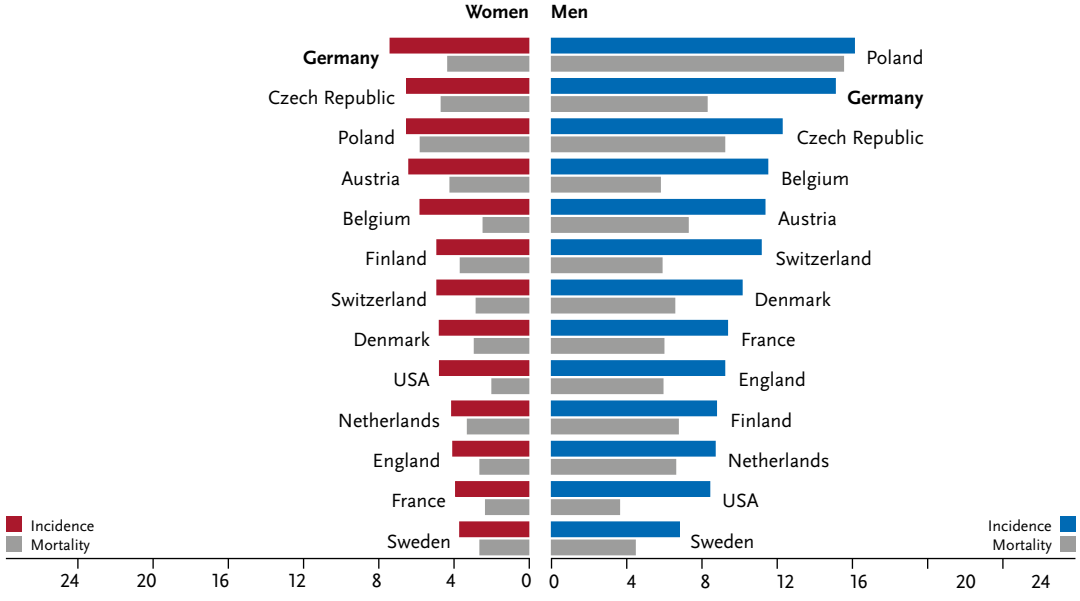


Figure 3.4.7
International comparison of age-standardised incidence and mortality rates by sex, ICD-10 C16, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



3.5 Small intestine

Table 3.5.1
Overview of key epidemiological parameters for Germany, ICD-10 C17

Incidence	2015		2016		Prediction for 2020	
	Women	Men	Women	Men	Women	Men
Incident cases	1,150	1,340	1,270	1,350	1,600	1,800
Crude incidence rate[1]	2.8	3.3	3.0	3.3	3.9	4.5
Age-standardised incidence rate[1,2]	1.7	2.3	1.8	2.2	2.3	2.9
Median age at diagnosis	70	69	70	69		

Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	300	366	325	341	313	345
Crude mortality rate[1]	0.7	0.9	0.8	0.8	0.7	0.8
Age-standardised mortality rate[1,2]	0.3	0.6	0.4	0.5	0.4	0.5
Median age at death	77	74	76	75	76	75

Prevalence and survival rates	5 years		10 years	
	Women	Men	Women	Men
Prevalence	3,800	4,200	5,800	6,500
Absolute survival rate (2015–2016)	53	50	38	35
Relative survival rate (2015–2016)	60	58	49	48

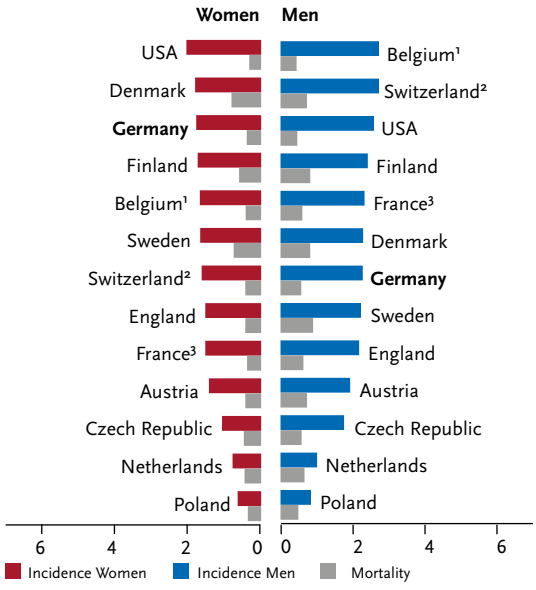
1 per 100,000 persons 2 age-standardised (old European Standard)

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

Epidemiology and risk factors

About half of all malignant tumours of the small intestine are neuroendocrine tumours (NET); these also occur in other organs of the digestive tract, and on the skin and in the lungs, albeit less frequently. Gastrointestinal stromal tumours (GIST) account for a good 10 % of cases of cancers of the small intestine. Around 2,620 people in Germany, of which 1,270 were women, developed cancer of the small intestine in 2016. As in other European countries, incidence and death rates have risen steadily since 1999, with a slightly higher increase identified among women. Overall survival rates are slightly lower than for colon cancer, but 5-year survival rates are higher for both GIST (at around 85 %) and NET (at around 75 %) than for other malignant tumours of the small intestine. Little is known about the risk factors associated with NET of the small intestine. Hereditary diseases such as Lynch syndrome, Peutz-Jeghers syndrome, familial juvenile polyposis and cystic fibrosis as well as inflammatory bowel diseases (Crohn's disease) increase a person's risk of developing adenocarcinomas of the small intestine. Furthermore, patients with type 1 neurofibromatosis (Recklinghausen's disease) have an increased risk of gastrointestinal stromal tumours (GIST) of the small intestine. Finally, a small proportion of these tumours are linked to genetics (a familial GIST syndrome).

Figure 3.5.1
International comparison of age-standardised incidence and mortality rates by sex, ICD-10 C17, 2015 – 2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



1 Mortality only for 2015 from WHO mortality database
2 Mortality only for 2015
3 Mortality only for 2013/2014 from WHO mortality database

Figure 3.5.2
Age-standardised incidence and mortality rates by sex, ICD-10 C17, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

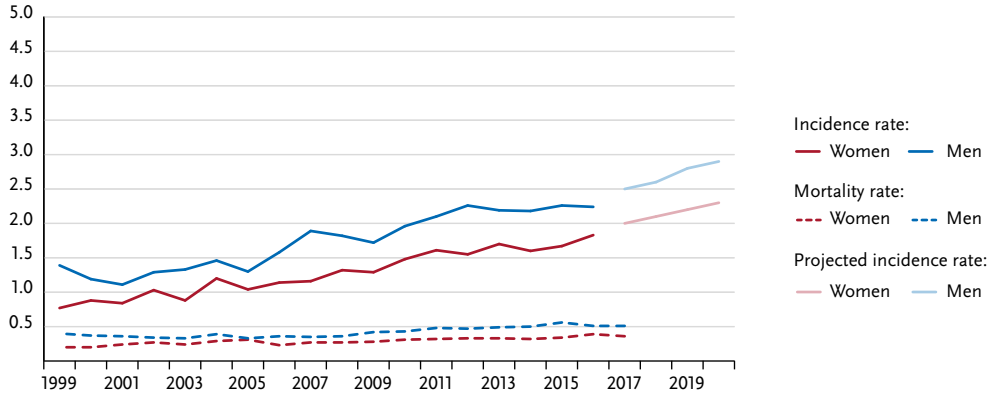


Figure 3.5.3
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C17, Germany 2015–2016

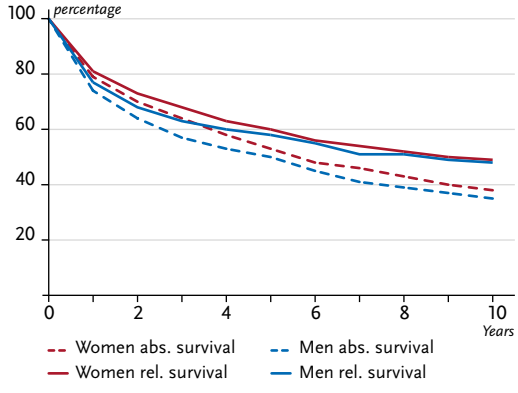


Figure 3.5.4
Relative 5-year survival by histology and sex, ICD-10 C17, Germany 2015–2016

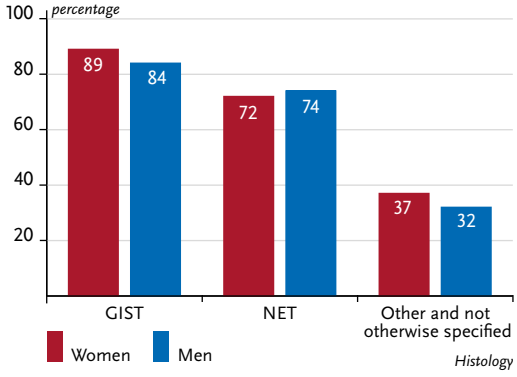
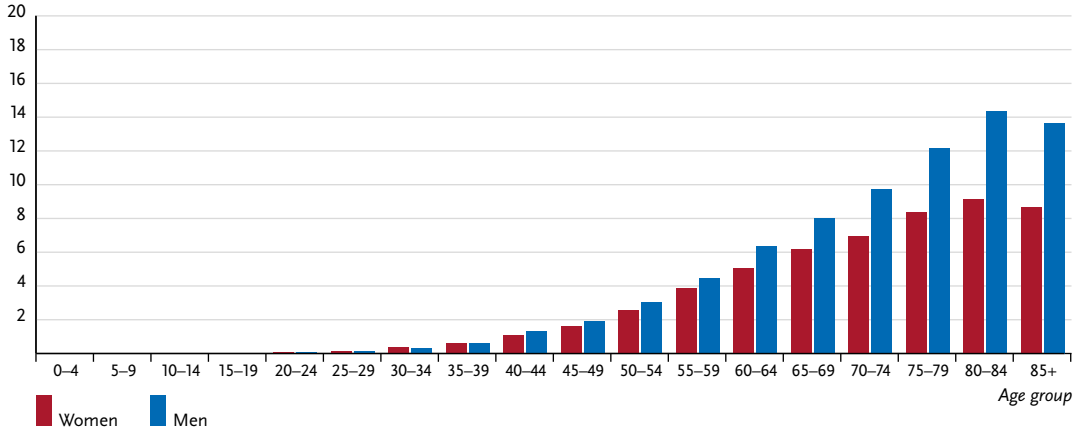


Figure 3.5.5
Age-specific incidence rates by sex, ICD-10 C17, Germany 2015–2016
per 100,000



3.6 Colon and rectum

Table 3.6.1
Overview of key epidemiological parameters for Germany, ICD-10 C18–C20

Incidence	2015		2016		Prediction for 2020	
	Women	Men	Women	Men	Women	Men
Incident cases	26,740	33,000	25,990	32,300	24,100	31,300
Crude incidence rate[1]	64.4	82.1	62.3	79.5	57.9	77.3
Age-standardised incidence rate[1,2]	33.0	52.7	31.8	50.7	28.3	46.1
Median age at diagnosis	75	72	76	72		

Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	11,479	13,468	11,391	13,411	10,879	12,873
Crude mortality rate[1]	27.7	33.5	27.3	33.0	26.0	31.6
Age-standardised mortality rate[1,2]	12.1	20.3	11.8	19.8	11.3	18.8
Median age at death	80	75	80	76	80	76

Prevalence and survival rates	5 years		10 years	
	Women	Men	Women	Men
Prevalence	91,900	115,000	159,500	196,100
Absolute survival rate (2015–2016)[3]	52 (50–55)	51 (48–54)	39 (36–42)	36 (34–39)
Relative survival rate (2015–2016)[3]	63 (60–66)	62 (58–66)	60 (55–64)	56 (52–60)

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

About one in eight cancer diagnoses in Germany are of cancer of the colon or rectum. In 2016, around 32,300 men and around 25,990 women were diagnosed with colorectal cancer. One in 17 men and one in 20 women will develop this cancer during their lifetime. Almost two-thirds of colorectal cancers are detected in the colon. The risk of colorectal cancer increases with age and continues to rise into old age. More than half of all cases occur in individuals aged 70 or above, with only about 10 % of diagnoses among people below the age of 55. This corresponds to a comparatively high median age at diagnosis of 76 years for women and 72 years for men. After a short-term increase, in 2003, age-standardised disease rates began to decline, and this trend has strengthened recently. New cases of colorectal cancer have decreased, with the exception of cancers of the ascending colon. The last 10 years have seen a particularly pronounced decline in age-standardised mortality rates, with this period accounting for more than 20 % of the reduction that has occurred since 2003. Relative 5-year-survival rates from colorectal cancer are approximately 63 % for women and 62 % for men.

Risk factors and early detection

Tobacco use and excess body weight are the most important risk factors associated with colorectal cancer. These are followed by a lack of exercise and a diet low in fibre. People who regularly consume alcohol or who eat large quantities of red meat or processed red meat are more prone to developing colorectal cancer. First-degree relatives of colorectal cancer patients also have an above average risk of developing this condition. Some rare, inherited conditions come with a very high risk of contracting colorectal cancer at a young age. Chronic inflammatory bowel diseases also slightly increase the risk of developing cancer of the large intestine. Statutory cancer screening in Germany offers people between the ages of 50 and 54 years an annual immunological test for hidden blood in stool (starting at age 55, this test can be conducted every two years). The screening program also offers a colonoscopy for men 50 years and older and for women 55 years and older. Colonoscopies can also be used to remove intestinal polyps that might otherwise develop into cancer. If colonoscopy results are negative, one additional colonoscopy may be conducted ten years later. Although a stool test can be used as an alternative to colonoscopy, a colonoscopy will usually be recommended in the case of a positive stool test. Different recommendations apply to people with a higher risk of developing colorectal cancer.

Figure 3.6.1a
Age-standardised incidence and mortality rates by sex, ICD-10 C18–C20, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

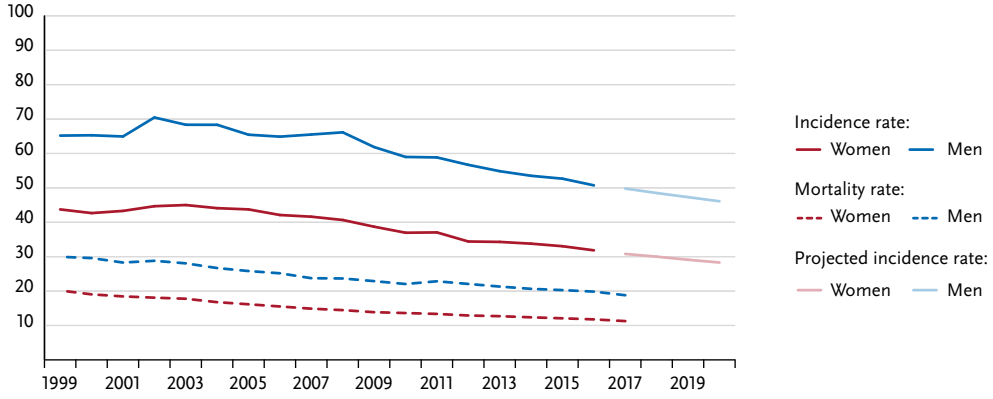


Figure 3.6.1b
Absolute numbers of incident cases and deaths by sex, ICD-10 C18–C20, Germany 1999–2016/2017, projection (incidence) through 2020

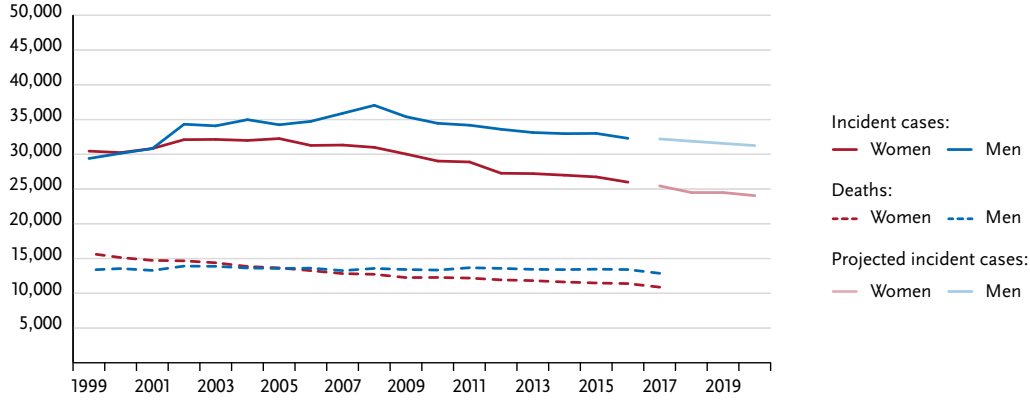


Figure 3.6.2
Age-specific incidence rates by sex, ICD-10 C18–C20, Germany 2015–2016
per 100,000

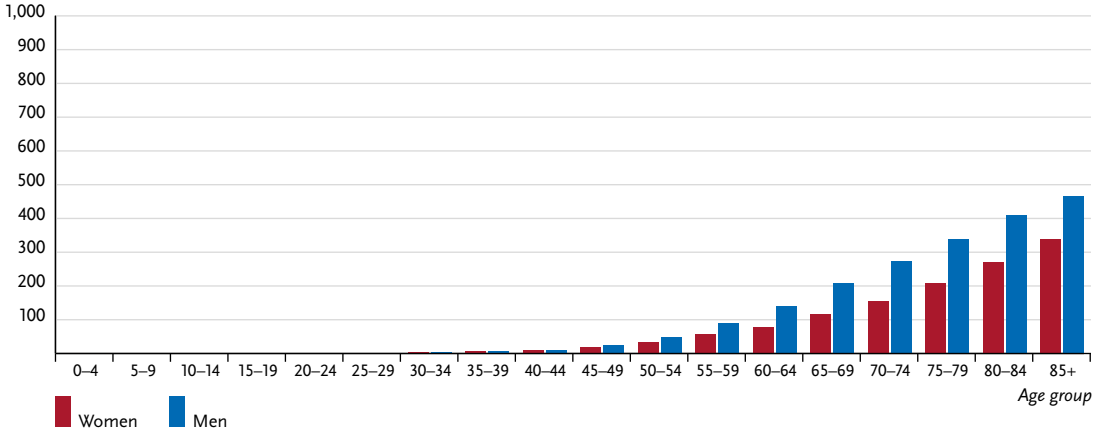


Table 3.6.2
Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C18–C20, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	0.1%	(1 in 1,200)	4.9%	(1 in 20)	< 0.1%	(1 in 4,900)	2.4%	(1 in 42)
45 years	0.3%	(1 in 370)	4.9%	(1 in 20)	0.1%	(1 in 1,400)	2.4%	(1 in 42)
55 years	0.7%	(1 in 150)	4.7%	(1 in 21)	0.2%	(1 in 530)	2.3%	(1 in 43)
65 years	1.3%	(1 in 78)	4.3%	(1 in 23)	0.4%	(1 in 240)	2.3%	(1 in 44)
75 years	2.0%	(1 in 50)	3.5%	(1 in 29)	1.0%	(1 in 100)	2.1%	(1 in 48)
Lifetime risk			4.9%	(1 in 20)			2.3%	(1 in 43)
Men aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	0.1%	(1 in 1,100)	6.1%	(1 in 16)	< 0.1%	(1 in 4,100)	2.9%	(1 in 35)
45 years	0.4%	(1 in 270)	6.1%	(1 in 16)	0.1%	(1 in 1,000)	2.9%	(1 in 35)
55 years	1.1%	(1 in 90)	6.0%	(1 in 17)	0.3%	(1 in 290)	2.9%	(1 in 35)
65 years	2.2%	(1 in 46)	5.4%	(1 in 18)	0.8%	(1 in 130)	2.8%	(1 in 36)
75 years	2.9%	(1 in 35)	4.2%	(1 in 24)	1.5%	(1 in 66)	2.5%	(1 in 39)
Lifetime risk			6.0%	(1 in 17)			2.8%	(1 in 36)

Figure 3.6.3
Distribution of UICC-stages at first diagnosis by sex, ICD-10 C18–C20, Germany 2015–2016
(top: all cases; bottom: only valid reports)

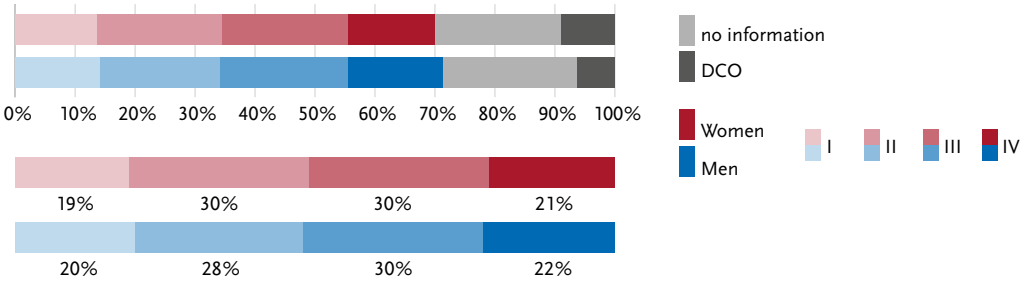


Figure 3.6.4
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C18–C20, Germany 2015–2016

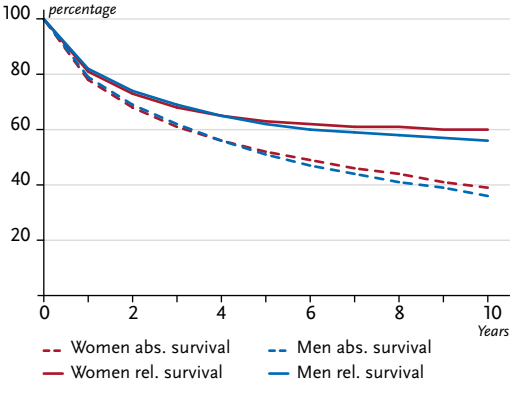


Figure 3.6.5
Relative 5-year survival by UICC-stage and sex, ICD-10 C18–C20, Germany 2015–2016

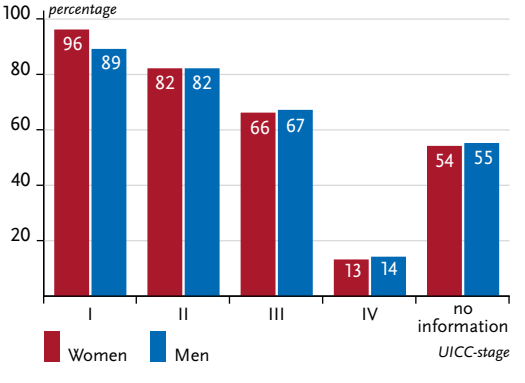


Figure 3.6.6
Age-standardised incidence and mortality rates in German federal states by sex, ICD-10 C18–C20, 2015–2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

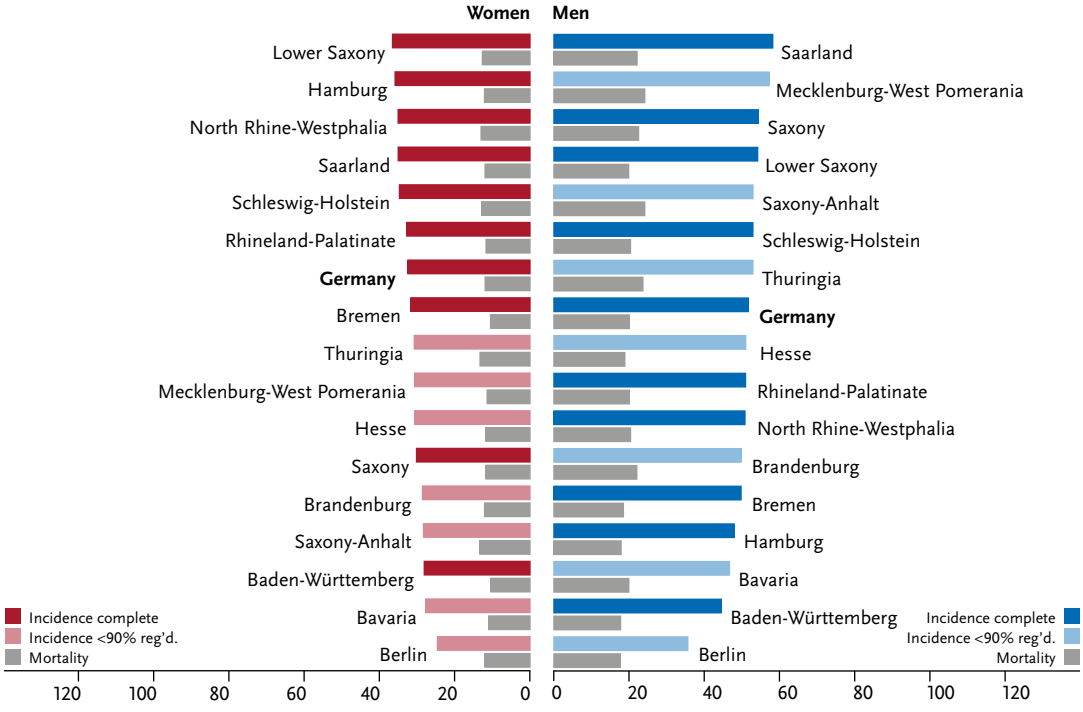
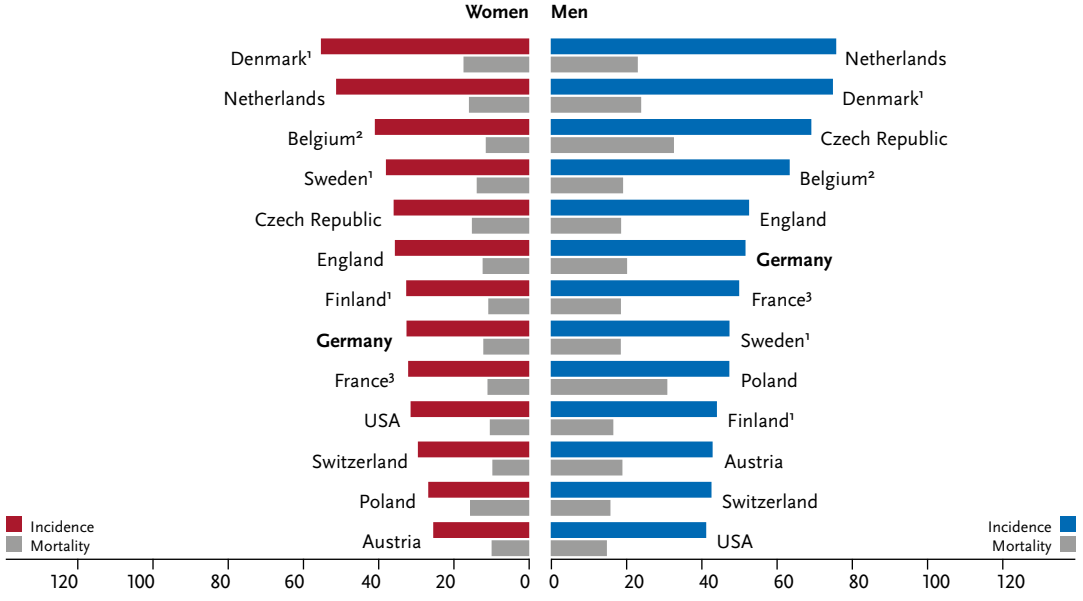


Figure 3.6.7
International comparison of age-standardised incidence and mortality rates by sex, ICD-10 C18–C20, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



[1] Data including C21
[2] Mortality only for 2015 from WHO mortality database
[3] Mortality including C21

3.7 Anus

Table 3.7.1
Overview of key epidemiological parameters for Germany, ICD-10 C21

Incidence	2015		2016		Prediction for 2020	
	Women	Men	Women	Men	Women	Men
Incident cases	1,240	850	1,320	830	1,500	980
Crude incidence rate[1]	3.0	2.1	3.2	2.0	3.6	2.4
Age-standardised incidence rate[1,2]	1.9	1.5	2.1	1.5	2.3	1.7
Median age at diagnosis	66	64	65	64		

Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	290	181	308	204	336	229
Crude mortality rate[1]	0.7	0.5	0.7	0.5	0.8	0.6
Age-standardised mortality rate[1,2]	0.4	0.3	0.4	0.3	0.4	0.4
Median age at death	75	68	76	70	76	70

Prevalence and survival rates	5 years		10 years	
	Women	Men	Women	Men
Prevalence	4,700	2,600	7,600	4,100
Absolute survival rate (2015–2016)	58	54	46	40
Relative survival rate (2015–2016)	65	61	59	53

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

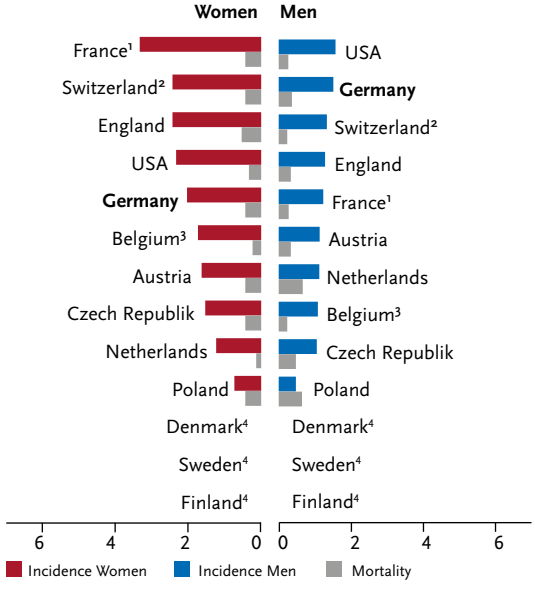
▶ Additional information under www.krebsdaten.de/cancer-sites

Epidemiology and risk factors

Most cancers of the anus are squamous cell carcinomas. In 2016, around 2,150 people developed this condition, 1,320 were women. Contrary to the declining rates of colorectal cancer, incidence and mortality rates for anal cancer have increased substantially over the past 15 years. Incidence is also increasing in other countries. Relative 5-year survival rates from cancer of the anus are approximately 65 % for women and 61 % for men.

In Germany, about 90 % of anal carcinomas can be traced back to an infection with human papillomaviruses. Other risk factors include smoking, chronic immunosuppression and certain sexual practices, such as changing sexual partners frequently, and passive anal intercourse. The risk of developing anal cancer is significantly higher for HIV-positive patients, particularly among men with same-sex partners, than in the general population. The Standing Committee on Vaccination (STIKO) recommends that girls and boys be vaccinated against HPV between the ages of 9 and 14 years.

Figure 3.7.1
International comparison of age-standardised incidence and mortality rates by sex, ICD-10 C21, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



1 Mortality only for 2013/2014 from WHO mortality database
2 Mortality only for 2015
3 Mortality only for 2015 from WHO mortality database
4 No comparable data available

Figure 3.7.2
Age-standardised incidence and mortality rates by sex, ICD-10 C21, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

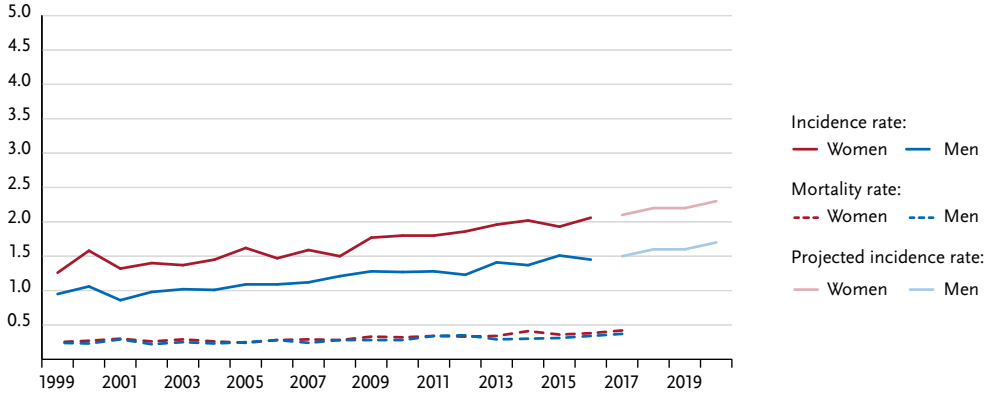


Figure 3.7.3
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C21, Germany 2015–2016

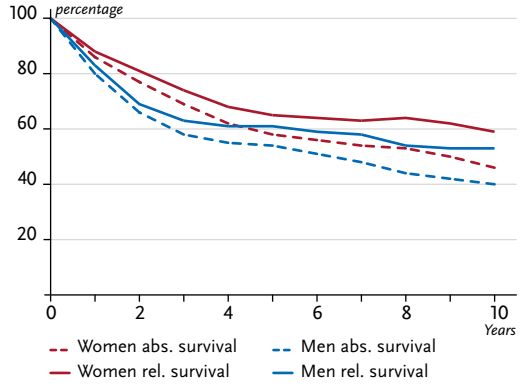


Figure 3.7.4
Relative 5-year survival by UICC-stage and sex, ICD-10 C21, Germany 201–2016

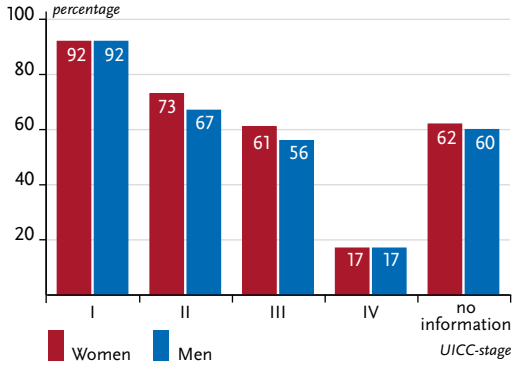
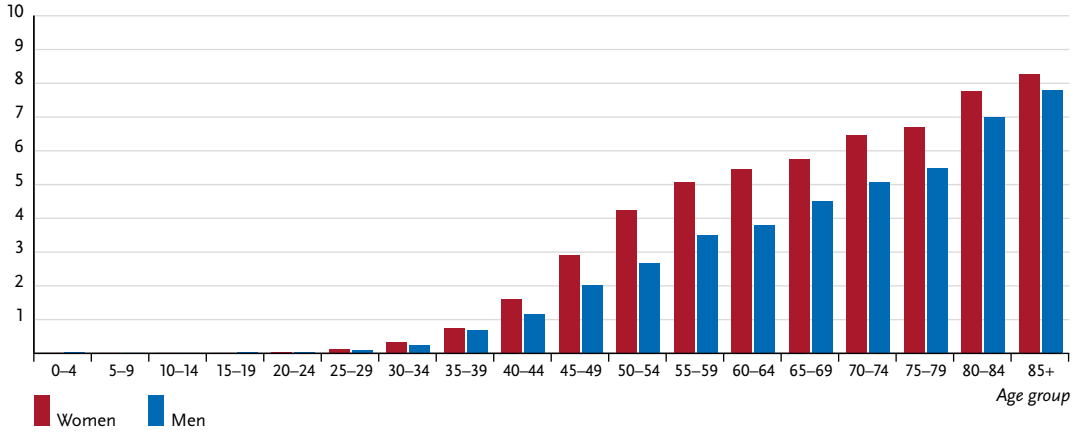


Figure 3.7.5
Age-specific incidence rates by sex, ICD-10 C21, Germany 2015–2016
per 100,000



3.8 Liver

Table 3.8.1
Overview of key epidemiological parameters for Germany, ICD-10 C22

Incidence	2015		2016		Prediction for 2020	
	Women	Men	Women	Men	Women	Men
Incident cases	2,880	6,110	2,750	6,220	3,100	6,400
Crude incidence rate[1]	6.9	15.2	6.6	15.3	7.4	15.9
Age-standardised incidence rate[1,2]	3.7	9.8	3.5	9.8	3.7	9.5
Median age at diagnosis	75	71	74	71		

Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	2,611	5,231	2,625	5,411	2,697	5,213
Crude mortality rate[1]	6.3	13.0	6.3	13.3	6.4	12.8
Age-standardised mortality rate[1,2]	3.1	8.1	3.0	8.2	3.1	7.8
Median age at death	76	73	77	74	77	74

Prevalence and survival rates	5 years		10 years	
	Women	Men	Women	Men
Prevalence	3,600	9,700	4,700	12,700
Absolute survival rate (2015–2016)[3]	13 (6–20)	12 (7–18)	9 (6–17)	7 (5–11)
Relative survival rate (2015–2016)[3]	15 (7–22)	15 (9–21)	12 (8–25)	10 (7–16)

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

Although liver cancer is relatively rare, it is one of the most common causes of cancer death and, as such, comes with a particularly poor prognosis. Around 9,000 new cases are diagnosed in Germany every year, with nearly 8,000 deaths. One in 88 men and one in 190 women in Germany will develop a malignant tumour of the liver during their lifetime. Relative 5-year survival rates among both men and women are currently around 15 %. About 65 % of malignant liver tumours develop out of liver cells (hepatocellular carcinomas) with 23 % developing from the intrahepatic bile ducts (cholangiocarcinoma); this proportion is higher among women.

Since 1999, age-standardised incidence and mortality rates have risen slightly in both sexes. However, this increase does not appear to have continued over the past 5 years, and a decline in incidence and mortality has even been identified among men.

Incidence and mortality in the north-western German federal states are somewhat lower than in the rest of the country. Finally, men and women have particularly high rates of incidence and death in France.

Risk factors and early detection

The main risk factor associated with liver cancer is cirrhosis. In Germany, the most common causes of cirrhosis are chronic hepatitis C infections and high levels of alcohol consumption. Non-alcoholic fatty liver disease, which also increases the risk of liver cancer, is also becoming increasingly important in this context. This condition may occur as a consequence of diabetes mellitus or metabolic syndrome, with metabolic syndrome often being triggered by obesity.

Chronic hepatitis B infection, even without cirrhosis of the liver, is also a risk factor associated with liver cancer and is particularly important in Africa and Southeast Asia. Smoking also increases the risk of liver cancer. The consumption of foods containing the mould toxin aflatoxin B1 continues to play a role in less developed countries. Inherited metabolic diseases such as hemochromatosis, porphyrias and alpha-1-antitrypsin deficiency can also increase the risk of liver cancer.

No statutory screening programme for liver cancer is currently in place for the general population. However, regular ultrasound check-ups should be offered to all patients with liver cirrhosis, chronic hepatitis B or C infections, and fatty liver disease. Blood tests (for alpha-fetoprotein) are only of minor relevance.

Figure 3.8.1a
Age-standardised incidence and mortality rates by sex, ICD-10 C22, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

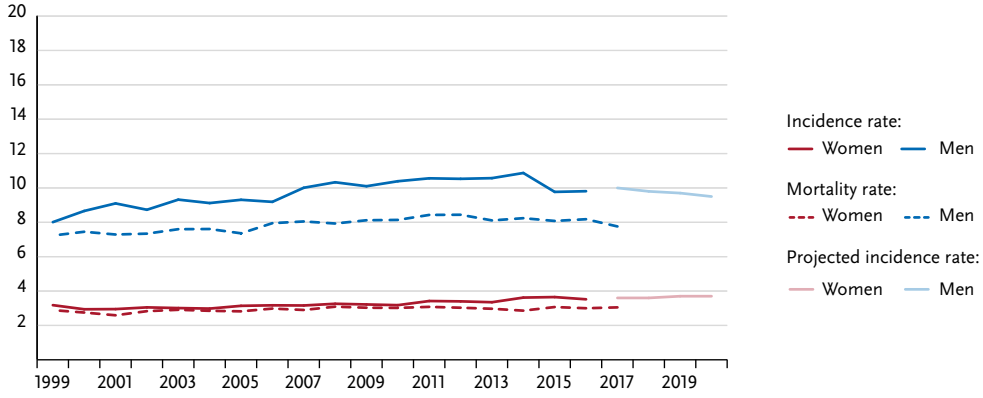


Figure 3.8.1b
Absolute numbers of incident cases and deaths by sex, ICD-10 C22, Germany 1999–2016/2017, projection (incidence) through 2020

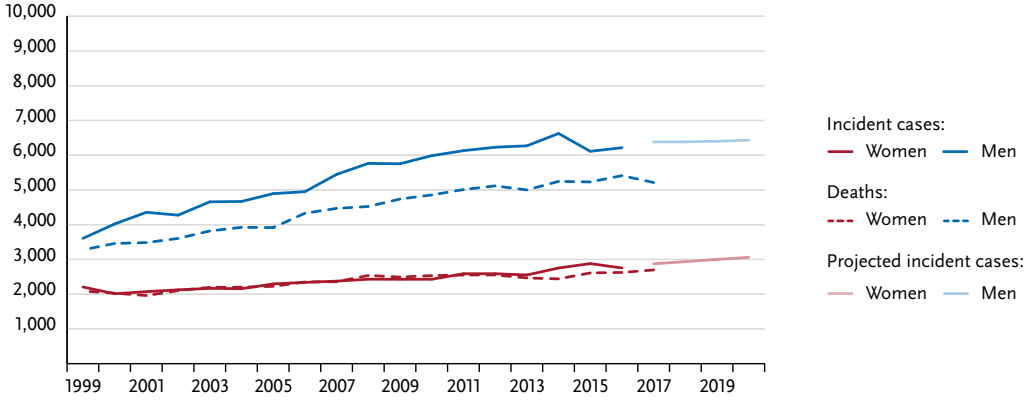


Figure 3.8.2
Age-specific incidence rates by sex, ICD-10 C22, Germany 2015–2016
per 100,000

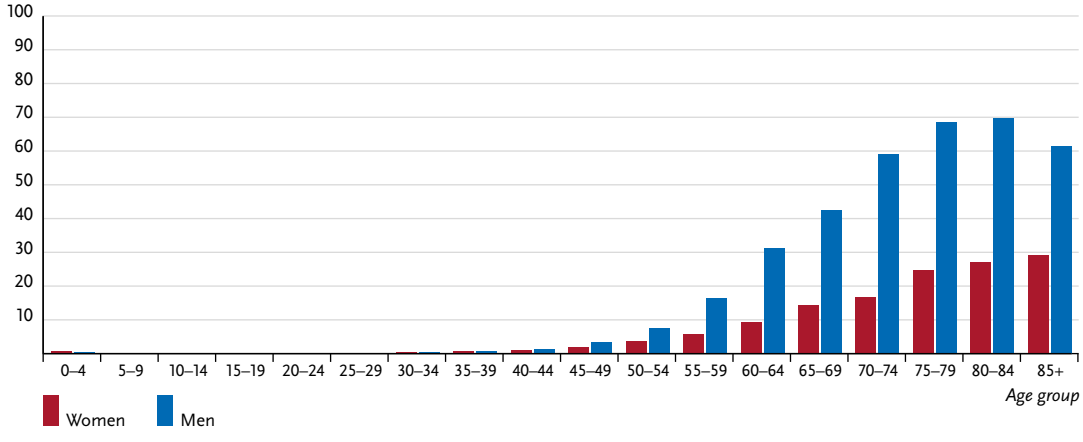


Table 3.8.2
Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C22, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1 %	(1 in 11,100)	0.5 %	(1 in 190)	< 0.1 %	(1 in 23,100)	0.5 %	(1 in 190)
45 years	< 0.1 %	(1 in 3,600)	0.5 %	(1 in 200)	< 0.1 %	(1 in 5,300)	0.5 %	(1 in 190)
55 years	0.1 %	(1 in 1,300)	0.5 %	(1 in 200)	0.1 %	(1 in 1,600)	0.5 %	(1 in 200)
65 years	0.1 %	(1 in 670)	0.4 %	(1 in 230)	0.1 %	(1 in 810)	0.5 %	(1 in 210)
75 years	0.2 %	(1 in 500)	0.3 %	(1 in 300)	0.2 %	(1 in 430)	0.4 %	(1 in 250)
Lifetime risk			0.5 %	(1 in 190)			0.5 %	(1 in 190)
Men aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1 %	(1 in 8,200)	1.2 %	(1 in 86)	< 0.1 %	(1 in 14,100)	1.1 %	(1 in 91)
45 years	0.1 %	(1 in 1,600)	1.2 %	(1 in 86)	< 0.1 %	(1 in 2,700)	1.1 %	(1 in 91)
55 years	0.2 %	(1 in 440)	1.1 %	(1 in 87)	0.2 %	(1 in 570)	1.1 %	(1 in 91)
65 years	0.5 %	(1 in 220)	1.0 %	(1 in 98)	0.4 %	(1 in 270)	1.0 %	(1 in 97)
75 years	0.5 %	(1 in 190)	0.7 %	(1 in 140)	0.6 %	(1 in 170)	0.8 %	(1 in 120)
Lifetime risk			1.1 %	(1 in 88)			1.1 %	(1 in 93)

Figure 3.8.3
Distribution of UICC-stages at first diagnosis by sex, ICD-10 C22, Germany 2015–2016
(top: all cases; bottom: only valid reports)

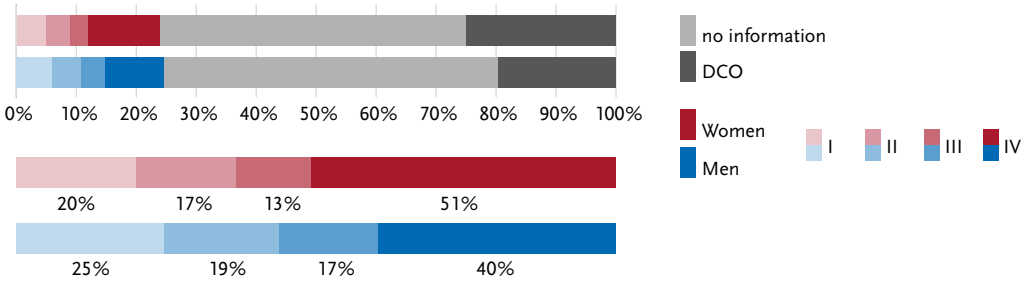


Figure 3.8.4
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C22, Germany 2015–2016

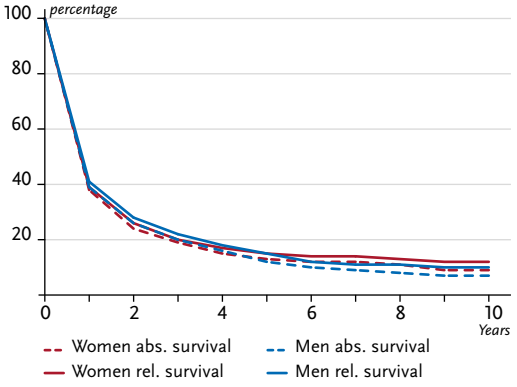


Figure 3.8.5
Relative 5-year survival by UICC-stage and sex, ICD-10 C22, Germany 2015–2016

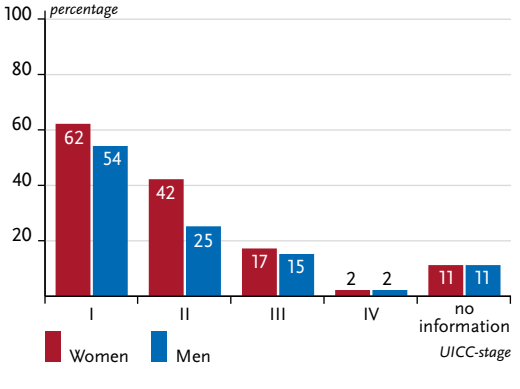


Figure 3.8.6
Age-standardised incidence and mortality rates in German federal states by sex, ICD-10 C22, 2015–2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

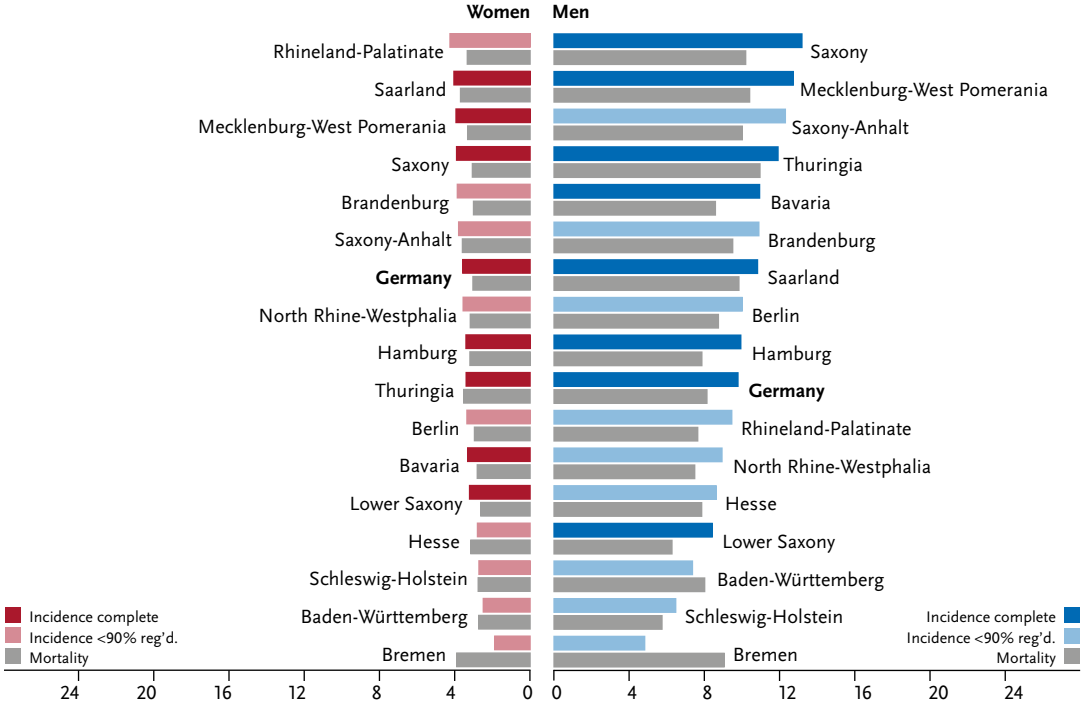
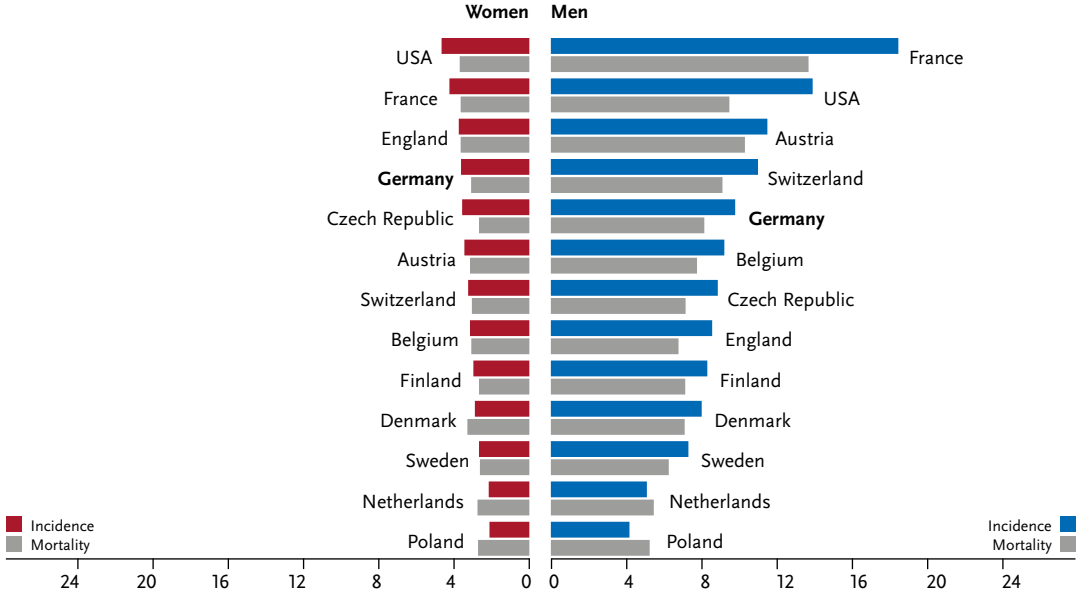


Figure 3.8.7
International comparison of age-standardised incidence and mortality rates by sex, ICD-10 C22, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



3.9 Gall bladder and biliary tract

Table 3.9.1
Overview of key epidemiological parameters for Germany, ICD-10 C23–C24

Incidence	2015		2016		Prediction for 2020	
	Women	Men	Women	Men	Women	Men
Incident cases	2,890	2,600	2,740	2,550	2,500	2,600
Crude incidence rate[1]	7.0	6.5	6.6	6.3	6.1	6.5
Age-standardised incidence rate[1,2]	3.3	4.0	3.2	3.9	2.8	3.8
Median age at diagnosis	77	73	77	74		

Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	2,090	1,611	2,113	1,562	2,072	1,727
Crude mortality rate[1]	5.0	4.0	5.1	3.8	4.9	4.2
Age-standardised mortality rate[1,2]	2.2	2.4	2.2	2.2	2.1	2.5
Median age at death	78	75	79	76	79	76

Prevalence and survival rates	5 years		10 years	
	Women	Men	Women	Men
Prevalence	4,400	4,200	6,100	5,800
Absolute survival rate (2015–2016)[3]	15 (9–24)	18 (7–22)	10 (6–22)	12 (5–16)
Relative survival rate (2015–2016)[3]	18 (11–30)	22 (9–27)	16 (9–37)	18 (7–23)

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

In 2016, about 5,290 new cases of malignant tumours of the gall bladder (about 32 %) and extrahepatic bile ducts (68 %) were diagnosed in Germany. The proportion of biliary tract tumours diagnosed outside of the liver was significantly higher in men (79 %) than in women (60 %). The majority of these cancers were adenocarcinomas. About 1 % of tumours of the biliary tract were what are known as Klatskin tumours.

As with liver cancer, the risk of developing gall bladder and biliary tract cancer increases steadily with age. One in every 190 women and one in every 210 men will develop a gall bladder or biliary tract tumour during their lifetime.

Since 1999, age-standardised incidence in Germany has declined significantly among women (particularly regarding gall bladder carcinomas). Incidence has remained largely constant among men, although age-standardised mortality decreased until around 2009, after which it began to rise again slightly.

The 5-year survival rates from malignant tumours of the gall bladder and biliary tract are rather low at 18 % among women and 22 % among men.

Risk factors

The causes of gall bladder and biliary tract carcinomas have yet to be clearly identified. Age is the main known risk factor. Severe overweight and primary sclerosing cholangitis (PSC) are also risk factors associated with these tumours. Large gallbladder polyps, inflammation of the gallbladder (and the resulting porcelain gallbladder), as well as gallbladder stones, can increase the risk of gallbladder carcinomas. In addition to chronic inflammatory diseases of the bile ducts, the following pre-existing diseases are risk factors associated with bile duct carcinomas: congenital dilation of the bile ducts (Caroli syndrome), bile duct stones, bile duct cysts, diabetes mellitus, hepatitis B and C infections, liver diseases caused by a high level of alcohol consumption; inflammatory bowel disease, and smoking. Parasitic liver flukes are another risk factor associated with bile duct and gallbladder carcinomas, and are particularly relevant in Asia.

Screening of the general population for these forms of cancer would not be particularly useful. However, regular check-ups could be considered for certain risk groups, such as patients with gallbladder polyps, gallbladder stones and PSC.

Figure 3.9.1a
Age-standardised incidence and mortality rates by sex, ICD-10 C23–C24, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

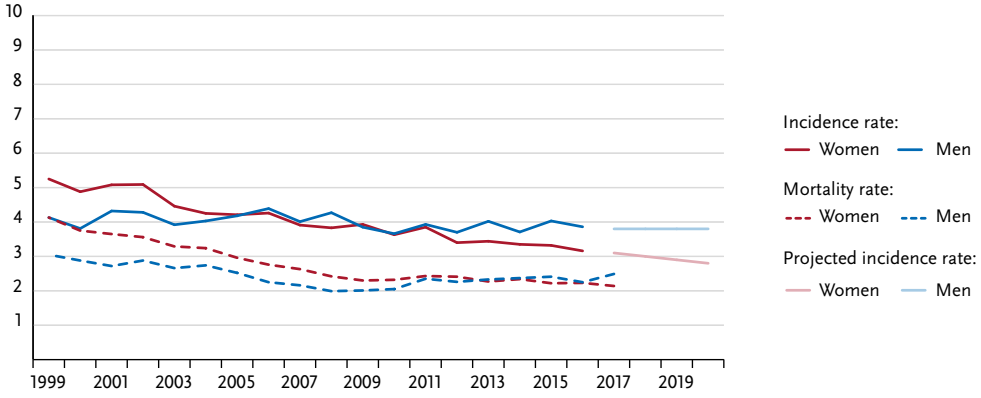


Figure 3.9.1b
Absolute numbers of incident cases and deaths by sex, ICD-10 C23–C24, Germany 1999–2016/2017, projection (incidence) through 2020

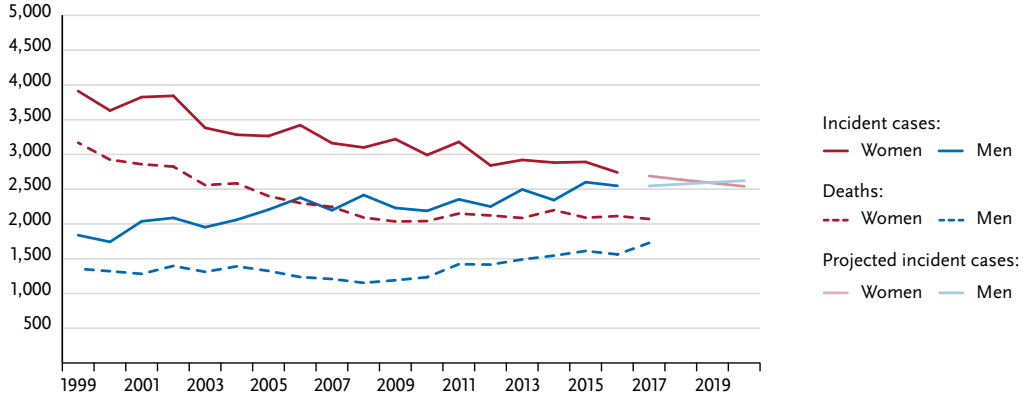


Figure 3.9.2
Age-specific incidence rates by sex, ICD-10 C23–C24, Germany 2015–2016
per 100,000

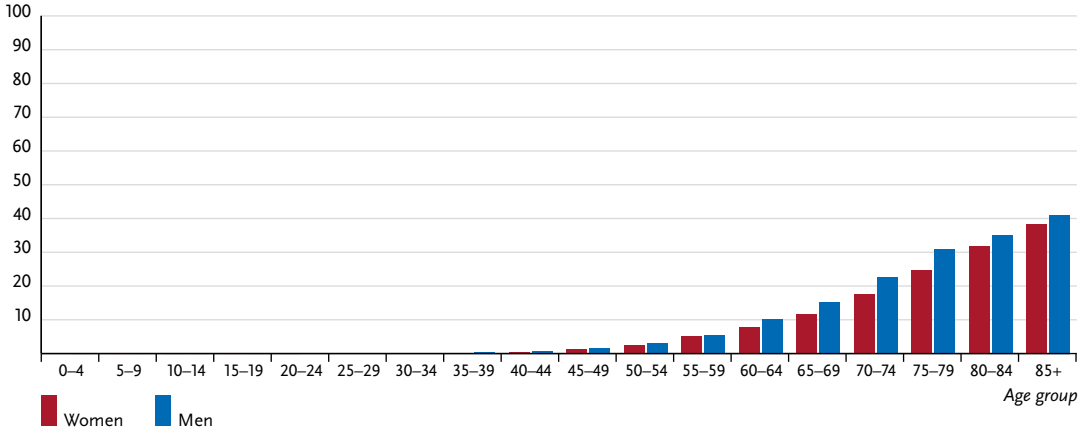


Table 3.9.2
Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C23–C24, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1 %	(1 in 23,700)	0.5 %	(1 in 190)	< 0.1 %	(1 in 52,600)	0.4 %	(1 in 230)
45 years	< 0.1 %	(1 in 5,100)	0.5 %	(1 in 190)	< 0.1 %	(1 in 8,900)	0.4 %	(1 in 230)
55 years	0.1 %	(1 in 1,500)	0.5 %	(1 in 190)	< 0.1 %	(1 in 2,500)	0.4 %	(1 in 230)
65 years	0.1 %	(1 in 720)	0.5 %	(1 in 210)	0.1 %	(1 in 1,100)	0.4 %	(1 in 240)
75 years	0.2 %	(1 in 450)	0.4 %	(1 in 260)	0.2 %	(1 in 510)	0.4 %	(1 in 270)
Lifetime risk			0.5 %	(1 in 190)			0.4 %	(1 in 240)
Men aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1 %	(1 in 16,600)	0.5 %	(1 in 200)	< 0.1 %	(1 in 81,000)	0.3 %	(1 in 300)
45 years	< 0.1 %	(1 in 4,100)	0.5 %	(1 in 200)	< 0.1 %	(1 in 11,200)	0.3 %	(1 in 300)
55 years	0.1 %	(1 in 1,400)	0.5 %	(1 in 210)	< 0.1 %	(1 in 2,900)	0.3 %	(1 in 300)
65 years	0.2 %	(1 in 600)	0.5 %	(1 in 220)	0.1 %	(1 in 1,000)	0.3 %	(1 in 300)
75 years	0.2 %	(1 in 400)	0.4 %	(1 in 280)	0.2 %	(1 in 530)	0.3 %	(1 in 340)
Lifetime risk			0.5 %	(1 in 210)			0.3 %	(1 in 310)

Figure 3.9.3
Distribution of UICC-stages at first diagnosis by sex, ICD-10 C23–C24, Germany 2015–2016
(top: all cases; bottom: only valid reports)

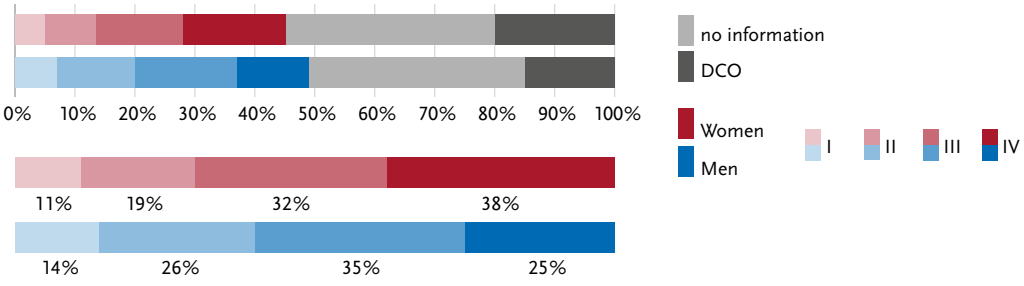


Figure 3.9.4
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C23–C24, Germany 2015–2016

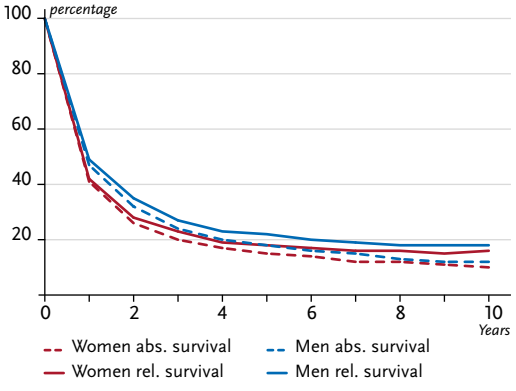


Figure 3.9.5
Relative 5-year survival by UICC-stage and sex, ICD-10 C23–C24, Germany 2015–2016

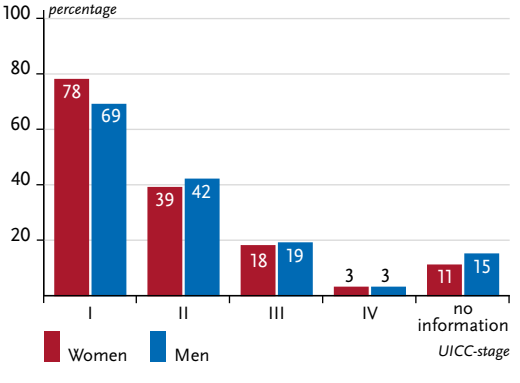


Figure 3.9.6
Age-standardised incidence and mortality rates in German federal states by sex, ICD-10 C23–C24, 2015–2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

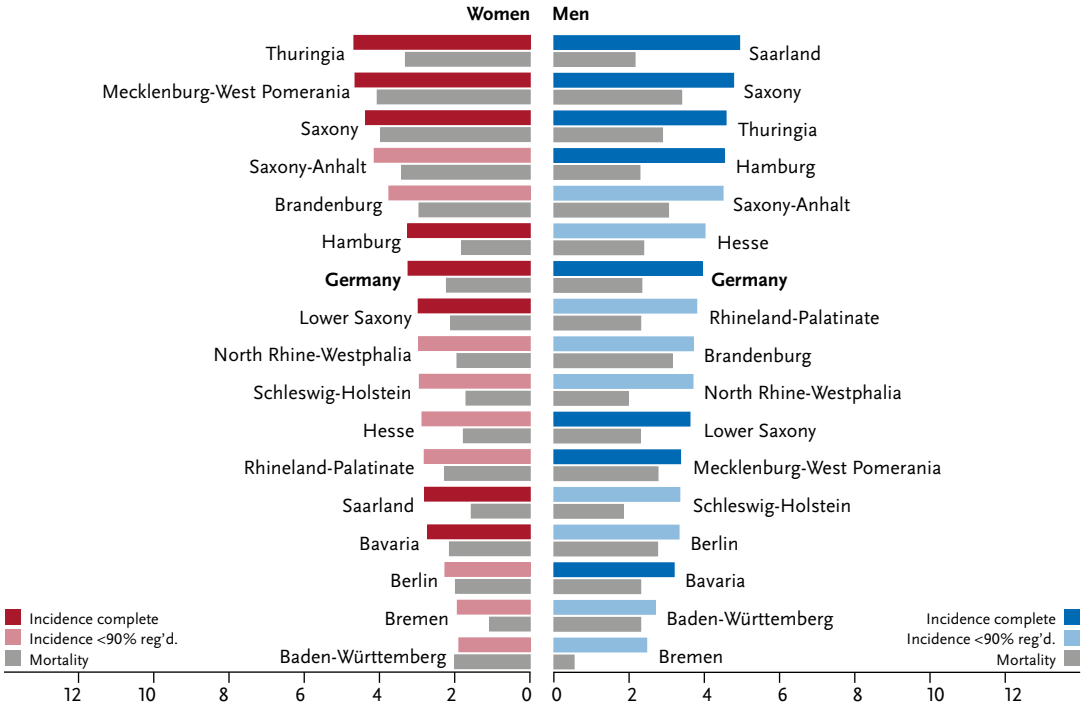
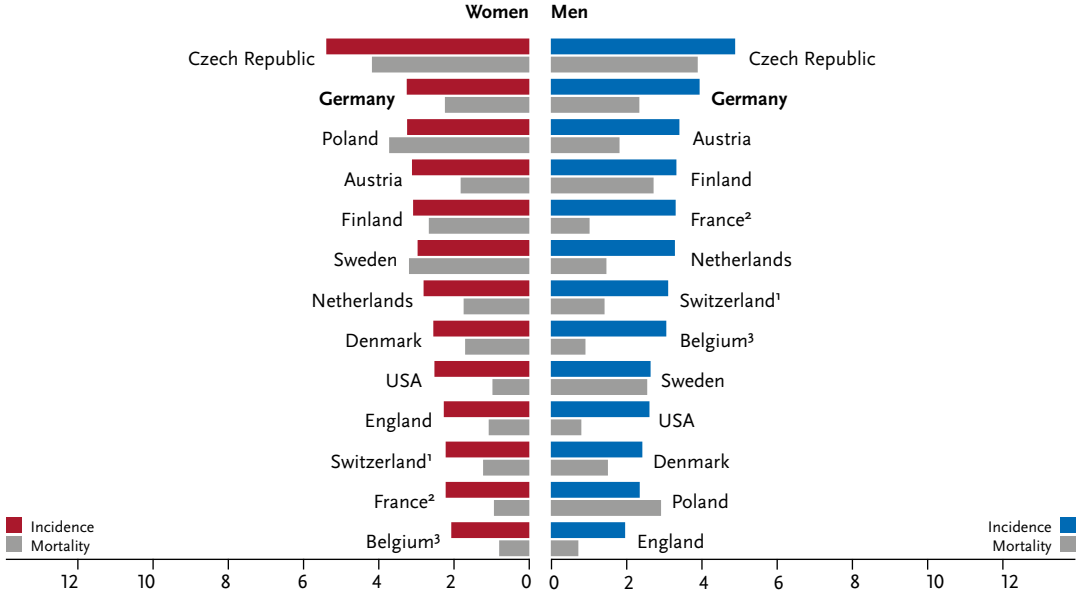


Figure 3.9.7
International comparison of age-standardised incidence and mortality rates by sex, ICD-10 C23–C24, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



[1] Mortality only for 2015
[2] Mortality for 2013/2014 from WHO mortality database
[3] Mortality only for 2015 from WHO mortality database

3.10 Pancreas

Table 3.10.1
Overview of key epidemiological parameters for Germany, ICD-10 C25

Incidence	2015		2016		Prediction for 2020	
	Women	Men	Women	Men	Women	Men
Incident cases	9,020	9,370	9,190	9,180	9,700	10,200
Crude incidence rate[1]	21.7	23.3	22.0	22.6	23.3	25.3
Age-standardised incidence rate[1,2]	10.8	14.9	10.9	14.4	10.9	15.1
Median age at diagnosis	76	72	76	72		

Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	8,659	8,497	9,044	9,008	9,058	8,947
Crude mortality rate[1]	20.9	21.2	21.7	22.2	21.6	21.9
Age-standardised mortality rate[1,2]	9.8	13.2	10.1	13.7	9.9	13.3
Median age at death	77	73	77	73	77	74

Prevalence and survival rates	5 years		10 years	
	Women	Men	Women	Men
Prevalence	10,600	11,500	13,500	14,200
Absolute survival rate (2015–2016)[3]	8 (4–17)	8 (4–12)	5 (2–12)	5 (3–9)
Relative survival rate (2015–2016)[3]	9 (4–19)	9 (5–14)	7 (3–17)	7 (4–12)

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

In 2016, around 18,400 people in Germany were diagnosed with pancreatic cancer. Its unfavourable prognosis means that nearly the same number of people died from the condition. Since the end of the 1990s, age-standardised incidence and mortality rates have increased slightly, especially among persons above the age of 65 years. Furthermore, the absolute number of new cases and deaths has steadily increased over the years both among women and men, although this trend is also influenced by demographics.

Malignant neoplasms of the pancreas frequently cause no or non-specific symptoms in their early stages. Thus, they are usually first detected at an advanced stage. This explains the extremely unfavourable relative 5-year survival rate associated with pancreatic cancer: just 9 % for women and men in Germany. Pancreatic carcinoma, thus, has the lowest survival rate of all forms of cancer. Moreover, it is also the fourth most common cause of death from cancer among both women and men (8.6 % and 7.2 % respectively). The median age at diagnosis is 76 years for women and 72 years for men.

Risk factors

Passive and active smoking are known risk factors associated with pancreatic cancer. Severe excess weight (adiposity), type 2 diabetes mellitus and a very high alcohol intake are further risk factors. Patients with chronic inflammation of the pancreas (pancreatitis) also have an increased risk. Infections with pathogens such as Helicobacter pylori, hepatitis B or HIV are also linked to pancreatic cancer. First-degree relatives of people with pancreatic cancer are at an increased risk of developing the condition themselves. This association may be due to a similar lifestyle or to genetic factors, such as a BRCA-2 mutation. The consumption of large amounts of processed meats and smoked or grilled foods may also increase the risk of pancreatic cancer.

The role played by environmental factors and occupational exposure to harmful substances is currently unclear. However, possible risk factors associated with pancreatic carcinoma include pesticides, herbicides, fungicides, chlorinated hydrocarbons, chromium and chromium-containing compounds, electromagnetic fields and fuel vapours.

Figure 3.10.1a
Age-standardised incidence and mortality rates by sex, ICD-10 C25, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

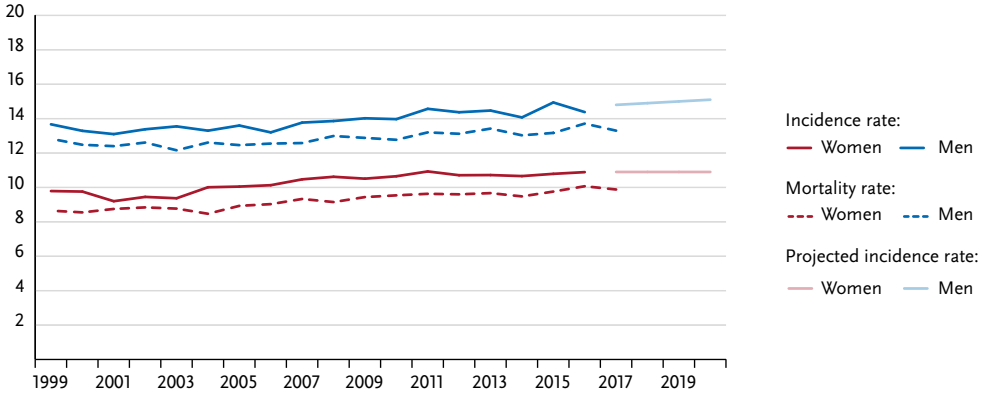


Figure 3.10.1b
Absolute numbers of incident cases and deaths by sex, ICD-10 C25, Germany 1999–2016/2017, projection (incidence) through 2020

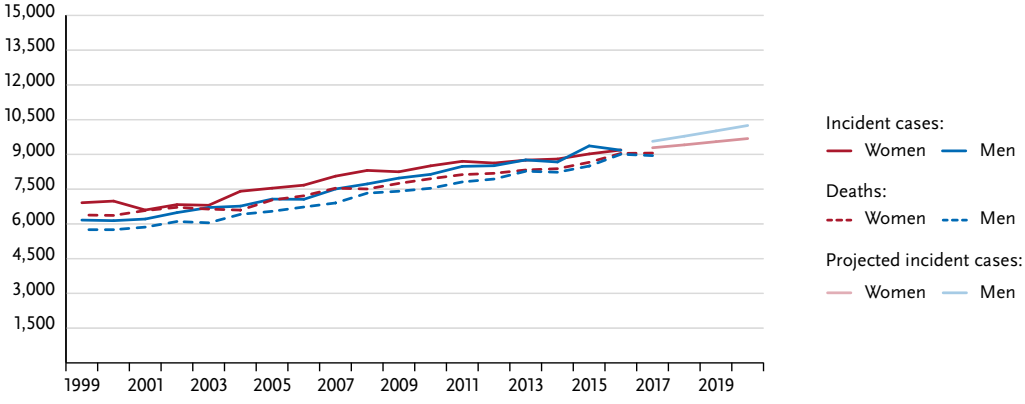


Figure 3.10.2
Age-specific incidence rates by sex, ICD-10 C25, Germany 2015–2016
per 100,000

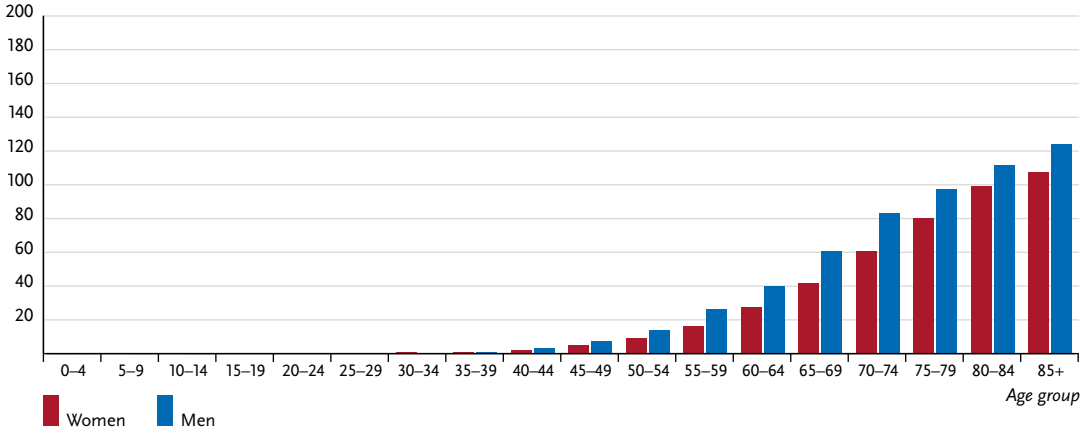


Table 3.10.2
Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C25, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1 %	(1 in 5,500)	1.8 %	(1 in 57)	< 0.1 %	(1 in 9,000)	1.8 %	(1 in 55)
45 years	0.1 %	(1 in 1,400)	1.7 %	(1 in 57)	0.1 %	(1 in 1,800)	1.8 %	(1 in 55)
55 years	0.2 %	(1 in 460)	1.7 %	(1 in 58)	0.2 %	(1 in 520)	1.8 %	(1 in 56)
65 years	0.5 %	(1 in 200)	1.6 %	(1 in 63)	0.4 %	(1 in 230)	1.7 %	(1 in 59)
75 years	0.8 %	(1 in 130)	1.2 %	(1 in 82)	0.8 %	(1 in 120)	1.4 %	(1 in 71)
Lifetime risk			1.7 %	(1 in 58)			1.8 %	(1 in 56)
Men aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1 %	(1 in 4,500)	1.7 %	(1 in 57)	< 0.1 %	(1 in 7,800)	1.8 %	(1 in 54)
45 years	0.1 %	(1 in 950)	1.7 %	(1 in 57)	0.1 %	(1 in 1,200)	1.8 %	(1 in 54)
55 years	0.3 %	(1 in 320)	1.7 %	(1 in 59)	0.3 %	(1 in 350)	1.8 %	(1 in 55)
65 years	0.6 %	(1 in 160)	1.5 %	(1 in 65)	0.6 %	(1 in 170)	1.7 %	(1 in 58)
75 years	0.8 %	(1 in 130)	1.1 %	(1 in 88)	0.9 %	(1 in 110)	1.4 %	(1 in 72)
Lifetime risk			1.7 %	(1 in 59)			0.4 %	(1 in 56)

Figure 3.10.3
Distribution of UICC-stages at first diagnosis by sex, ICD-10 C25, Germany 2015–2016
(top: all cases; bottom: only valid reports)

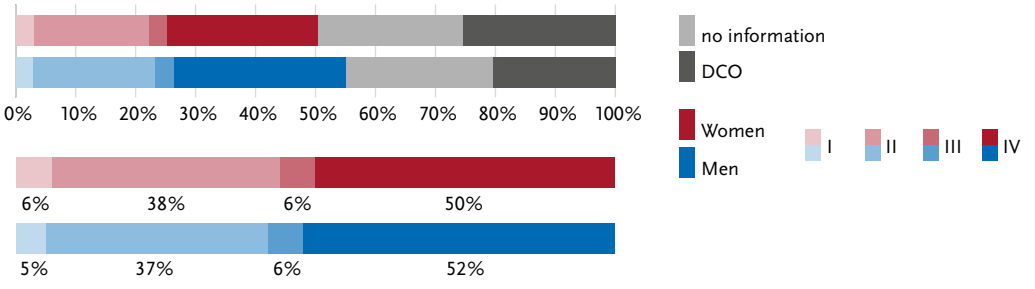


Figure 3.10.4
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C25, Germany 2015–2016

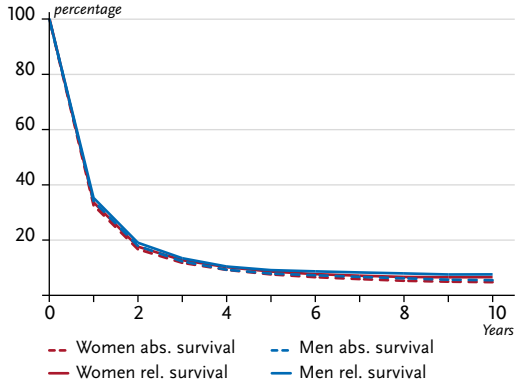


Figure 3.10.5
Relative 5-year survival by UICC-stage and sex, ICD-10 C25, Germany 2015–2016

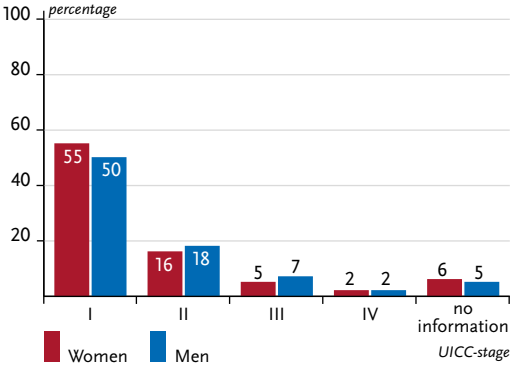


Figure 3.10.6
Age-standardised incidence and mortality rates in German federal states by sex, ICD-10 C25, 2015–2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

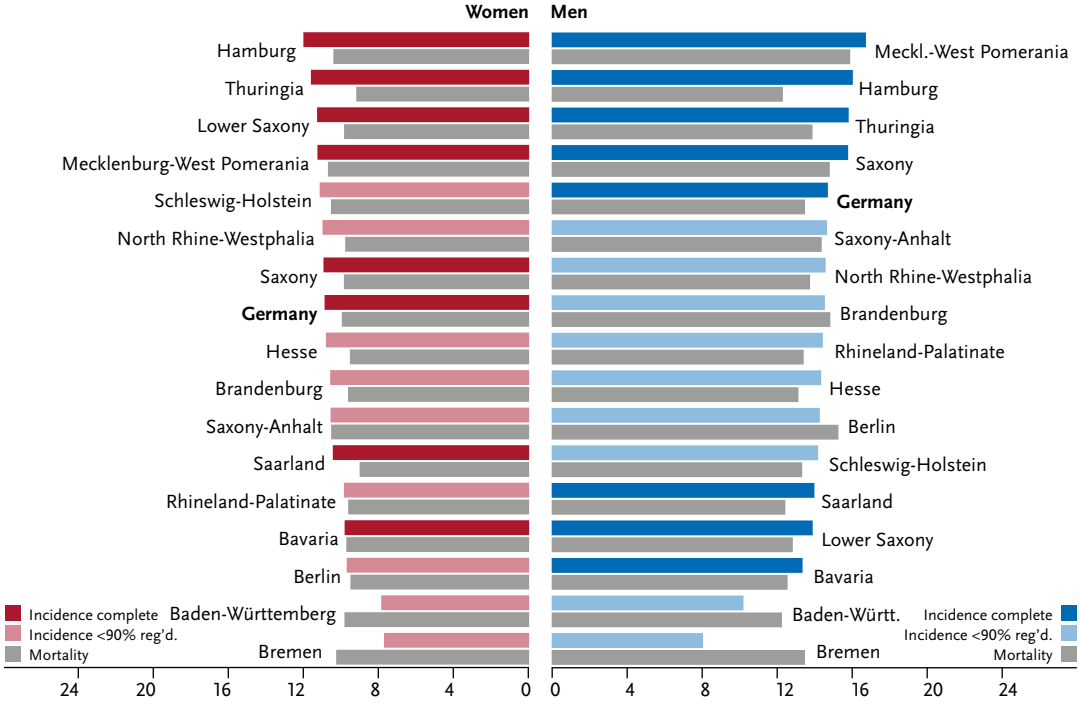
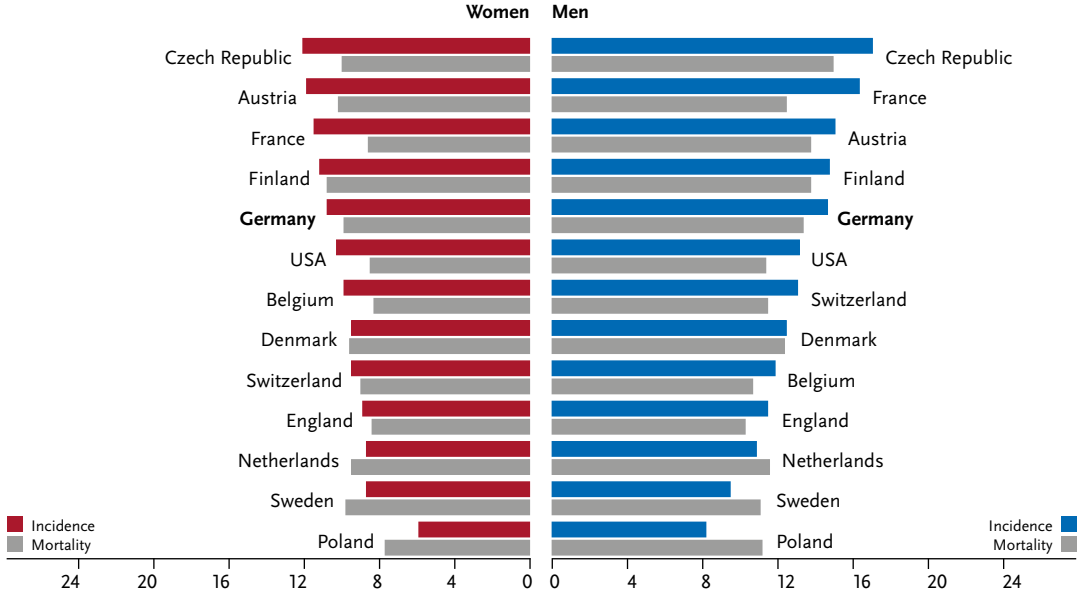


Figure 3.10.7
International comparison of age-standardised incidence and mortality rates by sex, ICD-10 C25, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



3.11 Larynx

Table 3.11.1
Overview of key epidemiological parameters for Germany, ICD-10 C32

Incidence	2015		2016		Prediction for 2020	
	Women	Men	Women	Men	Women	Men
Incident cases	560	2,920	510	3,130	630	2,900
Crude incidence rate[1]	1.3	7.3	1.2	7.7	1.5	7.1
Age-standardised incidence rate[1,2]	0.9	5.1	0.8	5.4	1.0	4.6
Median age at diagnosis	64	66	64	66		

Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	205	1,291	227	1,247	201	1,182
Crude mortality rate[1]	0.5	3.2	0.5	3.1	0.5	2.9
Age-standardised mortality rate[1,2]	0.3	2.1	0.3	2.0	0.3	1.9
Median age at death	69	70	70	70	71	70

Prevalence and survival rates	5 years		10 years	
	Women	Men	Women	Men
Prevalence	2,000	11,300	3,300	19,500
Absolute survival rate (2015–2016)[3]	58	54 (44–60)	42	36 (32–41)
Relative survival rate (2015–2016)[3]	63	61 (50–69)	51	49 (42–53)

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

The larynx is almost only ever affected by squamous cell carcinomas. Men develop this cancer much more often than women. In 2016, approximately 3,640 new cases of cancer of the larynx were diagnosed in Germany; women were affected in about one in seven cases. One in 180 men and one in 1,100 women will develop cancer of the larynx over the course of their life. The median age at diagnosis is 64 years for women and 66 years for men, which is earlier than for most other types of cancer. Age-specific disease rates are highest among women between 55 and 75 years old, and among men between 65 and 75 years old.

Incidence and mortality rates among men have been declining since the end of the 1990s. However, rates among women remained almost unchanged during this period.

Relative 5-year survival rates do not differ substantially between the sexes: 61% among men and 63% among women. However, a higher proportion of men (35%) are diagnosed at an early stage (stage I) than women (30%).

Risk factors

Regular tobacco use and excessive alcohol consumption are major risk factors associated with cancer of the larynx. These risk factors are particularly harmful in combination.

There are also known links between laryngeal cancer and an occupational exposure to asbestos; ionising radiation such as from uranium; sulphuric acid aerosols, polycyclic aromatic hydrocarbons, lignite and tar products. Cement and wood dust seem to play a less significant role.

Infections with human papillomaviruses (HPV), particularly with HPV 16, are responsible for a small proportion of cancers of the larynx.

The effects of lifestyle and diet are still unclear because the impacts of tobacco use and alcohol consumption usually overlap with those stemming from other risk factors. However, there are indications that a diet that lacks both variation and vitamins combined with a high dietary intake of red meat and fried food may increase a person's risk of developing cancer of the larynx.

Genetics is also assumed to play a role, since a higher frequency of laryngeal carcinomas has been observed within some families.

Figure 3.11.1a
Age-standardised incidence and mortality rates by sex, ICD-10 C32, Germany 1999–2016/17, projection (incidence) through 2020
per 100,000 (old European Standard)

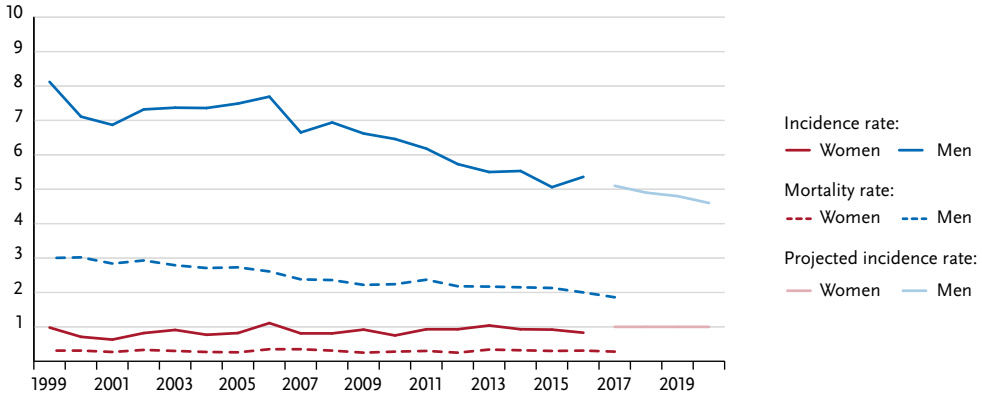


Figure 3.11.1b
Absolute numbers of incident cases and deaths by sex, ICD-10 C32, Germany 1999–2016/17, projection (incidence) through 2020

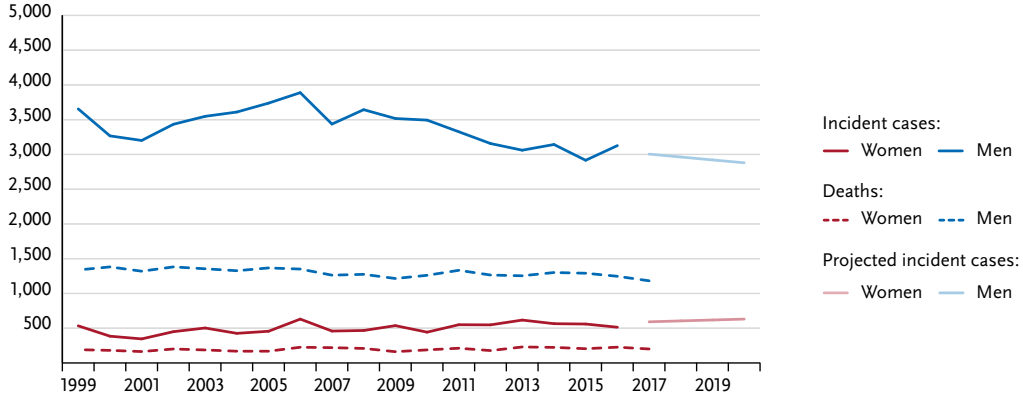


Figure 3.11.2
Age-specific incidence rates by sex, ICD-10 C32, Germany 2015–2016
per 100,000

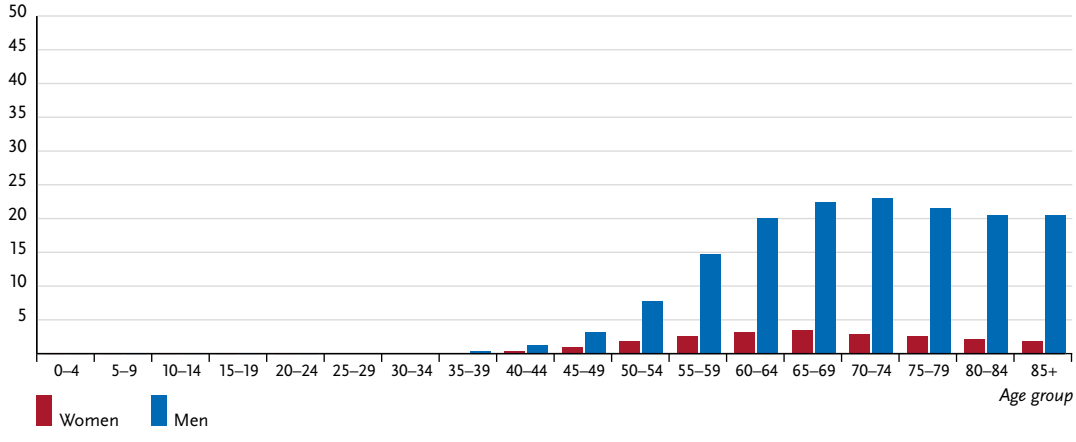


Table 3.11.2
Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C32, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1 %	(1 in 36,000)	0.1 %	(1 in 1,100)	< 0.1 %	(1 in 363,000)	< 0.1 %	(1 in 2,300)
45 years	< 0.1 %	(1 in 7,500)	0.1 %	(1 in 1,100)	< 0.1 %	(1 in 30,100)	< 0.1 %	(1 in 2,300)
55 years	< 0.1 %	(1 in 3,700)	0.1 %	(1 in 1,300)	< 0.1 %	(1 in 10,500)	< 0.1 %	(1 in 2,400)
65 years	< 0.1 %	(1 in 3,600)	0.1 %	(1 in 1,900)	< 0.1 %	(1 in 7,400)	< 0.1 %	(1 in 3,000)
75 years	< 0.1 %	(1 in 5,100)	< 0.1 %	(1 in 3,500)	< 0.1 %	(1 in 8,000)	< 0.1 %	(1 in 4,500)
Lifetime risk			0.1 %	(1 in 1,100)			< 0.1 %	(1 in 2,300)
Men aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1 %	(1 in 10,500)	0.6 %	(1 in 180)	< 0.1 %	(1 in 68,600)	0.2 %	(1 in 400)
45 years	0.1 %	(1 in 1,600)	0.6 %	(1 in 180)	< 0.1 %	(1 in 6,800)	0.3 %	(1 in 400)
55 years	0.2 %	(1 in 600)	0.5 %	(1 in 190)	0.1 %	(1 in 1,800)	0.2 %	(1 in 410)
65 years	0.2 %	(1 in 480)	0.4 %	(1 in 260)	0.1 %	(1 in 1,200)	0.2 %	(1 in 480)
75 years	0.2 %	(1 in 590)	0.2 %	(1 in 440)	0.1 %	(1 in 970)	0.2 %	(1 in 650)
Lifetime risk			0.5 %	(1 in 180)			0.2 %	(1 in 410)

Figure 3.11.3
Distribution of UICC-stages at first diagnosis by sex, ICD-10 C32, Germany 2015–2016
(top: all cases; bottom: only valid reports)

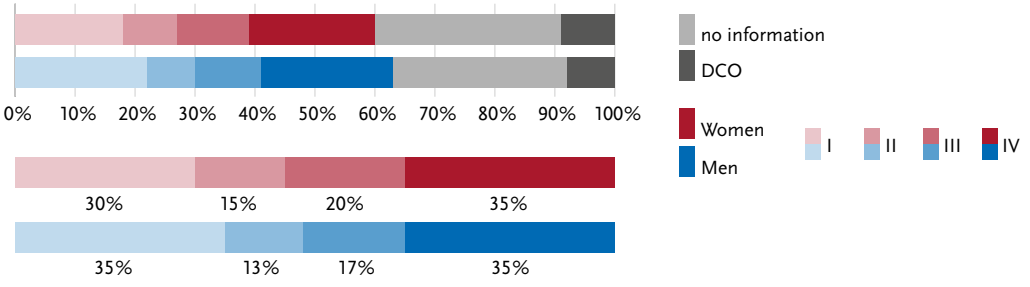


Figure 3.11.4
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C32, Germany 2015–2016

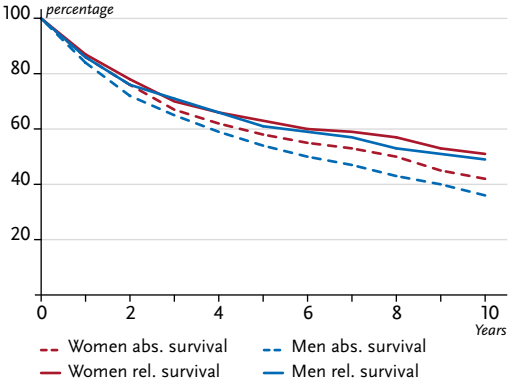


Figure 3.11.5
Relative 5-year survival by UICC-stage and sex, ICD-10 C32, Germany 2015–2016

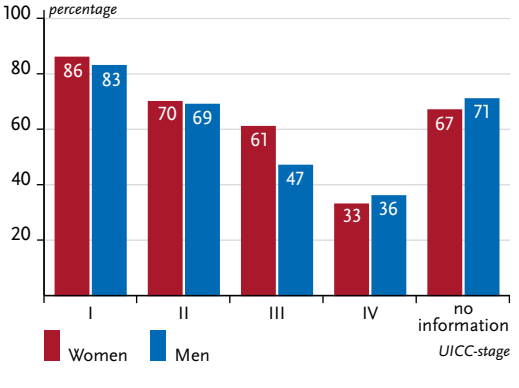


Figure 3.11.6
Age-standardised incidence and mortality rates in German federal states by sex, ICD-10 C32, 2015–2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

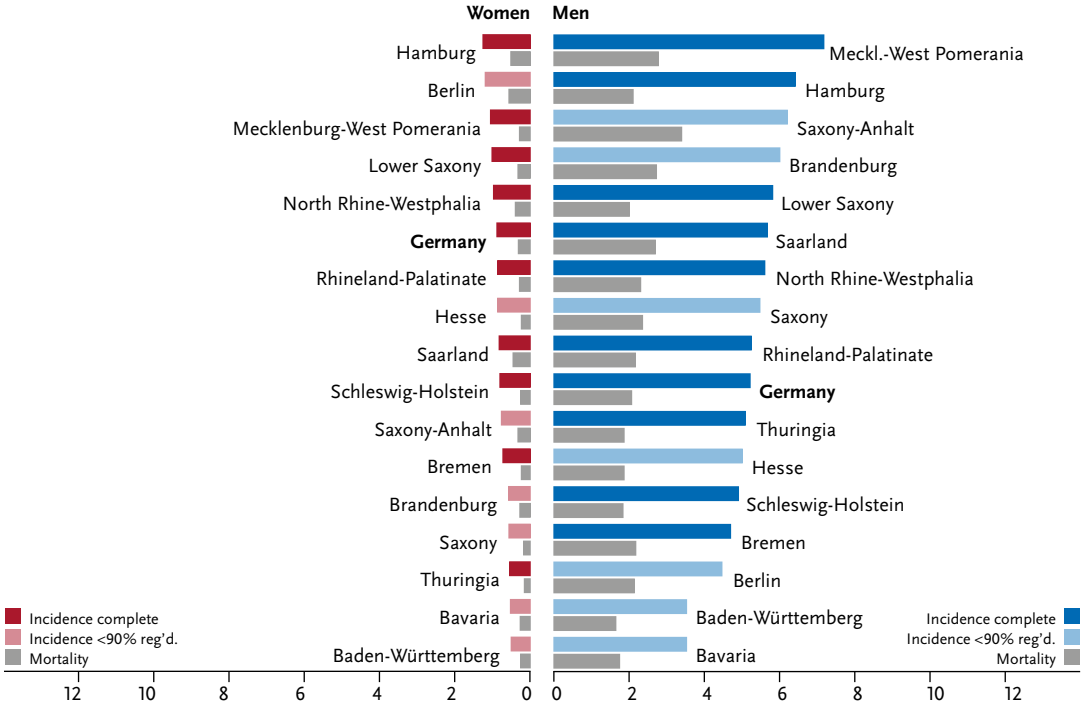
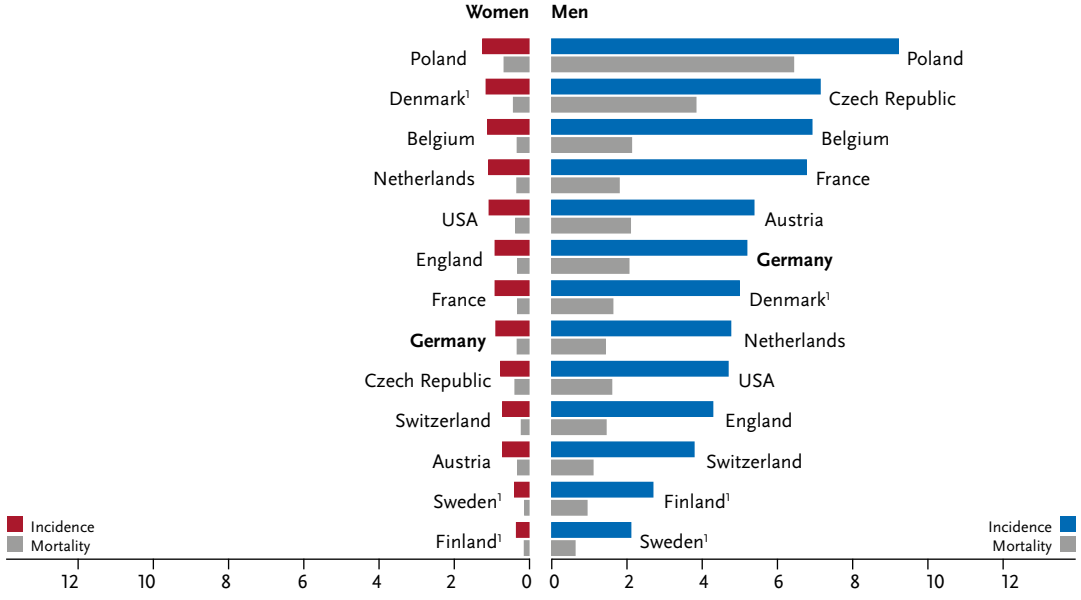


Figure 3.11.7
International comparison of age-standardised incidence and mortality rates by sex, ICD-10 C32, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



[1] Data including C10.1

3.12 Lung

Table 3.12.1
Overview of key epidemiological parameters for Germany, ICD-10 C33–C34

Incidence	2015		2016		Prediction for 2020	
	Women	Men	Women	Men	Women	Men
Incident cases	21,470	36,860	21,500	35,960	25,920	36,460
Crude incidence rate[1]	51.7	91.8	51.5	88.6	62.4	90.1
Age-standardised incidence rate[1,2]	31.9	59.9	31.4	57.5	36.7	55.1
Median age at diagnosis	69	70	69	70		

Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	15,881	29,378	16,481	29,324	16,382	28,692
Crude mortality rate[1]	38.3	73.1	39.5	72.2	39.1	70.4
Age-standardised mortality rate[1,2]	22.1	46.5	22.6	45.7	22.1	43.9
Median age at death	71	72	71	72	71	72

Prevalence and survival rates	5 years		10 years	
	Women	Men	Women	Men
Prevalence	38,200	58,300	52,700	80,500
Absolute survival rate (2015–2016)[3]	19 (15–24)	13 (9–17)	13 (10–17)	8 (5–11)
Relative survival rate (2015–2016)[3]	21 (17–26)	15 (10–19)	16 (12–21)	11 (7–16)

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

In 2016, approximately 21,500 women and 36,000 men developed malignant tumours of the lung; in the same year, 16,481 women and 29,324 men died from the condition.

Age-standardised incidence and mortality rates among men and women show contrasting trends. Whereas rates among women have risen continuously since the end of the 1990s, they decreased over the same period among men. These diverging trends can be attributed to changes in smoking habits that occurred in the past. As such, these trends will probably continue in the future. Lung cancer has one of the least favourable prognoses, with low 5-year survival rates of about 21% for women and 15% for men. There are three main types of lung cancer: adenocarcinomas, which account for 42% of cases; squamous cell carcinomas, which account for about a quarter of cases; and small-cell lung carcinomas, which account for around one fifth of all cases. The latter tend to metastasise early and thus have the worst prognosis.

A comparison of selected countries revealed the highest incidence rates for women in Denmark and for men in Belgium.

Risk factors and early detection

Tobacco use is the main risk factor associated with lung cancer. Up to nine out of ten cases of lung cancer cases among men and at least six out of ten cases among women are due to active smoking. However, passive smoking also increases the risk of lung cancer.

Other risk factors tend to play a minor role. Between 9 and 15 out of every 100 lung cancer cases can be attributed to carcinogenic substances such as asbestos, polycyclic aromatic hydrocarbons, and quartz or nickel dust. People living in areas with a high natural exposure to radon in buildings have a higher risk of developing lung cancer, with those living on the lower floors at particular risk. This also applies to occupational exposure to radon and to other sources of ionising radiation. Diesel exhaust fumes and particulate matter are the most important risk factors among air pollutants. Genetic factors are also assumed to play a role. Currently, no appropriate form of lung cancer screening exists for the entire population. Studies are being carried out to determine whether and for whom screening with low-dose computed tomography could be useful. However, an annual screening programme for lung cancer has yet to be established.

Figure 3.12.1a
Age-standardised incidence and mortality rates by sex, ICD-10 C33 – C34, Germany 1999 – 2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

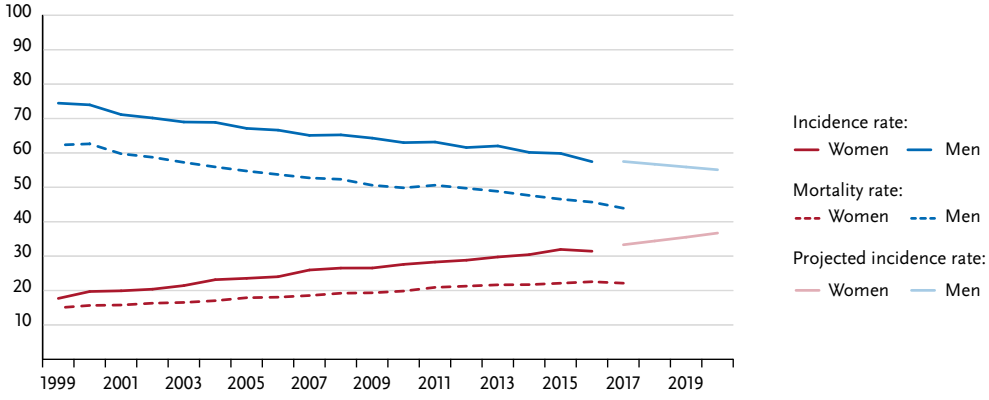


Figure 3.12.1b
Absolute numbers of incident cases and deaths by sex, ICD-10 C33 – C34, Germany 1999 – 2016/2017, projection (incidence) through 2020

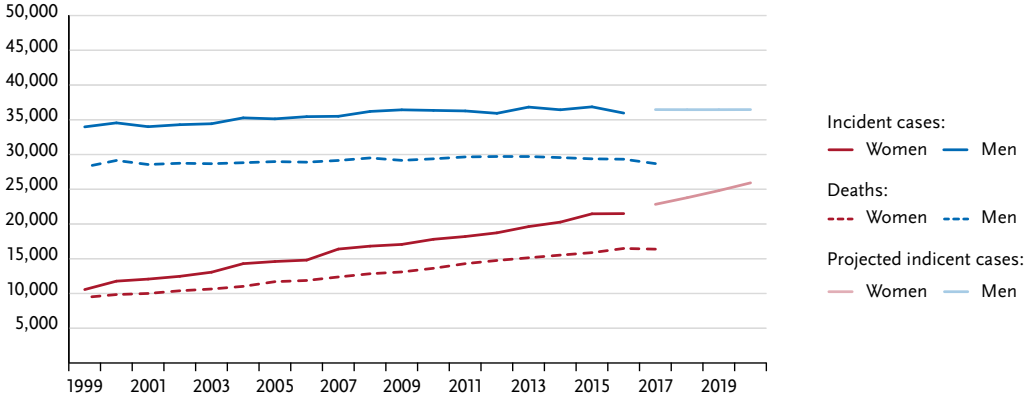


Figure 3.12.2
Age-specific incidence rates by sex, ICD-10 C33 – C34, Germany 2015 – 2016
per 100,000

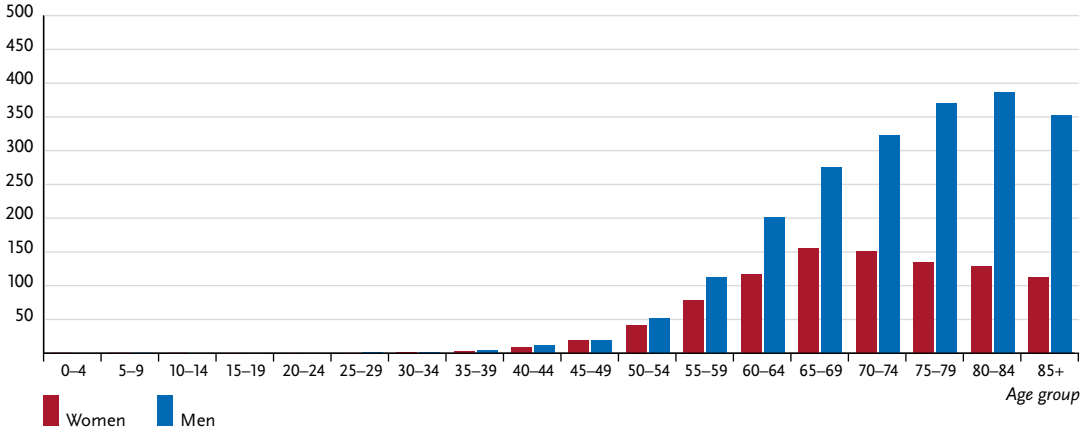


Table 3.12.2
Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C33–C34, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	0.1%	(1 in 1,500)	3.9%	(1 in 25)	< 0.1%	(1 in 3,700)	3.1%	(1 in 32)
45 years	0.3%	(1 in 340)	3.9%	(1 in 26)	0.2%	(1 in 520)	3.1%	(1 in 32)
55 years	0.9%	(1 in 110)	3.7%	(1 in 27)	0.7%	(1 in 150)	3.0%	(1 in 33)
65 years	1.4%	(1 in 70)	2.9%	(1 in 35)	1.0%	(1 in 97)	2.5%	(1 in 40)
75 years	1.2%	(1 in 87)	1.7%	(1 in 60)	1.1%	(1 in 94)	1.6%	(1 in 61)
Lifetime risk			3.9%	(1 in 26)			3.1%	(1 in 32)
Men aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	0.1%	(1 in 1,300)	6.7%	(1 in 15)	< 0.1%	(1 in 3,100)	5.9%	(1 in 17)
45 years	0.4%	(1 in 270)	6.7%	(1 in 15)	0.3%	(1 in 380)	5.9%	(1 in 17)
55 years	1.5%	(1 in 69)	6.6%	(1 in 15)	1.1%	(1 in 88)	5.8%	(1 in 17)
65 years	2.7%	(1 in 37)	5.7%	(1 in 17)	2.1%	(1 in 48)	5.2%	(1 in 19)
75 years	2.9%	(1 in 35)	3.9%	(1 in 26)	2.7%	(1 in 37)	4.0%	(1 in 25)
Lifetime risk			6.6%	(1 in 15)			5.7%	(1 in 17)

Figure 3.12.3
Distribution of UICC-stages at first diagnosis by sex, ICD-10 C33–C34, Germany 2015–2016
(top: all cases; bottom: only valid reports)

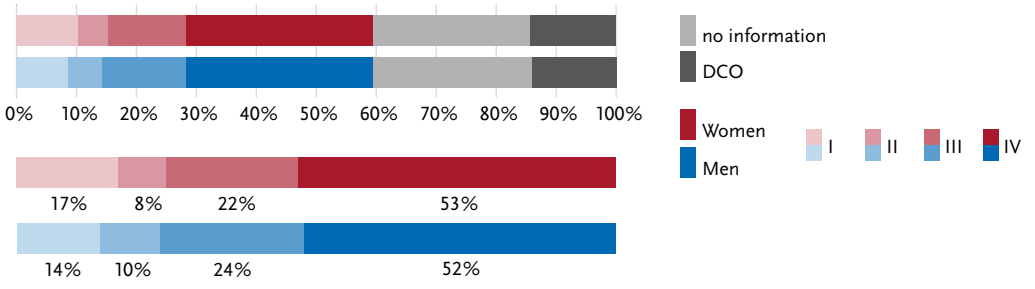


Figure 3.12.4
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C33–C34, Germany 2015–2016

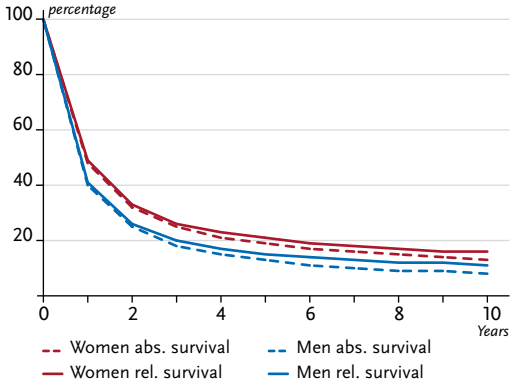


Figure 3.12.5
Relative 5-year survival by UICC-stage and sex, ICD-10 C33–C34, Germany 2015–2016

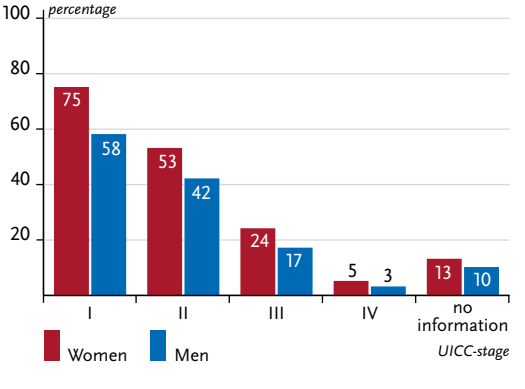


Figure 3.12.6
Age-standardised incidence and mortality rates in German federal states by sex, ICD-10 C33 – C34, 2015 – 2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

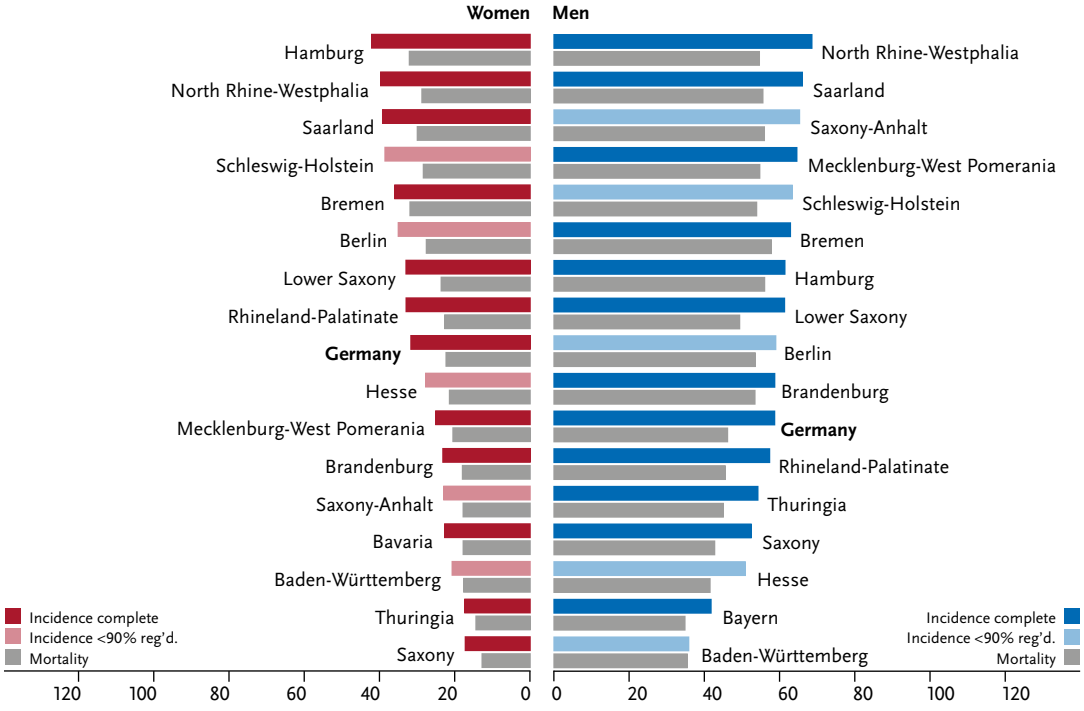
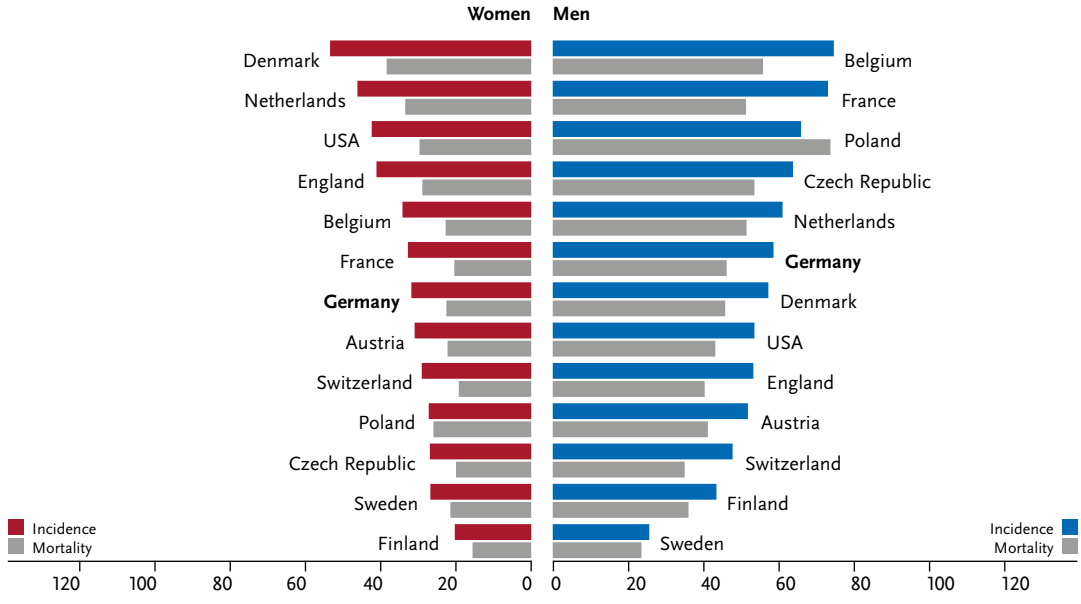


Figure 3.12.7
International comparison of age-standardised incidence and mortality rates by sex, ICD-10 C33 – C34, 2015 – 2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



3.13 Malignant melanoma of the skin

Table 3.13.1
Overview of key epidemiological parameters for Germany, ICD-10 C43

Incidence	2015		2016		Prediction for 2020	
	Women	Men	Women	Men	Women	Men
Incident cases	10,850	11,170	11,150	12,090	12,100	13,000
Crude incidence rate[1]	26.1	27.8	26.7	29.8	29.0	32.2
Age-standardised incidence rate[1,2]	19.6	19.7	19.9	21.0	20.7	21.3
Median age at diagnosis	60	67	60	68		

Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	1,287	1,767	1,226	1,700	1,242	1,593
Crude mortality rate[1]	3.1	4.4	2.9	4.2	3.0	3.9
Age-standardised mortality rate[1,2]	1.6	2.8	1.5	2.7	1.6	2.4
Median age at death	76	74	76	74	75	75

Prevalence and survival rates	5 years		10 years	
	Women	Men	Women	Men
Prevalence	51,000	50,900	92,900	88,100
Absolute survival rate (2015–2016)[3]	85 (80–87)	78 (70–81)	75 (67–79)	63 (52–67)
Relative survival rate (2015–2016)[3]	93 (89–96)	91 (83–94)	92 (84–94)	88 (74–92)

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

In 2016, around 23,200 people in Germany developed malignant melanoma of the skin. Similar numbers of women and men developed the condition; however, women tended to be diagnosed younger, at a median age of 60 years, compared with 68 years for men. The age-standardised incidence rates for women and men have increased markedly since 2008. This is probably due to the introduction of skin cancer screening in Germany in July 2008. Furthermore, incidence among both sexes has increased more than fivefold since the 1970s. Nevertheless, mortality increased only slightly (and only among men) over the same period. Superficial spreading melanomas are the predominant type of malignant melanomas. They come with a favourable prognosis and are chiefly responsible for the increased incidence. Other forms, in particular nodular and amelanotic melanomas, have considerably less favourable prognoses. Currently, the relative 5-year survival rate with malignant melanoma of the skin in Germany is 93% among women and 91% among men. Two-thirds of all melanomas are detected at an early stage (stage I).

Risk factors and early detection

Ultraviolet (UV) radiation, particularly from repeated intensive exposure to sunlight, is the most important exogenous risk factor associated with malignant melanoma. In addition to radiation from natural sunlight, artificial sources of UV radiation, such as solariums, pose the same risk. Sunburn at any age further increases risk. In addition, one of the most important risk factors that are present at birth are congenital pigment marks (moles), especially particularly large ones. Malignant melanomas are more likely to occur in people with a lighter skin colour. Patients who have already had melanoma have an increased risk of developing it again. Cases in which multiple first-degree relatives contract malignant melanoma may indicate the presence of genetic mutations. However, the risk a family member has of developing a malignant melanoma varies depending on the mutation in question. The number of benign pigment marks that have developed during a person's lifetime and the presence of atypical (dysplastic) pigment marks are further significant risk factors. Statutory screening offers women and men 35-years and older a bi-annual skin examination conducted by a specially trained doctor (such as a dermatologist or general practitioner).

Figure 3.13.1a
Age-standardised incidence and mortality rates by sex, ICD-10 C43, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

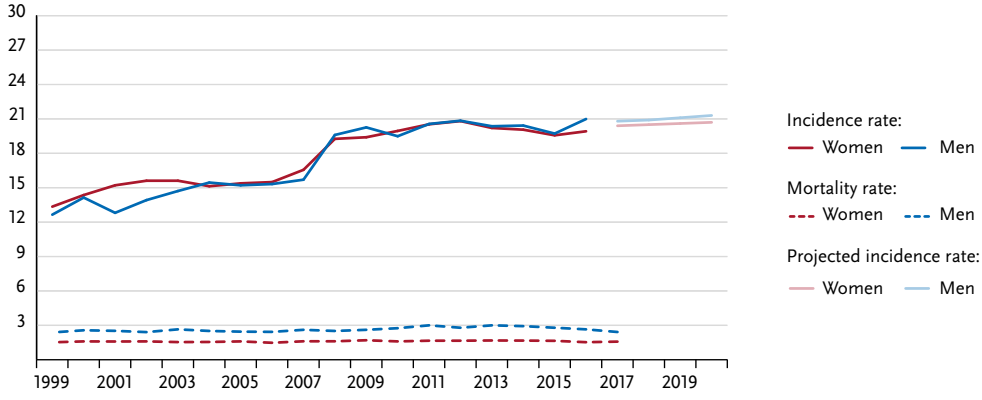


Figure 3.13.1b
Absolute numbers of incident cases and deaths by sex, ICD-10 C43, Germany 1999–2016/2017, projection (incidence) through 2020

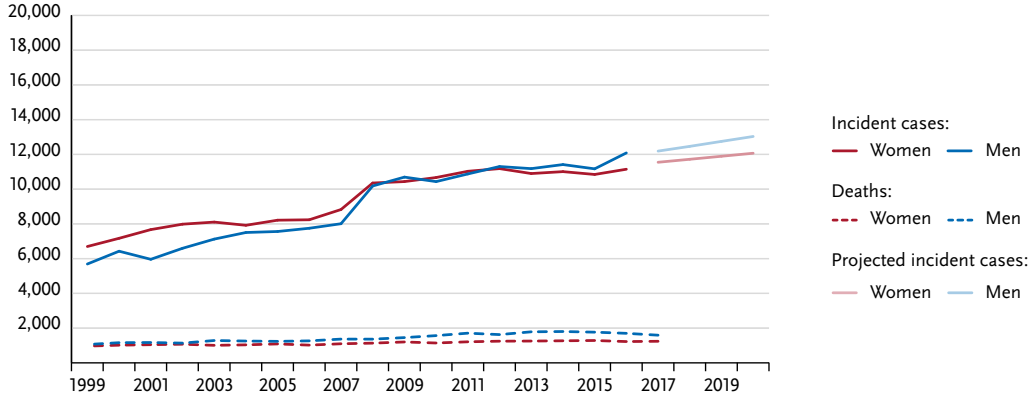


Figure 3.13.2
Age-specific incidence rates by sex, ICD-10 C43, Germany 2015–2016
per 100,000

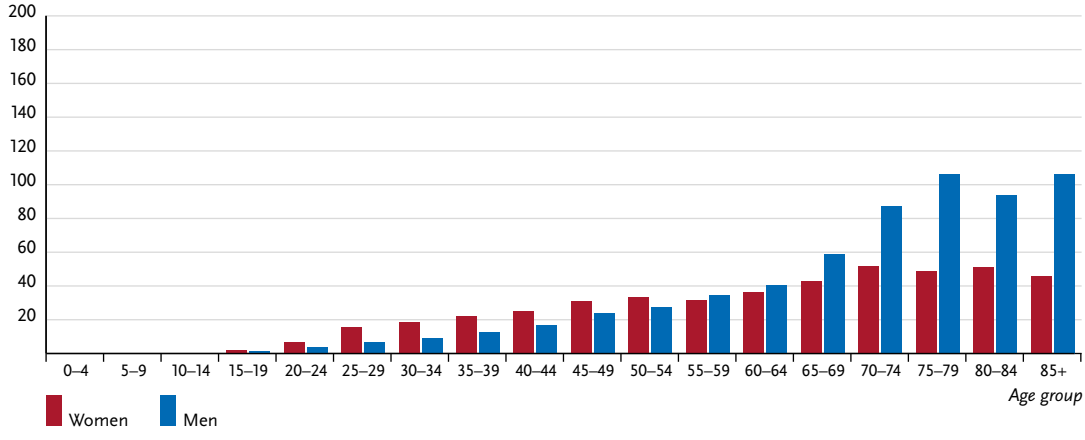


Table 3.13.2
Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C43, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	0.2 %	(1 in 420)	1.8 %	(1 in 55)	< 0.1 %	(1 in 14,500)	0.2 %	(1 in 410)
45 years	0.3 %	(1 in 310)	1.6 %	(1 in 63)	< 0.1 %	(1 in 5,400)	0.2 %	(1 in 420)
55 years	0.3 %	(1 in 290)	1.3 %	(1 in 77)	< 0.1 %	(1 in 3,400)	0.2 %	(1 in 450)
65 years	0.4 %	(1 in 230)	1.0 %	(1 in 98)	< 0.1 %	(1 in 2,200)	0.2 %	(1 in 490)
75 years	0.5 %	(1 in 220)	0.7 %	(1 in 150)	0.1 %	(1 in 1,100)	0.2 %	(1 in 560)
Lifetime risk			2.0 %	(1 in 50)			0.2 %	(1 in 410)
Men aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	0.2 %	(1 in 650)	2.1 %	(1 in 47)	< 0.1 %	(1 in 10,500)	0.3 %	(1 in 290)
45 years	0.3 %	(1 in 380)	2.0 %	(1 in 50)	< 0.1 %	(1 in 4,300)	0.3 %	(1 in 290)
55 years	0.4 %	(1 in 270)	1.8 %	(1 in 56)	< 0.1 %	(1 in 2,100)	0.3 %	(1 in 300)
65 years	0.7 %	(1 in 150)	1.6 %	(1 in 63)	0.1 %	(1 in 1,100)	0.3 %	(1 in 320)
75 years	0.8 %	(1 in 120)	1.1 %	(1 in 88)	0.2 %	(1 in 590)	0.3 %	(1 in 360)
Lifetime risk			1.0 %	(1 in 46)			0.3 %	(1 in 290)

Figure 3.13.3
Distribution of UICC-stages at first diagnosis by sex, ICD-10 C43, Germany 2015–2016
(top: all cases; bottom: only valid reports)

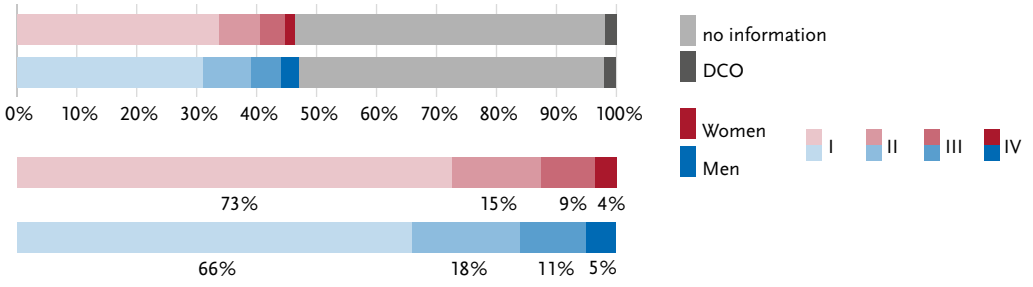


Figure 3.13.4
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C43, Germany 2015–2016

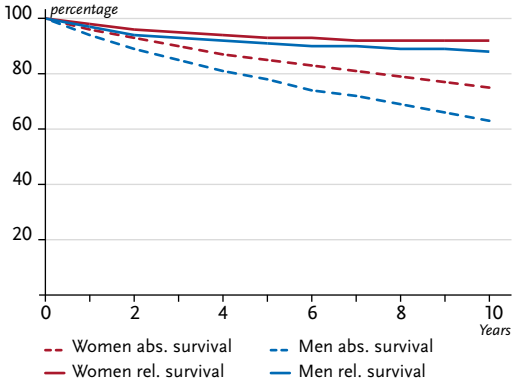


Figure 3.13.5
Relative 5-year survival by UICC-stage and sex, ICD-10 C43, Germany 2015–2016

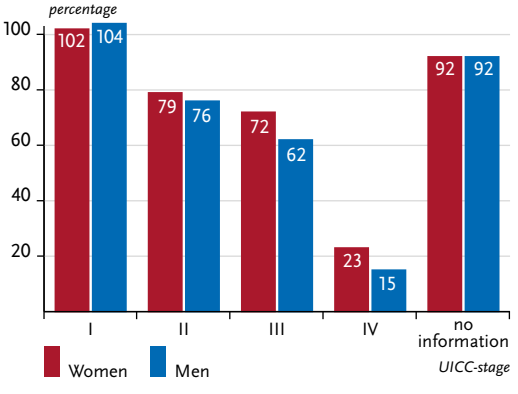


Figure 3.13.6
Age-standardised incidence and mortality rates in German federal states by sex, ICD-10 C43, 2015–2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

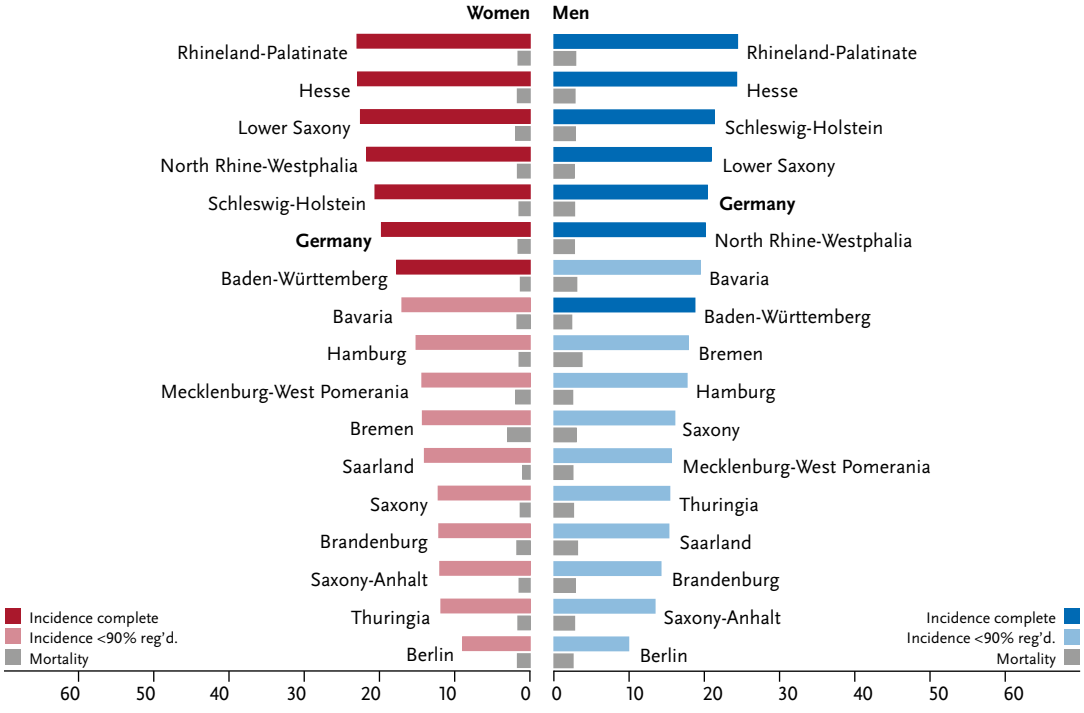
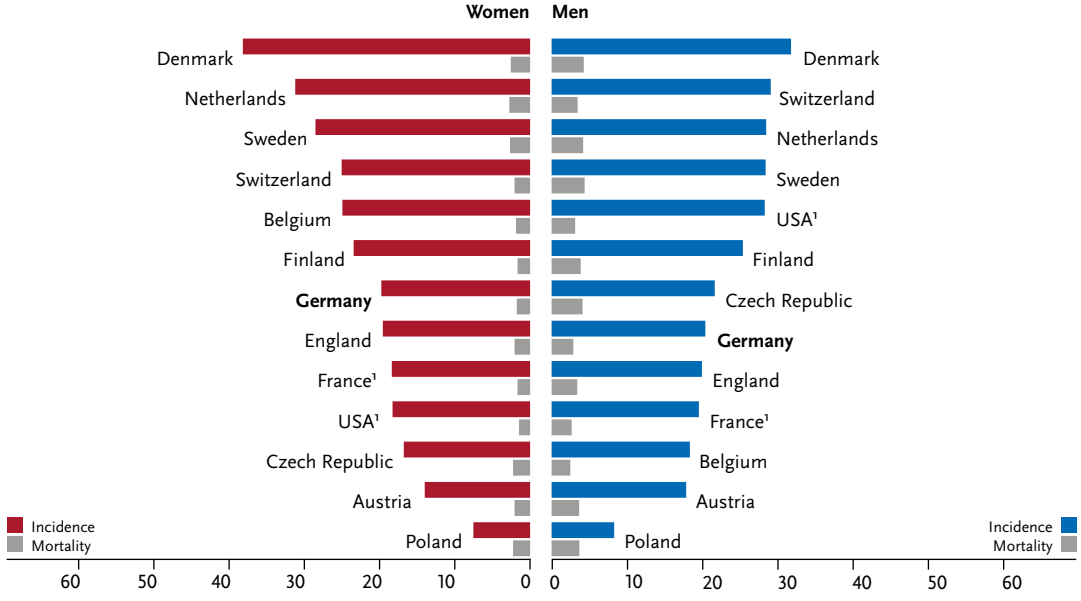


Figure 3.13.7
International comparison of age-standardised incidence and mortality rates by sex, ICD-10 C43, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



¹ Data according to ICD-O-3 for topography C44 for morphology 8720 – 8780

3.14 Non-melanoma skin cancer

Table 3.14.1
Overview of key epidemiological parameters for Germany, ICD-10 C44

Incidence	2015		2016		Prediction for 2020	
	Women	Men	Women	Men	Women	Men
Incident cases	105,140	118,620	107,020	122,730	119,700	145,000
Crude incidence rate[1]	253.3	295.3	256.4	302.3	287.8	358.5
Age-standardised incidence rate[1,2]	142.3	181.2	143.0	184.1	151.4	203.5
Median age at diagnosis	73	74	73	75		

Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	350	464	378	520	402	527
Crude mortality rate[1]	0.8	1.2	0.9	1.3	1.0	1.3
Age-standardised mortality rate[1,2]	0.3	0.7	0.3	0.7	0.3	0.7
Median age at death	87	82	87	82	86	82

Prevalence and survival rates	5 years		10 years	
	Women	Men	Women	Men
Prevalence	489,300	534,300	825,700	882,600
Absolute survival rate (2015–2016)[3]	85 (83–87)	80 (78–81)	69 (65–73)	61 (57–64)
Relative survival rate (2015–2016)[3]	103 (102–105)	102 (100–104)	106 (101–112)	104 (98–109)

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

Around three quarters of non-melanoma skin cancers are basal cell carcinomas. These metastasize only in exceptional cases, and particularly in the presence of a weakened immune system. As such, they are rarely life-threatening. However, they can grow into the surrounding tissue, for example into bone tissue, and thus can potentially impact quality of life in a considerable way. Almost a quarter of malignant, non-melanoma tumours of the skin are squamous cell carcinomas. These two types of tumours most commonly affect the face, with this localisation accounting for around 40 % of cases. Rare forms include Merkel cell carcinomas, which are neuroendocrine tumours, as well as dermatofibrosarcomas and carcinomas of the sebaceous and sweat glands. In 2016, an estimated 230,000 people in Germany were diagnosed with non-melanoma skin cancer; around 930 people died from the condition in 2017. As with malignant melanoma, incidence increased significantly with the introduction of skin cancer screening, and has stabilised recently. Although reliable international data are not as widely available in this case as they are for malignant melanoma, it is likely that the incidence of non-melanoma skin cancers has increased significantly in western industrialised nations over the past few decades.

Risk factors

Non-melanoma skin cancer is more commonly diagnosed among people with lighter skin types than those with darker skin types. The most important risk factor associated with this cancer is strong exposure of the skin to ultraviolet (UV) radiation. The type of source – be it the sun or artificial UV sources such as solariums – is not important. The risk of squamous cell carcinoma increases with the cumulative (lifelong) dose of UV radiation.

In contrast, intermittent (recurring, intensive) UV exposure increases the risk of basal cell carcinomas. Patients who have already developed a basal cell carcinoma have an increased risk of developing further non-melanoma skin cancer. Non-melanoma skin cancer can also develop many years after exposure to arsenic; on skin that has been damaged by radiation (such as after radiation therapy) and due to immunosuppressive therapy, for example after an organ transplant.

In accordance with the guidelines on statutory screening, men and women are entitled to have their skin examined by a specially trained doctor (such as a dermatologist or general practitioner) every two years beginning at 35 years of age.

Figure 3.14.1
Age-standardised incidence and mortality rates by sex, ICD-10 C44, Germany 2006–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

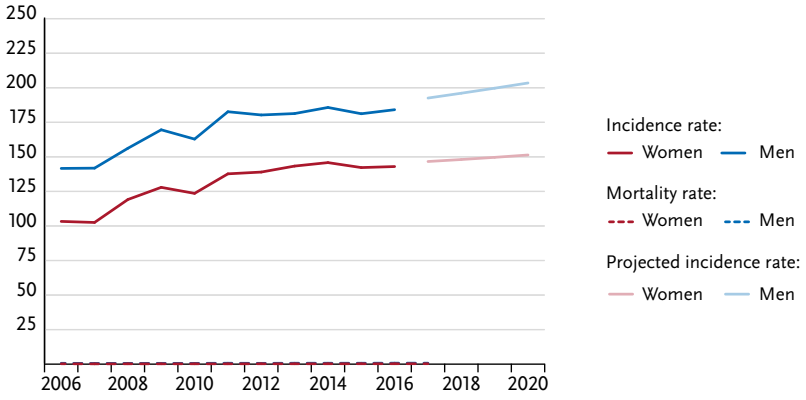


Figure 3.14.2
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C44, Germany 2015–2016

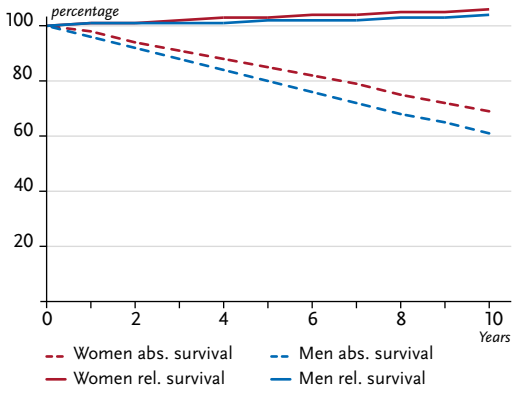


Figure 3.14.3
Relative 5-year survival by histology and sex, ICD-10 C44, Germany 2015–2016

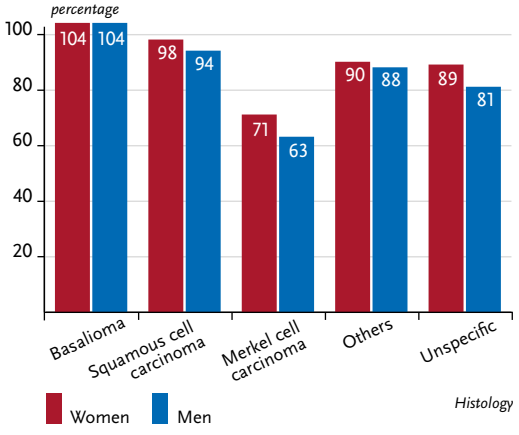
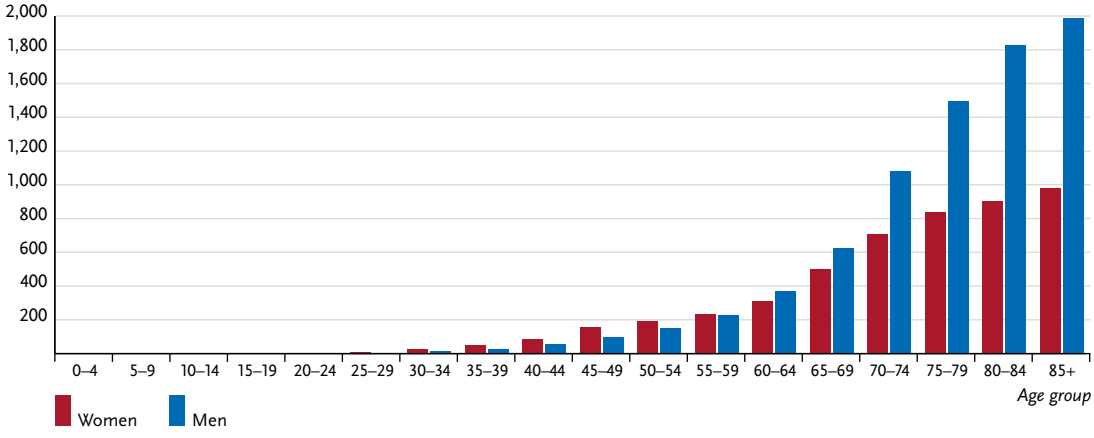


Figure 3.14.4
Age-specific incidence rates by sex, ICD-10 C44, Germany 2015–2016
per 100,000



3.15 Mesothelioma

Table 3.15.1
Overview of key epidemiological parameters for Germany, ICD-10 C45

Incidence	2015		2016		Prediction for 2020	
	Women	Men	Women	Men	Women	Men
Incident cases	330	1,220	280	1,060	320	1,160
Crude incidence rate[1]	0.8	3.0	0.7	2.6	0.8	2.9
Age-standardised incidence rate[1,2]	0.4	1.8	0.3	1.5	0.4	1.5
Median age at diagnosis	74	75	74	75		

Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	305	1,128	287	1,193	270	1,121
Crude mortality rate[1]	0.7	2.8	0.7	2.9	0.6	2.7
Age-standardised mortality rate[1,2]	0.3	1.6	0.3	1.7	0.3	1.5
Median age at death	76	76	76	76	77	77

Prevalence and survival rates	5 years		10 years	
	Women	Men	Women	Men
Prevalence	600	1,700	700	2,000
Absolute survival rate (2015–2016)	12	7	4	3
Relative survival rate (2015–2016)	13	8	5	5

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

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

Epidemiology

Malignant mesotheliomas are rare soft tissue tumours that mainly occur in elderly men. The most common localisation is the pleura; in rare cases, they affect the peritoneum. In 2016, around 1,060 men and 280 women in Germany developed mesothelioma. More than 20 years after the ban on asbestos processing in Germany, age-standardised incidence rates are declining slightly, although a clear reduction in death rates has yet to be identified. However, incidence and mortality rates among men under the age of 75 are falling substantially, and they are no longer rising among older age groups. Comparatively high morbidity rates can found in northwest Germany in (former) locations of the ship building industry, such as in Bremen and neighbouring regions, and in areas where the steel industry is located, such as in the Ruhr. Occasionally, regions close to former asbestos production sites are also affected. With relative 5-year survival rates of just 8 % in men and 13 % in women, mesothelioma has a very unfavourable prognosis. As such, the number of annual deaths is very similar to the annual incidence.

Risk factors

Inhalation of asbestos fibres is responsible for the majority of newly diagnosed cases of mesothelioma. Although asbestos processing was banned in Germany in 1993, and later throughout the entire EU, there is an average latency period of 30 to 50 years between initial exposure to development of cancer. The occupational groups that tend to be most affected include metalworkers, welders, electricians, plumbers, roofers, bricklayers, construction workers, automotive technicians and tilers. In 2016, about 1,000 new cases were recognised by trade associations in Germany; in 2018 there were almost 900 cases. Some people may be affected despite having no known occupational exposure; in these cases, asbestos fibres can often still be detected using X-rays or in tissue samples: this group includes women who did not work with asbestos themselves but came into indirect contact with the material (such as when cleaning clothes from an affected workplace).

Weakly-bound asbestos that contains a large percentage of fibres is particularly dangerous. Asbestos cement (Eternit), which can still be found in or on many buildings, is considered harmless as long as it remains intact. Other risk factors, including exposure to fibres such as Erionite and to radiation therapy (of the chest or the abdomen), play a minor role.

Figure 3.15.1a
Age-standardised incidence and mortality rates by sex, ICD-10 C45, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

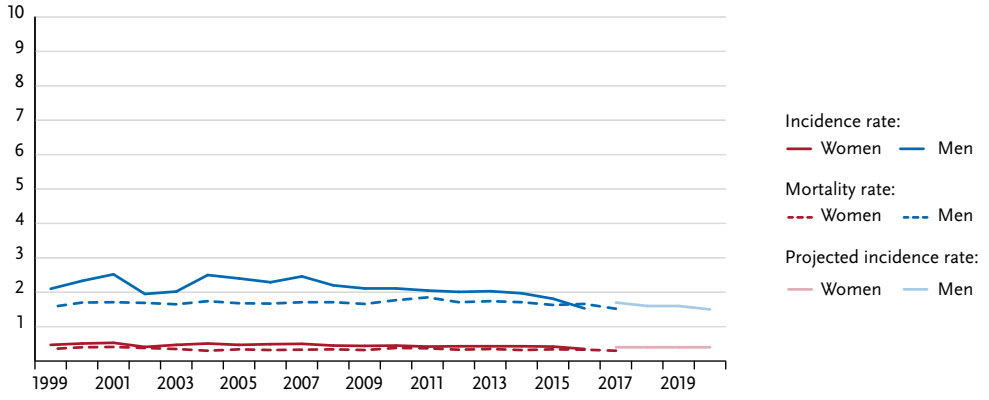


Figure 3.15.1b
Absolute numbers of incident cases and deaths by sex, ICD-10 C45, Germany 1999–2016/2017, projection (incidence) through 2020

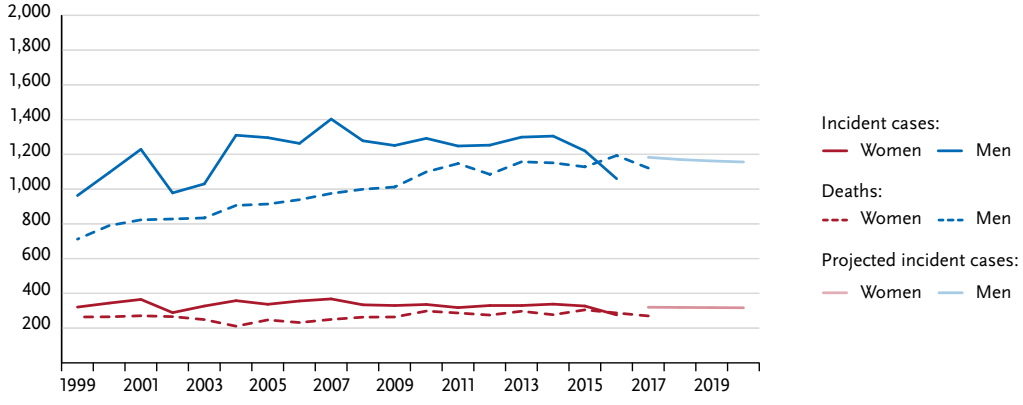


Figure 3.15.2
Age-specific incidence rates by sex, ICD-10 C45, Germany 2015–2016
per 100,000

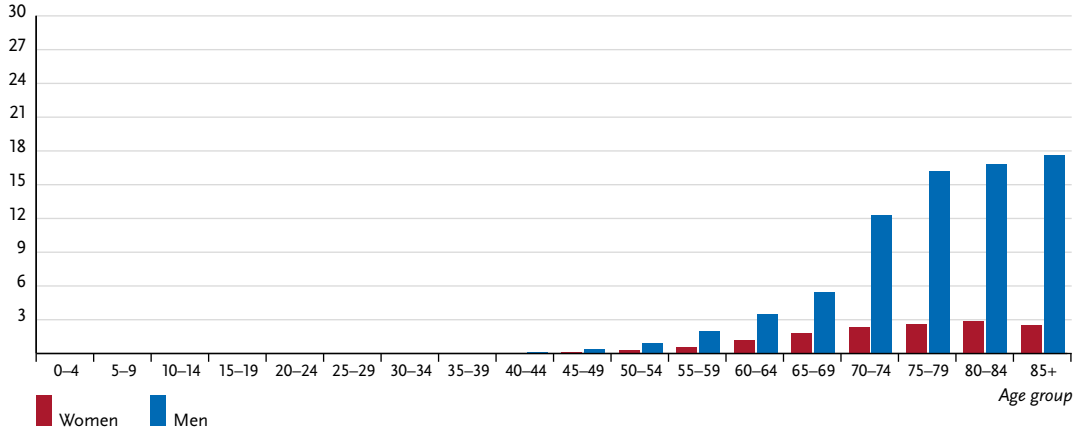


Table 3.15.2
Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C45, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1 %	(1 in 218,000)	0.1 %	(1 in 1,900)	< 0.1 %	(1 in 79,400)	0.1 %	(1 in 1,800)
45 years	< 0.1 %	(1 in 49,400)	0.1 %	(1 in 1,900)	< 0.1 %	(1 in 50,000)	0.1 %	(1 in 1,800)
55 years	< 0.1 %	(1 in 12,600)	0.1 %	(1 in 2,000)	< 0.1 %	(1 in 17,400)	0.1 %	(1 in 1,800)
65 years	< 0.1 %	(1 in 5,700)	< 0.1 %	(1 in 2,200)	< 0.1 %	(1 in 6,900)	0.1 %	(1 in 1,900)
75 years	< 0.1 %	(1 in 4,800)	< 0.1 %	(1 in 3,200)	< 0.1 %	(1 in 3,900)	< 0.1 %	(1 in 2,400)
Lifetime risk			0.1 %	(1 in 1,900)			0.1 %	(1 in 1,800)
Men aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1 %	(1 in 75,900)	0.2 %	(1 in 490)	< 0.1 %	(1 in 157,100)	0.3 %	(1 in 400)
45 years	< 0.1 %	(1 in 14,900)	0.2 %	(1 in 480)	< 0.1 %	(1 in 25,000)	0.3 %	(1 in 400)
55 years	< 0.1 %	(1 in 4,400)	0.2 %	(1 in 480)	< 0.1 %	(1 in 4,700)	0.3 %	(1 in 390)
65 years	0.1 %	(1 in 1,400)	0.2 %	(1 in 490)	0.1 %	(1 in 1,300)	0.3 %	(1 in 380)
75 years	0.1 %	(1 in 840)	0.2 %	(1 in 610)	0.2 %	(1 in 620)	0.2 %	(1 in 430)
Lifetime risk			0.2 %	(1 in 500)			0.2 %	(1 in 410)

Figure 3.15.3
Distribution of UICC-stages at first diagnosis by sex
Not presented due to the large proportion of missing data.

Figure 3.15.4
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C45, Germany 2015–2016

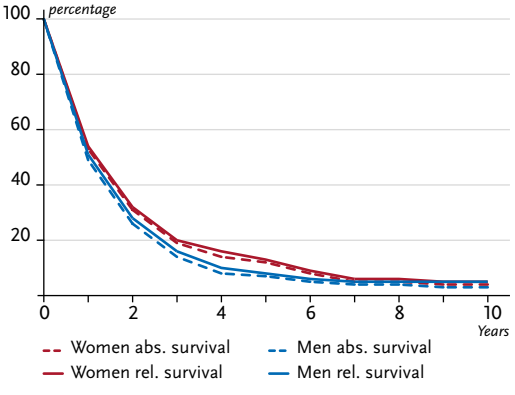


Figure 3.15.5
Relative 5-year survival by site and sex, ICD-10 C45, Germany 2015–2016

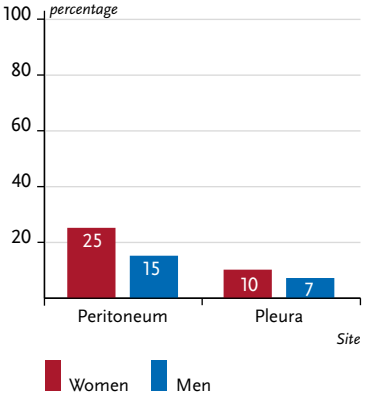


Figure 3.15.6
Age-standardised incidence and mortality rates in German federal states by sex, ICD-10 C45, 2015–2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

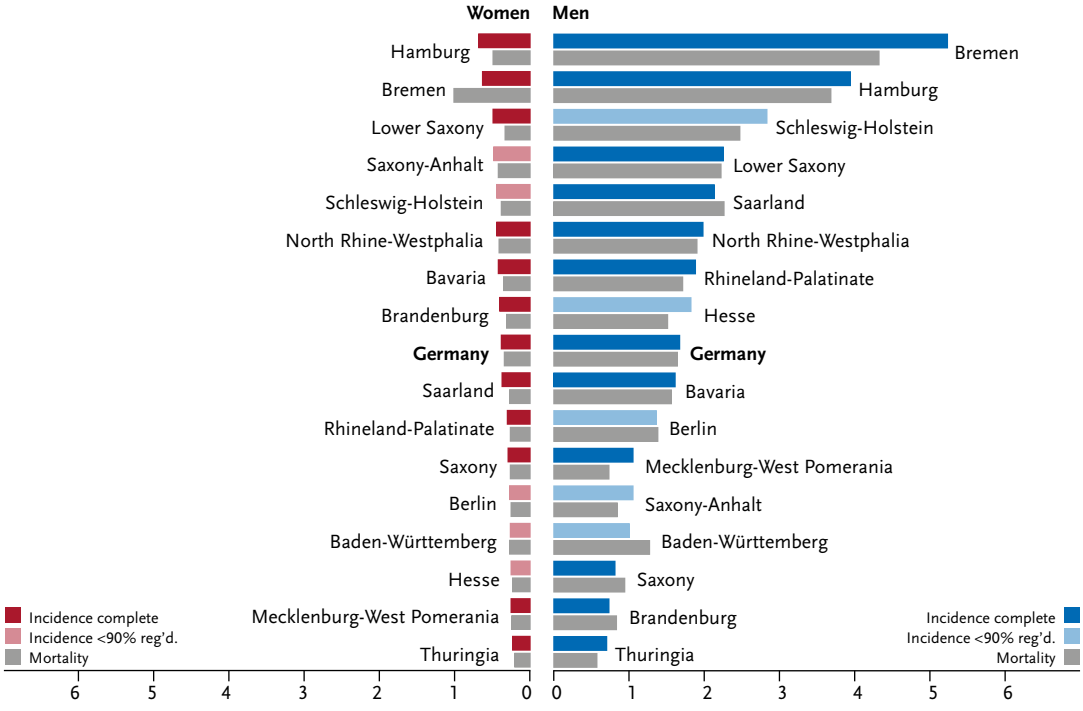
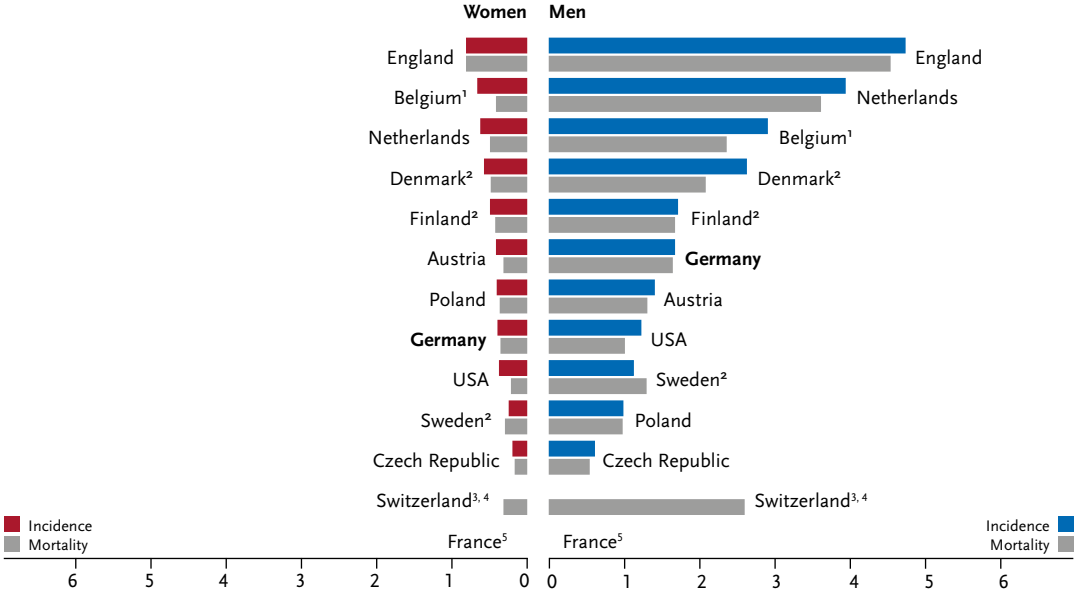


Figure 3.15.7
International comparison of age-standardised incidence and mortality rates by sex, ICD-10 C45, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



[1] Mortality only for 2015 from WHO mortality database
[2] Data including C38.4 and C45.9
[3] No data for incidence
[4] Mortality only for 2015
[5] No data available

3.16 Soft tissue cancers without mesothelioma

Table 3.16.1
Overview of key epidemiological parameters for Germany, ICD-10 C46–C49

Incidence	2015		2016		Prediction for 2020	
	Women	Men	Women	Men	Women	Men
Incident cases	2,050	2,320	1,970	2,270	2,200	2,600
Crude incidence rate[1]	4.9	5.8	4.7	5.6	5.3	6.5
Age-standardised incidence rate[1,2]	3.3	4.3	3.2	4.1	3.5	4.5
Median age at diagnosis	68	67	68	67		

Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	927	843	901	859	972	884
Crude mortality rate[1]	2.2	2.1	2.2	2.1	2.3	2.2
Age-standardised mortality rate[1,2]	1.3	1.4	1.2	1.4	1.3	1.4
Median age at death	74	71	74	72	75	72

Prevalence and survival rates	5 years		10 years	
	Women	Men	Women	Men
Prevalence	6,400	7,600	10,500	12,500
Absolute survival rate (2015–2016)[3]	48 (40–66)	51 (40–55)	35 (32–46)	40
Relative survival rate (2015–2016)[3]	54 (45–74)	60 (46–67)	45 (41–56)	56

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

This group of diseases includes rare, malignant tumours of the peripheral nerves, the connective tissue and other soft tissues, the peritoneum and the retroperitoneal soft tissue found behind it. It also includes the rare Kaposi sarcomas, which develop on the skin and account for 3 % of diagnoses. In contrast to carcinomas, which usually develop from the epithelial or glandular tissue, tumours of the soft tissue predominantly develop from connective tissue structures, sarcomas account for the majority of soft tissue tumours.

Of the approximately 4,240 new cases of malignant soft tissue tumours that occur annually, around 4 % are neoplasms of the peripheral nerves or the autonomic nervous system. The largest proportion (about 75 %) are neoplasms of the connective tissues, with leiomyosarcomas originating in smooth muscle tissue and liposarcomas (adipose tissue tumours) being two of the most common forms found among adults. In contrast, rhabdomyosarcomas, which originate from skeletal muscle tissue, almost exclusively develop in children and adolescents. Since 1999, the age-standardised incidence and mortality rates for malignant soft tissue tumours has remained fairly constant in Germany.

Risk factors

In most cases, no clear cause of soft tissue sarcoma can be found. Sarcomas are frequently identified in patients with rare hereditary cancer syndromes. The presence of one or more genetic mutations, therefore, presumably increases the risk of developing the disease.

In exceptional cases, sarcomas can also occur in areas of the body that have undergone radiation therapy. Furthermore, human herpesvirus 8 (HHV8) has been shown to cause Kaposi's sarcoma and the Epstein-Barr virus (EBV) may also be involved in the development of soft tissue sarcomas in cases of severe immune deficiency.

Environmental toxins and chemicals can also contribute to the development of sarcomas, with vinyl chloride having been shown to cause angiosarcoma of the liver. Chronic inflammatory processes are also likely to increase the risk of soft tissue sarcomas. In rare cases, lymphedema after a mastectomy (breast removal) can lead to the development of angiosarcoma (Stewart Treves syndrome). The impact of diet and other lifestyle factors such as smoking and alcohol consumption have yet to be determined.

Figure 3.16.1a
Age-standardised incidence and mortality rates by sex, ICD-10 C46–C49, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

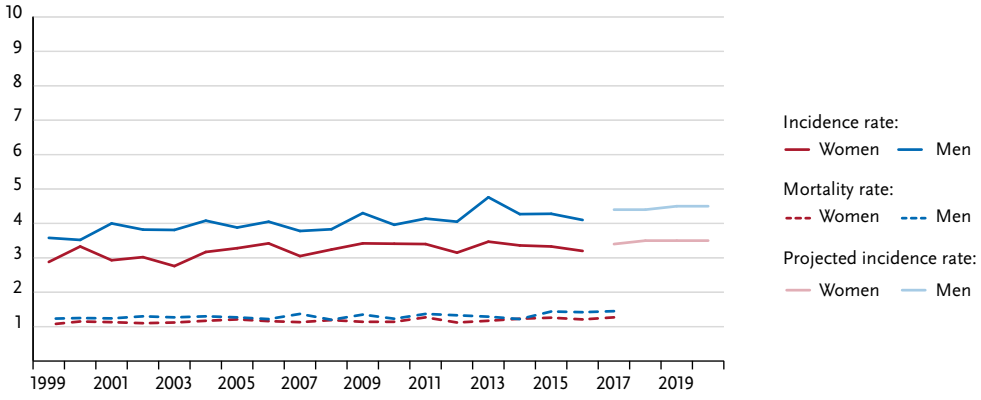


Figure 3.16.1b
Absolute numbers of incident cases and deaths by sex, ICD-10 C46–C49, Germany 1999–2016/2017, projection (incidence) through 2020

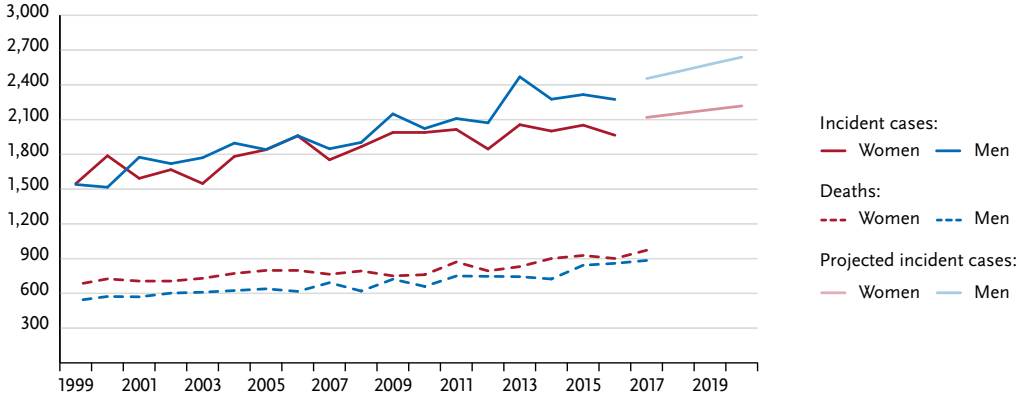


Figure 3.16.2
Age-specific incidence rates by sex, ICD-10 C46–C49, Germany 2015–2016
per 100,000

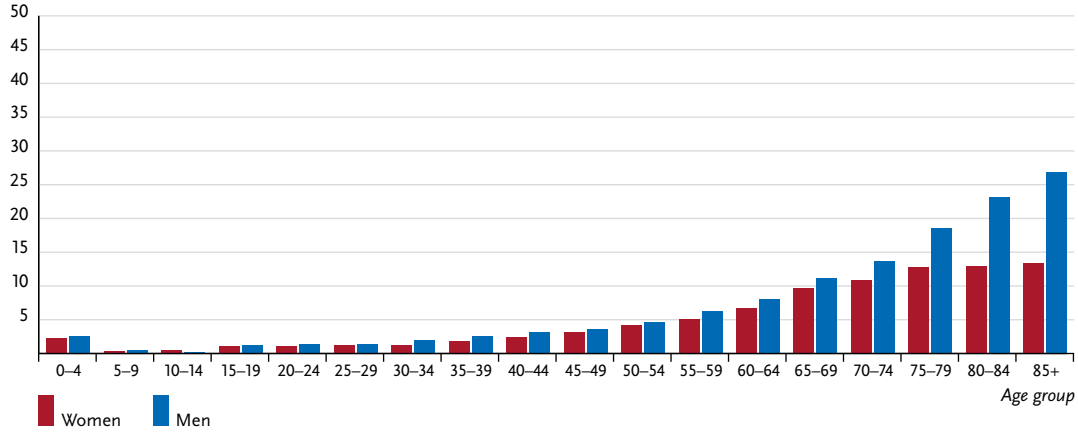


Table 3.16.2
Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C46–C49, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1 %	(1 in 4,700)	0.3 %	(1 in 300)	< 0.1 %	(1 in 22,200)	0.2 %	(1 in 590)
45 years	< 0.1 %	(1 in 2,700)	0.3 %	(1 in 320)	< 0.1 %	(1 in 10,000)	0.2 %	(1 in 600)
55 years	0.1 %	(1 in 1,700)	0.3 %	(1 in 360)	< 0.1 %	(1 in 3,800)	0.2 %	(1 in 620)
65 years	0.1 %	(1 in 1,100)	0.2 %	(1 in 420)	< 0.1 %	(1 in 2,300)	0.1 %	(1 in 710)
75 years	0.1 %	(1 in 940)	0.2 %	(1 in 610)	0.1 %	(1 in 1,500)	0.1 %	(1 in 890)
Lifetime risk			0.4 %	(1 in 270)			0.2 %	(1 in 560)
Men aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1 %	(1 in 3,500)	0.4 %	(1 in 260)	< 0.1 %	(1 in 13,600)	0.2 %	(1 in 600)
45 years	< 0.1 %	(1 in 2,400)	0.4 %	(1 in 270)	< 0.1 %	(1 in 9,000)	0.2 %	(1 in 620)
55 years	0.1 %	(1 in 1,500)	0.3 %	(1 in 300)	< 0.1 %	(1 in 3,800)	0.2 %	(1 in 640)
65 years	0.1 %	(1 in 900)	0.3 %	(1 in 340)	< 0.1 %	(1 in 2,400)	0.1 %	(1 in 700)
75 years	0.2 %	(1 in 640)	0.2 %	(1 in 440)	0.1 %	(1 in 1,200)	0.1 %	(1 in 780)
Lifetime risk			0.4 %	(1 in 240)			0.2 %	(1 in 560)

Figure 3.16.3
Proportion of morphologic groups of malignant soft tissue tumours by sex, ICD-10 C46–C49, Germany 2015–2016

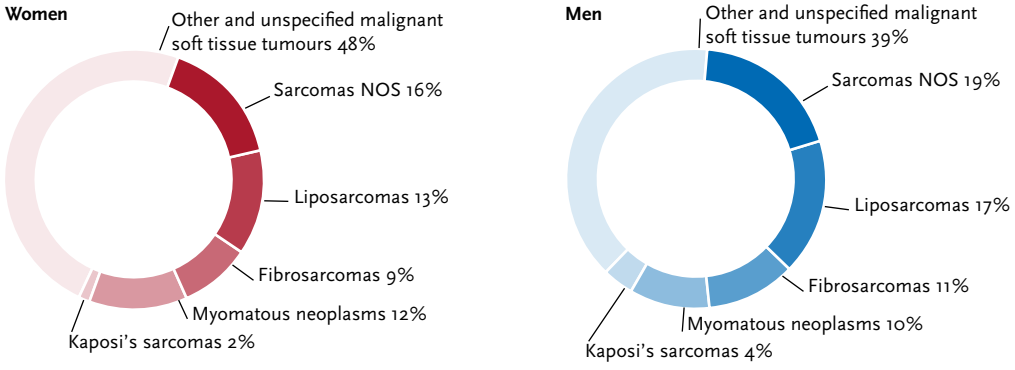


Figure 3.16.4
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C46–C49, Germany 2015–2016

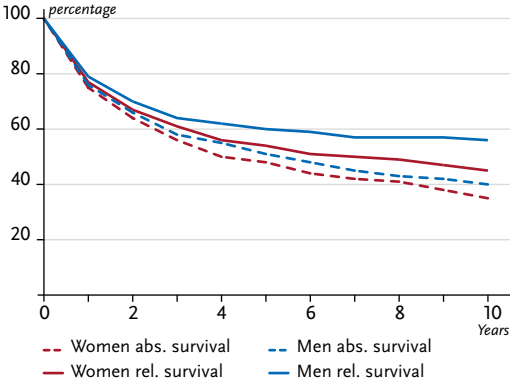


Figure 3.16.5
Relative 5-year survival by UICC-stage and sex, ICD-10 C47–C49, Germany 2015–2016

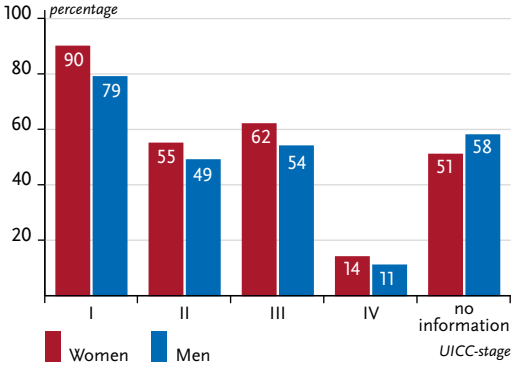


Figure 3.16.6
Age-standardised incidence and mortality rates in German federal states by sex, ICD-10 C46–C49, 2015–2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

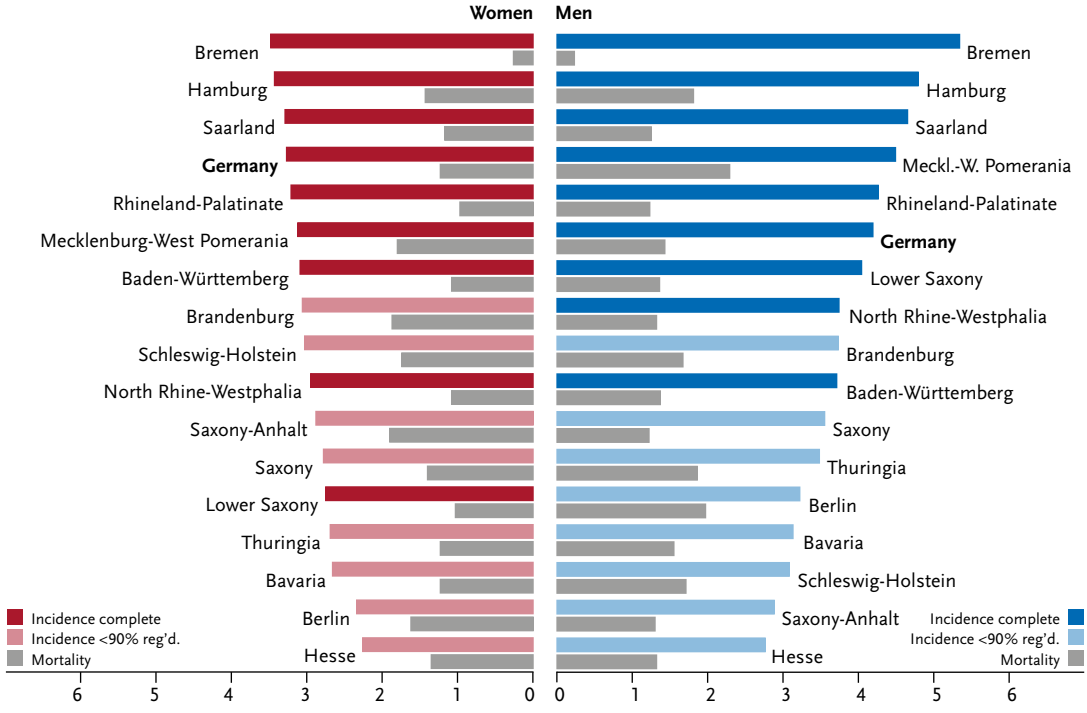
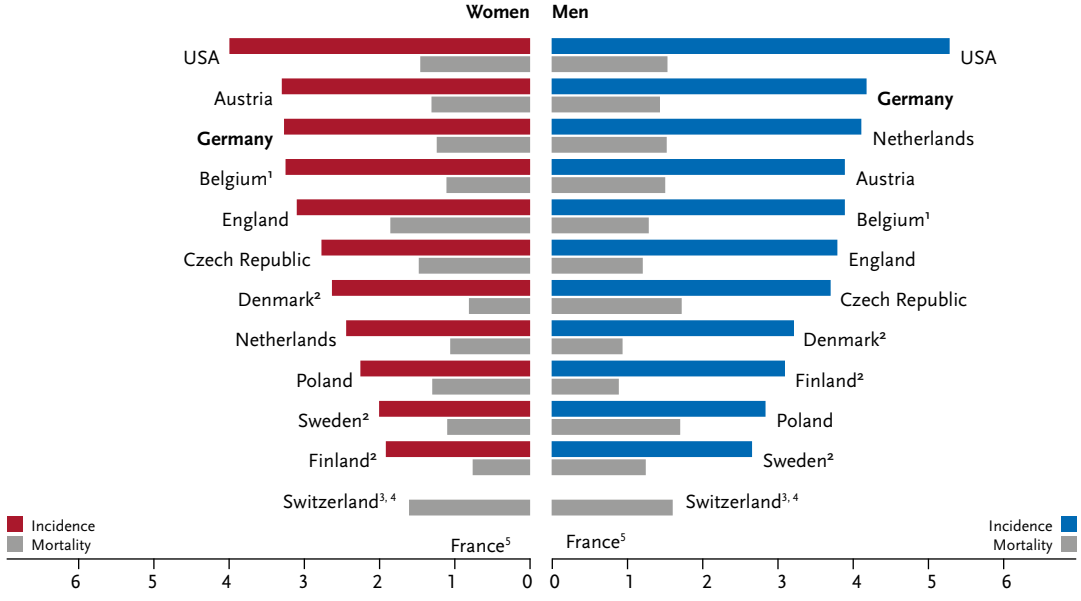


Figure 3.16.7
International comparison of age-standardised incidence and mortality rates by sex, ICD-10 C46–C49, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



[1] Mortality only for 2015 from WHO mortality database
[2] Data only for C46.1 and C49
[3] No data for incidence
[4] Mortality only for 2015
[5] No data available

3.17 Breast

Table 3.17.1
Overview of key epidemiological parameters for Germany, ICD-10 C50

Incidence	2015		2016		Prediction for 2020	
	Women	Men	Women	Men	Women	Men
Incident cases	69,630	600	68,950	710	69,700	750
Crude incidence rate[1]	167.7	1.5	165.2	1.7	167.6	1.8
Age-standardised incidence rate[1,2]	113.7	1.0	112.2	1.1	110.4	1.1
Median age at diagnosis	64	72	64	72		

Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	18,136	159	18,570	166	18,401	192
Crude mortality rate[1]	43.7	0.4	44.5	0.4	43.9	0.5
Age-standardised mortality rate[1,2]	23.0	0.2	23.4	0.3	22.9	0.3
Median age at death	75	75	75	75	76	77

Prevalence and survival rates	5 years		10 years	
	Women	Men	Women	Men
Prevalence	313,500	2,600	584,900	4,200
Absolute survival rate (2015–2016)[3]	79 (78–82)	62	66 (65–69)	46
Relative survival rate (2015–2016)[3]	87 (86–90)	77	82 (81–86)	72

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

Breast cancer is by far the most common cancer among women: around 69,000 new cases are diagnosed in Germany every year, together with around 6,000 in situ carcinomas. About 1% of all new cases affect men.

Current incidence rates indicate that approximately one in eight women will develop breast cancer during their lifetime. Almost three out of ten women affected by breast cancer are younger than 55 when diagnosed. Incidence and mortality rates in eastern Germany are still lower than in western Germany; however, rates now largely coincide for women up to the age of 55.

Following the introduction of breast cancer screening between 2005 and 2009, incidence followed typical post-screening patterns with a significant increase of new cases at the beginning of the programme followed by a subsequent slow decrease.

Advances in therapy have significantly improved the chances of surviving breast cancer, and this is also reflected in the corresponding decline in mortality. Over the next few years, it will be possible to assess the extent to which screening has been able to bring about a further reduction. However, it is already clear that fewer women in the relevant age group are being diagnosed with tumours at an advanced stage than before the introduction of screening.

Risk factors and early detection

Hormones can influence the risk of developing breast cancer: an early first and a late last menstrual period, childlessness and giving birth for the first time at an older age are considered risk factors. Hormone replacement therapy can increase the risk of breast cancer, especially prolonged treatment involving a combination of oestrogen and gestagen. Hormone-containing ovulation inhibitors (birth control pills) only slightly increase the risk of breast cancer.

Further risk factors include very dense mammary tissue, certain benign changes to the breast, and previous breast cancer.

Some breast cancer cases are related to genetics: people with close relatives who have been diagnosed with breast or ovarian cancer have a higher risk of contracting breast cancer themselves. Breast cancer risk also increases if the chest is exposed to radiotherapy in childhood or adolescence.

Lifestyle factors such as obesity and a lack of exercise after menopause as well as alcohol consumption are further risk factors. Smoking may also lead to a slightly higher increased risk.

Statutory screening offers women 30 and older an annual physical examination conducted by a physician. Women between 50 and 69 are invited to undergo a breast X-ray every two years as part of the mammography screening programme.

Figure 3.17.1a
Age-standardised incidence and mortality rates by sex, ICD-10 C50, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

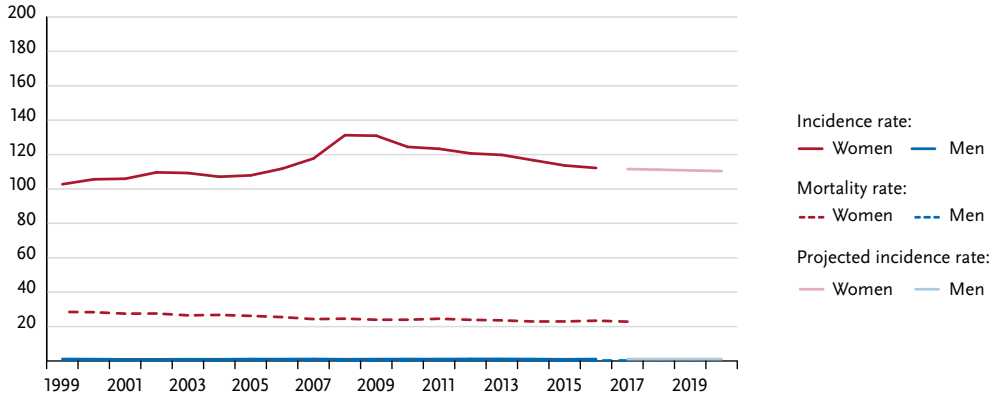


Figure 3.17.1b
Absolute numbers of incident cases and deaths by sex, ICD-10 C50, Germany 1999–2016/2017, projection (incidence) through 2020

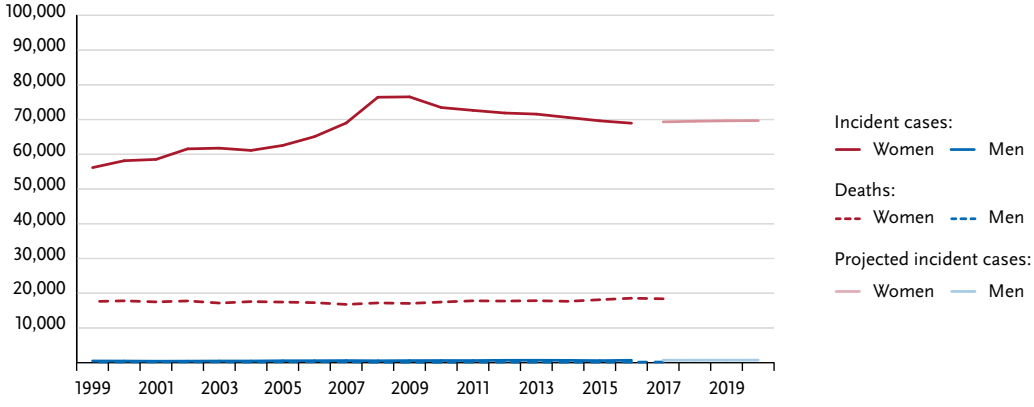


Figure 3.17.2
Age-specific incidence rates by sex, ICD-10 C50, Germany 2015–2016
per 100,000

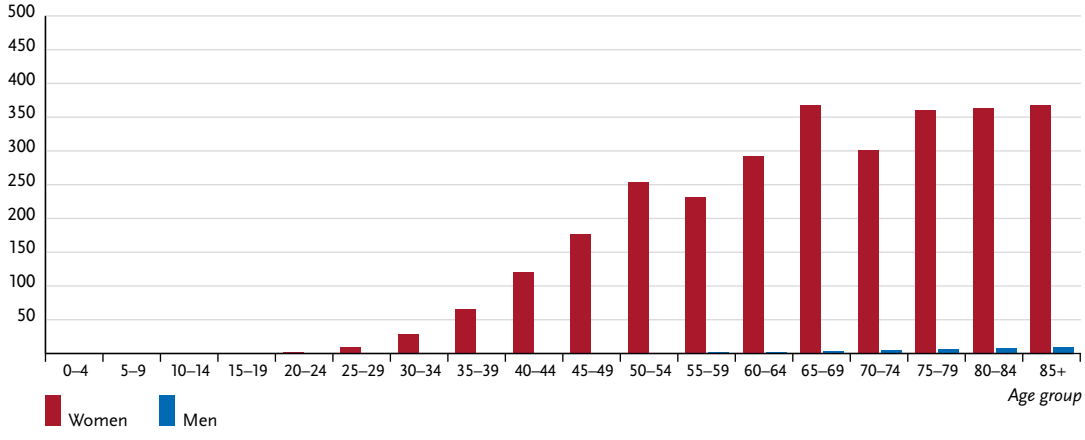


Table 3.17.2
Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C50, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	0.9 %	(1 in 110)	12.2 %	(1 in 8)	0.1 %	(1 in 1,100)	3.6 %	(1 in 27)
45 years	2.1 %	(1 in 48)	11.4 %	(1 in 9)	0.3 %	(1 in 390)	3.6 %	(1 in 28)
55 years	2.7 %	(1 in 37)	9.7 %	(1 in 10)	0.5 %	(1 in 200)	3.4 %	(1 in 30)
65 years	3.3 %	(1 in 30)	7.6 %	(1 in 13)	0.8 %	(1 in 120)	3.0 %	(1 in 33)
75 years	3.3 %	(1 in 31)	5.0 %	(1 in 20)	1.4 %	(1 in 74)	2.5 %	(1 in 40)
Lifetime risk			12.2 %	(1 in 8)			3.6 %	(1 in 28)
Men aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1 %	(1 in 30,800)	0.1 %	(1 in 750)	< 0.1 %	(1 in 115,600)	< 0.1 %	(1 in 2,700)
45 years	< 0.1 %	(1 in 11,400)	0.1 %	(1 in 760)	< 0.1 %	(1 in 90,900)	< 0.1 %	(1 in 2,800)
55 years	< 0.1 %	(1 in 4,300)	0.1 %	(1 in 780)	< 0.1 %	(1 in 24,000)	< 0.1 %	(1 in 2,700)
65 years	< 0.1 %	(1 in 2,200)	0.1 %	(1 in 860)	< 0.1 %	(1 in 9,900)	< 0.1 %	(1 in 2,800)
75 years	0.1 %	(1 in 1,700)	0.1 %	(1 in 1,100)	< 0.1 %	(1 in 6,300)	< 0.1 %	(1 in 3,100)
Lifetime risk			0.1 %	(1 in 760)			< 0.1 %	(1 in 2,800)

Figure 3.17.3
Distribution of UICC-stages at first diagnosis for all women and women between 50 and 69 years, ICD-10 C50, Germany 2015–2016
(top: all cases; bottom: only valid reports)

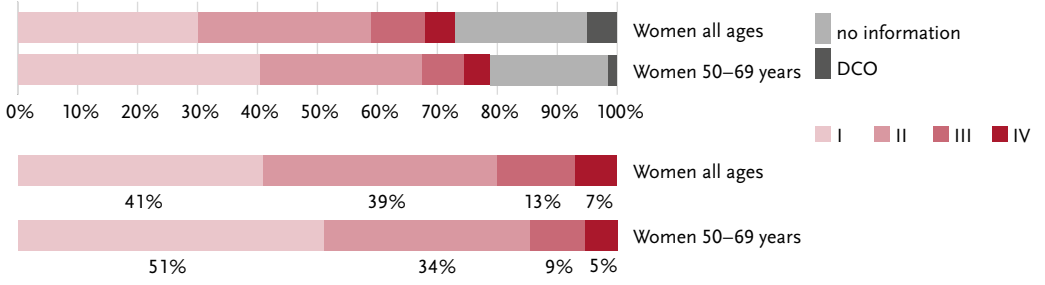


Figure 3.17.4
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C50, Germany 2015–2016

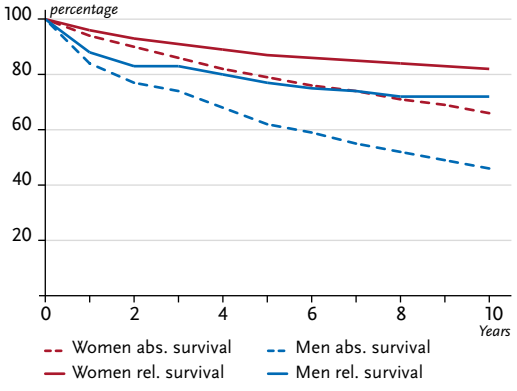


Figure 3.17.5
Relative 5-year survival by UICC-stage and sex, women, ICD-10 C50, Germany 2015–2016

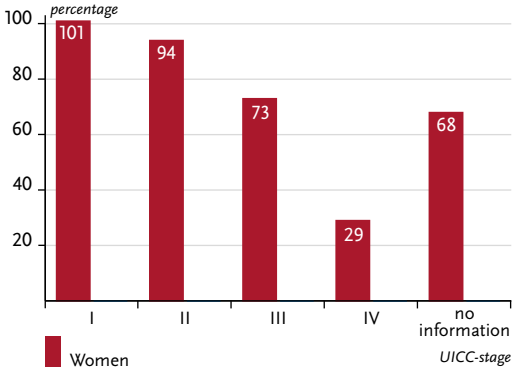


Figure 3.17.6
Age-standardised incidence and mortality rates in German federal states, women, ICD-10 C50, 2015–2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

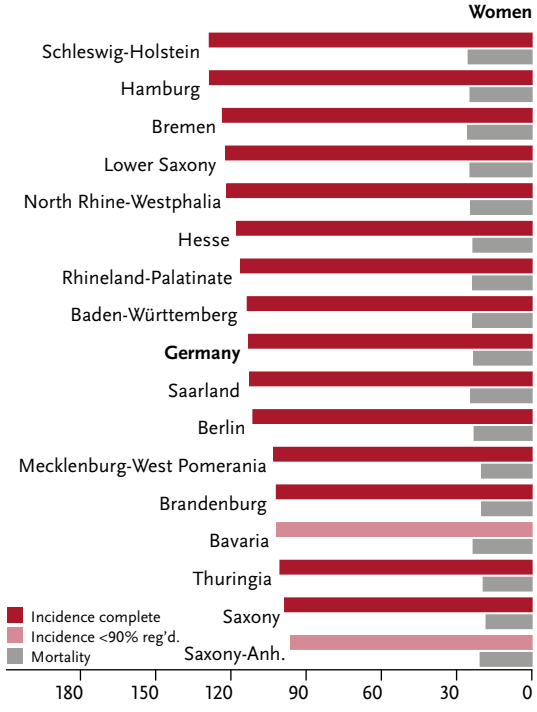
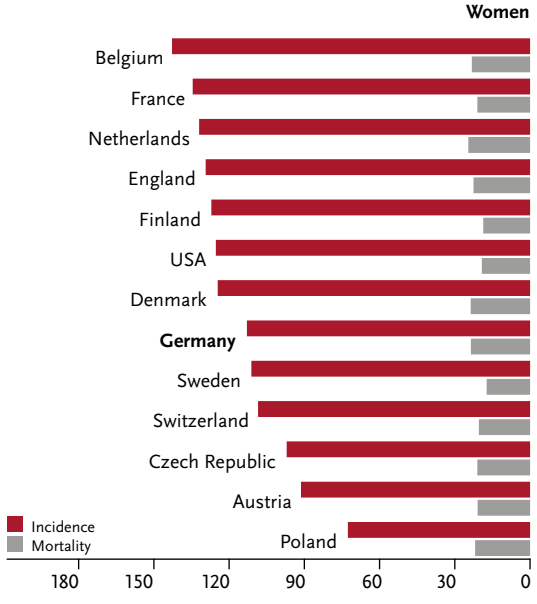


Figure 3.17.7
International comparison of age-standardised incidence and mortality rates, women, ICD-10 C50, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



3.18 Vulva

Table 3.18.1
Overview of key epidemiological parameters for Germany, ICD-10 C51

Incidence	2015	2016	Prediction for 2020
	Women	Women	Women
Incident cases	3,410	3,330	4,000
Crude incidence rate[1]	8.2	8.0	10.0
Age-standardised incidence rate[1,2]	4.7	4.5	5.5
Median age at diagnosis	72	73	

Mortality	2015	2016	2017
	Women	Women	Women
Deaths	940	937	943
Crude mortality rate[1]	2.3	2.2	2.3
Age-standardised mortality rate[1,2]	1.0	0.9	1.0
Median age at death	80	80	80

Prevalence and survival rates	5 years	10 years
	Women	Women
Prevalence	12,200	20,100
Absolute survival rate (2015–2016)[3]	61 (51–70)	47 (30–55)
Relative survival rate (2015–2016)[3]	71 (60–80)	66 (44–79)

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

Incidence of malignant vulvar tumours in Germany continued to increase substantially until the beginning of the current decade. This trend was accompanied by a slightly increasing mortality rate. These rates have now stabilised. Around 3,330 women were diagnosed with a malignant neoplasm of the vulva in 2016, and 943 women died from the condition in 2017. The greatest increase in incidence occurred among women under the age of 70 years. However, since 2010, this trend has also levelled off. The greatest burden of illness affects women over the age of 70 years, with the median age at diagnosis being 73. The relative 5-year survival rate for women with a malignant tumour of the vulva is 71%. The majority of diagnoses with valid cancer staging data occur at an early stage (stage I, limited to the vulva or perineum) and account for about 60% of cases.

In Germany, Saarland has had the highest rate of malignant neoplasms of the vulva and cervix for several years. With largely comparable death rates, incidence in Germany is higher than in neighbouring countries; however, comparable incidence and mortality data are not available from all countries.

Risk factors, early detection and prevention

Around 90% of vulvar carcinomas are squamous cell carcinomas that can be divided into non-keratinising and keratinising forms. The latter account for between 50% and 80% of squamous cell carcinomas of the vulva.

Non-keratinising carcinomas and their precursors often arise in conjunction with a chronic human papillomavirus infection (especially HPV 16). These cases mostly affect younger women. In contrast, keratinising vulvar carcinomas and their precursors particularly occur in older women, independent of a concurrent HPV infection. The main risk factors are autoimmune processes, such as lichen sclerosus. Smoking and long-term immunosuppression such as after an organ transplant or due to HIV, also increase the risk of vulvar cancer. HIV also promotes an HPV infection and thus increases the risk of developing vulvar cancer. Further risk factors include HPV-induced cancers of the genitals and anus, such as cervical and anal carcinomas, their associated precursors, and Paget's disease of the vulva.

No targeted screening programme is currently in place in Germany for cancer of the vulva or its precursors. As such, the vulva should be completely examined during gynaecological cancer screening. HPV vaccination is viewed as a possible means of preventing vulvar cancer.

Figure 3.18.1a
Age-standardised incidence and mortality rates, ICD-10 C51, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

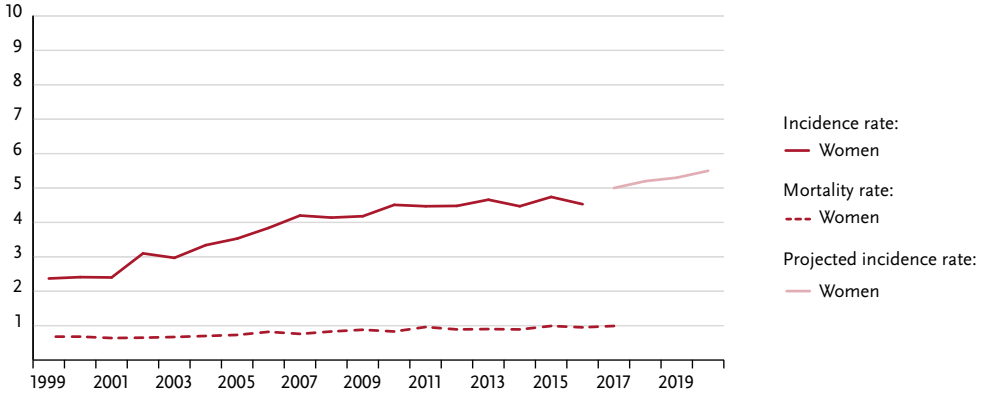


Figure 3.18.1b
Absolute numbers of incident cases and deaths, ICD-10 C51, Germany 1999–2016/2017, projection (incidence) through 2020

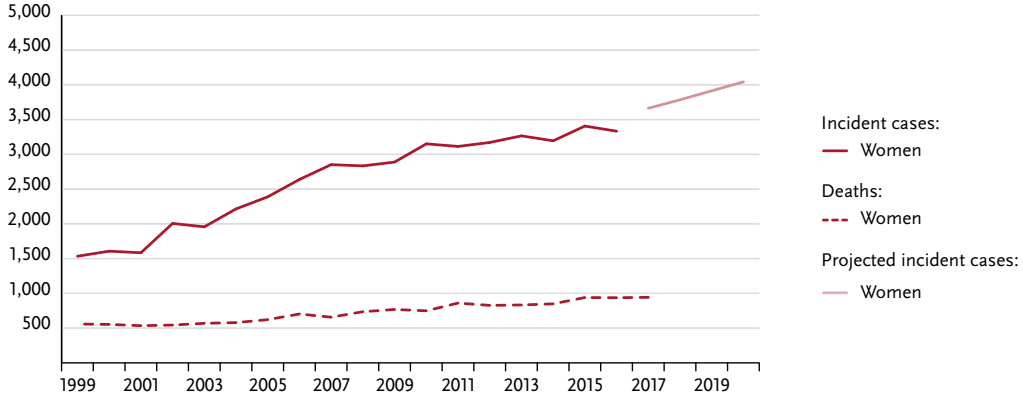


Figure 3.18.2
Age-specific incidence rates, ICD-10 C51, Germany 2015–2016
per 100,000

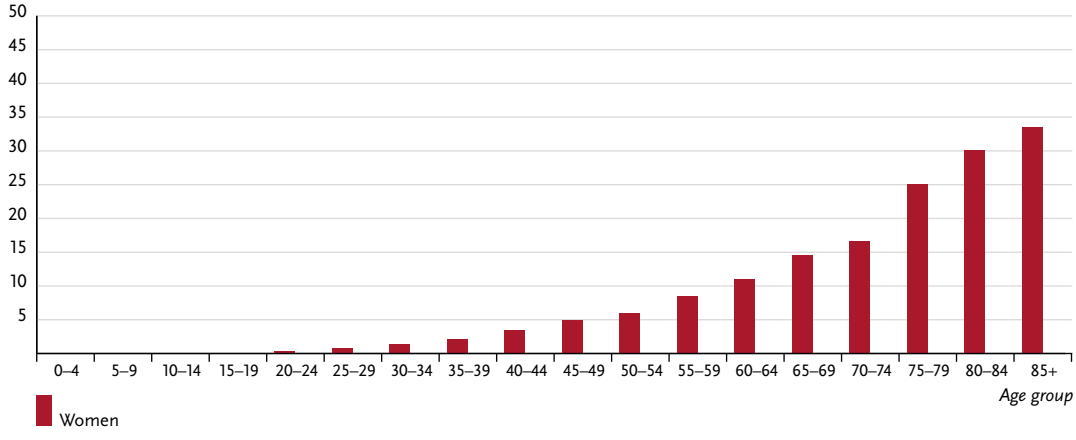


Table 3.18.2
Cancer incidence and mortality risks in Germany by age, ICD-10 C51, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1 %	(1 in 3,600)	0.6 %	(1 in 160)	< 0.1 %	(1 in 35,500)	0.2 %	(1 in 520)
45 years	0.1 %	(1 in 1,900)	0.6 %	(1 in 170)	< 0.1 %	(1 in 21,600)	0.2 %	(1 in 520)
55 years	0.1 %	(1 in 1,200)	0.5 %	(1 in 180)	< 0.1 %	(1 in 6,500)	0.2 %	(1 in 520)
65 years	0.2 %	(1 in 640)	0.5 %	(1 in 210)	< 0.1 %	(1 in 3,400)	0.2 %	(1 in 540)
75 years	0.2 %	(1 in 430)	0.4 %	(1 in 270)	0.1 %	(1 in 1,100)	0.2 %	(1 in 560)
Lifetime risk			0.6 %	(1 in 160)			0.2 %	(1 in 520)

Figure 3.18.3
Distribution of UICC-stages at first diagnosis, ICD-10 C51, Germany 2015–2016
(top: all cases; bottom: only valid reports)

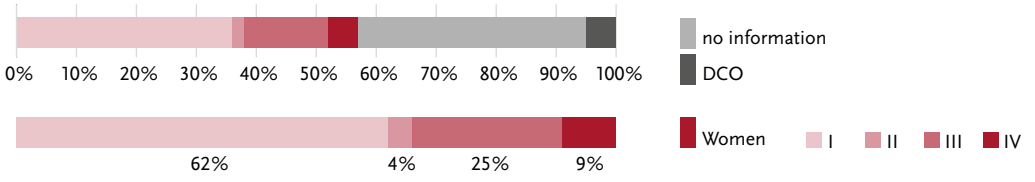


Figure 3.18.4
Absolute and relative survival rates up to 10 years after first diagnosis, ICD-10 C51, Germany 2015–2016

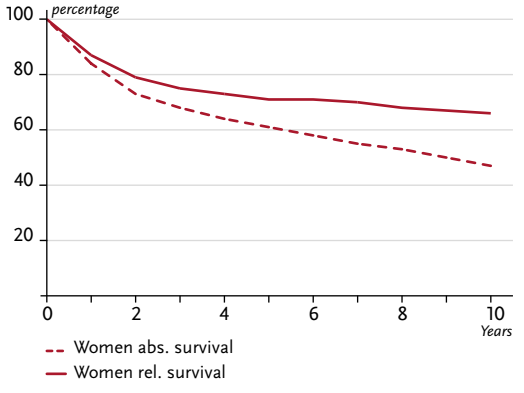


Figure 3.18.5
Relative 5-year survival by UICC-stage, ICD-10 C51, Germany 2015–2016

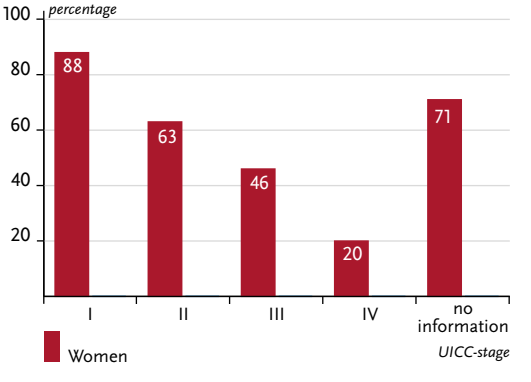


Figure 3.18.6
Age-standardised incidence and mortality rates in German federal states, ICD-10 C51, 2015–2016, (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

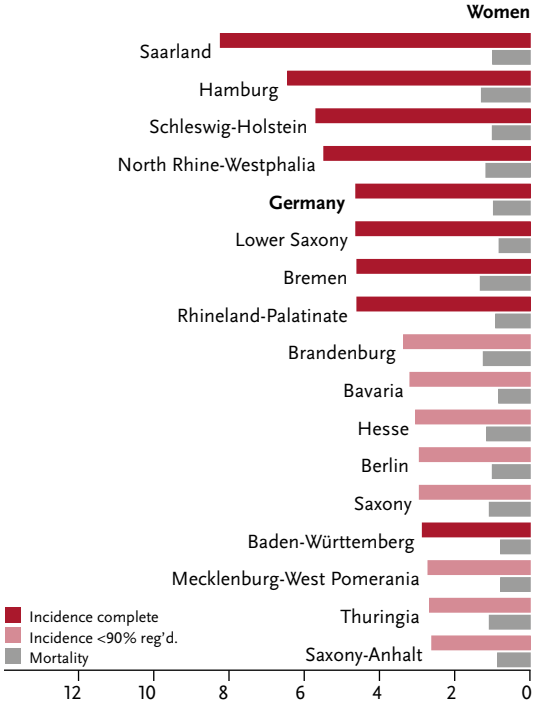
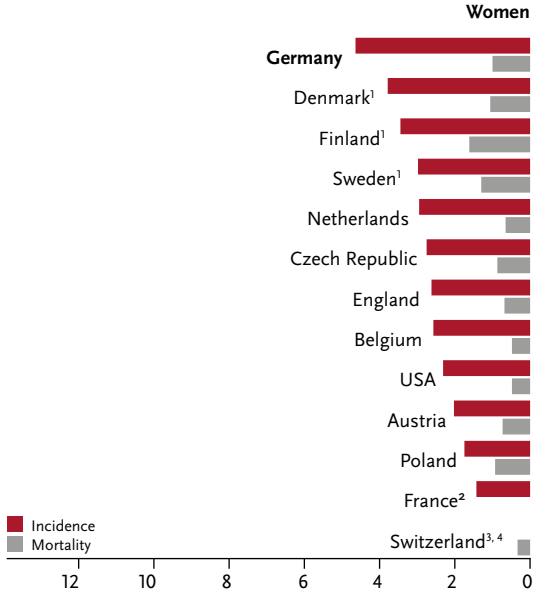


Figure 3.18.7
International comparison of age-standardised incidence and mortality rates, ICD-10 C51, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



[1] Data including C52, C57.7, C57.8 and C57.9
[2] No data for mortality
[3] No data for incidence
[4] Mortality only for 2015

3.19 Cervix

Table 3.19.1
Overview of key epidemiological parameters for Germany, ICD-10 C53

Incidence	2015	2016	Prediction for 2020
	Women	Women	Women
Incident cases	4,470	4,380	4,400
Crude incidence rate[1]	10.8	10.5	10.5
Age-standardised incidence rate[1,2]	9.0	8.7	8.7
Median age at diagnosis	54	55	

Mortality	2015	2016	2017
	Women	Women	Women
Deaths	1,541	1,562	1,588
Crude mortality rate[1]	3.7	3.7	3.8
Age-standardised mortality rate[1,2]	2.4	2.4	2.5
Median age at death	66	66	64

Prevalence and survival rates	5 years	10 years
	Women	Women
Prevalence	17,400	32,900
Absolute survival rate (2015–2016)[3]	64 (59–67)	57 (55–60)
Relative survival rate (2015–2016)[3]	67 (62–70)	63 (61–67)

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

In 2016, around 4,380 women were diagnosed with cervical cancer in Germany. In about seven out of ten of these cases, invasive tumours originated from the squamous epithelial tissue of the cervical mucosa. Adenocarcinomas tend to occur more proximally at the transition between the uterus and cervix. Although the incidence of invasive carcinomas of the cervix has remained largely stable over the past 15 years, a very sharp decline in incidence occurred during the three preceding decades. About four out of ten women are diagnosed at an early stage (stage I). Median age at diagnosis with an invasive carcinoma is 55 years. In situ carcinomas are much more common and are usually discovered during screening among women 20 years younger on average. Around 1,590 women die from cervical cancer in Germany every year; however, 30 years ago this number was twice as large. The relative 5-year survival rate for women with invasive tumours of the cervix is 67 %. International comparisons demonstrate that incidence and mortality are substantially lower in countries with long-standing, well-organised screening programs.

Risk factors, early detection and prevention

The main cause of cervical cancer is a persistent infection with a sexually-transmitted human papillomavirus (HPV). Asymptomatic HPV infections are common and usually clear up. Prolonged infection with high-risk viruses such as HPV 16 and 18, however, can lead to cervical cancer. Other risk factors include smoking, sexually transmitted pathogens (such as herpes simplex and chlamydia), early onset of sexual activity, a large number of childbirths and a severely weakened immune system. Long-term use of oral contraceptives also comes with a slightly increased risk. Furthermore, some hereditary factors are also thought to promote the development of cervical cancer.

The statutory screening programme offers women 20 years and older with an annual cell test taken from the cervix (PAP smear). As of 2020, women 35 years and older will be able to have a PAP smear combined with an HPV test every three years. The Standing Committee on Vaccination (STIKO) recommends that girls and boys be vaccinated against HPV, primarily between the ages of 9 and 14 years. Furthermore, statutory health insurers also cover the costs of a catch-up vaccination for young people until the age of 17. However, vaccination should not be viewed as a replacement for screening because it does not protect against all high-risk HP viruses.

Figure 3.19.1a
Age-standardised incidence and mortality rates, ICD-10 C53, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

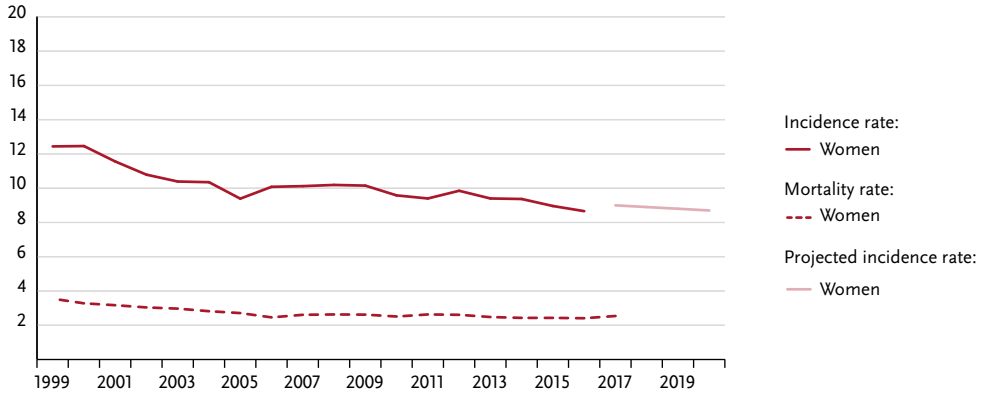


Figure 3.19.1b
Absolute numbers of incident cases and deaths, ICD-10 C53, Germany 1999–2016/2017, projection (incidence) through 2020

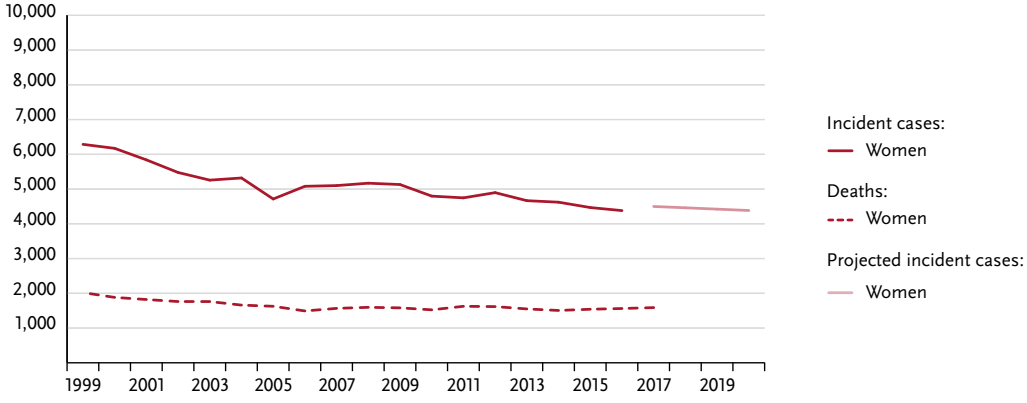


Figure 3.19.2
Age-specific incidence rates, ICD-10 C53, Germany 2015–2016
per 100,000

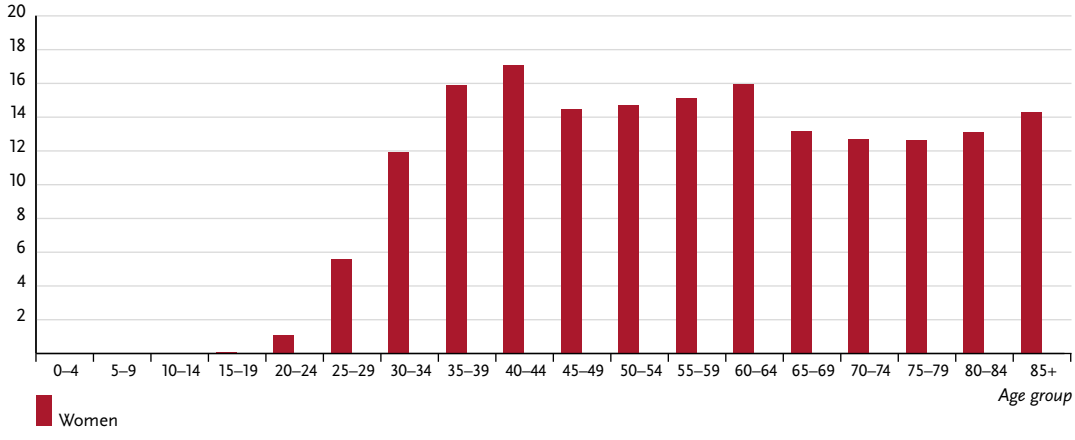


Table 3.19.2
Cancer incidence and mortality risks in Germany by age, ICD-10 C53, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
15 years	< 0.1 %	(1 in 11,900)	0.8 %	(1 in 130)	< 0.1 %	(1 in 499,100)	0.3 %	(1 in 340)
25 years	0.1 %	(1 in 1,200)	0.8 %	(1 in 130)	< 0.1 %	(1 in 15,100)	0.3 %	(1 in 340)
35 years	0.2 %	(1 in 640)	0.7 %	(1 in 140)	< 0.1 %	(1 in 4,600)	0.3 %	(1 in 350)
45 years	0.1 %	(1 in 700)	0.6 %	(1 in 180)	< 0.1 %	(1 in 2,600)	0.3 %	(1 in 370)
55 years	0.1 %	(1 in 670)	0.4 %	(1 in 240)	0.1 %	(1 in 1,600)	0.2 %	(1 in 420)
65 years	0.1 %	(1 in 790)	0.3 %	(1 in 360)	0.1 %	(1 in 1,700)	0.2 %	(1 in 540)
75 years	0.1 %	(1 in 880)	0.2 %	(1 in 570)	0.1 %	(1 in 1,300)	0.1 %	(1 in 690)
Lifetime risk			0.8 %	(1 in 130)			0.3 %	(1 in 340)

Figure 3.19.3
Distribution of UICC-stages at first diagnosis, ICD-10 C53, Germany 2015–2016
(top: all cases; bottom: only valid reports)

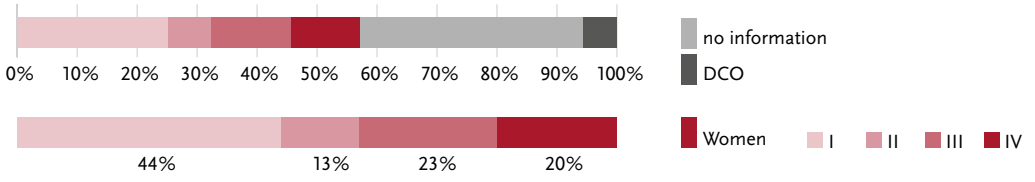


Figure 3.19.4
Absolute and relative survival rates up to 10 years after first diagnosis, ICD-10 C53, Germany 2015–2016

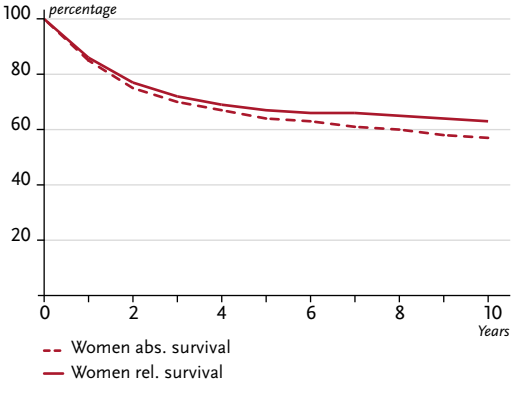


Figure 3.19.5
Relative 5-year survival by UICC-stage, ICD-10 C53, Germany 2015–2016

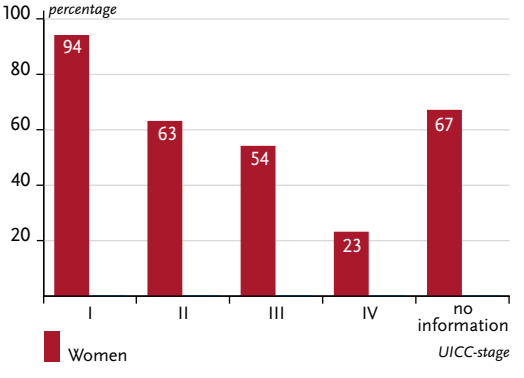


Figure 3.19.6
Age-standardised incidence and mortality rates in German federal states, ICD-10 C53, 2015–2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

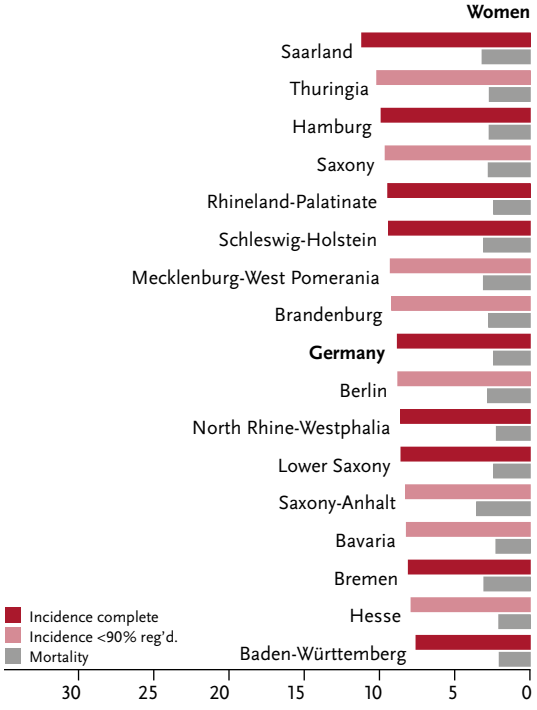
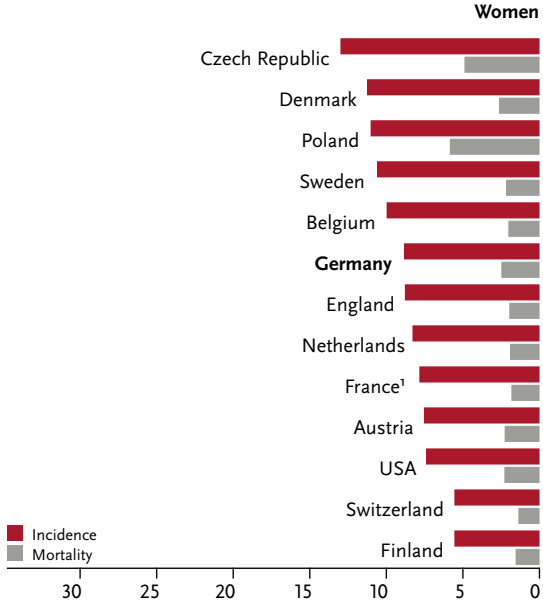


Figure 3.19.7
International comparison of age-standardised incidence and mortality rates, ICD-10 C53, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



[1] Mortality figures from Eurostat, Statistical Office of the European Union

3.20 Uterus

Table 3.20.1
Overview of key epidemiological parameters for Germany, ICD-10 C54–C55

Incidence	2015	2016	Prediction for 2020
	Women	Women	Women
Incident cases	10,990	11,090	11,200
Crude incidence rate[1]	26.5	26.6	27.7
Age-standardised incidence rate[1,2]	16.2	16.5	16.0
Median age at diagnosis	69	68	

Mortality	2015	2016	2017
	Women	Women	Women
Deaths	2,602	2,600	2,707
Crude mortality rate[1]	6.3	6.2	6.5
Age-standardised mortality rate[1,2]	3.0	3.0	3.1
Median age at death	77	77	77

Prevalence and survival rates	5 years	10 years
	Women	Women
Prevalence	45,700	83,300
Absolute survival rate (2015–2016)[3]	70 (66–72)	57 (52–61)
Relative survival rate (2015–2016)[3]	78 (75–82)	74 (69–79)

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

With approximately 11,090 new cases each year, malignant tumours of the uterus are the fifth most common form of cancer among women and the most common cancer of the female genital organs. Uterine cancer generally has a good prognosis. As such, the number of deaths from this disease is comparatively low at around 2,700 per year. One in 50 women will develop uterine cancer over the course of her life, with one in 200 dying from it. Recently, uterine cancer incidence has declined slightly, but age-standardised mortality has remained almost constant. The median age at diagnosis is 68 years. Uterine cancers are usually endometrial adenocarcinomas (cancers that develop from the glandular lining of the uterus). About 70 % of uterine cancers with valid cancer staging data were diagnosed as stage I.

The relative 5-year survival rate from uterine cancer in Germany is around 78 %. At the end of 2016, approximately 83,300 women living in Germany had developed cancer of the uterus within the preceding 10 years. Regional differences in incidence and mortality within Germany are rather small. Higher incidences are reported by eastern European countries and the US.

Risk factors

About 80 % of uterine cancers are hormone dependent. Oestrogen has a long-term impact on the development of uterine cancer: an early first menstruation, a late menopause, childlessness and diseases of the ovaries increase risk. Similarly, oestrogen monotherapy during menopause also increases risk; however, this risk can be reducing by combining oestrogen with gestagen. Oral contraceptives and combined oestrogen and progesterone therapy reduce risk. Excess body weight and lack of exercise also play a role in hormone-dependent tumours. Furthermore, women with type 2 diabetes mellitus as well as women who undergo breast cancer treatment with tamoxifen are also more likely to develop uterine cancer. Gene mutations associated with hereditary non-polyposis colorectal cancer also increase the risk of developing uterine cancer.

Advanced age is associated with the rarer oestrogen-independent forms of uterine cancer. Whereas exposure of the uterus to radiation can increase this risk, the role of lifestyle and genetic factors remains unclear.

Figure 3.20.1a
Age-standardised incidence and mortality rates, ICD-10 C54–C55, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

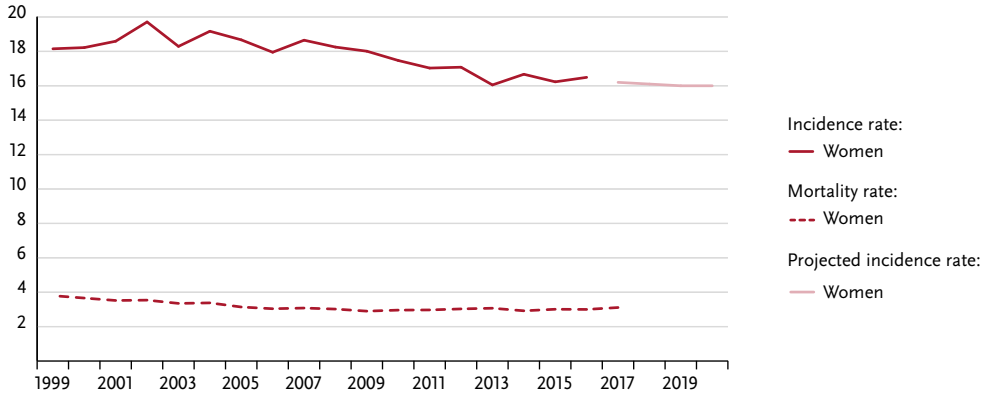


Figure 3.20.1b
Absolute numbers of incident cases and deaths, ICD-10 C54–C55, Germany 1999–2016/2017, projection (incidence) through 2020

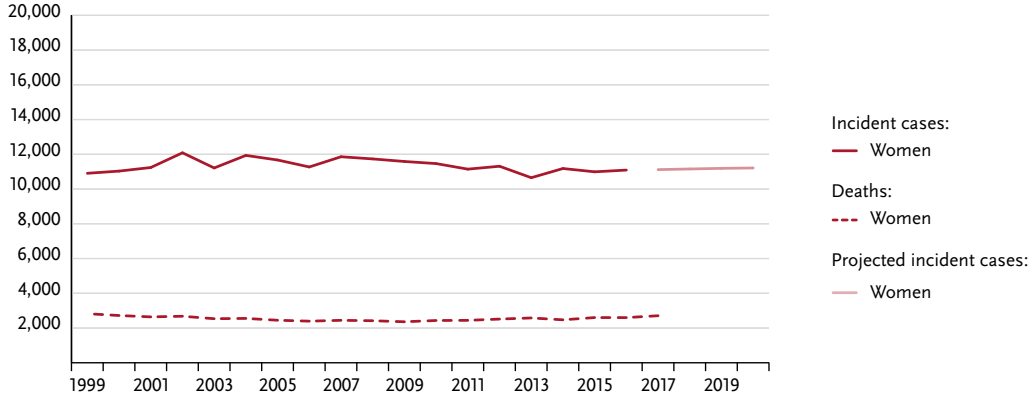


Figure 3.20.2
Age-specific incidence rates, ICD-10 C54–C55, Germany 2015–2016
per 100,000

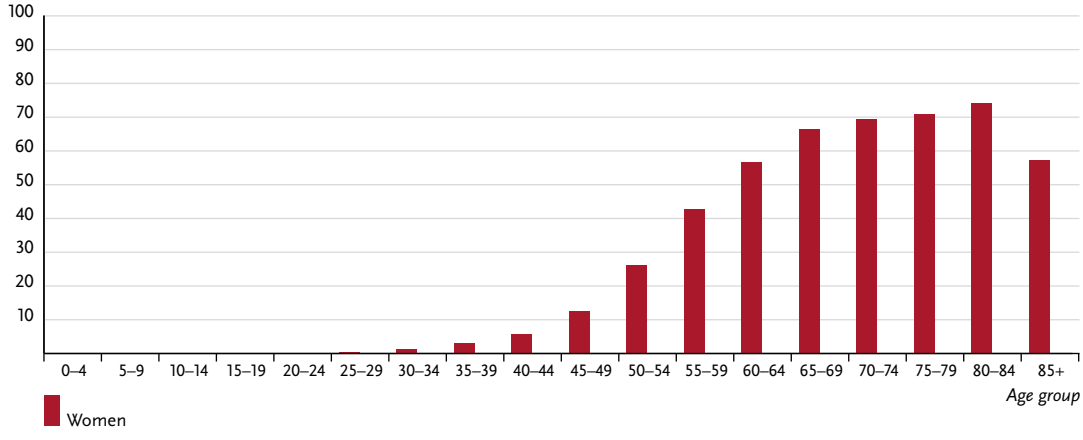


Table 3.20.2
Cancer incidence and mortality risks in Germany by age, ICD-10 C54–C55, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1 %	(1 in 2,100)	2.0 %	(1 in 50)	< 0.1 %	(1 in 18,900)	0.5 %	(1 in 190)
45 years	0.2 %	(1 in 500)	2.0 %	(1 in 51)	< 0.1 %	(1 in 5,700)	0.5 %	(1 in 190)
55 years	0.5 %	(1 in 210)	1.8 %	(1 in 55)	0.1 %	(1 in 1,600)	0.5 %	(1 in 200)
65 years	0.7 %	(1 in 150)	1.4 %	(1 in 71)	0.1 %	(1 in 770)	0.5 %	(1 in 210)
75 years	0.6 %	(1 in 170)	0.9 %	(1 in 120)	0.2 %	(1 in 440)	0.4 %	(1 in 260)
Lifetime risk			2.0 %	(1 in 50)			0.5 %	(1 in 200)

Figure 3.20.3
Distribution of UICC-stages at first diagnosis, ICD-10 C54–C55, Germany 2015–2016
(top: all cases; bottom: only valid reports)

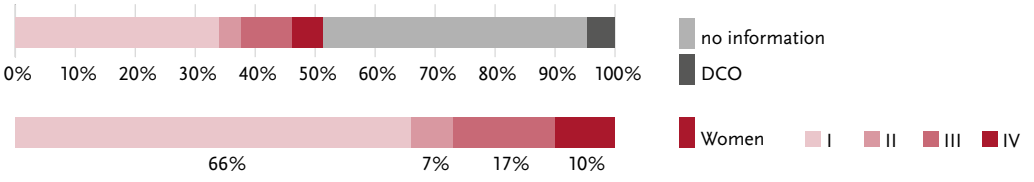


Figure 3.20.4
Absolute and relative survival rates up to 10 years after first diagnosis, ICD-10 C54–C55, Germany 2015–2016

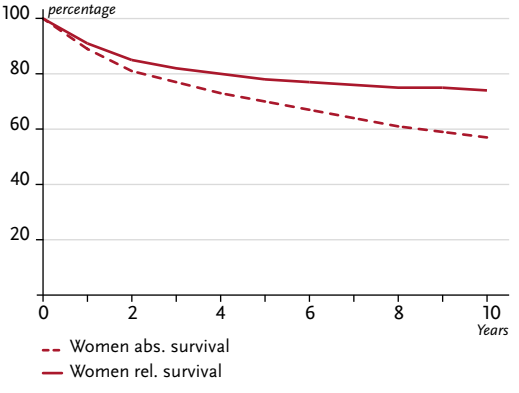


Figure 3.20.5
Relative 5-year survival by UICC-stage, ICD-10 C54–C55, Germany 2015–2016

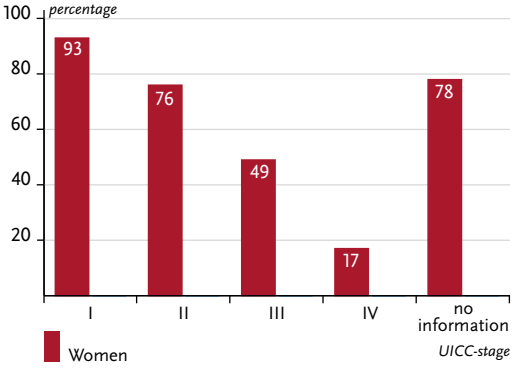


Figure 3.20.6
Age-standardised incidence and mortality rates in German federal states, ICD-10 C54–C55, 2015–2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

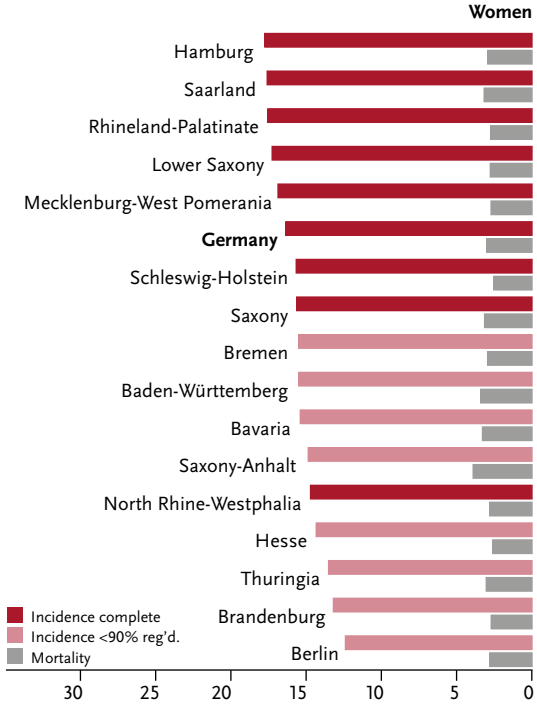


Figure 3.20.7
International comparison of age-standardised incidence and mortality rates, ICD-10 C54–C55, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)

[1] Data including C58
[2] Incidence only for C54
[3] Mortality figures from Eurostat, Statistical Office of the European Union

3.21 Ovaries

Table 3.21.1
Overview of key epidemiological parameters for Germany, ICD-10 C56

Incidence	2015	2016	Prediction for 2020
	Women	Women	Women
Incident cases	7,760	7,350	7,000
Crude incidence rate[1]	18.7	17.6	16.7
Age-standardised incidence rate[1,2]	11.8	11.1	10.1
Median age at diagnosis	68	68	

Mortality	2015	2016	2017
	Women	Women	Women
Deaths	5,431	5,486	5,373
Crude mortality rate[1]	13.1	13.1	12.8
Age-standardised mortality rate[1,2]	6.9	6.9	6.6
Median age at death	75	75	75

Prevalence and survival rates	5 years	10 years
	Women	Women
Prevalence	22,400	35,900
Absolute survival rate (2015–2016)[3]	40 (35–46)	29 (26–37)
Relative survival rate (2015–2016)[3]	43 (38–50)	35 (30–43)

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

Cancer of the ovaries accounts for a third of all malignant neoplasms of the female genitalia and half of all deaths from cancers of these organs. The incidence rate increases continuously up to 85 years of age, with a median age at diagnosis of 68 years. Ovarian cancers tend to be moderately to poorly differentiated serous adenocarcinomas. Some rare forms of ovarian cancer, such as germ cell tumours, can occur in girls and young women. About one in 75 women will develop ovarian cancer during her lifetime.

Incidence and mortality rates have decreased substantially in Germany since the turn of the millennium, and the absolute number of new cases has also declined. Nonetheless, as diagnosis often occurs at a later stage (76 % in stage III/IV), women with ovarian cancer have relatively poor survival prospects. Although the relative 5-year survival rate is currently 43 %, it improves if the disease is recognised early: relative survival rates are 89 % for stage I and 77 % for stage II.

Risk factors

The risk of developing ovarian cancer increases with age. Obesity also plays a role. In addition, hormonal factors have an impact on the risk of developing ovarian cancer: whereas childlessness and infertility are linked to an increased risk, multiple births and longer periods of breastfeeding are associated with a lower risk. Whether early menstruation or a late menopause increases the risk of ovarian cancer remains unclear. Hormonal factors are likely to increase risk among women with numerous ovarian cysts. Hormone replacement therapy, especially with oestrogen monotherapies in postmenopausal women, is also a risk factor. In contrast, ovulation inhibitors (birth control pills) have a protective effect. Finally, sterilisation through occlusion of the fallopian tubes reduces the risk of ovarian cancer.

Women with first-degree relatives who have developed breast or ovarian cancer, as well as women with breast, uterine or colorectal cancer, have an increased risk of ovarian cancer. Underlying genetic mutations, especially in the BRCA1 and BRCA2 genes, can often be identified in these cases. However, although these gene mutations significantly increase the risk of developing uterine cancer, they only play a role in one in 10 cases in Germany.

Figure 3.21.1a
Age-standardised incidence and mortality rates, ICD-10 C56, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

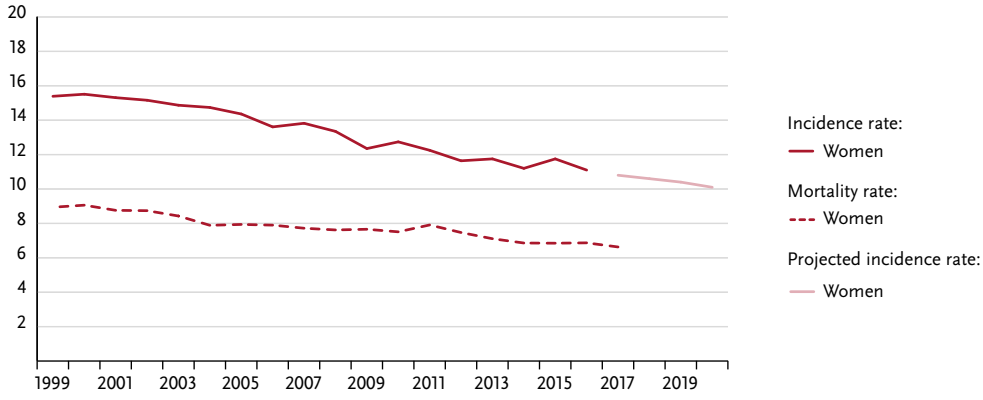


Figure 3.21.1b
Absolute numbers of incident cases and deaths, ICD-10 C56, Germany 1999–2016/2017, projection (incidence) through 2020

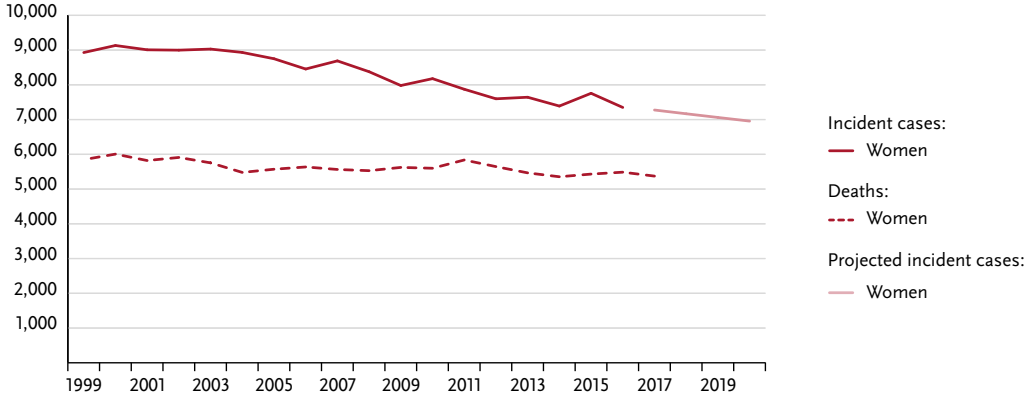


Figure 3.21.2
Age-specific incidence rates, ICD-10 C56, Germany 2015–2016
per 100,000

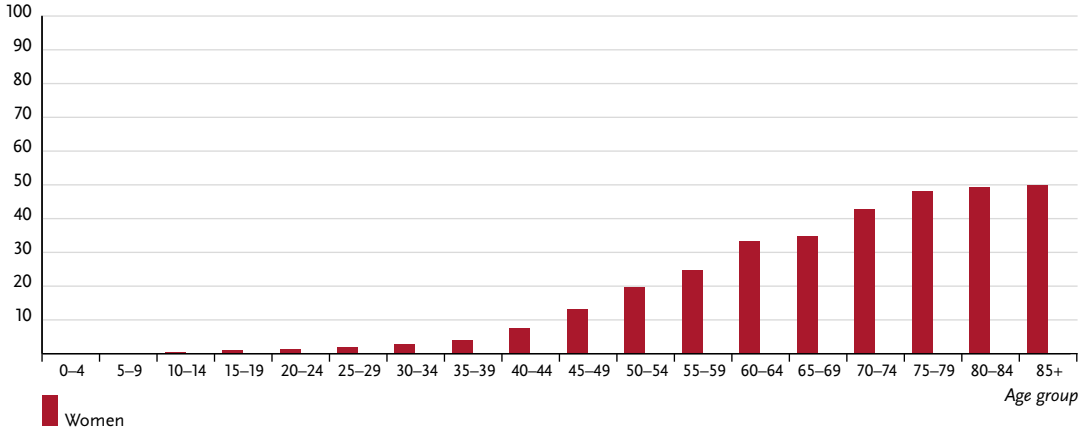


Table 3.21.2
Cancer incidence and mortality risks in Germany by age, ICD-10 C56, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	0.1 %	(1 in 1,700)	1.3 %	(1 in 76)	< 0.1 %	(1 in 6,400)	1.1 %	(1 in 94)
45 years	0.2 %	(1 in 650)	1.3 %	(1 in 79)	0.1 %	(1 in 1,600)	1.1 %	(1 in 95)
55 years	0.3 %	(1 in 360)	1.1 %	(1 in 88)	0.2 %	(1 in 610)	1.0 %	(1 in 99)
65 years	0.4 %	(1 in 280)	0.9 %	(1 in 110)	0.3 %	(1 in 370)	0.9 %	(1 in 110)
75 years	0.4 %	(1 in 260)	0.6 %	(1 in 160)	0.4 %	(1 in 230)	0.7 %	(1 in 140)
Lifetime risk			1.3 %	(1 in 75)			1.0 %	(1 in 95)

Figure 3.21.3
Distribution of UICC-stages at first diagnosis, ICD-10 C56, Germany 2015–2016
(top: all cases; bottom: only valid reports)

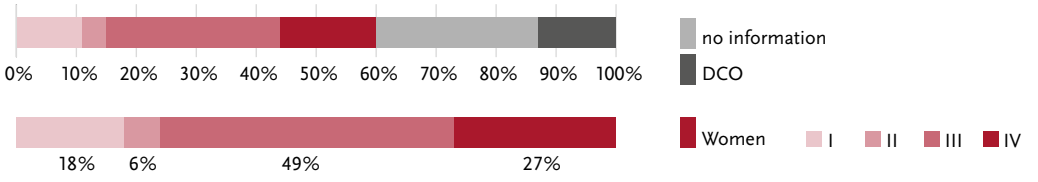


Figure 3.21.4
Absolute and relative survival rates up to 10 years after first diagnosis, ICD-10 C56, Germany 2015–2016

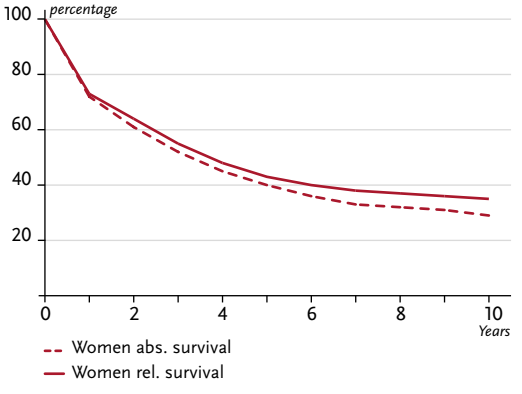


Figure 3.21.5
Relative 5-year survival by UICC-stage, ICD-10 C56, Germany 2015–2016

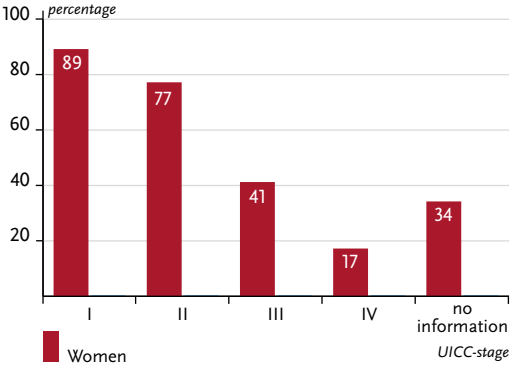


Figure 3.21.6
Age-standardised incidence and mortality rates in German federal states, ICD-10 C56, 2015–2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

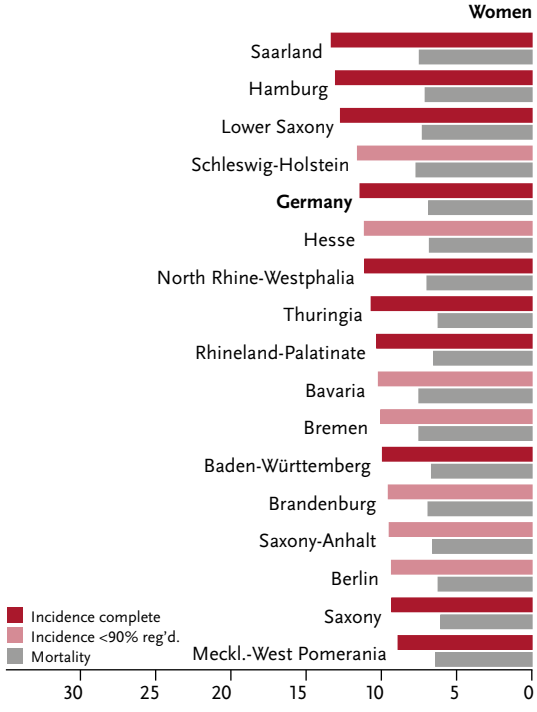
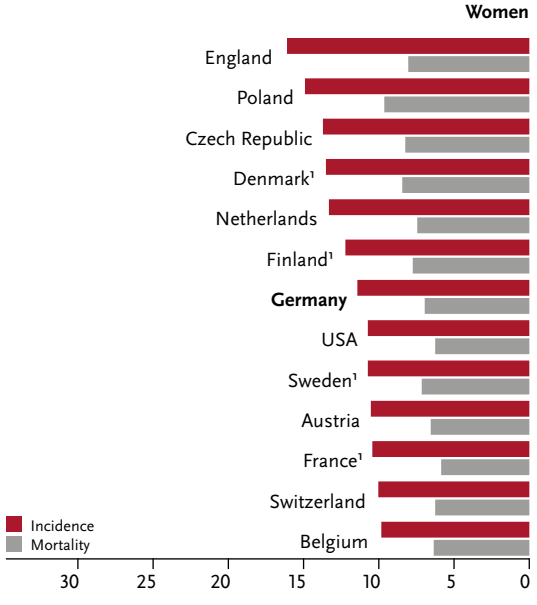


Figure 3.21.7
International comparison of age-standardised incidence and mortality rates, ICD-10 C56, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



[1] Data including C57.0 to C57.4

3.22 Prostate

Table 3.22.1
Overview of key epidemiological parameters for Germany, ICD-10 C61

Incidence	2015	2016	Prediction for 2020
	Men	Men	Men
Incident cases	58,000	58,780	61,200
Crude incidence rate[1]	144.4	144.7	151.3
Age-standardised incidence rate[1,2]	91.7	91.6	90.1
Median age at diagnosis	72	72	

Mortality	2015	2016	2017
	Men	Men	Men
Deaths	13,900	14,417	14,318
Crude mortality rate[1]	34.6	35.5	35.1
Age-standardised mortality rate[1,2]	19.4	19.5	18.8
Median age at death	79	80	80

Prevalence and survival rates	5 years	10 years
	Men	Men
Prevalence	258,000	496,200
Absolute survival rate (2015–2016)[3]	75 (71–78)	58 (56–61)
Relative survival rate (2015–2016)[3]	89 (86–91)	88 (85–90)

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

Around 58,500 new cases of prostate cancer were diagnosed in 2016. After having increased over nearly two decades, the age-standardised incidence rate for prostate cancer remained largely constant since 2003 and has decreased substantially between 2011 and 2016. A similar development can be observed in many other countries and is likely to be attributable to a long-term increase in use of the prostate-specific antigen (PSA) test, although use in Germany has declined recently. In contrast to incidence, age-standardised mortality decreased continuously until 2007 and has since remained largely stable. Incidence in Germany is currently similar to other countries in Central Europe.

Prostate cancer rarely occurs before the age of 50 years: the risk of developing prostate cancer over the next 10 years is less than 0.1% for a 35-year-old, whereas it is about 5% for a 75-year-old.

Men with prostate cancer have a relative 5-year survival rate of 89%, with about two thirds of tumours diagnosed at an early stage (UICC I/II).

Risk factors and early detection

The causes of prostate cancer and most of the risk factors associated with it have yet to be determined. Age is an important risk factor. Men of sub-Saharan African origin or ancestry are more likely to develop prostate cancer than Europeans and those of European descent; Asians are rarely affected. Genetics is a proven risk factor, as clustering has been observed among close relatives. In addition, chronic inflammation of the prostate and sexually transmitted diseases also seem to increase the risk of prostate cancer.

There is little certainty about whether lifestyle or environmental risk factors play a role. However, normal weight and sufficient exercise may reduce the risk of prostate cancer.

The statutory screening programme in Germany offers a health check-up for men 45 years and older, an annual examination of the genitals and a digital rectal examination of the prostate and lymph nodes. The programme does not include a PSA blood test because its benefits at the population level have yet to be proven unequivocally.

Figure 3.22.1a
Age-standardised incidence and mortality rates, ICD-10 C61, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

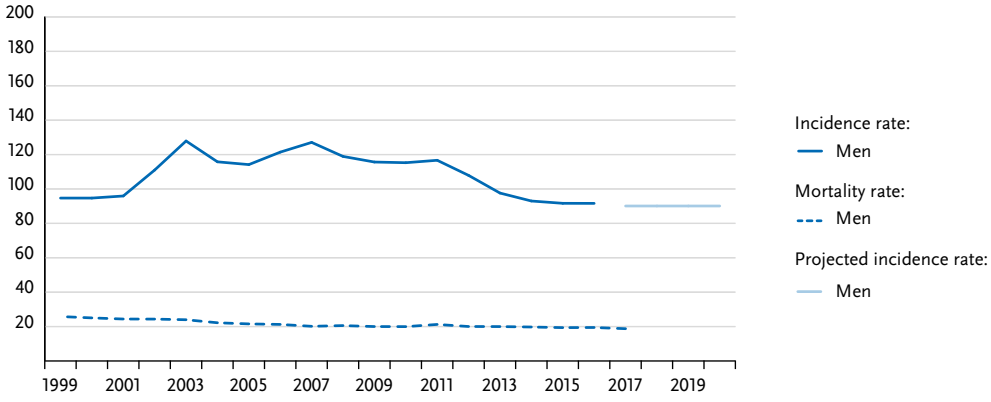


Figure 3.22.1b
Absolute numbers of incident cases and deaths, ICD-10 C61, Germany 1999–2016/2017, projection (incidence) through 2020

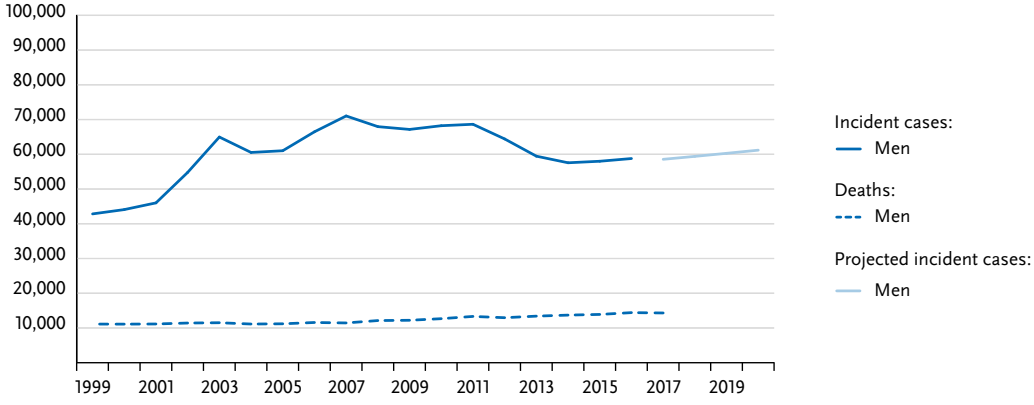


Figure 3.22.2
Age-specific incidence rates, ICD-10 C61, Germany 2015–2016
per 100,000

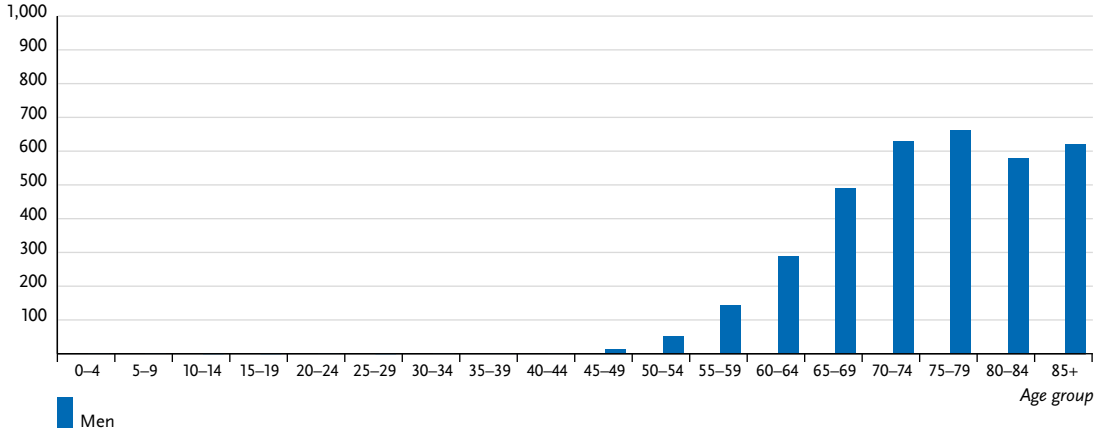


Table 3.22.2
Cancer incidence and mortality risks in Germany by age, ICD-10 C61, database 2016

	Risk of developing cancer				Mortality risk			
Men aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1 %	(1 in 5,100)	11.1 %	(1 in 9)	< 0.1 %	(1 in 89,200)	3.4 %	(1 in 29)
45 years	0.4 %	(1 in 270)	11.3 %	(1 in 9)	< 0.1 %	(1 in 4,900)	3.4 %	(1 in 29)
55 years	2.1 %	(1 in 47)	11.3 %	(1 in 9)	0.2 %	(1 in 590)	3.6 %	(1 in 28)
65 years	5.1 %	(1 in 20)	10.4 %	(1 in 10)	0.7 %	(1 in 150)	3.8 %	(1 in 27)
75 years	5.2 %	(1 in 19)	7.1 %	(1 in 14)	2.0 %	(1 in 50)	3.9 %	(1 in 26)
Lifetime risk			10.9 %	(1 in 9)			3.3 %	(1 in 30)

Figure 3.22.3
Distribution of UICC-stages at first diagnosis, ICD-10 C61, Germany 2015–2016
(top: all cases; bottom: only valid reports)

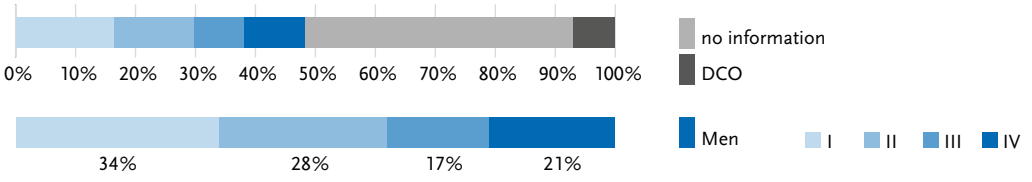


Figure 3.22.4
Absolute and relative survival rates up to 10 years after first diagnosis, ICD-10 C61, Germany 2015–2016

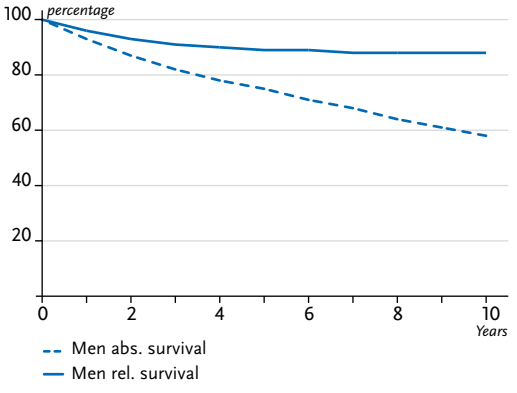


Figure 3.22.5
Relative 5-year survival by UICC-stage, ICD-10 C61, Germany 2015–2016

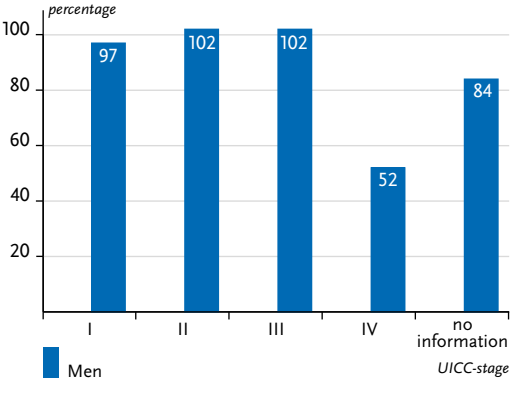


Figure 3.22.6
Age-standardised incidence and mortality rates in German federal states, ICD-10 C61, 2015–2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

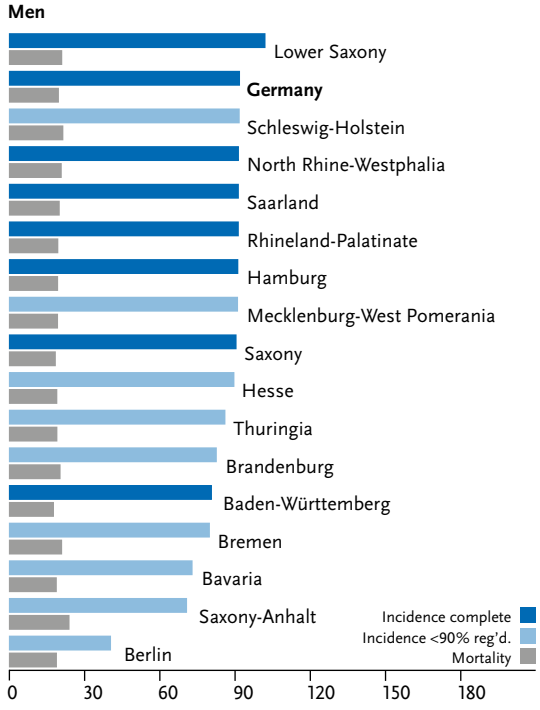
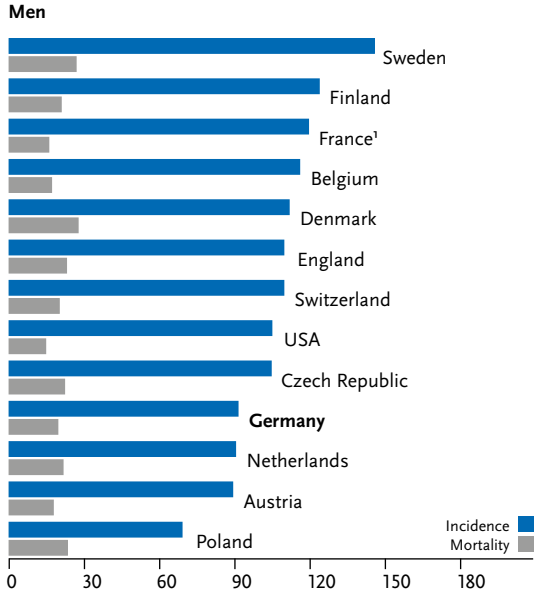


Figure 3.22.7
International comparison of age-standardised incidence and mortality rates, ICD-10 C61, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



¹ Incidence and mortality for 2015, no projection

3.23 Testis

Table 3.23.1
Overview of key epidemiological parameters for Germany, ICD-10 C62

Incidence	2015	2016	Prediction for 2020
	Men	Men	Men
Incident cases	4,280	4,120	4,200
Crude incidence rate[1]	10.7	10.1	10.5
Age-standardised incidence rate[1,2]	10.7	10.2	10.6
Median age at diagnosis	37	37	

Mortality	2015	2016	2017
	Men	Men	Men
Deaths	145	140	157
Crude mortality rate[1]	0.4	0.3	0.4
Age-standardised mortality rate[1,2]	0.3	0.3	0.3
Median age at death	48	56	53

Prevalence and survival rates	5 years	10 years
	Men	Men
Prevalence	20,600	40,200
Absolute survival rate (2015–2016)[3]	95 (87–98)	93 (87–96)
Relative survival rate (2015–2016)[3]	97 (89–100)	97 (90–100)

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

In 2016, around 4,120 men in Germany developed testicular cancer. As such, testicular cancer is rare, accounting for just 1.6 % of all cancers in men. In contrast to most other cancers, testicular cancer occurs comparatively early, between the ages of 25 and 45 years. Testicular cancer is the most common malignant tumour in men of this age group. The median age of onset is 37 years. After a steady increase lasting multiple decades, age-standardised incidence has remained fairly constant in recent years; the same has been reported by other countries in Europe. About 90 % of testicular tumours are diagnosed at stage I/II. Testicular cancers are predominantly germ cell tumours, of which around two thirds are seminomas. About one in every sixth case is a malignant teratoma or a mixture of these two types.

Since the introduction of the chemotherapy drug cisplatin more than 30 years ago, testicular cancer has had one of the most favourable prognoses and a correspondingly high relative 5-year survival rate (most recently 97 %) and low mortality (157 deaths in 2017).

Risk factors and early detection

Undescended testicles (cryptorchidism) have been confirmed as a risk factor for testicular cancer. Men who have a history of testicular cancer or a precancerous condition in one testicle also have an increased risk of developing a tumour in the healthy testicle. Rare, genetic disorders of sexual development such as Klinefelter syndrome also increase the risk of developing the disease.

Sons and brothers of individuals who have developed testicular cancer are at substantially higher risk of developing this disease themselves. In a small proportion of these cases, genetics may play a role in this familial predisposition.

A birth weight of less than 2,500 g or more than 4,500 g as well as tall stature have also been discussed as possible risk factors. The reasons behind the increased incidence that has been observed over the last few decades have yet to be determined conclusively. The latest research suggests that neither lifestyle nor environmental factors play a role in the development of testicular cancer.

Nevertheless, an early diagnosis is associated with a better prognosis. Adolescents and men are therefore advised to carry out regular self-examinations from puberty onwards. Statutory cancer screening offers men 45 years and older an annual genital examination.

Figure 3.23.1a
Age-standardised incidence and mortality rates, ICD-10 C62, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

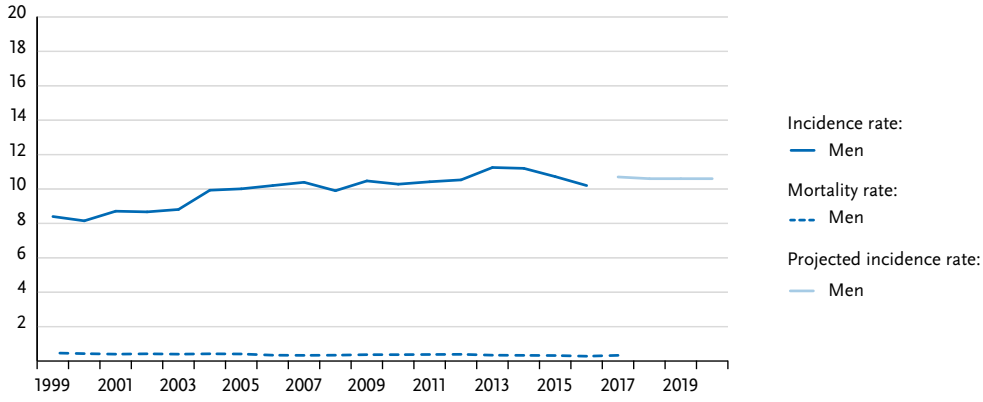


Figure 3.23.1b
Absolute numbers of incident cases and deaths, ICD-10 C62, Germany 1999–2016/2017, projection (incidence) through 2020

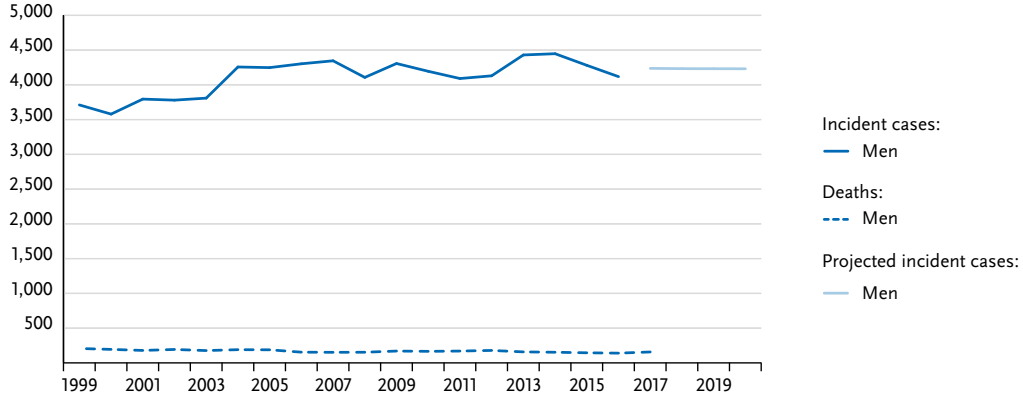


Figure 3.23.2
Age-specific incidence rates, ICD-10 C62, Germany 2015–2016
per 100,000

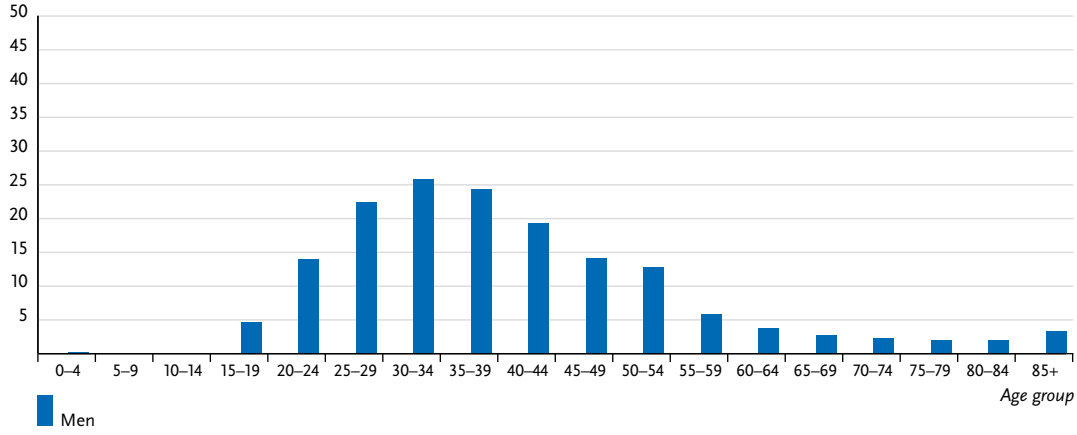


Table 3.23.2
Cancer incidence and mortality risks in Germany by age, ICD-10 C62, database 2016

	Risk of developing cancer				Mortality risk			
Men aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
15 years	0.1%	(1 in 1,100)	0.7%	(1 in 140)	< 0.1%	(1 in 85,100)	< 0.1%	(1 in 3,800)
25 years	0.2%	(1 in 440)	0.6%	(1 in 160)	< 0.1%	(1 in 32,100)	< 0.1%	(1 in 4,000)
35 years	0.2%	(1 in 480)	0.4%	(1 in 240)	< 0.1%	(1 in 23,100)	< 0.1%	(1 in 4,500)
45 years	0.1%	(1 in 760)	0.2%	(1 in 460)	< 0.1%	(1 in 28,900)	< 0.1%	(1 in 5,500)
55 years	< 0.1%	(1 in 2,000)	0.1%	(1 in 1,100)	< 0.1%	(1 in 17,300)	< 0.1%	(1 in 6,500)
65 years	< 0.1%	(1 in 4,400)	< 0.1%	(1 in 2,300)	< 0.1%	(1 in 39,800)	< 0.1%	(1 in 9,500)
75 years	< 0.1%	(1 in 6,100)	< 0.1%	(1 in 4,000)	< 0.1%	(1 in 14,700)	< 0.1%	(1 in 9,900)
Lifetime risk			0.7%	(1 in 140)			< 0.1%	(1 in 3,800)

Figure 3.23.3
Distribution of UICC-stages at first diagnosis, ICD-10 C62, Germany 2015–2016
(top: all cases; bottom: only valid reports)

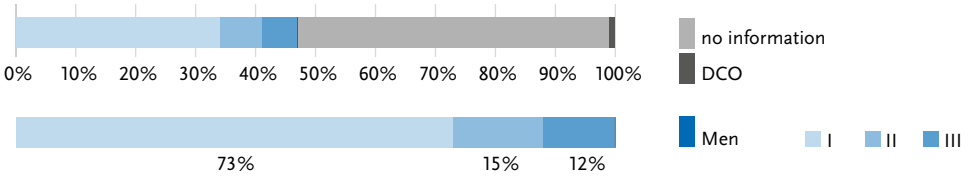


Figure 3.23.4
Absolute and relative survival rates up to 10 years after first diagnosis, ICD-10 C62, Germany 2015–2016

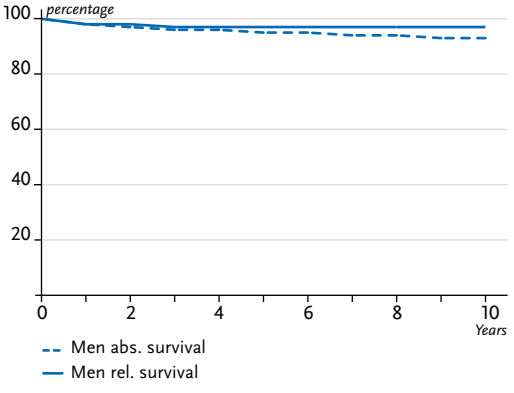


Figure 3.23.5
Relative 5-year survival by UICC-stage, ICD-10 C62, Germany 2015–2016

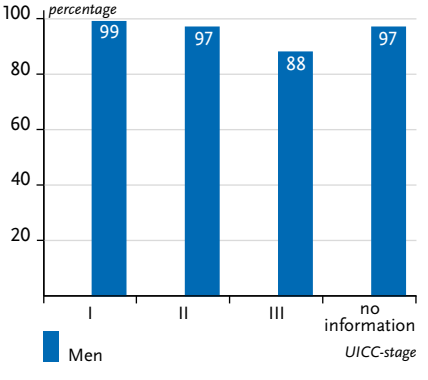


Figure 3.23.6
Age-standardised incidence and mortality rates in German federal states, ICD-10 C62, 2015–2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

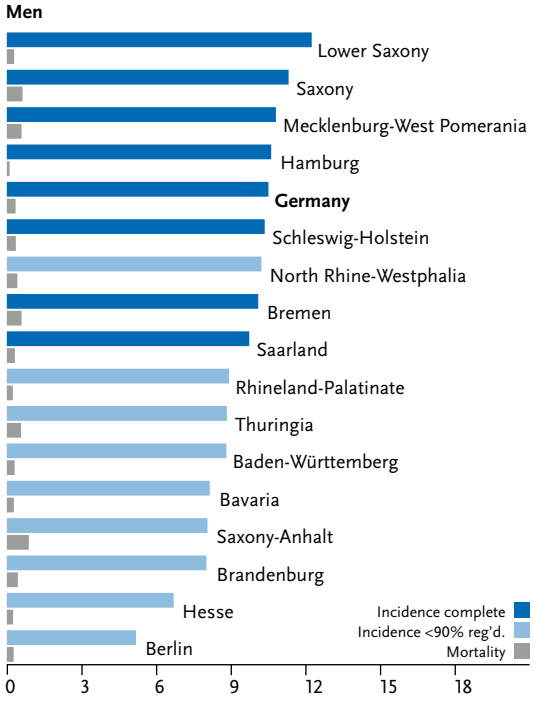
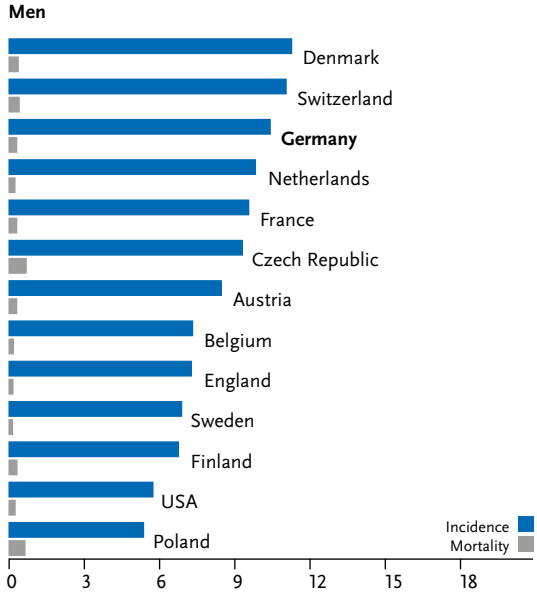


Figure 3.23.7
International comparison of age-standardised incidence and mortality rates, ICD-10 C62, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



3.24 Kidney

Table 3.24.1
Overview of key epidemiological parameters for Germany, ICD-10 C64

Incidence	2015		2016		Prediction for 2020	
	Women	Men	Women	Men	Women	Men
Incident cases	5,720	9,780	5,360	9,280	5,700	9,700
Crude incidence rate[1]	13.8	24.4	12.9	22.8	13.6	23.9
Age-standardised incidence rate[1,2]	8.0	16.8	7.5	15.7	7.4	15.7
Median age at diagnosis	72	68	72	68		

Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	2,106	3,306	2,074	3,280	1,985	3,155
Crude mortality rate[1]	5.1	8.2	5.0	8.1	4.7	7.7
Age-standardised mortality rate[1,2]	2.2	5.0	2.1	4.9	2.0	4.6
Median age at death	79	75	79	75	80	76

Prevalence and survival rates	5 years		10 years	
	Women	Men	Women	Men
Prevalence	21,900	37,900	39,900	66,600
Absolute survival rate (2015–2016)[3]	69 (64–74)	66 (60–71)	53 (50–57)	50 (46–56)
Relative survival rate (2015–2016)[3]	77 (73–82)	76 (69–81)	70 (67–75)	69 (63–76)

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

Malignant neoplasms of the kidney originate from various types of tissue. Renal cell carcinomas (hypernephromas) occur most frequently in adulthood and account for almost 96 % of all kidney tumours. In contrast, cancer of the kidney is rare among children, although nephroblastomas (Wilms' tumours) are predominantly diagnosed in children. In total, around 14,640 new cases of kidney cancer were diagnosed in 2016, and men were affected almost twice as often as women.

Age-standardised incidence rates have been falling among both sexes since about 2008. Age-standardised mortality rates have decreased slightly throughout the entire period. The median age at diagnosis is 72 years for women and 68 years for men. The prognosis for patients with kidney cancer is comparatively favourable, with a relative 5-year survival rate of 77 % for women and 76 % for men. About 56 % of all tumours are diagnosed at relatively early stages (UICC I/II). A regional comparison shows higher rates of incidence and mortality in eastern Germany. At the international level, incidence and mortality rates are relatively high in the Czech Republic.

Risk factors

Active and passive smoking as well as high blood pressure and obesity are the most important risk factors associated with cancer of the kidney. A lack of physical activity also appears to increase risk. An additional risk factor is chronic renal insufficiency, regardless of whether it is due to medicines that damage the kidneys, repeated inflammation of the urinary tract or another cause. Patients with a suppressed immune system after a kidney transplant have a high risk of developing renal cell carcinoma.

A familial predisposition probably only plays a role in a relatively small number of cases. Nevertheless, around 4 % of renal cell carcinomas occur in patients with complex hereditary diseases such as von Hippel-Lindau syndrome. Renal cell carcinomas that are caused by genetic factors are often multifocal, bilateral and occur more often at a younger age than kidney cancers in people without a genetic predisposition.

Figure 3.24.1a
Age-standardised incidence and mortality rates by sex, ICD-10 C64, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

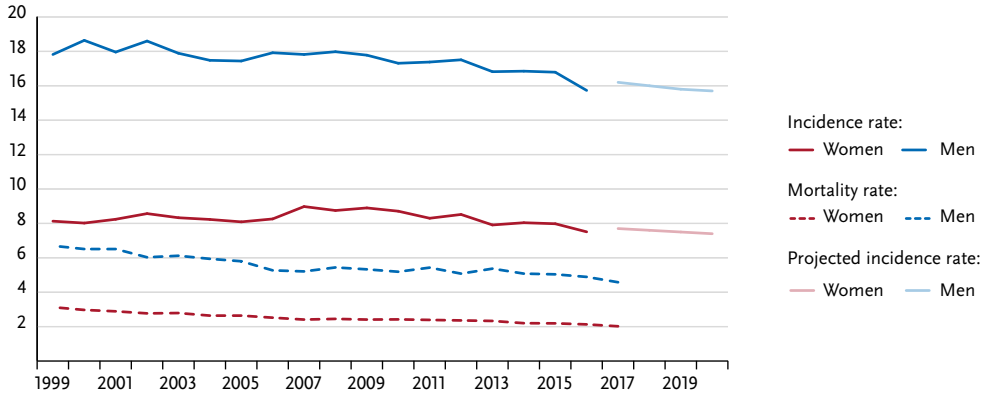


Figure 3.24.1b
Absolute numbers of incident cases and deaths by sex, ICD-10 C64, Germany 1999–2016/2017, projection (incidence) through 2020

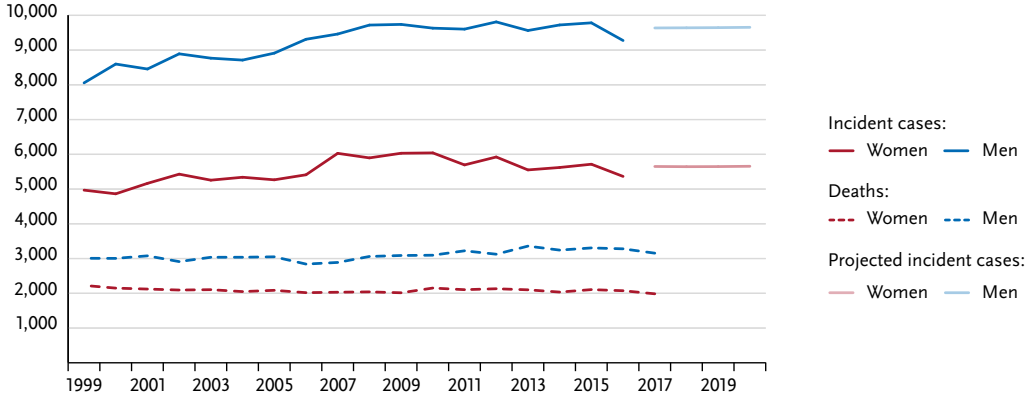


Figure 3.24.2
Age-specific incidence rates by sex, ICD-10 C64, Germany 2015–2016
per 100,000

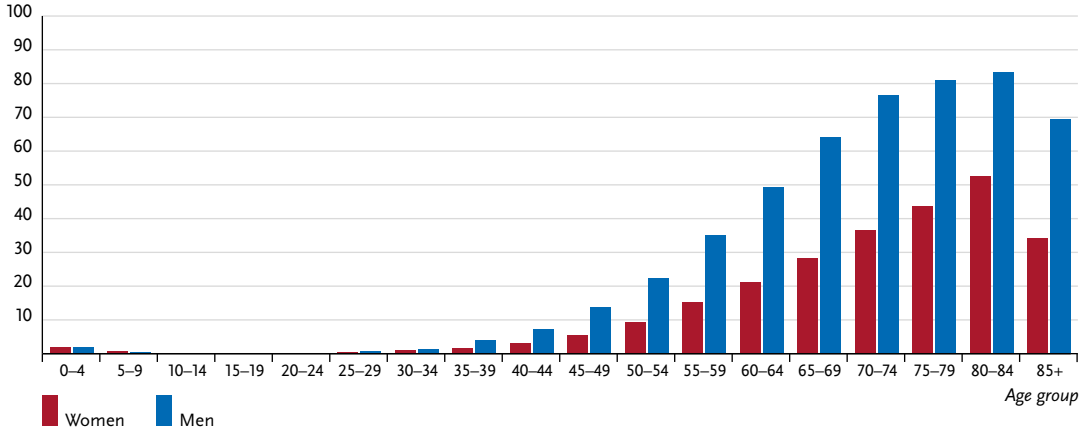


Table 3.24.2
Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C64, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1 %	(1 in 4,000)	1.0 %	(1 in 100)	< 0.1 %	(1 in 41,300)	0.4 %	(1 in 230)
45 years	0.1 %	(1 in 1,300)	1.0 %	(1 in 110)	< 0.1 %	(1 in 10,100)	0.4 %	(1 in 230)
55 years	0.2 %	(1 in 580)	0.9 %	(1 in 110)	< 0.1 %	(1 in 2,900)	0.4 %	(1 in 240)
65 years	0.3 %	(1 in 330)	0.8 %	(1 in 130)	0.1 %	(1 in 1,200)	0.4 %	(1 in 240)
75 years	0.4 %	(1 in 260)	0.5 %	(1 in 190)	0.2 %	(1 in 500)	0.4 %	(1 in 270)
Lifetime risk			1.0 %	(1 in 100)			0.4 %	(1 in 240)
Men aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	0.1 %	(1 in 1,800)	1.7 %	(1 in 60)	< 0.1 %	(1 in 21,200)	0.7 %	(1 in 150)
45 years	0.2 %	(1 in 590)	1.6 %	(1 in 61)	< 0.1 %	(1 in 3,800)	0.7 %	(1 in 140)
55 years	0.4 %	(1 in 250)	1.5 %	(1 in 66)	0.1 %	(1 in 1,000)	0.7 %	(1 in 150)
65 years	0.6 %	(1 in 160)	1.3 %	(1 in 79)	0.2 %	(1 in 530)	0.7 %	(1 in 150)
75 years	0.6 %	(1 in 160)	0.8 %	(1 in 130)	0.4 %	(1 in 270)	0.6 %	(1 in 170)
Lifetime risk			1.7 %	(1 in 61)			0.7 %	(1 in 150)

Figure 3.24.3
Distribution of UICC-stages at first diagnosis by sex, ICD-10 C64, Germany 2015–2016
(top: all cases; bottom: only valid reports)

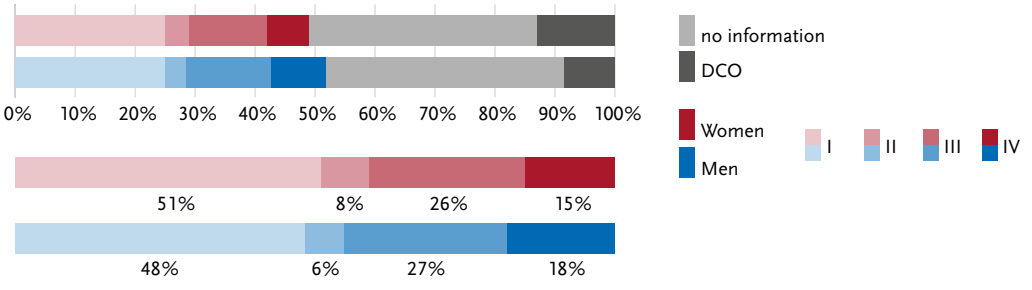


Figure 3.24.4
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C64, Germany 2015–2016

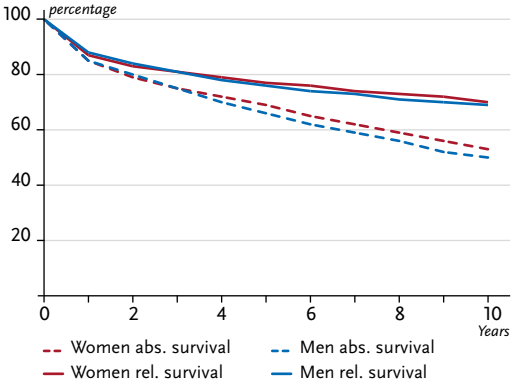


Figure 3.24.5
Relative 5-year survival by UICC-stage and sex, ICD-10 C64, Germany 2015–2016

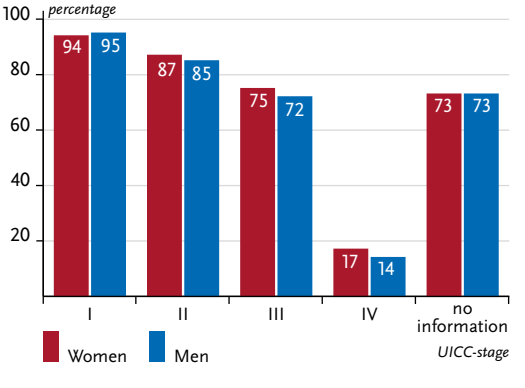


Figure 3.24.6
Age-standardised incidence and mortality rates in German federal states by sex, ICD-10 C64, 2015–2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

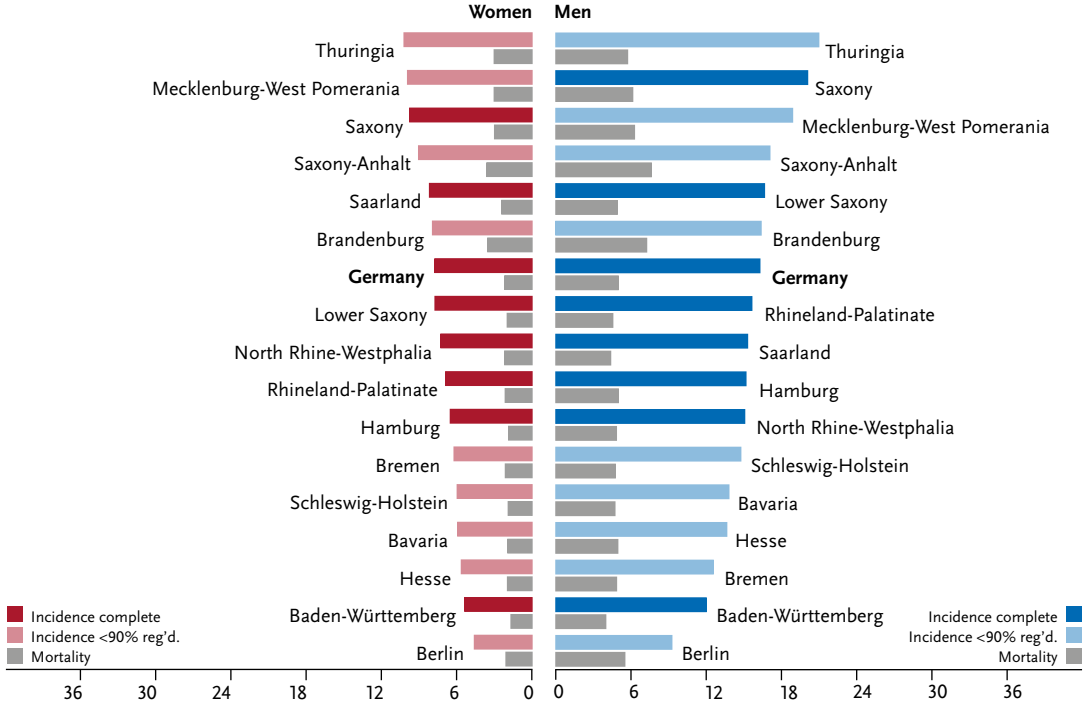
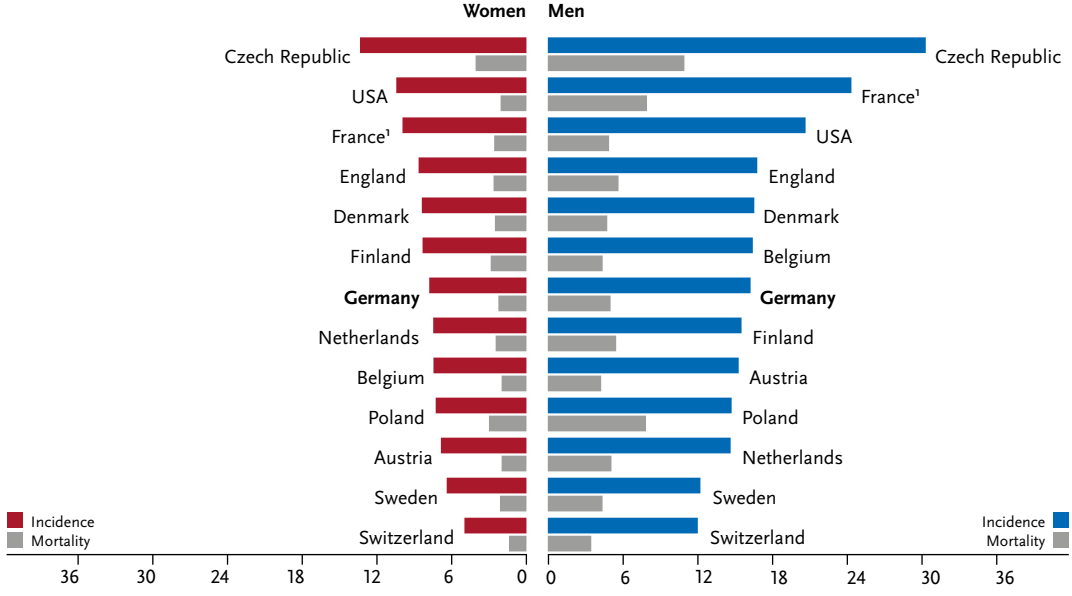


Figure 3.24.7
International comparison of age-standardised incidence and mortality rates by sex, ICD-10 C64, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



¹ Data including C65, C66 and C68

3.25 Bladder

Table 3.25.1
Overview of key epidemiological parameters for Germany, ICD-10 C67

Incidence	2015				2016				Prediction for 2020			
	Women		Men		Women		Men		Women		Men	
Incident cases[4]	4,560	(7,560)	12,670	(23,370)	4,250	(7,220)	12,220	(22,760)	4,500	(7,600)	12,800	(23,800)
Crude incidence rate[1,4]	11.0	(18.2)	31.5	(58.2)	10.2	(17.3)	30.1	(56.0)	10.7	(18.3)	31.7	(58.8)
Age-standardised incidence rate[1,2,4]	5.3	(9.4)	19.4	(36.3)	5.0	(9.0)	18.4	(34.7)	4.9	(9.0)	17.7	(34.1)
Median age at diagnosis[4]	77	(75)	74	(73)	77	(75)	74	(74)				

Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	1,872	3,963	1,897	4,049	1,858	3,848
Crude mortality rate[1]	4.5	9.9	4.5	10.0	4.4	9.4
Age-standardised mortality rate[1,2]	1.8	5.7	1.8	5.7	1.8	5.2
Median age at death	82	79	82	80	82	80

Prevalence and survival rates	5 years				10 years			
	Women		Men		Women		Men	
Prevalence[4]	12,000	(25,900)	39,700	(88,400)	19,300	(44,200)	63,300	(147,000)
Absolute survival rate (2015–2016)[3]	37 (29–45)		44 (38–51)		26 (20–31)		29 (23–35)	
Relative survival rate (2015–2016)[3]	45 (36–53)		55 (48–63)		41 (29–49)		49 (38–56)	

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)
4 in parentheses: including in situ tumours and neoplasms of uncertain or unknown behavior (D09.0, D41.4)

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

Epidemiology

Approximately 16,470 people were diagnosed with invasive bladder cancer in Germany in 2016; a quarter of whom were women. In addition, 13,500 people were diagnosed with non-invasive papillary carcinomas and in situ carcinomas of the bladder. These are associated with an increased risk of tumour progression and recurrence; this particularly applies to in situ bladder carcinomas. As such, both are of particular clinical relevance, although the ICD-10 system does not currently classify them as malignant neoplasms. Most cancers of the bladder are urothelial carcinomas, and they often occur together with carcinomas of the urinary tract.

Since the late 1990s, age-standardised incidence and mortality rates have declined significantly among men. This is probably due to a reduction in tobacco use, and possibly because of a decrease in occupational exposure to carcinogens. Rates among women have remained largely constant over time, although bladder cancer has always occurred in substantially lower levels among women than men.

The higher relative 5-year survival rates for men compared to women, however, are due to the fact that these tumours tend to be identified at earlier stages among men (36 % identified at UICC I) than among women (24 %).

Risk factors

Active and passive smoking are the main risk factors for bladder cancer. In addition, some chemicals, such as aromatic amines, increase risk. Although such substances have largely disappeared from European workplaces, the long latency period between exposure and the development of bladder cancer means that occupationally-related bladder carcinomas continue to occur. Cytostatics used in cancer therapy, and radiation therapy to the pelvic area can also increase risk. Some medicines, such as the diabetes drug pioglitazone, also appear to increase bladder cancer risk.

Air pollution, chlorine in drinking water, and arsenic are additional bladder cancer risk factors, as is chronic inflammatory damage to the bladder mucosa. Family clusters have been observed, and there are indications that genetic factors influence sensitivity to carcinogens and thus increase the risk of contracting cancer of the bladder.

Figure 3.25.1a
Age-standardised incidence and mortality rates by sex, ICD-10 C67, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

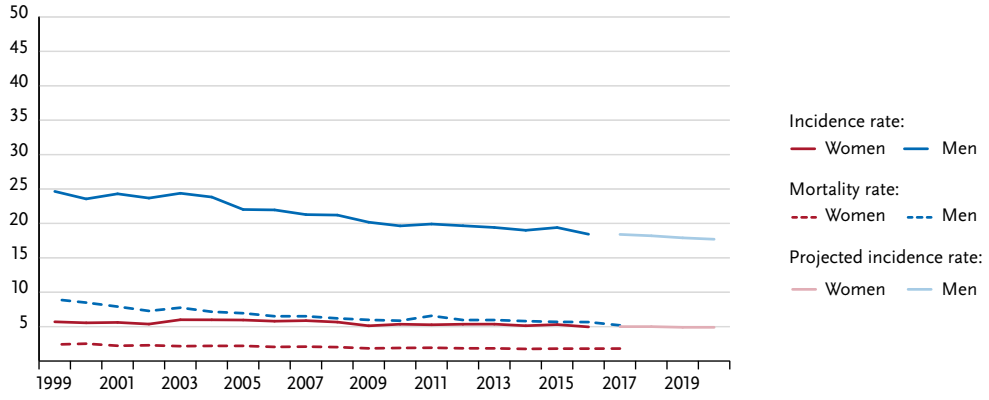


Figure 3.25.1b
Absolute numbers of incident cases and deaths by sex, ICD-10 C67, Germany 1999–2016/2017, projection (incidence) through 2020

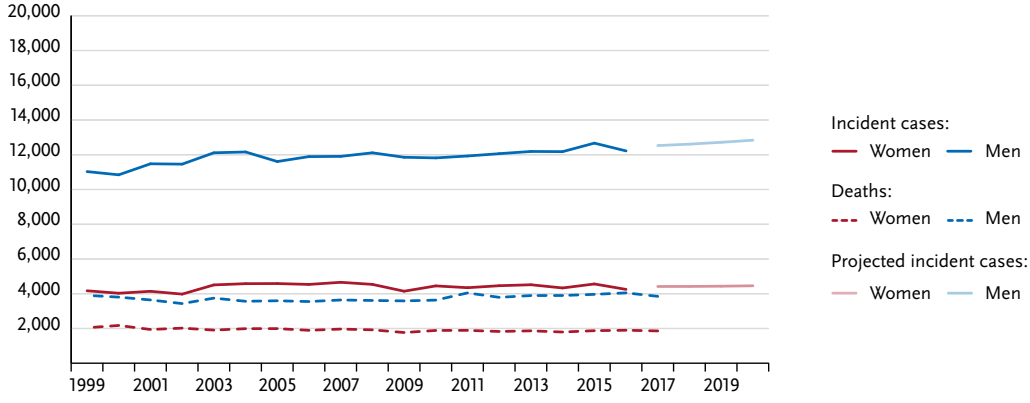


Figure 3.25.2
Age-specific incidence rates by sex, ICD-10 C67, Germany 2015–2016
per 100,000

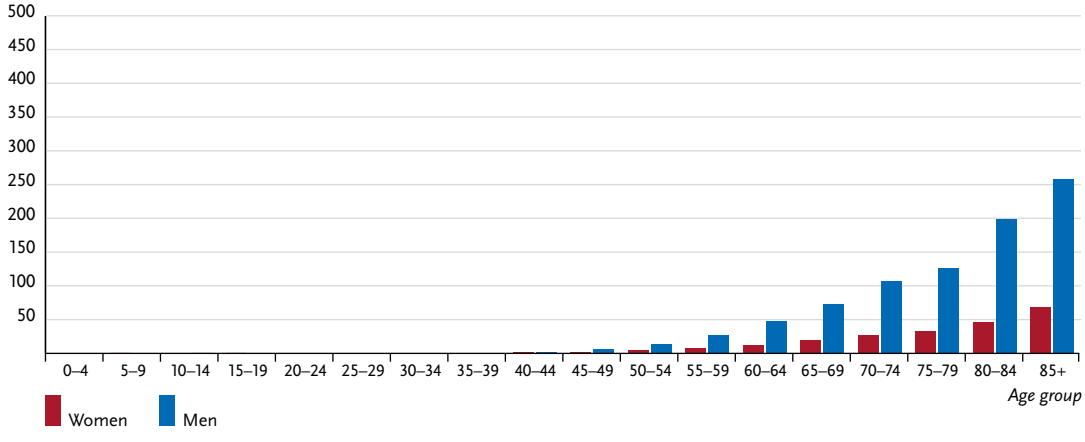


Table 3.25.2
Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C67, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1 %	(1 in 10,100)	0.8 %	(1 in 120)	< 0.1 %	(1 in 30,300)	0.4 %	(1 in 250)
45 years	< 0.1 %	(1 in 2,800)	0.8 %	(1 in 120)	< 0.1 %	(1 in 10,800)	0.4 %	(1 in 250)
55 years	0.1 %	(1 in 1,000)	0.8 %	(1 in 120)	< 0.1 %	(1 in 4,200)	0.4 %	(1 in 250)
65 years	0.2 %	(1 in 480)	0.7 %	(1 in 130)	0.1 %	(1 in 1,900)	0.4 %	(1 in 250)
75 years	0.3 %	(1 in 320)	0.6 %	(1 in 160)	0.2 %	(1 in 580)	0.4 %	(1 in 260)
Lifetime risk			0.8 %	(1 in 120)			0.4 %	(1 in 250)
Men aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1 %	(1 in 5,300)	2.4 %	(1 in 41)	< 0.1 %	(1 in 41,400)	1.0 %	(1 in 100)
45 years	0.1 %	(1 in 1,000)	2.4 %	(1 in 41)	< 0.1 %	(1 in 6,700)	1.0 %	(1 in 100)
55 years	0.4 %	(1 in 280)	2.4 %	(1 in 41)	0.1 %	(1 in 1,400)	1.0 %	(1 in 100)
65 years	0.8 %	(1 in 130)	2.3 %	(1 in 43)	0.2 %	(1 in 580)	1.0 %	(1 in 98)
75 years	1.2 %	(1 in 83)	1.9 %	(1 in 52)	0.5 %	(1 in 200)	1.1 %	(1 in 94)
Lifetime risk			2.4 %	(1 in 42)			0.9 %	(1 in 110)

Figure 3.25.3
Distribution of UICC-stages at first diagnosis by sex, ICD-10 C67, Germany 2015–2016
(top: all cases; bottom: only valid reports)

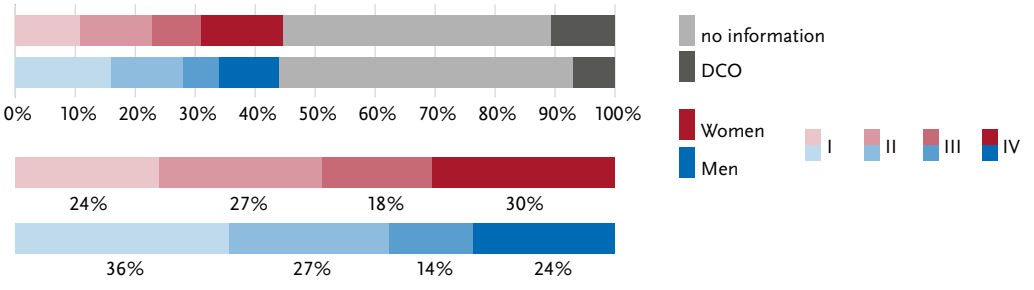


Figure 3.25.4
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C67, Germany 2015–2016

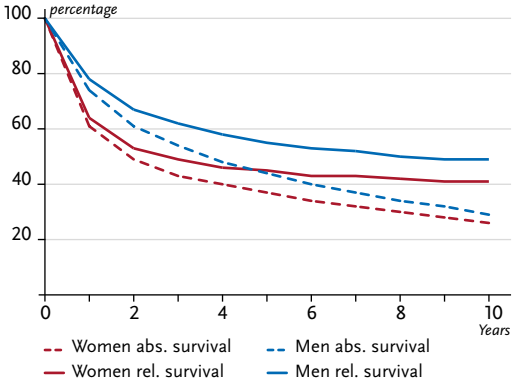


Figure 3.25.5
Relative 5-year survival by UICC-stage and sex, ICD-10 C67, Germany 2015–2016

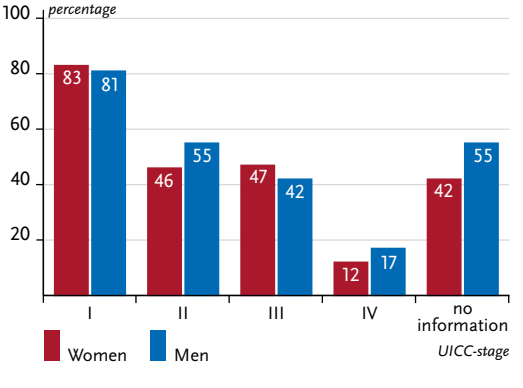


Figure 3.25.6
Age-standardised incidence and mortality rates in German federal states by sex, ICD-10 C67, 2015–2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

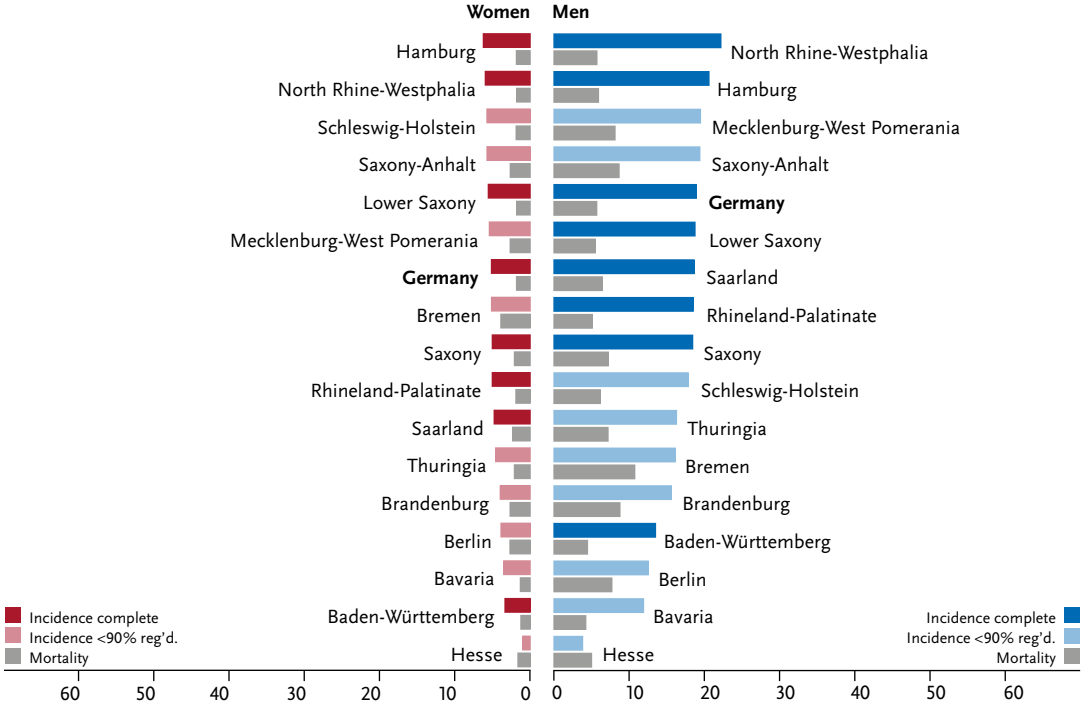
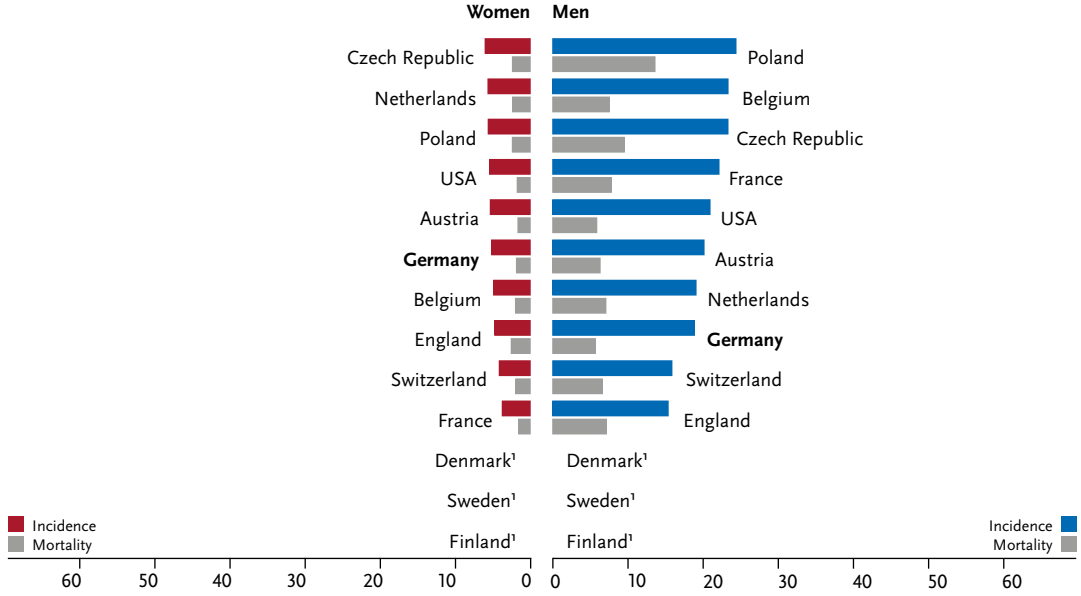


Figure 3.25.7
International comparison of age-standardised incidence and mortality rates by sex, ICD-10 C67, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



¹ No comparable data available

3.26 Central nervous system

Table 3.26.1
Overview of key epidemiological parameters for Germany, ICD-10 C70–C72

Incidence	2015		2016		Prediction for 2020	
	Women	Men	Women	Men	Women	Men
Incident cases	3,320	4,200	3,460	3,970	3,500	4,400
Crude incidence rate[1]	8.0	10.4	8.3	9.8	8.5	10.8
Age-standardised incidence rate[1,2]	5.7	8.1	5.9	7.6	5.9	8.2
Median age at diagnosis	66	63	66	62		

Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	2,535	3,317	2,816	3,320	2,721	3,385
Crude mortality rate[1]	6.1	8.3	6.7	8.2	6.5	8.3
Age-standardised mortality rate[1,2]	3.8	5.9	4.1	5.9	4.0	5.9
Median age at death	70	66	71	66	70	66

Prevalence and survival rates	5 years		10 years	
	Women	Men	Women	Men
Prevalence	6,900	8,400	10,500	12,400
Absolute survival rate (2015–2016)[3]	22 (14–31)	19 (14–36)	18 (11–23)	14 (8–26)
Relative survival rate (2015–2016)[3]	24 (15–32)	21 (14–38)	20 (13–26)	16 (9–29)

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

In 95% of cases, cancers of the central nervous system (CNS) affect the brain; the remaining 5% are diagnosed in the meninges and spinal membranes, cranial nerves and spinal cord.

CNS tumours can occur at any age. Adults predominantly develop gliomas originating from the supportive tissue of the nerve cells, of which almost three quarters are glioblastomas (grade IV astrocytomas) with an unfavourable prognosis. In contrast, embryonic tumours predominate in infants and toddlers.

In 2016, around 3,460 women and 3,970 men in Germany contracted malignant CNS tumours. No substantial changes in age-standardised incidence and death rates have been observed since 1999. The relative 5-year survival rates for malignant CNS tumours are 21% for men and 24% for women. These figures do not include histologically benign CNS tumours or tumours with uncertain or unknown behaviour that, depending on their location, can also lead to complications or even death. Around 6,000 such cases occur each year, of which almost two thirds originate from the meninges. Women are affected much more often than men.

Risk factors

The majority of risk factors associated with the various types of brain tumours have yet to be determined. However, patients with very rare hereditary tumour syndromes have a significantly increased risk. Radiation therapy to the head slightly increases the risk of developing a brain tumour but comes with a long latency period. This particularly applies to radiation therapy in childhood and adolescence. Computed tomography imaging in childhood may also slightly increase the risk of a brain tumour.

There is no clear connection between cell phone use and brain tumours. However, an increased risk cannot be ruled out. This particularly applies to people who make long and frequent calls using mobile phones. Current research suggests that viruses, toxic substances and lifestyle factors such as smoking and alcohol do not increase the risk of cancer of the central nervous system. However, first-degree relatives of patients who have had brain tumours have a slightly increased risk of developing the condition themselves. Hereditary gene mutations are probably involved in these cases.

Figure 3.26.1a
Age-standardised incidence and mortality rates by sex, ICD-10 C70–C72, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

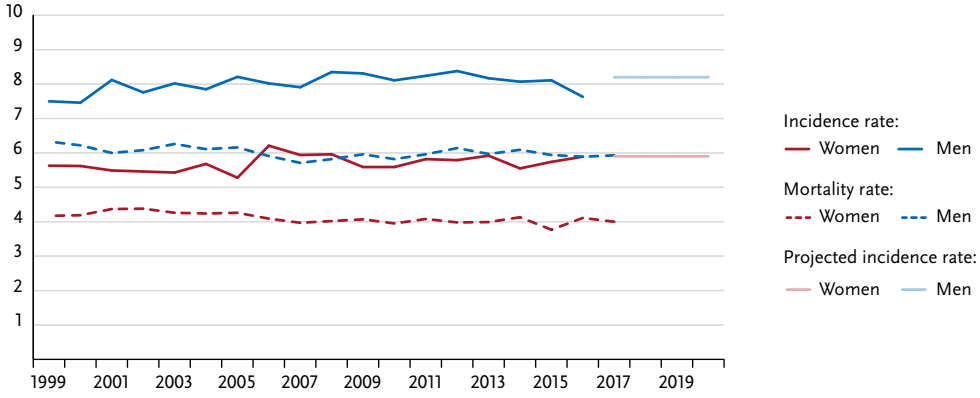


Figure 3.26.1b
Absolute numbers of incident cases and deaths by sex, ICD-10 C70–C72, Germany 1999–2016/2017, projection (incidence) through 2020

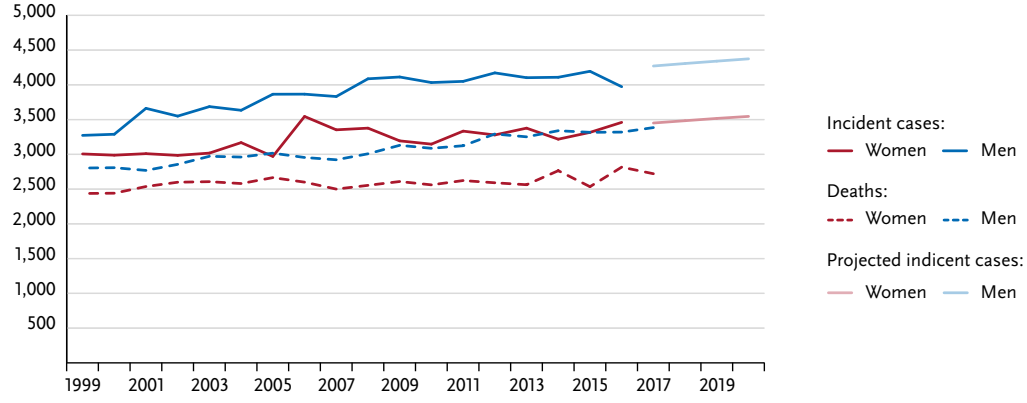


Figure 3.26.2
Age-specific incidence rates by sex, ICD-10 C70–C72, Germany 2015–2016
per 100,000

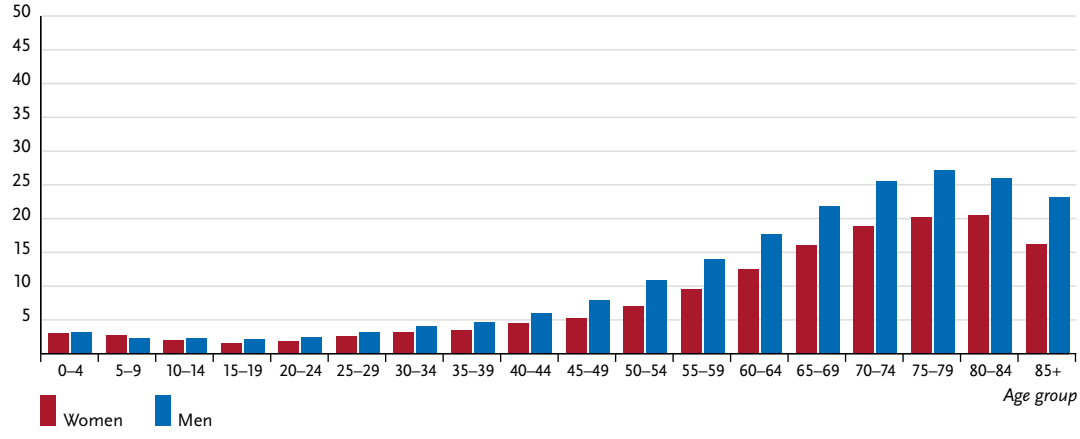
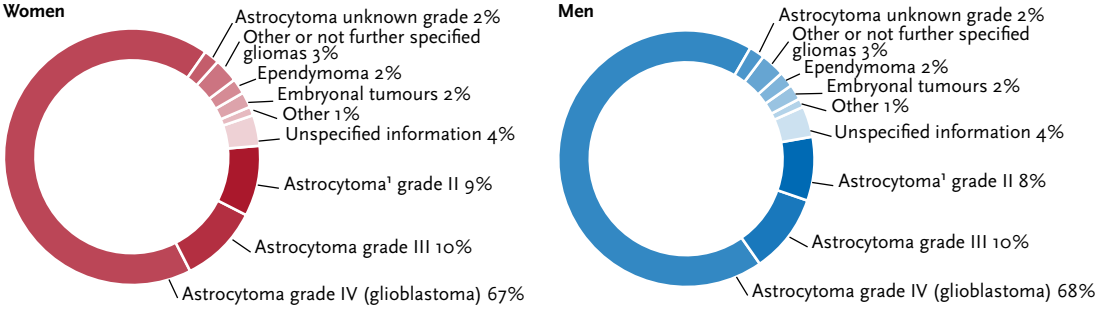


Table 3.26.2
Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C70–C72, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1 %	(1 in 2,500)	0.6 %	(1 in 180)	< 0.1 %	(1 in 5,800)	0.5 %	(1 in 190)
45 years	0.1 %	(1 in 1,600)	0.5 %	(1 in 190)	< 0.1 %	(1 in 2,500)	0.5 %	(1 in 200)
55 years	0.1 %	(1 in 920)	0.5 %	(1 in 210)	0.1 %	(1 in 1,100)	0.5 %	(1 in 210)
65 years	0.2 %	(1 in 590)	0.4 %	(1 in 250)	0.2 %	(1 in 660)	0.4 %	(1 in 250)
75 years	0.2 %	(1 in 570)	0.3 %	(1 in 400)	0.2 %	(1 in 530)	0.3 %	(1 in 360)
Lifetime risk			0.6 %	(1 in 160)			0.6 %	(1 in 180)
Men aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	0.1 %	(1 in 1,900)	0.6 %	(1 in 160)	< 0.1 %	(1 in 3,000)	0.6 %	(1 in 170)
45 years	0.1 %	(1 in 1,100)	0.6 %	(1 in 170)	0.1 %	(1 in 1,400)	0.6 %	(1 in 180)
55 years	0.1 %	(1 in 680)	0.5 %	(1 in 190)	0.1 %	(1 in 730)	0.5 %	(1 in 200)
65 years	0.2 %	(1 in 490)	0.4 %	(1 in 240)	0.2 %	(1 in 530)	0.4 %	(1 in 240)
75 years	0.2 %	(1 in 500)	0.3 %	(1 in 380)	0.2 %	(1 in 460)	0.3 %	(1 in 350)
Lifetime risk			0.7 %	(1 in 140)			0.6 %	(1 in 160)

Figure 3.26.3
Distribution of histologic types in malignant brain tumours (C71) according to WHO-classification (2016), by sex, (DCO cases excluded), Germany 2015–2016



¹ including oligodendrogliomas
Astrocytomas grade I are histologically benign tumours and are therefore not included.

Figure 3.26.4
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C70–C72, Germany 2015–2016

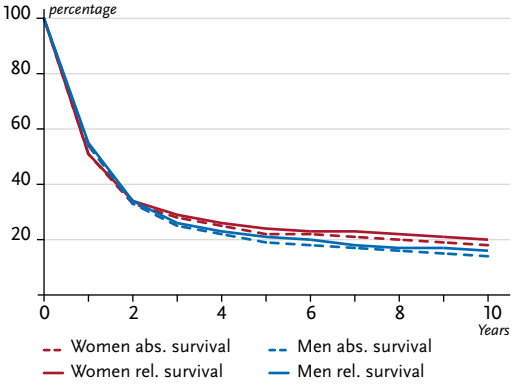


Figure 3.26.5
Relative 5-year survival by histology and sex, ICD-10 C70–C72, Germany 2015–2016

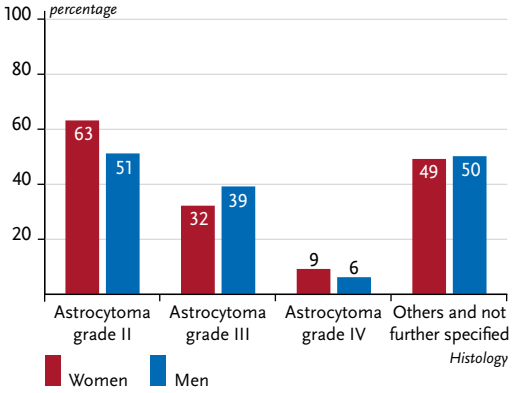


Figure 3.26.6
Age-standardised incidence and mortality rates in German federal states by sex, ICD-10 C70–C72, 2015–2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

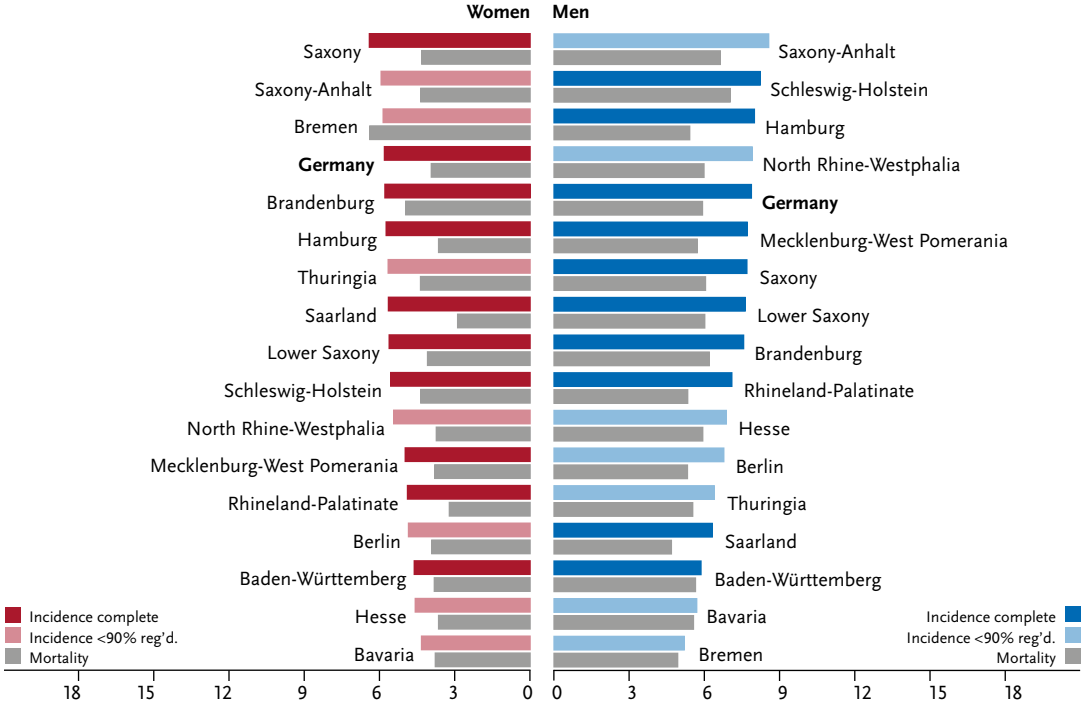
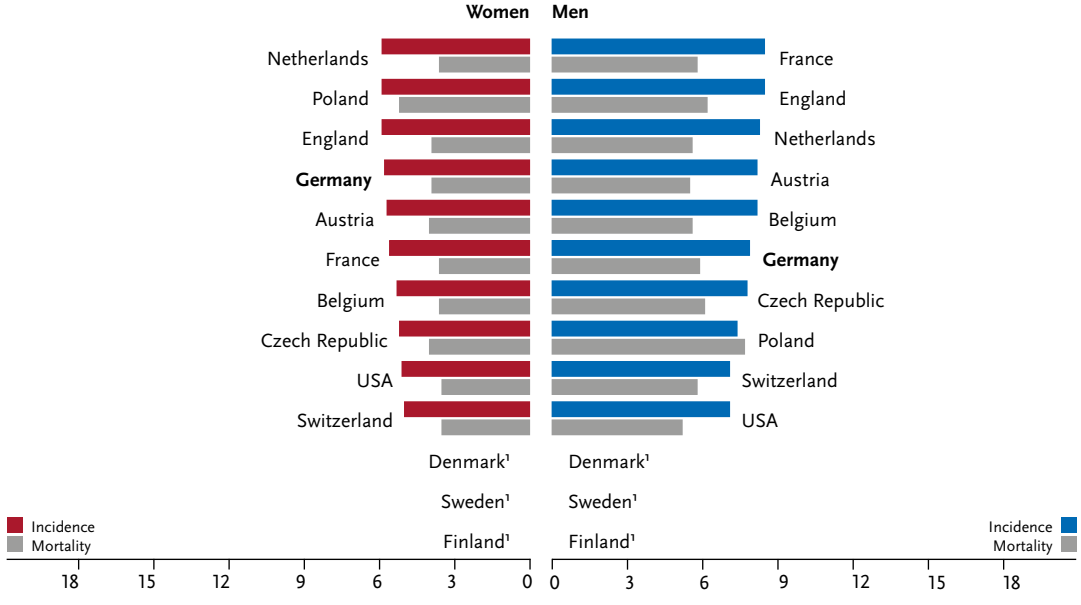


Figure 3.26.7
International comparison of age-standardised incidence and mortality rates by sex, ICD-10 C70–C72, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



¹ No comparable data available

3.27 Thyroid gland

Table 3.27.1
Overview of key epidemiological parameters for Germany, ICD-10 C73

Incidence	2015		2016		Prediction for 2020	
	Women	Men	Women	Men	Women	Men
Incident cases	5,070	2,070	5,280	2,500	6,200	2,600
Crude incidence rate[1]	12.2	5.2	12.7	6.2	14.9	6.5
Age-standardised incidence rate[1,2]	10.6	4.2	11.1	5.1	13.1	5.3
Median age at diagnosis	52	55	52	55		

Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	416	300	390	286	411	292
Crude mortality rate[1]	1.0	0.7	0.9	0.7	1.0	0.7
Age-standardised mortality rate[1,2]	0.4	0.5	0.4	0.4	0.4	0.4
Median age at death	79	73	79	75	78	74

Prevalence and survival rates	5 years		10 years	
	Women	Men	Women	Men
Prevalence	22,100	9,100	42,400	16,400
Absolute survival rate (2015–2016)[3]	90 (86–94)	82 (67–87)	83 (77–92)	73 (58–81)
Relative survival rate (2015–2016)[3]	94 (90–97)	88 (71–93)	91 (84–100)	86 (68–95)

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

About 5,280 women and 2,500 men in Germany were diagnosed with thyroid cancer in 2016. The median age at diagnosis was 52 years for women and 55 years for men.

Between 1999 and 2016, mortality in Germany decreased among women and men, whereas the age-standardised incidence for both sexes rose. However, this applied exclusively to papillary carcinoma, with a particularly favourable prognosis. Most of these cancers were diagnosed among adults under 60 years old, and the detection of these cases can probably be attributed to the increased use of diagnostic imaging techniques and improved examination methods. Incidence in Germany is in the mid-range compared to other selected countries, with the highest rates identified in the US and France.

Most thyroid cancers are detected at an early stage (UICC I: 75 % in women, 58 % in men) and thus have a favourable prognosis with relative 5-year survival rates of 94 % in women and 88 % in men. However, anaplastic carcinomas are an exception with a 10 % 5-year relative survival rate.

Risk factors

Ionising radiation from the environment increases the risk of thyroid cancer. The thyroid is particularly sensitive to radiation during childhood. For example, the risk of thyroid cancer increases if the thyroid is placed within a radiation field during radiation therapy. Intake of radioactive iodine also increases the risk, as demonstrated by cases identified after the Chernobyl reactor accident in the affected Soviet republics. An association with other nutritional, lifestyle-related or environmental risk factors has yet to be demonstrated reliably. It is also unclear as to why women are affected more often than men. However, many patients have a history of iodine deficiency and benign thyroid disorders such as goitre and adenomas, which increase the risk of thyroid cancer. About one fifth of people who develop rare medullary thyroid carcinomas carry a genetic mutation inherited through autosomal dominance. Medullary thyroid carcinoma can also occur together with other endocrine tumours as part of what is known as multiple endocrine neoplasia type 2 (MEN 2). In papillary thyroid carcinomas, a genetic component is also suspected.

Figure 3.27.1a
Age-standardised incidence and mortality rates by sex, ICD-10 C73, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

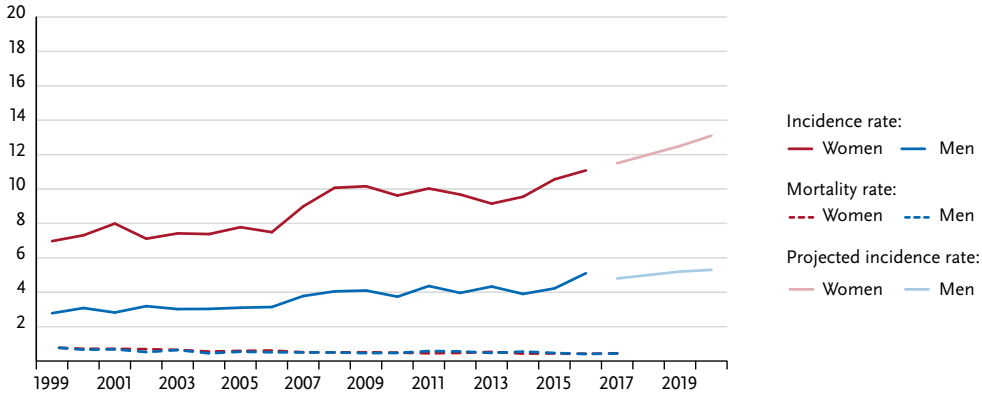


Figure 3.27.1b
Absolute numbers of incident cases and deaths by sex, ICD-10 C73, Germany 1999–2016/2017, projection (incidence) through 2020

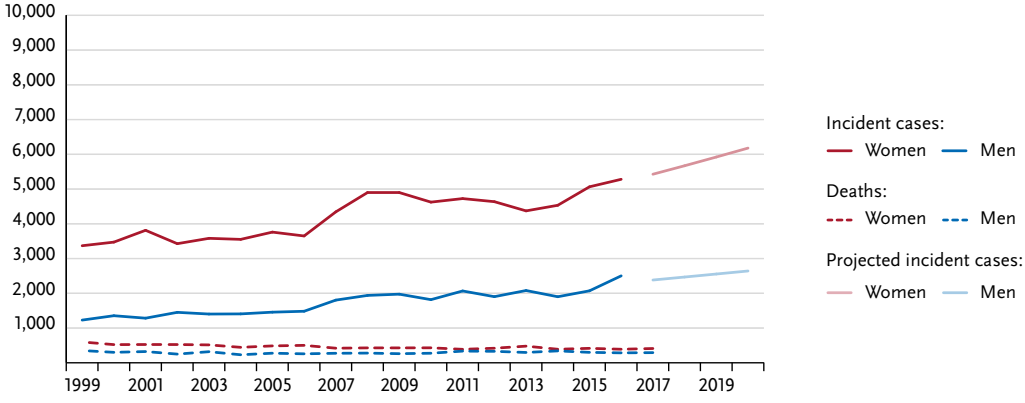


Figure 3.27.2
Age-specific incidence rates by sex, ICD-10 C73, Germany 2015–2016
per 100,000

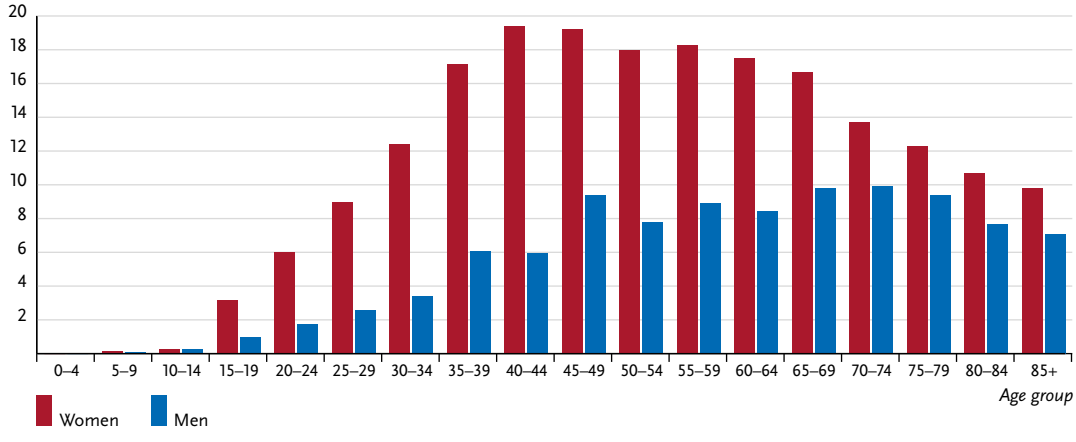


Table 3.27.2
Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C73, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
25 years	0.1%	(1 in 890)	0.9%	(1 in 110)	< 0.1%	(1 in 284,400)	0.1%	(1 in 1,300)
35 years	0.2%	(1 in 520)	0.8%	(1 in 130)	< 0.1%	(1 in 203,800)	0.1%	(1 in 1,300)
45 years	0.2%	(1 in 550)	0.6%	(1 in 160)	< 0.1%	(1 in 35,900)	0.1%	(1 in 1,300)
55 years	0.2%	(1 in 560)	0.4%	(1 in 230)	< 0.1%	(1 in 12,600)	0.1%	(1 in 1,300)
65 years	0.1%	(1 in 680)	0.3%	(1 in 360)	< 0.1%	(1 in 6,900)	0.1%	(1 in 1,300)
75 years	0.1%	(1 in 990)	0.1%	(1 in 690)	< 0.1%	(1 in 2,900)	0.1%	(1 in 1,500)
Lifetime risk			1.0%	(1 in 110)			0.1%	(1 in 1,300)
Men aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
25 years	< 0.1%	(1 in 3,000)	0.4%	(1 in 240)	< 0.1%	(1 in 3,821,000)	0.1%	(1 in 1,700)
35 years	0.1%	(1 in 1,500)	0.4%	(1 in 260)	< 0.1%	(1 in 230,000)	0.1%	(1 in 1,700)
45 years	0.1%	(1 in 1,100)	0.3%	(1 in 310)	< 0.1%	(1 in 57,300)	0.1%	(1 in 1,700)
55 years	0.1%	(1 in 1,100)	0.2%	(1 in 410)	< 0.1%	(1 in 13,400)	0.1%	(1 in 1,700)
65 years	0.1%	(1 in 1,100)	0.2%	(1 in 590)	< 0.1%	(1 in 5,700)	0.1%	(1 in 1,700)
75 years	0.1%	(1 in 1,400)	0.1%	(1 in 1,100)	< 0.1%	(1 in 2,800)	0.1%	(1 in 2,000)
Lifetime risk			0.4%	(1 in 230)			0.1%	(1 in 1,700)

Figure 3.27.3
Distribution of UICC-stages at first diagnosis by sex, ICD-10 C73, Germany 2015–2016
(top: all cases; bottom: only valid reports)

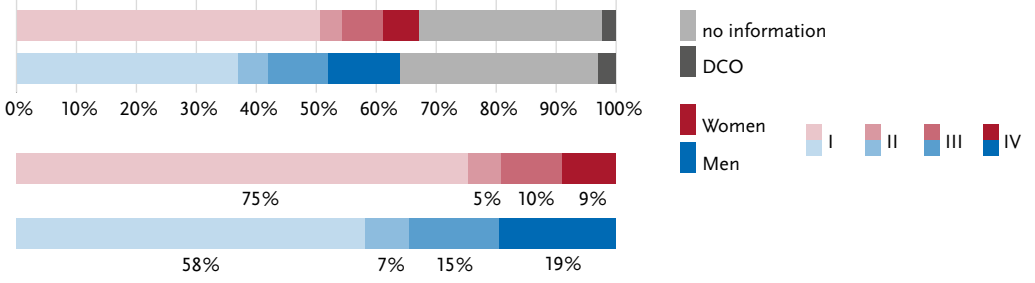


Figure 3.27.4
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C73, Germany 2015–2016

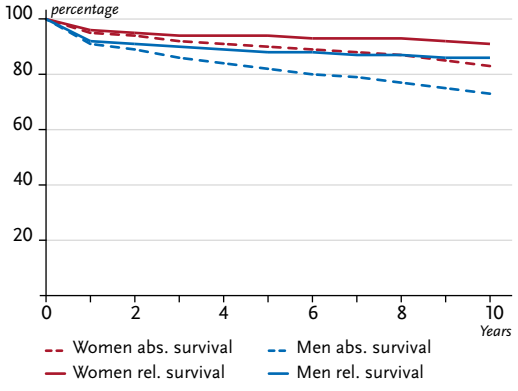


Figure 3.27.5
Relative 5-year survival by UICC-stage and sex, ICD-10 C73, Germany 2015–2016

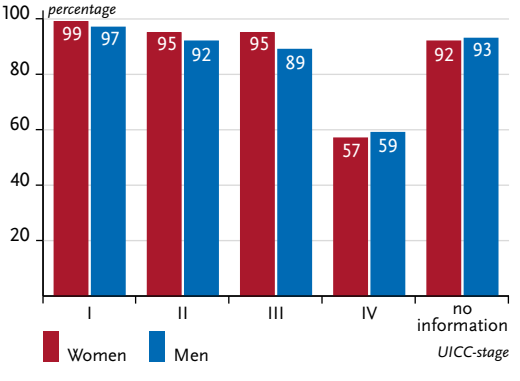


Figure 3.27.6
Age-standardised incidence and mortality rates in German federal states by sex, ICD-10 C73, 2015–2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

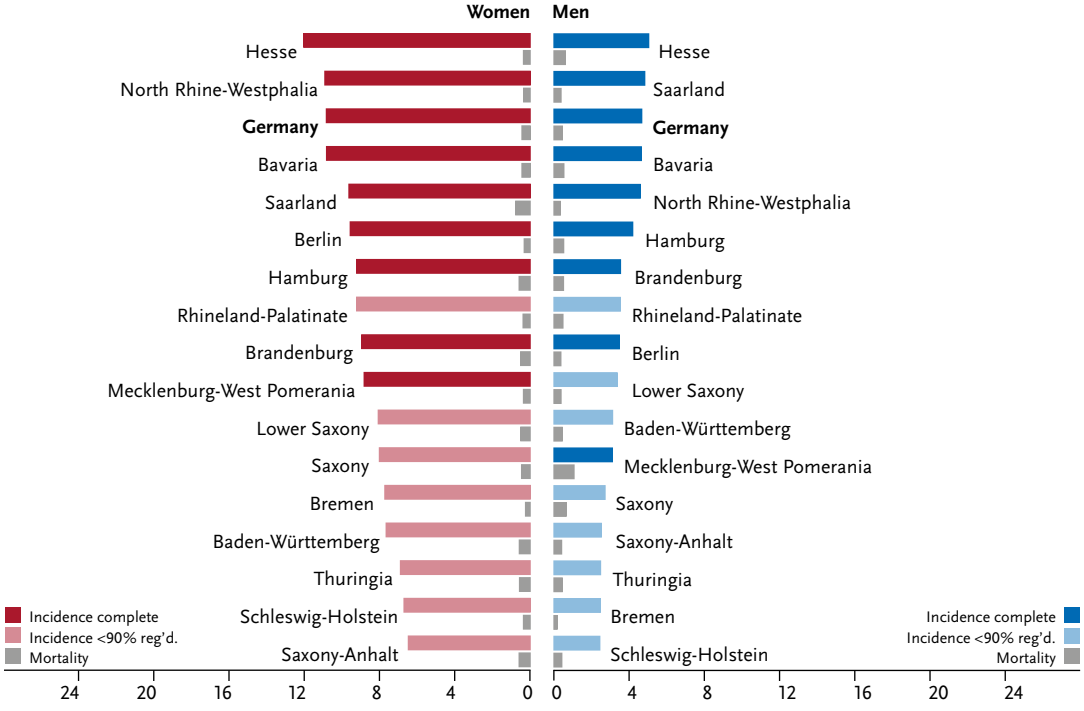
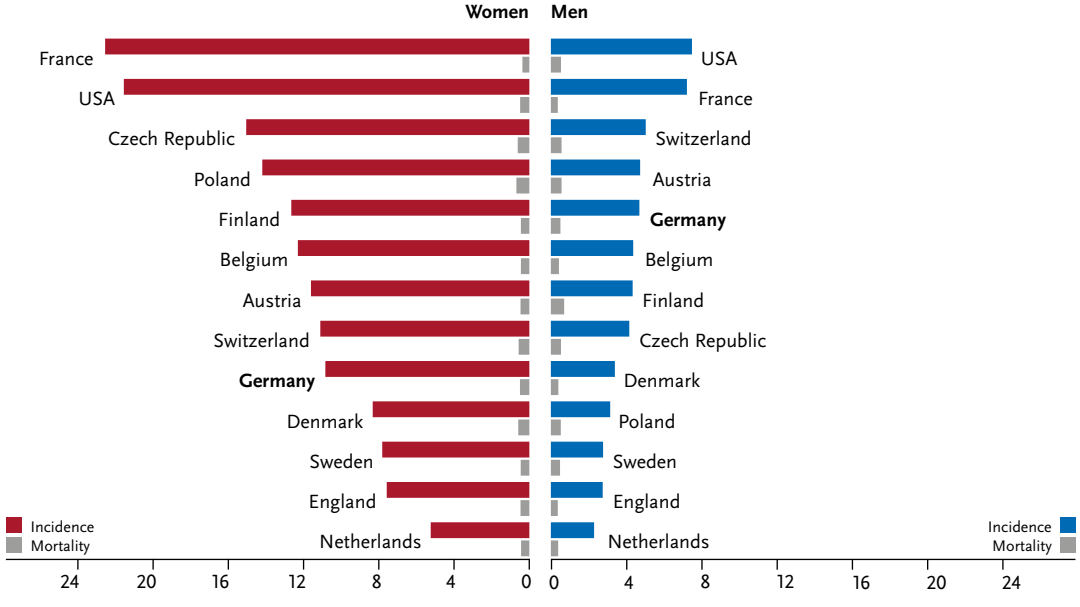


Figure 3.27.7
International comparison of age-standardised incidence and mortality rates by sex, ICD-10 C73, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



3.28 Hodgkin lymphoma

Table 3.28.1
Overview of key epidemiological parameters for Germany, ICD-10 C81

Incidence	2015		2016		Prediction for 2020	
	Women	Men	Women	Men	Women	Men
Incident cases	1,070	1,360	1,060	1,430	1,100	1,500
Crude incidence rate[1]	2.6	3.4	2.5	3.5	2.7	3.7
Age-standardised incidence rate[1,2]	2.5	3.1	2.4	3.2	2.6	3.4
Median age at diagnosis	43	46	43	46		

Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	132	180	143	178	125	177
Crude mortality rate[1]	0.3	0.4	0.3	0.4	0.3	0.4
Age-standardised mortality rate[1,2]	0.2	0.3	0.2	0.3	0.2	0.3
Median age at death	76	70	79	75	76	73

Prevalence and survival rates	5 years		10 years	
	Women	Men	Women	Men
Prevalence	4,400	5,800	8,200	10,600
Absolute survival rate (2015–2016)[3]	81 (73–88)	82 (74–91)	78 (71–88)	74 (66–83)
Relative survival rate (2015–2016)[3]	84 (75–92)	86 (78–94)	84 (75–96)	82 (73–93)

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

Hodgkin lymphoma is characterised by Sternberg-Reed giant cells in bone marrow, which distinguishes it from non-Hodgkin lymphomas.

Hodgkin lymphoma is a rare disease that affected around 1,060 women and 1,430 men in Germany in 2016. Nevertheless, this disease is one of the five most frequently diagnosed cancers among people between 10 and 35 years old. Women have a 0.2% and men have a 0.3% risk of developing Hodgkin lymphoma.

Incidence rates and the numbers of new cases have increased slightly since the mid-2000s, although fewer people currently die from Hodgkin lymphoma. In 2016, just over 300 deaths were reported in Germany, which is almost 200 fewer than in the late 1990s. Hodgkin lymphoma has a favourable prognosis, with relative 5-year survival rates of around 84% in women and 86% in men. Due to the fact that the disease often recurs chronically, the long-term prognosis is also influenced by the side effects of therapy, including the risk of developing subsequent tumours.

Risk factors

The risk factors associated with Hodgkin lymphoma are only partially understood. Congenital diseases of the immune system and acquired immune defects, because of an HIV infection for instance, can increase the risk of Hodgkin lymphoma.

Epstein-Barr viruses (EBV), which cause glandular fever (infectious mononucleosis), can also play a causal role in Hodgkin lymphoma. However, they are probably only relevant in a small number of cases. It is unclear whether lifestyle-related risk factors or environmental risks are responsible for the development of Hodgkin lymphoma. Prolonged cigarette smoking may increase risk.

Children and siblings of persons with a history of Hodgkin lymphoma have a slightly higher risk of developing the condition themselves. The reasons behind this have yet to be understood and research is ongoing.

It is normally impossible to find a clear causal explanation for the development of Hodgkin lymphoma, and it is likely that the condition results from a combination of several factors.

Figure 3.28.1a
Age-standardised incidence and mortality rates by sex, ICD-10 C81, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

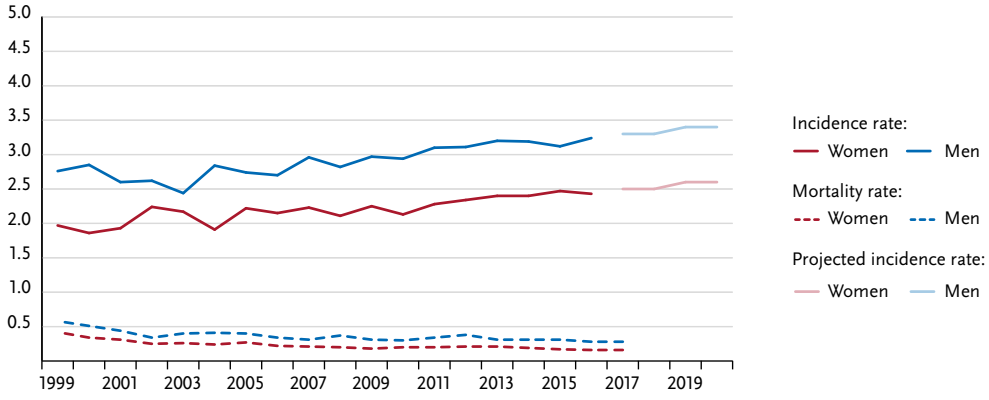


Figure 3.28.1b
Absolute numbers of incident cases and deaths by sex, ICD-10 C81, Germany 1999–2016/2017, projection (incidence) through 2020

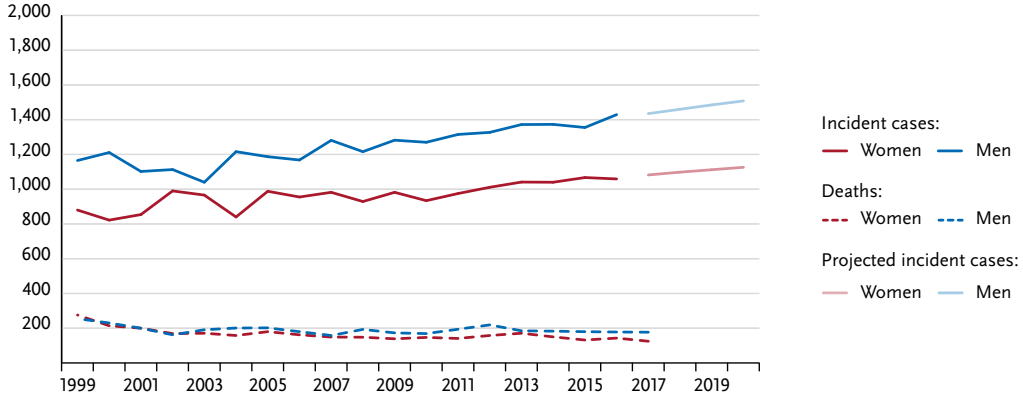


Figure 3.28.2
Age-specific incidence rates by sex, ICD-10 C81, Germany 2015–2016
per 100,000

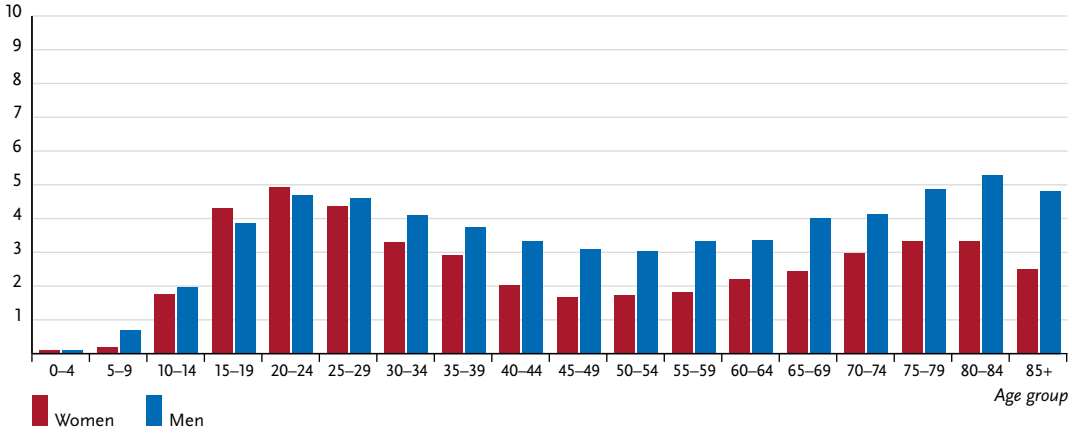


Table 3.28.2
Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C81, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
15 years	< 0.1 %	(1 in 2,300)	0.2 %	(1 in 500)	< 0.1 %	(1 in 138,900)	< 0.1 %	(1 in 3,400)
25 years	< 0.1 %	(1 in 2,600)	0.2 %	(1 in 650)	< 0.1 %	(1 in 264,000)	< 0.1 %	(1 in 3,500)
35 years	< 0.1 %	(1 in 4,100)	0.1 %	(1 in 860)	< 0.1 %	(1 in 1,801,000)	< 0.1 %	(1 in 3,500)
45 years	< 0.1 %	(1 in 5,800)	0.1 %	(1 in 1,100)	< 0.1 %	(1 in 141,200)	< 0.1 %	(1 in 3,500)
55 years	< 0.1 %	(1 in 5,000)	0.1 %	(1 in 1,300)	< 0.1 %	(1 in 28,000)	< 0.1 %	(1 in 3,500)
Lifetime risk			0.2 %	(1 in 460)			< 0.1 %	(1 in 3,400)
Men aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
15 years	< 0.1 %	(1 in 2,300)	0.3 %	(1 in 400)	< 0.1 %	(1 in 173,900)	< 0.1 %	(1 in 2,700)
25 years	< 0.1 %	(1 in 2,300)	0.2 %	(1 in 480)	< 0.1 %	(1 in 49,800)	< 0.1 %	(1 in 2,700)
35 years	< 0.1 %	(1 in 2,800)	0.2 %	(1 in 600)	< 0.1 %	(1 in 68,300)	< 0.1 %	(1 in 2,900)
45 years	< 0.1 %	(1 in 3,200)	0.1 %	(1 in 750)	< 0.1 %	(1 in 48,100)	< 0.1 %	(1 in 2,900)
55 years	< 0.1 %	(1 in 3,100)	0.1 %	(1 in 950)	< 0.1 %	(1 in 31,200)	< 0.1 %	(1 in 3,000)
Lifetime risk			0.3 %	(1 in 370)			< 0.1 %	(1 in 2,700)

Figure 3.28.3
Distribution of UICC-stages at first diagnosis by sex
Not included because UICC-stages are not defined for Hodgkin lymphoma.

Figure 3.28.4
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C81, Germany 2015–2016

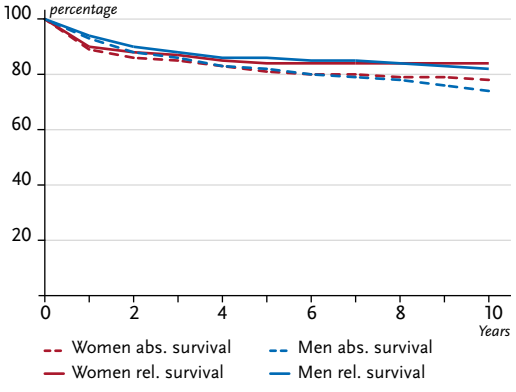


Figure 3.28.5
Relative 5-year survival by UICC-stage
Not included because UICC-stages are not defined for Hodgkin lymphoma.

Figure 3.28.6
Age-standardised incidence and mortality rates in German federal states by sex, ICD-10 C81, 2015–2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

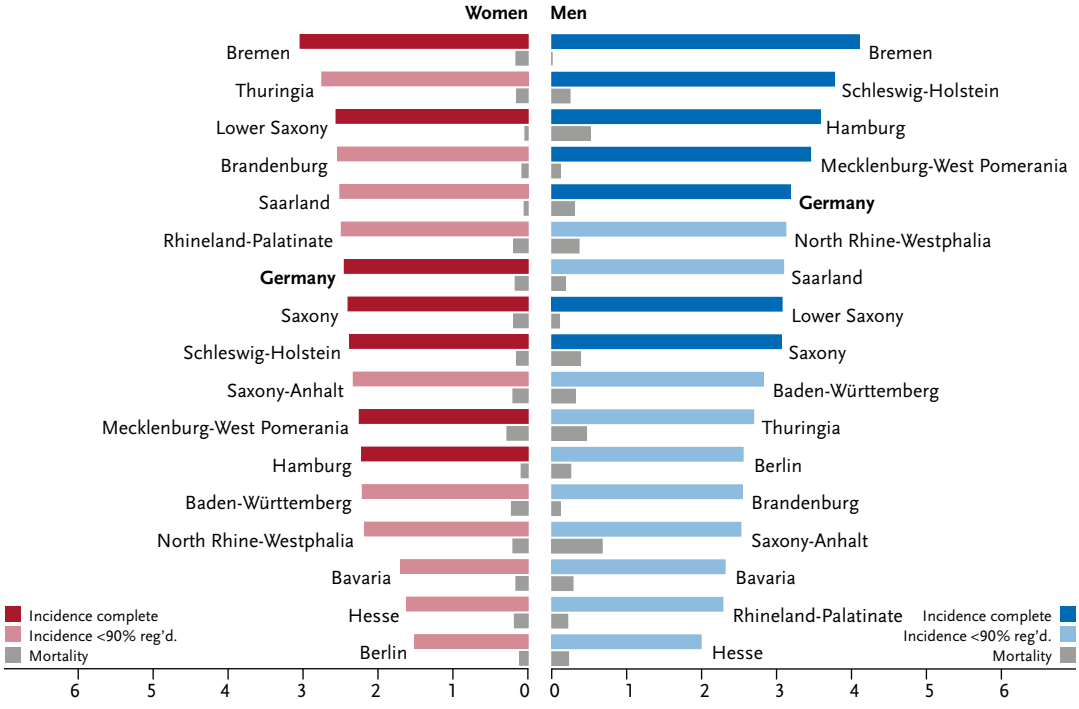
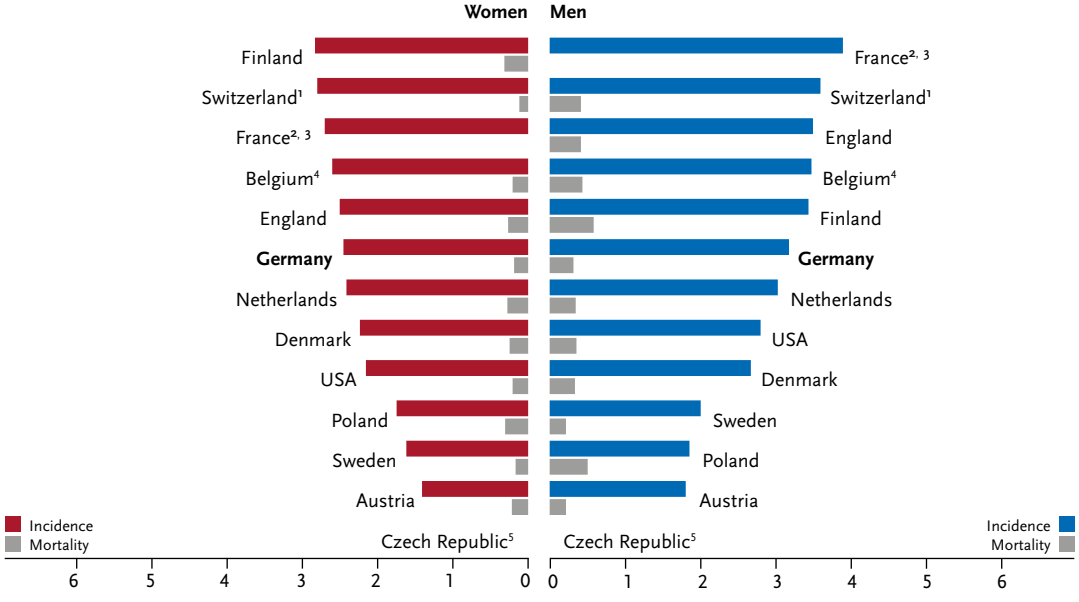


Figure 3.28.7
International comparison of age-standardised incidence and mortality rates by sex, ICD-10 C81, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



[1] Mortality only for 2015
[2] Hodgkin lymphoma defined by ICD-O-3 morphologies 9650/3–9655/3, 9661/3–9667/3
[3] No data for mortality
[4] Mortality only for 2015 from WHO mortality database
[5] No data available

3.29 Non-Hodgkin lymphoma

Table 3.29.1
Overview of key epidemiological parameters for Germany, ICD-10 C82–C88

Incidence	2015		2016		Prediction for 2020	
	Women	Men	Women	Men	Women	Men
Incident cases	8,170	10,070	8,540	9,830	9,100	11,200
Crude incidence rate[1]	19.7	25.1	20.5	24.2	22.0	27.7
Age-standardised incidence rate[1,2]	11.4	17.1	12.0	16.4	12.3	17.8
Median age at diagnosis	72	70	72	70		

Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	2,975	3,619	3,152	3,701	3,116	3,745
Crude mortality rate[1]	7.2	9.0	7.6	9.1	7.4	9.2
Age-standardised mortality rate[1,2]	3.1	5.4	3.2	5.4	3.1	5.3
Median age at death	79	76	79	77	80	77

Prevalence and survival rates	5 years		10 years	
	Women	Men	Women	Men
Prevalence	29,400	34,800	50,000	57,700
Absolute survival rate (2015–2016)[3]	62 (59–65)	58 (51–65)	49 (45–54)	43 (39–52)
Relative survival rate (2015–2016)[3]	70 (67–74)	68 (59–76)	64 (59–72)	60 (53–72)

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

Non-Hodgkin lymphomas are a heterogeneous group of cancers that originate from lymphocyte cells in the lymphatic system. The different forms of lymphoma have varying prognoses. The options available for treatment also vary by cell type as well as by clinical and molecular manifestation. In 2016, around 18,370 people in Germany developed non-Hodgkin lymphoma. The condition chiefly occurs among older people with an average age at diagnosis of 72 years for women and 70 years for men.

The increasing age-standardised incidence observed for non-Hodgkin lymphoma needs to be interpreted against the backdrop of changed diagnostic criteria. Chronic lymphatic leukaemias are now often classified as low-grade, malignant non-Hodgkin lymphomas.

Age-standardised mortality among women and men declined in the first decade of the millennium but has remained at a constant level ever since.

Non-Hodgkin lymphomas come with a rather good overall prognosis, with relative 5-year survival rates of 70 % in women and 68 % in men. However, the risk of death increases as the disease progresses.

Risk factors

No known risk factor is associated with every type of non-Hodgkin lymphoma. Nevertheless, congenital or acquired immunodeficiency, radiation, chemotherapy and some rare autoimmune diseases can increase risk. Certain viruses and other pathogens are also considered risk factors in some cases. For example, the Epstein-Barr virus (EBV) can contribute to the development of Burkitt's lymphoma, which is mainly endemic in Africa. At the same time, Helicobacter pylori bacteria promote the development of gastric MALT lymphoma.

Benzene and related substances can encourage the development of some non-Hodgkin lymphomas. Other environmental toxins and lifestyle factors are currently being discussed as causes of the disease. Families that have been frequently affected by lymphomas in the past may have a slightly increased risk of developing the condition. However, the exact relationships remain unclear.

In the majority of cases, no clear causal explanation can be found for the condition, and it is likely that it results from several factors working together.

Figure 3.29.1a
Age-standardised incidence and mortality rates by sex, ICD-10 C82 – C88, Germany 1999 – 2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

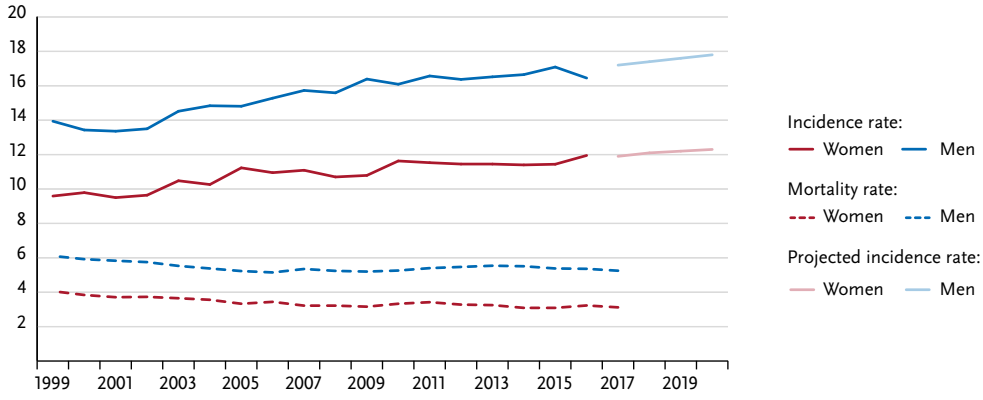


Figure 3.29.1b
Absolute numbers of incident cases and deaths by sex, ICD-10 C82 – C88, Germany 1999 – 2016/2017, projection (incidence) through 2020

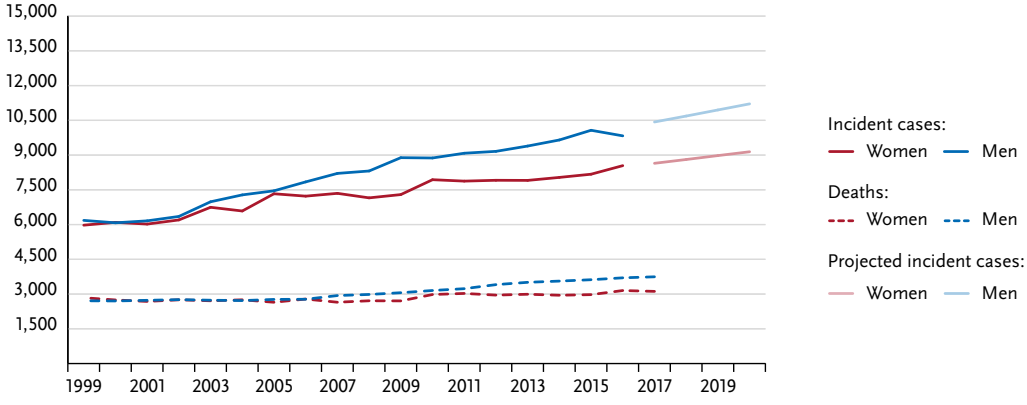


Figure 3.29.2
Age-specific incidence rates by sex, ICD-10 C82-C88, Germany 2015 – 2016
per 100,000

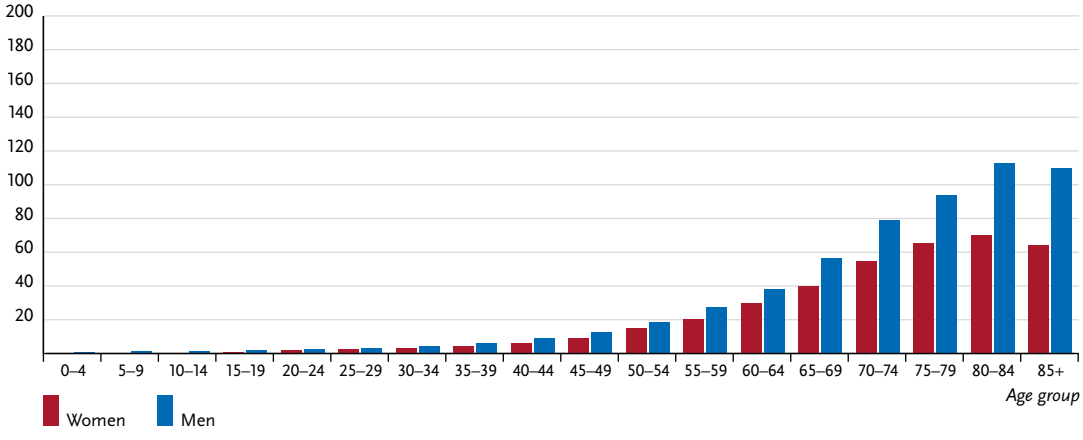


Table 3.29.2
Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C82–C88, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	0.1%	(1 in 1,900)	1.6%	(1 in 65)	< 0.1%	(1 in 24,300)	0.6%	(1 in 160)
45 years	0.1%	(1 in 820)	1.5%	(1 in 66)	< 0.1%	(1 in 6,700)	0.6%	(1 in 160)
55 years	0.3%	(1 in 400)	1.4%	(1 in 71)	< 0.1%	(1 in 2,000)	0.6%	(1 in 160)
65 years	0.5%	(1 in 210)	1.2%	(1 in 81)	0.1%	(1 in 830)	0.6%	(1 in 160)
75 years	0.6%	(1 in 170)	0.9%	(1 in 120)	0.3%	(1 in 320)	0.6%	(1 in 180)
Lifetime risk			1.6%	(1 in 64)			0.6%	(1 in 160)
Men aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	0.1%	(1 in 1,300)	1.8%	(1 in 57)	< 0.1%	(1 in 12,100)	0.8%	(1 in 130)
45 years	0.2%	(1 in 650)	1.7%	(1 in 58)	< 0.1%	(1 in 4,100)	0.8%	(1 in 130)
55 years	0.3%	(1 in 320)	1.6%	(1 in 62)	0.1%	(1 in 1,200)	0.8%	(1 in 130)
65 years	0.6%	(1 in 170)	1.5%	(1 in 69)	0.2%	(1 in 510)	0.8%	(1 in 130)
75 years	0.8%	(1 in 130)	1.1%	(1 in 93)	0.5%	(1 in 220)	0.7%	(1 in 130)
Lifetime risk			1.8%	(1 in 55)			0.8%	(1 in 130)

Figure 3.29.3
Distribution of UICC-stages at first diagnosis by sex
Not included because UICC-stages are not defined for non-Hodgkin lymphomas.

Table 3.29.3
Proportion of the various non-Hodgkin lymphomas for all new diagnoses C82–C88, by sex, Germany 2015–2016

	C82[1]	C83[2]	C84[3]	C85[4]	C86[5]	C88[6]
Women	20%	47%	5%	18%	2%	7%
Men	16%	53%	7%	15%	2%	6%

1 Follicular lymphoma
2 Non-follicular lymphoma
3 Mature T/NK-cell lymphomas
4 Other and unspecified types
5 Other specified types of T/NK-cell lymphoma
6 Malignant immunoproliferative diseases

Figure 3.29.4
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C82–C88, Germany 2015–2016

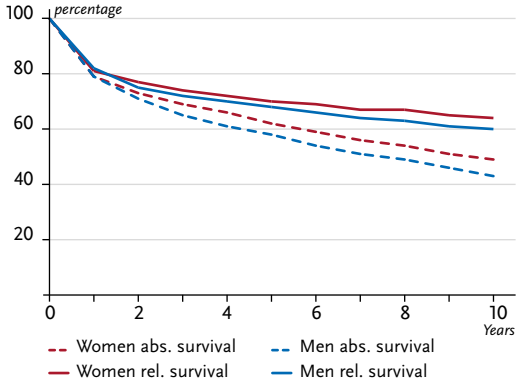


Figure 3.29.5
Relative 5-year-survival by type of non-Hodgkin lymphoma (ICD-10) and sex, ICD-10 C82–C88, Germany 2015–2016

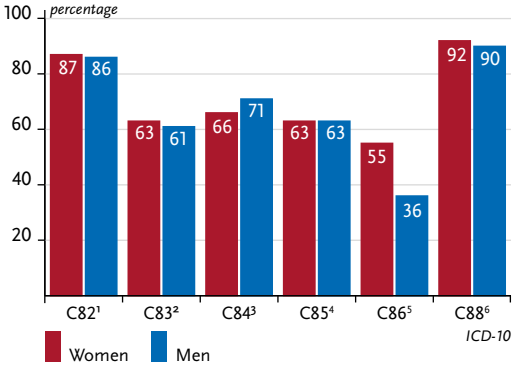


Figure 3.29.6
Age-standardised incidence and mortality rates in German federal states by sex, ICD-10 C82–C88, 2015–2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

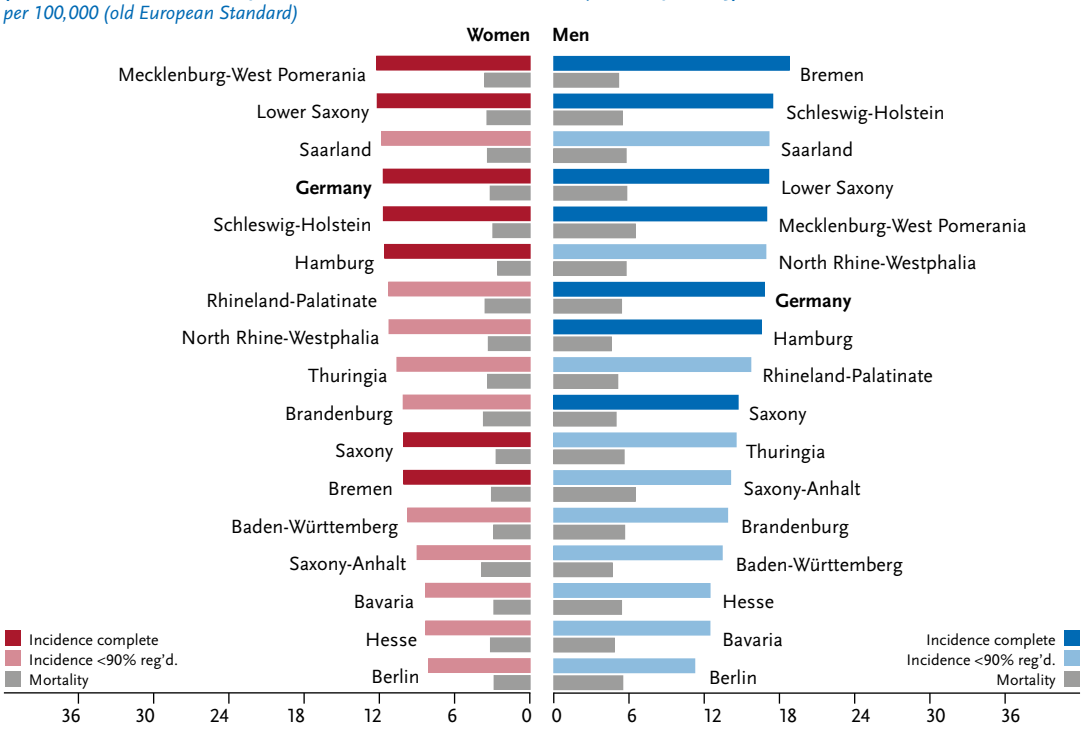
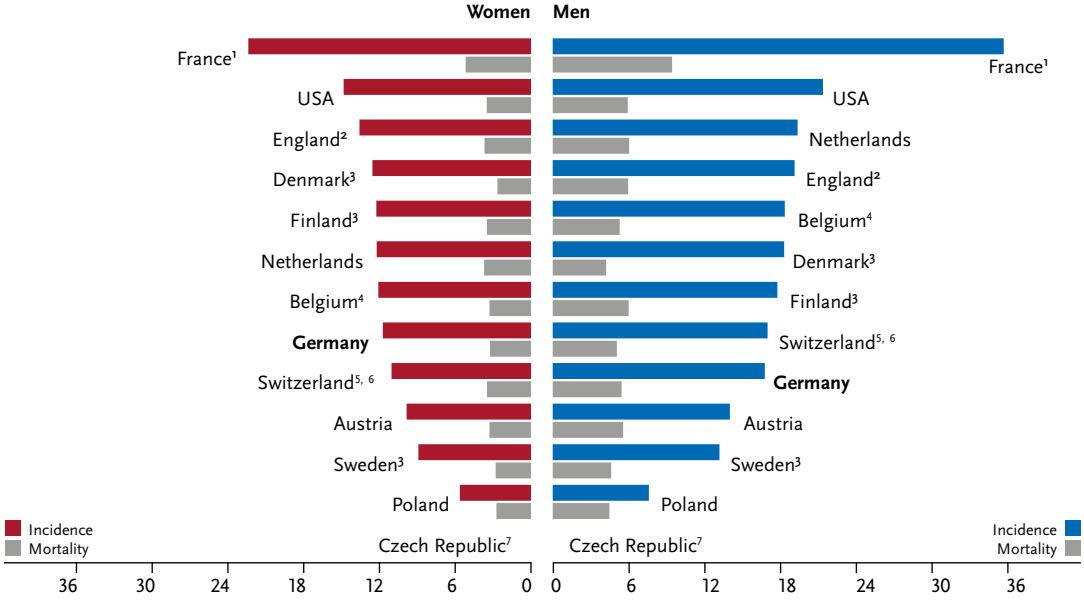


Figure 3.29.7
International comparison of age-standardised incidence and mortality rates by sex, ICD-10 C82–C88, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



[1] Incidence figures based on estimate from ICD-O-3
[2] Data for C82 to C85 and C88
[3] Data for C82 to C86
[4] Mortality only for 2015 from WHO-mortality database
[5] Data for incidence for C82 to C86 and C96
[6] Mortality only for 2015
[7] No data available

3.30 Multiple myeloma

Table 3.30.1
Overview of key epidemiological parameters for Germany, ICD-10 C90

Incidence	2015		2016		Prediction for 2020	
	Women	Men	Women	Men	Women	Men
Incident cases	3,120	4,010	3,000	3,910	3,200	4,400
Crude incidence rate[1]	7.5	10.0	7.2	9.6	7.7	10.8
Age-standardised incidence rate[1,2]	4.0	6.4	3.8	6.1	3.9	6.4
Median age at diagnosis	74	72	74	72		

Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	1,950	2,149	1,987	2,243	1,851	2,287
Crude mortality rate[1]	4.7	5.3	4.8	5.5	4.4	5.6
Age-standardised mortality rate[1,2]	2.1	3.1	2.1	3.2	1.9	3.2
Median age at death	77	76	78	76	78	76

Prevalence and survival rates	5 years		10 years	
	Women	Men	Women	Men
Prevalence	9,800	12,600	14,600	18,300
Absolute survival rate (2015–2016)[3]	43 (35–54)	41 (33–50)	23 (13–30)	23 (17–27)
Relative survival rate (2015–2016)[3]	49 (39–61)	49 (39–59)	31 (18–40)	33 (25–41)

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

Multiple myeloma (also known as plasmacytoma) is a malignant proliferation of antibody-producing plasma cells. In most cases, the disease initially occurs in bone marrow. It often forms multiple foci with corresponding complications such as broken bones, painful bones and changes in blood cell counts. Only about 1% of diagnoses affect organs other than the bone marrow (extramedullary plasmacytoma).

In 2016, around 3,000 women and 3,900 men in Germany developed this condition. The risk of illness increases significantly in older age, with cases in before the age of 45 years being extremely rare (about 2%). Age-standardised incidence and mortality rates have remained almost constant among women and men in recent years.

Multiple myeloma has a generally unfavourable prognosis with relative 5-year survival rates of just 49%. In most cases, a lasting return to good health is unlikely. The disease sometimes causes only few symptoms for long periods, and temporary remissions are possible with therapy.

Risk factors

The causes of multiple myeloma are still largely unknown. Monoclonal gammopathy of undetermined significance (MGUS) is considered a precancerous stage of multiple myeloma. Other risk factors associated with multiple myeloma include advanced age, male gender and a family history of the disease.

Despite the fact that family clusters have been observed, there is no conclusive evidence to suggest that genetics plays a role. Nonetheless, variations in incidence within different population groups could still be related to genetic factors.

Chronic infections with HIV or hepatitis C are associated with an increased risk of multiple myeloma. Recent studies have shown that excess body weight also increases the risk of developing the condition.

There are currently conflicting results as to whether certain lifestyle habits, exposure to environmental toxins or radiation significantly increase the risk of developing myeloma.

Figure 3.30.1a
Age-standardised incidence and mortality rates by sex, ICD-10 C90, Germany 1999–2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

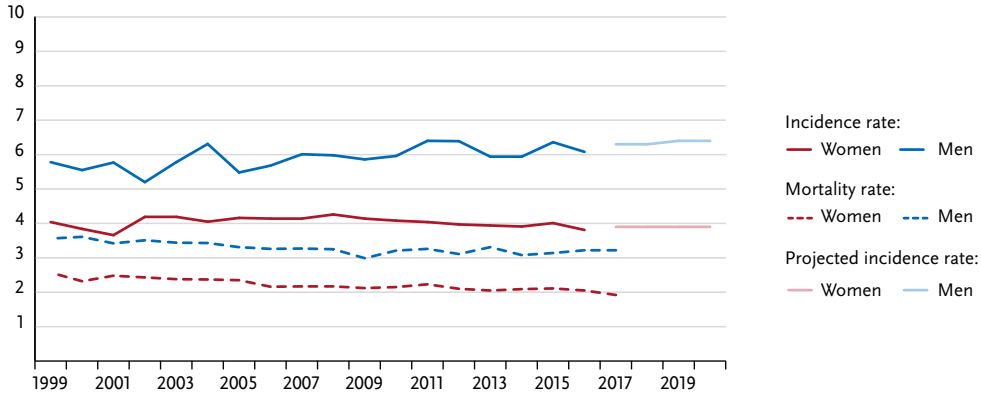


Figure 3.30.1b
Absolute numbers of incident cases and deaths by sex, ICD-10 C90, Germany 1999–2016/2017, projection (incidence) through 2020

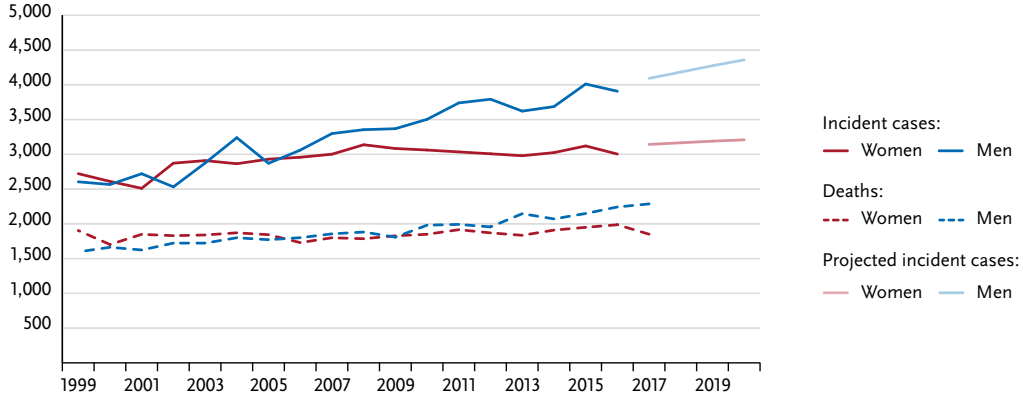


Figure 3.30.2
Age-specific incidence rates by sex, ICD-10 C90, Germany 2015–2016
per 100,000

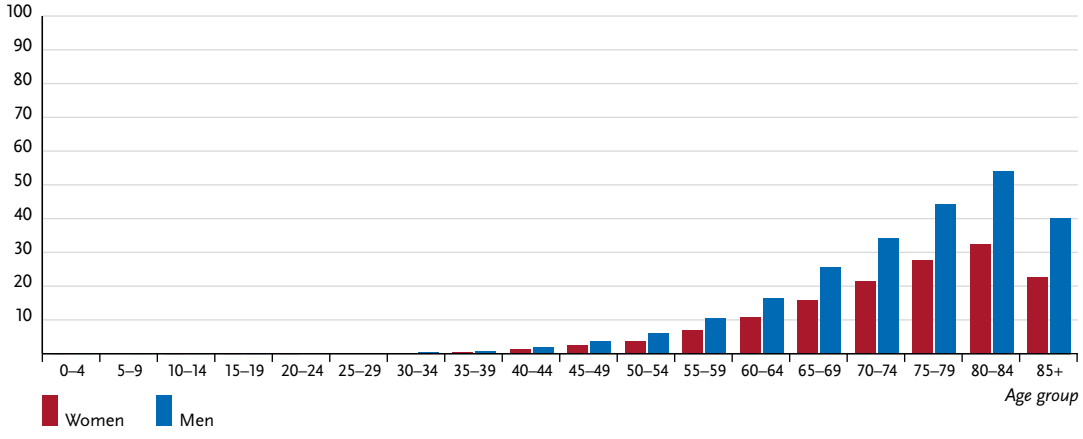


Table 3.30.2
Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C90, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**			**ever**	**in the next ten years**			**ever**
35 years	< 0.1 %	(1 in 10,600)	0.6 %	(1 in 180)	< 0.1 %	(1 in 65,000)	0.4 %	(1 in 250)
45 years	< 0.1 %	(1 in 3,200)	0.6 %	(1 in 180)	< 0.1 %	(1 in 12,700)	0.4 %	(1 in 250)
55 years	0.1 %	(1 in 1,200)	0.5 %	(1 in 190)	< 0.1 %	(1 in 3,200)	0.4 %	(1 in 250)
65 years	0.2 %	(1 in 590)	0.5 %	(1 in 210)	0.1 %	(1 in 1,100)	0.4 %	(1 in 260)
75 years	0.2 %	(1 in 410)	0.3 %	(1 in 290)	0.2 %	(1 in 470)	0.3 %	(1 in 290)
Lifetime risk			0.6 %	(1 in 180)			0.4 %	(1 in 250)
Men aged	**in the next ten years**			**ever**	**in the next ten years**			**ever**
35 years	< 0.1 %	(1 in 7,300)	0.7 %	(1 in 140)	< 0.1 %	(1 in 38,800)	0.5 %	(1 in 210)
45 years	< 0.1 %	(1 in 2,100)	0.7 %	(1 in 140)	< 0.1 %	(1 in 6,900)	0.5 %	(1 in 210)
55 years	0.1 %	(1 in 770)	0.7 %	(1 in 140)	0.1 %	(1 in 1,800)	0.5 %	(1 in 210)
65 years	0.3 %	(1 in 390)	0.6 %	(1 in 160)	0.1 %	(1 in 750)	0.5 %	(1 in 220)
75 years	0.4 %	(1 in 280)	0.5 %	(1 in 210)	0.3 %	(1 in 360)	0.4 %	(1 in 240)
Lifetime risk			0.7 %	(1 in 140)			0.5 %	(1 in 220)

Figure 3.30.3
Distribution of UICC-stages at first diagnosis by sex
Not included because UICC-stages are not defined for multiple myeloma.

Figure 3.30.4
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C90, Germany 2015–2016

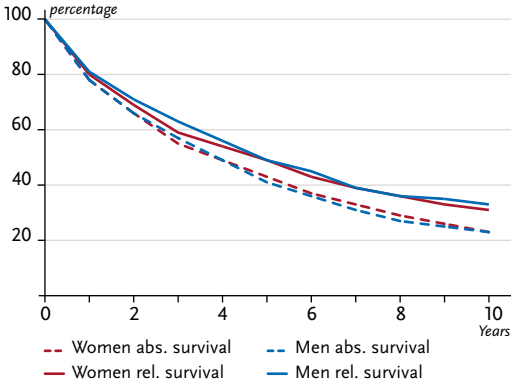


Figure 3.30.5
Relative 5-year survival by UICC-stage and sex
Not included because UICC-stages are not defined for multiple myeloma.

Figure 3.30.6
Age-standardised incidence and mortality rates in German federal states by sex, ICD-10 C90, 2015–2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

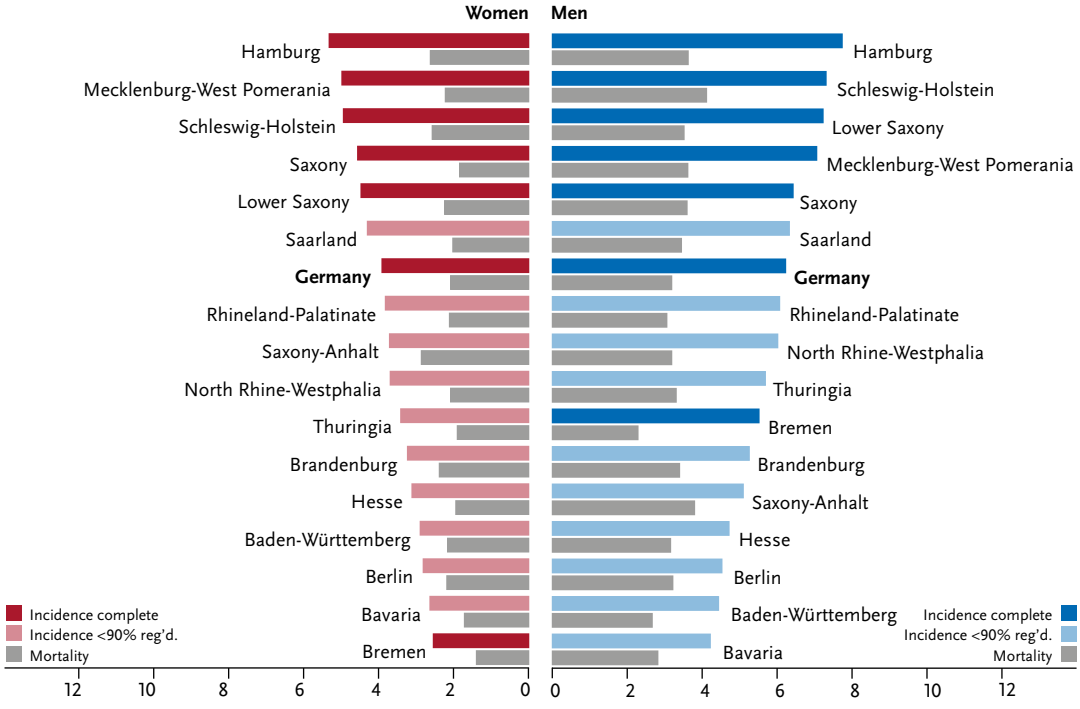
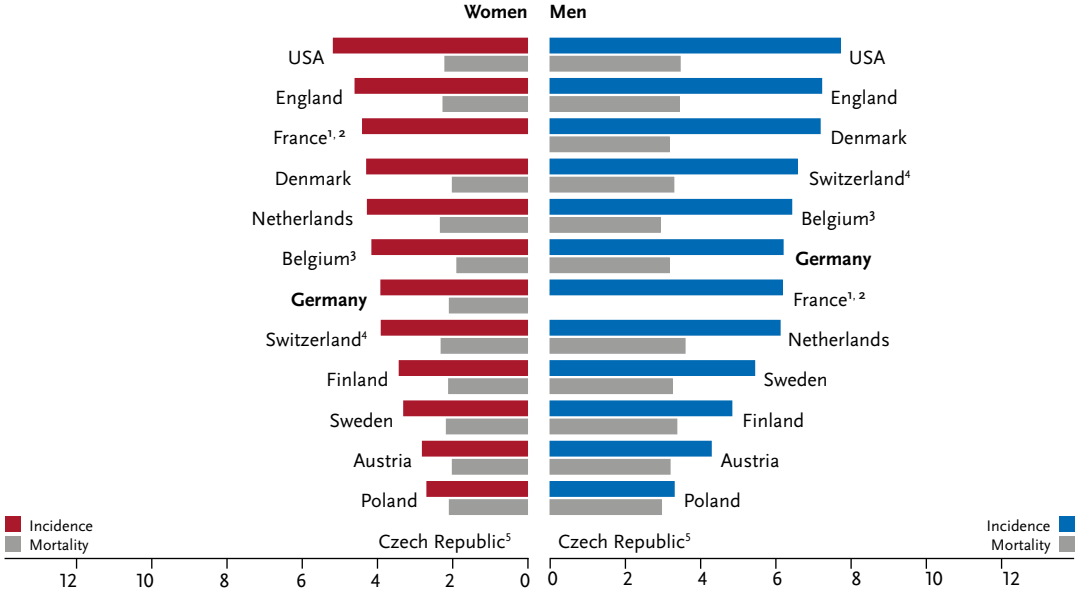


Figure 3.30.7
International comparison of age-standardised incidence and mortality rates by sex, ICD-10 C90, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



[1] Multiple myeloma (plasmacytoma) defined by ICD-O-3 morphologies 9731/3, 9732/3, 9733/3, 9734/3
[2] No data for mortality available
[3] Mortality only for 2015 from WHO mortality database
[4] Mortality only for 2015
[5] No data available

3.31 Leukaemia

Table 3.31.1
Overview of key epidemiological parameters for Germany, ICD-10 C91–C95

Incidence	2015		2016		Prediction for 2020	
	Women	Men	Women	Men	Women	Men
Incident cases	6,050	7,820	6,010	7,900	6,400	8,600
Crude incidence rate[1]	14.6	19.5	14.4	19.5	15.4	21.3
Age-standardised incidence rate[1,2]	8.9	13.7	8.6	13.5	8.8	14.0
Median age at diagnosis	73	71	74	71		

Mortality	2015		2016		2017	
	Women	Men	Women	Men	Women	Men
Deaths	3,579	4,290	3,710	4,542	3,653	4,521
Crude mortality rate[1]	8.6	10.7	8.9	11.2	8.7	11.1
Age-standardised mortality rate[1,2]	3.9	6.5	4.0	6.6	3.8	6.4
Median age at death	79	76	79	77	79	77

Prevalence and survival rates	5 years		10 years	
	Women	Men	Women	Men
Prevalence	18,900	25,700	32,100	42,600
Absolute survival rate (2015–2016)[3]	50 (46–56)	49 (45–50)	38 (30–45)	35 (31–38)
Relative survival rate (2015–2016)[3]	57 (53–63)	58 (52–60)	49 (40–59)	48 (43–51)

1 per 100,000 persons 2 age-standardised (old European Standard) 3 in percentages (lowest and highest value of the included German federal states)

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

Epidemiology

In 2016, around 13,900 people in Germany were diagnosed with leukaemia, 4 % of whom were under the age of 15 years. Risk decreases during the transition to young adulthood, but risk begins to increase again starting at 30 years of age. Incidence is higher among men than women. One in 67 men and one in 87 women will develop leukaemia over the course of their lives.

Between 1999 and 2016, age-standardised incidence remained relatively stable, whereas age-standardised mortality fell during this period. About 38 % of newly diagnosed cases were chronic lymphoblastic leukaemia (CLL), and about 23 % were acute myeloid leukaemia (AML).

The prognosis depends on the form of the disease and age at diagnosis: those diagnosed in childhood have the best survival prospects, whereas adults with acute forms generally have a poor prognosis. Overall, just over a third of adults who develop the disease are still alive 10 years after diagnosis. Some people with chronic leukaemia recover full health, for example after undertaking a risky stem cell transplant.

Risk factors

No known risk factor is associated with every type of leukaemia. However, some factors increase the risk of developing certain forms of the condition. Ionising radiation and cytostatic drugs are associated with acute leukaemia. Occupational exposure to benzene, 1,3-butadiene and related substances can also contribute to the development of leukaemia. Some rare genetic mutations, including trisomy 21, can increase the risk of acute leukaemia. The only virus confirmed as a risk factor for leukaemia is the human T-lymphotropic virus (HTLV), but this virus is extremely rare in Europe. Numerous other risk factors are currently being discussed. In addition to environmental factors, this includes lifestyle factors such as smoking and excess body weight. However, a clear association has yet to be established.

In most cases it is not possible to provide a causal explanation for the development of leukaemia. The condition is presumably brought on by a combination of several factors.

Figure 3.31.1a
Age-standardised incidence and mortality rates by sex, ICD-10 C91 – C95, Germany 1999 – 2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

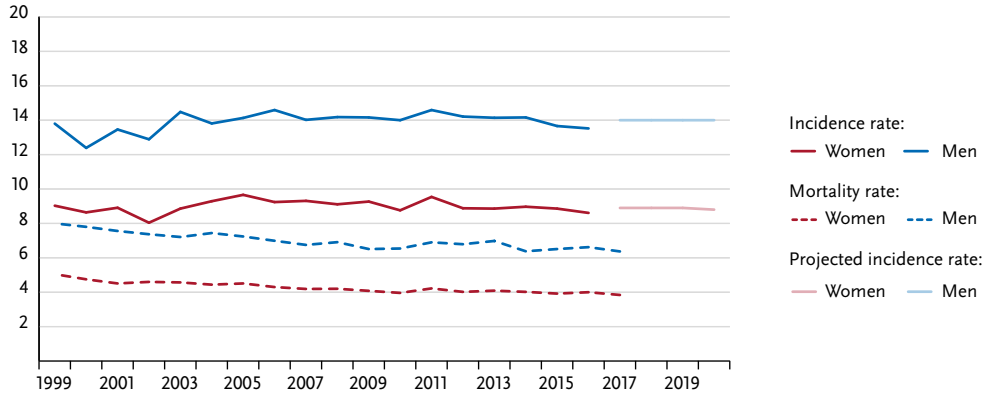


Figure 3.31.1b
Absolute numbers of incident cases and deaths by sex, ICD-10 C91 – C95, Germany 1999 – 2016/2017, projection (incidence) through 2020

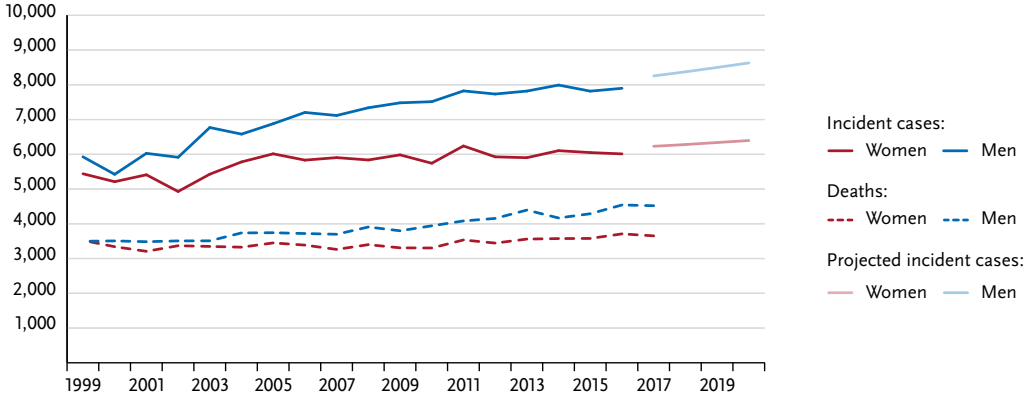


Figure 3.31.2
Age-specific incidence rates by sex, ICD-10 C91 – C95, Germany 2015 – 2016
per 100,000

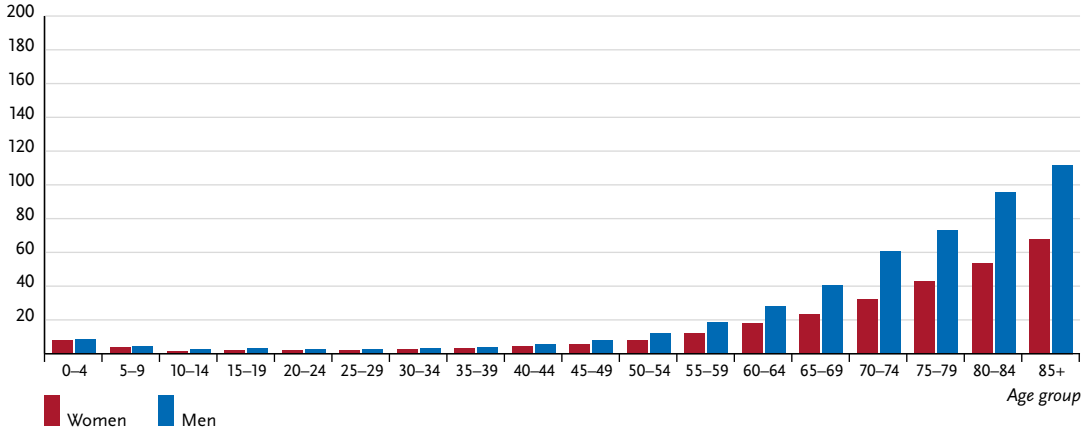


Table 3.31.2
Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C91–C95, database 2016

	Risk of developing cancer				Mortality risk			
Women aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1 %	(1 in 2,700)	1.1 %	(1 in 94)	< 0.1 %	(1 in 11,100)	0.7 %	(1 in 130)
45 years	0.1 %	(1 in 1,400)	1.0 %	(1 in 96)	< 0.1 %	(1 in 5,000)	0.7 %	(1 in 130)
55 years	0.1 %	(1 in 680)	1.0 %	(1 in 100)	0.1 %	(1 in 1,800)	0.7 %	(1 in 140)
65 years	0.3 %	(1 in 390)	0.9 %	(1 in 110)	0.1 %	(1 in 700)	0.7 %	(1 in 140)
75 years	0.4 %	(1 in 250)	0.7 %	(1 in 140)	0.3 %	(1 in 290)	0.7 %	(1 in 150)
Lifetime risk			1.1 %	(1 in 87)			0.8 %	(1 in 130)
Men aged	**in the next ten years**		**ever**		**in the next ten years**		**ever**	
35 years	< 0.1 %	(1 in 2,100)	1.4 %	(1 in 71)	< 0.1 %	(1 in 9,900)	1.0 %	(1 in 100)
45 years	0.1 %	(1 in 990)	1.4 %	(1 in 73)	< 0.1 %	(1 in 3,500)	1.0 %	(1 in 100)
55 years	0.2 %	(1 in 440)	1.3 %	(1 in 76)	0.1 %	(1 in 1,200)	1.0 %	(1 in 100)
65 years	0.4 %	(1 in 220)	1.2 %	(1 in 82)	0.2 %	(1 in 440)	1.0 %	(1 in 100)
75 years	0.6 %	(1 in 150)	1.0 %	(1 in 100)	0.6 %	(1 in 170)	1.0 %	(1 in 110)
Lifetime risk			1.5 %	(1 in 67)			1.0 %	(1 in 100)

Figure 3.31.3
Distribution of UICC-stages at first diagnosis by sex
Not included because UICC-stages are not defined for leukaemias.

Table 3.31.3
Proportion of leukaemias C91–C95 by type and sex, Germany 2015–2016

	ALL[1]	CLL[2]	AML[3]	CML[4]	others[5]
Women	6 %	36 %	25 %	9 %	24 %
Men	6 %	39 %	22 %	8 %	25 %

1 Acute lymphatic leukaemia (C91.0)
2 Chronic lymphatic leukaemia (C91.1)
3 Acute myeloid leukaemia (C92.0)
4 Chronic myeloid leukaemia (C92.1)
5 incl. unspecified leukaemia forms

Figure 3.31.4
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C91–C95, Germany 2015–2016

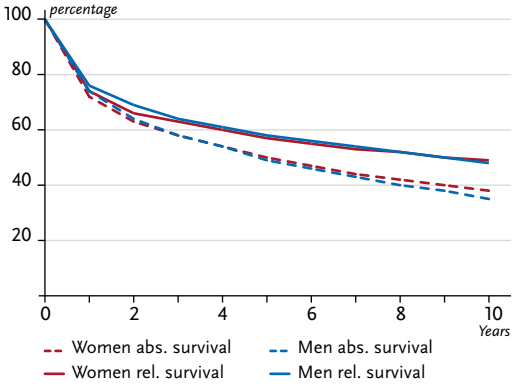


Figure 3.31.5
Relative 5-year-survival by type of leukaemia and sex, ICD-10 C91–C95, Germany 2015–2016

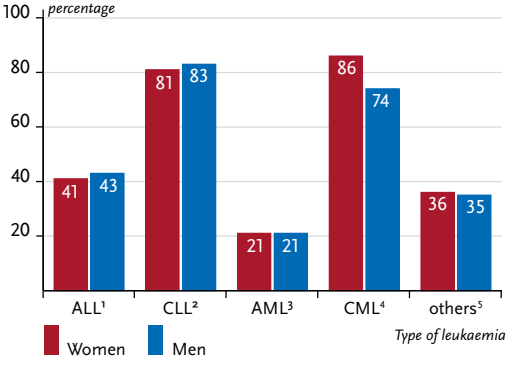


Figure 3.31.6
Age-standardised incidence and mortality rates in German federal states by sex, ICD-10 C91 – C95, 2015 – 2016 (Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

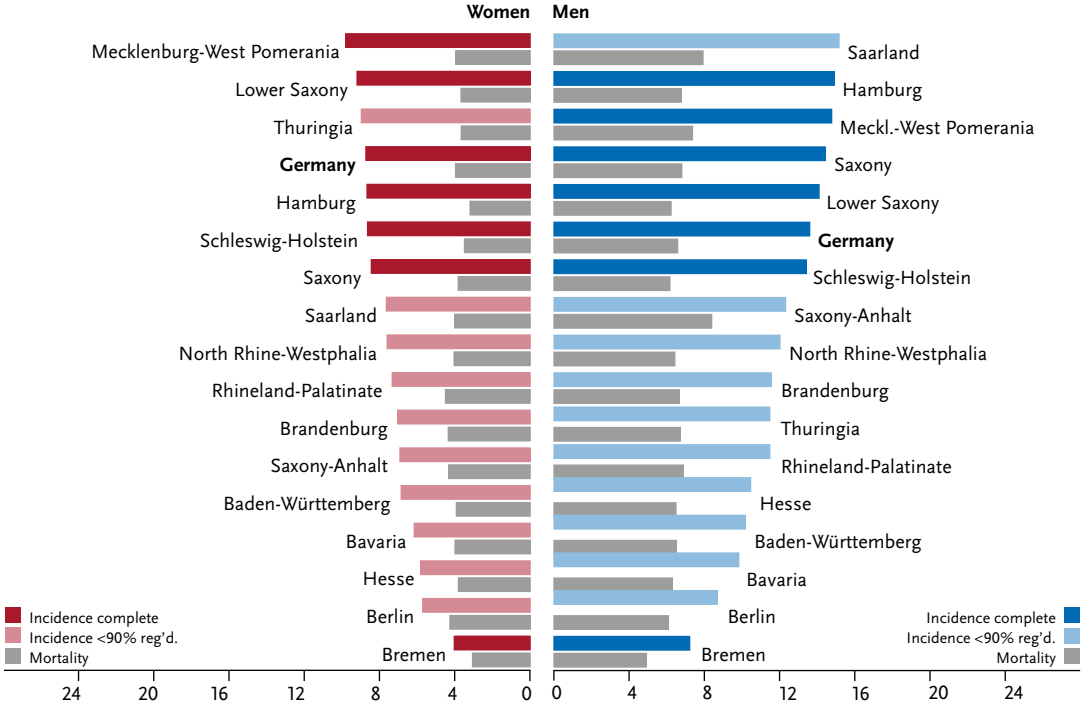
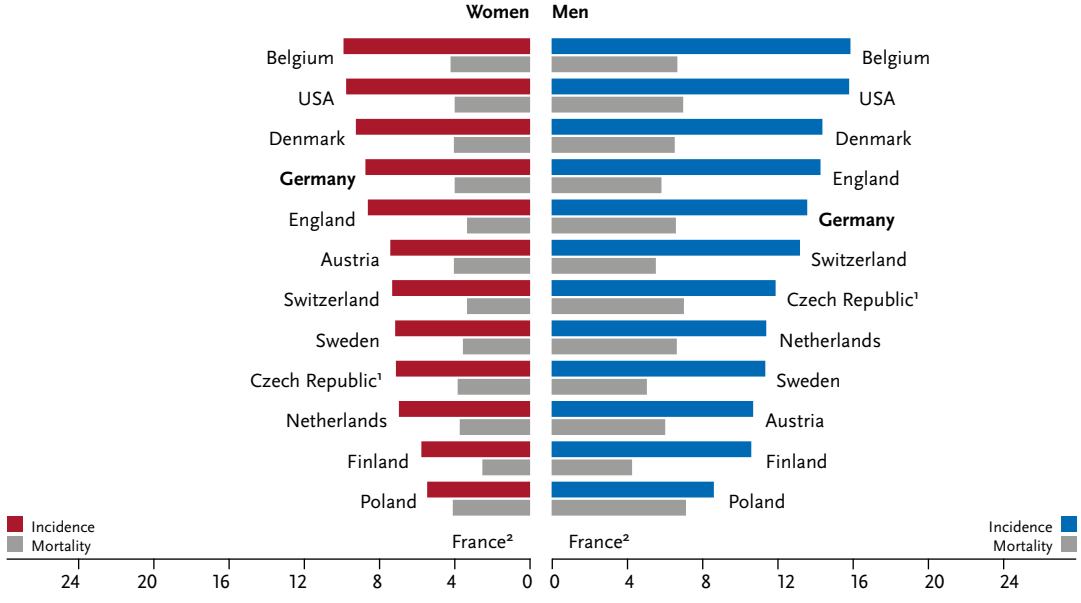


Figure 3.31.7
International comparison of age-standardised incidence and mortality rates by sex, ICD-10 C91 – C95, 2015 – 2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)



¹ Data only for 2015
² No data available

4 Cancer in children

Since taking up its work in 1980, the German Childhood Cancer Registry (GCCR) has been based at the Institute of Medical Biostatistics, Epidemiology and Informatics at the University Medical Centre of the Johannes Gutenberg University Mainz. From the outset, the GCCR was conceived to enable close cooperation with the Society for Paediatric Oncology and Haematology (GPOH) and its associated hospitals. This feature of the registry distinguishes it from adult oncology and has allowed it to become a nationwide epidemiologic childhood cancer registry with a high level of data quality and over 95 % coverage (since about 1987). The GCCR thus meets the international standards for an epidemiological cancer registry. A further feature of the GCCR is its active, open-ended, long-term follow-up observation of patients into adulthood. The registry therefore also provides a basis for researching late effects and secondary tumours, as well as studies with long-term survivors in general.

The registry includes children who have been diagnosed with a malignant disease or a histologically benign brain tumour before their 15th birthday and are part of the German resident population at diagnosis. The GCCR began registering cancer cases in eastern Germany in 1991. On 1 January 2009, the GCCR began registering all children and adolescents through the age of 17 years (i. e., those who receive their diagnosis before their 18th birthday) on the basis of the *Richtlinie des Gemeinsamen Bundesausschusses über Maßnahmen zur Qualitätssicherung für die stationäre Versorgung von Kindern und Jugendlichen mit hämato-onkologischen Krankheiten* (Guideline of the Joint Federal Committee on Quality-Assurance Measures for the In-Patient Care of Children and Adolescents with Haemato-Oncological Diseases). This will make it possible to better consider the needs of the collaborating hospitals, which have been combining paediatric and adolescent medicine for several years now and thus also treat cancer patients aged 15 years and over.

Currently, the Registry contains data from around 61,000 patients.

Childhood cancer incidence

Germany registers around 1,800 cases of cancer in children under the age of 15 every year. With around 11 million children under 15, this translates into an incidence rate of about 16.9 per 100,000 children for this age group. For a child, the likelihood of developing a malignant cancer within the first 15 years of his or her life is 0.2 %. Roughly one in 410 children is diagnosed with a malignant cancer before his or her 15th birthday. Since 2009, when registration of all children and adolescents up to the age of 18 began, an additional 360 cases between the ages of 15 and 17 years have been registered on average each year. 1,255 patients have been diagnosed with a subsequent cancer within the first 30 years after their initial diagnosis. This represents 7.3 % of all childhood cancer patients (cumulative incidence).

Survival

Less than 1 % of all cancer patients are children below the age of 15 years. Nonetheless, malignant neoplasms are the second most common cause of death for children. Luckily, survival prospects have improved over the past 30 years, in particular due to significantly more differentiated diagnoses and multimodal therapies. Of all children who were diagnosed with cancer and subsequently followed up between 2004 and 2013, 85 % of patients were alive after five years, 83 % after ten years and 82 % after fifteen years. In the early 1980s, the five-year survival probability of children with cancer was still only 67 %.

Gradually, the encouraging rise in the number of long-term survivors has shifted the focus towards the

Figure 4.1
Cancer in children (determined for the period 2008–2017)

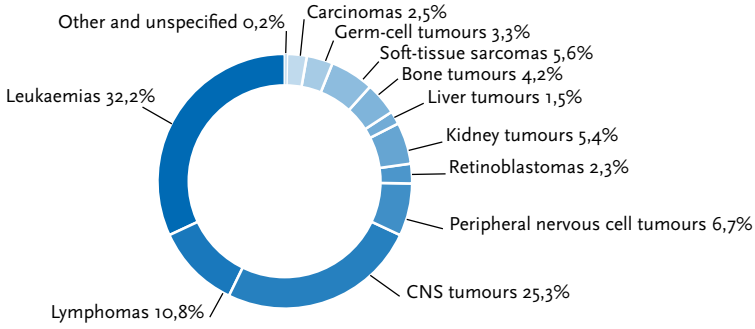
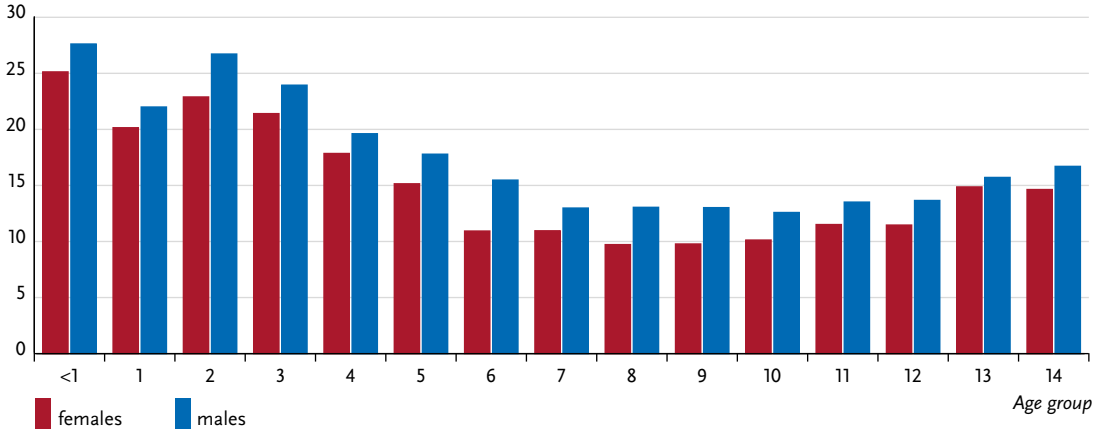


Figure 4.2
Incident cases by age and sex, all childhood malignancies
Number of cases per 100,000 by age group, determined for the period 2008–2017

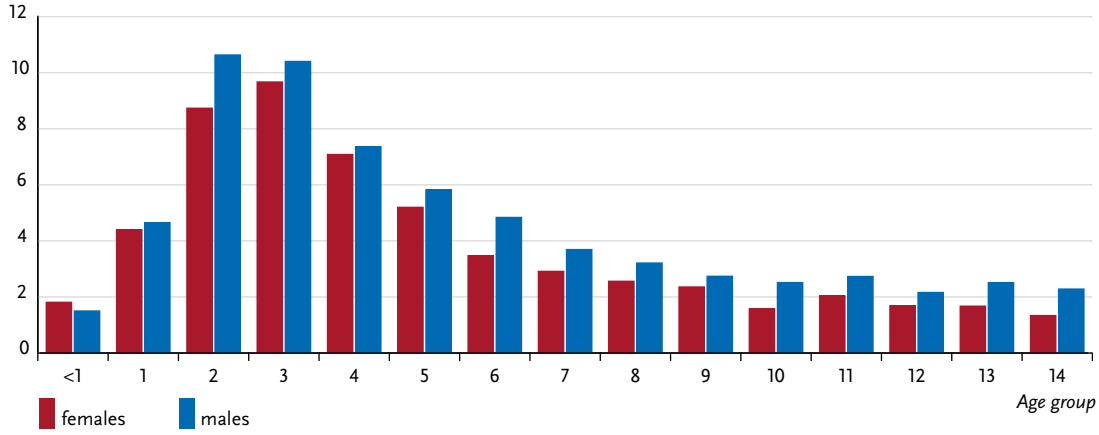


long-term observation of former paediatric cancer patients. The GCCR database is in this regard an ideal basis for studying long-term survivors. As the above figures reveal, analysis of long-term survival (for example after 15 years or more), as well as estimates regarding the risk of developing a second neoplasia after suffering cancer in childhood, are already possible. Further potential research fields include the incidence of other long-term impacts, such as the possible consequences of therapy for fertility, or studies that examine the health risks of descendants or cardiovascular implications of therapy at later stages of life. About 39,000 of the more than 50,000 patients currently known to be alive have been followed-up for at least five years. The majority of these former patients are now 18 years old or older.

Range of diagnoses

Compared to adults, children present a very different range of cancers. Most small children develop embryonal tumours (neuroblastomas, retinoblastomas, nephroblastomas, medulloblastomas, embryonic rhabdomyosarcomas or germ-cell tumours). Carcinomas, by contrast, are very rare in children (accounting for only about 2.5 % of all malignant cancers). Diagnostically, the most important groups of cancer in children are leukaemias (32.2 %), CNS tumours (25.3 %) and lymphomas (10.8 %). Cancer incidence rates for children under five years of age are about twice as high as in the 5- to 14-year age group. The median age at onset for children under fifteen years of age is five years, nine months. Boys are diagnosed with cancer 1.2 times more frequently than girls.

Figure 4.3
Incident cases by age and sex, childhood acute lymphatic leukaemia (ALL)
Number of cases per 100,000 by age group, determined for the period 2008–2017



Leukaemia

Among children under 15 years old, leukaemia accounts for about one third of all cancer cases. The most common single diagnosis overall (24.9 %) is lymphoid leukaemia (LL). It occurs more than twice as frequently among children under the age of five as in all other age groups. 4.1 % of all childhood malignancies are acute myeloid leukaemias (AML). AML is most common among children under the age of two. The survival prospects for AML are significantly lower than for LL. About 11 % of all subsequent neoplasms are AML.

The causes of childhood leukaemia still remain largely unclear today. For a long time, environmental factors were suspected of playing a role in the development of leukaemia among children. Recently, however, it has become quite clear that the number of cases related to environmental factors (such as low-dose ionising radiation, non-ionising radiation and pesticides) is quite small, even though a weak association between these factors and childhood leukaemia cannot be ruled out. A number of facts have given greater weight to hypotheses that assign a key role to infections and the immune system in childhood leukaemia. Increasingly, genetic causes continue to be researched and discussed for all childhood neoplasms.

Lymphomas

The most common lymphomas are Hodgkin lymphoma (4.7 %) and non-Hodgkin lymphomas (NHL), including Burkitt's lymphoma (6 %). The chances of survival for patients with Hodgkin lymphoma are among the best in paediatric oncology. Unfortunately, at more than 9 %, the frequency of subsequent cancers within 30 years after diagnosis of Hodgkin lymphoma is particularly high. Children with congenital or acquired immunodeficiency and those who have had immunosuppressive therapy are at increased risk of developing NHL.

CNS tumours

The most commonly diagnosed CNS tumours are astrocytomas (11.5 %), intracranial and intraspinal embryonal tumours (4.3 %) and ependymomas (1.9 %). 23 % of subsequent neoplasms are CNS tumours. The increase in the incidence rates of CNS tumours observed in a number of western countries over the past few decades is mostly related to better registration, but general changes in environmental factors and related exposures are also being discussed. For example, a number of epidemiological studies are investigating the influence of ionising radiation, electromagnetic fields, pesticides, the mother's diet, as well as of genetic aspects.

Other common malignant diseases

Other common malignant cancers in childhood include neuroblastomas, nephroblastomas, germ-cell tumours, bone tumours and rhabdomyosarcomas (tumours of the skeletal muscle and connective tissue). The prognosis for children with nephroblastoma or germ-cell tumours is much more favourable than for the other tumours.

Table 4.1
Incidence* and survival rates for the most common diagnoses, determined for the period 2004–2013

Cancer sites	Incidence*	Survival rate in %**		
		after 5 years	after 10 years	after 15 years
Hodgkin lymphomas	0.7	99	98	97
Retinoblastomas	0.5	98	97	97
Nephroblastomas	1	93	93	93
Germ-cell tumours	0.5	94	93	93
Lymphoid leukaemias	4.3	92	91	90
Non-Hodgkin lymphomas	0.7	89	88	86
Astrocytomas	1.9	81	79	78
Neuroblastomas and ganglioneuroblastomas	1.3	80	77	77
Acute myeloid leukaemias	0.7	73	72	71
Rhabdomyosarcomas	0.5	73	71	71
Osteosarcomas	0.3	75	71	70
Intracranial and intraspinal embryonal tumours	0.8	66	58	56
All malignancies	16.9	85	83	82

* Cases per 100,000 children under the age of 15, age standardised, standard: Segi world population, children diagnosed 2008–2017
** Brenner H, Spix C. Combining cohort and period methods for retrospective time trend analyses of long-term cancer patient survival rates. Br J Cancer 89, 1260–1265, 2003.

Figure 4.4
Trends of incidence of selected diagnosis groups and for all childhood malignancies
Number of cases per 100,000 (age standardised), including eastern Germany since 1991

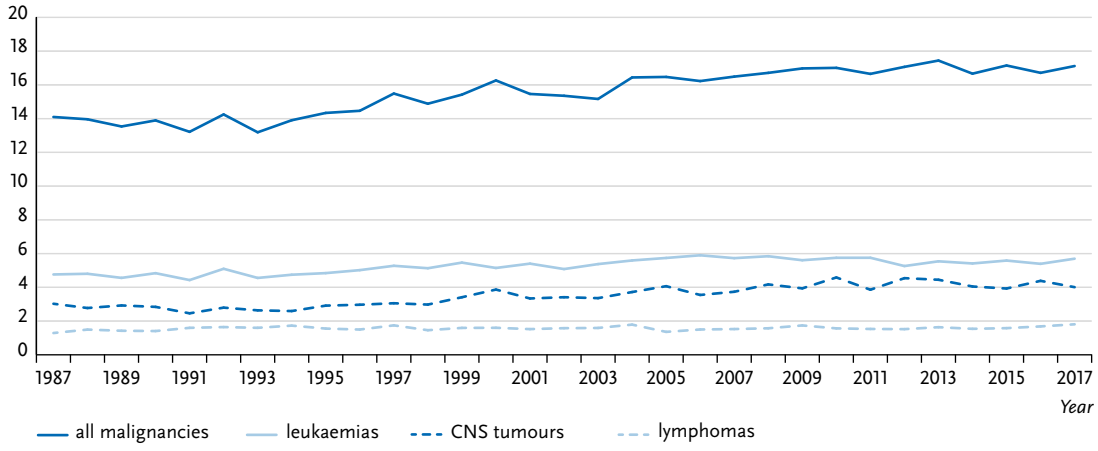
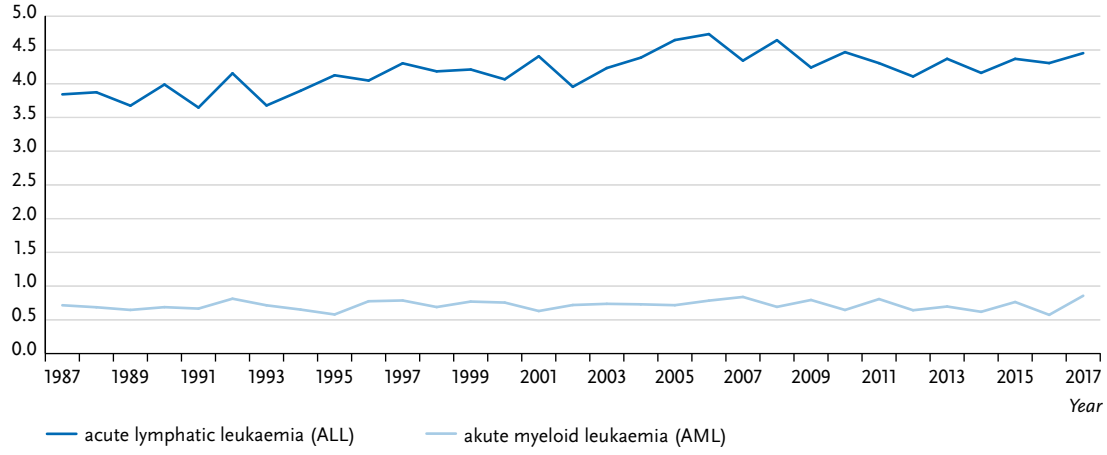


Figure 4.5
Trends of incidence of childhood leukaemias, myeloproliferative and myelodysplastic disorders
Number of cases per 100,000 (age standardised), including eastern Germany since 1991



Skin tumours, thyroid cancer, breast cancer among young women and other carcinomas are very rare as primary diagnoses in children but are frequent subsequent cancers after childhood cancer, sometimes already occurring in childhood or adolescence.

Literature on childhood cancer

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5 Appendix

5.1 The German Centre for Cancer Registry Data at the Robert Koch Institute (Zentrum für Krebsregisterdaten, ZfKD)

After enactment of the Federal Cancer Registry Data Act (Bundeskrebsregisterdatengesetz – BKRG) in August 2009, the German Centre for Cancer Registry Data was established at the beginning of 2010 as an independent division within the Robert Koch Institute's Department of Epidemiology and Health Monitoring to perform the tasks laid down in the Act:

- to check the completeness of case finding and of the variables included in the anonymised data submitted by the epidemiological (population-based) state cancer registries
- to create, maintain and update a dataset containing the data transmitted by the state cancer registries and checked by the ZfKD
- to further enhance methods and standards for data collection and data transfer, and to analyse the data together with the state cancer registries
- to regularly estimate and analyse cancer incidence, mortality, survival rates, stage distribution at diagnosis, and other indicators, particularly prevalence, the risk of developing and dying of cancer, and how these indicators change over time
- to examine regional differences in selected cancer sites
- to provide a dataset for evaluating health-policy measures for cancer prevention, cancer screening, cancer treatment and healthcare
- to conduct analyses and studies on cancer and to publish the results in national and international journals
- to conduct a nationwide record linkage for the detection of duplicate notifications and to inform the cancer registries accordingly
- to publish a report on cancer incidence and trends in Germany in consultation with the state cancer registries every two years (»Cancer in Germany«)
- to write a comprehensive report on cancer in Germany every five years; the first edition was published in November 2016
- to complement classic print-products with interactive analysis tools based on annually updated data and an expanded presence on the Internet
- to use additional data sources to describe all aspects of cancer in Germany
- to cooperate internationally
- to collaborate in scientific bodies as well as European and international organizations dedicated to cancer registration and cancer epidemiology (e.g. active participation in working groups of the German National Cancer Plan, in the Association of Population-based Cancer Registries in Germany (GEKID), International Association of Cancer Registries (IACR) membership)

The work of the German Centre for Cancer Registry Data is supported by a scientific advisory board with an office at the RKI. After a review by this advisory board, applications for third party use of the dataset at the German Centre for Cancer Registry Data may be approved if a justified and, in particular, scienti ic interest can be substantiated. Further information on the application process as well as the German Centre for Cancer Registry Data is available on the Internet at www.krebsdaten.de/english.

Staff of the German Centre for Cancer Registry Data:

Dr Klaus Kraywinkel, MSc (section head)
Dr Benjamin Barnes, MEM (deputy section head)
Nina Buttmann-Schweiger, MPH
Dr Stefan Dahm
Julia Fiebig, MSc
Manuela Franke
Ina Gurung-Schönfeld
Dr Jörg Haberland
Maren Imhoff, MSc
André Kötschau
Stefan Meisegeier
Dr Petra von Berenberg-Gossler, MPH
Dr Antje Wienecke, MSc

5.2 Association of Population-based Cancer Registries in Germany

The Association of Population-based Cancer Registries in Germany (Gesellschaft der epidemiologischen Krebsregister in Deutschland e.V., GEKID) was formed in 2004 as a registered, non-profit association. GEKID's members include not only all population-based cancer registries in Germany, but also a tumour centre and interested scientists working in the field of cancer epidemiology.

In the field of cancer control, GEKID cooperates closely with the Federal Ministry of Health, particularly in the context of the National Cancer Plan, and with the German Centre for Cancer Registry Data based at the Robert Koch Institute. GEKID also participates actively in a wide range of scientific committees, especially in working groups determining the uniform data set for cancer registration in Germany.

The association's primary task is to harmonise cancer registration methods through standardisation, despite differences in legislation between the federal states. The comparability of results from the cancer registries can only be assured through nationwide cooperation. To promote such cooperation, GEKID published »The Manual of Population-based Cancer Registration« in 2008. Together with the Association of German Tumour Centres (ADT), this manual was updated ten years later in 2018 and expanded to include elements of clinical cancer registration. The manual is available via the GEKID Homepage.

Furthermore, GEKID is a mutual point of contact for the population-based cancer registries on all issues of common interest and represents the registries at the European level. GEKID is a member of the European Network of Cancer Registries (ENCR) and the International Association of Cancer Registries (IACR).

In its charter, GEKID has set itself the following tasks:

- to be the point of contact both for national and international cooperation partners and for the interested public
- to provide information on the status of cancer registration in Germany to the (professional) public and explain the aims of cancer registration
- to engage in joint information activities and thus help cancer registries to achieve and maintain completeness of case ascertainment
- to define standards on content as a basis for the comparability of population-based cancer registries
- to coordinate tasks involving multiple registries and foster contacts with clinical tumour documentation
- to initiate joint research activities
- to promote the scientific use of the population-based cancer registries
- to use the data to advance quality assurance in oncological care

Important results of GEKID activities in recent years:

- Enhancement of the interactive GEKID-Atlas regarding current cancer incidence, mortality and survival in the federal states; the GEKID-Atlas made significant contributions to the scientific use of cancer registry data and is available via the GEKID-Homepage
- Continued development of the ADT/GEKID basis dataset for reporting to a registry as well as of an interchange format for exchanging data according to the state of residence and for forwarding data to the German Centre for Cancer Registry Data
- Evaluation and publication of results of survival analyses in Germany together with the German Cancer Research Centre, funded by the German Cancer Aid

Information on GEKID can be obtained on the Internet at www.gekid.de/home or from the respective regional member registries (see address section, appendix 5.4).

Contacts for the Association of Population-based Cancer Registries in Germany (see address section, appendix 5.4):

Prof Dr Alexander Katalinic
(Chair of GEKID, Schleswig-Holstein Cancer Registry)
Dr Stefan Hentschel
(1st Vice-chair, Hamburg Cancer Registry)
Hiltraud Kajüter
(2nd Vice-chair, North Rhine-Westphalia Population-based Cancer Registry)

5.3 KID – The Cancer Information Service provided by the German Cancer Research Center

The Cancer Information Service »KID« was founded in 1986 to provide personal information over the telephone to patients, their relatives and the interested public with questions regarding cancer. Today, doctors provide up-to-date, scientifically sound answers to around 33,500 questions every year by phone, by e-mail and in consultations in both Heidelberg and Dresden. Professionals involved with the care of persons with cancer also turn to the Cancer Information Service. The information on offer is individually tailored to the needs of the various target groups:

- Patients as well as their family and friends are interested primarily in detailed information relating to diagnosis and treatment options, living with the disease and additional sources of assistance within the healthcare system. For interested citizens, the main focus is on risk factors, cancer prevention and early detection or on current cancer research. The comprehensive information of the Cancer Information Service strengthens the health literacy of individuals and creates the basis for more equal communication with physicians, so that those affected are able to make an informed and participative decision.
- Professionals in occupations involved in cancer care receive pertinent information on the telephone and via e-mail quickly, reliably, competently, and based on the best available scientific evidence. The clear preparation of research results and the individual compilation of relevant literature generate direct added value for patient care.

Via its website www.krebsinformationsdienst.de the Cancer Information Service conveys the latest knowledge about cancer, useful addresses, additional contacts, tips for further links and information material. 600,000 individual visitors per month used this website in 2018. Additionally, the service posts breaking news and invites discussion on the social networking sites Facebook and Instagram. For professionals, the website offers relevant information on medical research and provides links to further scientific sources. Newsletters for medical professionals, especially for psycho-oncologists, convey current topics on cancer.

The Cancer Information Service is provided by the German Cancer research Center (DKFZ) in Heidelberg, the largest bio-medical research institution in Germany. The service is financed by funds from the Federal Ministry of Education and Research (BMBF), the State of Baden-Württemberg's Ministry of Science, Research and Art (MWK) and the Federal Ministry of Health (BMG). Thus, the service provides information independently, free from conflicts of interest and free of charge. In its capacity as national reference centre for cancer information, the Cancer Information Service is committed to providing the highest possible standard of information. Through its evaluation research, the Service also provides feedback on how cancer patients and their relatives experience health care in Germany.

Further information on the mission and methods of the Cancer Information Service can be found by following the link: www.krebsinformationsdienst.de/info/cancer-information-service.pdf

Cancer Information Service (KID)
Telephone: + 49 (0)800 – 420 30 40,
(Free within Germany) Daily from 08.00 to 20.00
E-Mail: krebsinformationsdienst@dkfz.de
Answers usually within 2 working days
Internet: www.krebsinformationsdienst.de and
www.facebook.com/krebsinformationsdienst

Cancer Information Service.med
Telephone: +49 (0)800 – 430 40 50,
(Free within Germany) Daily from 08.00 to 20.00
E-Mail: kid.med@dkfz.de
Answers usually within 2 working days
Internet: www.krebsinformationsdienst.de/fachkreise

Contacts at the Cancer Information Service KID
(also see address section, appendix 5.4):

Dr Susanne Weg-Remers
Head of the Cancer Information Service (KID)
Dr Andrea Penzkofer
Head of the Working Group »Knowledge Management« at KID

5.4 Addresses

Krebsregister **Baden-Württemberg** (Baden-Württemberg Cancer Registry)
Epidemiologisches Krebsregister (Population-based Cancer Registry)
Deutsches Krebsforschungszentrum Heidelberg (German Cancer Research Center)
Im Neuenheimer Feld 581
69120 Heidelberg
Telephone: 06221/42 42 20
E-Mail: ekr-bw@dkfz.de
Internet: www.krebsregister-bw.de

Krebsregister Baden-Württemberg (Baden-Württemberg Cancer Registry)
Vertrauensstelle (Baden-Württemberg Confidentiality Unit)
bei der Deutschen Rentenversicherung (German Pension Insurance) Baden-Württemberg
Gartenstraße 105
76135 Karlsruhe
Telephone: 0721/82 57 90 00 Telefax: 0721/82 59 97 90 99
E-Mail: vs@drv-bw.de
Internet: www.krebsregister-bw.de

Klinische Landesregisterstelle (KLR) des Krebsregisters Baden-Württemberg (Clinical State Registration Unit)
bei der Baden-Württembergischen Krankenhausgesellschaft e.V. (Baden-Württemberg Hospital Association)
Birkenwaldstraße 149
70191 Stuttgart
Telephone: 0711/2 57 77 70 Telefax: 0711/2 57 77 79
E-Mail: info@klr-krbw.de
Internet: www.krebsregister-bw.de

Bayerisches Landesamt für Gesundheit und Lebensmittelsicherheit (Bavarian Health and Food Safety Authority)
Zentrum für Krebsfrüherkennung und Krebsregistrierung (Registration Unit)
Schweinauer Hauptstraße 80
90441 Nürnberg
Telephone: 09131/68 08 29 20 Telefax: 09131/68 08 29 05
E-Mail: zkfr@lgl.bayern.de
Internet: www.krebsregister-bayern.de

Bayerisches Landesamt für Gesundheit und Lebensmittelsicherheit (Bavarian Health and Food Safety Authority)
Vertrauensstelle des Bayerischen Krebsregisters (Confidentiality Unit of Bavarian Cancer Registry)
Schweinauer Hauptstraße 80
90441 Nürnberg
Telephone: 09131/68 08 28 87 Telefax: 09131/68 08 29 06
E-Mail: vertrauensstelle-krebsregister@lgl.bayern.de
Internet: www.krebsregister-bayern.de

Gemeinsames Krebsregister der Länder **Berlin, Brandenburg, Mecklenburg-Vorpommern, Sachsen-Anhalt** und der Freistaaten **Sachsen** und **Thüringen** (GKR)
(Joint Cancer Registry of Berlin, Brandenburg, Mecklenburg-West Pomerania, Saxony-Anhalt, Saxony and Thuringia)
Brodauer Straße 16–22
12621 Berlin
Telephone: 030/56 58 11 00 (R) Telefax: 030/56 58 11 99 (R)
030/56 58 12 00 (V) 030/56 58 12 99 (V)
E-Mail: registerstelle@gkr.berlin.de
vertrauensstelle@gkr.berlin.de
Internet: http://www.krebsregister.berlin.de

Bremer Krebsregister (Bremen Cancer Registry)
Auswertungsstelle
Leibniz-Institut für Präventionsforschung und Epidemiologie – BIPS GmbH
(Leibniz Institute for Prevention Research and Epidemiology)
Achterstraße 30
28359 Bremen
Telephone: 0421/21 85 69 61 Telefax: 0421/21 85 68 21
E-Mail: krebsregister@leibniz-bips.de
Internet: www.krebsregister.bremen.de

Vertrauensstelle des **Bremer** Krebsregisters (Bremen Confidentiality Unit)
Kassenärztliche Vereinigung Bremen
Achterstraße 30
28359 Bremen
Telephone: 0421/21 85 69 99
E-Mail: vbkr.kvhb@t-online.de

Hamburgisches Krebsregister (Hamburg Cancer Registry)
Behörde für Gesundheit und Verbraucherschutz (State Ministry of Health and Consumer Protection)
Billstraße 80
20539 Hamburg
Telephone: 040/4 28 37 22 11 Telefax: 040/4 27 94 85 03
E-Mail: hamburgischeskrebsregister@bgv.hamburg.de
Internet: www.hamburg.de/krebsregister

Hessisches Landesprüfungs- und Untersuchungsamt im Gesundheitswesen
Landesauswertungsstelle des Hessischen Krebsregisters
Lurgiallee 10
60439 Frankfurt am Main
Telephone: 069/58 00 13-400 Telefax: 0611/32 76 44-814
E-Mail: Soo-Zin.Kim-Wanner@hlpug.hessen.de
Internet: www.hlpug.de

Vertrauensstelle des Hessischen Krebsregisters bei der Landesärztekammer Hessen
(Confidentiality Unit of Hesse Cancer Registry)
Lurgiallee 10
60439 Frankfurt am Main
Telephone: 069/5 66 08 76-0 Telefax: 069/5 66 08 76-10
E-Mail: vertrauensstelle@laekh.de
Internet: www.hessisches-krebsregister.de

Epidemiologisches Krebsregister **Niedersachsen** (Lower Saxony Population-based Cancer Registry)
OFFIS CARE GmbH
Industriestraße 9
26121 Oldenburg
Telephone: 0441/36 10 56 12
E-Mail: registerstelle@krebsregister-niedersachsen.de
Internet: www.krebsregister-niedersachsen.de

Niedersächsisches Landesgesundheitsamt (Lower Saxony Local Health Authority)
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30159 Hannover
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E-Mail: vertrauensstelle.ekn@nlga.niedersachsen.de
Internet: www.krebsregister-niedersachsen.de

Landeskrebsregister **Nordrhein-Westfalen** gGmbH (North Rhine-Westphalia Population-based Cancer Registry)
Gesundheitscampus 10
44801 Bochum
Telephone: 0234/5 45 09-000 Telefax: 0234/5 45 09-499
E-Mail: info@krebsregister.nrw.de
Internet: www.krebsregister.nrw.de

Krebsregister **Rheinland-Pfalz** gGmbH (Rhineland-Palatinate Cancer Registry)
Große Bleiche 46
55116 Mainz
Zentrale: 06131/9 71 75-0 Telefax: 06131/9 71 75-90
E-Mail: info@krebsregister-rlp.de
Internet: www.krebsregister-rlp.de

(R) = Registerstelle (Registry Unit) (V) = Vertrauensstelle (Confidentiality Unit)

Krebsregister **Saarland** (Saarland Cancer Registry)
Ministerium für Soziales, Gesundheit, Frauen und Familie
(Ministry of Social Affairs, Health, Women and Family)
Präsident-Baltz-Straße 5
66119 Saarbrücken
Telephone: 0681/5 01 58 05 (R)
0681/5 01 45 38 (V) Telefax: 0681/5 01 59 98
E-Mail: koordinierungsstelle@krebsregister.saarland.de
Internet: www.krebsregister.saarland.de

Krebsregister **Schleswig-Holstein** (Schleswig-Holstein Cancer Registry)
Registerstelle (Registry Unit)
Institut für Krebsepidemiologie e.V.
Ratzeburger Allee 160, Haus 50
23562 Lübeck
Telephone: 0451/50 05 21 01 Telefax: 0451/50 05 21 04
E-Mail: info@krebsregister-sh.de
Internet: www.krebsregister-sh.de

Vertrauensstelle des Krebsregisters (Confidentiality Unit of Schleswig-Holstein Cancer Registry)
bei der Ärztekammer Schleswig-Holstein (at Schleswig-Holstein Medical Council)
Bismarckallee 8–12
23795 Bad Segeberg
Telephone: 04551/80 38 52
E-Mail: krebsregister-sh@aeksh.de

Deutsches Kinderkrebsregister (German Childhood Cancer Registry)
Institut für Medizinische Biometrie, Epidemiologie und Informatik (IMBEI)
(Institute of Medical Biostatistics, Epidemiology and Informatics)
Obere Zahlbacher Straße 69
55131 Mainz
Telephone: 06131/17 31 11 Telefax: 06131/17 44 62
E-Mail: info@kinderkrebsregister.de
Internet: www.kinderkrebsregister.de

Krebsinformationsdienst (KID) (Cancer Information Service)
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Internet: www.bundesgesundheitsministerium.de

(R) = Registerstelle (Registry Unit) (V) = Vertrauensstelle (Confidentiality Unit)

5.5 Sources for international comparison of cancer incidence and mortality rates

(for the years 2015–2016, if not otherwise stated. Access date: July to October 2019)

Netherlands:
Netherlands Cancer Registry
http://www.cijfersoverkanker.nl/?language=en

Sweden, Finland, Denmark:
Association of the Nordic Cancer Registries (ANCR)
http://www-dep.iarc.fr/nordcan/English/frame.asp

Poland:
Krajowy Rejestr Nowotworów
http://onkologia.org.pl/raporty/#tabela_nowotwor

Czech Republic:
SVOD Web Portal
https://www.svod.cz/?sec=aktuality&lang=en
Figures for total cancer (C00–C97 w/o. C44) and for leukaemias (C91–C95) only available for 2015 from:
Institute of Health Information and Statistics of the Czech Republic (ÚZIS)
Cancer Incidence in the Czech Republic, 2015 (http://www.uzis.cz/en)

Switzerland:
Incidence only available for 2015 from:
Provided by NICER – National Institute for Cancer Epidemiology and Registration
https://www.nicer.org/
Mortality: Eurostat, Statistical Office of the European Union
http://ec.europa.eu/eurostat/web/health/causes-death/data/database

Belgium:
Incidence: Belgian Cancer Registry
http://www.kankerregister.org/
Mortality: Eurostat, Statistical Office of the European Union
https://ec.europa.eu/eurostat/web/health/data/database
Mortality for C17, C18–C20, C21, C23–C24, C44, C45, C46–C49, C81, C82–C88, C90 only available for 2015 from WHO mortality database
http://apps.who.int/healthinfo/statistics/mortality/causeofdeath_query/

France:
Incidence and mortality available only as projection for 2018, classified by ICD-O-3 topography, and incidence and mortality for C61 available only for 2015 from:
Provided by FRANCIM – French Network of Cancer registries
Defossez G, Le Guyader, Peyrou S, Uhry Z, Grosclaude P, Colonna M, Dantony E, et al. Estimations nationales de l'incidence et de la mortalité par cancer en France métropolitaine entre 1990 et 2018. Volume 1 – Tumeurs solides. Saint Maurice (Fra): Sante publique France, 2019. 372 p.
Volume 2 – Hémopathies malignes. Étude à partir des registres des cancers du réseau Francim. Saint-Maurice (Fra): Santé publique France, 2019. 169 p.
https://www.e-cancer.fr/
Mortality for C17, C21, C23–C24 only available for 2013/2014 from
WHO mortality database
http://apps.who.int/healthinfo/statistics/mortality/causeofdeath_query/
Mortality for C53, C54–C55 from
Eurostat, Statistical Office of the European Union
http://ec.europa.eu/eurostat/web/health/causes-death/data/database

USA:
National Cancer Institute, Surveillance, Epidemiology, and End Results (SEER) Program, classified according to ICD-O-3 topography
http://seer.cancer.gov/canques/incidence.html
http://seer.cancer.gov/canques/mortality.html

England: Office for National Statistics
https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/datasets/cancerregistrationstatisticscancerregistrationstatisticsengland
http://www.cancerresearchuk.org/cancer-info/cancerstats/types/

Austria: STATISTIK AUSTRIA, Austrian Cancer Registry (Access date: 19th December 2018) and Official cause of death statistics

5.6 Publications with participation/with results of German population-based cancer registries

Adam S, Koch-Gallenkamp L, Bertram H, Eberle A, Holleczek B, Pritzkuleit R, Waldeyer-Sauerland M, Waldmann A, Zeissig SR, Rohrmann S, Brenner H, Arndt V (2019) Health-related quality of life in long-term survivors with localised prostate cancer by therapy – Results from a population-based study. Eur J Cancer Care 28 (5): e13076. doi: 10.1111/ecc.13076

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Arndt V (2019) »Cancer survivorship« in Deutschland – Epidemiologie und Definitionen, Forum, (2): 1–7, doi: 10.1007/s12312-019-0560-2

Behrens G, Gredner T, Stock C, Leitzmann MF, Brenner H, Mons U (2018) Cancers due to excess weight, low physical activity, and unhealthy diet. Deutsches Ärzteblatt International; 115: 578–585. doi: 10.3238/arztebl.2018.0578

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Literature on cancer risk factors is available on request at the Cancer Information Service (see appendix 5.3).

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This 12th edition of »Cancer in Germany« is based on data from the population-based cancer registries in Germany through the year 2016. It contains information on cancer epidemiology in Germany compiled by the editors – the Association of Population-based Cancer Registries in Germany (GEKID) and the German Centre for Cancer Registry Data (ZfKD) at the Robert Koch Institute – as well as by the German Childhood Cancer Registry and the Cancer Information Service provided by the German Cancer Research Center. Further analyses and information are available at www.krebsdaten.de/english.
In 2016, there were an estimated 492,000 new cases of cancer in Germany. Although there has recently been a decline in incidence rates for many types of cancer, population aging is expected to lead to an increase in the annual number of new cancer cases to 510,000 by the year 2020. The roughly 230,000 annual cases of non-melanoma skin cancer are not included in these figures, which is common practice in cancer reporting internationally. Detailed analyses for this cancer site are presented in a separate chapter for the first time in this edition.