ROBERT KOCH INSTITUT

# Cancer in Germany 2009/2010

*9th Edition 2014*

GERMAN CENTRE FOR
CANCER REGISTRY DATA

GEKID

Federal Health Reporting

Contributions to
Federal Health Reporting

# Cancer in Germany 2009/2010

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## Preface

For the 9th Edition of the "Cancer in Germany" report, data from the whole of Germany is available for the first time covering the years 2009 and 2010. With the exception of the Baden-Württemberg Cancer Register, which was established in 2009 and which, because of its gradual development, is not in a position to deliver reliable data for the purposes of epidemiological research for the period 2009-2010, reliable data is available for all other federal states. This means that an important milestone in the history of cancer registry in Germany has been reached. A history that encompasses almost a hundred years from the initial beginnings of population-based cancer registration in 1920's Hamburg, via the establishment of the National Cancer Registry in the GDR in 1953 and the Saarland Cancer Registry in 1967 through to the current achievement of national coverage.

Germany is now going another step further following this development, which although initially slow, has been consistently driven forward over the past almost two decades by the Federal Government, Federal States and a whole number of committed staff within the Cancer Registries themselves: Last Spring, within the framework of the National Cancer Plan, a law was passed – the Cancer Screening and Cancer Registries Act (KFRG) – which also puts clinical cancer registration nationwide on a legal footing. One of the particular tasks of clinical cancer registration is the quality control of oncological care, which requires much more detailed clinical documentation of recorded new cases of cancer. Epidemiological and clinical cancer registration can only succeed if both forms of registration work together closely in spite of their different funding models, by coordinating registration channels and data-flows, sharing the data recorded and experience gained or even by merging – along the lines of the Dutch model – to form "integrated" clinical-epidemiological cancer registries.

It is already obvious now that clinical cancer registration in many regions will require a start-up period spanning many years. This means that the deadline target set in the Act for the end of 2017 may seem somewhat ambitious – at least for those regions starting from "scratch" with their clinical cancer registration. It will therefore still be a number of years until German, nationwide clinical data is scientifically usable.

However, from an epidemiological and public health point of view, even the data that has been available to date from the epidemiological cancer registries is extremely valuable. On the one hand it shows a need for epidemiological research, based on the example of those types of cancer with increasing incidence rates such as carcinomas of the liver, thyroid and vulva. On the other, it helps to evaluate current and future measures for cancer screening, which forms a second focus of the National Cancer Plan and of the KFR. Furthermore, initial examples reveal that even under the very strict restrictions on the part of data protection in Germany, a comparison of data from epidemiological studies with data in cancer registries is indeed possible, which in a few years will also come to benefit the "National Cohorts", a broad-scale, nationwide cohort study to research the causes of all chronic diseases. Even without a direct link to other data, many scientific issues can be processed using the data, as many publications based on German Cancer Registry data meanwhile show.

With the establishment of the Centre for Cancer Registry Data (ZfKD) at the Robert Koch Institute in 2010 the possibility now exists of being able to obtain the data of all German population-based cancer registries for substantiated purposes on application, centrally, from one office.

Amongst other things, one of the tasks of the Advisory Committee is to make recommendations regarding applications for use [of data].

The well-known high regard for cancer registries in Scandinavia stems from the fact that important findings have been derived from the data contained therein. I would therefore like to encourage those who read this to use the data and results from the German Cancer Registry for the ultimate objective of public health: "Maintaining and improving the state of health of the population".

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# 1 Epidemiological cancer registration in Germany

## 1.1 Aims and tasks of population-based cancer registries

Population-based (epidemiological) cancer registries are institutions for the collection, storage, processing, analysis and interpretation of data on the incidence and prevalence of cancers within defined registration areas (e.g. one German federal state). The data from the cancer registries also forms an indispensable basis for further studies into the causes of carcinogenesis, the assessment of early detection measures and population-based care of tumour patients.

Findings from population-based cancer registries include:

The prostate, bowel and lungs are the most common cancer sites among men.

The incidence of cancers (i.e. how frequently they occur annually in a certain population group) can be described using the data from population-based cancer registries. The incidence is calculated according to cancer type, patient age and gender, as well as other characteristics. Reliable information regarding incidence is indispensable for depicting the extent and type of the burden that cancer places on a population.

For some years there have been just as many new cases of lung cancer among women under the age of forty as among men of the same age.

Only by using data from the population-based cancer registries can the development of incidence over time (trends) can be observed. The registries have a key function for health reporting in this context.

Regional differences in the incidence of malignant melanoma of the skin can be observed in Europe and in Germany.

Population-based cancer registries can analyse the regional distribution of various types of cancer. It is also within their remit to investigate any cancer clusters observed. Further clarification of these clusters with regard to possible causes usually involves targeted analytical studies.

In recent years, the survival prospects following diagnosis with cancer have largely converged in both the western and eastern federal states.

Population-based cancer registries conduct survival-time analyses of all cancer patients in their registration region. Population-based survival rates are an important parameter for assessing the effectiveness of diagnosis, therapy and aftercare of cancers.

Because of the demographic development in Germany, it is expected that there will be more than a 20 % increase in new cases of cancer between 2010 and 2030.

The prediction of the future number of new cancer cases is an important aspect of requirement planning within the health service. The population-based cancer registries provide the baseline data needed for this.

The data from population-based cancer registries is also used for scientific research into the causes of cancer or for health services research. Such studies (case-control studies, cohort studies, etc.) investigate issues such as:

- What are the causes of childhood leukaemia?
- Do women who take hormone-replacement therapy for menopausal problems have a higher risk of developing breast cancer?
- Does lung cancer develop more frequently in people in certain occupational groups?
- Are diagnosis, therapy and aftercare being carried out according to the latest standards?

Population-based cancer registries make it possible for all cases of the disease that have occurred in a defined population to be taken into account in research projects. If as many patients as possible participate in the project, it can be broadly guaranteed that the findings of such studies do not only apply to a specific group of patients (for example, in a specific study or a particular hospital). Population-based case-control studies and cohort studies consequently use data from population-based cancer registries for research into the causes and risks of cancer.

Further or specific issues may also be analysed using the registry data. Examples include:

- Detailed analyses regarding survival prospects following diagnosis of cancer
- Examination of oncological care and long-term quality of life of cancer patients
- Evaluation of pilot projects concerning mammography-screening, quality assured breast-screening and diagnostic services and skin-cancer screening

- Study of the connection between social strata and cancer incidence and mortality
- Cooperation with the cancer centres, e.g. in the assessment of the long-term survival of treated patients
- Study on the effectiveness of colonoscopy screening

A detailed list can be found at: www.gekid.de.

In the years to come, the evaluation of the screening measures introduced in Germany will present a particular challenge for the population-based cancer registries. Using the data provided by the registries, it will be possible to assess whether screening has had the desired effect of reducing the number of advanced cancers within the population. By linking the registry data with the respective screening programme it should also be possible to demonstrate reduction in mortality among participants in such measures.

One initial focus in this regard has been the assessment of mammography screening, which had been introduced nationwide by 2009. The population-based cancer registries have already provided detailed basic data for the first evaluation reports on mammography screening (www.mammo-programm.de), and this is being used for quality assurance and an initial assessment of the programme. A new task scheduled here is the identification of interval carcinomas (incidence of breast cancer following negative screening examination).

In 2008, the statutory health insurers introduced screening for skin cancer, the effects of which on the incidence of skin cancer and related mortality can also be investigated using the data from the cancer registries. The National Cancer Plan once again emphasised the central role of cancer registration in assessing the effects of organised programmes for the early detection of cancer. A number of implementational recommendations were adopted in the plan, which may ensure improved coordination in the future between the early recognition programmes and the information collected in the cancer registries.

A longer-term task of the population-based cancer registries is also to examine the effectiveness of the vaccination programme for girls between 12 and 17 years of age against human papilloma viruses (HPV) with the aim of significantly reducing the number of new cases of cervical cancer.

In order to fulfil the stated objectives and tasks of the cancer registries it does not suffice to operate population-based cancer registries in selected regions of Germany. To achieve this it is necessary to operate cancer registries in all federal states nationwide. This has been achieved in the meantime with commencement of registration in Baden-Wuerttemberg in 2009. The Federal Cancer Registry Data Act, which came into force in the same year, further improved the scope for collection and evaluation of anonymised cancer registry data at the national level via the newly established German Centre for Cancer Registry Data at the Robert Koch Institute.

In order to be able to pool information about an individual's cancer condition from different sources, data is collected in such a way that multiple reports on the same person are identifiable. For research purposes it has to be possible to re-establish the link between the data and the individual. However in order to safeguard patients' privacy and their right to control what happens to their data, all population-based registries are required under state legislation to adopt extensive precautions to protect and secure personal data.

Undistorted evaluation of the data is only possible if more than 90 % of all new cancer cases are registered. The cooperation of all physicians and dentists involved in diagnosis, treatment and aftercare is therefore crucial to the significance of data from a population-based cancer registry. Patients are also requested to take an active part in cancer registration. Ask your doctor to report your case to the appropriate cancer registry! This way you too can contribute to improved evaluation of cancer-related developments, cancer research and also help to improve cancer detection, treatment and aftercare.

## 1.2 Current developments in cancer registration in Germany

Since 2009, all new cases of cancer nationwide are being systematically registered across the whole of Germany on the basis of regional legislation. As a consequence, the current situation for population-based cancer registration is to be viewed as very good. In nine federal states the estimated degree of registration for 2010 is over 90 %. This means we now have reliable data on new cases of cancer for a population of more than 50 million. Across Germany approximately 90 % of the estimated new cases for 2010 have actually been recorded in the registries – ten years previously the figure was still under 40 %. In the next few years of reporting, this percentage will increase further solely because of the phased establishment of the Baden-Wuerttemberg cancer registry up to the end of 2011. Internationally, barely any other country of comparable population size has achieved such a high rate of registration to date.

Numerous individual initiatives in the federal states to improve cancer registration have contributed to this great result. Population-based cancer registration has also continued to receive support

from the Federal Government with the Federal Cancer Registry Data Act of 2009 and the establishment of the German Centre for Cancer Registry Data (ZfKD) within the Robert Koch Institute. Since the end of 2011, all regional cancer registries have been supplying their depersonalised data annually to the ZfKD in a uniform format. This collective data forms the basis of the analyses carried out by the ZfKD which are presented in this, the 9th edition of "Cancer in Germany".

For 2014, the International Agency for Research on Cancer at the World Health Organisation in Lyon, France is planning a new edition of the publication "Cancer Incidence in Five Continents (Vol. X)". Once again the German cancer registries were asked to actively participate and have transferred their anonymised data sets on new cases of cancer to the IARC. Since in the last edition data was presented from seven German cancer registries, it is to be assumed that due to the quality of the data gathered in Germany it will now be possible for additional state cancer registries to meet the strict criteria of the IARC and qualify for inclusion in this central publication series of the WHO.

Data from the German cancer registries together with data from other European countries can already be found today on the European Network for Cancer Registries' website (http://eco.iarc.fr). Here the German data can easily be compared with the details from other European registries.

The Association of Population-based Cancer Registries in Germany (GEKID), which has cancer epidemiologists as members in addition to all the population-based cancer registries, has continued to work intensively over the past two years on the improved use of the cancer registry data. An important result is the GEKID's new interactive cancer atlas on current cancer prevalence and mortality in Germany. The atlas is available on the GEKID website (www.gekid.de), with maps offering interactive regional comparisons for 23 cancer sites. Important agreements were also reached on the methodology for calculating survival rates, with the aim of improving the transparency and comparability of this important parameter.

In addition to purely presenting cancer registry data, the population-based cancer registries and GEKID have also been involved in planning and carrying out epidemiological cancer research projects. A particular area of emphasis here was the German Cancer Aid (Deutsche Krebshilfe) funding programme focussing on "Cancer epidemiology." Together with the German Cancer Research Centre in Heidelberg it was possible to investigate in detail survival data following cancer and publish the findings internationally. Several important, international publications, for example on the link between research data and cancer registry data have also resulted from further research projects. Information with regard to further research work and current publications can be found on the GEKID homepage and in the annex to this report.

These examples show clearly that the focus of cancer registration in Germany is currently shifting away from the mere collection of data towards the active scientific utilisation of the data. This development is of essential importance because without in-depth scientific analysis the knowledge gained from the laboriously gathered data would be limited. Finally, the pooled anonymised datasets from all registries can now also be used by external scientists (on application to the German Centre for Cancer Registry Data), an opportunity which has increasingly been made use of recently. Even from the point of view of health reporting, the numerous contributions from the cancer registries have, in the meantime, become an important component.

Within the framework of the National Cancer Plan, the population-based cancer registries together with GEKID and the German Centre for Cancer Registry Data, have taken active roles in various bodies. (See Federal Ministry of Health website at www.bundesgesundheitsministerium.de for NCP objectives). The passing of the Cancer Screening and Registration Act (KFRG) at the beginning of 2013 can be viewed as a major success of the National Cancer Plan. Through this law and following epidemiological registration, clinical cancer registration has also been introduced on a mandatory basis, which includes – amongst other things – recording of detailed data pertaining to therapy and progress. In conjunction with the German Tumour Centres Working Group (ADT) the federal states are currently working on an implementation programme, which also includes the development of a uniform basic dataset for cancer registration.

A completely new era is dawning with the introduction of clinical cancer registries. The data from cancer registries will therefore be useful for purposes of comprehensive quality-assurance and for health services research. This will consequently result in an increase in the significance of cancer registration for oncological research and care and in the benefits for patients with cancer.

Viewed overall, the current development in cancer registration and usage of data for cancer-related matters in Germany is to be seen very positively and has considerable future prospects. If the doctors and patients remain willing to report, and given the appropriate financial and political support for cancer registries, the goal of a comprehensive, nationwide system of cancer registration in Germany will soon be reached.

## 1.3 Current main foci of the Centre for Cancer Registry Data (ZfKD)

Almost four years have passed since the ZfKD was established, building on the former working group Federal Cancer Surveillance Unit. One important theme during this period has been the development of an interactive evaluation tool at www.krebsdaten.de supplementary to the results contained in this report. Compared to previous editions, the presentation of the results in "Cancer in Germany" has become considerably more extensive and detailed: In the meantime, ten additional cancer sites have been added to the 16 presented in the 1997 first edition, and these have now been supplemented for the first time with an overview of rarer tumour diseases and of non-melanoma skin cancer. In addition to details regarding incidence and mortality for the individual disease types, analysis results are presented pertaining to prevalence, distribution of tumour stages and to the survival rates according to cancer type. This development is not only an expression of what is now a marked improvement in the data available, but also necessary to do the complex phenomenon of 'cancer' justice. Also, especially with regard to rarer forms of cancer together affecting several thousand people every year in Germany, the ZfKD nationwide collective dataset permits considerably more reliable statements to be made than would have been possible from the results of individual registries.

Another ZfKD focus has been the collaboration with GEKID on further standardisation of data acquisition in the registries. Simply because of the fact that the nationwide dataset can be made available to third parties on application, the need arises for any differences in registration practice and data quality that still exist to be further minimised or documented. However, a coordinated implementation is also required for changes in international disease classification, as most recently in the case of leukaemia and lymphoma as part of an ICD10 update by the WHO. The same currently applies for amended data-protection requirements with regard to encryption methods used in the registries. In these fields too, the ZfKD and GEKID are working together intensively and even representatives from the clinical cancer registries are already being included to some extent.

The contributions of the ZfKD to the increased scientific use of the data already mentioned in Section 1.2 are manifold: in addition to its own publications and conference papers, the ZfKD supports external scientists by answering queries and providing results, as well as – if appropriate – planning and executing evaluation projects using the 'Scientific Use File'. When processing applications for such projects, the ZfKD receives support from an Advisory Committee, which is also consulted regarding ZfKD publications. Finally, and in conjunction with university teaching staff from various universities, the ZfKD is currently advising on several Doctoral and Master's theses.

The clinical cancer registries, which are to be introduced in all federal states in accordance with the Cancer Screening and Registration Act (KFRG), should contribute with their data and analyses in the future toward guaranteeing or further improving the quality of care for those suffering from cancer in Germany. For the implementation of the National Cancer Plan, however, nationwide, population-based (epidemiological) data is also indispensable: the analysis of temporal trends, regional differences and not least the comparison thereof with international results all contribute significantly toward highlighting advances, but also deficits in the fight against cancer. This is especially valid with regard to the assessment of the effects of cancer screening, which constitutes a second focus of the National Cancer Plan and the Cancer Screening and Registration Act.

In the next few years, in addition to the tasks outlined in the above, the ZfKD will increasingly be turning its attention to further scientific and methodological issues. In January 2014, the Federal Health Gazette will publish a special booklet on "Epidemiological Cancer Registration" to which authors from within the registries, the ZfKD, the German Cancer Research Centre and university institutions will contribute. This booklet will offer a summary of the multitude of possible uses of cancer registry data in Germany. In 2015 the second ZfKD report series - initiated via the Federal Cancer Registry Data Act (BKRG) - will start. As part of this, comprehensive reports about the cancer situation in Germany will be published every five years using additional data sources. Information concerning current projects and activities can be found on the ZfKD website (www.krebsdaten.de).

# 2 Methodological Aspects

## 2.1 Estimating the degree of capture in the epidemiological cancer registries (Estimation of Completeness)

The usefulness of population-based data with regard to cancer largely depends on the level of completeness with which new cancer cases are registered. Therefore the Centre for Cancer Registry Data (ZfKD) annually checks the completeness of the data from the population-based cancer registries in Germany, and 2010 marked the first year of diagnosis this was done in all federal states. The estimation is made with the help of an internationally accepted

indicator of completeness, namely the ratio of mortality to incidence. This ratio (M/I Index) can largely be assumed to be regionally constant for the respective cancer diagnosis, provided there are no fundamental differences in diagnosis and therapy and therefore also in the survival prospects of cancer patients in Germany. With the help of the M/I-Index in a particular reference region where registration is known to be comprehensive and by using regional mortality figures, the incidence in the respective region examined can be estimated and compared with the actual recorded data. Cases identified through death certificate only (DCO) are not taken into account here. The completeness of the reference region register is also estimated by means of comparison with the expected values.

The following inclusion criteria were established for the reference region in 2010.

- Comprehensive cancer registration for a period of at least ten years
- Completeness of more than 90 % for cancer overall over the past ten years (using the previous RKI estimation method) and more than 80 % for all individual years
- Proportion of DCO-cases of less than 15 % for cancer overall over the past ten years or at least from the sixth year since the beginning of registration

These criteria were met by the registries in Saarland, Hamburg, Bremen, Saxony and the administrative district of Münster (North Rhine-Westphalia). It is expected that this pool will grow to include further registries in the next few years.

According to the principle described in the above, expected values are calculated for six age groups for men and women respectively and for 18 diagnosis groups. In order to compensate for random fluctuations the observed and expected values were smoothed using log-linear models.

If mortality in the region being studied is too low (less than five cases of death per year on average) the modelled (smoothed) incidence in the reference region is used instead of the quotients derived from incidence and mortality for the appropriate age group in order to calculate the expected number of new cases. The estimated degree of completeness for each diagnosis group is the result of the ratio of observed and expected case figures accumulated across all age groups. The completeness for cancer overall is again estimated by summing the observed and expected values for all diagnosis groups.

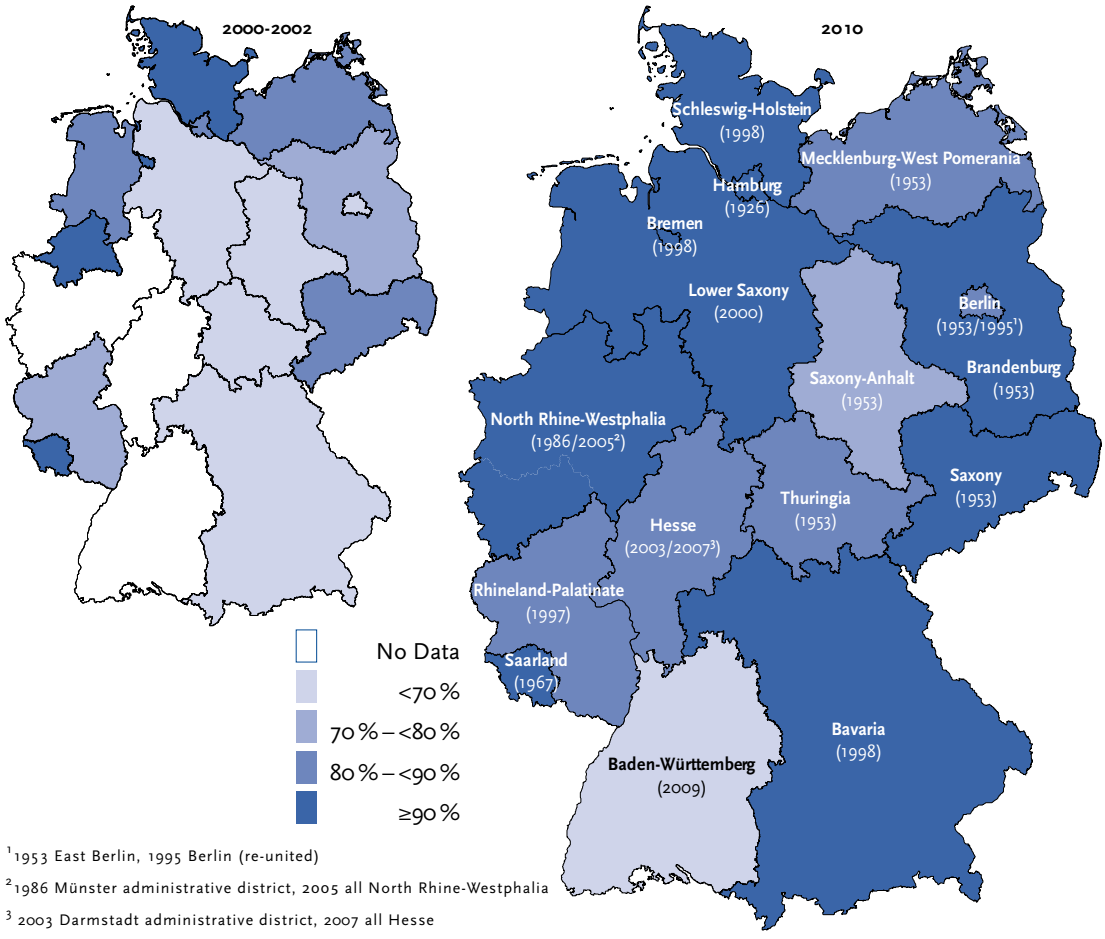
The procedure described has limitations, especially if the mortality for one type of cancer is low in absolute terms or relative to incidence (testicular cancer, malignant melanoma, thyroid cancer), or if the real ratio of mortality to incidence differs between the regions. This may, for example, be the case if early detection measures are utilised to varying degrees in the federal states or if they are introduced at different points in time, as was the case with mammography-screening.

According to the current estimation, nine federal states are already achieving an estimated completeness of at least 90 % for 2010, with seven of the states even achieving over 95 % in relation to the aforementioned reference registries. In the last ten years, the degree of capture has consequently increased considerably (Illustration 2.1.1). Any deficits that still exist can in part be explained by the fact that the forwarding of data regarding patients treated outside their state of residence is not yet satisfactorily regulated in all areas. Planned adaptations to regional laws and the development of technical solutions should lead to further improvements in the next few years. The stepwise implementation of the cancer registry in Baden-Wuerttemberg did not reach completion until during the course of 2011, which means that comprehensive capture cannot be expected until the diagnosis year 2012 at the earliest. According to ZfKD estimates, the greatest deficits still exist for cancers of the liver, gall bladder and pancreas, as well as leukaemias and lymphoma. In each, only five federal states and the administrative district of Münster have achieved an estimated degree of capture of at least 90 %. In contrast, for the majority of diagnosis groups examined, at least ten federal states can already be classified as having comprehensive coverage.

## 2.2 Estimating national incidence for Germany

The estimation of incidence rates for Germany are based on the results of completeness estimation as explained in 2.1. The estimated nationwide figures for new cases for the individual diagnoses and years arise from the summation of the results from the registries with a degree of capture of at least 90 % and the expected value from the completeness estimation for those regions that were not (yet) deemed to be comprehensive for the respective year. The DCO (Death Certificate Only) cases were included for the comprehensive registries from the sixth year of nationwide registration. For the first five years and for the non-comprehensive registers the DCO-rates from the five reference registries were taken into the calculation (according to site, age and gender). Because of the varying stages of development, North Rhine-Westphalia was divided into three regions for the time being (the administrative district of Münster, Düsseldorf/Cologne and Arnsberg/Detmold).

**Figure 2.1.1**
**Development of the estimated completeness of the population-based cancer registries in Germany 2000 to 2002 and 2010, by federal state or region (showing start of registration)**




[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

Because the entire dataset is analysed anew for every estimation of incidence, this may result in changes (usually slight) in the incidence rates from estimation to estimation, which partly can be caused by delayed notification of incident cases and partly by the methodology of the estimation itself. Consequently the current estimations for 2008 for laryngeal and oesophageal cancer are up to 5% lower than two years ago whilst the estimated number of cases of Non-Hodgkin lymphomas are around 10% higher. With regard to most sites, slight increases resulted of around 2-3% on average, which approximately corresponds to the number of late registrations in the registries.

This report presents estimated trends over time since 1999. Since the population-based cancer registries in the densely populated federal states did not commence data capture until between 2002 and 2009, the estimations for recent years are based on a significantly broader data basis than those for the period before 2002 for instance. Although the same methodology was used in each case, estimates for recent years can generally be viewed as more reliable.

Assuming that the levels of completeness within the diagnosis groups do not differ significantly, estimations were conducted for the first time for rarer types of cancer according to the same principle. The results are shown in Chapter 3.28 and in even more detail on the website at www.krebsdaten.de.

An estimation of the incidence of non-melanoma skin cancers (C44) is not possible using the method described, amongst other things due to the low mortality. Experience shows that the acquisition of data pertaining to these diseases in population-based cancer registries is difficult since treatment is often on a purely out-patient basis. Consequently, even in an international context there is very little reliable data. However, in recent years some registries in Germany have made successful efforts to also include registered dermatologists in the registration

process. This first-time estimation of nationwide incidence figures is thus based on the data of those registries where the age-standardised incidence rate in the past two years deviated by less than 25 % from the federal state with the highest recorded incidence (Schleswig-Holstein, Lower Saxony, North Rhine-Westphalia, Hesse and the Rhineland Palatinate). The calculation was performed by projecting the pooled, age-specific incidence rates in these states onto the entire German population. However, a great degree of uncertainty still surrounds the incidence estimates for non-melanoma skin cancers and these do not yet allow any reliable statements to be made regarding trends over time, which is why they are not presented in their own chapter. With regard to the presentation of the incidence of cancer in general (chapter 3.1) non-melanoma skin cancers have not, as in previous years, been included for reasons of comparability.

## 2.3 Indicators and graphical presentations

The following section provides explanations of the measured values used in the results chapters and in the graphical presentations.

### Age-specific rates

The age-specific rate is determined by dividing the number of cases of cancer and deaths in a certain age group by the corresponding number of men or women in this age group within the population. The graphical presentation of these rates shows the relationship between age and incidence by gender. The age-specific incidence rates are expressed as the annual number of new cases per 100,000 inhabitants for the respective age group and year.

### Age-standardised rates

As the presentation of the age-specific incidence for men and women in this report shows, the cancer incidence rate usually increases considerably with age, so that before comparing incidence or mortality in different states and regions, or within the same population at different times, differences in the age structure of the compared populations must first be removed with the help of age-standardisation. This is achieved through weighting and subsequent summing of the observed age-specific rates. An age-standardised rate indicates the incidence of a type of illness or cause of death in a total of 100,000 people in a pre-defined age structure (standard population). In this report the old European Standard Population has been used.

### Cancer incidence and mortality risks

Age-specific incidence rates and mortality rates may be interpreted as measures for the age- and gender-specific risks of developing and dying from a specific malignant tumour within a year. In addition, age and sex specific risks of developing or dying from a specific form of cancer within the next ten years or at some point in the future were calculated. The results are presented both as a percentage and as one in N individuals of the same age and sex. So-called "competing risks" were also taken into consideration, e.g. the probability of a 75-year-old man to die from some other disease within the next ten years. Similarly, the "lifetime risk" was calculated, i.e. the risk of developing a tumour at some point during an entire lifespan. However, only the respective current rates (incidence and mortality rates and general life expectancy) are used in the calculations. No prediction is therefore made regarding the future development of these values. Furthermore, these results are to be viewed as average values for the entire German population and individual risks may differ considerably due to the presence or absence of specific risk factors. The DevCan programme developed by the US National Cancer Institute was used to perform the calculations.

### International comparison

In order to be able to classify the estimated cancer incidence and cancer mortality in Germany in an international context, current age-standardised incidence and mortality rates in the countries bordering on Germany as well as the United Kingdom, Finland, and the USA (see Annex for sources). Where figures were available by the editorial deadline, these results refer to the mean value for 2009 and 2010, otherwise the latest available data or estimations were used for the comparison. For some types of cancer (e.g. bladder cancer, renal cancer) the grouping of diagnoses in accordance with ICD-10 differs somewhat in individual countries from that used in Germany, which slightly limits comparability in some cases (see appropriate footnote).
The international results were accepted without checking completeness or plausibility. Therefore it is not possible to rule out an underestimation of incidence in particular for individual countries (due to underreporting of new cases). As a rule, a significant deviation in the ratio of mortality to incidence - compared to other countries represented - can be considered an indication of underestimation; just as an incidence rate for individual cancer types below the corresponding mortality rate would indicate underreporting.

### Median age at diagnosis

The median age at which a specific cancer develops according to cancer site and gender was calculated for all cases diagnosed in 2009 and 2010. The inclusion of DCO cases, for which the age at death is used instead of age at diagnosis, inevitably leads to a slight overestimation of this value.

### Mortality

Cancer mortality is based on number of deaths in any one year due to cancer according to the official cause-of-death statistics. The deaths are attributed to the underlying cause of death and grouped in terms of age and sex. The mortality rate is expressed as the relationship of the annual number of deaths to the size of the population. The rates are relative to 100,000 people. In this report, the absolute number of deaths, as well as crude and the age-standardised mortality rates from 1999 to 2010 (European Standard) are presented. More up-to-date figures are already available from the German Federal Statistical Office (www.gbe-bund.de) and at www.krebsdaten.de.

### Prediction of incidence for 2014

The incidence rates were predicted for 2014 by determining linear trends in estimated age-, gender- and site-specific logarithmic incidence rates for Germany over the past ten years, and continuing these trends through to 2014 drawing on the current demographic projections from the German Federal Statistical Office. In variation from the above, constant incidence rates were assumed in the case of prostate cancer for all age groups and for female breast cancer for the 50 to 69 year age group (target group for mammography screening).

### Regional comparison

The mean age-standardised incidence rates for 2009 and 2010 (European Standard) from the federal states are expressed in comparison with the corresponding estimates for Germany. Any estimated capture rates of less than 90 % for 2010 are indicated by highlighting the incidence bar. Age-standardised mortality according to site and sex for all federal states is shown in comparison to nationwide mortality in Germany for the same period, using figures from the German Federal Statistical Office (www.gbe-bund.de).

### Crude rates

A crude rate of incidence or mortality for a specific cancer site and population is calculated by dividing the total number of all new cases of cancer reported (incidence) or the number of deaths due to cancer (mortality) in a pre-determined time period by the total number of all women and/or men in the relevant population (in this case the residential population of Germany). The result is expressed as the number of new diagnoses or deaths per 100,000 residents per year. In contrast to the age-standardised rates, crude rates are highly dependent on the age-structure of a population, particularly in the case of cancer.

### Survival rates

The results of survival analyses in this report describe the average survival prospects of patients over the age of 15 years at the time of diagnosis given a specific cancer type. Absolute and relative survival rates have been calculated for this purpose. Absolute survival rates represent the proportion of patients who are still alive at a certain time after their diagnosis. For example, an absolute 5-year survival rate of 80 % means that 80 people out of 100 diagnosed with a specific type of cancer have survived the first five years after their diagnosis.

Relative survival rates show cancer-related mortality in terms of the ratio of absolute survival of the cancer patients to the expected survival in the general population of the same age and gender. For example, a relative 5-year survival rate of 100 % means that within 5 years of cancer diagnosis, just as many persons affected have died as would have been expected even without diagnosis. The relative survival rate is always higher than the corresponding absolute rate. It has been calculated using the so called “Ederer II method” using the federal German mortality tables from the Federal Statistical Office.

In order to make the most up-to-date estimates of survival prospects possible, the so-called “period method” was used. This takes into account the survival of people with cancer who have been alive during a specific period (in this case 2009-2010). Because the accuracy of the survival analyses is highly dependent on the quality of the underlying data, only those registries were included for the current calculations, which met two criteria. Firstly, DCO cases should account for no more than 15 % across all malignant cancers (C00-C97 not including C44) for the period under consideration. The fact that there is no diagnosis date for a DCO case, i.e. a case of the illness which is only recorded because of the death certificate, inevitably means they have to be excluded from the survival analysis. This causes a potential over-estimation of survival rates since according to the results of many studies, DCO cases tend to represent a selection of patients with shorter survival times.

The second criterion concerns the quality of the determination of the vital status of patients included in registry data during their lifetime. International studies indicate that patients diagnosed with pan-

creatic cancer or lung cancer with metastases have a very poor prognosis. Furthermore, the average survival prospects for patients with such diagnoses have not changed substantially over a long period. Consequently, any high proportion of surviving patients with these types of cancer established by cancer registries could be an indication of deficiencies in the quality of the data (a relevant proportion of 'missed' deaths). Therefore, only those registries were included in the evaluation in which patients diagnosed with pancreatic cancer or metastasised lung cancer showed a relative 5-year survival rate of no more than 7.5 % on average.

After applying these two criteria, the cancer registries of Hamburg, Lower Saxony, Bremen, the Rhineland Palatinate and Saarland, as well as the data from the Joint Cancer Registry for Brandenburg, Mecklenburg-Western Pomerania, Saxony and Thuringia were used in the evaluations. The range quoted for five year survival represents the lowest and highest values in the individual regions included, though for these purposes only regions with case figures of at least 50 patients were taken into account in the analysis. If this criterion was not met by at least five regions, no range details have been presented. Presumably, the presented range only to a small extent reflects 'real' differences in the quality of care. Differences in data quality or in the proportion of DCO cases may play a role, as well as random fluctuations, especially for smaller federal states. Methodological differences between registries may also influence results, in particular efforts to conduct trace-back research on DCO cases, which is not performed in all federal states. Overall, it can be assumed that the estimated survival rates quoted for Germany are slightly over-estimated, at least for those types of cancer with worse prognoses, but this is probably the case for most of the international results published too.

### Distribution of stages of tumours

The extent of a solid malignant tumour at the point of diagnosis in the years 2009-2010 was evaluated using the TNM-classification, though given the data situation, only the distribution of T stages (tumour size) are presented here. For those cancer sites, for which the definition of the T-stages have been amended in the 7th Edition of the TNM-classification, valid since the beginning of 2010, only data from 2010 were used that were not explicitly coded according to the 6th Edition. For the respective sites, those registries were included in the evaluation where the proportion of missing values (including DCO-cases) was less than 50 %. For sites where fewer than four federal states were able to fulfil this criterion, the stages have not been presented.

### 5-year prevalence

The 5-year prevalence refers to the number of people living at a given time (here 31 December 2010) who had been newly diagnosed with cancer within the previous five years, i.e. between 2006 and 2010. The prevalence is calculated using the Pisani method from the estimated incidence rates for Germany and the absolute survival rates calculated using the Kaplan-Meier method (according to age, sex, site, and calendar year) for the regions listed under 'survival rates' (see above).

# 3 Results

## 3.0 Overview of incident cancer cases and cancer deaths

**Table 3.0.1**
**Estimated numbers of incident cancer cases in Germany 2010**

| | | No. of incident cases | | Incidence rate[1] | |
|---|---|---|---|---|---|
| **Cancer site** | **ICD-10** | **Men** | **Women** | **Men** | **Women** |
| Oral cavity and pharynx | C00 - C14 | 9,340 | 3,490 | 18.2 | 5.9 |
| Oesophagus | C15 | 4,890 | 1,420 | 8.9 | 2.1 |
| Stomach | C16 | 9,150 | 6,690 | 15.7 | 8.5 |
| Colon and rectum | C18 - C21 | 33,800 | 28,630 | 57.8 | 36.8 |
| Liver | C22 | 5,850 | 2,480 | 10.1 | 3.2 |
| Gallbladder and biliary tract | C23, C24 | 2,240 | 3,070 | 3.8 | 3.7 |
| Pancreas | C25 | 8,020 | 8,060 | 13.8 | 10.0 |
| Larynx | C32 | 3,230 | 460 | 6.0 | 0.8 |
| Lung | C33, C34 | 35,040 | 17,030 | 60.7 | 26.5 |
| Malignant melanoma of the skin | C43 | 9,640 | 9,580 | 18.0 | 17.8 |
| Mesothelioma | C45 | 1,320 | 350 | 2.1 | 0.5 |
| Breast | C50 | 610 | 70,340 | 1.1 | 119.6 |
| Vulva | C51 | | 3,190 | | 4.6 |
| Cervix | C53 | | 4,660 | | 9.3 |
| Uterus | C54, C55 | | 11,550 | | 17.7 |
| Ovaries | C56 | | 7,790 | | 12.1 |
| Prostate | C61 | 65,830 | | 111.4 | |
| Testis | C62 | 3,820 | | 9.4 | |
| Kidney | C64 | 8,950 | 5,570 | 16.2 | 8.2 |
| Bladder | C67 | 11,350 | 4,150 | 18.9 | 5.0 |
| Central nervous system | C70 - C72 | 3,890 | 3,030 | 7.9 | 5.2 |
| Thyroid gland | C73 | 1,690 | 4,220 | 3.5 | 8.7 |
| Hodgkin's lymphoma | C81 | 1,260 | 940 | 2.9 | 2.2 |
| Non-Hodgkin lymphomas | C82 - C85 | 8,590 | 7,640 | 15.5 | 11.2 |
| Multiple myeloma | C90 | 3,360 | 2,780 | 5.7 | 3.7 |
| Leukaemias | C91 - C95 | 6,640 | *4,920* | 12.5 | 7.7 |
| Other cancer sites | | 13,890 | *12,880* | 24.9 | 18.4 |
| **Total cancer[2]** | **C00-C97 w/o. C44** | **252,390** | **224,910** | **445.0** | **349.1** |

[1] age-standardised (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 2010 (not including non-melanoma skin cancer)**

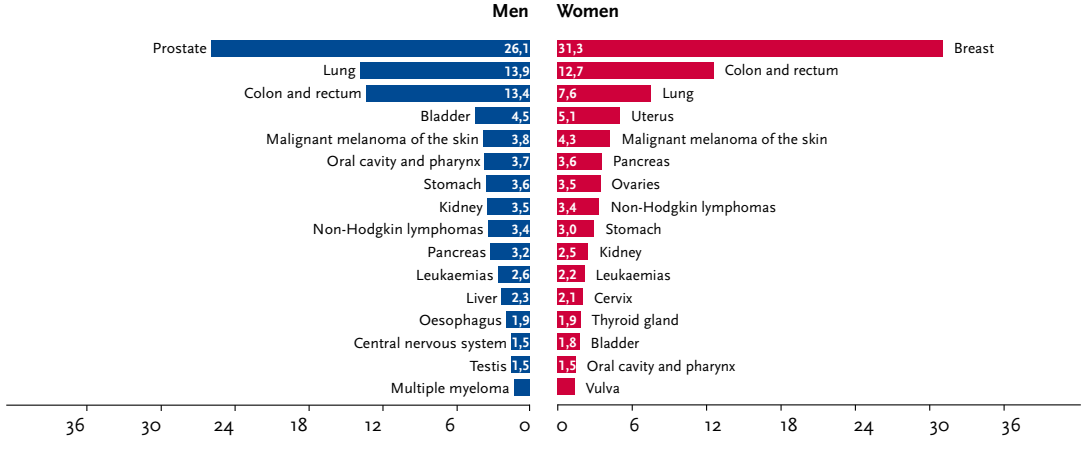
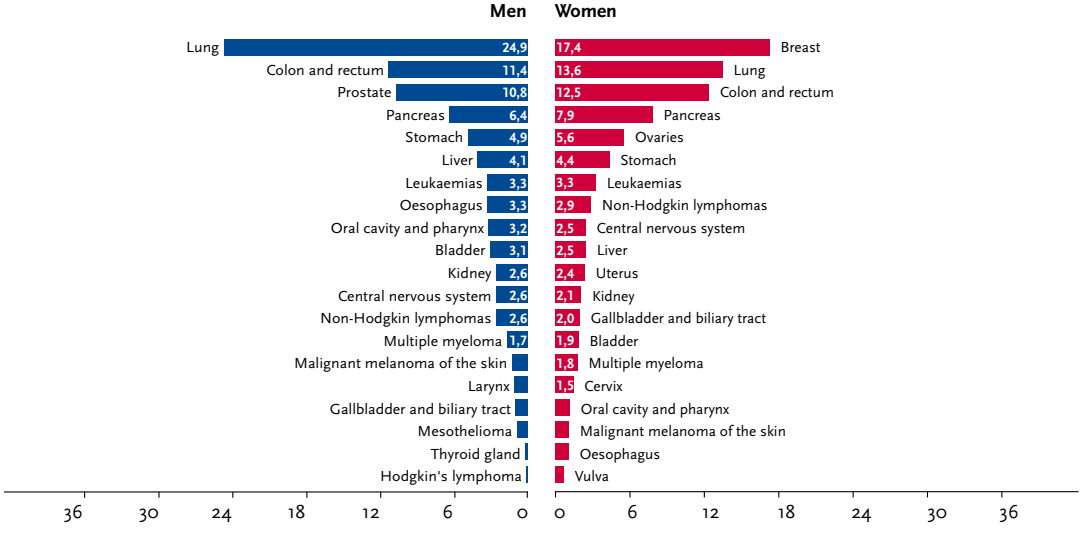


**Table 3.0.2**
**Number of deaths from cancer in Germany 2010**
*Source: Official cause of death statistics, Federal Statistical Office, Wiesbaden*

| | | No. of deaths | | Mortality rate[1] | |
|---|---|---|---|---|---|
| **Cancer Site** | **ICD-10** | **Men** | **Women** | **Men** | **Women** |
| Oral cavity and pharynx | C00 - C14 | 3,816 | 1,204 | 7.2 | 1.8 |
| Oesophagus | C15 | 3,837 | 1,142 | 6.9 | 1.5 |
| Stomach | C16 | 5,777 | 4,400 | 9.7 | 5.1 |
| Colon and rectum | C18 - C21 | 13,489 | 12,510 | 22.3 | 13.9 |
| Liver | C22 | 4,856 | 2,534 | 8.1 | 3.0 |
| Gallbladder and biliary tract | C23, C24 | 1,234 | 2,041 | 2.1 | 2.3 |
| Pancreas | C25 | 7,537 | 7,950 | 12.8 | 9.5 |
| Larynx | C32 | 1,261 | 188 | 2.2 | 0.3 |
| Lung | C33, C34 | 29,381 | 13,627 | 49.9 | 19.8 |
| Malignant melanoma of the skin | C43 | 1,568 | 1,143 | 2.7 | 1.6 |
| Mesothelioma | C45 | 1,099 | 298 | 1.8 | 0.4 |
| Breast | C50 | 107 | 17,466 | 0.2 | 24.0 |
| Vulva | C51 | | 749 | | 0.8 |
| Cervix | C53 | | 1,524 | | 2.5 |
| Uterus | C54, C55 | | 2,432 | | 3.0 |
| Ovaries | C56 | | 5,599 | | 7.5 |
| Prostate | C61 | 12,676 | | 20.0 | |
| Testis | C62 | 166 | | 0.4 | |
| Kidney | C64 | 3,096 | 2,151 | 5.2 | 2.4 |
| Bladder | C67 | 3,631 | 1,885 | 5.9 | 1.9 |
| Central nervous system | C70 - C72 | 3,087 | 2,559 | 5.8 | 3.9 |
| Thyroid gland | C73 | 275 | 431 | 0.5 | 0.5 |
| Hodgkin's lymphoma | C81 | 169 | 147 | 0.3 | 0.2 |
| Non-Hodgkin lymphomas | C82 - C85 | 3,082 | 2,921 | 5.1 | 3.3 |
| Multiple myeloma | C90 | 1,981 | 1,850 | 3.2 | 2.2 |
| Leukaemias | C91 - C95 | 3,942 | 3,304 | 6.5 | 4.0 |
| Other cancer sites | | 11,788 | 10,348 | 19.9 | 12.4 |
| **Total cancer[2]** | **C00 - C97 w/o. C44** | **117,855** | **100,403** | **198.7** | **127.9** |

[1] age-standardised (European standard) [2] not including non-melanoma skin cancer (C44)

**Figure 3.0.2**
**Most frequent tumour sites when cancer was the cause of death in Germany 2010**
*Source: Official cause of death statistics, Federal Statistical Office, Wiesbaden*



## 3.1 All cancer sites

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

| | 2009 | | 2010 | | Prediction for 2014 | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Incident cases | 253,100 | 228,500 | 252,400 | 224,900 | 264,700 | 236,200 |
| Crude incidence rate[1] | 630.6 | 547.3 | 629.4 | 539.9 | 666.5 | 573.3 |
| Standardised incidence rate[1,2] | 453.2 | 357.4 | 445.0 | 349.1 | 436.8 | 356.2 |
| Median age at diagnosis | 69 | 69 | 69 | 69 | | |
| Deaths | 116,381 | 99,152 | 117,855 | 100,403 | | |
| Crude mortality rate[1] | 290.0 | 237.5 | 293.9 | 241.0 | | |
| Standardised mortality rate[1,2] | 201.4 | 128.6 | 198.7 | 127.9 | | |
| 5-year prevalence | 759,500 | 743,200 | 770,000 | 753,200 | | |
| Absolute 5-year survival rate (2009-2010)[3] | | | 52 (45-56) | 59 (55-63) | | |
| Relative 5-year survival rate (2009-2010)[3] | | | 61 (54-66) | 67 (62-71) | | |

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

### Epidemiology

'All cancer sites' refers here to all malignant neoplasms including lymphomas and leukaemias. In line with normal international practice, non-melanoma skin cancers (white skin cancer) are not included in the above. Estimates regarding the frequency of this widespread yet seldom life-threatening disease can be found in chapter 3.28.

According to our estimates a total of approximately 477,300 new cases of cancer were diagnosed in Germany in 2010. Of these, approximately 252,400 were in men and 224,900 in women.

Just over half of all cases relate to the mammary gland (71,000), the prostate (65,800), the bowel (62,400) or the lungs (52,100).

Between 2000 and 2010 the number of new cancer cases increased among men by around 21% and in women by 14%. The decisive factor influencing this was the changing demographic structure of the population (increase in the proportion of older people), which was more pronounced among men than women. The development in age-standardised incidence rates indicates that without these changes there would have been no increase in incidence figures among men and only a slight increase of around 7% in women. The latter can be explained to a significant extent by the changes in breast cancer, where the introduction of mammography screening between 2005 and 2009 has played a significant role (cf. Chapter 3.13). Apart from breast cancer, the age-standardised incidence rates in women have increased for malignant melanoma and for malignant tumours of the lung, thyroid, vulva, oral cavity and pharynx, yet only in the cases of lung cancer and vulvar carcinoma there was also an associated increase in mortality rates. Declining incidence and mortality rates were observed above all in cancers of the stomach, of the gall bladder and bile duct, the bowel and the ovaries, whilst in the case of breast cancer, carcinoma of the thyroid and malignant tumours of the uterus and cervix, as well as of the kidneys and the bladder, the mortality rate has fallen by at least 15% despite incidence rates increasing or remaining constant.

In men, incidence rates since the year 2000 have only increased by more than 10% for malignant melanoma, prostate cancer and carcinoma of the liver and only the latter showed an increase in mortality rate. Incidence and mortality rates declined significantly for malignant tumours of the stomach, lungs, larynx and bladder. The mortality rates also fell for cancers of the bowel, gall bladder, prostate and kidney.

In the last decade the age-standardised incidence rates for cancer among men have fallen by 17% and in women by 11%, somewhat greater reductions than in the European Union overall (13% and 9% respectively). The absolute number of deaths caused by cancer increased among men in Germany by around 8% and remained largely unchanged in women.

Due to the demographic change, the median age at diagnosis for men has increased from 67 to 69 years, though the incidence rates among those over 70 years old have fallen slightly whilst increasing slightly in younger years. There tends to be a similar picture for women although the median age at diagnosis remains unchanged at 69.

Currently every second man (51%) and 43% of all women can be expected to develop cancer in the

course of their life. Every fourth man and every fifth woman dies of cancer. The relationship between cancer incidence and age varies between men and women. Women under the age of 55 years reveal higher incidence rates than men of the same age. In the higher age groups this relationship reverses. In the over 65 year age group the incidence rates among men are almost twice as high as those among women.

Cancer can occur in all kinds of organs in the body and can originate from different types of cell. The origin of most types of cancers are the internal or external body surfaces. Approximately 70 % are adenocarcinomas originating in glandular tissue. Around a further 15 % are squamous-cell carcinomas, malignant tumours of the transitional epithelium (urothelium carcinoma) and small-cell carcinoma, which occur for example in the lung. Alongside leukaemias and lymphomas, malignant tumours also have their origins, for example, in the support cells of the nervous system (glia cells) or under pigment-producing cells (melanomas). Rarer forms of cancer include those originating in connective tissue, such as mesothelioma and various sarcomas.

The relative 5-year survival rates range from above 90 % for malignant melanoma of the skin, testicular cancer, and now also prostate cancer, through to survival rates of less than 20 % for lung and oesophageal cancer. In the case of malignant tumours of the pancreas and mesothelioma, the relative 5-year survival rates are below 10 % (Figure 3.1.0). Compared to patient survival rates from the 1980s in Saarland (50 % to 53 % for women and 38 % to 40 % for men), the prognosis for cancer patients in Germany overall has improved considerably. Current estimations using the period method and only the most recent data show 5-year relative survival rates of 61 % for men and 67 % for women in patients diagnosed in 2009 and 2010. This means that the survival rates for both genders are converging overall. The improved overall cancer survival rates are due in part to shifts in the localisation spectrum, for example the decline in cases of stomach cancer and lung cancer among men (for which the prognoses are poor) and a larger proportion of colorectal, breast, and prostate cancer with better prognoses. The most obvious improvements in the survival rates of adult cancer patients over the last 25 years have been achieved in malignant tumours of the mammary gland, the bowel and the prostate.

## Risk factors and early detection

The aetiology of many cancers is not known, and in other cases, known risk factors cannot be influenced. Prevention strategies are therefore only available for a few tumour types. However, these include types of cancer which affect large numbers of people. The World Health Organization estimates that more than 30 % of all cancer cases could be avoided with preventive measures.

Among avoidable risk factors, tobacco consumption is the most important. According to estimates by the Centre for Cancer Registry Data, a total of around 15 % of all cancer cases in Germany in 2008 were to be attributed to smoking. Also the roles of excess weight and lack of exercise have long been known from observational epidemiological investigations. Possible underlying biological mechanisms are becoming clearer due to the most recent research into the metabolic syndrome. This chronic "metabolic imbalance" is linked with hypertension, high blood cholesterol and hyperglycaemia. Inflammatory processes in adipose tissue are also suspected of being involved in the development of cancer.

Among individual nutrition-related factors, alcohol consumption plays an important role. Low quantities of fruit, vegetables, and dietary fibre, often combined with a high intake of red meat, have been identified as risk factors for a number of frequently occurring types of cancer. However it has not always been possible in observational studies to separate the influence of specific foodstuffs and their constituents from that of the energy balance.

Also among the avoidable risk factors for developing cancer is the ultraviolet fraction of sunlight (UV radiation). Many people, particularly in Germany, overestimate the influence of hazardous substances and impurities in foodstuffs, as well as environmental factors or toxic exposure at the workplace. However, in certain individual cases these factors can also play a substantial role in the development of cancer, even here. Examples here are radon, the regionally occurring noble gas, which is thought to be responsible for up to nine per cent of lung cancer cases in Germany, or earlier occupational exposure to asbestos, which because of the long latency period is still causing mesothelioma of the pleura or peritoneum even today. Even medical procedures may impact on the cancer risk in individual cases. Potential risks include diagnostic procedures and therapies involving exposure to radiation, cytostatic agents used in chemotherapy, and hormone replacement therapy for menopausal women, which has been identified as a risk factor for breast cancer.

Chronic infections are now known to be risk factors for some widespread forms of cancer. Vaccinations or the treatment of causal factors can contribute to the reduction of cancer risk. This has been established for vaccinations against hepatitis viruses as a risk factor for liver cancer, and it is hoped that vaccination against human papilloma viruses will have a similar effect reducing the incidence rate for cervical carcinoma.

In addition to avoidable risk factors, genetic causes may also increase the risk of developing cancer. To date, however, only very few of these genetic mutations have been clearly identified. The respective relevant risk factors for specific types of cancer are presented in more detail in the individual sections.

The early detection programmes supported by the statutory health insurance companies in Germany screen for cancer of the skin and bowel, as well as breast and cervical cancer in women, and prostate cancer for men. These early detection measures are presented in the individual sections.

**Figure 3.1.0**
**Relative 5-year survival rates, by tumour site and sex, Germany 2009 – 2010 (period analysis)**

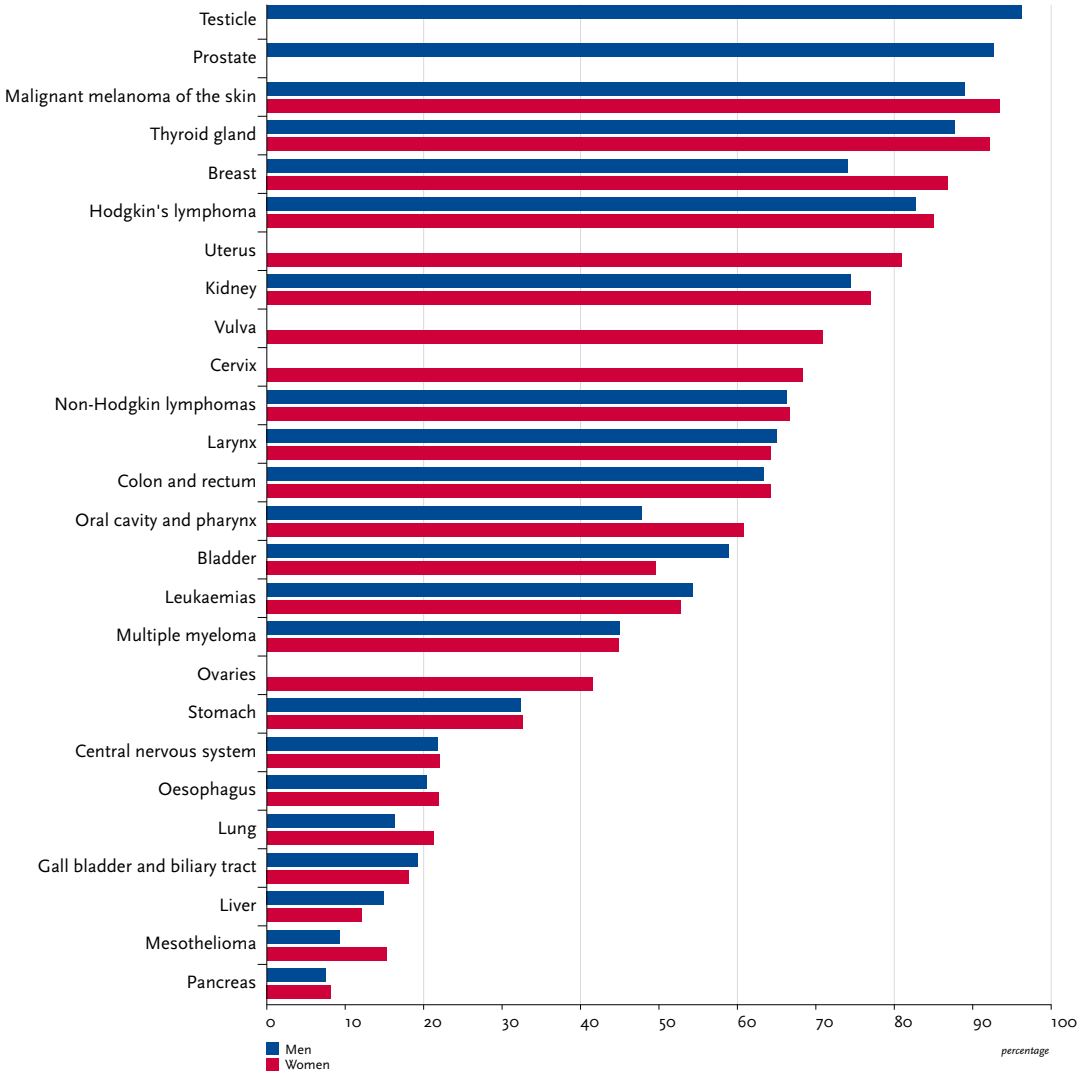


**Figure 3.1.1a**
**Age-standardised incidence and mortality rates, by sex, ICD-10 C00 – C97 without C44, Germany 1999 – 2010**
*per 100,000 (European standard)*

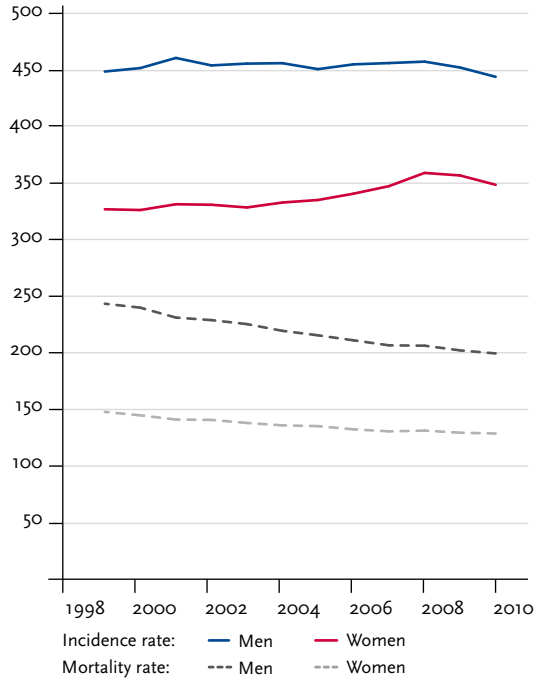



**Figure 3.1.1b**
**Absolute numbers of incident cases and deaths, by sex, ICD-10 C00 – C97 without C44, Germany 1999 – 2010**

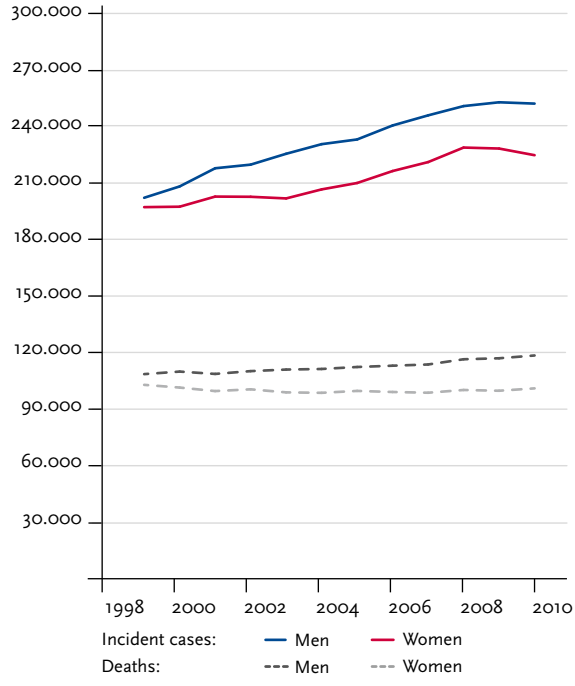



**Figure 3.1.2**
**Age-specific incidence rates by sex, ICD-10 C00 – C97 without C44, Germany 2009 – 2010**
*per 100,000*

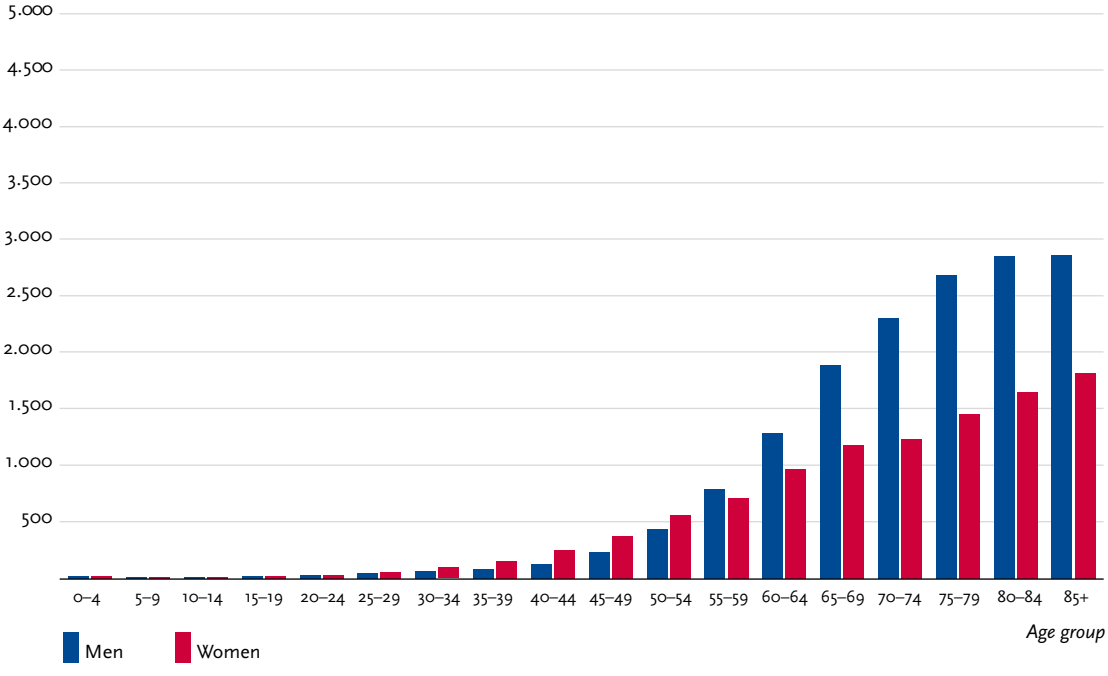


**Table 3.1.2**
**Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C00 – C97 without C44, database 2010**

| | Risk of developing cancer | | | | Mortality risk | | | |
|---|---|---|---|---|---|---|---|---|
| **Men aged** | **in the next ten years** | | **ever** | | **in the next ten years** | | **ever** | |
| 35 years | 1.2% | (1 in 86) | 51.0% | (1 in 2) | 0.3% | (1 in 390) | 26.1% | (1 in 4) |
| 45 years | 3.5% | (1 in 29) | 51.0% | (1 in 2) | 1.2% | (1 in 81) | 26.2% | (1 in 4) |
| 55 years | 10.5% | (1 in 10) | 50.6% | (1 in 2) | 3.8% | (1 in 26) | 26.0% | (1 in 4) |
| 65 years | 21.0% | (1 in 5) | 47.9% | (1 in 2) | 8.0% | (1 in 13) | 24.6% | (1 in 4) |
| 75 years | 27.6% | (1 in 4) | 40.4% | (1 in 2) | 12.9% | (1 in 8) | 21.1% | (1 in 5) |
| Lifetime risk | | | 50.8% | (1 in 2) | | | 25.8% | (1 in 4) |
| **Women aged** | **in the next ten years** | | **ever** | | **in the next ten years** | | **ever** | |
| 35 years | 2.1% | (1 in 48) | 42.5% | (1 in 2) | 0.3% | (1 in 310) | 20.3% | (1 in 5) |
| 45 years | 4.8% | (1 in 21) | 41.5% | (1 in 2) | 1.1% | (1 in 92) | 20.1% | (1 in 5) |
| 55 years | 8.8% | (1 in 11) | 39.0% | (1 in 3) | 2.6% | (1 in 38) | 19.4% | (1 in 5) |
| 65 years | 13.0% | (1 in 8) | 34.0% | (1 in 3) | 4.9% | (1 in 20) | 17.7% | (1 in 6) |
| 75 years | 16.2% | (1 in 6) | 26.1% | (1 in 4) | 8.1% | (1 in 12) | 14.6% | (1 in 7) |
| Lifetime risk | | | 42.9% | (1 in 2) | | | 20.2% | (1 in 5) |

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

**Figure 3.1.4a**
**Absolute survival rates up to 5 years after first diagnosis, by sex, ICD-10 C00 – C97 without C44, Germany 2009 – 2010**

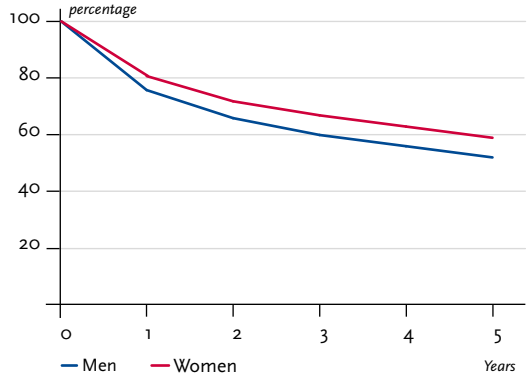



**Figure 3.1.4b**
**Relative survival rates up to 5 years after first diagnosis, by sex, ICD-10 C00 – C97 without C44, Germany 2009 – 2010**

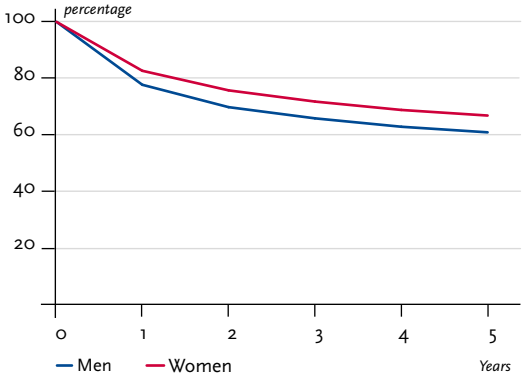


**Figure 3.1.5**
**Registered age-standardised incidence and mortality rates in German federal states, by sex, ICD-10 C00 – C97 without C44, 2009 – 2010**
*per 100,000 (European standard)*

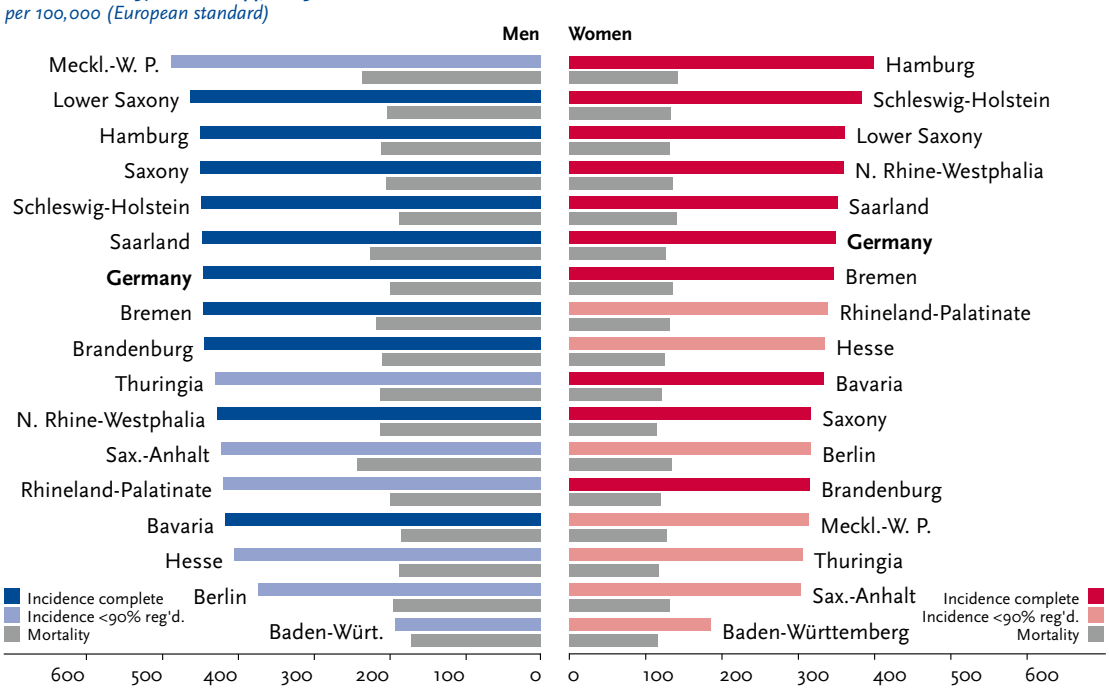
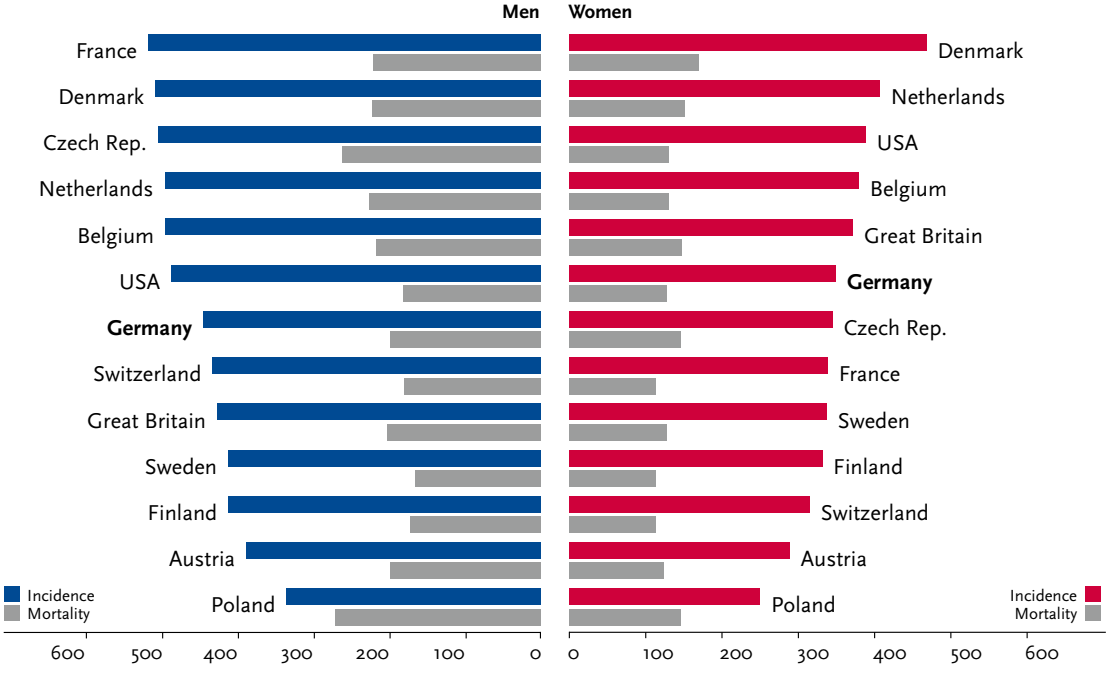



**Figure 3.1.6**
**International comparison of age-standardised incidence and mortality rates, by sex, ICD-10 C00 – C97 without C44, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*



## 3.2 Oral cavity and pharynx

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

| | 2009 | | 2010 | | Prediction for 2014 | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Incident cases | 9,480 | 3,480 | 9,340 | 3,490 | 9,900 | 3,900 |
| Crude incidence rate[1] | 23.6 | 8.3 | 23.3 | 8.4 | 24.9 | 9.5 |
| Standardised incidence rate[1,2] | 18.8 | 5.9 | 18.2 | 5.9 | 18.3 | 6.4 |
| Median age at diagnosis | 61 | 64 | 61 | 65 | | |
| Deaths | 3,813 | 1,169 | 3,816 | 1,204 | | |
| Crude mortality rate[1] | 9.5 | 2.8 | 9.5 | 2.9 | | |
| Standardised mortality rate[1,2] | 7.4 | 1.8 | 7.2 | 1.8 | | |
| 5-year prevalence | 27,800 | 11,300 | 27,900 | 11,500 | | |
| Absolute 5-year survival rate (2009-2010)[3] | | | 44 (40-46) | 55 (49-66) | | |
| Relative 5-year survival rate (2009-2010)[3] | | | 48 (44-50) | 61 (55-72) | | |

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

### Epidemiology

Cancer of the oral cavity and the pharynx is made up of a heterogeneous group of malignant neoplasms. In addition to squamous-cell carcinomas, somewhat more than 5 % of cases are adenocarcinomas, for example of the salivary glands.

Men are significantly more frequently affected and given a median age at diagnosis of 61 years, somewhat earlier than women too (65 years).

Incidence and mortality rates for men from cancer of the oral cavity and pharynx have been declining since the turn of the millennium, whilst among women there is still a slight increase in both incidence and mortality rates in Germany. The number of cases among men is currently no longer increasing and in women the increase is slight. The highest incidence and mortality rates for women in Germany continue to be reported from Hamburg and Bremen, and for men in Mecklenburg-Western Pomerania. In an international comparison, the highest incidence rate among men is in France, and for women in Denmark.

Depending on site, the survival prospects vary greatly within this disease group. Favourable 5-year-survival rates are associated with carcinoma of the lips and salivary glands, whereas comparatively unfavourable prognoses exist for malignant tumours of the pharynx. These differences partly also account for the low survival rates of men (48 %) compared to women (61 %). Approximately 40 % of the tumours in women are diagnosed at an early stage (T1), but only around 30 % in men.

### Risk factors

The most important triggers for cancer of the oral cavity and pharynx are tobacco and alcohol consumption. The combination of both factors is particularly harmful. Further possible risk factors can be a one-sided, vitamin deficient diet with excessive meat consumption. Inadequate oral hygiene and mechanical irritations, for example due to poorly fitting dentures, are also possible risk factors. Exposure to sunlight can contribute to carcinoma of the lips. Contact with sawdust or some chemicals – mostly in an occupational context - can increase the risk of developing tumours, especially in the nasopharynx. An infection with human papilloma virus (HPV) is a risk factor for tumours of the pharynx. The role of HPV in the origins of cancer of the oral cavity has not yet been completely clarified. Epstein-Barr viruses are regarded as a further viral risk factor, in particular for nasopharyngeal carcinoma. People with type 2 diabetes, a marked immunodeficiency or rare pre-existing conditions may also have an increased risk. There are also clear indications that a genetic pre-disposition plays a role in the development of carcinoma in the head and neck areas.

**Figure 3.2.1a**
**Age-standardised incidence and mortality rates, by sex, ICD-10 C00 – C14, Germany 1999 – 2010**
*per 100,000 (European standard)*

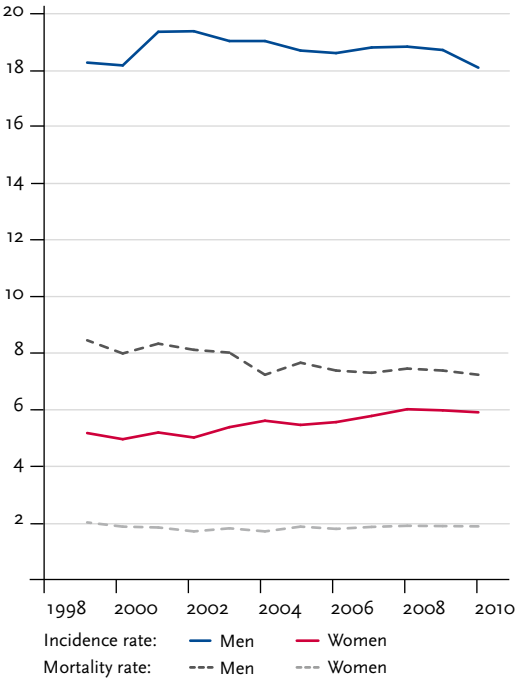



**Figure 3.2.1b**
**Absolute numbers of incident cases and deaths, by sex, ICD-10 C00 – C14, Germany 1999 – 2010**

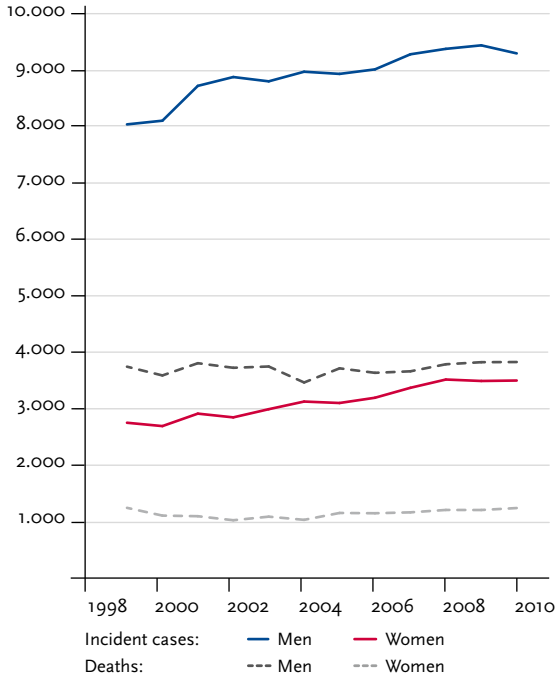



**Figure 3.2.2**
**Age-specific incidence rates by sex, ICD-10 C00 – C14, Germany 2009 – 2010**
*per 100,000*

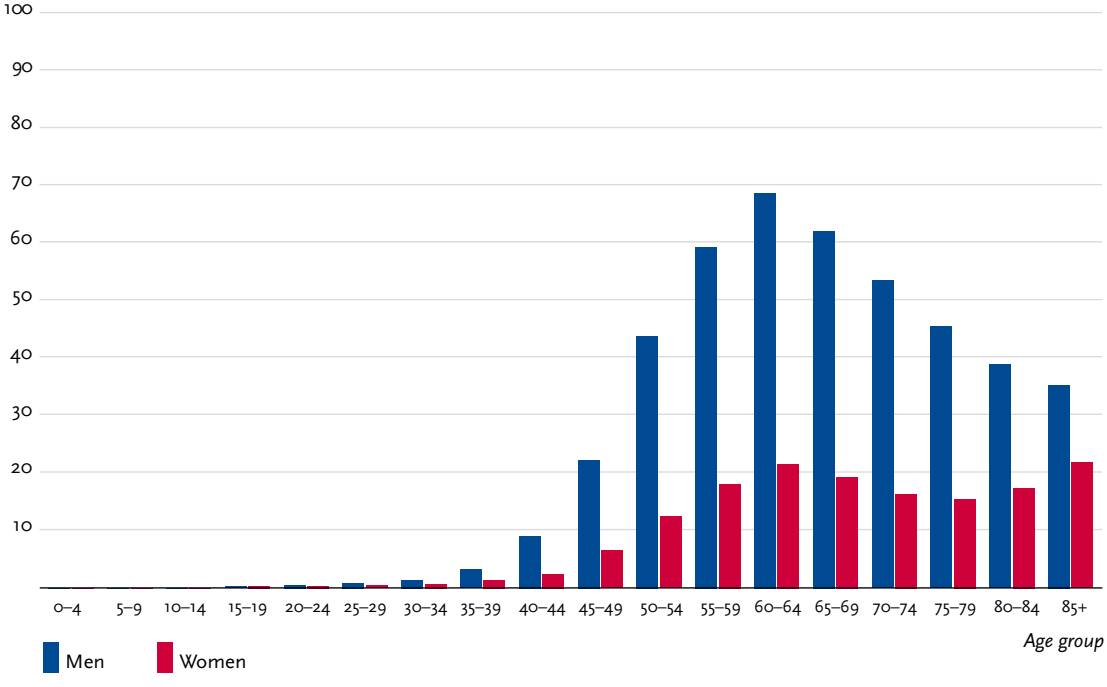


**Table 3.2.2**
**Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C00 – C14, database 2010**

| | 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 1,500) | 1.7% | (1 in 59) | <0.1% | (1 in 6,800) | 0.7% | (1 in 140) |
| 45 years | 0.3% | (1 in 320) | 1.6% | (1 in 61) | 0.1% | (1 in 930) | 0.7% | (1 in 140) |
| 55 years | 0.6% | (1 in 170) | 1.4% | (1 in 72) | 0.2% | (1 in 440) | 0.6% | (1 in 160) |
| 65 years | 0.5% | (1 in 190) | 0.9% | (1 in 110) | 0.2% | (1 in 410) | 0.4% | (1 in 220) |
| 75 years | 0.3% | (1 in 300) | 0.5% | (1 in 220) | 0.2% | (1 in 560) | 0.3% | (1 in 380) |
| Lifetime risk | | | 1.7% | (1 in 60) | | | 0.7% | (1 in 140) |
| **Women aged** | **in the next ten years** | | **ever** | | **in the next ten years** | | **ever** | |
| 35 years | <0.1% | (1 in 4,600) | 0.6% | (1 in 160) | <0.1% | (1 in 22,000) | 0.2% | (1 in 430) |
| 45 years | 0.1% | (1 in 1,100) | 0.6% | (1 in 160) | <0.1% | (1 in 4,200) | 0.2% | (1 in 430) |
| 55 years | 0.2% | (1 in 530) | 0.5% | (1 in 180) | 0.1% | (1 in 2,000) | 0.2% | (1 in 470) |
| 65 years | 0.2% | (1 in 570) | 0.4% | (1 in 260) | 0.1% | (1 in 1,700) | 0.2% | (1 in 590) |
| 75 years | 0.1% | (1 in 730) | 0.2% | (1 in 430) | 0.1% | (1 in 1,500) | 0.1% | (1 in 790) |
| Lifetime risk | | | 0.7% | (1 in 150) | | | 0.2% | (1 in 430) |

**Figure 3.2.3**
**Distribution of T-stages at first diagnosis by sex (top: all cases; bottom: only valid reports)**
**ICD-10 C00 – C14, Germany 2010**

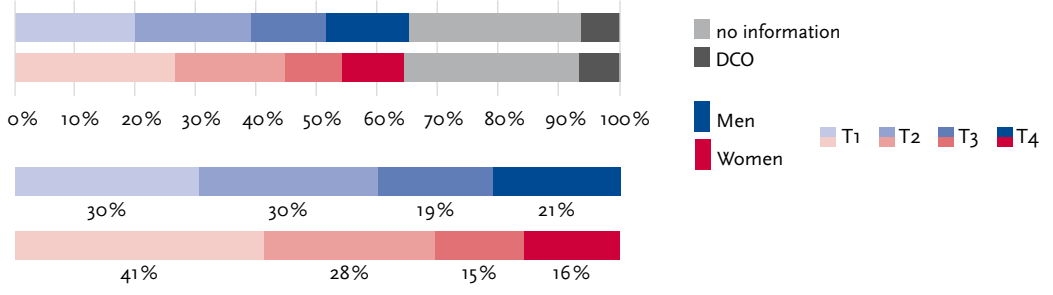



**Figure 3.2.4a**
**Absolute survival rates up to 5 years after first diagnosis, by sex, ICD-10 C00 – C14, Germany 2009 – 2010**

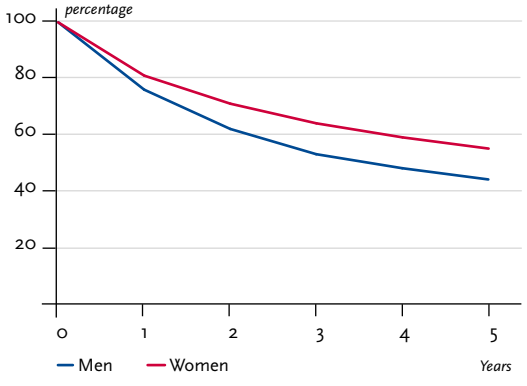



**Figure 3.2.4b**
**Relative survival rates up to 5 years after first diagnosis, by sex, ICD-10 C00 – C14, Germany 2009 – 2010**

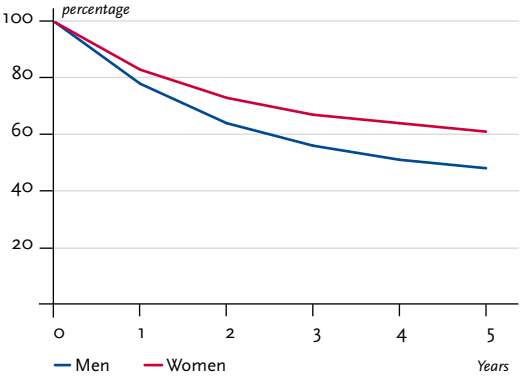


**Figure 3.2.5**
**Registered age-standardised incidence and mortality rates in German federal states, by sex, ICD-10 C00 – C14, 2009 – 2010**
*per 100,000 (European standard)*

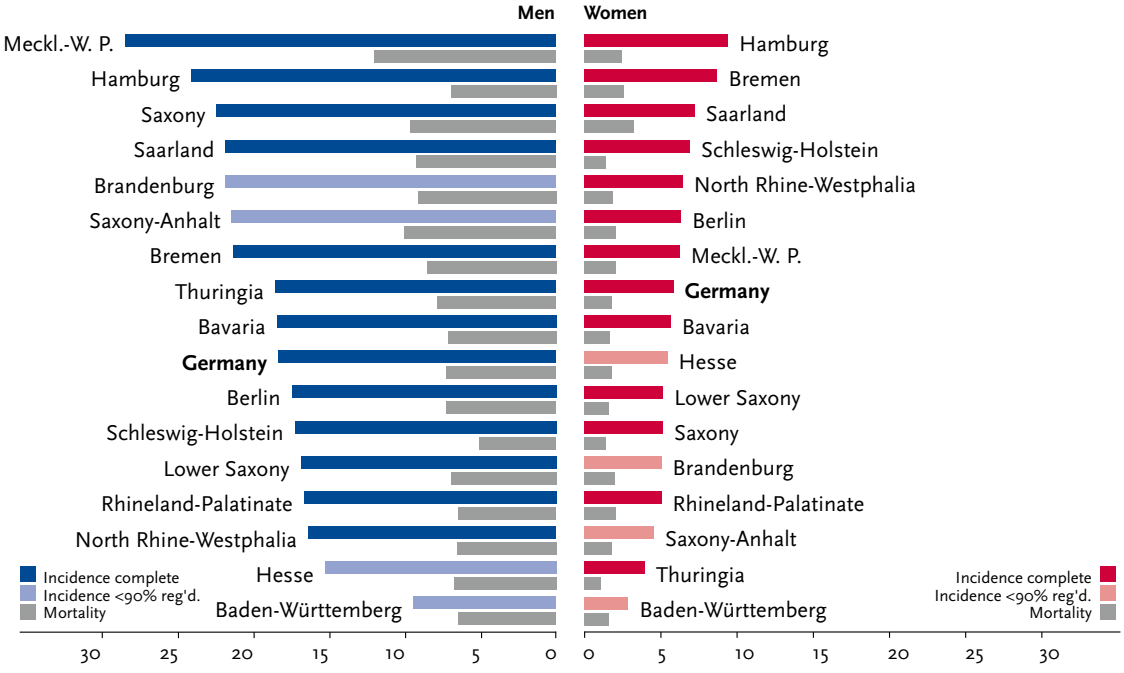
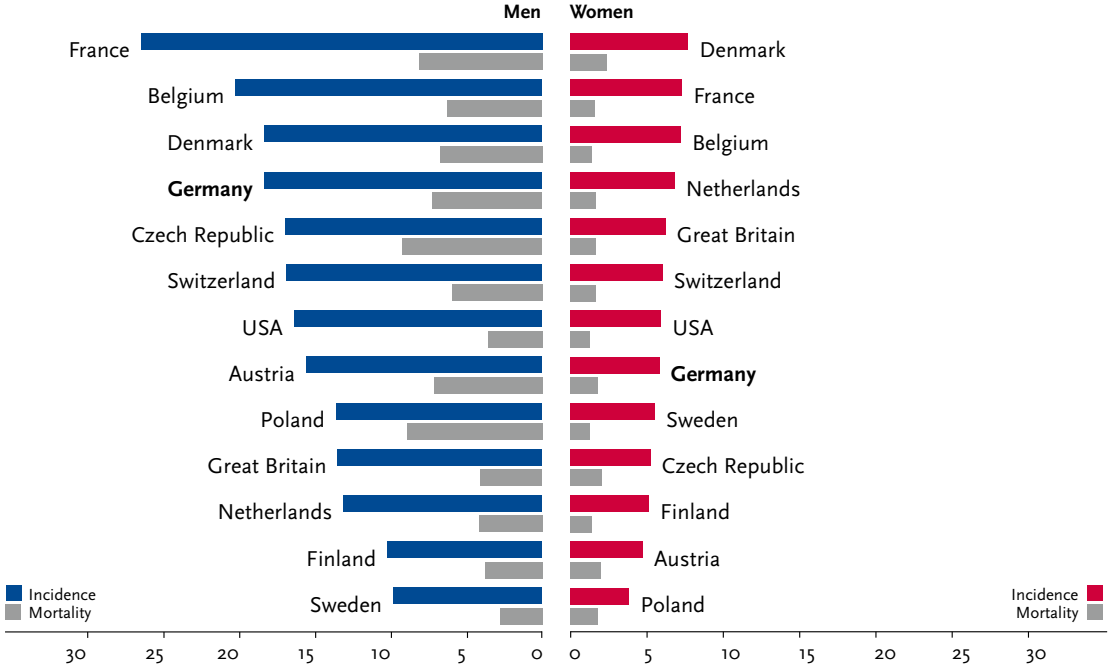



**Figure 3.2.6**
**International comparison of age-standardised incidence and mortality rates, by sex, ICD-10 C00 – C14, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*



## 3.3 Oesophagus

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

| | 2009 | | 2010 | | Prediction for 2014 | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Incident cases | 4,880 | 1,370 | 4,890 | 1,420 | 5,400 | 1,500 |
| Crude incidence rate[1] | 12.1 | 3.3 | 12.2 | 3.4 | 13.6 | 3.7 |
| Standardised incidence rate[1,2] | 9.0 | 2.0 | 8.9 | 2.1 | 9.1 | 2.2 |
| Median age at diagnosis | 67 | 71 | 66 | 70 | | |
| Deaths | 3,776 | 1,161 | 3,837 | 1,142 | | |
| Crude mortality rate[1] | 9.4 | 2.8 | 9.6 | 2.7 | | |
| Standardised mortality rate[1,2] | 6.8 | 1.6 | 6.9 | 1.5 | | |
| 5-year prevalence | 8,000 | 2,200 | 8,100 | 2,300 | | |
| Absolute 5-year survival rate (2009-2010)[3] | | | 18 (15-24) | 19 (10-29) | | |
| Relative 5-year survival rate (2009-2010)[3] | | | 21 (17-27) | 22 (12-31) | | |

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

### Epidemiology

Men are diagnosed approximately three to four times more frequently than women with cancer of the oesophagus and contributing to this is the greater distribution of major risk factors, i.e. alcohol and tobacco consumption, among men.

Squamous-cell carcinomas account for 50 % to 60 % of all cases of cancer of the oesophagus. In recent years, the proportion of adenocarcinomas, which are mainly found in the lower section of the oesophagus, has risen to approximately one third of cases.

Following considerable improvements, the survival prospects of patients with oesophageal cancer are still just a little less favourable than with stomach cancer. Currently, the relative 5-year survival rates for both men and women are over 20 %. Only one in eight cases is diagnosed at an early stage (T1).

The age-standardised incidence and mortality rates have remained virtually unchanged since the turn of the millennium, whilst the absolute number of cases in both sexes is increasing.

The highest incidence rates in Germany are being recorded in the northern federal states. Internationally, high incidence and mortality rates are apparent in the Netherlands and in the United Kingdom.

### Risk factors

The most important risk factors for the development of the more frequent squamous-cell carcinoma in the oesophagus include alcohol and tobacco consumption. In combination, the two factors reinforce one another. Studies have also shown that those affected, often eat little fruit and vegetables.

Adenocarcinomas, which are somewhat less frequent, often originate in combination with a gastro-oesophageal reflux disease (long-term flow of gastric juices back into the oesophagus, chronic heartburn). This leads to changes to the mucous lining of the lower part of the oesophagus, causing a Barrett´s oesophagus, which is regarded as a precursor to cancer. Also in the case of adenocarcinoma, a consumption below the average of fruit and vegetables increases the risk of developing the disease.

Recently, adenocarcinomas of the oesophagus have been associated with smoking, being overweight and possibly also with type 2 diabetes. Family clusters of cases are known, but these may possibly be attributable to shared lifestyle risks.

The possible influence of the human papilloma viruses is a topic of controversial debate.

**Figure 3.3.1a**
**Age-standardised incidence and mortality rates, by sex, ICD-10 C15, Germany 1999 – 2010**
*per 100,000 (European standard)*

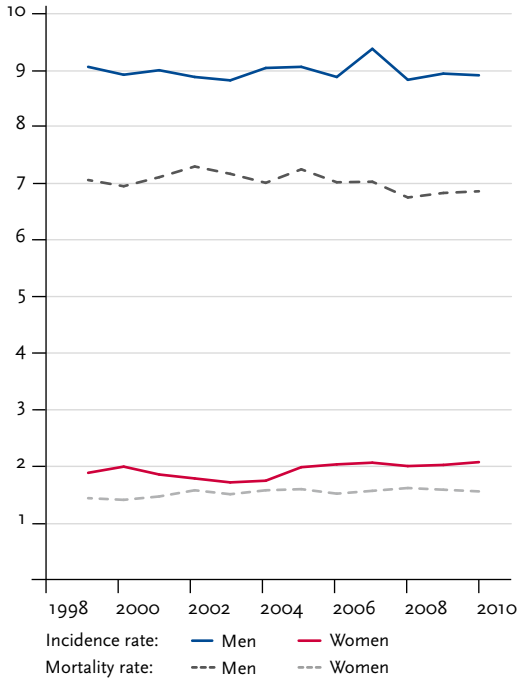



**Figure 3.3.1b**
**Absolute numbers of incident cases and deaths, by sex, ICD-10 C15, Germany 1999 – 2010**

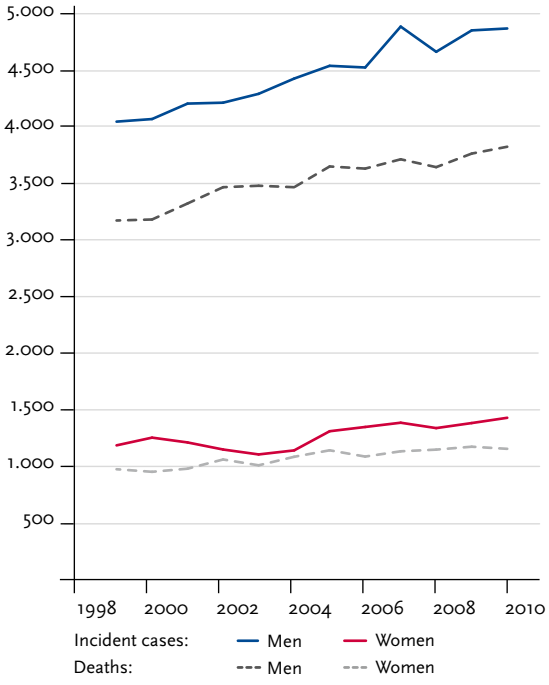



**Figure 3.3.2**
**Age-specific incidence rates by sex, ICD-10 C15, Germany 2009 – 2010**
*per 100,000*

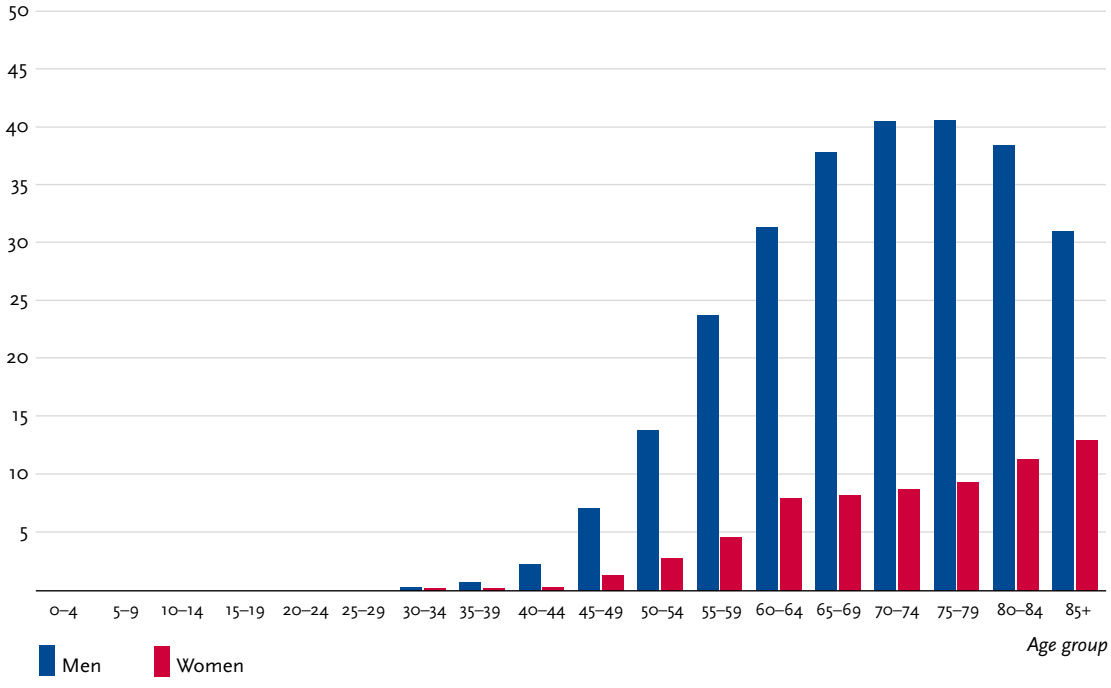


**Table 3.3.2**
**Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C15, database 2010**

| | 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 5,200) | 0.9% | (1 in 110) | <0.1% | (1 in 10,000) | 0.8% | (1 in 130) |
| 45 years | 0.1% | (1 in 930) | 0.9% | (1 in 110) | 0.1% | (1 in 1,400) | 0.7% | (1 in 130) |
| 55 years | 0.3% | (1 in 380) | 0.9% | (1 in 120) | 0.2% | (1 in 520) | 0.7% | (1 in 140) |
| 65 years | 0.3% | (1 in 290) | 0.7% | (1 in 150) | 0.3% | (1 in 370) | 0.6% | (1 in 170) |
| 75 years | 0.3% | (1 in 340) | 0.4% | (1 in 240) | 0.3% | (1 in 370) | 0.4% | (1 in 250) |
| Lifetime risk | | | 0.9% | (1 in 110) | | | 0.8% | (1 in 130) |
| **Women aged** | **in the next ten years** | | **ever** | | **in the next ten years** | | **ever** | |
| 35 years | <0.1% | (1 in 26,000) | 0.3% | (1 in 360) | <0.1% | (1 in 65,000) | 0.2% | (1 in 440) |
| 45 years | <0.1% | (1 in 4,800) | 0.3% | (1 in 360) | <0.1% | (1 in 8,300) | 0.2% | (1 in 440) |
| 55 years | 0.1% | (1 in 1,700) | 0.3% | (1 in 390) | <0.1% | (1 in 2,300) | 0.2% | (1 in 450) |
| 65 years | 0.1% | (1 in 1,200) | 0.2% | (1 in 470) | 0.1% | (1 in 1,500) | 0.2% | (1 in 530) |
| 75 years | 0.1% | (1 in 1,100) | 0.1% | (1 in 390) | 0.1% | (1 in 1,300) | 0.1% | (1 in 720) |
| Lifetime risk | | | 0.3% | (1 in 360) | | | 0.2% | (1 in 440) |

**Figure 3.3.3**
**Distribution of T-stages at first diagnosis by sex (top: all cases; bottom: only valid reports)**
**ICD-10 C15, Germany 2010**

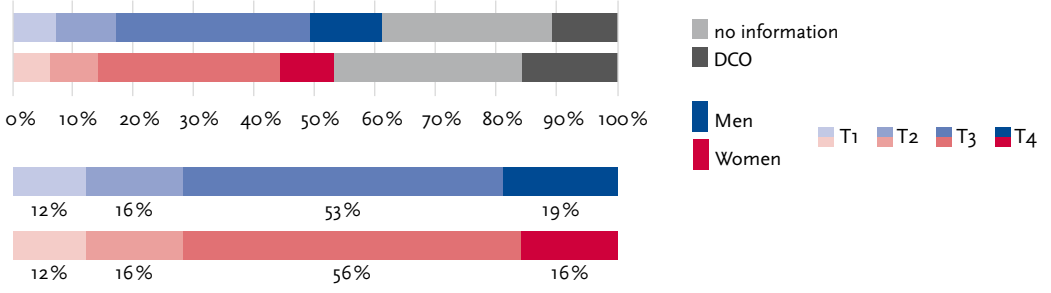



**Figure 3.3.4a**
**Absolute survival rates up to 5 years after first diagnosis, by sex, ICD-10 C15, Germany 2009 – 2010**

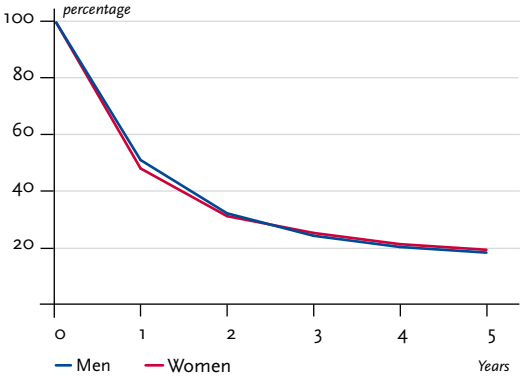



**Figure 3.3.4b**
**Relative survival rates up to 5 years after first diagnosis, by sex, ICD-10 C15, Germany 2009 – 2010**

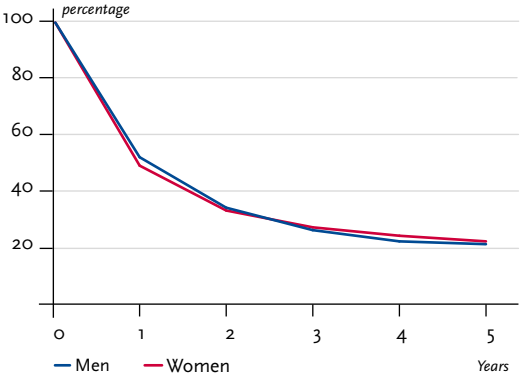


**Figure 3.3.5**
**Registered age-standardised incidence and mortality rates in German federal states, by sex, ICD-10 C15, 2009 – 2010**
*per 100,000 (European standard)*

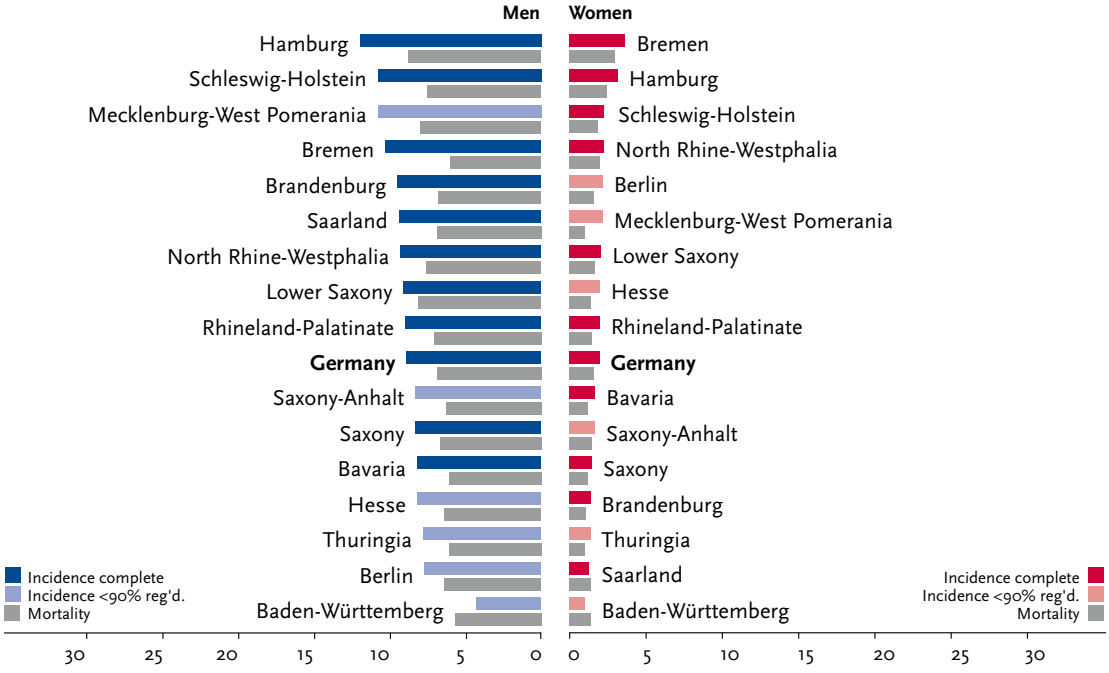
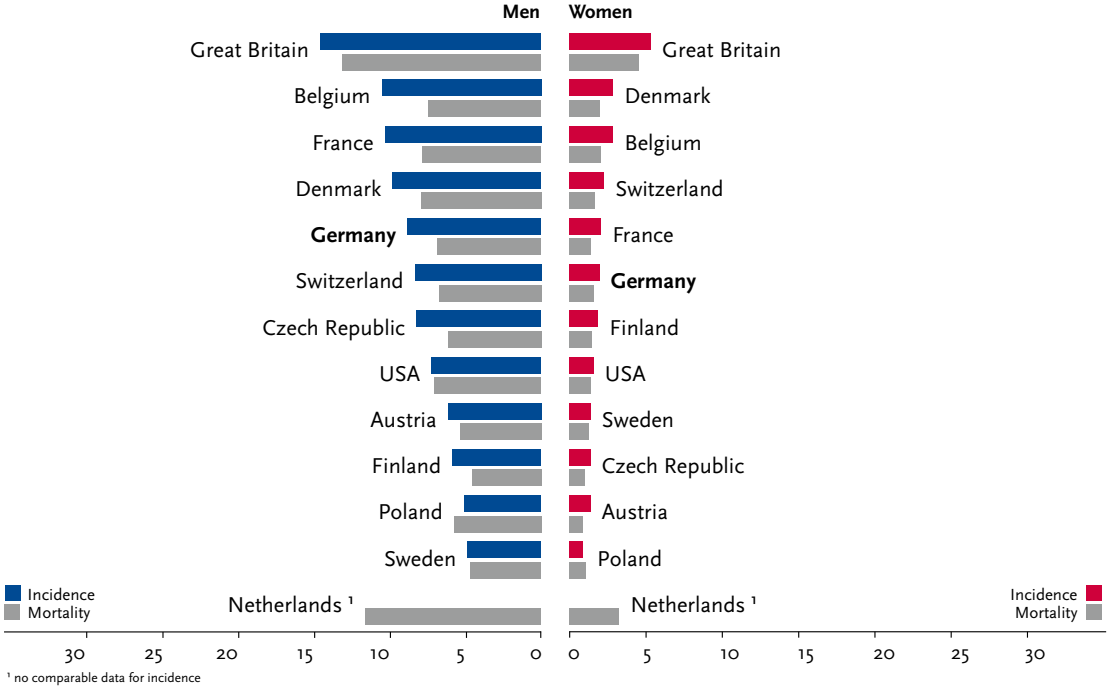



**Figure 3.3.6**
**International comparison of age-standardised incidence and mortality rates, by sex, ICD-10 C15, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*




¹ no comparable data for incidence

## 3.4 Stomach

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

| | 2009 | | 2010 | | Prediction for 2014 | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Incident cases | 9,500 | 6,650 | 9,150 | 6,690 | 9,100 | 6,200 |
| Crude incidence rate[1] | 23.7 | 15.9 | 22.8 | 16.1 | 22.8 | 15.2 |
| Standardised incidence rate[1,2] | 16.6 | 8.6 | 15.7 | 8.5 | 14.3 | 7.7 |
| Median age at diagnosis | 71 | 75 | 71 | 75 | | |
| Deaths | 5,783 | 4,461 | 5,777 | 4,400 | | |
| Crude mortality rate[1] | 14.5 | 11.1 | 14.7 | 10.9 | | |
| Standardised mortality rate[1,2] | 10.0 | 5.4 | 9.7 | 5.2 | | |
| 5-year prevalence | 19,700 | 14,000 | 19,500 | 13,800 | | |
| Absolute 5-year survival rate (2009-2010)[3] | | | 27 (21-30) | 27 (22-31) | | |
| Relative 5-year survival rate (2009-2010)[3] | | | 33 (25-36) | 33 (26-36) | | |

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

### Epidemiology

For more than 30 years in Germany – as in other industrialised nations – there has been a steady decline in the incidence and mortality rates for stomach cancer. This decline is ongoing. International and regional comparisons show that in Europe and within Germany the rates are higher in the east than in the west. The highest of the incidence rates included here were found in Poland and the Czech Republic. The incidence rates for all eastern federal states in Germany except Berlin are higher than for western federal states.

The median age for developing stomach cancer is comparatively high at 71 years of age for men and 75 for women. One in every 74 women and one in every 52 men can still expect to develop stomach cancer during their lifetime.

Although the 5-year survival rate for stomach cancer has recently improved to 33 %, it is still unfavourable in comparison to other forms of cancer.

Due to changes in the 7th edition of the TNM classification system and thus to the associated heterogeneity of data for the current period of observation, no interpretation of tumour stages is included in this edition of the report.

Histologically, various forms of adenocarcinomas predominate in the stomach. Particularly noteworthy are the (mucosa-associated) MALT lymphomas originating in the stomach mucosa.

### Risk factors

A bacterial infection of the stomach with Helicobacter pylori is the most important risk factor for stomach cancer, as this can probably reinforce the effects of other risks. Smoking and excessive alcohol consumption also increase the risk of stomach cancer. The relationships between dietary factors and the risk of stomach cancer are complex. In general, a diet with a low fruit and vegetable content and high animal product content is associated with a higher risk. There are indications that chronic heartburn or gastro-oesophageal reflux increases the risk for certain forms of tumour at the transition from the stomach to the oesophagus. Being overweight can also promote these carcinomas. Low socio-economic status and past stomach surgery continue to be associated with an increased frequency of stomach cancer.

First-degree relatives of patients have a risk two to three times higher than the general population. It is not always clear whether this is due to a shared lifestyle, to the transmission of Helicobacter pylori within the family, or to hereditary gene mutations. In the case of young patients, it can be useful for relatives to receive genetic advice. The same applies for members of families with rare hereditary colorectal cancer (HNPCC, Lynch syndrome).

Pernicious anaemia and several other pre-existing diseases constitute risk factors that affect only comparatively few people. Among the mostly benign stomach polyps, only the rare adenoma is regarded as a precursor to cancer.

**Figure 3.4.1a**
**Age-standardised incidence and mortality rates, by sex, ICD-10 C16, Germany 1999 – 2010**
*per 100,000 (European standard)*

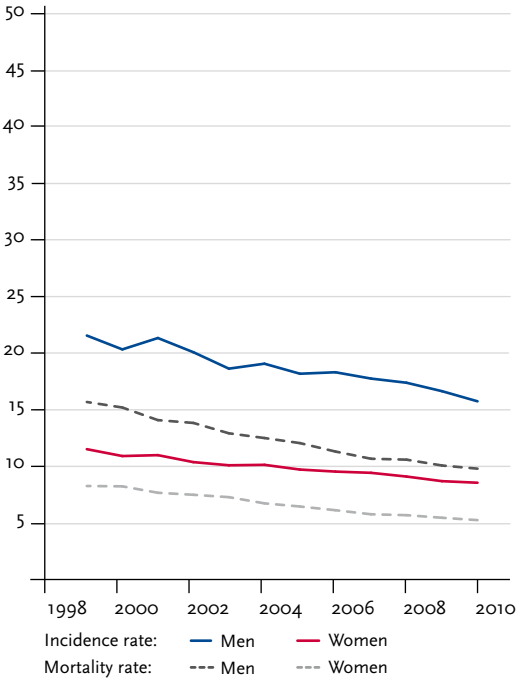



**Figure 3.4.1b**
**Absolute numbers of incident cases and deaths, by sex, ICD-10 C16, Germany 1999 – 2010**

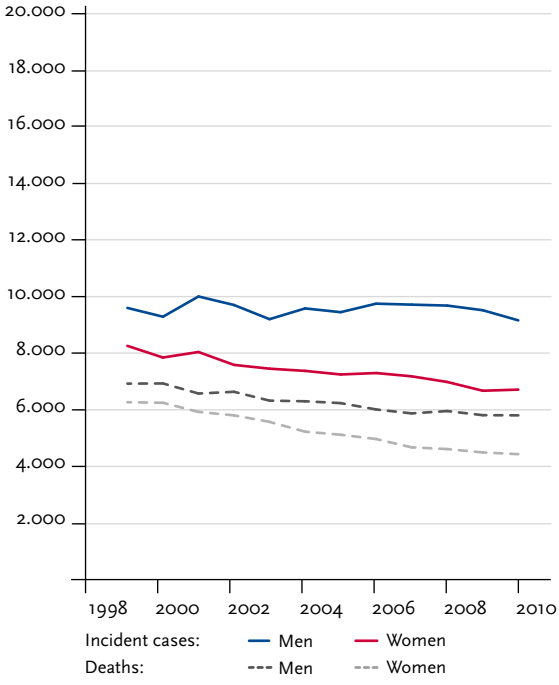



**Figure 3.4.2**
**Age-specific incidence rates by sex, ICD-10 C16, Germany 2009 – 2010**
*per 100,000*

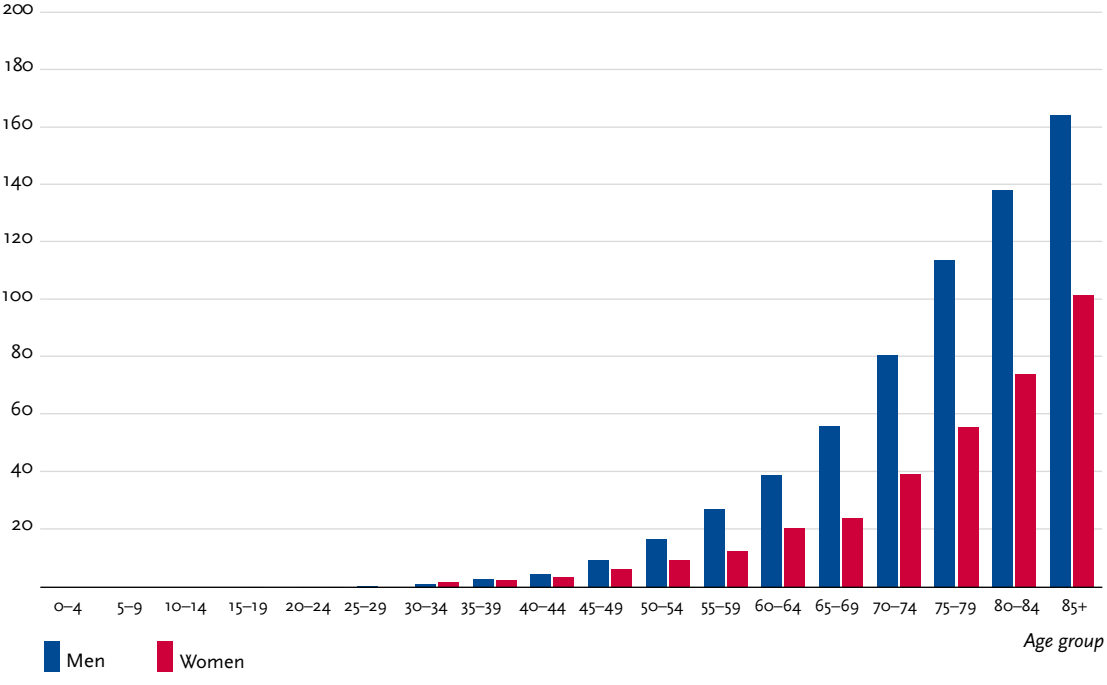


**Table 3.4.2**
**Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C16, database 2010**

| | 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 2,500) | 2.0% | (1 in 51) | <0.1% | (1 in 5,400) | 1.3% | (1 in 77) |
| 45 years | 0.1% | (1 in 760) | 1.9% | (1 in 51) | 0.1% | (1 in 1,500) | 1.3% | (1 in 77) |
| 55 years | 0.3% | (1 in 310) | 1.8% | (1 in 53) | 0.2% | (1 in 560) | 1.3% | (1 in 78) |
| 65 years | 0.6% | (1 in 170) | 1.7% | (1 in 57) | 0.4% | (1 in 280) | 1.2% | (1 in 82) |
| 75 years | 0.9% | (1 in 110) | 1.4% | (1 in 69) | 0.7% | (1 in 150) | 1.1% | (1 in 91) |
| Lifetime risk | | | 1.9% | (1 in 52) | | | 1.3% | (1 in 78) |
| **Women aged** | **in the next ten years** | | **ever** | | **in the next ten years** | | **ever** | |
| 35 years | <0.1% | (1 in 3,300) | 1.3% | (1 in 74) | <0.1% | (1 in 6,700) | 0.9% | (1 in 110) |
| 45 years | 0.1% | (1 in 1,200) | 1.3% | (1 in 75) | <0.1% | (1 in 2,400) | 0.9% | (1 in 110) |
| 55 years | 0.2% | (1 in 640) | 1.3% | (1 in 78) | 0.1% | (1 in 1,200) | 0.9% | (1 in 110) |
| 65 years | 0.3% | (1 in 330) | 1.2% | (1 in 85) | 0.2% | (1 in 570) | 0.8% | (1 in 120) |
| 75 years | 0.5% | (1 in 180) | 1.0% | (1 in 100) | 0.4% | (1 in 270) | 0.8% | (1 in 130) |
| Lifetime risk | | | 1.3% | (1 in 74) | | | 0.9% | (1 in 110) |

**Figure 3.4.3**
**Distribution of T-stages at first diagnosis by sex**
*Not presented due to the large proportion of missing data.*

**Figure 3.4.4a**
**Absolute survival rates up to 5 years after first diagnosis, by sex, ICD-10 C16, Germany 2009 – 2010**

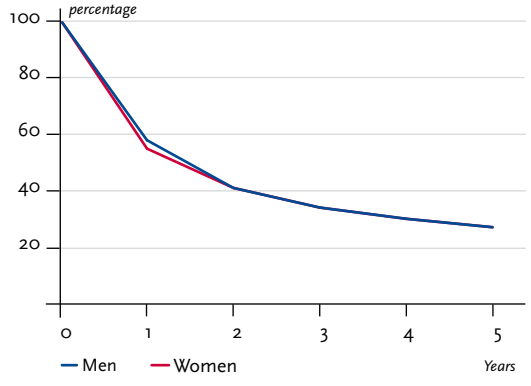



**Figure 3.4.4b**
**Relative survival rates up to 5 years after first diagnosis, by sex, ICD-10 C16, Germany 2009 – 2010**

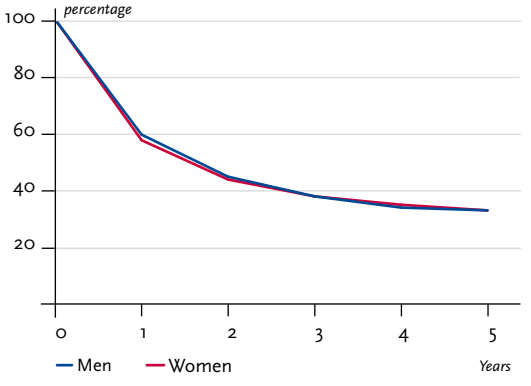


**Figure 3.4.5**
**Registered age-standardised incidence and mortality rates in German federal states, by sex, ICD-10 C16, 2009 – 2010**
*per 100,000 (European standard)*

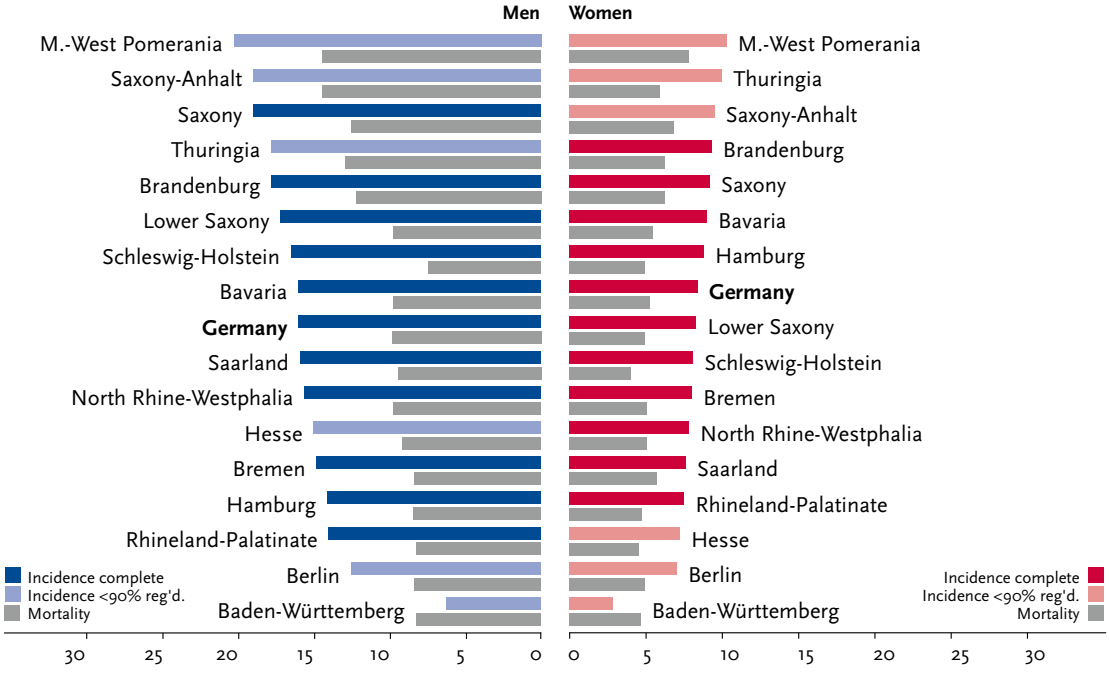
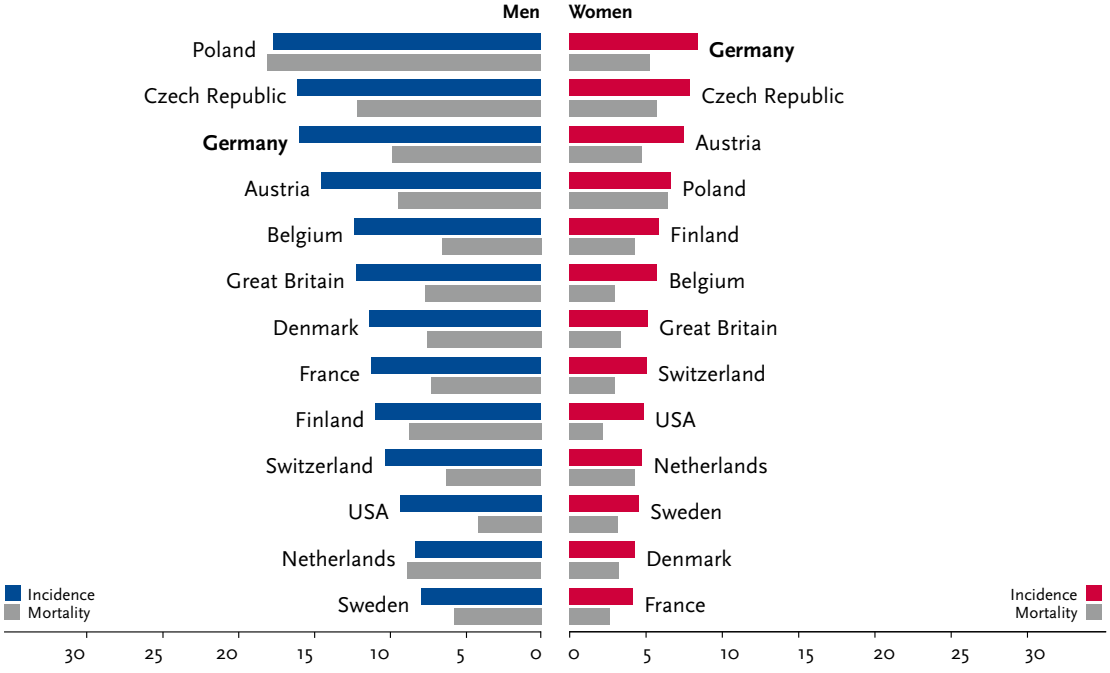



**Figure 3.4.6**
**International comparison of age-standardised incidence and mortality rates, by sex, ICD-10 C16, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*



## 3.5 Colon and rectum

**Table 3.5.1**
**Overview of key epidemiological parameters for Germany, ICD-10 C18 – C21**

| | 2009 | | 2010 | | Prediction for 2014 | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Incident cases | 34,770 | 29,540 | 33,800 | 28,620 | 35,500 | 28,400 |
| Crude incidence rate[1] | 86.6 | 70.8 | 84.3 | 68.7 | 89.5 | 68.9 |
| Standardised incidence rate[1,2] | 60.7 | 38.3 | 57.8 | 36.8 | 56.2 | 34.9 |
| Median age at diagnosis | 71 | 74 | 71 | 75 | | |
| Deaths | 13,572 | 12,504 | 13,489 | 12,510 | | |
| Crude mortality rate[1] | 33.8 | 30.0 | 33.6 | 30.0 | | |
| Standardised mortality rate[1,2] | 23.2 | 14.2 | 22.3 | 13.9 | | |
| 5-year prevalence | 116,800 | 99,700 | 116,200 | 98,100 | | |
| Absolute 5-year survival rate (2009-2010)[3] | | | 53 (47-58) | 53 (48-58) | | |
| Relative 5-year survival rate (2009-2010)[3] | | | 64 (57-68) | 65 (58-68) | | |

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

### Epidemiology

About every seventh case of cancer in Germany affects the colon or rectum. In 2010 almost 34,000 men and 29,000 women were diagnosed. In addition, there were nearly 5,000 in situ tumours. Almost two thirds of tumours were located in the large intestine, some 30 % affected the rectum, while the remainder were located at the junction between the colon and the rectum (rectosigmoid), i.e. the anal canal. The rare cases of cancer of the upper intestine (C17) are not included here, in line with international practice. Histologically, besides squamous-cell carcinomas of the anus and rare neuroendrocrinal tumours (approx. 1%), almost all tumours are adenocarcinomas (approx. 85 %).

The risk of developing the disease increases steadily with advancing age. Correspondingly the median age at diagnosis is 71 years for men and 75 years for women. More than half of those affected were diagnosed after the age of 70 years, with only about 10 % before 55 years of age, i.e. before qualifying for the colonoscopy offered in the early detection programme. The age-standardised incidence rates for women and men have recently shown a slight downward trend. Despite a demographic change, the absolute number of cases of colorectal cancer has recently not further increased. The age-standardised mortality rates for men and women have declined by more than 20 % in the past 10 years. Colorectal cancer has a moderately good prognosis, and five years after diagnosis about half of the patients are still alive. The relative survival rates are approximately 65 % for men and for women.

### Risk factors and early detection

A number of factors increase the risk of colorectal cancer. Smoking and being overweight are the principal risk factors, followed by insufficient exercise and a diet low in fibre. People who regularly consume alcohol or eat a lot of red meat or processed meats made from red meat are more prone to develop colorectal cancer. First-degree relatives of colorectal cancer patients are themselves affected with an above-average frequency. There is a very high risk of developing colorectal cancer early in life in the case of rare inherited diseases such as familial adenomatous polyposis (FAP) or Lynch syndrome (hereditary non-polyposis colorectal cancer, HNPCC).

Chronic inflammatory bowel diseases also slightly increase the risk of developing this cancer.

As part of the early detection directive, people between 50 and 54 years of age with statutory health insurance can have an annual test for blood in the stool. From the age of 55 years they are entitled to a colonoscopy examination, in the course of which colon polyps, which may develop into malignant tumours, can also be removed. If there are no pathological findings, they are entitled to a further colonoscopy ten years later. As an alternative to colonoscopy, insured persons can have the above-mentioned stool test every two years, with entitlement to a follow-up colonoscopy where clarification is required. Special provisions are made for people with an increased risk.

**Figure 3.5.1a**
**Age-standardised incidence and mortality rates, by sex, ICD-10 C18 – C21, Germany 1999 – 2010**
*per 100,000 (European standard)*

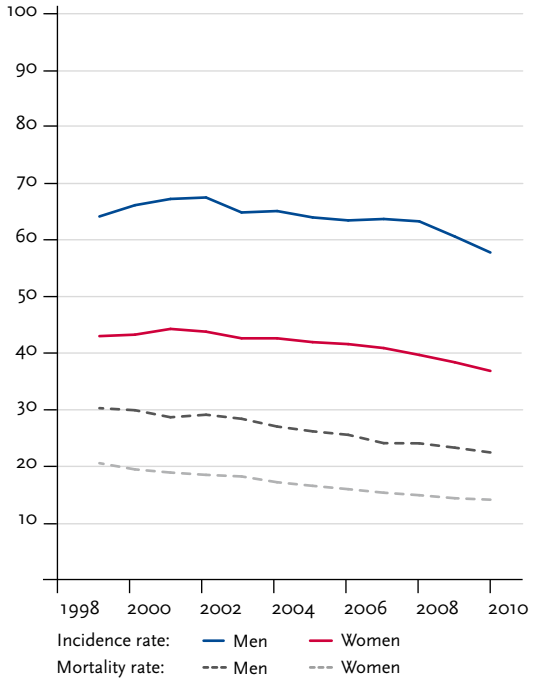



**Figure 3.5.1b**
**Absolute numbers of incident cases and deaths, by sex, ICD-10 C18 – C21, Germany 1999 – 2010**

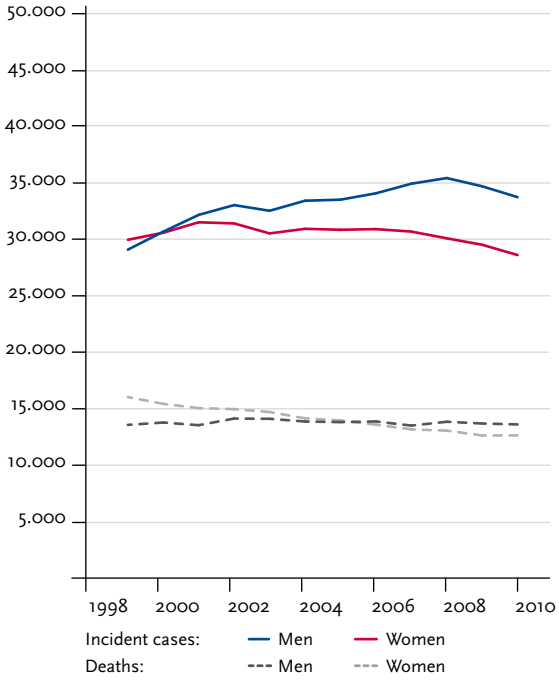



**Figure 3.5.2**
**Age-specific incidence rates by sex, ICD-10 C18 – C21, Germany 2009 – 2010**
*per 100,000*

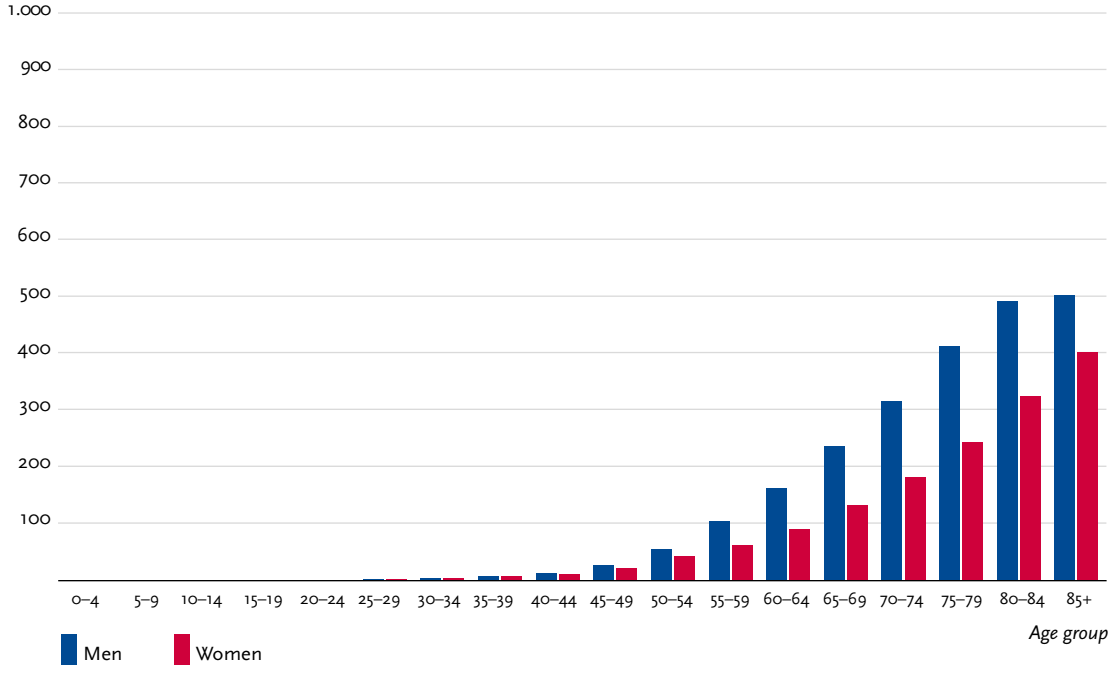


**Table 3.5.2**
**Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C18 – C21, database 2010**

| | 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 920) | 7.1% | (1 in 14) | <0.1% | (1 in 4,200) | 3.1% | (1 in 32) |
| 45 years | 0.4% | (1 in 240) | 7.1% | (1 in 14) | 0.1% | (1 in 860) | 3.1% | (1 in 32) |
| 55 years | 1.3% | (1 in 79) | 7.0% | (1 in 14) | 0.4% | (1 in 260) | 3.1% | (1 in 32) |
| 65 years | 2.4% | (1 in 41) | 6.4% | (1 in 16) | 0.9% | (1 in 110) | 3.0% | (1 in 33) |
| 75 years | 3.4% | (1 in 29) | 5.1% | (1 in 20) | 1.6% | (1 in 63) | 2.7% | (1 in 37) |
| Lifetime risk | | | 7.0% | (1 in 14) | | | 3.0% | (1 in 33) |
| **Women aged** | **in the next ten years** | | **ever** | | **in the next ten years** | | **ever** | |
| 35 years | 0.1% | (1 in 1,000) | 5.7% | (1 in 17) | <0.1% | (1 in 4,000) | 2.6% | (1 in 38) |
| 45 years | 0.3% | (1 in 300) | 5.7% | (1 in 18) | 0.1% | (1 in 1,200) | 2.6% | (1 in 38) |
| 55 years | 0.7% | (1 in 140) | 5.5% | (1 in 18) | 0.2% | (1 in 460) | 2.6% | (1 in 38) |
| 65 years | 1.4% | (1 in 69) | 5.0% | (1 in 20) | 0.5% | (1 in 190) | 2.5% | (1 in 40) |
| 75 years | 2.4% | (1 in 42) | 4.1% | (1 in 24) | 1.1% | (1 in 91) | 2.3% | (1 in 44) |
| Lifetime risk | | | 5.7% | (1 in 17) | | | 2.6% | (1 in 38) |

**Figure 3.5.3**
**Distribution of T-stages at first diagnosis by sex (top: all cases; bottom: only valid reports)**
**ICD-10 C18 – C21, Germany 2010**

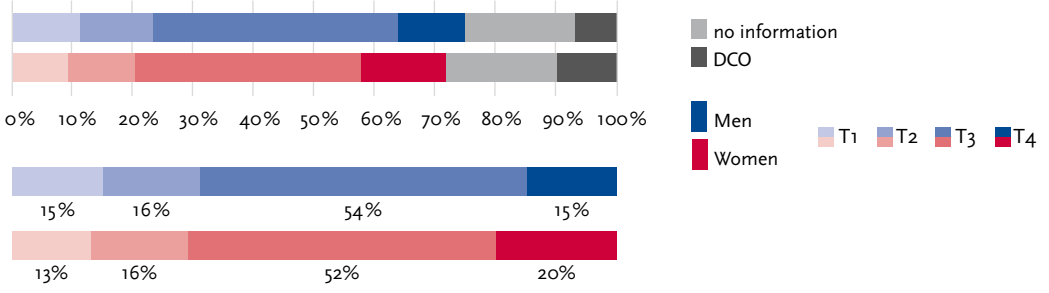



**Figure 3.5.4a**
**Absolute survival rates up to 5 years after first diagnosis, by sex, ICD-10 C18 – C21, Germany 2009 – 2010**

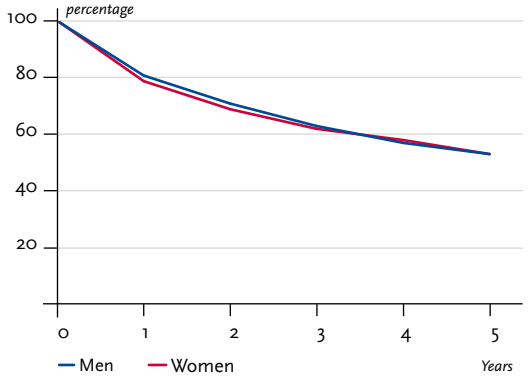



**Figure 3.5.4b**
**Relative survival rates up to 5 years after first diagnosis, by sex, ICD-10 C18 – C21, Germany 2009 – 2010**

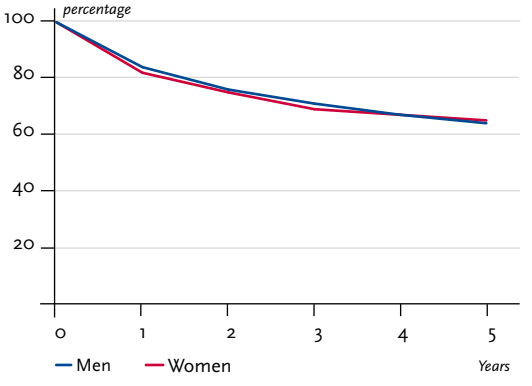


**Figure 3.5.5**
**Registered age-standardised incidence and mortality rates in German federal states, by sex, ICD-10 C18 – C21, 2009 – 2010**
*per 100,000 (European standard)*

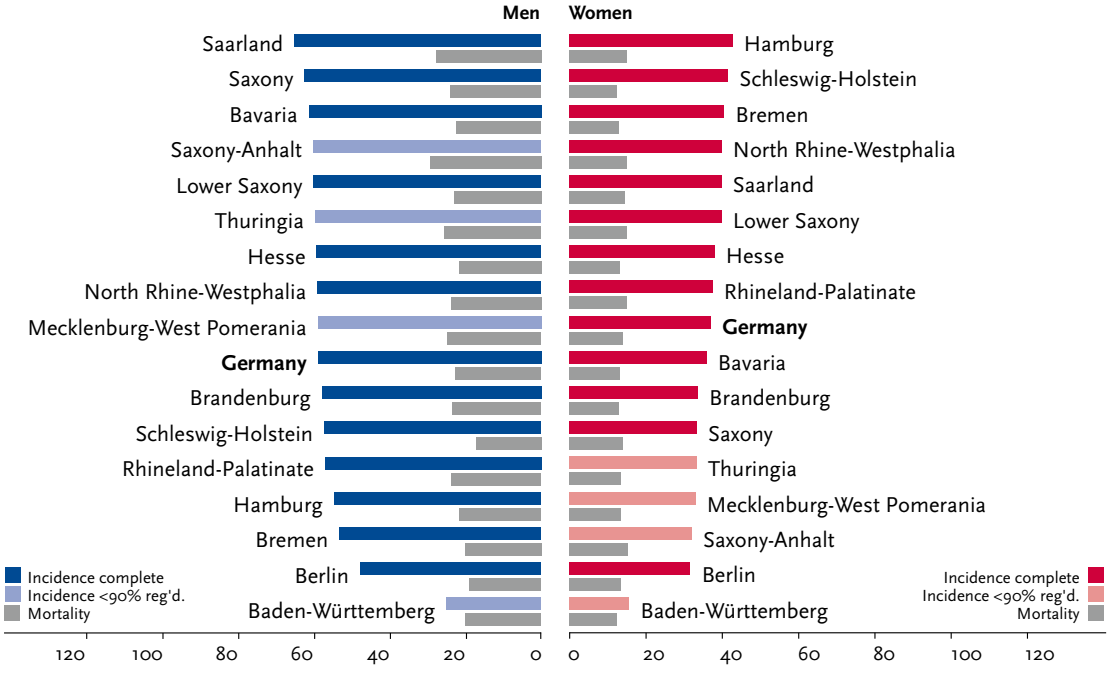
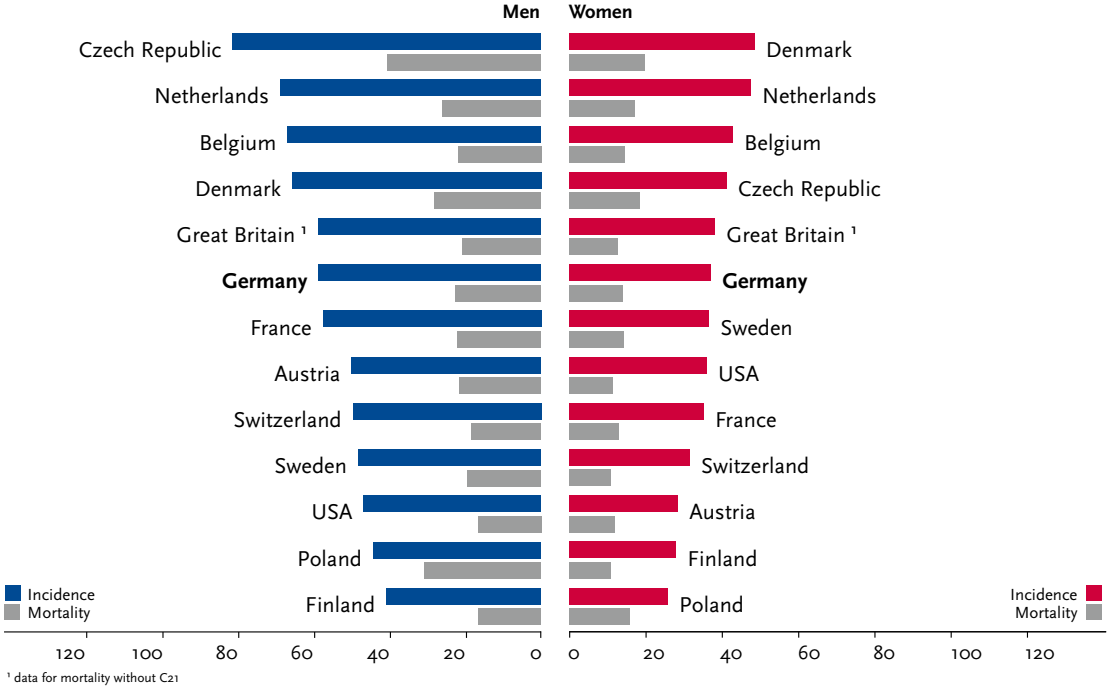



**Figure 3.5.6**
**International comparison of age-standardised incidence and mortality rates, by sex, ICD-10 C18 – C21, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*




¹ data for mortality without C21

## 3.6 Liver

**Table 3.6.1**
**Overview of key epidemiological parameters for Germany, ICD-10 C22**

| | 2009 | | 2010 | | Prediction for 2014 | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Incident cases | 5,630 | 2,390 | 5,850 | 2,480 | 6,200 | 2,700 |
| Crude incidence rate[1] | 14.0 | 5.7 | 14.6 | 5.9 | 15.7 | 6.6 |
| Standardised incidence rate[1,2] | 9.9 | 3.1 | 10.1 | 3.2 | 10.0 | 3.3 |
| Median age at diagnosis | 70 | 74 | 70 | 74 | | |
| Deaths | 4,738 | 2,493 | 4,856 | 2,534 | | |
| Crude mortality rate[1] | 11.8 | 6.0 | 12.1 | 6.1 | | |
| Standardised mortality rate[1,2] | 8.1 | 3.0 | 8.1 | 3.0 | | |
| 5-year prevalence | 7,400 | 2,700 | 7,600 | 2,800 | | |
| Absolute 5-year survival rate (2009-2010)[3] | | | 13 (10-17) | 11 (5-16) | | |
| Relative 5-year survival rate (2009-2010)[3] | | | 15 (11-20) | 12 (6-19) | | |

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

### Epidemiology

Liver cancer is relatively uncommon, but in view of its poor prognosis it ranks among the ten most frequent causes of death due to cancer for both men and women. There are approximately 8,300 new cases in Germany every year, and roughly the same number of deaths. The median age at diagnosis is 70 years for men and 74 years for women. Only about 4 % of cases are diagnosed before 45 years of age. One in 86 men and one in 200 women in Germany develop a malignant liver tumour in the course of their life.

Some 65 % of malignant tumours develop from liver cells (hepatocellular carcinoma), and almost 25 % from cells in the intrahepatic bile ducts (cholangiocarcinoma). This proportion is significantly higher for women.

Since 1980, the mortality rate for men has risen steadily by a total of 52 %, even after age-standardisation, while it has remained more or less unchanged for women in the same period. The increased mortality rate in men was independent of the histology of the tumour. The age-standardised incidence rate for liver cancer in men has also increased slightly over the past 10 years.

Currently, incidence and mortality rates in the north-western federal states are somewhat lower than in the rest of Germany.

The survival prospects for liver cancer depend on the stage of the tumour at diagnosis and on the condition of the liver (cirrhosis). Only just over 10 % of patients survive the first five years after diagnosis.

### Risk factors and early detection

Proven risk factors for liver cancer are chronic infection with hepatitis-B or hepatitis-C virus. There is also a relationship between regular high alcohol consumption and the risk of developing liver cancer. Foodstuffs contaminated with aflatoxin B1 (produced by the fungi Aspergillus parasiticus and A. flavus) constitute a further risk factor. Tobacco consumption is also associated with an increased risk. From the lifestyle-related risk factors, type 2 diabetes mellitus and obesity are also associated with an increased risk of liver cancer. Finally, hereditary metabolic diseases such as haemochromatosis can also increase this risk.

Early detection examinations for the general population are not included in the statutory health insurance. It is recommended that regular examinations should be undertaken by all patients with cirrhosis of the liver, with long-standing hepatitis infections, and with nonalcoholic fatty liver disease. Ultrasound examination is suitable for this, while blood tests (for alpha-fetoprotein) are only of minor relevance.

**Figure 3.6.1a**
**Age-standardised incidence and mortality rates, by sex, ICD-10 C22, Germany 1999 – 2010**
*per 100,000 (European standard)*

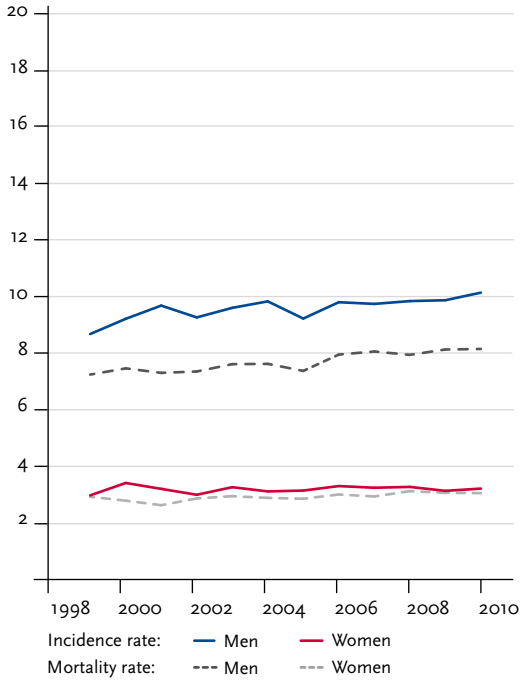



**Figure 3.6.1b**
**Absolute numbers of incident cases and deaths, by sex, ICD-10 C22, Germany 1999 – 2010**

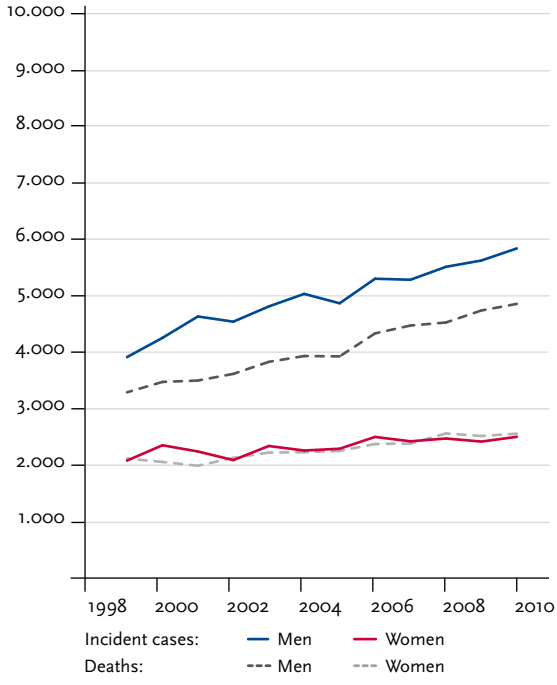



**Figure 3.6.2**
**Age-specific incidence rates by sex, ICD-10 C22, Germany 2009 – 2010**
*per 100,000*

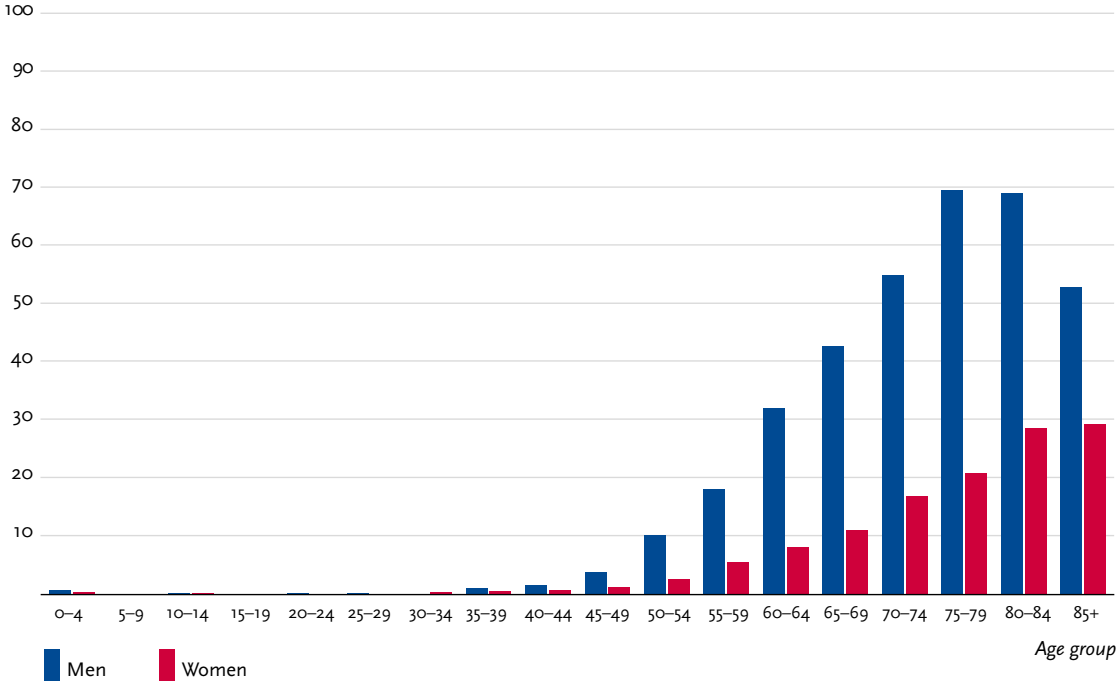


**Table 3.6.2**
**Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C22, database 2010**

| | 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 6,700) | 1.2% | (1 in 85) | <0.1% | (1 in 15,000) | 1.0% | (1 in 98) |
| 45 years | 0.1% | (1 in 1,400) | 1.2% | (1 in 85) | <0.1% | (1 in 2,100) | 1.0% | (1 in 98) |
| 55 years | 0.3% | (1 in 390) | 1.2% | (1 in 87) | 0.2% | (1 in 590) | 1.0% | (1 in 98) |
| 65 years | 0.4% | (1 in 220) | 1.0% | (1 in 100) | 0.4% | (1 in 260) | 0.9% | (1 in 110) |
| 75 years | 0.5% | (1 in 190) | 0.7% | (1 in 140) | 0.5% | (1 in 200) | 0.7% | (1 in 140) |
| Lifetime risk | | | 1.2% | (1 in 86) | | | 1.0% | (1 in 100) |
| **Women aged** | **in the next ten years** | | **ever** | | **in the next ten years** | | **ever** | |
| 35 years | <0.1% | (1 in 22,000) | 0.5% | (1 in 200) | <0.1% | (1 in 22,000) | 0.5% | (1 in 190) |
| 45 years | <0.1% | (1 in 4,900) | 0.5% | (1 in 200) | <0.1% | (1 in 5,900) | 0.5% | (1 in 190) |
| 55 years | 0.1% | (1 in 1,400) | 0.4% | (1 in 210) | 0.1% | (1 in 1,800) | 0.5% | (1 in 200) |
| 65 years | 0.1% | (1 in 740) | 0.4% | (1 in 230) | 0.1% | (1 in 780) | 0.5% | (1 in 210) |
| 75 years | 0.2% | (1 in 510) | 0.3% | (1 in 290) | 0.2% | (1 in 430) | 0.4% | (1 in 250) |
| Lifetime risk | | | 0.5% | (1 in 200) | | | 0.5% | (1 in 190) |

**Figure 3.6.3**
**Distribution of T-stages at first diagnosis by sex**
*Not presented due to the large proportion of missing data.*

**Figure 3.6.4a**
**Absolute survival rates up to 5 years after first diagnosis, by sex, ICD-10 C22, Germany 2009 – 2010**

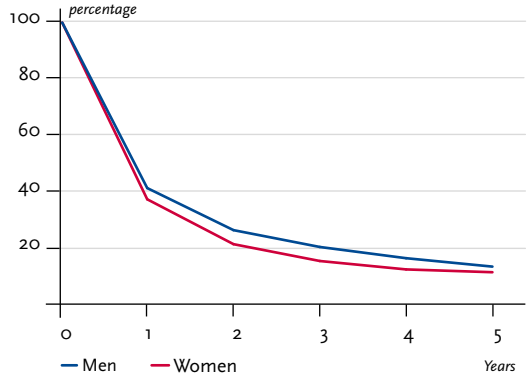



**Figure 3.6.4b**
**Relative survival rates up to 5 years after first diagnosis, by sex, ICD-10 C22, Germany 2009 – 2010**

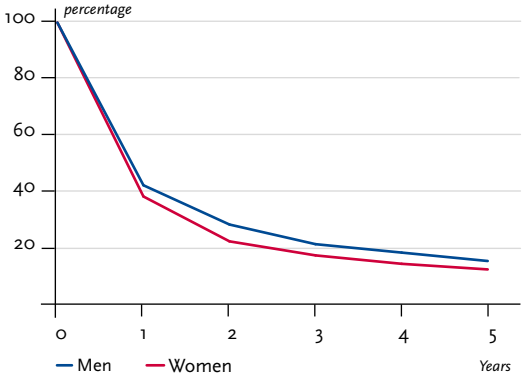


**Figure 3.6.5**
**Registered age-standardised incidence and mortality rates in German federal states, by sex, ICD-10 C22, 2009 – 2010**
*per 100,000 (European standard)*

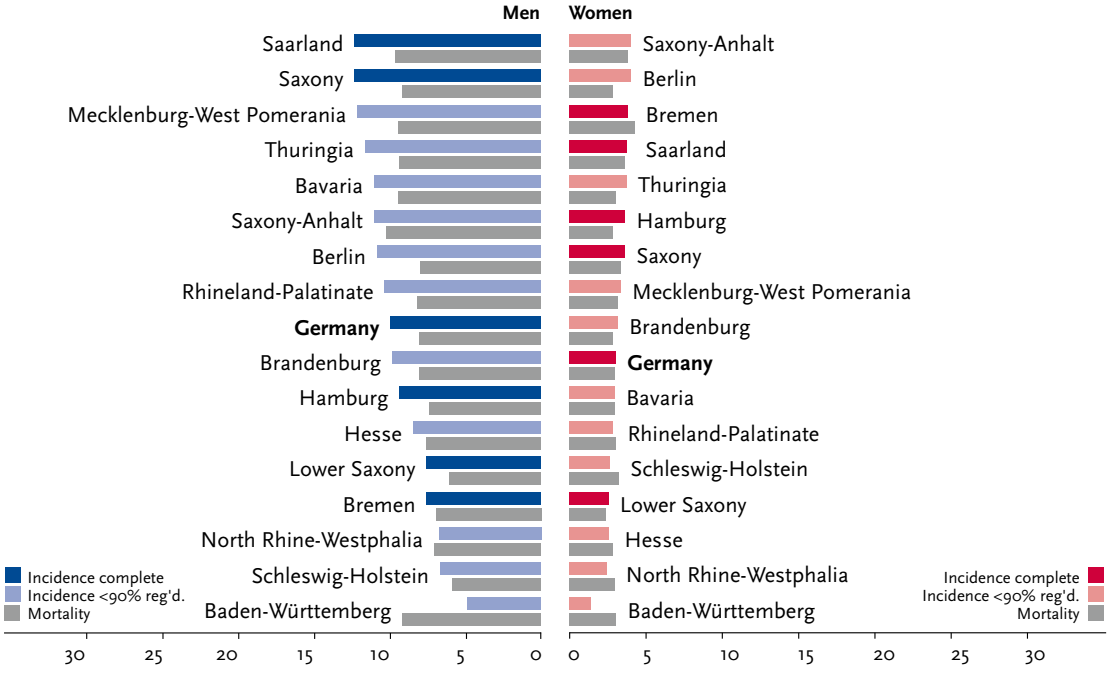
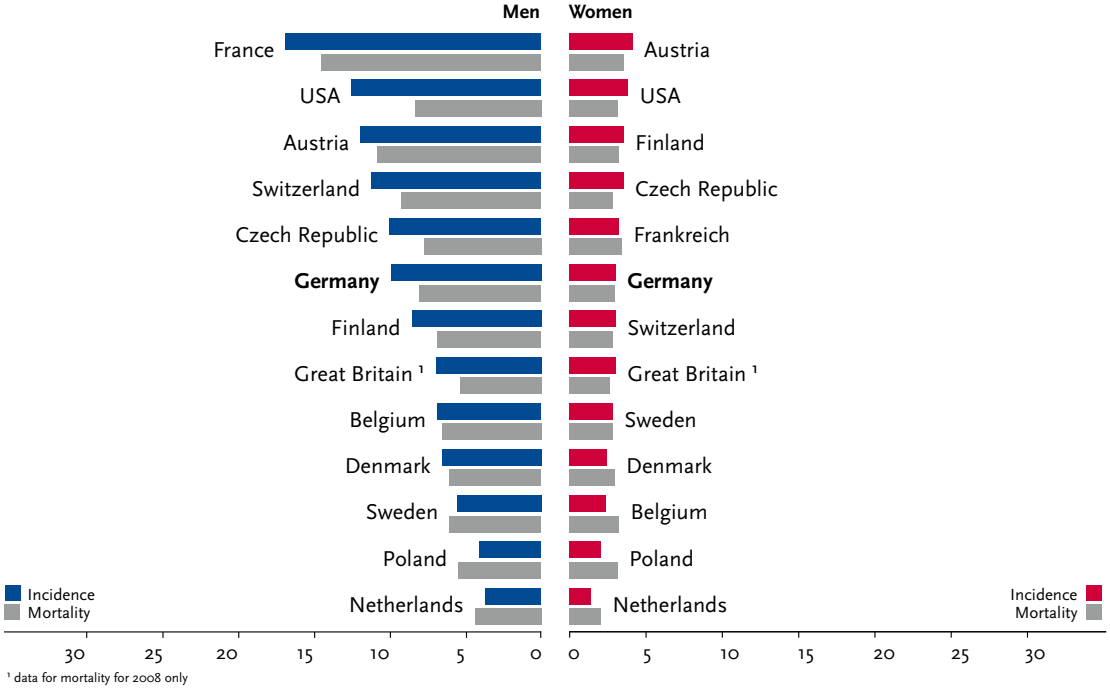



**Figure 3.6.6**
**International comparison of age-standardised incidence and mortality rates, by sex, ICD-10 C22, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*




¹ data for mortality for 2008 only

## 3.7 Gall bladder and biliary tract

**Table 3.7.1**
**Overview of key epidemiological parameters for Germany, ICD-10 C23 – C24**

| | 2009 | | 2010 | | Prediction for 2014 | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Incident cases | 2,210 | 3,080 | 2,240 | 3,070 | 2,400 | 2,700 |
| Crude incidence rate[1] | 5.5 | 7.4 | 5.6 | 7.4 | 6.0 | 6.6 |
| Standardised incidence rate[1,2] | 3.8 | 3.7 | 3.8 | 3.7 | 3.7 | 3.0 |
| Median age at diagnosis | 72 | 76 | 72 | 76 | | |
| Deaths | 1,190 | 2,035 | 1,234 | 2,041 | | |
| Crude mortality rate[1] | 3.0 | 4.9 | 3.1 | 4.9 | | |
| Standardised mortality rate[1,2] | 2.0 | 2.3 | 2.1 | 2.3 | | |
| 5-year prevalence | 3,600 | 4,200 | 3,600 | 4,200 | | |
| Absolute 5-year survival rate (2009-2010)[3] | | | 16 (7-27) | 15 (12-19) | | |
| Relative 5-year survival rate (2009-2010)[3] | | | 19 (8-31) | 18 (14-23) | | |

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

### Epidemiology

In Germany, about 5,300 new cases of malignant tumours of the gall bladder (approx. 40 %) and of the biliary tract outside the liver (60 %) were diagnosed in 2010. Women develop gall bladder carcinomas more frequently, whereas tumours in the extra hepatic biliary tracts are diagnosed more frequently in men.

Histologically, the majority of these are adenocarcinomas. Other histological variants such as squamous-cell carcinomas or hybrid forms are rare. As with liver cancer, the risk of developing this type increases steadily with age. The lifetime risk is about 0.6 % for women and 0.5 % for men.

Since 1999 the age-standardised incidence rate in Germany has declined for women and remained largely unchanged for men. However, because of demographic changes the absolute number of new cases has increased significantly among men. The age-standardised mortality rates for the same period have decreased constantly in both genders.

The survival prospects with malignant tumours of the gall bladder and biliary tract are generally poor, yet better than for liver cancer. The relative 5-year survival rate for women is 18 % and 19 % for men. Details with regard to tumour stage at point of diagnosis exist for approximately 50 % of gall bladder cases registered, most of which were diagnosed in stage T2 and T3.

### Risk factors and early detection

The triggers for gall bladder carcinomas are not absolutely clear. In the current scientific debate, the presence of gallstones, chronic inflammatory diseases of the biliary tract, such as a primary sclerosing cholangitis (PSC), the inflammatory bowel disease ulcerative colitis, liver diseases as a result of the high consumption of alcohol, hepatitis-C virus infection, and HIV infection are all deemed to be possible risk factors. As lifestyle related risk factors, obesity and smoking are suspected of increasing the risk of biliary tract carcinomas. Diabetes can also increase the risk, however, available studies do not show clearly enough whether this applies for both type 1 and type 2 diabetes. A further risk factor, especially in Asia, is an infection with the parasitic liver flukes Clonorchis sinensis or Opisthorchis viverrini.

Various markers are being tested for their suitability for early detection among persons at risk, however, without any practical consequences. There is no screening programme on offer for the general population. Often, however, early stage diagnosis is made upon removing the gall bladder for other reasons.

**Figure 3.7.1a**
**Age-standardised incidence and mortality rates, by sex, ICD-10 C23 – C24, Germany 1999 – 2010**
*per 100,000 (European standard)*

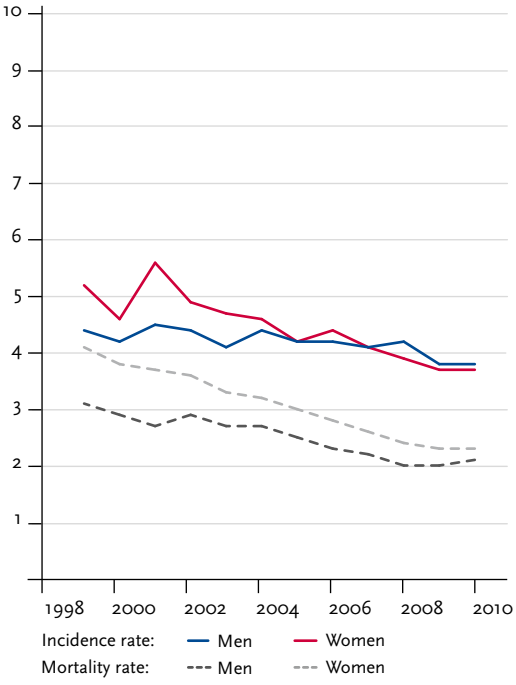



**Figure 3.7.1b**
**Absolute numbers of incident cases and deaths, by sex, ICD-10 C23 – C24, Germany 1999 – 2010**

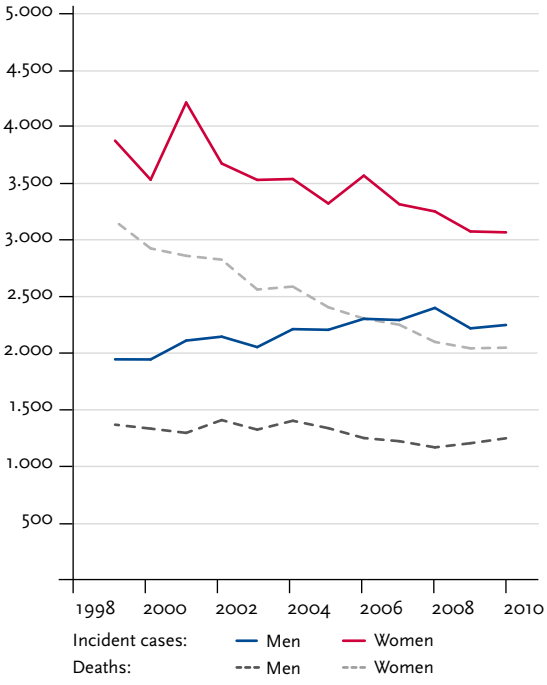



**Figure 3.7.2**
**Age-specific incidence rates by sex, ICD-10 C23 – C24, Germany 2009 – 2010**
*per 100,000*

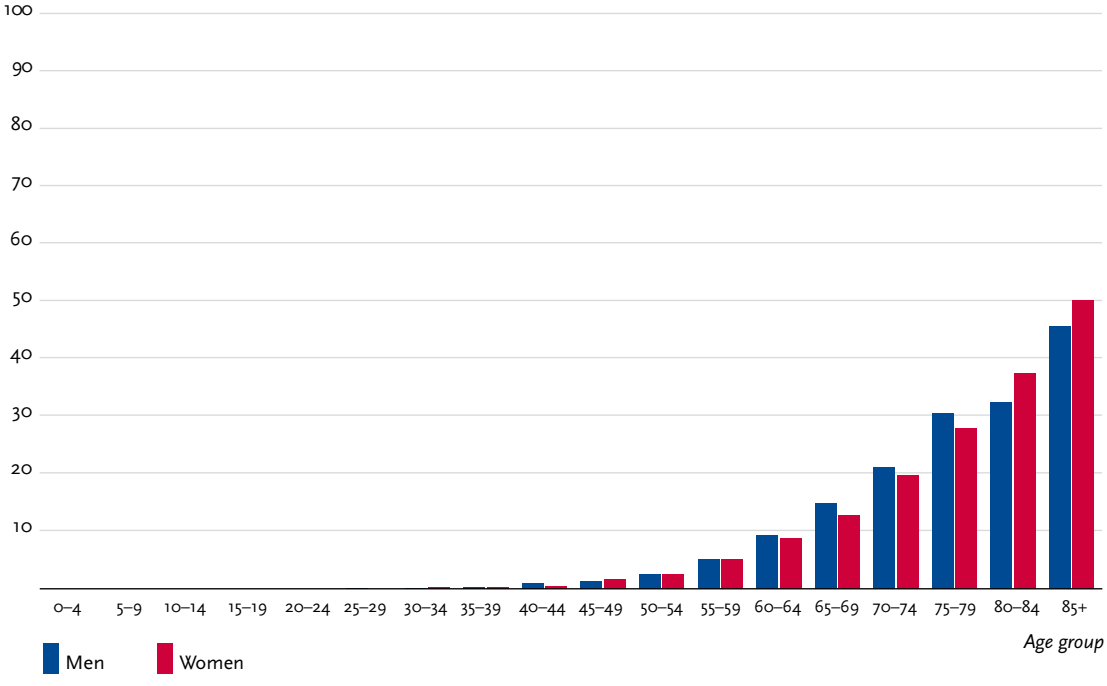


**Table 3.7.2**
**Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C23 – C24, database 2010**

| | 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 17,000) | 0.5% | (1 in 200) | <0.1% | (1 in 42,000) | 0.3% | (1 in 360) |
| 45 years | <0.1% | (1 in 5,000) | 0.5% | (1 in 200) | <0.1% | (1 in 9,700) | 0.3% | (1 in 360) |
| 55 years | 0.1% | (1 in 1,500) | 0.5% | (1 in 200) | <0.1% | (1 in 2,900) | 0.3% | (1 in 360) |
| 65 years | 0.2% | (1 in 640) | 0.5% | (1 in 210) | 0.1% | (1 in 1,100) | 0.3% | (1 in 370) |
| 75 years | 0.2% | (1 in 410) | 0.4% | (1 in 240) | 0.1% | (1 in 720) | 0.2% | (1 in 430) |
| Lifetime risk | | | 0.5% | (1 in 200) | | | 0.3% | (1 in 370) |
| **Women aged** | **in the next ten years** | | **ever** | | **in the next ten years** | | **ever** | |
| 35 years | <0.1% | (1 in 26,000) | 0.6% | (1 in 160) | <0.1% | (1 in 41,000) | 0.4% | (1 in 240) |
| 45 years | <0.1% | (1 in 4,400) | 0.6% | (1 in 160) | <0.1% | (1 in 8,400) | 0.4% | (1 in 240) |
| 55 years | 0.1% | (1 in 1,400) | 0.6% | (1 in 160) | <0.1% | (1 in 2,700) | 0.4% | (1 in 240) |
| 65 years | 0.2% | (1 in 650) | 0.6% | (1 in 170) | 0.1% | (1 in 1,000) | 0.4% | (1 in 250) |
| 75 years | 0.3% | (1 in 380) | 0.5% | (1 in 210) | 0.2% | (1 in 520) | 0.3% | (1 in 290) |
| Lifetime risk | | | 0.6% | (1 in 160) | | | 0.4% | (1 in 240) |

**Figure 3.7.3**
**Distribution of T-stages at first diagnosis by sex (top: all cases; bottom: only valid reports)**
**ICD-10 only C23, Germany 2009 – 2010**

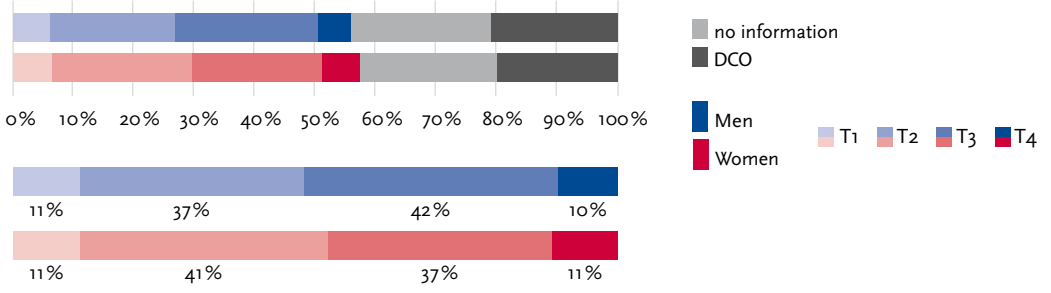



**Figure 3.7.4a**
**Absolute survival rates up to 5 years after first diagnosis, by sex, ICD-10 C23 – C24, Germany 2009 – 2010**

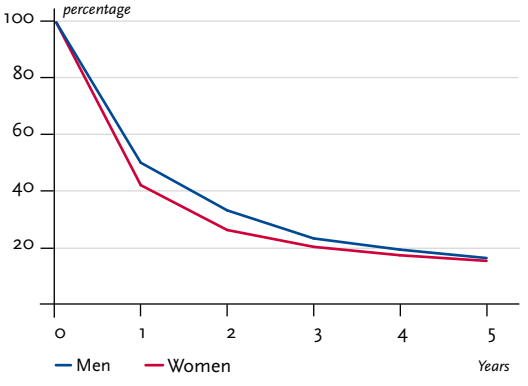



**Figure 3.7.4b**
**Relative survival rates up to 5 years after first diagnosis, by sex, ICD-10 C23 – C24, Germany 2009 – 2010**

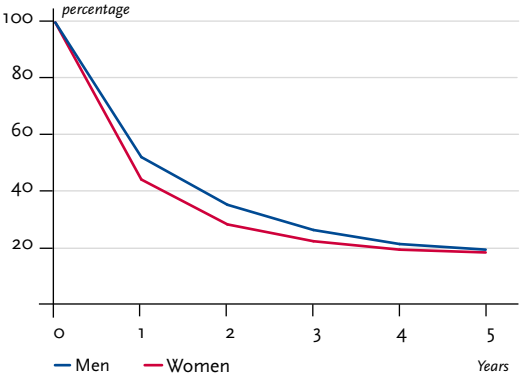


**Figure 3.7.5**
**Registered age-standardised incidence and mortality rates in German federal states, by sex, ICD-10 C23 – C24, 2009 – 2010**
*per 100,000 (European standard)*

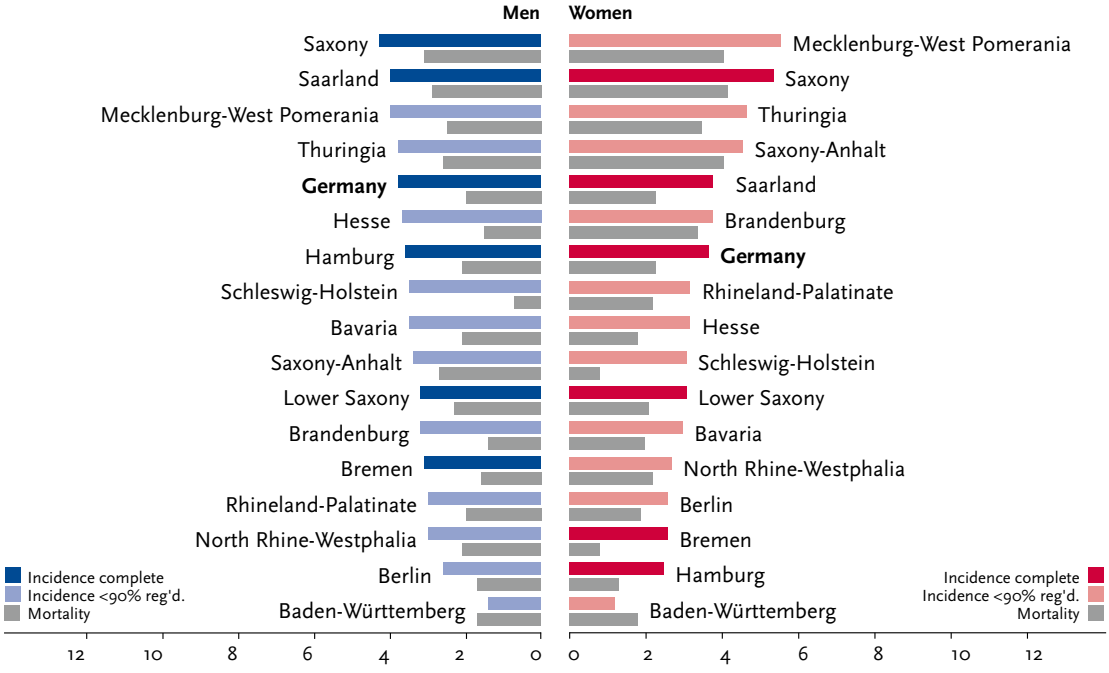
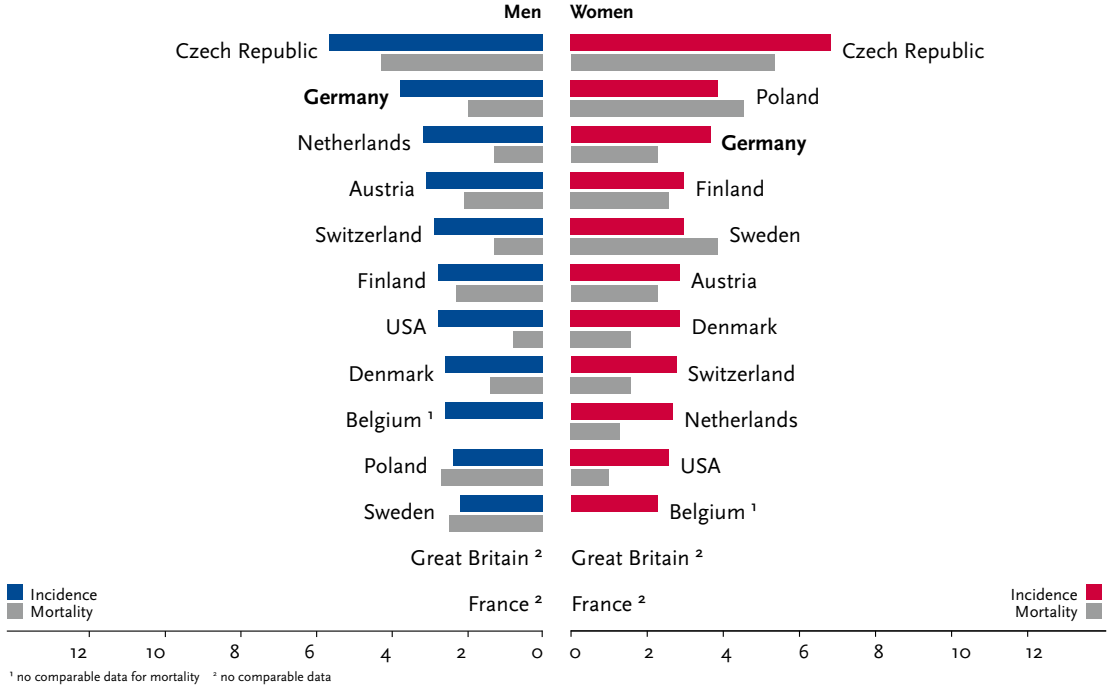



**Figure 3.7.6**
**International comparison of age-standardised incidence and mortality rates, by sex, ICD-10 C23 – C24, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*




¹ no comparable data for mortality ² no comparable data

## 3.8 Pancreas

**Table 3.8.1**
**Overview of key epidemiological parameters for Germany, ICD-10 C25**

| | 2009 | | 2010 | | Prediction for 2014 | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Incident cases | 7,790 | 7,840 | 8,020 | 8,060 | 8,500 | 8,900 |
| Crude incidence rate[1] | 19.4 | 18.8 | 20.0 | 19.4 | 21.4 | 21.6 |
| Standardised incidence rate[1,2] | 13.7 | 9.9 | 13.8 | 10.0 | 13.5 | 10.5 |
| Median age at diagnosis | 70 | 74 | 71 | 75 | | |
| Deaths | 7,410 | 7,748 | 7,537 | 7,950 | | |
| Crude mortality rate[1] | 18.5 | 18.6 | 18.8 | 19.1 | | |
| Standardised mortality rate[1,2] | 12.9 | 9.4 | 12.8 | 9.5 | | |
| 5-year prevalence | 7,100 | 7,200 | 7,300 | 7,400 | | |
| Absolute 5-year survival rate (2009-2010)[3] | | | 7 (3-9) | 7 (4-11) | | |
| Relative 5-year survival rate (2009-2010)[3] | | | 8 (4-11) | 8 (5-12) | | |

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

### Epidemiology

The pancreas produces hormones (endocrinal function of islet cells) as well as digestive juices (exocrine function). The vast majority of malignant tumours in the pancreas originate in the exocrine portion of the pancreas. In 2010 more than 16,000 people were diagnosed with pancreatic cancer. In line with the unfavourable prognosis, almost that many people also died of the disease. The age-standardised incidence and mortality rates have remained almost constant since the late 1990s, whereas the absolute number of new cases and deaths has risen steadily.

In the early stages, malignant neoplasms of the pancreas frequently cause no or only nonspecific symptoms, thus the tumour is frequently only detected late. Accordingly, the relative 5-year survival rate is extremely unfavourable. In Germany it is 8 % for both men and women, although the rare malignant islet cell tumours have a significantly better prognosis. The pancreatic carcinoma thus has the lowest survival rate of all forms of cancer and is the fourth most frequent cause of death due to cancer.

The median age at diagnosis is 71 years for men and 75 years for women. The mean lifetime risk of developing pancreatic cancer is 1.6 % for both sexes.

### Risk factors

Smoking tobacco is a proven risk factor, and passive smoking also plays a part. Obesity (adiposity) is another risk factor. Further lifestyle-related factors and in particular the influence of diet, have not been conclusively proven. It is believed that high consumption of processed meat goods can increase the risk. High consumption of alcohol similarly appears to increase the risk.

The risk of developing pancreatic cancer is also higher for patients with type 2 diabetes mellitus. Patients with long-term chronic inflammation of the pancreas (pancreatitis) also have an increased risk.

First-degree relatives of patients with a pancreatic carcinoma have a statistically higher risk of developing the cancer themselves, although it is not clear whether this is due to a hereditary predisposition or a shared lifestyle. An inheritable risk does indeed appear to play a part for some patients at least. People with two or more first-degree relative patients are at a significantly higher risk of also developing the disease compared to the normal population. Research is being conducted to analyse which genes are involved. The risk of developing this cancer is also high for people affected by one of the known, rare, genetic cancer syndromes.

It is not yet clear what role is played by environmental factors or occupational exposure to harmful substances.

**Figure 3.8.1a**
**Age-standardised incidence and mortality rates, by sex, ICD-10 C25, Germany 1999 – 2010**
*per 100,000 (European standard)*

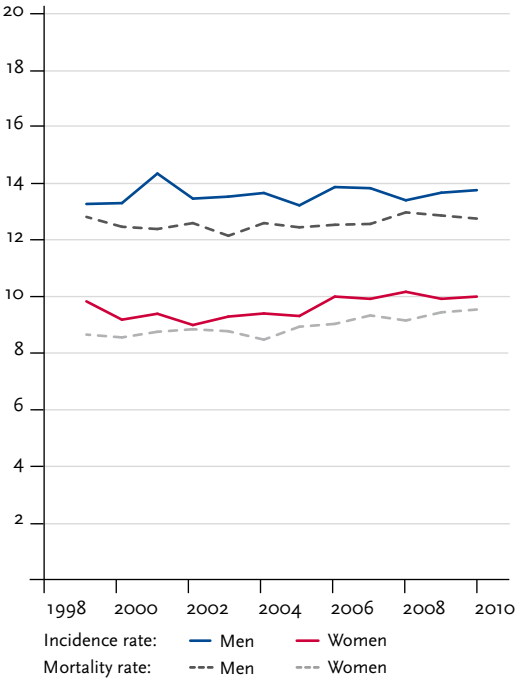



**Figure 3.8.1b**
**Absolute numbers of incident cases and deaths, by sex, ICD-10 C25, Germany 1999 – 2010**

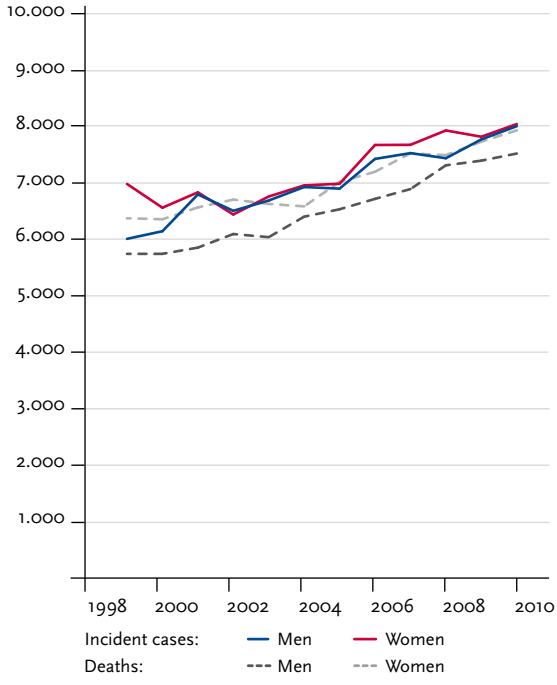



**Figure 3.8.2**
**Age-specific incidence rates by sex, ICD-10 C25, Germany 2009 – 2010**
*per 100,000*

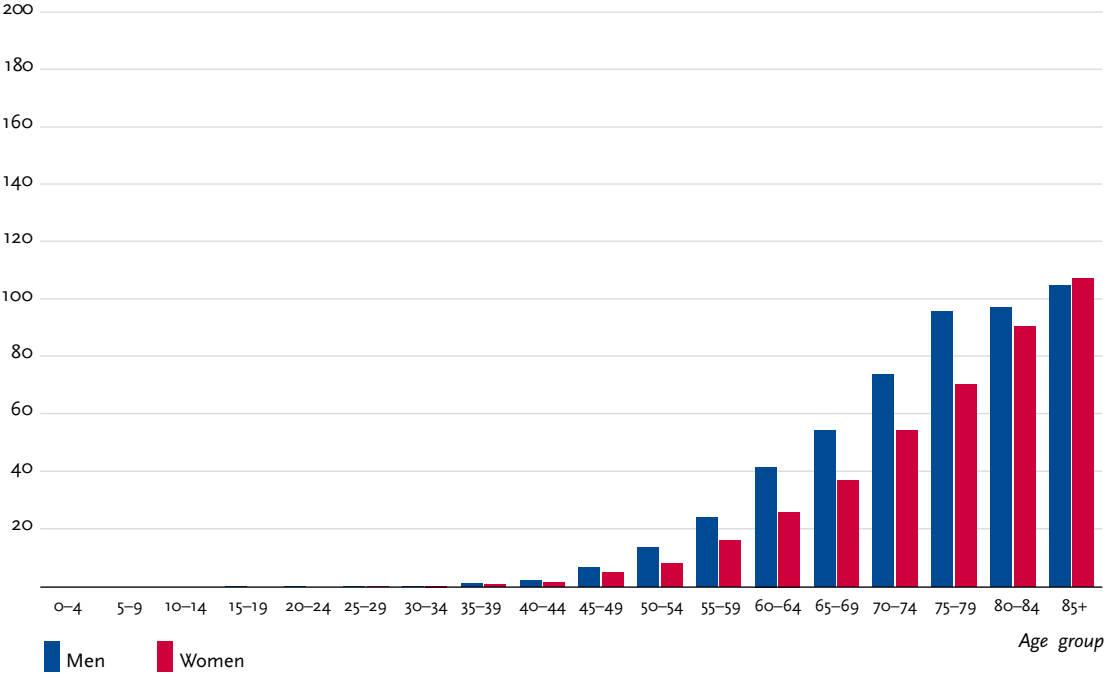


**Table 3.8.2**
**Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C25, database 2010**

| | 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 4,900) | 1.7% | (1 in 60) | <0.1% | (1 in 6,000) | 1.6% | (1 in 62) |
| 45 years | 0.1% | (1 in 1,000) | 1.7% | (1 in 60) | 0.1% | (1 in 1,200) | 1.6% | (1 in 62) |
| 55 years | 0.3% | (1 in 300) | 1.6% | (1 in 61) | 0.3% | (1 in 360) | 1.6% | (1 in 63) |
| 65 years | 0.6% | (1 in 170) | 1.5% | (1 in 69) | 0.6% | (1 in 180) | 1.5% | (1 in 68) |
| 75 years | 0.8% | (1 in 130) | 1.1% | (1 in 90) | 0.8% | (1 in 130) | 1.2% | (1 in 86) |
| Lifetime risk | | | 1.6% | (1 in 61) | | | 1.6% | (1 in 63) |
| **Women aged** | **in the next ten years** | | **ever** | | **in the next ten years** | | **ever** | |
| 35 years | <0.1% | (1 in 8,100) | 1.6% | (1 in 61) | <0.1% | (1 in 10,000) | 1.6% | (1 in 62) |
| 45 years | 0.1% | (1 in 1,500) | 1.6% | (1 in 61) | 0.1% | (1 in 1,800) | 1.6% | (1 in 62) |
| 55 years | 0.2% | (1 in 470) | 1.6% | (1 in 63) | 0.2% | (1 in 550) | 1.6% | (1 in 62) |
| 65 years | 0.4% | (1 in 230) | 1.5% | (1 in 68) | 0.4% | (1 in 240) | 1.5% | (1 in 67) |
| 75 years | 0.7% | (1 in 150) | 1.2% | (1 in 85) | 0.7% | (1 in 140) | 1.2% | (1 in 82) |
| Lifetime risk | | | 1.6% | (1 in 62) | | | 1.6% | (1 in 62) |

**Figure 3.8.3**
**Distribution of T-stages at first diagnosis by sex**
*Not presented due to the large proportion of missing data.*

**Figure 3.8.4a**
**Absolute survival rates up to 5 years after first diagnosis, by sex, ICD-10 C25, Germany 2009 – 2010**

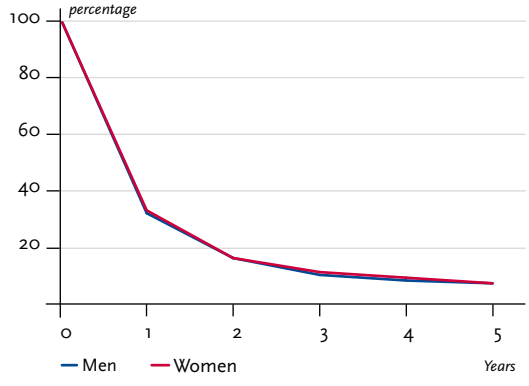



**Figure 3.8.4b**
**Relative survival rates up to 5 years after first diagnosis, by sex, ICD-10 C25, Germany 2009 – 2010**

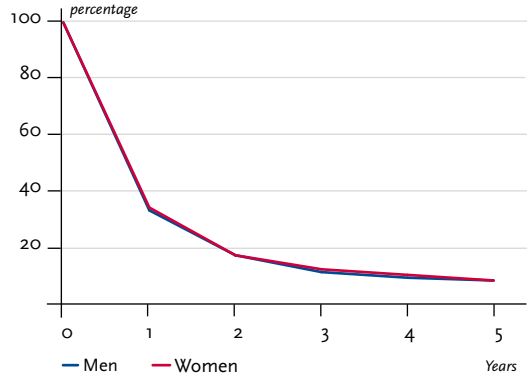


**Figure 3.8.5**
**Registered age-standardised incidence and mortality rates in German federal states, by sex, ICD-10 C25, 2009 – 2010**
*per 100,000 (European standard)*

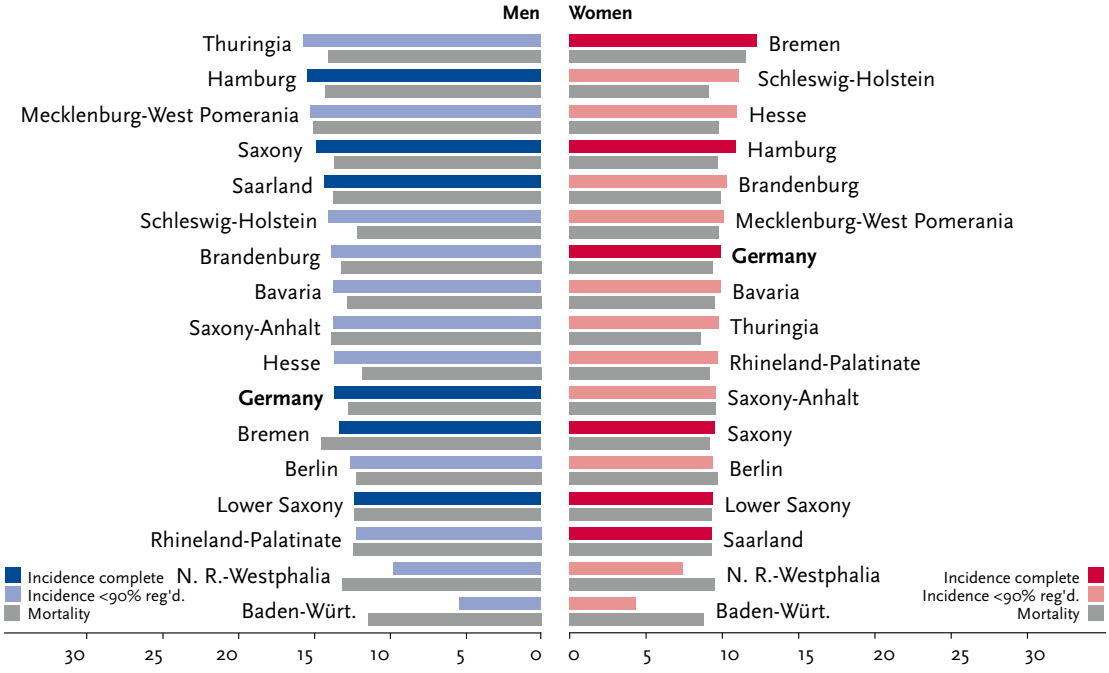
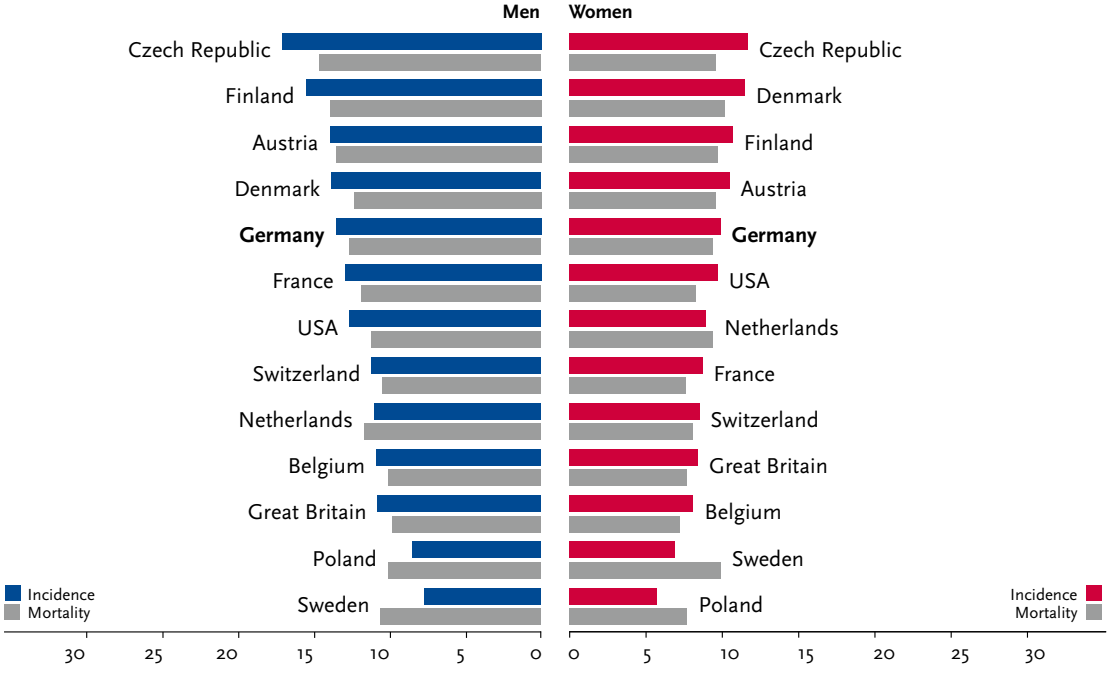



**Figure 3.8.6**
**International comparison of age-standardised incidence and mortality rates, by sex, ICD-10 C25, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*



## 3.9 Larynx

**Table 3.9.1**
**Overview of key epidemiological parameters for Germany, ICD-10 C32**

| | 2009 | | 2010 | | Prediction for 2014 | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Incident cases | 3,330 | 510 | 3,230 | 460 | 3,300 | 600 |
| Crude incidence rate[1] | 8.3 | 1.2 | 8.1 | 1.1 | 8.3 | 1.4 |
| Standardised incidence rate[1,2] | 6.3 | 0.9 | 6.0 | 0.8 | 5.7 | 1.0 |
| Median age at diagnosis | 66 | 64 | 66 | 63 | | |
| Deaths | 1,215 | 162 | 1,261 | 188 | | |
| Crude mortality rate[1] | 3.0 | 0.4 | 3.1 | 0.5 | | |
| Standardised mortality rate[1,2] | 2.2 | 0.3 | 2.2 | 0.3 | | |
| 5-year prevalence | 12,100 | 1,700 | 12,000 | 1,700 | | |
| Absolute 5-year survival rate (2009-2010)[3] | | | 58 (50-62) | 59 | | |
| Relative 5-year survival rate (2009-2010)[3] | | | 65 (56-70) | 65 | | |

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

### Epidemiology

Men are affected by laryngeal cancer considerably more frequently than women due to their higher consumption of tobacco and alcohol. Currently one in 170 men in Germany develops laryngeal cancer during their lifetime, but only one in 1,200 women (lifetime risk). The median age of diagnosis in women is 63 years and in men 66 years.

The incidence and mortality rates for men have continued to decline since the turn of the millennium, very markedly among younger individuals. For the same period, the rates for women have not increased further. Here too, incidence rates among the under 50 year-olds are in decline. In the first decade of this century this resulted in a decrease in the mortality and incidence rates among men, with the number of cases among women remaining unchanged.

The relative 5-year survival rates for men and women do not differ, each with a rate of 65 %. Tumours of the larynx are diagnosed at an early stage (T1) in approximately one third of all cases. The vast majority of all cases of laryngeal cancer are squamous-cell carcinomas.

### Risk factors

Smoking is the most important risk factor for the development of laryngeal cancer. Alcohol consumption also increases the probability of developing this cancer, whereby the combination of both factors is particularly harmful. The influences of lifestyle, diet, or environmental factors are not yet completely clear, because in the majority of cases the influence of tobacco and alcohol consumption overshadows other effects. However, there are indications that increased consumption of red meat, as well as a vitamin-deficient diet may increase risk. There is a known link between tumours of the larynx and occupational exposure to asbestos, nickel or polycyclic aromatic hydrocarbons. The role of infections with human papilloma viruses (HPV) has not been completely clarified to date. There are indications that infections with Helicobacter pylori may also be of significance.

First-degree relatives of patients have a higher risk of developing laryngeal cancer, but it is not clear in detail, whether this is attributable to risk-genes which are directly involved in the development of the tumour or to genes which determine the individual susceptibility to carcinogens.

**Figure 3.9.1a**
**Age-standardised incidence and mortality rates, by sex, ICD-10 C32, Germany 1999 – 2010**
*per 100,000 (European standard)*

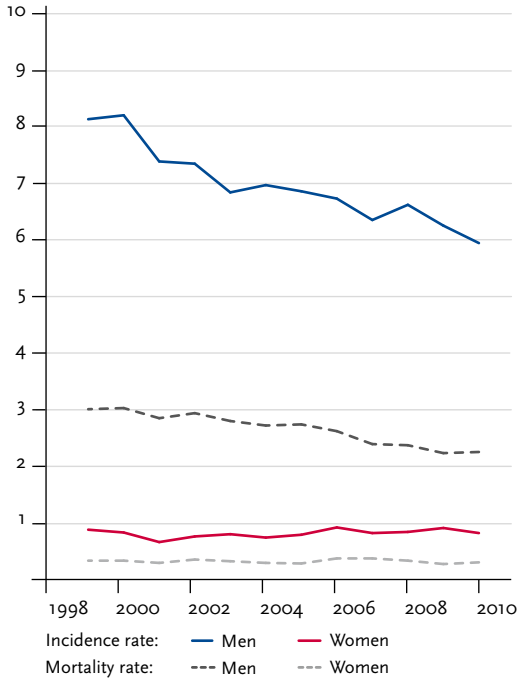



**Figure 3.9.1b**
**Absolute numbers of incident cases and deaths, by sex, ICD-10 C32, Germany 1999 – 2010**

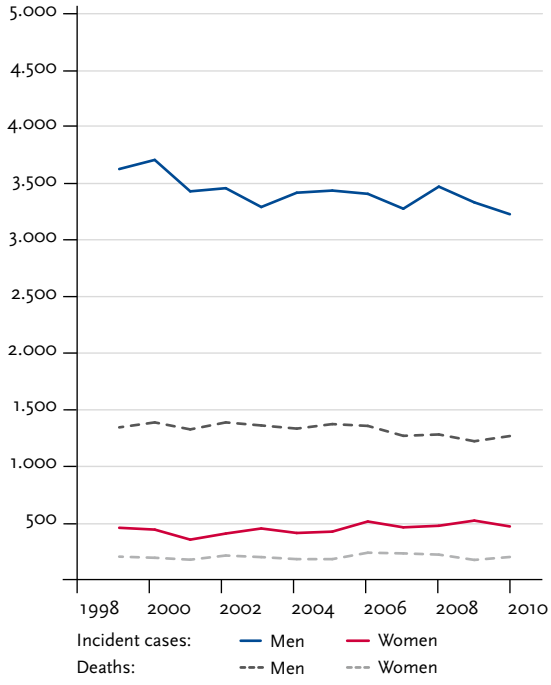



**Figure 3.9.2**
**Age-specific incidence rates by sex, ICD-10 C32, Germany 2009 – 2010**
*per 100,000*

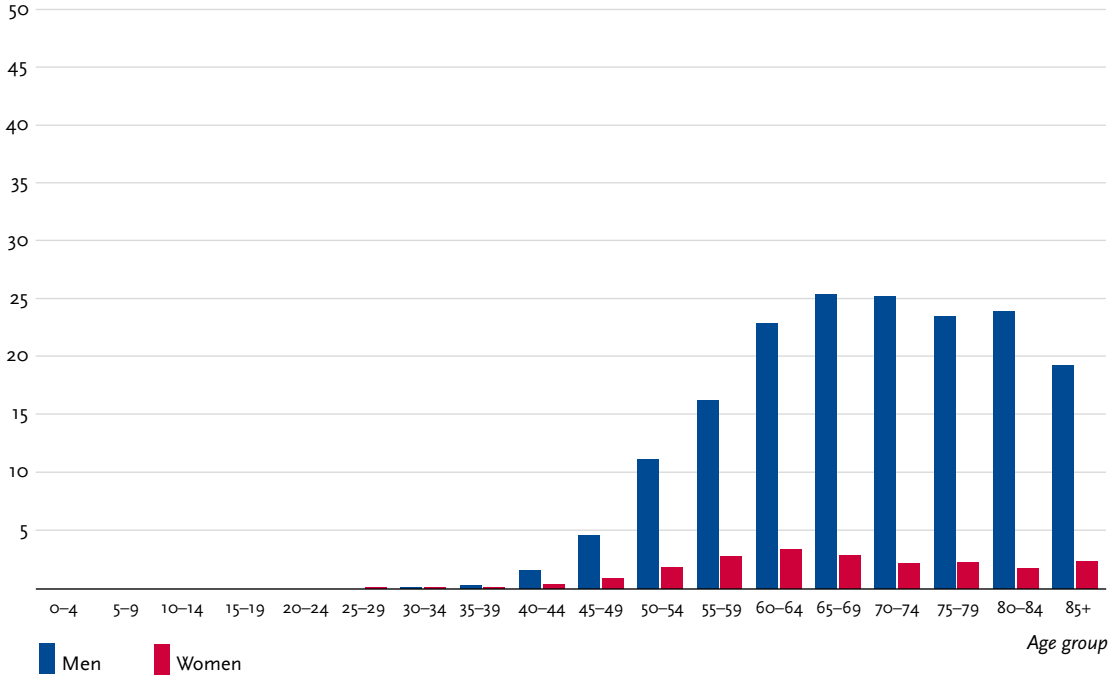


**Table 3.9.2**
**Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C32, database 2010**

| | 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 9,000) | 0.6% | (1 in 160) | <0.1% | (1 in 49,000) | 0.3% | (1 in 390) |
| 45 years | 0.1% | (1 in 1,400) | 0.6% | (1 in 160) | <0.1% | (1 in 4,500) | 0.3% | (1 in 380) |
| 55 years | 0.2% | (1 in 550) | 0.6% | (1 in 180) | 0.1% | (1 in 1,700) | 0.2% | (1 in 400) |
| 65 years | 0.2% | (1 in 440) | 0.4% | (1 in 240) | 0.1% | (1 in 1,200) | 0.2% | (1 in 480) |
| 75 years | 0.2% | (1 in 570) | 0.2% | (1 in 420) | 0.1% | (1 in 980) | 0.2% | (1 in 640) |
| Lifetime risk | | | 0.6% | (1 in 170) | | | 0.3% | (1 in 390) |
| **Women aged** | **in the next ten years** | | **ever** | | **in the next ten years** | | **ever** | |
| 35 years | <0.1% | (1 in 38,000) | 0.1% | (1 in 1,200) | <0.1% | (1 in 181,000) | <0.1% | (1 in 2,800) |
| 45 years | <0.1% | (1 in 7,200) | 0.1% | (1 in 1,200) | <0.1% | (1 in 28,000) | <0.1% | (1 in 2,800) |
| 55 years | <0.1% | (1 in 3,600) | 0.1% | (1 in 1,400) | <0.1% | (1 in 14,000) | <0.1% | (1 in 3,100) |
| 65 years | <0.1% | (1 in 4,900) | <0.1% | (1 in 2,300) | <0.1% | (1 in 8,800) | <0.1% | (1 in 3,700) |
| 75 years | <0.1% | (1 in 5,400) | <0.1% | (1 in 3,700) | | (1 in 9,100) | | (1 in 5,700) |
| Lifetime risk | | | 0.1% | (1 in 1,200) | | | <0.1% | (1 in 2,800) |

**Figure 3.9.3**
**Distribution of T-stages at first diagnosis by sex (top: all cases; bottom: only valid reports)**
**ICD-10 C32, Germany 2009 – 2010**

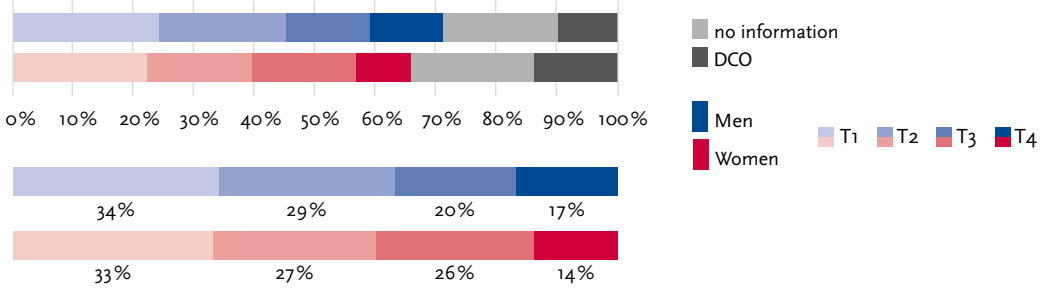



**Figure 3.9.4a**
**Absolute survival rates up to 5 years after first diagnosis, by sex, ICD-10 C32, Germany 2009 – 2010**

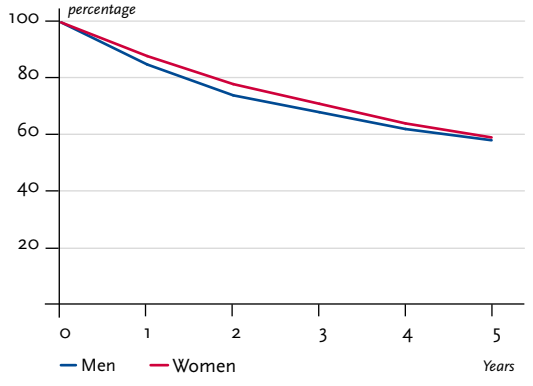



**Figure 3.9.4b**
**Relative survival rates up to 5 years after first diagnosis, by sex, ICD-10 C32, Germany 2009 – 2010**

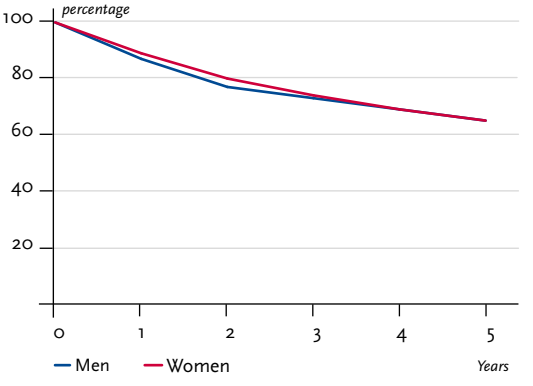


**Figure 3.9.5**
**Registered age-standardised incidence and mortality rates in German federal states, by sex, ICD-10 C32, 2009 – 2010**
*per 100,000 (European standard)*

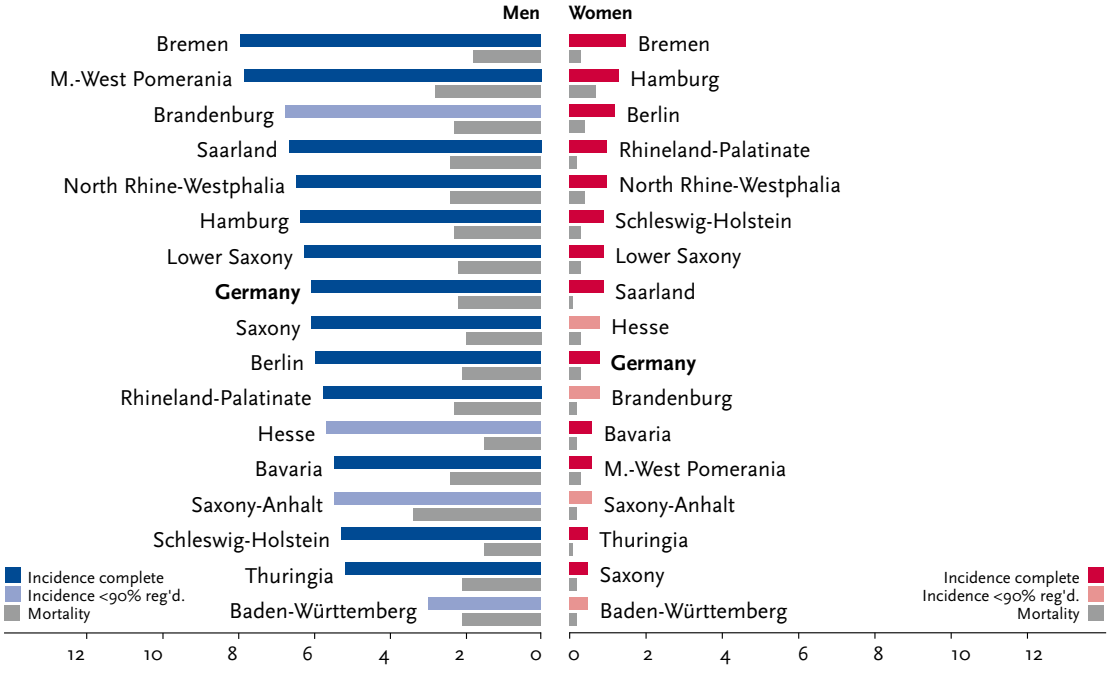
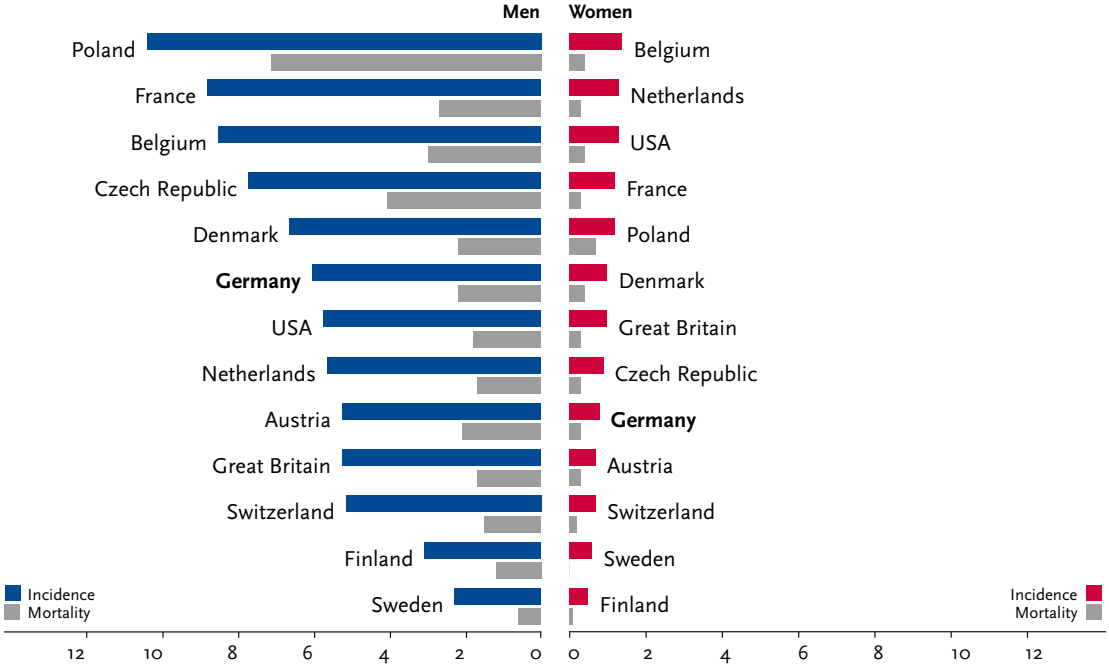



**Figure 3.9.6**
**International comparison of age-standardised incidence and mortality rates, by sex, ICD-10 C32, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*



## 3.10 Lung

**Table 3.10.1**
**Overview of key epidemiological parameters for Germany, ICD-10 C33 – C34**

| | 2009 | | 2010 | | Prediction for 2014 | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Incident cases | 35,500 | 16,550 | 35,040 | 17,030 | 36,000 | 19,600 |
| Crude incidence rate[1] | 88.5 | 39.6 | 87.4 | 40.9 | 90.6 | 47.6 |
| Standardised incidence rate[1,2] | 62.6 | 26.0 | 60.7 | 26.5 | 57.8 | 29.2 |
| Median age at diagnosis | 69 | 68 | 70 | 68 | | |
| Deaths | 29,158 | 13,103 | 29,381 | 13,627 | | |
| Crude mortality rate[1] | 72.7 | 31.4 | 73.3 | 32.7 | | |
| Standardised mortality rate[1,2] | 50.6 | 19.3 | 49.9 | 19.8 | | |
| 5-year prevalence | 49,200 | 26,200 | 49,000 | 27,100 | | |
| Absolute 5-year survival rate (2009-2010)[3] | | | 14 (12-16) | 19 (16-25) | | |
| Relative 5-year survival rate (2009-2010)[3] | | | 16 (14-19) | 21 (17-28) | | |

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

### Epidemiology

In 2010 about 17,000 women and 35,000 men were diagnosed with malignant lung tumours and about 13,600 woman and 29,400 men died of the disease. Lung cancer therefore remains by far the commonest cause of death due to cancer among men in Germany, accounting for 25 % of deaths due to cancer, while it is the second most common among women (14 %).

The age-standardised incidence and mortality rates show opposing trends for men and for women. Among women they have risen by some 30 % since the end of the 1990s, while for men the rates over the same period have fallen by about 20 %. These differing trends for the two sexes can be attributed to a change in smoking habits dating back some time and will probably continue in future. In terms of prognosis, lung cancer is one of the more unfavourable cancers, with relatively low 5-year survival rates of about 21 % for women and 16 % for men. Histologically, three main types are distinguished. Adenocarcinomas account for a third of all cases, while squamous-cell and small-cell lung carcinomas each account for about a quarter of cases. Due to the tendency to metastasise early, small cell carcinomas have the worst prognosis.

### Risk factors and early detection

Exposure to tobacco smoke has long been recognised as the main risk factor for lung cancer. Up to nine out of ten cases of lung cancer in men, and at least six out of ten cases in women are attributable to active smoking. Passive smoke inhalation also increases the risk of cancer and is a major contributor to indoor pollution.

Other risk factors play a comparatively minor role. About 9 to 15 out of 100 cases of lung cancer are attributable to exposure to various carcinogenic substances, including asbestos, polycyclic aromatic hydrocarbons and quartz and nickel dust. In areas with a high natural exposure to radon in buildings, the risk of lung cancer is higher for occupants, particularly in lower storeys. This also applies for occupational exposure to radon or other sources of ionising radiation. Diesel exhaust fumes are the most important risk factor among air pollutants. Other environmental pollutants (e.g. particulate matter) are presumed to have an effect, but the extent of this is still the subject of research. The same applies for the influence of genetic factors. There is also a relationship between infection with human papilloma virus (HPV) or Epstein-Barr virus (EBV) and the development of lung carcinomas.

To date there is no established means of screening for lung cancer. The role that examinations, such as a regular computed tomography, could have for risk groups is being explored in clinical trials.

**Figure 3.10.1a**
**Age-standardised incidence and mortality rates, by sex, ICD-10 C33 – C34, Germany 1999 – 2010**
*per 100,000 (European standard)*

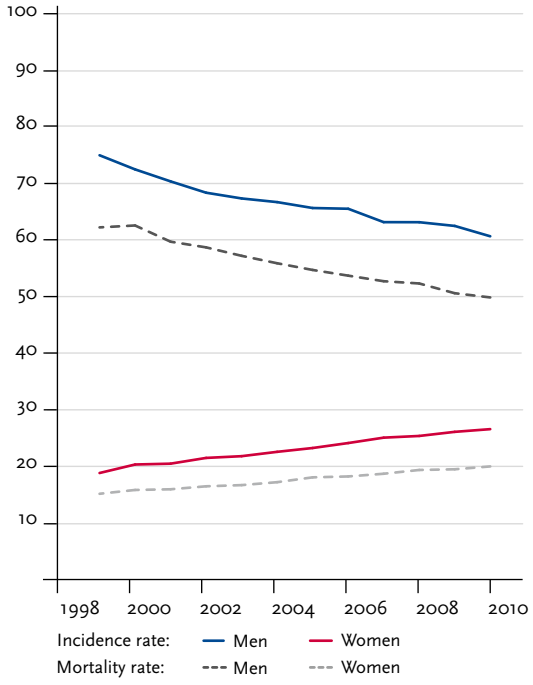



**Figure 3.10.1b**
**Absolute numbers of incident cases and deaths, by sex, ICD-10 C33 – C34, Germany 1999 – 2010**

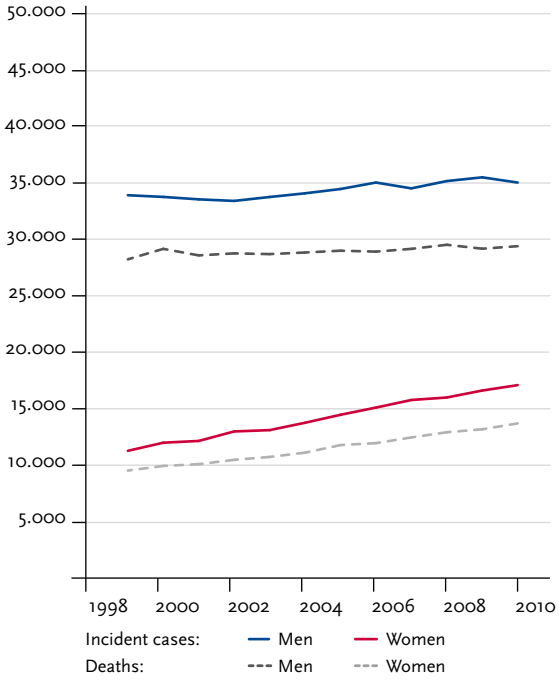



**Figure 3.10.2**
**Age-specific incidence rates by sex, ICD-10 C33 – C34, Germany 2009 – 2010**
*per 100,000*

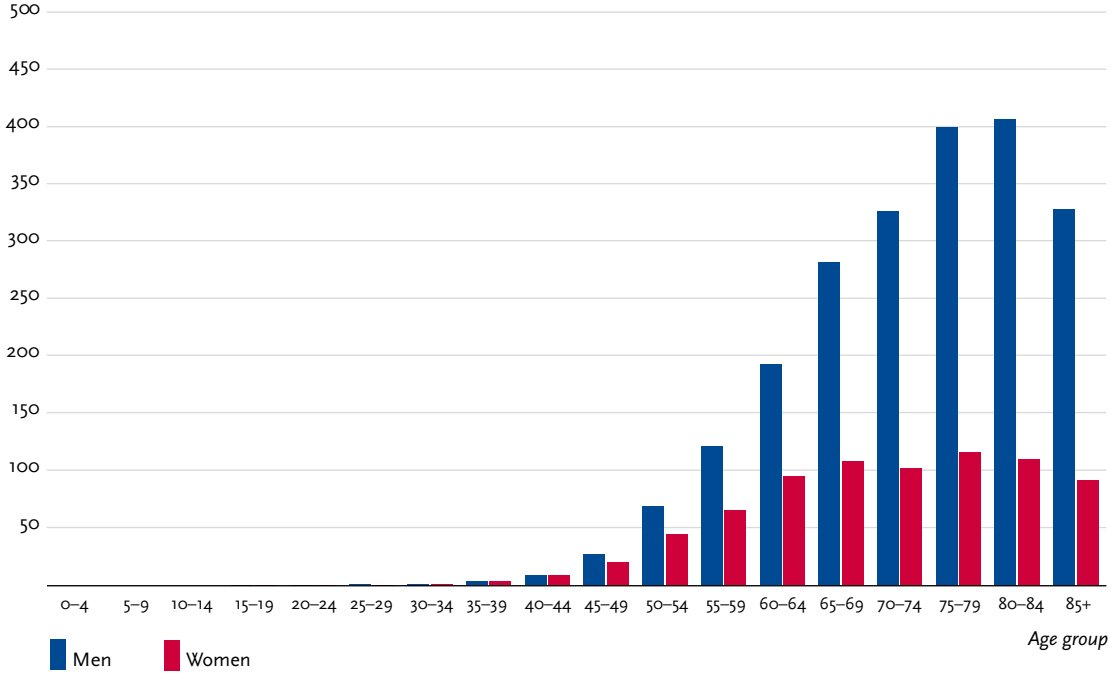


**Table 3.10.2**
**Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C33 – C34, database 2010**

| | 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 1,400) | 7.1% | (1 in 14) | <0.1% | (1 in 2,500) | 6.1% | (1 in 16) |
| 45 years | 0.5% | (1 in 210) | 7.1% | (1 in 14) | 0.3% | (1 in 300) | 6.2% | (1 in 16) |
| 55 years | 1.5% | (1 in 67) | 6.9% | (1 in 14) | 1.1% | (1 in 88) | 6.1% | (1 in 16) |
| 65 years | 2.7% | (1 in 37) | 6.0% | (1 in 17) | 2.2% | (1 in 45) | 5.5% | (1 in 18) |
| 75 years | 3.0% | (1 in 33) | 4.2% | (1 in 24) | 2.9% | (1 in 34) | 4.2% | (1 in 24) |
| Lifetime risk | | | 7.0% | (1 in 14) | | | 6.0% | (1 in 17) |
| **Women aged** | **in the next ten years** | | **ever** | | **in the next ten years** | | **ever** | |
| 35 years | 0.1% | (1 in 1,400) | 3.2% | (1 in 31) | <0.1% | (1 in 2,700) | 2.6% | (1 in 38) |
| 45 years | 0.3% | (1 in 310) | 3.2% | (1 in 31) | 0.2% | (1 in 470) | 2.6% | (1 in 38) |
| 55 years | 0.8% | (1 in 130) | 2.9% | (1 in 34) | 0.6% | (1 in 180) | 2.5% | (1 in 41) |
| 65 years | 1.0% | (1 in 96) | 2.2% | (1 in 45) | 0.8% | (1 in 130) | 2.0% | (1 in 50) |
| 75 years | 1.0% | (1 in 100) | 1.4% | (1 in 73) | 0.9% | (1 in 110) | 1.4% | (1 in 72) |
| Lifetime risk | | | 3.2% | (1 in 31) | | | 2.6% | (1 in 38) |

**Figure 3.10.3**
**Distribution of T-stages at first diagnosis by sex**
*Not presented due to the large proportion of missing data.*

**Figure 3.10.4a**
**Absolute survival rates up to 5 years after first diagnosis, by sex, ICD-10 C33 – C34, Germany 2009 – 2010**

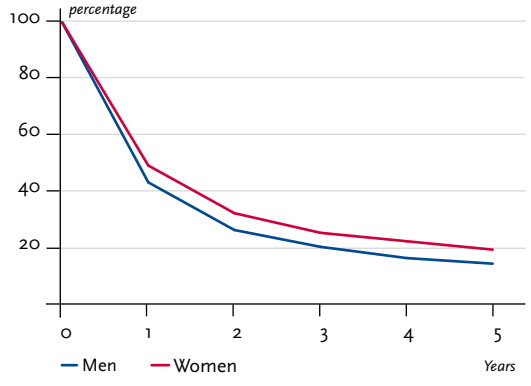



**Figure 3.10.4b**
**Relative survival rates up to 5 years after first diagnosis, by sex, ICD-10 C33 – C34, Germany 2009 – 2010**

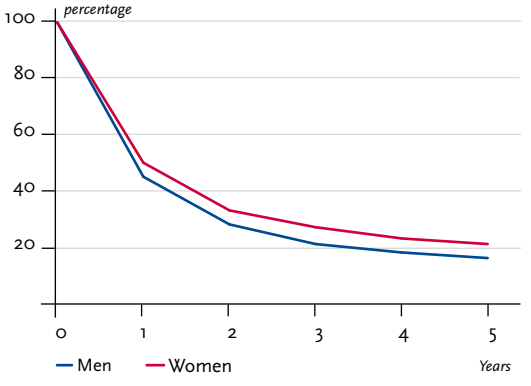


**Figure 3.10.5**
**Registered age-standardised incidence and mortality rates in German federal states, by sex, ICD-10 C33 – C34, 2009 – 2010**
*per 100,000 (European standard)*

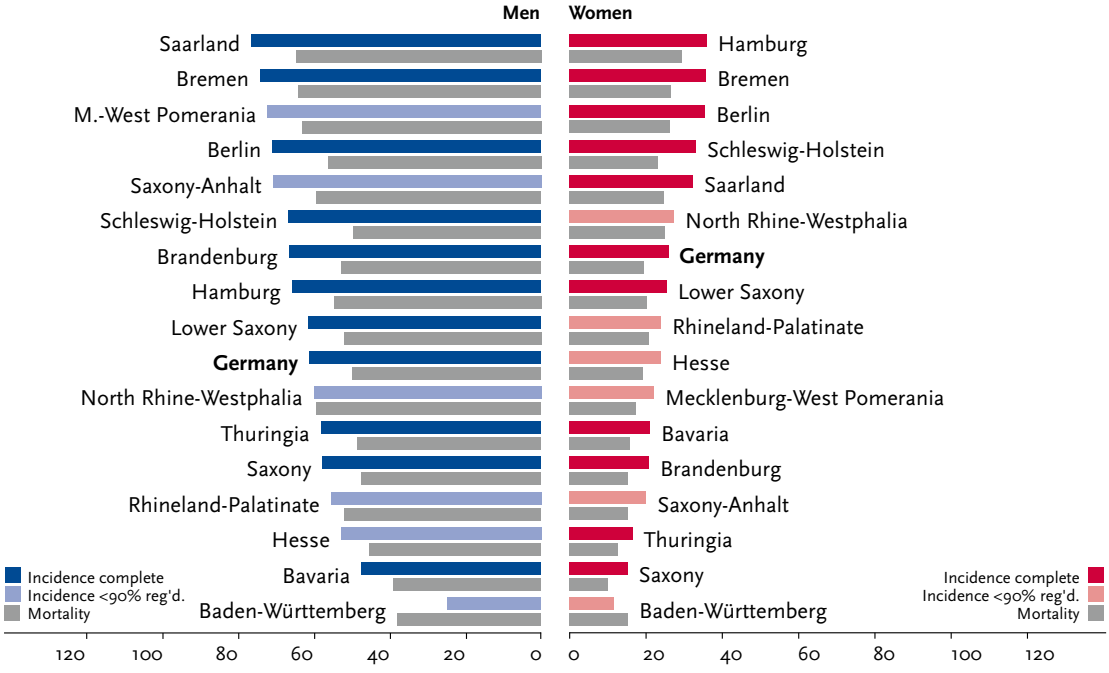
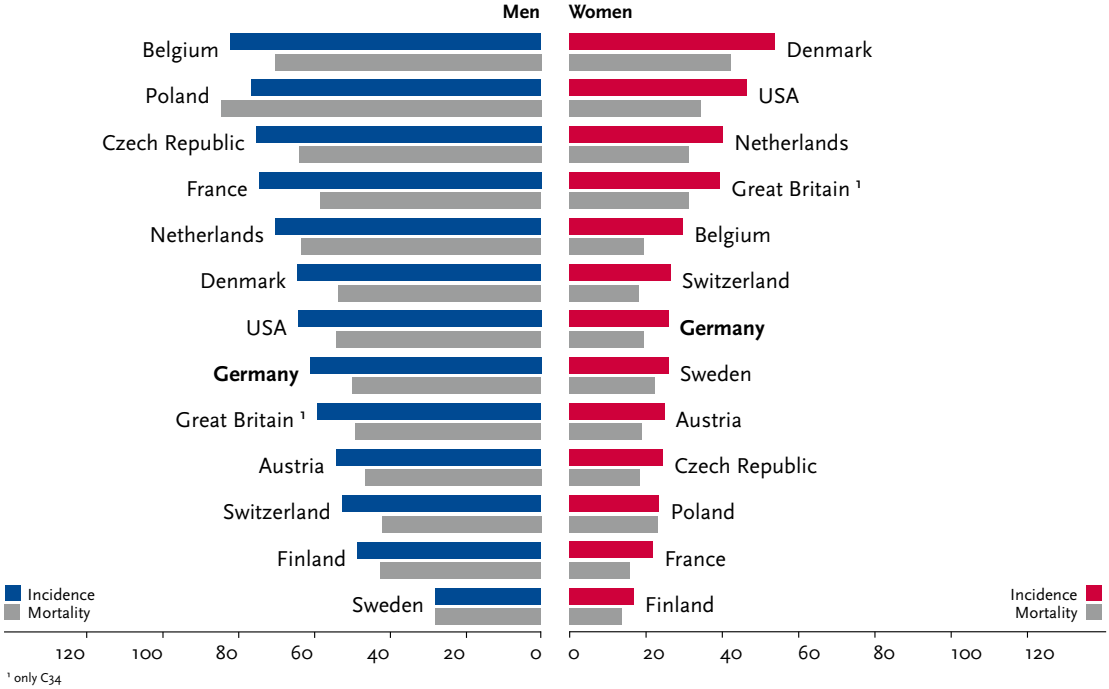



**Figure 3.10.6**
**International comparison of age-standardised incidence and mortality rates, by sex, ICD-10 C33 – C34, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*




¹ only C34

## 3.11 Malignant melanoma of the skin

**Table 3.11.1**
**Overview of key epidemiological parameters for Germany, ICD-10 C43**

| | 2009 | | 2010 | | Prediction for 2014 | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Incident cases | 9,640 | 9,660 | 9,640 | 9,580 | 10,100 | 9,600 |
| Crude incidence rate[1] | 24,0 | 23,1 | 24,0 | 23,0 | 25,4 | 23,4 |
| Standardised incidence rate[1,2] | 18,2 | 17,9 | 18,0 | 17,8 | 18,0 | 17,8 |
| Median age at diagnosis | 66 | 59 | 66 | 58 | | |
| Deaths | 1,454 | 1,203 | 1,568 | 1,143 | | |
| Crude mortality rate[1] | 3,6 | 2,9 | 3,9 | 2,7 | | |
| Standardised mortality rate[1,2] | 2,6 | 1,7 | 2,8 | 1,6 | | |
| 5-year prevalence | 35,900 | 38,800 | 38,200 | 40,700 | | |
| Absolute 5-year survival rate (2009-2010)[3] | | | 78 (70-83) | 86 (80-90) | | |
| Relative 5-year survival rate (2009-2010)[3] | | | 89 (83-95) | 94 (88-98) | | |

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

### Epidemiology

The introduction of clinical screening for skin cancer in 2008 led to a marked increase in the incidence of malignant melanoma that year. Since then the incidence has been approximately 20 % higher than the previous level. Approximately 9,600 men and a similar number of women were diagnosed with a malignant melanoma of the skin in 2010. In addition, about 6,000 in situ melanomas were detected even earlier predominantly in women.

The median age of women at diagnosis is currently 58 years, which is lower than previously. The median age of men at diagnosis is eight years later. This corresponds to a higher risk of developing the disease and to significantly higher incidence rates among younger women (under 55 years) and older men (over 55 years).

Since the 1980s, the age-standardised incidence rates have risen significantly in western industrialised nations and in some cases have more than tripled. The highest incidence rates in Europe are currently found in Denmark, and within Germany a clear geographical pattern is evident. Since 1990 mortality rates in Germany have remained nearly constant.

Currently, the relative 5-year survival rate in Germany for women with malignant melanoma of the skin is 94 % and for men is 89 %. These favourable survival rates are due in part to the fact that more than half of the melanomas were discovered at an early stage (T1). This proportion has risen markedly since 2008.

### Risk factors and early detection

People with a light skin type, which tans poorly or not at all, and people with a large number of skin pigmentations (acquired, congenital, and dysplastic naevi) have a higher risk of developing a melanoma, and genetic factors can therefore also play a part. High-risk genes have been identified, which are linked to rare familial clusters of melanoma, as well as medium-risk genes and hereditary dispositions, which increase the likelihood of "spontaneously" developing malignant melanomas as a result of other risk factors.

The most important exogenous risk factor is exposure to natural sunlight or artificial UV-radiation during childhood and youth. Particularly recurrent, intense exposure to UV-radiation, such as during summer holidays, increases the risk of developing a melanoma. A further risk factor is the exposure to ultraviolet radiation at the workplace, e.g. during welding.

In mid-2008, new screening regulations were introduced in Germany for all forms of skin cancer within the framework of legislation on the early detection of cancer. Men and women above 35 years of age with statutory health insurance are entitled to a skin examination every two years by a suitably trained doctor (dermatologist, general practitioner, etc.).

**Figure 3.11.1a**
**Age-standardised incidence and mortality rates, by sex, ICD-10 C43, Germany 1999 – 2010**
*per 100,000 (European standard)*

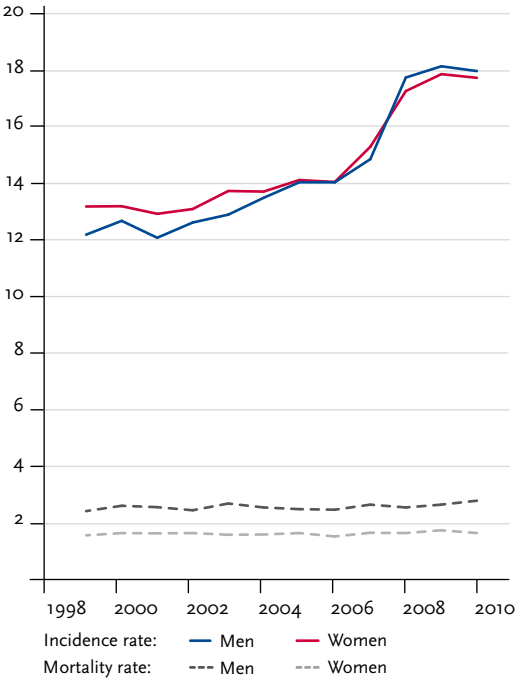



**Figure 3.11.1b**
**Absolute numbers of incident cases and deaths, by sex, ICD-10 C43, Germany 1999 – 2010**

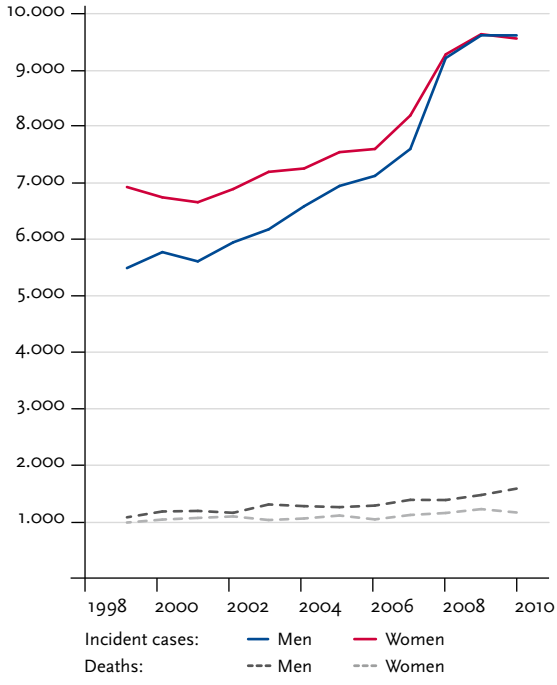



**Figure 3.11.2**
**Age-specific incidence rates by sex, ICD-10 C43, Germany 2009 – 2010**
*per 100,000*

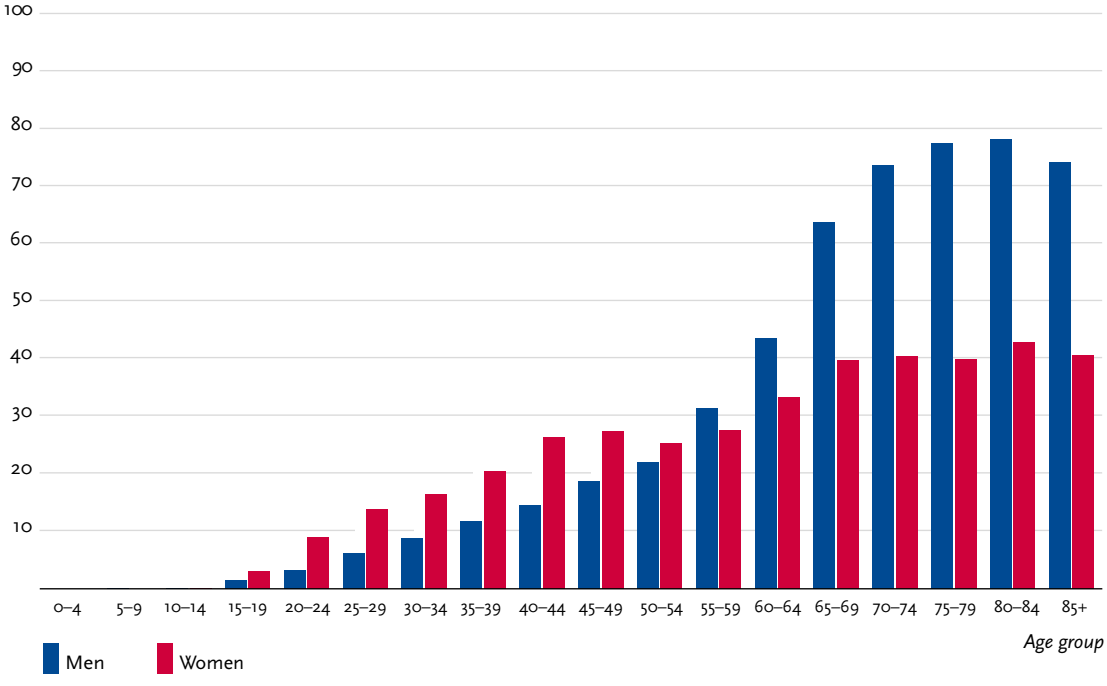


**Table 3.11.2**
**Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C43, database 2010**

| | 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 760) | 1.8% | (1 in 57) | <0.1% | (1 in 8,000) | 0.3% | (1 in 310) |
| 45 years | 0.2% | (1 in 490) | 1.7% | (1 in 60) | <0.1% | (1 in 3,600) | 0.3% | (1 in 320) |
| 55 years | 0.4% | (1 in 270) | 1.5% | (1 in 66) | 0.1% | (1 in 1,900) | 0.3% | (1 in 330) |
| 65 years | 0.6% | (1 in 160) | 1.3% | (1 in 78) | 0.1% | (1 in 1,100) | 0.3% | (1 in 360) |
| 75 years | 0.6% | (1 in 160) | 0.9% | (1 in 120) | 0.2% | (1 in 670) | 0.2% | (1 in 440) |
| Lifetime risk | | | 1.8% | (1 in 54) | | | 0.3% | (1 in 310) |
| **Women aged** | **in the next ten years** | | **ever** | | **in the next ten years** | | **ever** | |
| 35 years | 0.2% | (1 in 440) | 1.6% | (1 in 64) | <0.1% | (1 in 8,800) | 0.2% | (1 in 450) |
| 45 years | 0.3% | (1 in 370) | 1.3% | (1 in 75) | <0.1% | (1 in 5,100) | 0.2% | (1 in 470) |
| 55 years | 0.3% | (1 in 340) | 1.1% | (1 in 91) | <0.1% | (1 in 3,300) | 0.2% | (1 in 510) |
| 65 years | 0.4% | (1 in 260) | 0.8% | (1 in 120) | <0.1% | (1 in 2,100) | 0.2% | (1 in 570) |
| 75 years | 0.4% | (1 in 280) | 0.5% | (1 in 190) | 0.1% | (1 in 1,300) | 0.1% | (1 in 690) |
| Lifetime risk | | | 1.8% | (1 in 57) | | | 0.2% | (1 in 450) |

**Figure 3.11.3**
**Distribution of T-stages at first diagnosis by sex (top: all cases; bottom: only valid reports)**
**ICD-10 C43, Germany 2009 – 2010**

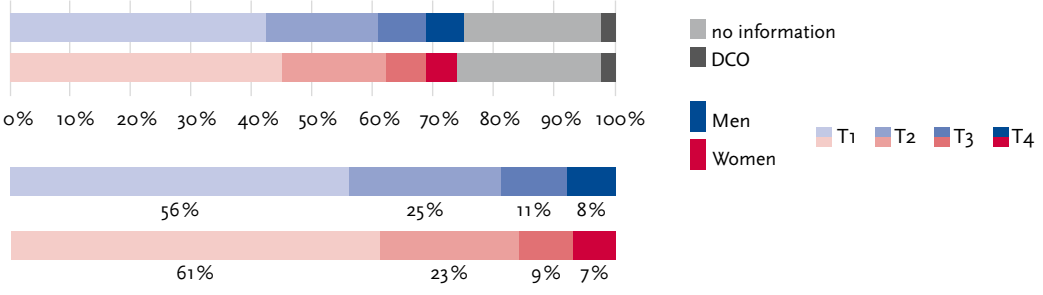



**Figure 3.11.4a**
**Absolute survival rates up to 5 years after first diagnosis, by sex, ICD-10 C43, Germany 2009 – 2010**

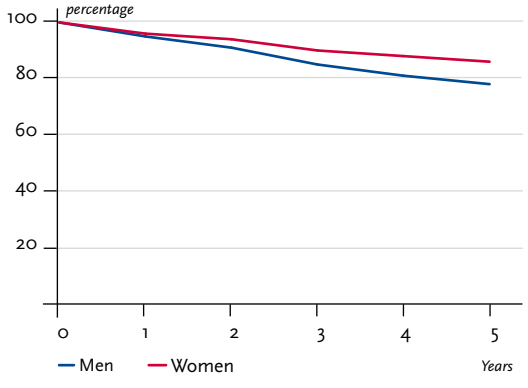



**Figure 3.11.4b**
**Relative survival rates up to 5 years after first diagnosis, by sex, ICD-10 C43, Germany 2009 – 2010**

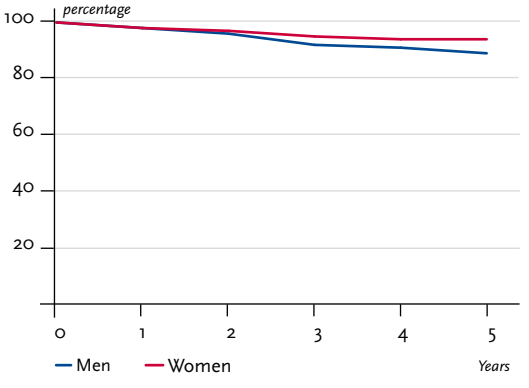


**Figure 3.11.5**
**Registered age-standardised incidence and mortality rates in German federal states, by sex, ICD-10 C43, 2009 – 2010**
*per 100,000 (European standard)*

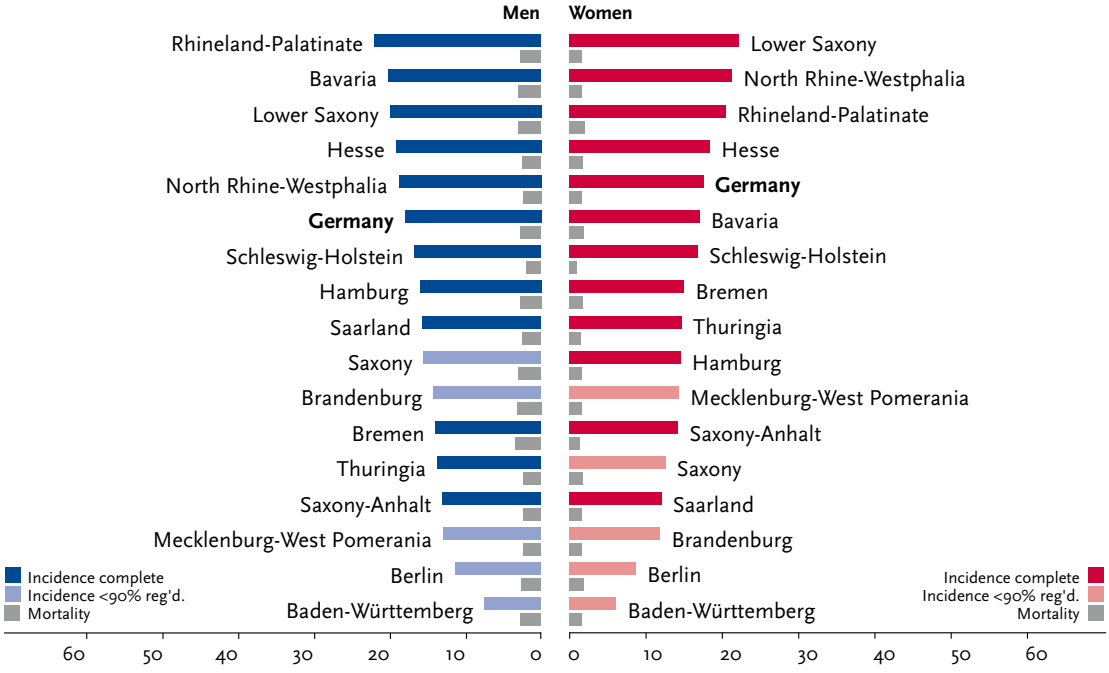
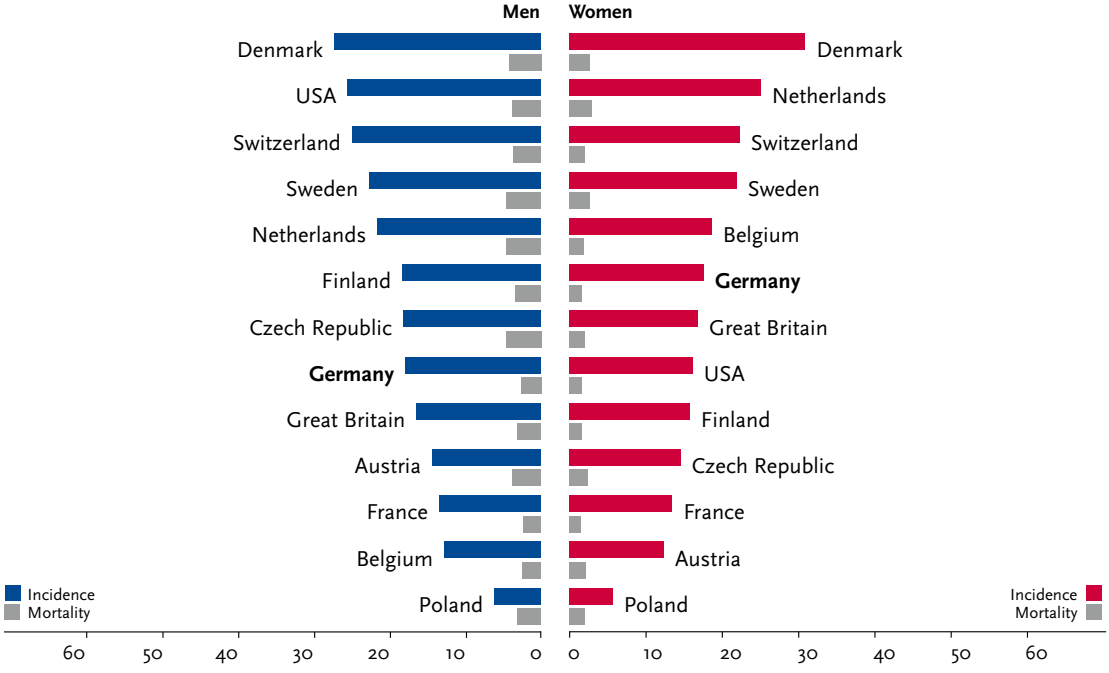



**Figure 3.11.6**
**International comparison of age-standardised incidence and mortality rates, by sex, ICD-10 C43, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*



## 3.12 Mesothelioma

**Table 3.12.1**
**Overview of key epidemiological parameters for Germany, ICD-10 C45**

| | 2009 | | 2010 | | Prediction for 2014 | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Incident cases | 1,280 | 310 | 1,320 | 350 | 1,600 | 300 |
| Crude incidence rate[1] | 3.2 | 0.7 | 3.3 | 0.8 | 4.1 | 0.8 |
| Standardised incidence rate[1,2] | 2.1 | 0.4 | 2.1 | 0.5 | 2.5 | 0.5 |
| Median age at diagnosis | 72 | 73 | 73 | 73 | | |
| Deaths | 1,012 | 264 | 1,099 | 298 | | |
| Crude mortality rate[1] | 2.5 | 0.6 | 2.7 | 0.7 | | |
| Standardised mortality rate[1,2] | 1.7 | 0.3 | 1.8 | 0.4 | | |
| 5-year prevalence | 1,700 | 500 | 1,700 | 500 | | |
| Absolute 5-year survival rate (2009-2010)[3] | | | 8 (4-23) | 14 | | |
| Relative 5-year survival rate (2009-2010)[3] | | | 9 (5-28) | 15 | | |

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

### Epidemiology

Malignant mesothelioma refer to a rare soft tissue tumour (in the cells of the mesothelium), mainly occurring in men of advanced age. The most frequently affected site is the pleura (pleural mesothelioma) – around 90 %.

Clear regional differences with high incidence and mortality rates, especially in Hamburg and Bremen can be explained by high exposure to asbestos among former shipyard workers and comparatively high rates in England and the Netherlands can be interpreted in a similar way.

Because of the long-term latency, no evidence of a reduction in age-standardised incidence rates is to be noted in spite of the ban on asbestos processing (see below). Meanwhile, the incidence and mortality rates in men under the age of 65 years are falling, whilst in the higher age groups they are still tending to increase. The absolute incidence and mortality figures are also still increasing, at least among men. In Germany, in 2010 approximately 1,320 men and 350 women were diagnosed.

With relative 5-year survival rates of 9 % in men and 15 % in women, mesothelomia belong to the types of cancer with very unfavourable prognosis, which to date has not been significantly affected by screening (early detection programmes) of occupationally at-risk persons.

### Risk factors

Even today, asbestos and above all the inhalation of asbestos fibres is still responsible for the majority of newly diagnosed cases. Admittedly the processing of asbestos is banned in Germany since 1995, however there is a latency period of on average 30 years between exposure beginning and the manifestation of the illness. Approximately 900 newly diagnosed cases per year are being recognised by employers' liability insurance associations. The occupational groups affected include metalworkers, welders, electricians, installers, roofers, bricklayers, construction workers, automotive engineers and tilers. Even if there is no known vocational exposure to asbestos, mesotheliomas are often asbestos-related. In autopsy studies high concentrations of asbestos fibres are often found in the lung tissue even without any corresponding vocational history.

Loosely bound asbestos with high fibre content is particularly dangerous. In contrast, asbestos cement (commonly referred to as 'Eternit', after a manufacturer), which is to be found even today both in and on buildings, is deemed to be largely safe, provided it remains intact and does not weather.

**Figure 3.12.1a**
**Age-standardised incidence and mortality rates, by sex, ICD-10 C45, Germany 1999 – 2010**
*per 100,000 (European standard)*

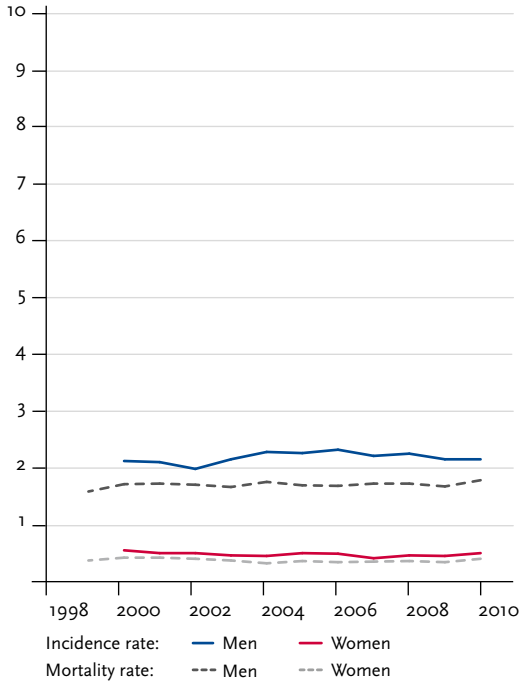



**Figure 3.12.1b**
**Absolute numbers of incident cases and deaths, by sex, ICD-10 C45, Germany 1999 – 2010**

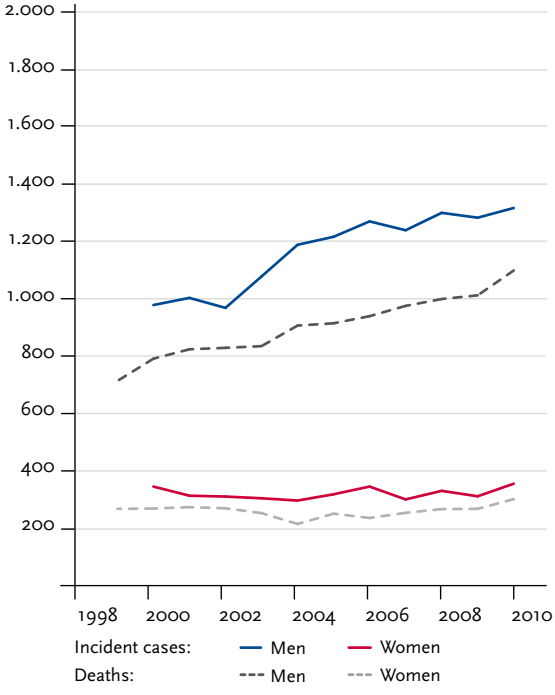



**Figure 3.12.2**
**Age-specific incidence rates by sex, ICD-10 C45, Germany 2009 – 2010**
*per 100,000*

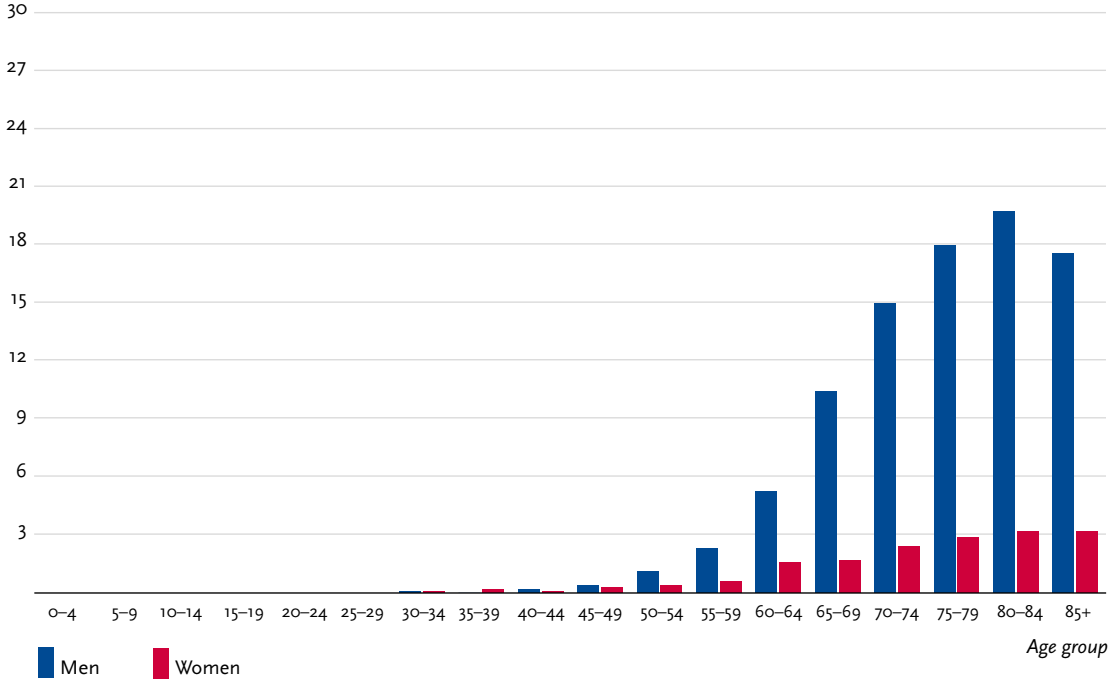


**Table 3.12.2**
**Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C45, database 2010**

| | 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 129,000) | 0.3% | (1 in 350) | <0.1% | (1 in 116,000) | 0.2% | (1 in 420) |
| 45 years | <0.1% | (1 in 13,000) | 0.3% | (1 in 350) | <0.1% | (1 in 19,000) | 0.2% | (1 in 410) |
| 55 years | <0.1% | (1 in 2,700) | 1.3% | (1 in 350) | <0.1% | (1 in 3,500) | 0.2% | (1 in 410) |
| 65 years | 0.1% | (1 in 890) | 0.3% | (1 in 360) | 0.1% | (1 in 1,100) | 0.2% | (1 in 420) |
| 75 years | 0.1% | (1 in 690) | 0.2% | (1 in 470) | 0.1% | (1 in 770) | 0.2% | (1 in 530) |
| Lifetime risk | | | 0.3% | (1 in 360) | | | 0.2% | (1 in 430) |
| **Women aged** | **in the next ten years** | | **ever** | | **in the next ten years** | | **ever** | |
| 35 years | <0.1% | (1 in 49,000) | 0.1% | (1 in 1,500) | <0.1% | (1 in 94,000) | 0.1% | (1 in 1,700) |
| 45 years | <0.1% | (1 in 33,000) | 0.1% | (1 in 1,500) | <0.1% | (1 in 48,000) | 0.1% | (1 in 1,700) |
| 55 years | <0.1% | (1 in 10,000) | 0.1% | (1 in 1,500) | <0.1% | (1 in 12,000) | 0.1% | (1 in 1,700) |
| 65 years | <0.1% | (1 in 4,500) | 0.1% | (1 in 1,700) | <0.1% | (1 in 5,700) | 0.1% | (1 in 1,900) |
| 75 years | <0.1% | (1 in 3,800) | <0.1% | (1 in 2,500) | <0.1% | (1 in 4,000) | <0.1% | (1 in 2,500) |
| Lifetime risk | | | 0.1% | (1 in 1,500) | | | 0.1% | (1 in 1,700) |

**Figure 3.12.3**
**Distribution of T-stages at first diagnosis by sex**
*Not presented due to the large proportion of missing data.*

**Figure 3.12.4a**
**Absolute survival rates up to 5 years after first diagnosis, by sex, ICD-10 C45, Germany 2009 – 2010**

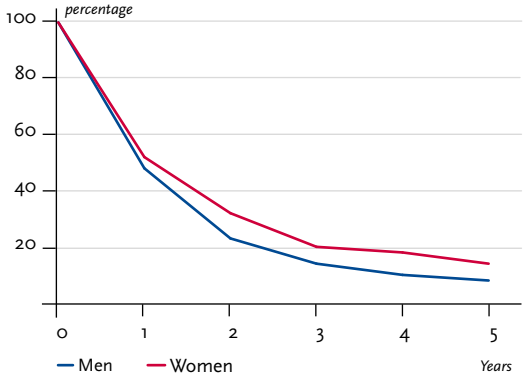



**Figure 3.12.4b**
**Relative survival rates up to 5 years after first diagnosis, by sex, ICD-10 C45, Germany 2009 – 2010**

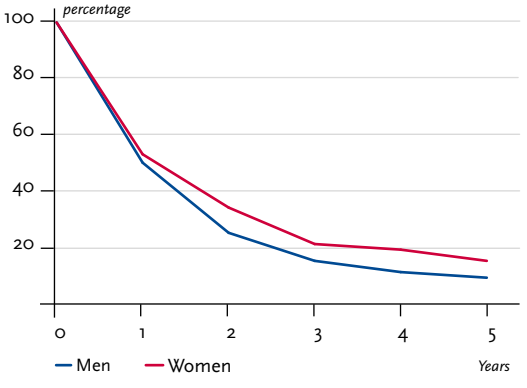


**Figure 3.12.5**
**Registered age-standardised incidence and mortality rates in German federal states, by sex, ICD-10 C45, 2009 – 2010**
*per 100,000 (European standard)*

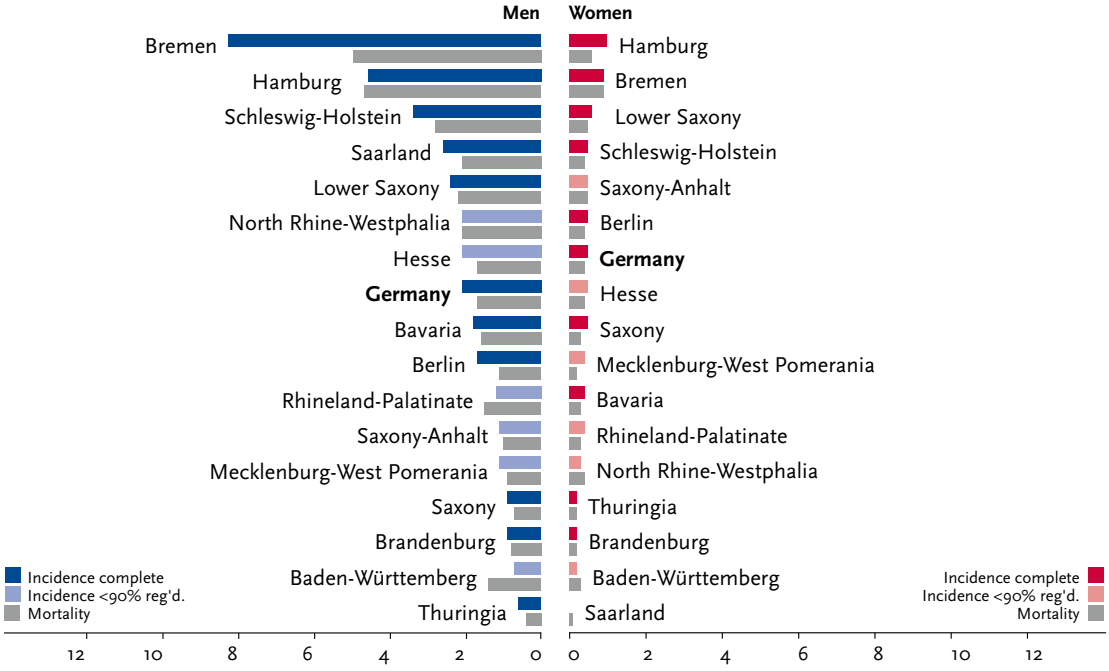
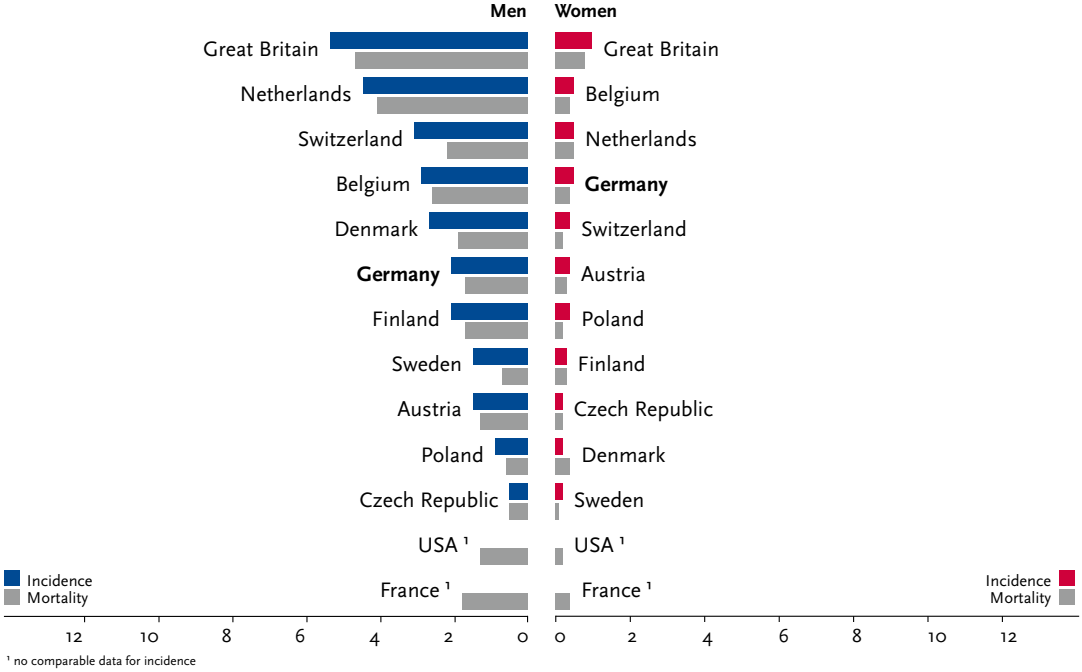



**Figure 3.12.6**
**International comparison of age-standardised incidence and mortality rates, by sex, ICD-10 C45, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*




¹ no comparable data for incidence

## 3.13 Breast

**Table 3.13.1**
**Overview of key epidemiological parameters for Germany, ICD-10 C50**

| | 2009 | | 2010 | | Prediction for 2014 | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Incident cases | 560 | 73,340 | 610 | 70,340 | 600 | 75,200 |
| Crude incidence rate[1] | 1.4 | 175.7 | 1.5 | 168.9 | 1.5 | 182.5 |
| Standardised incidence rate[1,2] | 1.0 | 125.6 | 1.1 | 119.6 | 1.0 | 123.3 |
| Median age at diagnosis | 69 | 64 | 69 | 64 | | |
| Deaths | 131 | 17,066 | 107 | 17,466 | | |
| Crude mortality rate[1] | 0.3 | 40.9 | 0.3 | 41.9 | | |
| Standardised mortality rate[1,2] | 0.2 | 24.0 | 0.2 | 24.0 | | |
| 5-year prevalence | 2,300 | 301,500 | 2,300 | 307,800 | | |
| Absolute 5-year survival rate (2009-2010)[3] | | | 61 (42-74) | 79 (78-80) | | |
| Relative 5-year survival rate (2009-2010)[3] | | | 74 (51-88) | 87 (86-88) | | |

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

### Epidemiology

With some 70,000 new cases currently being diagnosed annually, breast cancer is by far the most common form of cancer among women. There are also an additional 6,500 in situ tumours annually. According to current incidence figures, about one woman in eight will develop breast cancer in the course of her life. One in every four women is younger than 55 years at diagnosis, and one in ten is younger than 45 years of age.

The incidence and mortality rates in Europe follow an East to West gradient, and both are still significantly lower in eastern than in western Germany. Following the introduction of mammography screening in 2005, the incidence rates in Germany initially spiked, although since 2009 they have started to fall again slightly. This indicates that in the first phase of the programme many tumours were diagnosed at an earlier stage than they would have been without screening. Among those, some tumours might have been diagnosed that would otherwise have gone unrecognised for the entire life of the patient (over-diagnosis). The proportion of smaller tumours (T1) in the screening age group is considerably higher than before screening was introduced.

Despite the increased incidence, fewer women die of breast cancer now than ten years ago. The prospects of survival have improved considerably due to advances in therapy. It will not be possible to tell if screening leads to a further reduction in breast cancer mortality before 2015 at the earliest.

### Risk factors and early detection

Early first menses and late last menses, childlessness, and having a first child late are all associated with an increased risk of breast cancer. Conversely, numerous or early births and longer periods of breast-feeding reduce the risk of breast cancer. Hormone replacement therapy during and after menopause increases the risk of breast cancer, especially if it involves a combination of oestrogen and progestogen. Ovulation inhibitors containing hormones ("the pill"), on the other hand, have only a minor influence on the incidence rate. Studies have shown an increased risk associated with being overweight and with lack of exercise after menopause, and alcohol is also a proven risk factor. There are indications that active and passive smoking increase the risk.

In addition, women with very dense breast tissue or with certain benign breast neoplasms (lobular neoplasias and atypical ductal hyperplasias) have an increased risk. Having family clusters of breast or ovarian cancer is also a risk factor. In approximately half of these cases (5 - 10 % of all cases of breast cancer) the high family incidence results from a mutation in the "classic" breast cancer genes BRCA1 and BRCA2.

The statutory early detection programme offers women above 30 years of age an annual palpation examination by a physician. Between 2005 and 2009 the quality assured Mammography Screening Programme was introduced in Germany, and women between 50 and 69 years of age are invited to an X-ray examination of the breasts every two years.

**Figure 3.13.1a**
**Age-standardised incidence and mortality rates, by sex, ICD-10 C50, Germany 1999 – 2010**
*per 100,000 (European standard)*

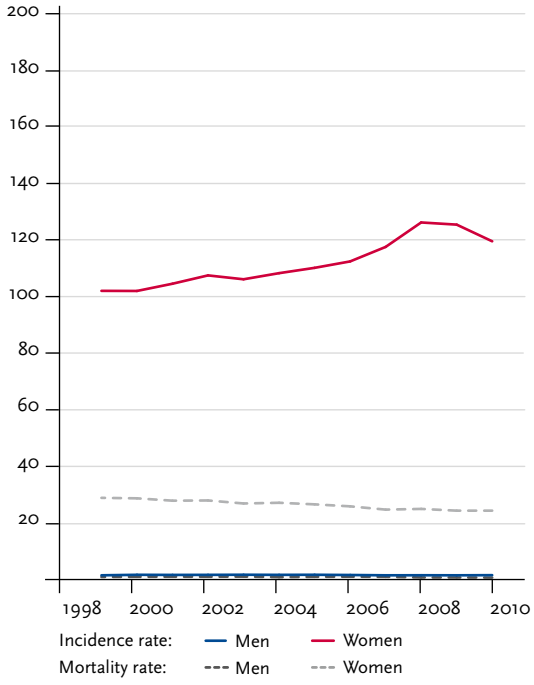



**Figure 3.13.1b**
**Absolute numbers of incident cases and deaths, by sex, ICD-10 C50, Germany 1999 – 2010**

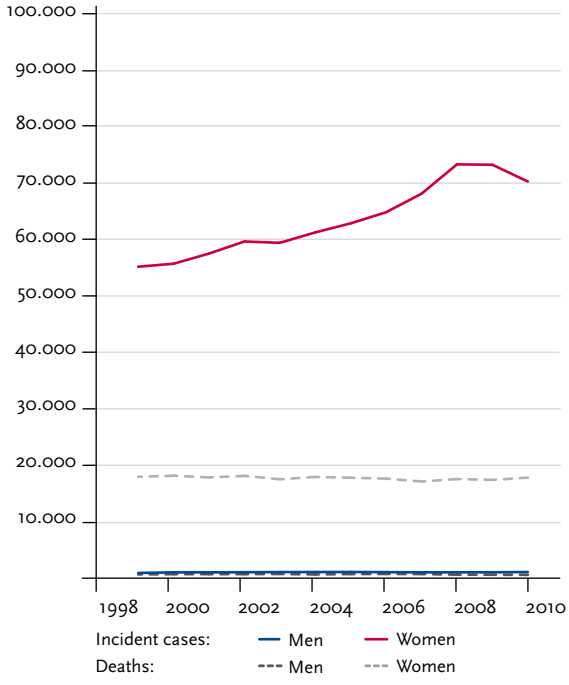



**Figure 3.13.2**
**Age-specific incidence rates by sex, ICD-10 C50, Germany 2009 – 2010**
*per 100,000*

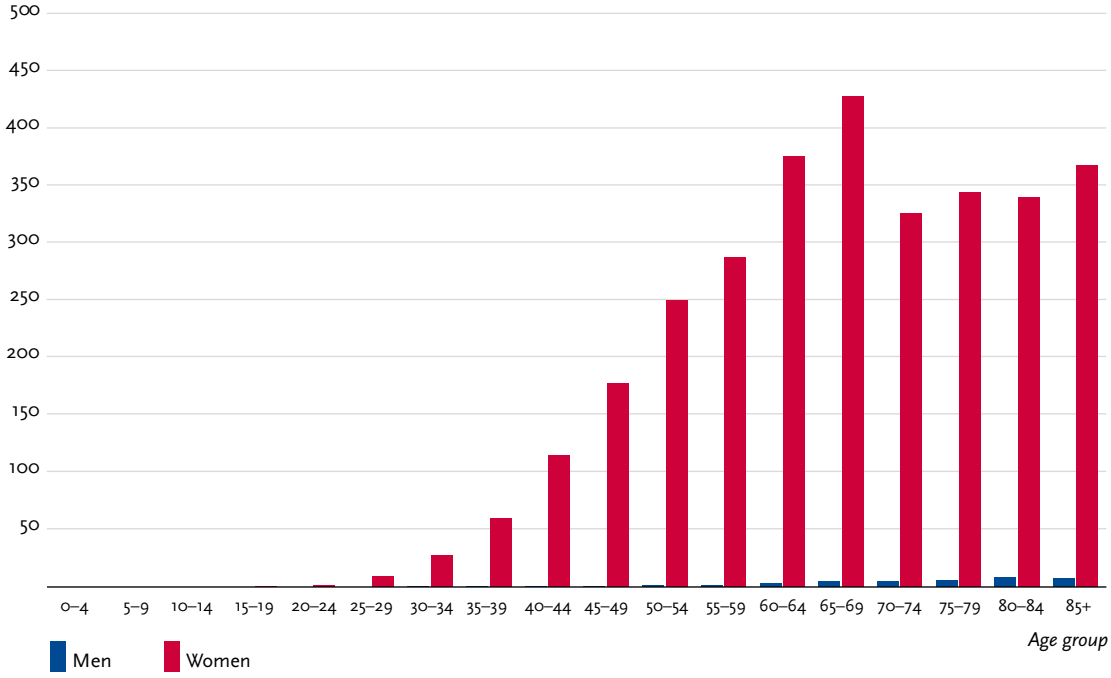


**Table 3.13.2**
**Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C50, database 2010**

| | 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 25,000) | 0.1% | (1 in 800) | <0.1% | (1 in 192,000) | <0.1% | (1 in 4,200) |
| 45 years | <0.1% | (1 in 15,000) | 0.1% | (1 in 820) | <0.1% | (1 in 108,000) | <0.1% | (1 in 4,300) |
| 55 years | <0.1% | (1 in 4,100) | 0.1% | (1 in 830) | <0.1% | (1 in 21,000) | <0.1% | (1 in 4,300) |
| 65 years | <0.1% | (1 in 2,300) | 0.1% | (1 in 930) | <0.1% | (1 in 14,000) | <0.1% | (1 in 4,800) |
| 75 years | 0.1% | (1 in 1,700) | 0.1% | (1 in 1,200) | <0.1% | (1 in 9,900) | <0.1% | (1 in 5,800) |
| Lifetime risk | | | 0.1% | (1 in 810) | | | <0.1% | (1 in 4,300) |
| **Women aged** | **in the next ten years** | | **ever** | | **in the next ten years** | | **ever** | |
| 35 years | 0.9% | (1 in 110) | 12.9% | (1 in 8) | 0.1% | (1 in 1,000) | 3.5% | (1 in 29) |
| 45 years | 2.1% | (1 in 47) | 12.2% | (1 in 8) | 0.3% | (1 in 370) | 3.4% | (1 in 30) |
| 55 years | 3.2% | (1 in 31) | 10.5% | (1 in 10) | 0.5% | (1 in 190) | 3.2% | (1 in 31) |
| 65 years | 3.7% | (1 in 27) | 7.8% | (1 in 13) | 0.9% | (1 in 120) | 2.8% | (1 in 36) |
| 75 years | 3.1% | (1 in 32) | 4.9% | (1 in 21) | 1.2% | (1 in 84) | 2.2% | (1 in 46) |
| Lifetime risk | | | 12.9% | (1 in 8) | | | 3.4% | (1 in 29) |

**Figure 3.13.3**
**Distribution of T-stages at first diagnosis for women at all ages and women between 50 and 69 years (top: all cases; bottom: only valid reports) ICD-10 C50, Germany 2009 – 2010**

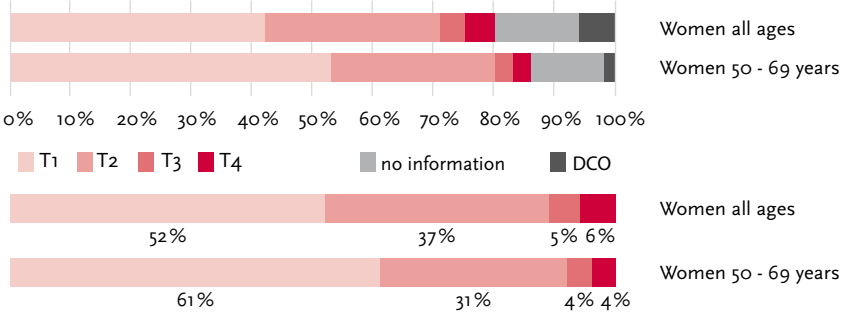



**Figure 3.13.4a**
**Absolute survival rates up to 5 years after first diagnosis, women, ICD-10 C50, Germany 2009 – 2010**

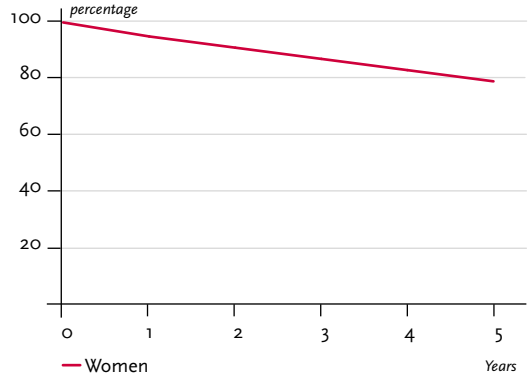



**Figure 3.13.4b**
**Relative survival rates up to 5 years after first diagnosis, women, ICD-10 C50, Germany 2009 – 2010**

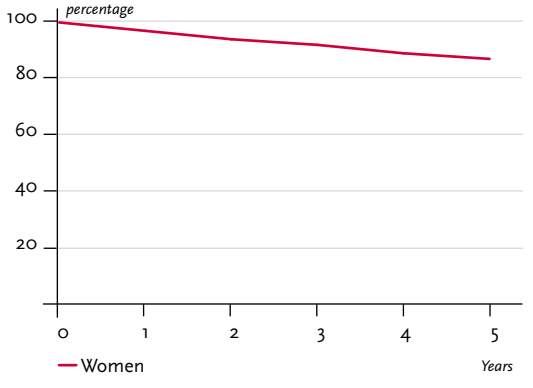


**Figure 3.13.5**
**Registered age-standardised incidence and mortality rates in German federal states, women, ICD-10 C50, 2009 – 2010**
*per 100,000 (European standard)*

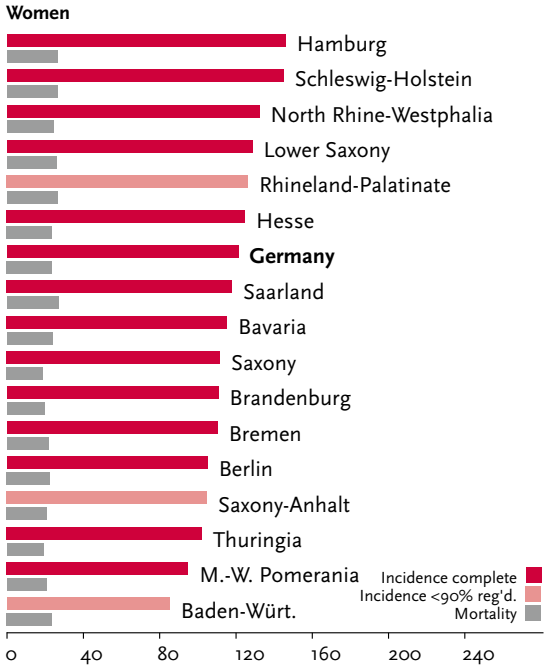
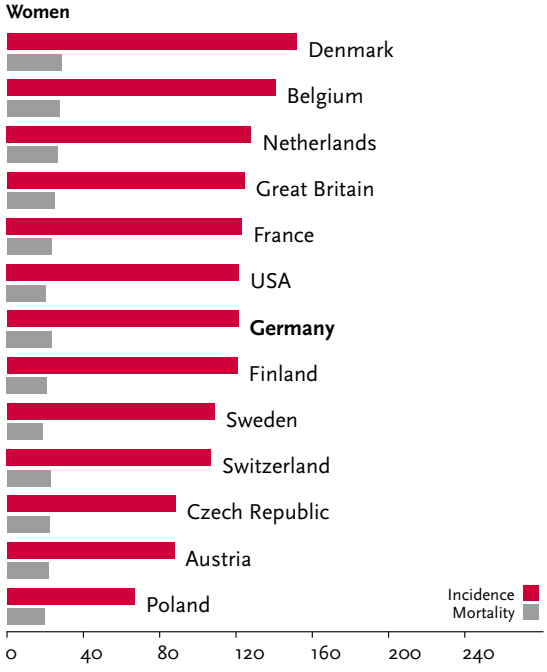



**Figure 3.13.6**
**International comparison of age-standardised incidence and mortality rates, women, ICD-10 C50, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*



## 3.14 Vulva

**Table 3.14.1**
**Overview of key epidemiological parameters for Germany, ICD-10 C51**

| | 2009 | 2010 | Prediction for 2014 |
|---|---|---|---|
| | Women | Women | Women |
| Incident cases | 2,950 | 3,190 | 4,000 |
| Crude incidence rate[1] | 7.1 | 7.7 | 9.8 |
| Standardised incidence rate[1,2] | 4.3 | 4.6 | 5.8 |
| Median age at diagnosis | 72 | 72 | |
| Deaths | 768 | 749 | |
| Crude mortality rate[1] | 1.8 | 1.8 | |
| Standardised mortality rate[1,2] | 0.9 | 0.8 | |
| 5-year prevalence | 9,700 | 10,500 | |
| Absolute 5-year survival rate (2009-2010)[3] | | 60 (52-65) | |
| Relative 5-year survival rate (2009-2010)[3] | | 71 (62-79) | |

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

### Epidemiology

A significant increase in the number of vulvar carcinomas has been observed in Germany in recent years. In 2010 some 3,200 women were diagnosed with this carcinoma. Just ten years ago there were fewer than half as many cases. The mortality rate has not decreased in recent years, in contrast to the mortality rates for most other gynaecological tumours. Latest data shows that about 750 women die of this disease every year.

The increase in the incidence rate is observed in young women in particular, although the majority of the burden of disease is still accounted for by women over 70 years of age. Median age at diagnosis is 72 years. The relative 5-year survival rate after diagnosis of a malignant vulvar tumour is 71%. The vast majority of invasive carcinomas are diagnosed at an early tumour stage (T1), although lymph nodes are already affected in one of every five of these cases. There are significant regional differences in both the incidence and the mortality rates. The Saarland has by far the highest incidence and mortality rates among Germany's federal states. Germany has a broadly comparable mortality rate at a higher incidence rate than its neighbours, although data was not available for comparison in all neighbouring countries.

### Risk factors and prevention

The majority of vulvar carcinomas are squamous-cell carcinomas (90%). A distinction is made between two types of these carcinomas: non-keratinising and keratinising squamous-cell carcinomas. The former involve chronic infection with the human Papillomavirus (HPV), while the keratinising carcinomas develop independent of HPV.

HPV-dependent vulvar carcinomas and their precancerous conditions (usual-type vulvar intraepithelial neoplasia, uVIN) occur predominantly in younger women (median age approximately 55 years). In contrast, HPV-independent carcinomas usually occur in older women (median age approximately 70 years), and these are the commonest type of vulvar carcinoma (65% to 80% of cases). Significant risk factors for this type of carcinoma and its precancerous conditions (differentiated VIN, dVIN) are in particular degenerative and chronic inflammatory skin diseases such as Lichen sclerosus.

Further risk factors are smoking and alcohol abuse. Long-standing immunosuppression, e.g. following organ transplants or in case of HIV infection, can facilitate infection with HPV and thus increase the risk. The presence of other cancers or their precursors in the genital area, for example cervical cancer, also constitutes a risk factor for vulvar carcinoma. The incidence in particular of HPV-related precursors to vulvar carcinoma has increased in recent years. One possible means of preventing these precancerous conditions and carcinomas is HPV vaccination.

**Figure 3.14.1a**
**Age-standardised incidence and mortality rates, ICD-10 C51, Germany 1999 – 2010**
*per 100,000 (European standard)*

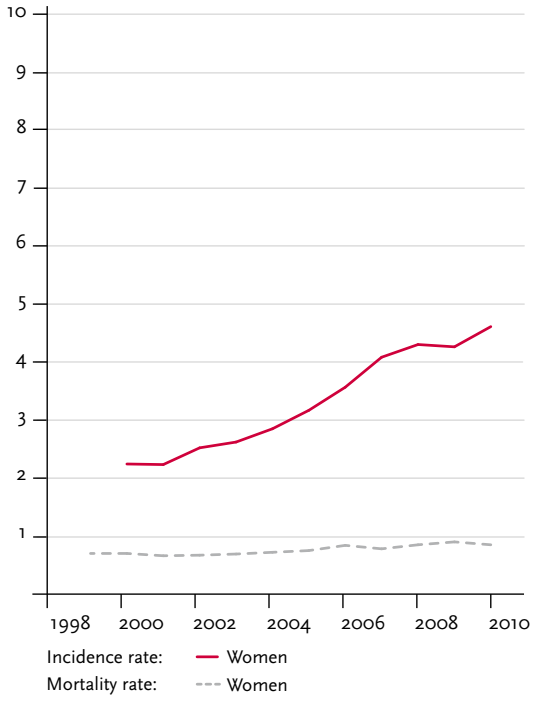



**Figure 3.14.1b**
**Absolute numbers of incident cases and deaths, ICD-10 C51, Germany 1999 – 2010**

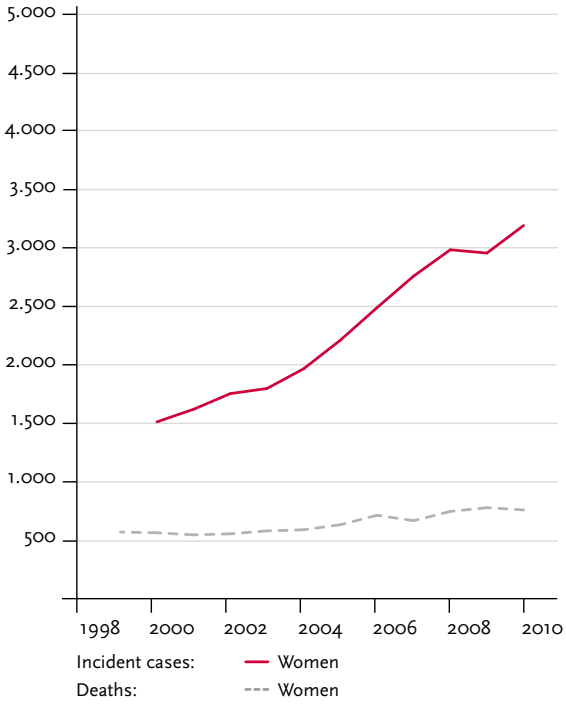



**Figure 3.14.2**
**Age-specific incidence rates, ICD-10 C51, Germany 2009 – 2010**
*per 100,0000*

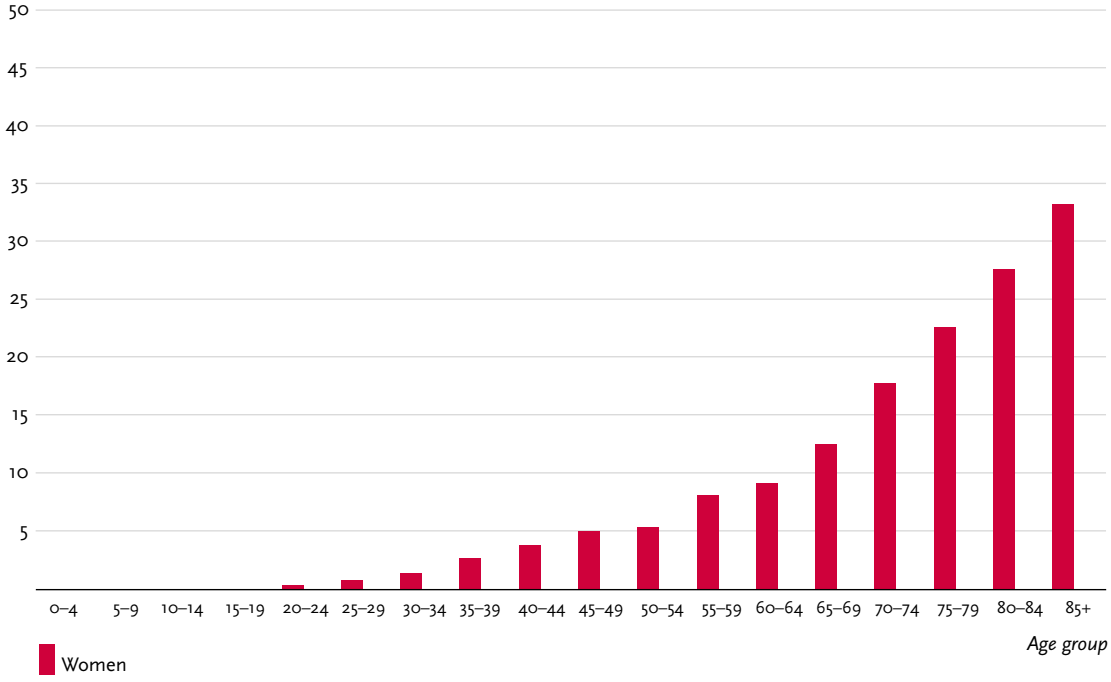


**Table 3.14.2**
**Cancer incidence and mortality risks in Germany by age, ICD-10 C51, database 2010**

| | 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 2,800) | 0.6% | (1 in 160) | <0.1% | (1 in 48,000) | 0.2% | (1 in 630) |
| 45 years | 0.1% | (1 in 1,700) | 0.6% | (1 in 170) | <0.1% | (1 in 22,000) | 0.2% | (1 in 630) |
| 55 years | 0.1% | (1 in 1,200) | 0.5% | (1 in 190) | <0.1% | (1 in 8,100) | 0.2% | (1 in 640) |
| 65 years | 0.2% | (1 in 660) | 0.5% | (1 in 210) | <0.1% | (1 in 3,400) | 0.2% | (1 in 660) |
| 75 years | 0.2% | (1 in 450) | 0.4% | (1 in 280) | 0.1% | (1 in 1,500) | 0.1% | (1 in 720) |
| Lifetime risk | | | 0.6% | (1 in 160) | | | 0.2% | (1 in 630) |

**Figure 3.14.3**
**Distribution of T-stages at first diagnosis (top: all cases; bottom: only valid reports)**
**ICD-10 C51, Germany 2009 – 2010**

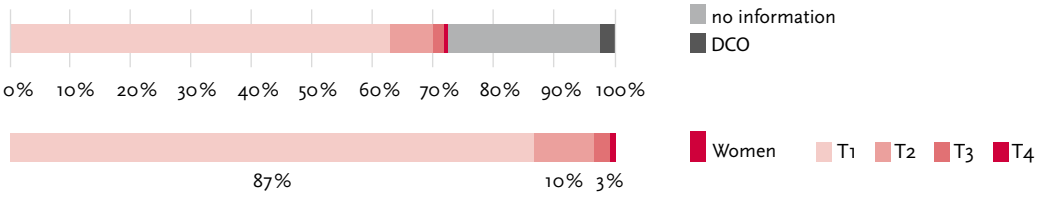



**Figure 3.14.4a**
**Absolute survival rates up to 5 years after first diagnosis,**
**ICD-10 C51, Germany 2009 – 2010**

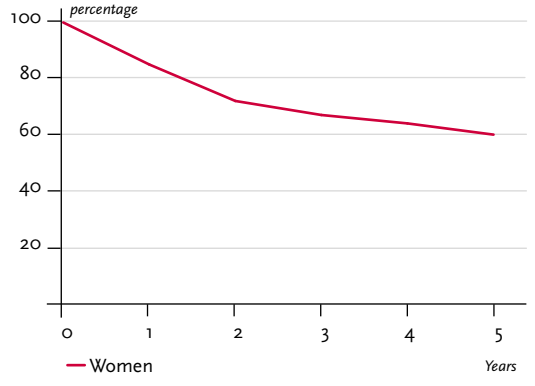



**Figure 3.14.4b**
**Relative survival rates up to 5 years after first diagnosis,**
**ICD-10 C51, Germany 2009 – 2010**

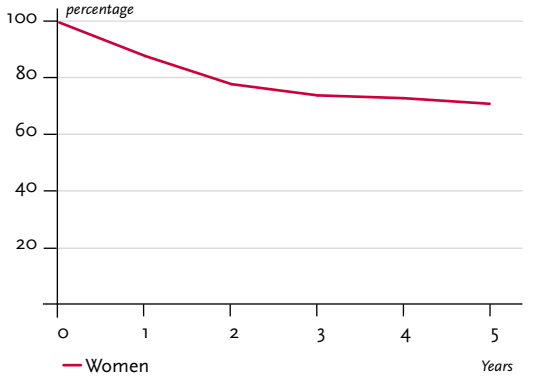


**Figure 3.14.5**
**Registered age-standardised incidence and mortality rates in German federal states, ICD-10 C51, 2009 – 2010**
*per 100,000 (European standard)*

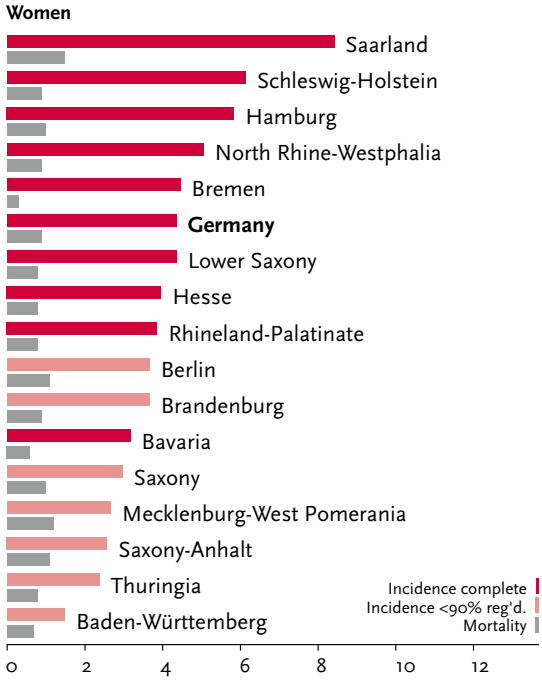



**Figure 3.14.6**
**International comparison of age-standardised incidence and mortality rates, ICD-10 C51, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*

## 3.15 Cervix

**Table 3.15.1**
**Overview of key epidemiological parameters for Germany, ICD-10 C53**

| | 2009 | 2010 | Prediction for 2014 |
|---|---|---|---|
| | Women | Women | Women |
| Incident cases | 4,780 | 4,660 | 4,600 |
| Crude incidence rate[1] | 11.5 | 11.2 | 11.2 |
| Standardised incidence rate[1,2] | 9.5 | 9.3 | 9.6 |
| Median age at diagnosis | 52 | 53 | |
| Deaths | 1,581 | 1,524 | |
| Crude mortality rate[1] | 3.8 | 3.7 | |
| Standardised mortality rate[1,2] | 2.6 | 2.5 | |
| 5-year prevalence | 17,800 | 17,800 | |
| Absolute 5-year survival rate (2009-2010)[3] | | 66 (61-69) | |
| Relative 5-year survival rate (2009-2010)[3] | | 69 (65-73) | |

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

### Epidemiology

In 2010 about 4,700 women were diagnosed with cervical carcinoma in Germany. About three quarters of cervical carcinomas are of squamous-cell origin. Adenocarcinomas (approx. 20 %) have a more proximate origin at the transition from uterus to cervix.

The incidence rates for invasive cervical carcinomas have remained largely stable since the late 1990s at a markedly lower level than in the 1980s. The highest incidence rates are currently found among women between 40 and 59 years of age. The age distribution is slightly distorted by cases registered by death certificate only (DCO) which are found in the eldest age groups in particular. The median age at diagnosis for invasive cancer is 53 years. The median age at diagnosis for in situ carcinomas is just 34 years. These are diagnosed some two to three times more often than invasive carcinomas, a result of the cervical cancer early detection examinations, aimed at identifying and treating cancer precursors. International comparison shows there are significant differences between countries like Switzerland and Finland with low incidence rates on the one hand and Denmark, the Czech Republic and Poland on the other, with significantly higher incidence rates.

Currently, about 1,500 women in Germany die of cervical cancer every year. 30 years ago this figure was more than twice as high. The relative 5-year survival rate after diagnosis of an invasive cervical tumour is 69 %. Over half of invasive carcinomas are diagnosed at an early tumour stage (T1).

### Risk factors and early detection

The main cause of cervical cancer is infection with the human Papillomavirus (HPV). The majority of women are infected with HPV at some point in their life. Usually the infection is transient and disappears without further effects, but in some cases it persists and a cervical carcinoma can develop, especially with virus subtypes from the high risk group (e.g. HPV 16 or 18). Further risk factors are smoking, infections in the genital area with sexually transmitted pathogens such as herpes simplex or chlamydia, becoming sexually active at a young age, numerous births, and a severely impaired immune system. Taking oral contraceptives ("the pill") over a long period of time is also associated with a slightly higher risk of developing cervical cancer. However, the risk falls again when oral contraceptives are discontinued, and after approximately ten years these women seem no more at-risk than women who never took oral contraceptives.

Women in Germany aged 20 years and above are entitled to an annual cervical smear test (PAP smear). In March 2007, the German Standing Committee on Vaccination Recommendations (STIKO) proposed vaccinating girls between 12 and 17 years of age against HPV 16 and 18, which are responsible for about 70 % of all cervical carcinomas. It has been proved that the vaccination can prevent the development of preliminary stages of cervical cancer. However, the vaccination does not supersede the PAP smear, as it only protects against two of the most common high-risk Papillomaviruses.

**Figure 3.15.1a**
**Age-standardised incidence and mortality rates, ICD-10 C53, Germany 1999 – 2010**
*per 100,000 (European standard)*

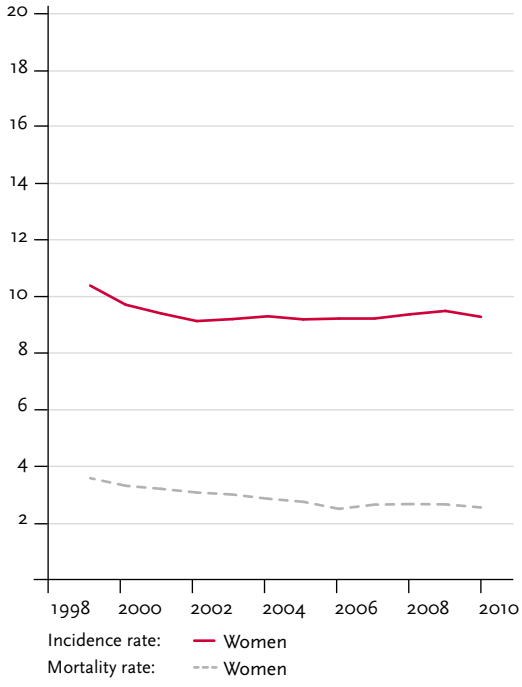



**Figure 3.15.1b**
**Absolute numbers of incident cases and deaths, ICD-10 C53, Germany 1999 – 2010**

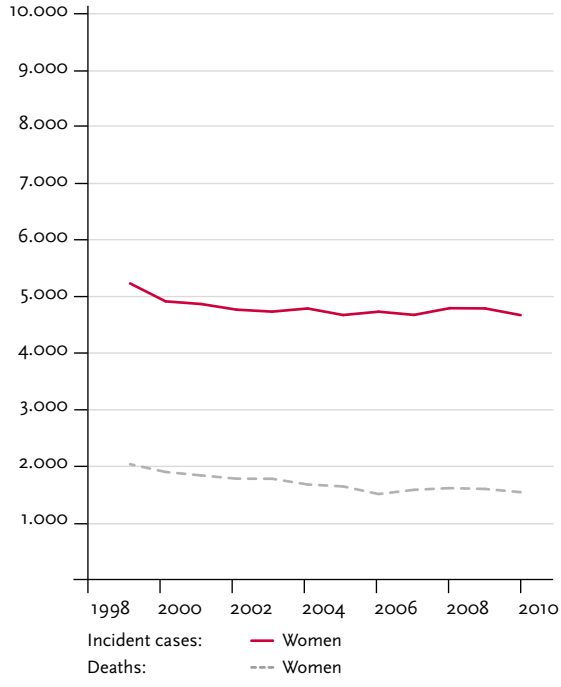



**Figure 3.15.2**
**Age-specific incidence rates, ICD-10 C53, Germany 2009 – 2010**
*per 100,000*

**Table 3.15.2**
**Cancer incidence and mortality risks in Germany by age, ICD-10 C53, database 2010**

| | 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 16,000) | 0.8% | (1 in 120) | <0.1% | (1 in 186,000) | 0.3% | (1 in 350) |
| 25 years | 0.1% | (1 in 1,200) | 0.8% | (1 in 120) | <0.1% | (1 in 16,000) | 0.3% | (1 in 350) |
| 35 years | 0.2% | (1 in 580) | 0.8% | (1 in 130) | <0.1% | (1 in 4,200) | 0.3% | (1 in 360) |
| 45 years | 0.2% | (1 in 620) | 0.6% | (1 in 170) | <0.1% | (1 in 2,100) | 0.3% | (1 in 390) |
| 55 years | 0.2% | (1 in 620) | 0.4% | (1 in 230) | 0.1% | (1 in 1,800) | 0.2% | (1 in 460) |
| 65 years | 0.1% | (1 in 790) | 0.3% | (1 in 350) | 0.1% | (1 in 1,700) | 0.2% | (1 in 590) |
| 75 years | 0.1% | (1 in 850) | 0.2% | (1 in 550) | 0.1% | (1 in 1,400) | 0.1% | (1 in 800) |
| Lifetime risk | | | 0.8% | (1 in 120) | | | 0.3% | (1 in 350) |

**Figure 3.15.3**
**Distribution of T-stages at first diagnosis (top: all cases; bottom: only valid reports)**
**ICD-10 C53, Germany 2009 – 2010**

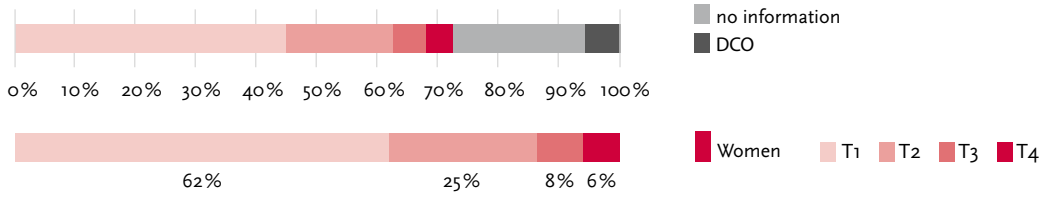



**Figure 3.15.4a**
**Absolute survival rates up to 5 years after first diagnosis,**
**ICD-10 C53, Germany 2009 – 2010**

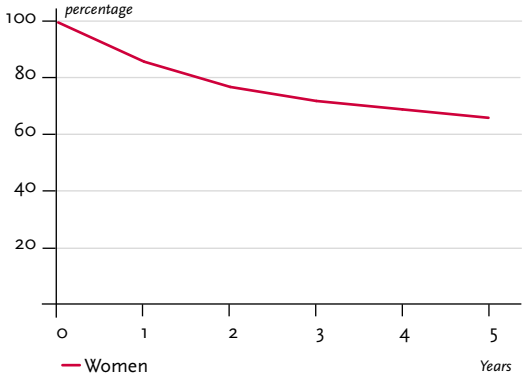



**Figure 3.15.4b**
**Relative survival rates up to 5 years after first diagnosis,**
**ICD-10 C53, Germany 2009 – 2010**

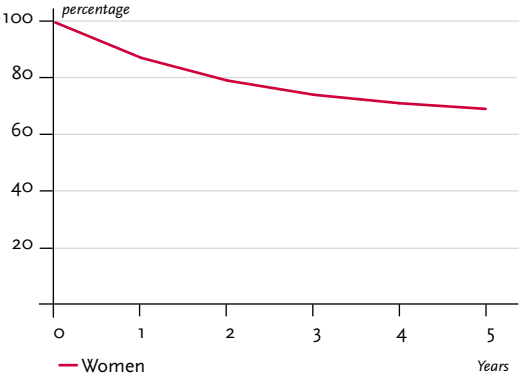


**Figure 3.15.5**
**Registered age-standardised incidence and mortality rates in German federal states, ICD-10 C53, 2009 – 2010**
*per 100,000 (European standard)*

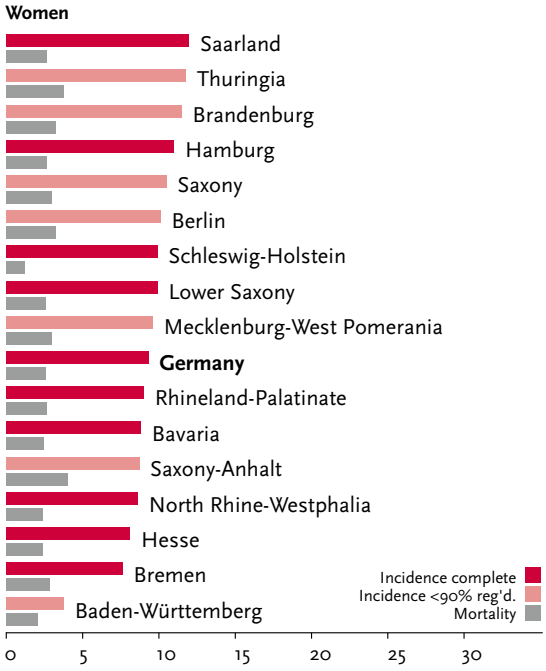
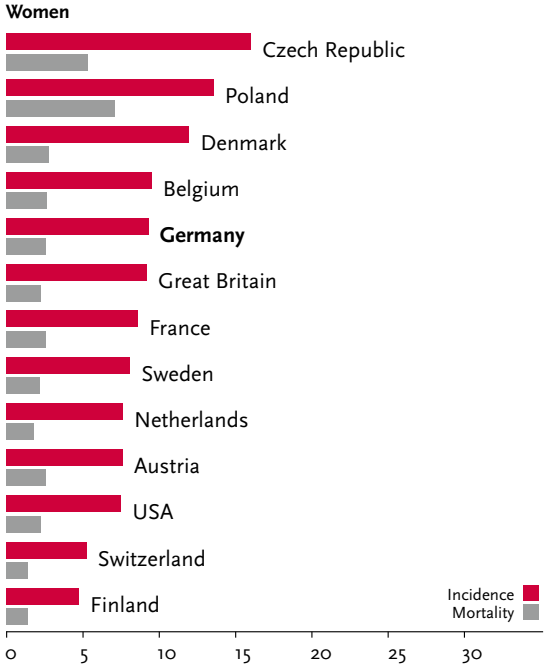



**Figure 3.15.6**
**International comparison of age-standardised incidence and mortality rates, ICD-10 C53, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*



## 3.16 Uterus

**Table 3.16.1**
**Overview of key epidemiological parameters for Germany, ICD-10 C54 – C55**

| | 2009 | 2010 | Prediction for 2014 |
|---|---|---|---|
| | Women | Women | Women |
| Incident cases | 11,650 | 11,550 | 11,900 |
| Crude incidence rate[1] | 27.9 | 27.7 | 28.9 |
| Standardised incidence rate[1,2] | 18.0 | 17.7 | 17.7 |
| Median age at diagnosis | 69 | 69 | |
| Deaths | 2,360 | 2,432 | |
| Crude mortality rate[1] | 5.7 | 5.8 | |
| Standardised mortality rate[1,2] | 2.9 | 3.0 | |
| 5-year prevalence | 46,700 | 46,800 | |
| Absolute 5-year survival rate (2009-2010)[3] | | 72 (69-78) | |
| Relative 5-year survival rate (2009-2010)[3] | | 81 (78-88) | |

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

### Epidemiology

With approximately 11,550 newly diagnosed cases every year, accounting for 5.1 % of all malignant neoplasms, uterine cancer is the fourth most common form of cancer among women and the most common cancer of the female genital organs. Due to the good prognosis, the proportion of all deaths the cancer accounts for is markedly lower, at just 2.4 %.

One in 46 women (2.2 %) develops cancer of the uterus in the course of her life, and one in 200 dies of it. As with the mortality rate for cancer of the cervix, the mortality rate for cancer of the uterus has fallen slightly, while the age-standardised incidence rate has recently remained almost constant. The median age at diagnosis is 69 years. Histologically, cancers of the uterus are mostly endometrial (i.e. originating from the lining of the uterus) adenocarcinomas. Approximately 70 % of the carcinomas are diagnosed at an early stage (T1).

Uterine carcinomas are one of the types of cancer with a favourable prognosis. The relative 5-year survival rate in Germany is approximately 81 %.

Regional differences within Germany are relatively small. Internationally, higher incidence and mortality rates have been observed in Eastern Europe, Scandinavia and also in the USA.

### Risk factors

Independent of and in addition to age, the long-term influence of oestrogen is a risk factor. Thus early first menses (menarche), late onset of menopause (climacterium), childlessness, and diseases of the ovaries, such as polycystic ovary syndrome (PCOS), all have the effect of increasing the risk. Oestrogen as monotherapy during menopause also increases the risk, although when combined with progesterone it does not. Oral contraceptives ("the pill"), in particular oestrogen-progesterone combinations, reduce the risk. For hormone-dependent tumours, lifestyle risk factors also play a role, particularly overweight and lack of exercise. Women with type 2 diabetes mellitus are more frequently affected.

Women with breast cancer who have been treated with tamoxifen often develop endometrial hyperplasia and thus have a higher risk of developing a uterine carcinoma. Gene mutations that can lead to hereditary nonpolyposis colorectal carcinoma (HNPPC) also contribute to an increased risk of uterine cancer.

For the rarer oestrogen-independent types of this tumour, advanced age is also a risk. Exposure of the uterus to radiation can also increase the risk. Study results available do not permit conclusive interpretation of the roles played by lifestyle and genetic factors in oestrogen-independent tumours.

**Figure 3.16.1a**
**Age-standardised incidence and mortality rates, ICD-10 C54 – C55, Germany 1999 – 2010**
*per 100,000 (European standard)*

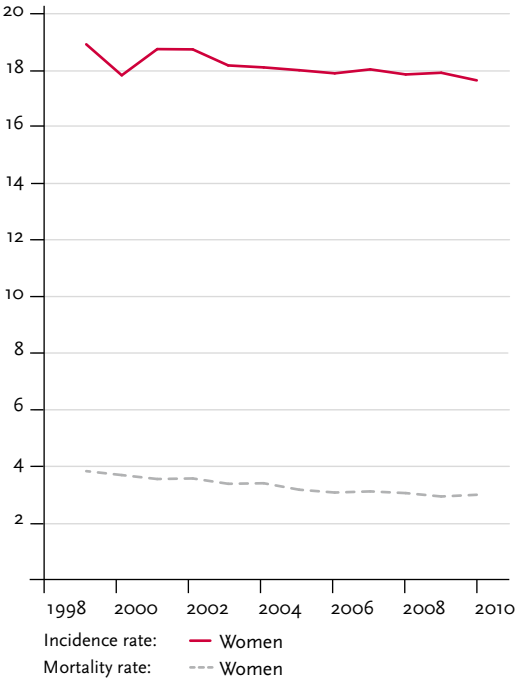



**Figure 3.16.1b**
**Absolute numbers of incident cases and deaths, ICD-10 C54 – C55, Germany 1999 – 2010**

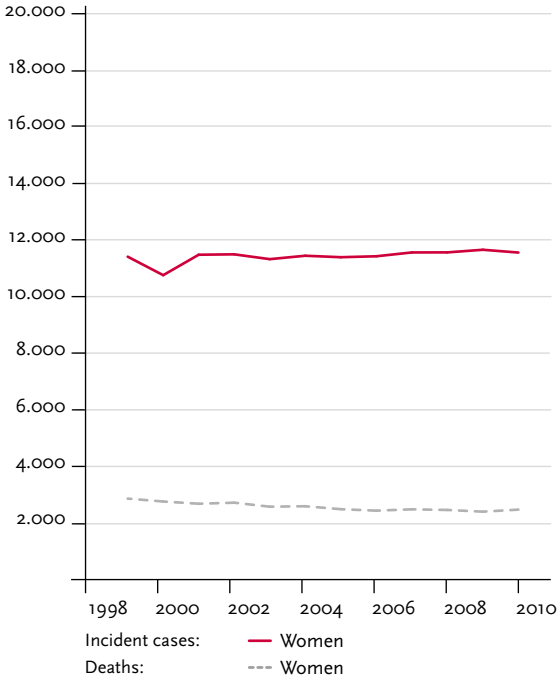



**Figure 3.16.2**
**Age-specific incidence rates, ICD-10 C54 – C55, Germany 2009 – 2010**
*per 100,000*

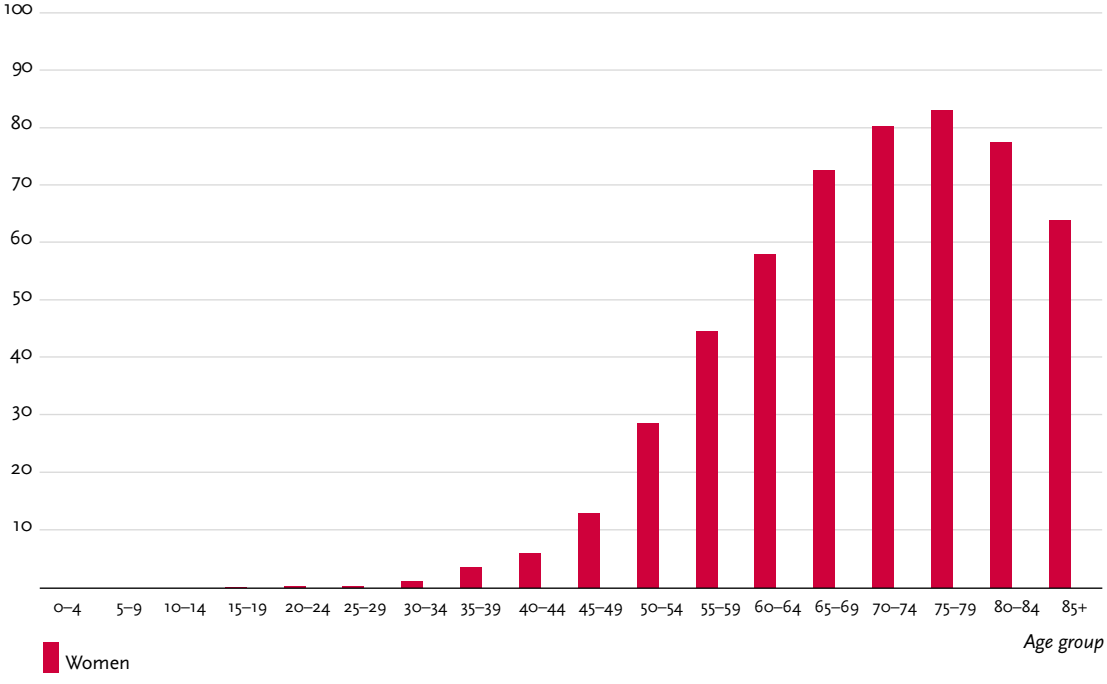


**Table 3.16.2**
**Cancer incidence and mortality risks in Germany by age, ICD-10 C54 – C55, database 2010**

| | 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 2,000) | 2.2% | (1 in 46) | <0.1% | (1 in 27,000) | 0.5% | (1 in 200) |
| 45 years | 0.2% | (1 in 470) | 2.2% | (1 in 46) | <0.1% | (1 in 5,800) | 0.5% | (1 in 200) |
| 55 years | 0.5% | (1 in 200) | 2.0% | (1 in 50) | 0.1% | (1 in 1,700) | 0.5% | (1 in 200) |
| 65 years | 0.7% | (1 in 140) | 1.6% | (1 in 64) | 0.1% | (1 in 750) | 0.5% | (1 in 220) |
| 75 years | 0.7% | (1 in 140) | 1.0% | (1 in 100) | 0.2% | (1 in 500) | 0.4% | (1 in 270) |
| Lifetime risk | | | 2.2% | (1 in 46) | | | 0.5% | (1 in 200) |

**Figure 3.16.3**
**Distribution of T-stages at first diagnosis (top: all cases; bottom: only valid reports)**
**ICD-10 C54 – C55, Germany 2009 – 2010**

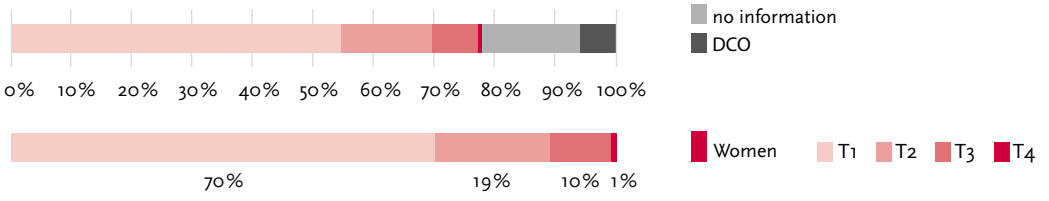



**Figure 3.16.4a**
**Absolute survival rates up to 5 years after first diagnosis,**
**ICD-10 C54 – C55, Germany 2009 – 2010**

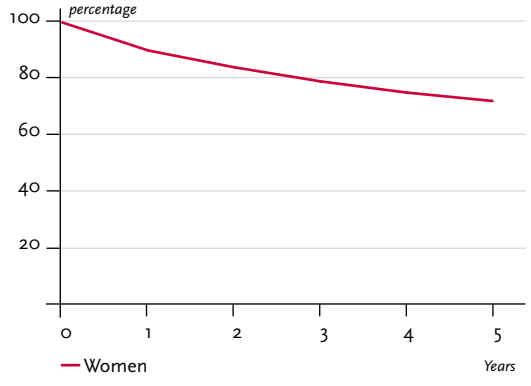



**Figure 3.16.4b**
**Relative survival rates up to 5 years after first diagnosis,**
**ICD-10 C54 – C55, Germany 2009 – 2010**

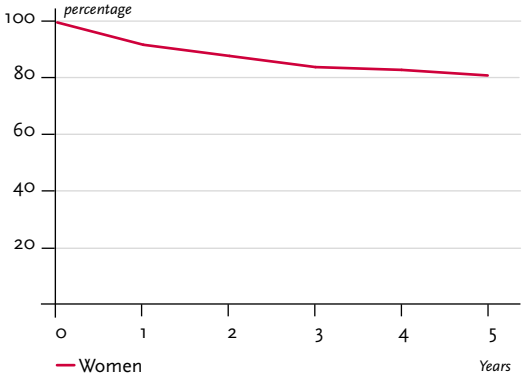


**Figure 3.16.5**
**Registered age-standardised incidence and mortality rates in German federal states, ICD-10 C54 – C55, 2009 – 2010**
*per 100,000 (European standard)*

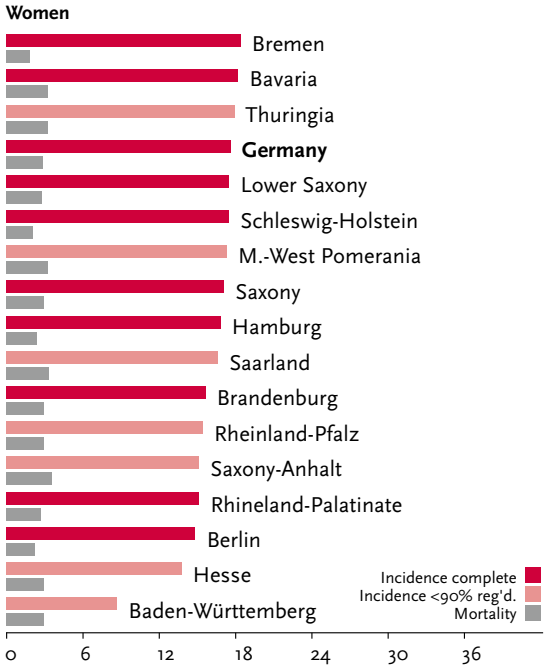
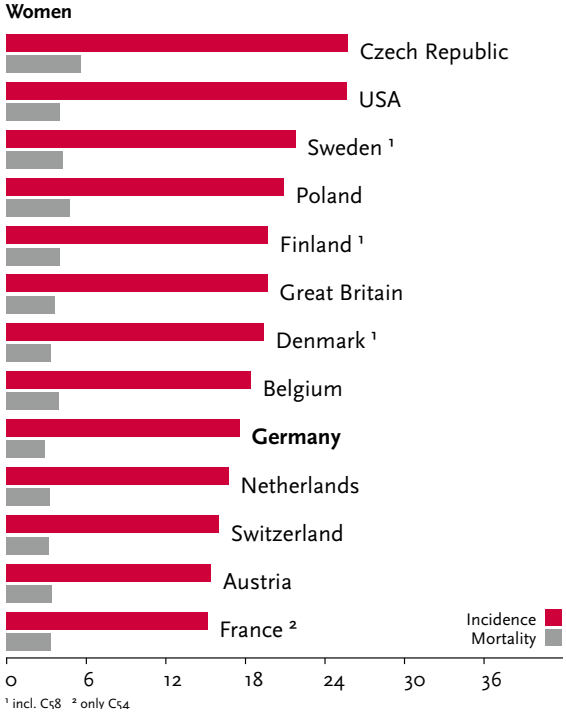



**Figure 3.16.6**
**International comparison of age-standardised incidence and mortality rates, ICD-10 C54 – C55, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*



## 3.17 Ovaries

**Table 3.17.1**
**Overview of key epidemiological parameters for Germany, ICD-10 C56**

| | 2009 | 2010 | Prediction for 2014 |
|---|---|---|---|
| | Women | Women | Women |
| Incident cases | 7,910 | 7,790 | 7,500 |
| Crude incidence rate[1] | 19.0 | 18.7 | 18.2 |
| Standardised incidence rate[1,2] | 12.3 | 12.1 | 11.2 |
| Median age at diagnosis | 69 | 69 | |
| Deaths | 5,623 | 5,599 | |
| Crude mortality rate[1] | 13.5 | 13.4 | |
| Standardised mortality rate[1,2] | 7.7 | 7.5 | |
| 5-year prevalence | 22,800 | 22,400 | |
| Absolute 5-year survival rate (2009-2010)[3] | | 38 (28-43) | |
| Relative 5-year survival rate (2009-2010)[3] | | 42 (31-47) | |

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

### Epidemiology

Ovarian cancer accounts for 3.5 % of all malignant neoplasms among women and 5.6 % of all female deaths due to cancer. The incidence rates increase continually up to the age of 85 years, while the median age at diagnosis is 69 years. Histologically, malignant tumours of the ovaries are predominantly adenocarcinomas. The rare germ cell tumours of the ovaries occur in younger women. One in approximately 68 women develops ovarian cancer in the course of her lifetime.

Since the millennium, the incidence and mortality rates in Germany have continued to fall significantly. Both the incidence and mortality rates are higher in eastern than in western Germany.

Since diagnosis often only occurs at a late tumour stage, the survival prospects for patients with ovarian cancer are relatively unfavourable. The relative 5-year survival rate is currently around 42 %.

### Risk factors

The risk of developing ovarian cancer increases with age in particular. Of the lifestyle-related risk factors, obesity (adipositas) plays a part. There are important relationships with hormonal factors: childlessness and infertility increase the risk of developing ovarian cancer, while numerous births and longer periods of breast-feeding reduce the risk. It has not been conclusively proved whether early first menses (menarche) or late onset of menopause (climacterium) also lead to an increased risk. Hormonal factors probably also increase the risk for women with polycystic ovaries. Hormone replacement therapy (particularly with oestrogen monotherapy) for women after menopause is also a risk factor. In contrast, hormonal ovulation inhibitors ("the pill") protect against ovarian cancer. Sterilisation by means of tubal ligation also reduces the risk of developing this cancer.

The risk of ovarian cancer is higher for women with first-degree relatives diagnosed with breast or ovarian cancer and for women who themselves have been diagnosed with breast, uterine or colorectal cancer. Underlying genetic mutations, above all of BRCA1 and BRCA2, considerably increase the risk, but they only play a part in a small proportion of cases.

**Figure 3.17.1a**
**Age-standardised incidence and mortality rates, ICD-10 C56, Germany 1999 – 2010**
*per 100,000 (European standard)*

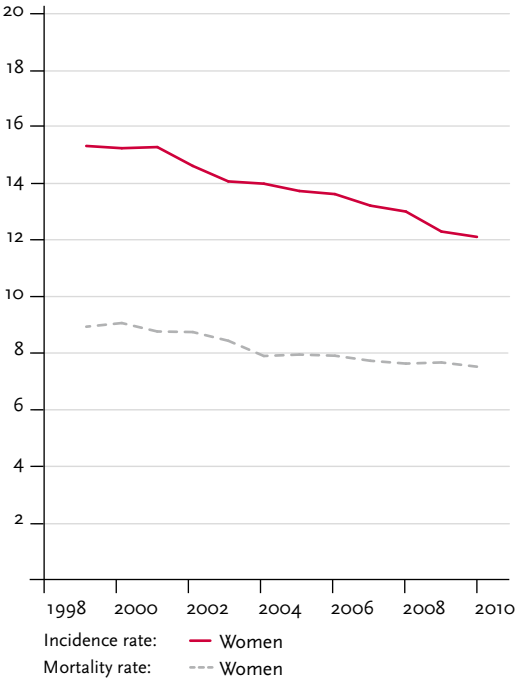



**Figure 3.17.1b**
**Absolute numbers of incident cases and deaths, ICD-10 C56, Germany 1999 – 2010**

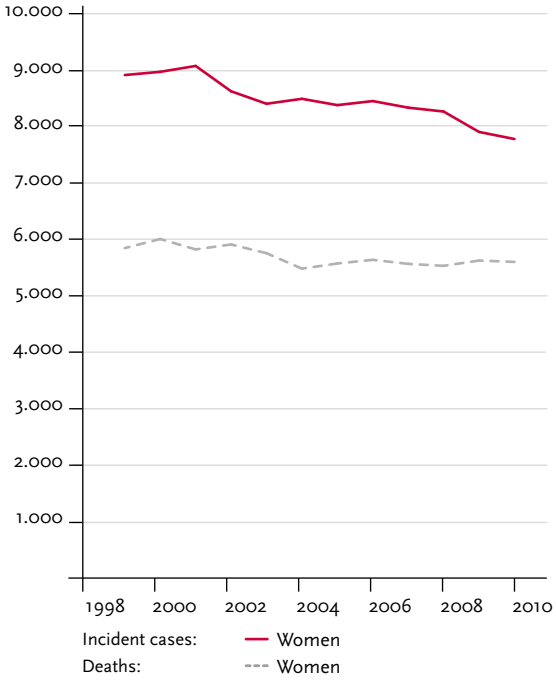



**Figure 3.17.2**
**Age-specific incidence rates, ICD-10 C56, Germany 2009 – 2010**
*per 100,000*

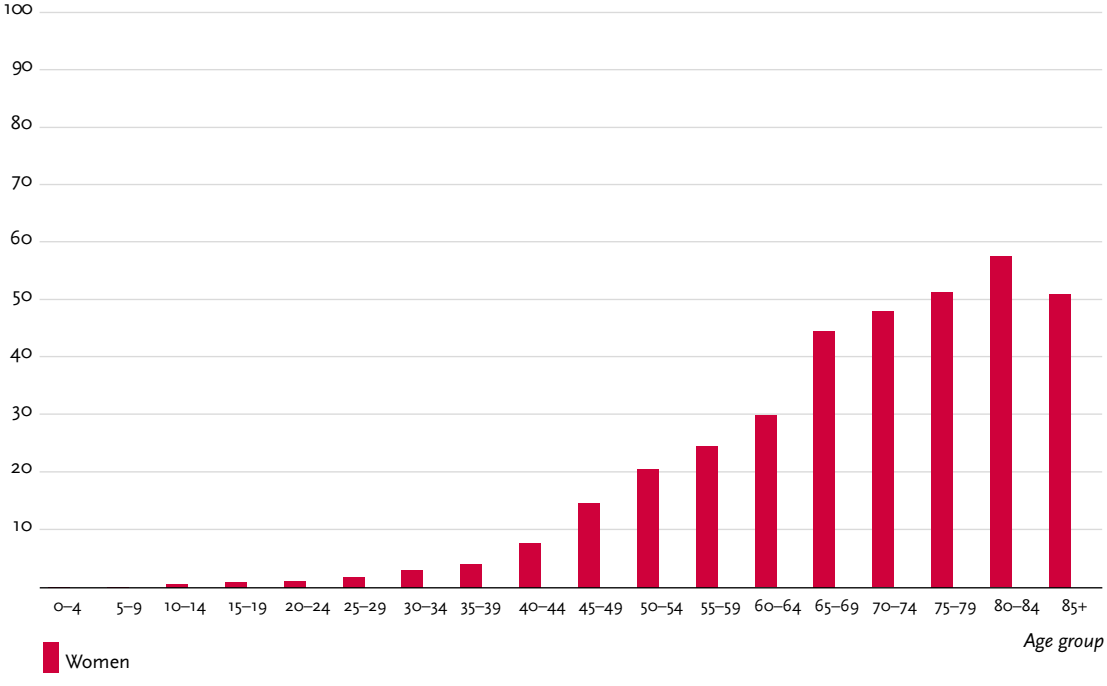


**Table 3.17.2**
**Cancer incidence and mortality risks in Germany by age, ICD-10 C56, database 2010**

| | 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) | 1.4% | (1 in 70) | <0.1% | (1 in 5,600) | 1.1% | (1 in 91) |
| 45 years | 0.2% | (1 in 590) | 1.4% | (1 in 72) | 0.1% | (1 in 1,400) | 1.1% | (1 in 92) |
| 55 years | 0.3% | (1 in 360) | 1.2% | (1 in 80) | 0.2% | (1 in 600) | 1.0% | (1 in 96) |
| 65 years | 0.4% | (1 in 230) | 1.0% | (1 in 98) | 0.3% | (1 in 320) | 0.9% | (1 in 110) |
| 75 years | 0.4% | (1 in 230) | 0.7% | (1 in 150) | 0.4% | (1 in 230) | 0.7% | (1 in 150) |
| Lifetime risk | | | 1.5% | (1 in 68) | | | 1.1% | (1 in 91) |

**Figure 3.17.3**
**Distribution of T-stages at first diagnosis (top: all cases; bottom: only valid reports)**
**ICD-10 C56, Germany 2009 – 2010**

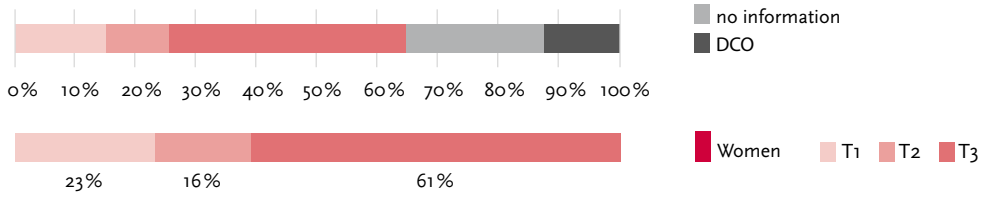



**Figure 3.17.4a**
**Absolute survival rates up to 5 years after first diagnosis,**
**ICD-10 C56, Germany 2009 – 2010**

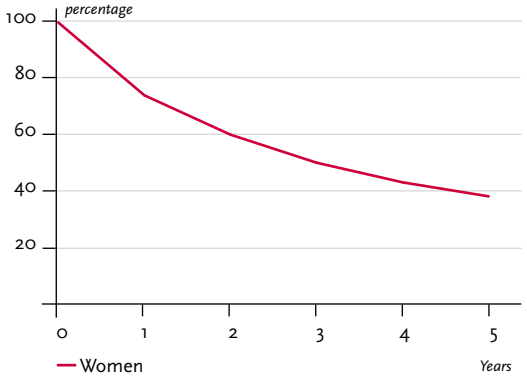



**Figure 3.17.4b**
**Relative survival rates up to 5 years after first diagnosis,**
**ICD-10 C56, Germany 2009 – 2010**

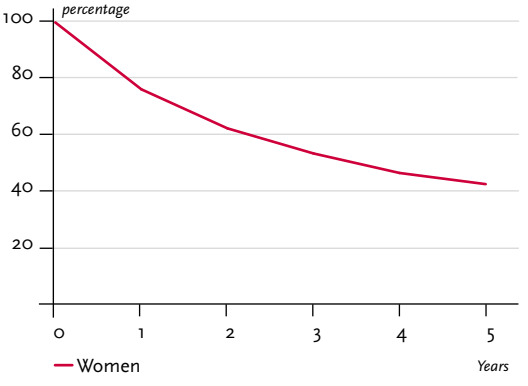


**Figure 3.17.5**
**Registered age-standardised incidence and mortality rates in German federal states, ICD-10 C56, 2009 – 2010**
*per 100,000 (European standard)*

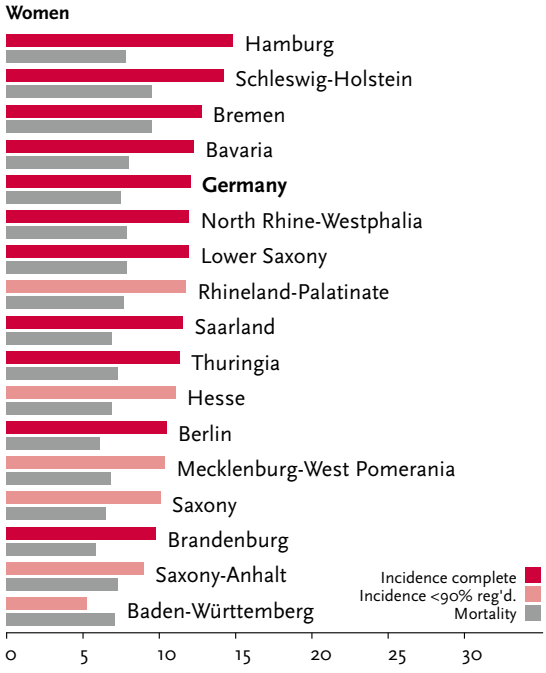
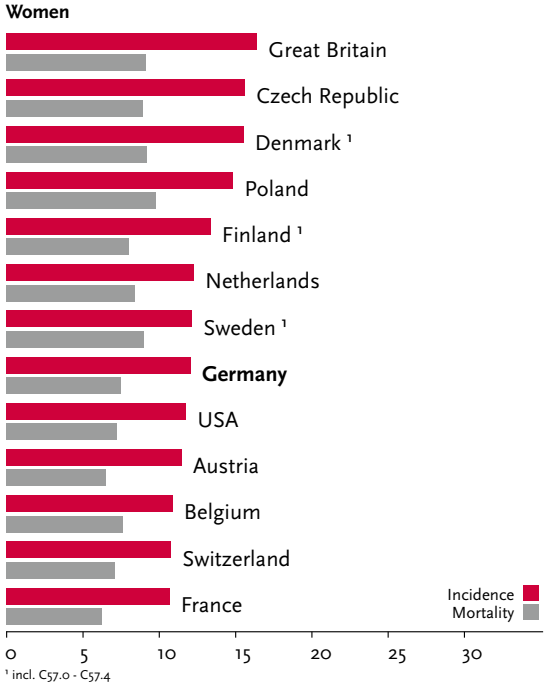



**Figure 3.17.6**
**International comparison of age-standardised incidence and mortality rates, ICD-10 C56, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*



## 3.18 Prostate

**Table 3.18.1**
**Overview of key epidemiological parameters for Germany, ICD-10 C61**

| | 2009 | 2010 | Prediction for 2014 |
|---|---|---|---|
| | Men | Men | Men |
| Incident cases | 64,960 | 65,830 | 70,100 |
| Crude incidence rate[1] | 161.9 | 164.2 | 176.4 |
| Standardised incidence rate[1,2] | 111.6 | 111.4 | 111.4 |
| Median age at diagnosis | 70 | 70 | |
| Deaths | 12,217 | 12,676 | |
| Crude mortality rate[1] | 30.4 | 31.6 | |
| Standardised mortality rate[1,2] | 20.0 | 20.0 | |
| 5-year prevalence | 273,100 | 279,000 | |
| Absolute 5-year survival rate (2009-2010)[3] | | 78 (73-80) | |
| Relative 5-year survival rate (2009-2010)[3] | | 93 (88-95) | |

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

### Epidemiology

Prostate cancer is the most common cancer and the third most common cause of death due to cancer among men in Germany. The number of new cases has risen steadily in recent years and in 2010 was 65,800. After increasing for almost two decades, the age-standardised incidence rate has remained largely constant since 2003. Similar trends can also be observed in most other Western industrialised nations and may be attributable to the introduction of the prostate specific antigen test (PSA test) in the late 1980s as an (unorganised) screening method. In contrast to the incidence rate, the age-standardised mortality rate has been falling since approximately the mid-1990s.

Prostate cancer occurs seldom in people under 50 years of age. For a 35-year old man, the risk of being diagnosed with prostate cancer within the next ten years is less than 0.1%, while for a 75-year old man it is approximately 6%.

Most tumours are discovered in the early stages T1 and T2. The relative 5-year survival rate for prostate cancer is currently 93%. Deaths may, however, still occur after a longer course of the disease, e.g. through recurrence.

### Risk factors and early detection

Little is known about the causes of prostate carcinoma development and the factors influencing its course. The presence of clustered cases among close relatives has now been adequately proved as a risk factor, although there is no understanding of the hereditary gene mutations involved. The male sex hormone (testosterone) also clearly plays a part.

Despite extensive research, there are few reliable findings relating to lifestyle, diet, or the environment. However, it is thought that diet may have an influence on the development of the prostate carcinoma. A large-scale cancer prevention study has shown that taking vitamin E as a dietary supplement increases the risk of developing prostate cancer.

For men above 45 years of age, the cancer early detection directive in Germany currently recommends an annual interview focusing on complaints and other health-related changes, an examination of the external sexual organs, as well as a palpation examination of the prostate and the lymph nodes. The test for PSA in the blood is not covered by the statutory health insurance, as to date the benefit of the PSA test has not been irrefutably proven.

**Figure 3.18.1a**
**Age-standardised incidence and mortality rates, ICD-10 C61, Germany 1999 – 2010**
*per 100,000 (European standard)*

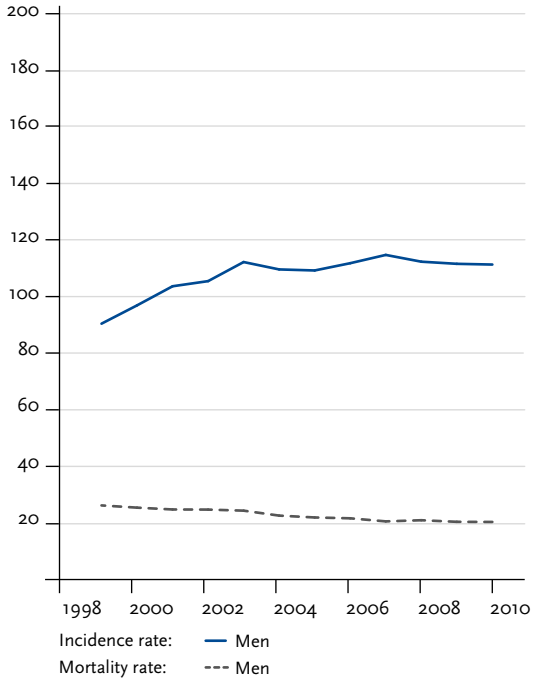



**Figure 3.18.1b**
**Absolute numbers of incident cases and deaths, ICD-10 C61, Germany 1999 – 2010**

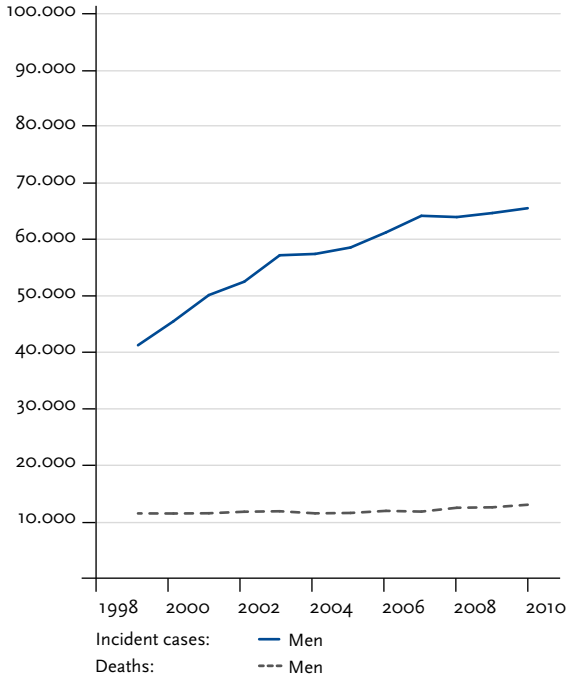



**Figure 3.18.2**
**Age-specific incidence rates, ICD-10 C61, Germany 2009 – 2010**
*per 100,000*

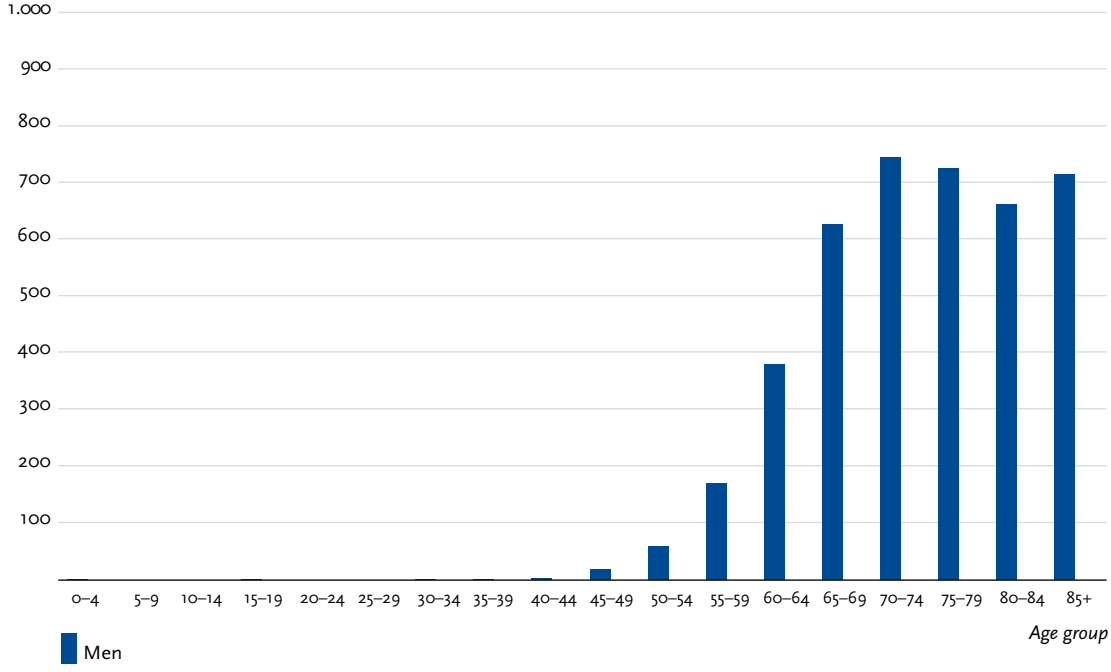


**Table 3.18.2**
**Cancer incidence and mortality risks in Germany by age, ICD-10 C61, database 2010**

| | 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 4,200) | 13.4% | (1 in 7) | <0.1% | (1 in 108,000) | 3.3% | (1 in 30) |
| 45 years | 0.5% | (1 in 220) | 13.6% | (1 in 7) | <0.1% | (1 in 4,200) | 3.4% | (1 in 30) |
| 55 years | 2.7% | (1 in 37) | 13.8% | (1 in 7) | 0.2% | (1 in 560) | 3.5% | (1 in 29) |
| 65 years | 6.3% | (1 in 16) | 12.6% | (1 in 9) | 0.7% | (1 in 140) | 3.7% | (1 in 27) |
| 75 years | 5.9% | (1 in 17) | 8.5% | (1 in 12) | 1.9% | (1 in 52) | 3.8% | (1 in 26) |
| Lifetime risk | | | 13.2% | (1 in 8) | | | 3.3% | (1 in 30) |

**Figure 3.18.3**
**Distribution of T-stages at first diagnosis (top: all cases; bottom: only valid reports)**
**ICD-10 C61, Germany 2009 – 2010**

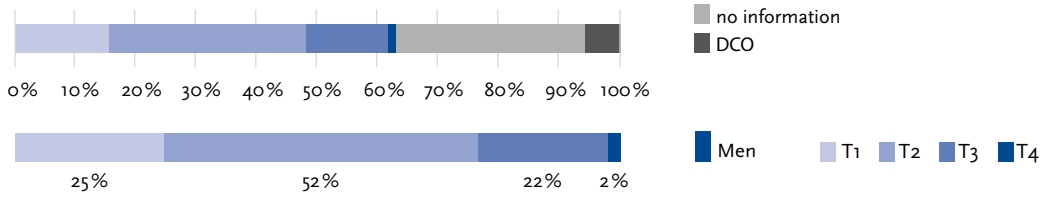



**Figure 3.18.4a**
**Absolute survival rates up to 5 years after first diagnosis,**
**ICD-10 C61, Germany 2009 – 2010**

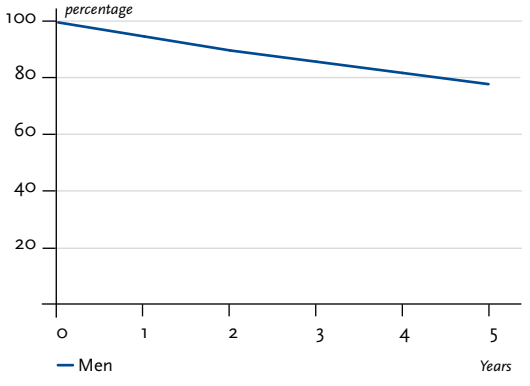



**Figure 3.18.4b**
**Relative survival rates up to 5 years after first diagnosis,**
**ICD-10 C61, Germany 2009 – 2010**

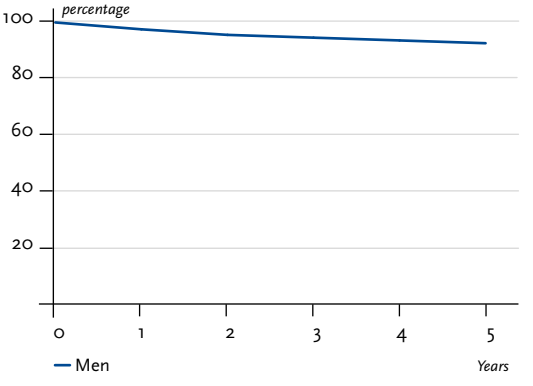


**Figure 3.18.5**
**Registered age-standardised incidence and mortality rates in German federal states, ICD-10 C61, 2009 – 2010**
*per 100,000 (European standard)*

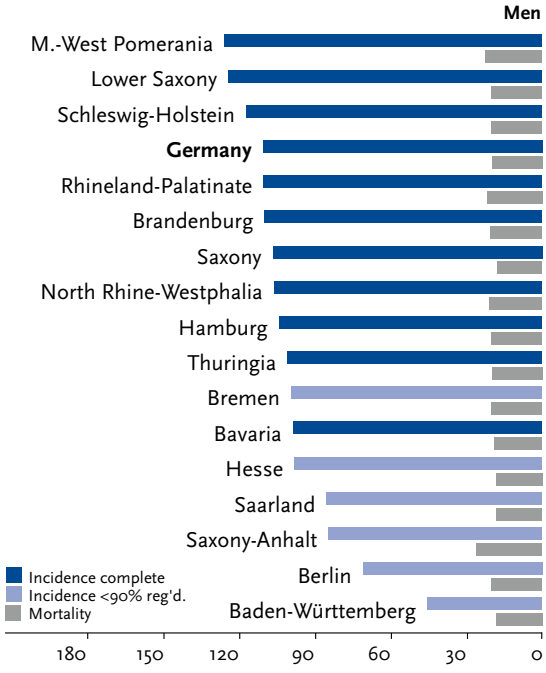
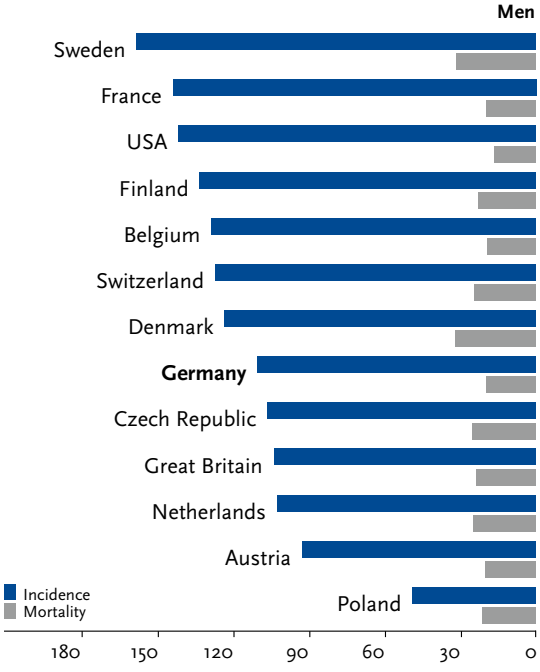



**Figure 3.18.6**
**International comparison of age-standardised incidence and mortality rates, ICD-10 C61, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*



## 3.19 Testicle

**Table 3.19.1**
**Overview of key epidemiological parameters for Germany, ICD-10 C62**

| | 2009 | 2010 | Prediction for 2014 |
|---|---|---|---|
| | Men | Men | Men |
| Incident cases | 3,900 | 3,820 | 4,000 |
| Crude incidence rate[1] | 9.7 | 9.5 | 9.9 |
| Standardised incidence rate[1,2] | 9.5 | 9.4 | 10.0 |
| Median age at diagnosis | 38 | 38 | |
| Deaths | 170 | 166 | |
| Crude mortality rate[1] | 0.4 | 0.4 | |
| Standardised mortality rate[1,2] | 0.4 | 0.4 | |
| 5-year prevalence | 18,900 | 18,800 | |
| Absolute 5-year survival rate (2009-2010)[3] | | 95 (93-96) | |
| Relative 5-year survival rate (2009-2010)[3] | | 97 (94-98) | |

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

### Epidemiology

In 2010 some 3,820 men in Germany were diagnosed with testicular cancer. It accounts for 1.5 % of all cases of cancer in men, making it a relatively rare tumour.

In contrast to almost all other types of cancer, most cases are diagnosed at a comparatively young age, namely between 25 and 45 years of age. In this age group, testicular cancer is the most common malignant tumour in men. Correspondingly, the median age at diagnosis is 38 years.

The age-standardised incidence rate has remained almost constant recently, levelling out after decades during which a steady increase was observed in Germany and other European countries. Over 90 % of testicular tumours are diagnosed in the early stages T1 or T2. Histologically, testicular cancers are predominantly germ cell tumours, of which approximately two thirds are seminomas. Approximately one case in six is a malignant teratoma or a combination of the latter types.

Since the introduction of cis-platinum in chemotherapy for testicular cancer over 30 years ago, this disease has become one of the malignant neoplasms with more favourable prognoses (5-year survival rate most recently 97 %) and a low mortality (166 deaths in 2010).

### Risk factors and early detection

A proven risk factor for testicular cancer is cryptorchidism (undescended testis), even after this has been properly treated. Men who have already had cancer or a preliminary stage of cancer in one testicle have an increased risk of developing a tumour in the other testicle. Infertility and rare, genetic disturbances to sexual development, such as Klinefelter's syndrome, also increase the likelihood of developing testicular cancer.

In a small proportion of cases there may be a genetic predisposition. Sons and brothers (especially twin brothers) of patients with testicular cancer have a significantly higher risk of developing the disease.

A hypothesis is that the predisposition for the most frequently occurring germ cell tumours in the testes may have its origin in cells which are scattered during the embryonic stage, and which then undergo a malignant development in puberty. A birth weight below 2500g or above 4500g as well as tall stature are also being discussed as possible risk factors. The causes of the increase in incidence observed in former decades are not clearly understood. The current view is that lifestyle and environmental factors play no part in the development of testicular cancer. Since an early diagnosis is correlated with a better prognosis, men between 20 and 40 years of age are advised to carry out regular self-examination by palpation of the testes.

**Figure 3.19.1a**
**Age-standardised incidence and mortality rates, ICD-10 C62, Germany 1999 – 2010**
*per 100,000 (European standard)*

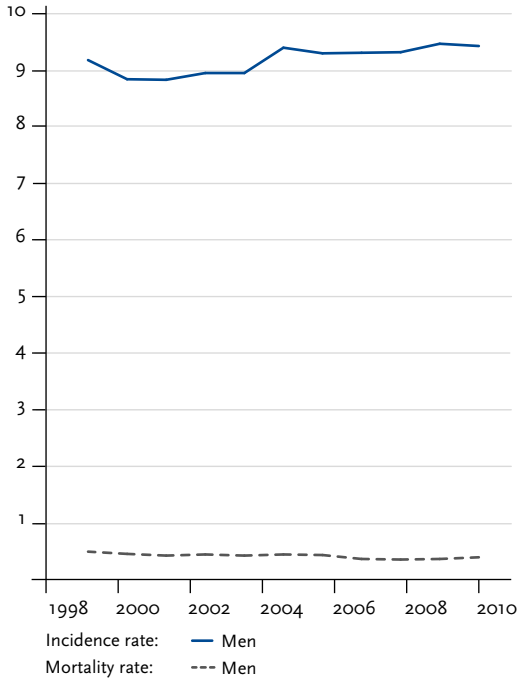



**Figure 3.19.1b**
**Absolute numbers of incident cases and deaths, ICD-10 C62, Germany 1999 – 2010**

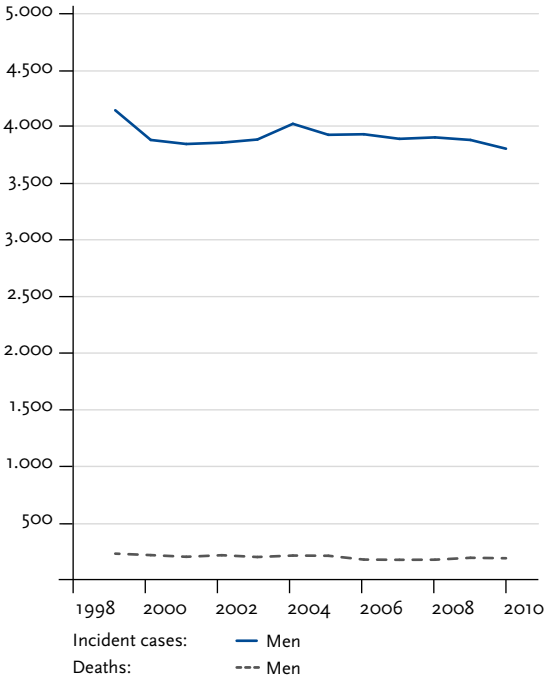



**Figure 3.19.2**
**Age-specific incidence rates, ICD-10 C62, Germany 2009 – 2010**
*per 100,000*

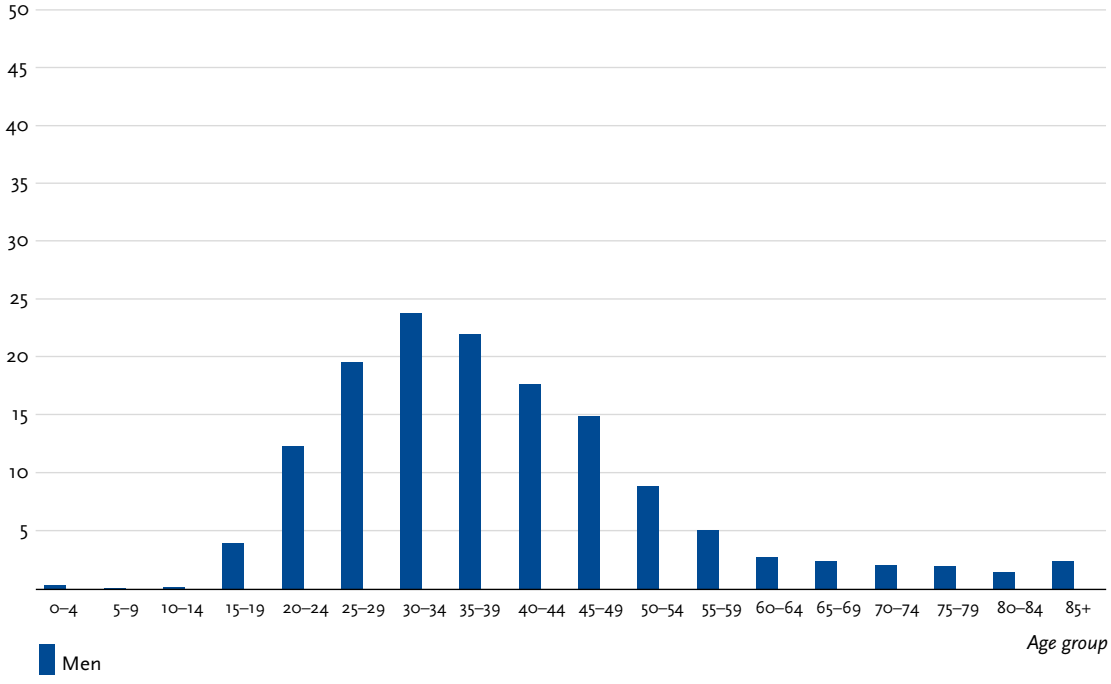


**Table 3.19.2**
**Cancer incidence and mortality risks in Germany by age, ICD-10 C62, database 2010**

| | 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 1,300) | 0.7% | (1 in 150) | <0.1% | (1 in 67,000) | <0.1% | (1 in 3,300) |
| 25 years | 0.2% | (1 in 470) | 0.6% | (1 in 170) | <0.1% | (1 in 16,000) | <0.1% | (1 in 3,500) |
| 35 years | 0.2% | (1 in 490) | 0.4% | (1 in 260) | <0.1% | (1 in 16,000) | <0.1% | (1 in 4,400) |
| 45 years | 0.1% | (1 in 860) | 0.2% | (1 in 550) | <0.1% | (1 in 19,000) | <0.1% | (1 in 6,000) |
| 55 years | <0.1% | (1 in 2,500) | 0.1% | (1 in 1,400) | <0.1% | (1 in 32,000) | <0.1% | (1 in 8,400) |
| 65 years | <0.1% | (1 in 5,000) | <0.1% | (1 in 3,000) | <0.1% | (1 in 23,000) | <0.1% | (1 in 10,000) |
| 75 years | <0.1% | (1 in 9,300) | <0.1% | (1 in 5,800) | <0.1% | (1 in 21,000) | <0.1% | (1 in 15,000) |
| Lifetime risk | | | 0.7% | (1 in 150) | | | <0.1% | (1 in 3,300) |

**Figure 3.19.3**
**Distribution of T-stages at first diagnosis (top: all cases; bottom: only valid reports)**
**ICD-10 C62, Germany 2009 – 2010**

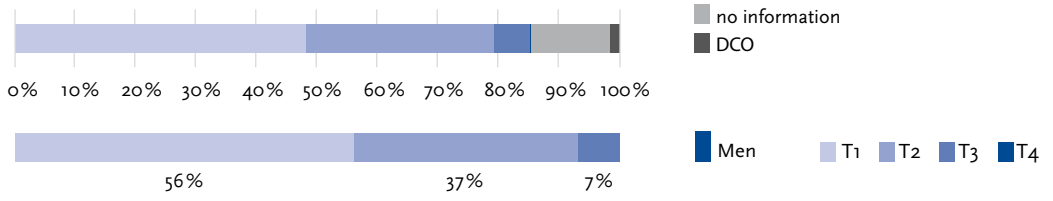



**Figure 3.19.4a**
**Absolute survival rates up to 5 years after first diagnosis,**
**ICD-10 C62, Germany 2009 – 2010**

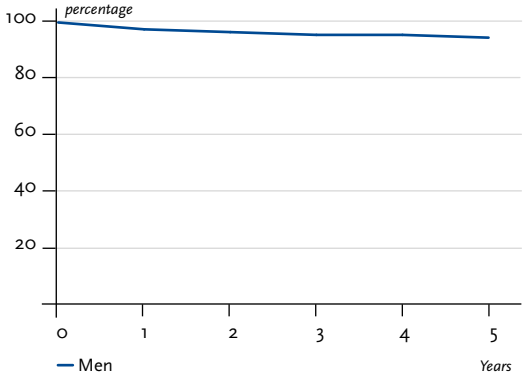



**Figure 3.19.4b**
**Relative survival rates up to 5 years after first diagnosis,**
**ICD-10 C62, Germany 2009 – 2010**

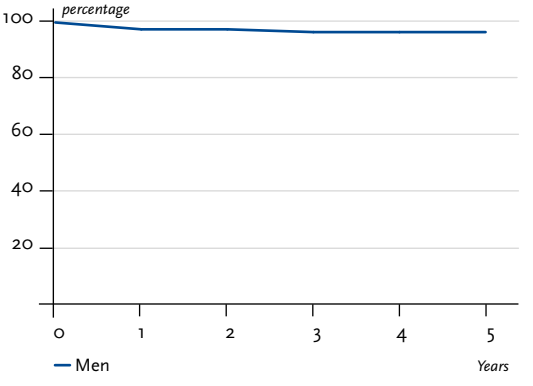


**Figure 3.19.5**
**Registered age-standardised incidence and mortality rates in German federal states, ICD-10 C62, 2009 – 2010**
*per 100,000 (European standard)*

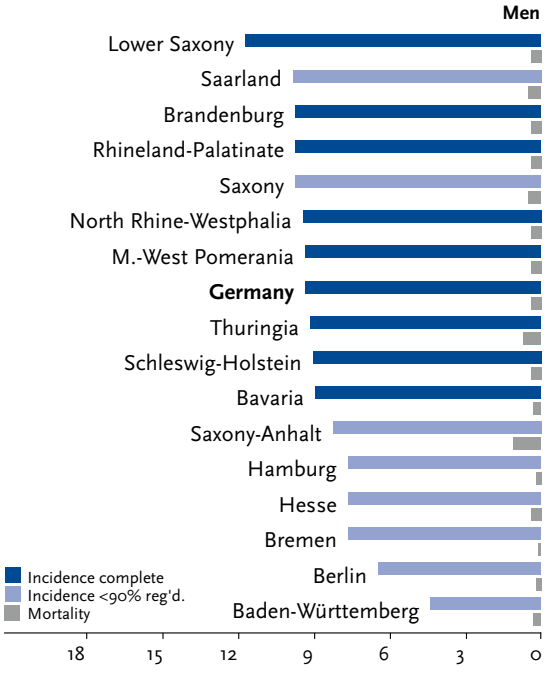
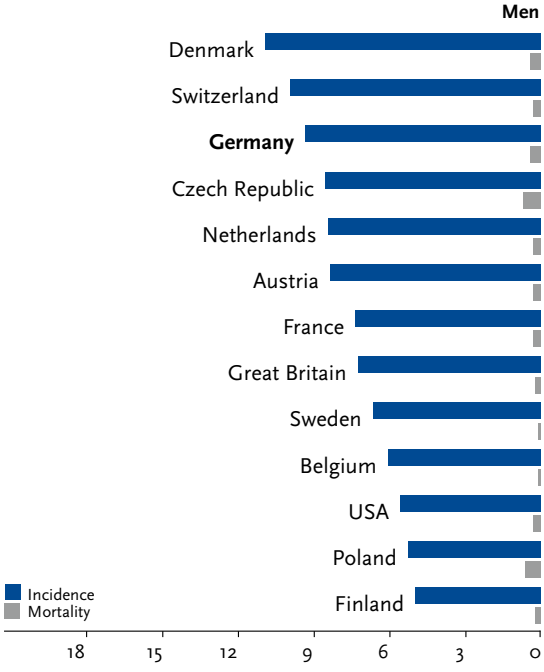



**Figure 3.19.6**
**International comparison of age-standardised incidence and mortality rates, ICD-10 C62, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*



## 3.20 Kidney

**Table 3.20.1**
**Overview of key epidemiological parameters for Germany, ICD-10 C64**

| | 2009 | | 2010 | | Prediction for 2014 | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Incident cases | 9,040 | 5,630 | 8,950 | 5,570 | 9,500 | 6,000 |
| Crude incidence rate[1] | 22.5 | 13.5 | 22.3 | 13.4 | 23.9 | 14.5 |
| Standardised incidence rate[1,2] | 16.4 | 8.3 | 16.2 | 8.2 | 15.9 | 8.2 |
| Median age at diagnosis | 68 | 71 | 68 | 71 | | |
| Deaths | 3,088 | 2,015 | 3,096 | 2,151 | | |
| Crude mortality rate[1] | 7.7 | 4.8 | 7.7 | 5.2 | | |
| Standardised mortality rate[1,2] | 5.3 | 2.4 | 5.2 | 2.4 | | |
| 5-year prevalence | 33,300 | 20,900 | 33,600 | 21,100 | | |
| Absolute 5-year survival rate (2009-2010)[3] | | | 65 (54-70) | 69 (56-78) | | |
| Relative 5-year survival rate (2009-2010)[3] | | | 75 (62-81) | 77 (63-89) | | |

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

### Epidemiology

Malignant neoplasms of the kidney can develop from various tissues. Among all types of kidney tumours in adults, renal cell carcinomas (hypernephromas) occur most frequently, account for 90 % of all cases. In contrast, nephroblastomas (Wilms' tumours), lymphomas or sarcomas of the kidney are more frequent in children.

The age-standardised incidence rates have remained at a fairly constant level for men and women since the end of the 1990s, although the incidence rate for men is twice as high as in women. As far as the age-standardised mortality rates are concerned, a slightly downward trend is observed for both sexes, whereas the absolute number of new cases in the last ten years has increased by a good 10 %.

The median age at diagnosis is 68 years for men and 71 years for women.

The prognosis for kidney carcinoma is comparatively favourable, the relative 5-year survival rate for kidney tumours is approx. 75 % in men and 77 % in women. Around three-quarters of all tumours are diagnosed at a relatively early stage (T1 and T2). In regional and/or international comparison, relatively high incidence and mortality rates are apparent in the eastern federal states, as well as in Germany's eastern European neighbouring countries.

### Risk factors

Smoking and passive smoking, as well as hypertension and obesity are the most important risk factors. A relationship appears to exist between being overweight and developing kidney cancer, especially in women. In men, the nature of the fat distribution may possibly be decisive. Studies have also found that alcohol consumption is a potential risk factor.

Occupational exposure to substances which may damage the kidneys, e.g. halogenated hydrocarbons and cadmium, can also increase cancer risk. On the whole, chronic renal insufficiency, regardless of cause, may promote carcinogenesis in the kidney. Also following a kidney transplant, the immuno-suppressed patient has an increased risk of developing a renal cell carcinoma.

Familial predisposition probably only plays a role in relatively few cases. Approximately three per cent of renal cell carcinomas occur in patients with complex hereditary diseases such as those affected by Hippel-Lindau syndrome. These genetic renal cell carcinomas are often multifocal and occur more often at a younger age than kidney cancers in patients without a genetic disposition.

**Figure 3.20.1a**
**Age-standardised incidence and mortality rates, by sex, ICD-10 C64, Germany 1999 – 2010**
*per 100,000 (European standard)*

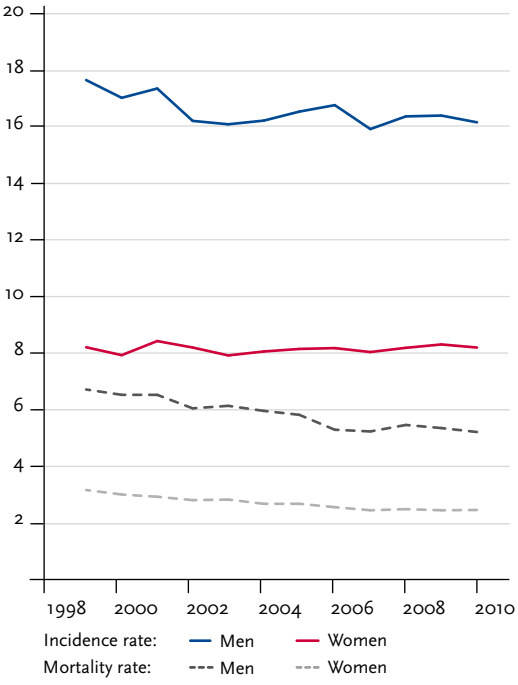



**Figure 3.20.1b**
**Absolute numbers of incident cases and deaths, by sex, ICD-10 C64, Germany 1999 – 2010**

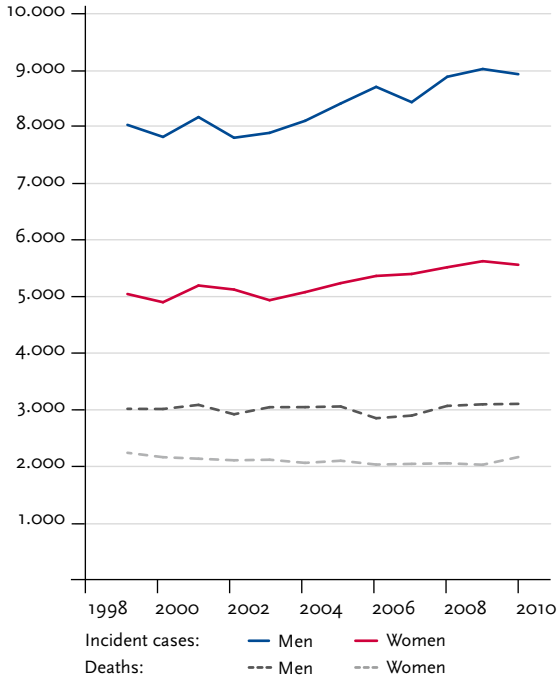



**Figure 3.20.2**
**Age-specific incidence rates by sex, ICD-10 C64, Germany 2009 – 2010**
*per 100,000*

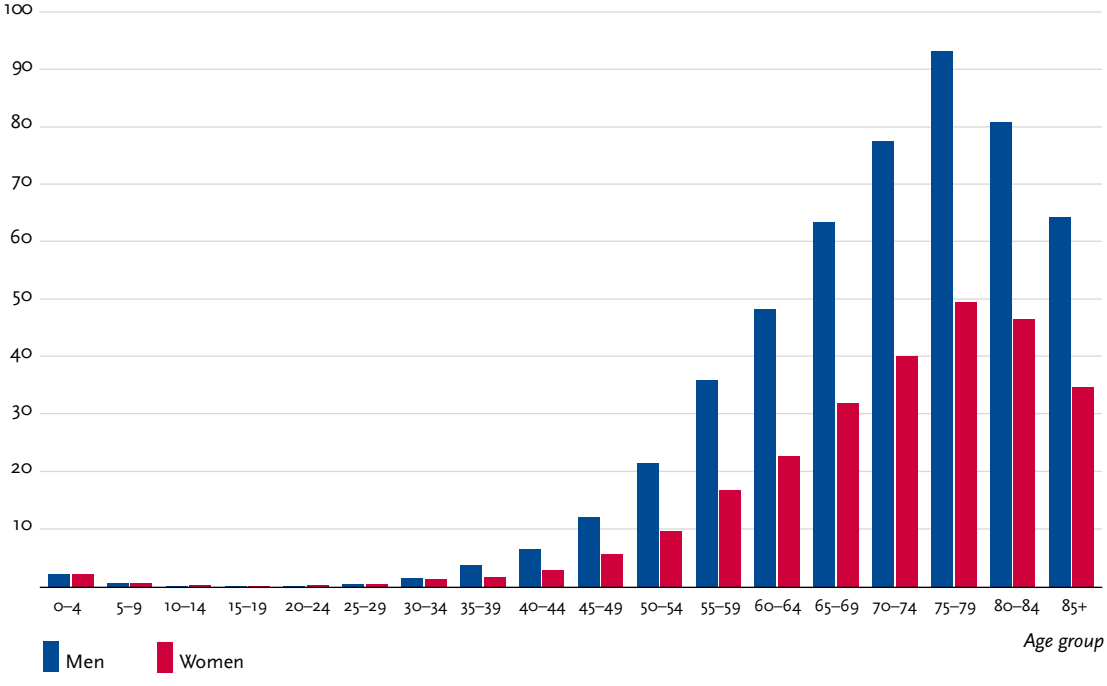


**Table 3.20.2**
**Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C64, database 2010**

| | 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 1,900) | 1.7% | (1 in 58) | <0.1% | (1 in 15,000) | 0.7% | (1 in 150) |
| 45 years | 0.2% | (1 in 580) | 1.7% | (1 in 59) | <0.1% | (1 in 3,000) | 0.7% | (1 in 150) |
| 55 years | 0.4% | (1 in 240) | 1.6% | (1 in 63) | 0.1% | (1 in 1,000) | 0.7% | (1 in 150) |
| 65 years | 0.6% | (1 in 160) | 1.3% | (1 in 76) | 0.2% | (1 in 490) | 0.6% | (1 in 160) |
| 75 years | 0.6% | (1 in 150) | 0.9% | (1 in 120) | 0.4% | (1 in 280) | 0.6% | (1 in 180) |
| Lifetime risk | | | 1.7% | (1 in 58) | | | 0.7% | (1 in 150) |
| **Women aged** | **in the next ten years** | | **ever** | | **in the next ten years** | | **ever** | |
| 35 years | <0.1% | (1 in 3,800) | 1.0% | (1 in 95) | <0.1% | (1 in 51,000) | 0.4% | (1 in 220) |
| 45 years | 0.1% | (1 in 1,300) | 1.0% | (1 in 97) | <0.1% | (1 in 7,700) | 0.4% | (1 in 220) |
| 55 years | 0.2% | (1 in 520) | 1.0% | (1 in 100) | <0.1% | (1 in 2,900) | 0.4% | (1 in 230) |
| 65 years | 0.3% | (1 in 300) | 0.8% | (1 in 120) | 0.1% | (1 in 980) | 0.4% | (1 in 230) |
| 75 years | 0.4% | (1 in 250) | 0.6% | (1 in 180) | 0.2% | (1 in 460) | 0.4% | (1 in 270) |
| Lifetime risk | | | 1.1% | (1 in 94) | | | 0.4% | (1 in 230) |

**Figure 3.20.3**
**Distribution of T-stages at first diagnosis by sex (top: all cases; bottom: only valid reports)**
**ICD-10 C64, Germany 2009 – 2010**

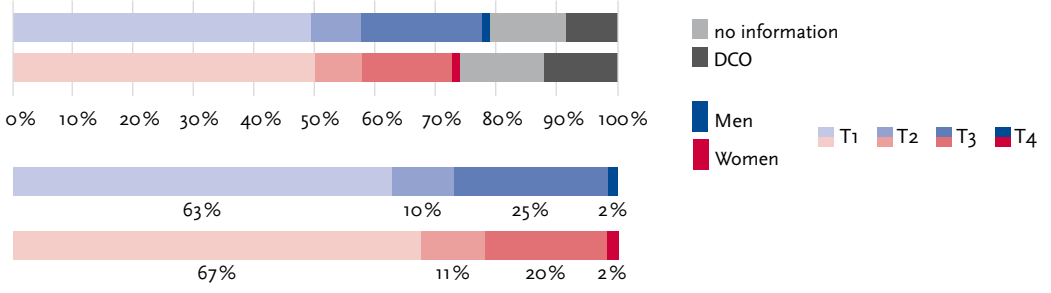



**Figure 3.20.4a**
**Absolute survival rates up to 5 years after first diagnosis, by sex, ICD-10 C64, Germany 2009 – 2010**

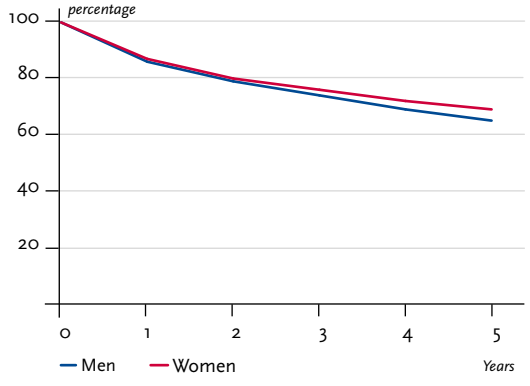



**Figure 3.20.4b**
**Relative survival rates up to 5 years after first diagnosis, by sex, ICD-10 C64, Germany 2009 – 2010**

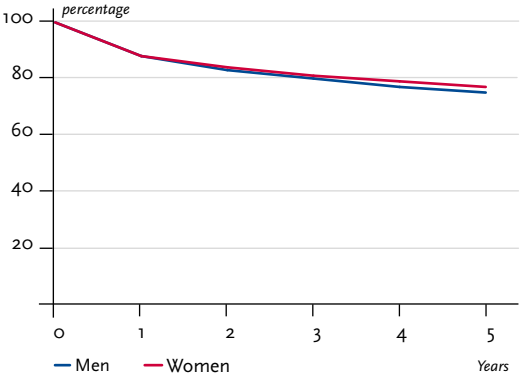


**Figure 3.20.5**
**Registered age-standardised incidence and mortality rates in German federal states, by sex, ICD-10 C64, 2009 – 2010**
*per 100,000 (European standard)*

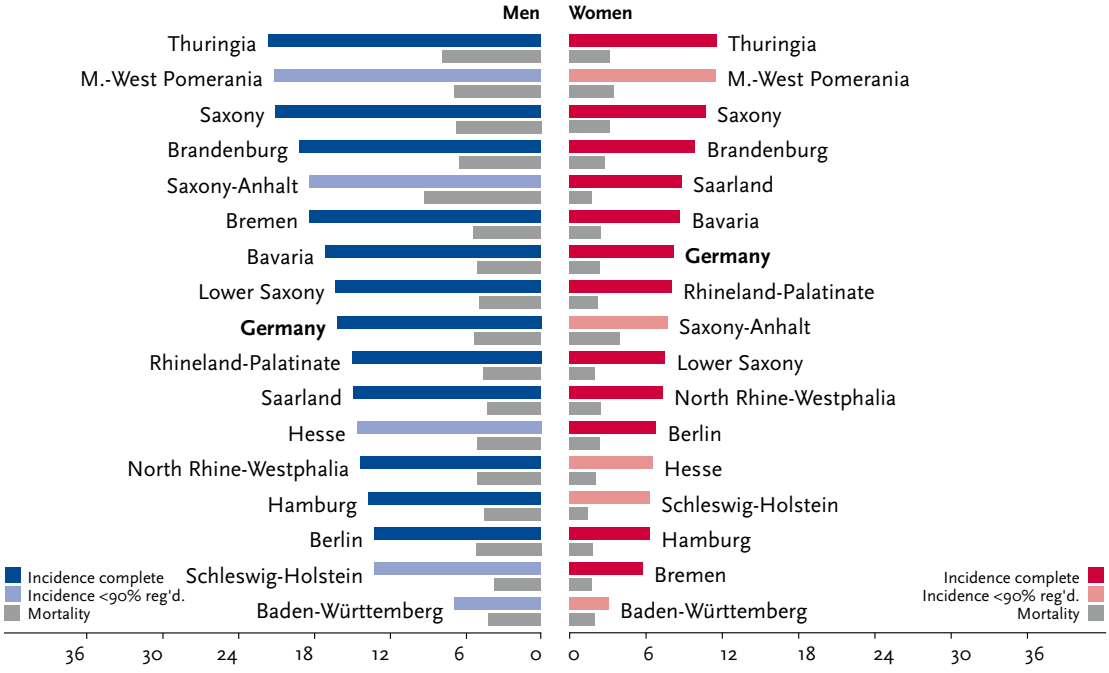
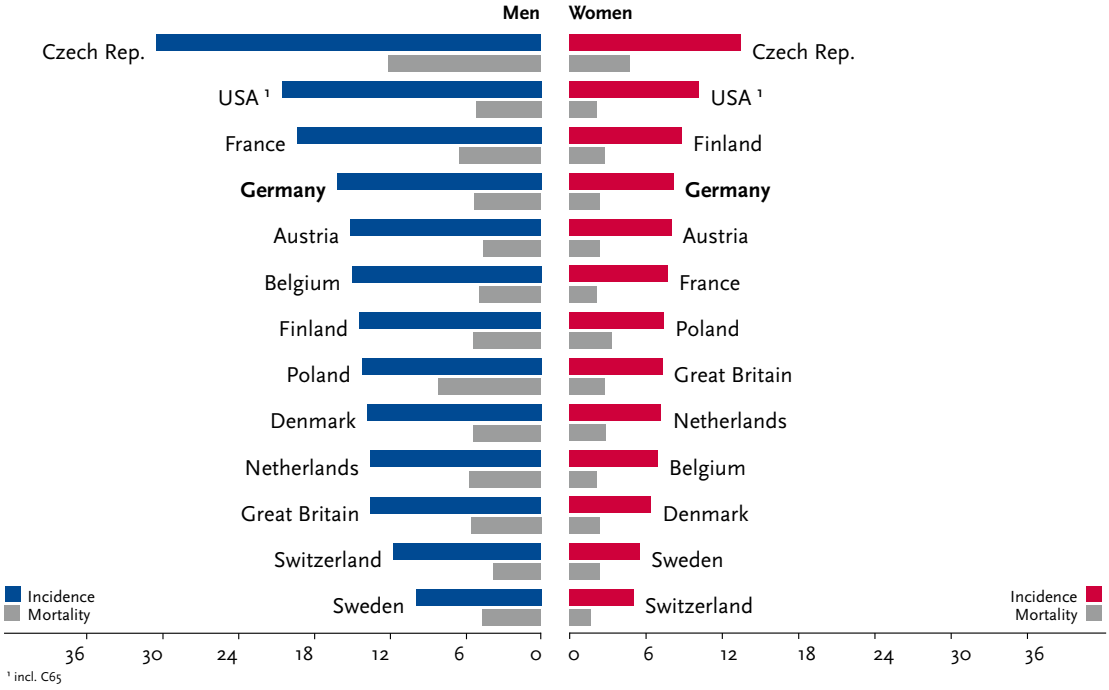



**Figure 3.20.6**
**International comparison of age-standardised incidence and mortality rates, by sex, ICD-10 C64, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*




[1] incl. C65

## 3.21 Bladder

**Table 3.21.1**
**Overview of key epidemiological parameters for Germany, ICD-10 C67**

| | 2009 | | 2010 | | Prediction for 2014 | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Incident cases | 11,550 | 4,050 | 11,350 | 4,150 | 11,900 | 4,500 |
| | (21,380)[4] | (6,970)[4] | (21,550)[4] | (7,240)[4] | | |
| Crude incidence rate[1] | 28.8 (53.3)[4] | 9.7 (16.7)[4] | 28.3 (53.7)[4] | 10.0 (17.4)[4] | 30.0 | 10.8 |
| Standardised incidence rate[1,2] | 19.7 (36.6)[4] | 5.0 (9.1)[4] | 18.9 (36.1)[4] | 5.0 (9.3)[4] | 18.2 | 5.2 |
| Median age at diagnosis | 73 (72)[4] | 76 (74)[4] | 73 (72)[4] | 77 (74)[4] | | |
| Deaths | 3,587 | 1,766 | 3,631 | 1,885 | | |
| Crude mortality rate[1] | 8.9 | 4.2 | 9.1 | 4.5 | | |
| Standardised mortality rate[1,2] | 6.0 | 1.8 | 5.9 | 1.9 | | |
| 5-year prevalence | 35,400 | 11,300 | 35,500 | 11,200 | | |
| Absolute 5-year survival rate (2009-2010)[3] | | | 47 (33-50) | 41 (34-49) | | |
| Relative 5-year survival rate (2009-2010)[3] | | | 59 (43-62) | 50 (41-60) | | |

[1] per 100,000 persons [2] age-standardised (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)

### Epidemiology

Some 15,500 people, two third of them men, were newly diagnosed with an invasive bladder carcinoma in Germany in 2010. In addition, more than 13,000 were diagnosed with non-invasive papillary carcinoma or in situ tumours of the bladder. The latter in particular, exhibit a high tendency of progression and recurrence and are thus of particular clinical relevance, despite the fact that they currently do not rank among malignant tumours according to ICD-10. The majority of bladder cancer cases are carcinomas of the urothelium, which frequently occur simultaneously at various places in the bladder and urinary tract.

Incidence rates increase steadily with age, with only about one in four being diagnosed before the age of 65. The age-standardised incidence and mortality rates for men show a clear downward trend since the 1990s, probably due to a decline in tobacco consumption, but possibly also because of a reduction in occupational exposure to carcinogens (see below). For women, the age-standardised incidence rate has recently been constant, while the mortality rate reduced slightly. The mortality rate for bladder cancer is higher in the eastern federal states than in the western parts of Germany, above all among men.

The higher relative 5-year survival rates for men (59 %) compared with women (50 %) relate to the more favourable distribution of tumour stages at diagnosis (47 % vs. 37 % T1 tumours).

### Risk factors

Tobacco consumption is a key risk factor for the development of cancer of the bladder. Passive smoking also contributes to an increase in risk. The risk is further increased by exposure to some chemical substances such as aromatic amines, which play a role especially for certain occupational groups. The known hazardous substances have largely been eliminated from industrial processes and workplaces in Europe. However, there is a long latency period between exposure and the development of cancer, so that bladder carcinomas caused by occupational exposure will continue to be registered. Cytostatic drugs used in chemotherapy and local radiation therapy can increase the risk. The risk potential for some other pharmaceuticals is currently being debated. In 2013 the International Agency for Research on Cancer (IARC) classified pioglitazone hydrochloride, an anti-diabetic agent, as probably carciongenic to humans (Class 2A) with regard to cancer of the bladder. Chronic inflammatory damage to the mucosa of the bladder also increases the risk of bladder cancer.

Family clusters have been observed. Furthermore, there are indications that genetic factors play a direct role in the occurrence of bladder cancer, by increasing the susceptibility to carcinogens.

**Figure 3.21.1a**
**Age-standardised incidence and mortality rates, by sex, ICD-10 C67, Germany 1999 – 2010**
*per 100,000 (European standard)*

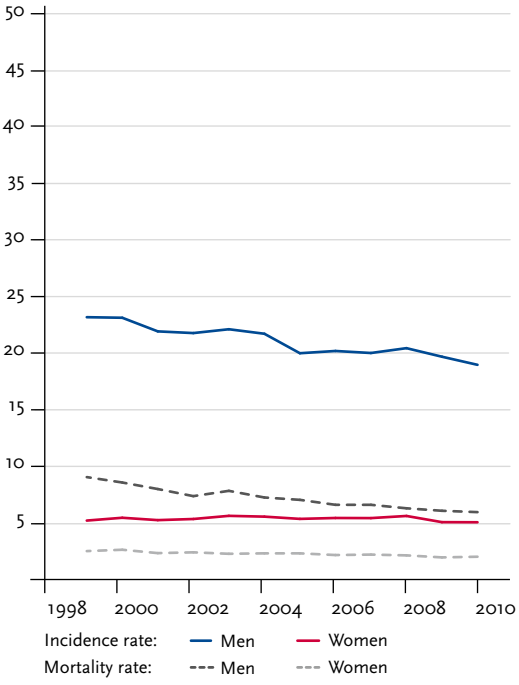



**Figure 3.21.1b**
**Absolute numbers of incident cases and deaths, by sex, ICD-10 C67, Germany 1999 – 2010**

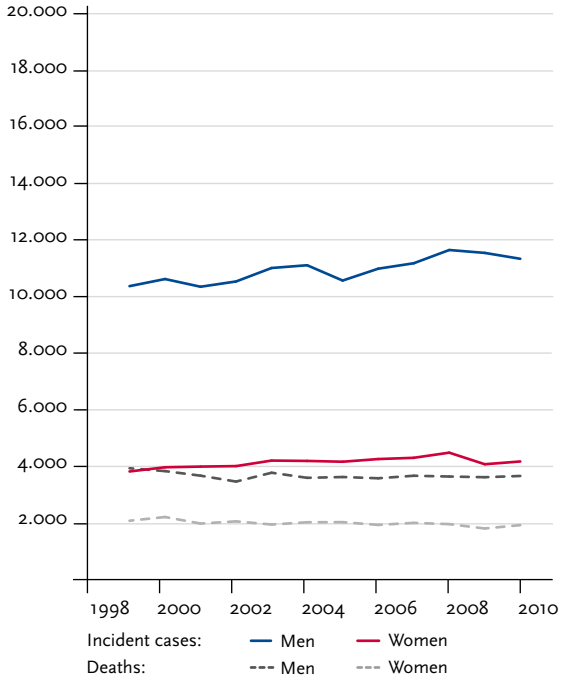



**Figure 3.21.2**
**Age-specific incidence rates by sex, ICD-10 C67, Germany 2009 – 2010**
*per 100,000*

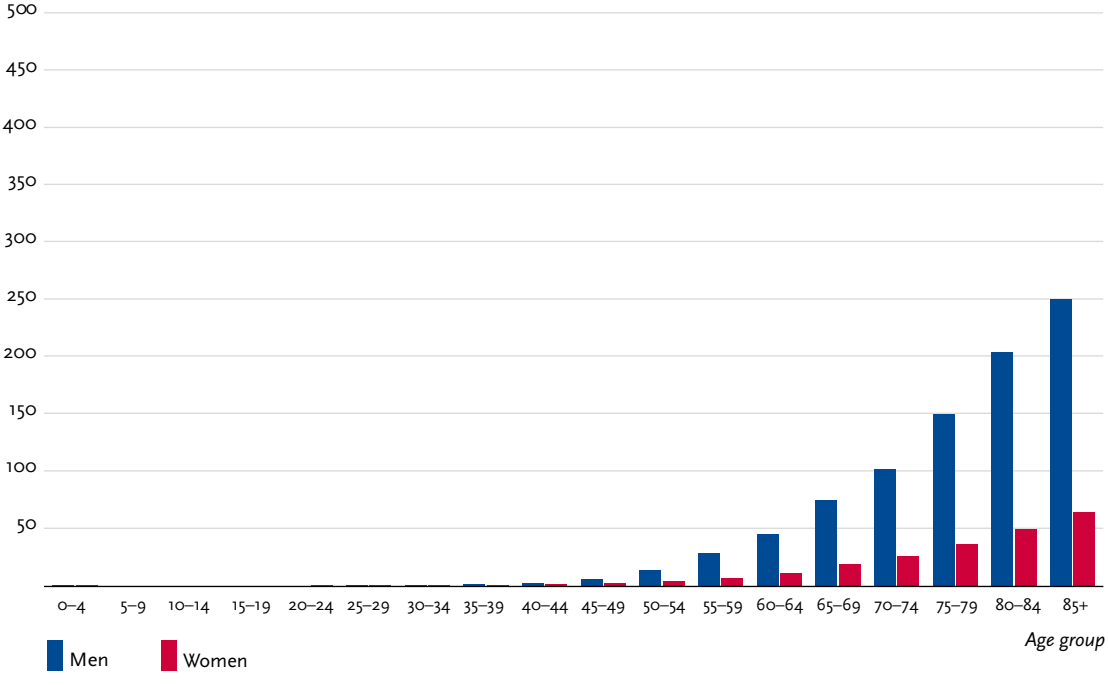


**Table 3.21.2**
**Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C67, database 2010**

| | 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 6,400) | 2.6% | (1 in 39) | <0.1% | (1 in 48,000) | 0.9% | (1 in 110) |
| 45 years | 0.1% | (1 in 980) | 2.6% | (1 in 39) | <0.1% | (1 in 5,400) | 1.0% | (1 in 110) |
| 55 years | 0.4% | (1 in 280) | 2.6% | (1 in 39) | 0.1% | (1 in 1,500) | 1.0% | (1 in 100) |
| 65 years | 0.8% | (1 in 130) | 2.5% | (1 in 41) | 0.2% | (1 in 500) | 1.0% | (1 in 100) |
| 75 years | 1.3% | (1 in 78) | 2.1% | (1 in 47) | 0.5% | (1 in 190) | 1.0% | (1 in 98) |
| Lifetime risk | | | 2.5% | (1 in 40) | | | 0.9% | (1 in 110) |
| **Women aged** | **in the next ten years** | | **ever** | | **in the next ten years** | | **ever** | |
| 35 years | <0.1% | (1 in 11,000) | 0.8% | (1 in 120) | <0.1% | (1 in 53,000) | 0.4% | (1 in 240) |
| 45 years | <0.1% | (1 in 3,200) | 0.8% | (1 in 120) | <0.1% | (1 in 13,000) | 0.4% | (1 in 240) |
| 55 years | 0.1% | (1 in 1,100) | 0.8% | (1 in 120) | <0.1% | (1 in 4,400) | 0.4% | (1 in 240) |
| 65 years | 0.2% | (1 in 480) | 0.8% | (1 in 130) | 0.1% | (1 in 1,600) | 0.4% | (1 in 240) |
| 75 years | 0.4% | (1 in 280) | 0.7% | (1 in 150) | 0.2% | (1 in 550) | 0.4% | (1 in 250) |
| Lifetime risk | | | 0.8% | (1 in 120) | | | 0.4% | (1 in 240) |

**Figure 3.21.3**
**Distribution of T-stages at first diagnosis by sex (top: all cases; bottom: only valid reports)**
**ICD-10 C67, Germany 2009 – 2010**

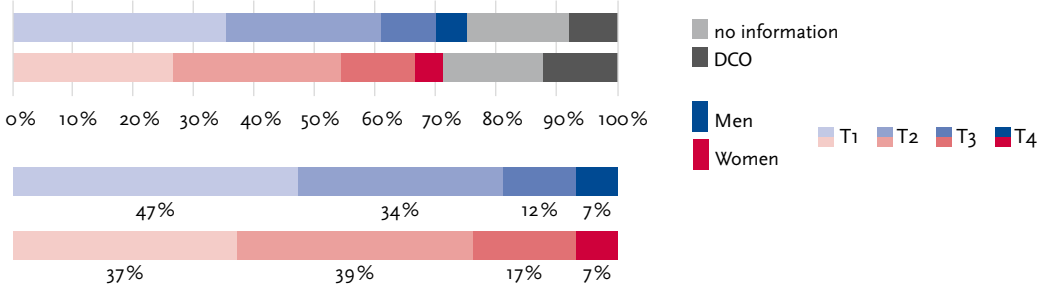



**Figure 3.21.4a**
**Absolute survival rates up to 5 years after first diagnosis, by sex, ICD-10 C67, Germany 2009 – 2010**

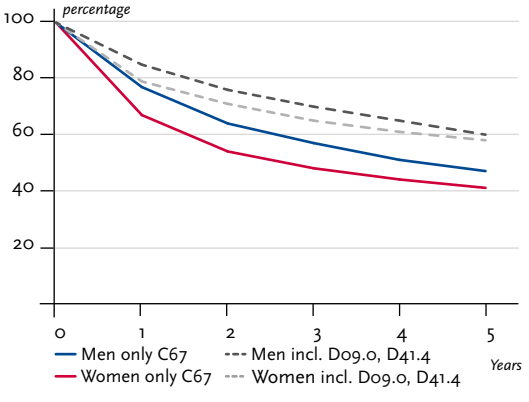



**Figure 3.21.4b**
**Relative survival rates up to 5 years after first diagnosis, by sex, ICD-10 C67, Germany 2009 – 2010**

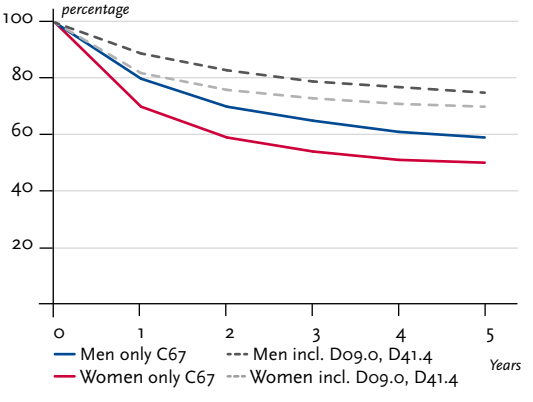


**Figure 3.21.5**
**Registered age-standardised incidence and mortality rates in German federal states, by sex, ICD-10 C67, 2009 – 2010**
*per 100,000 (European standard)*

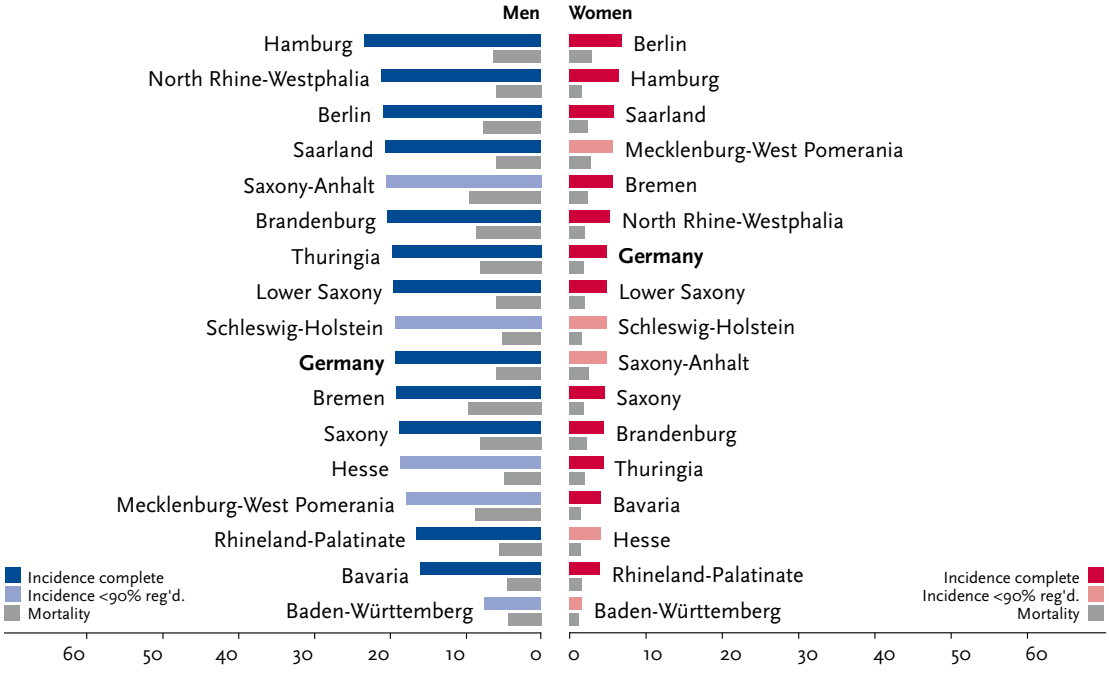
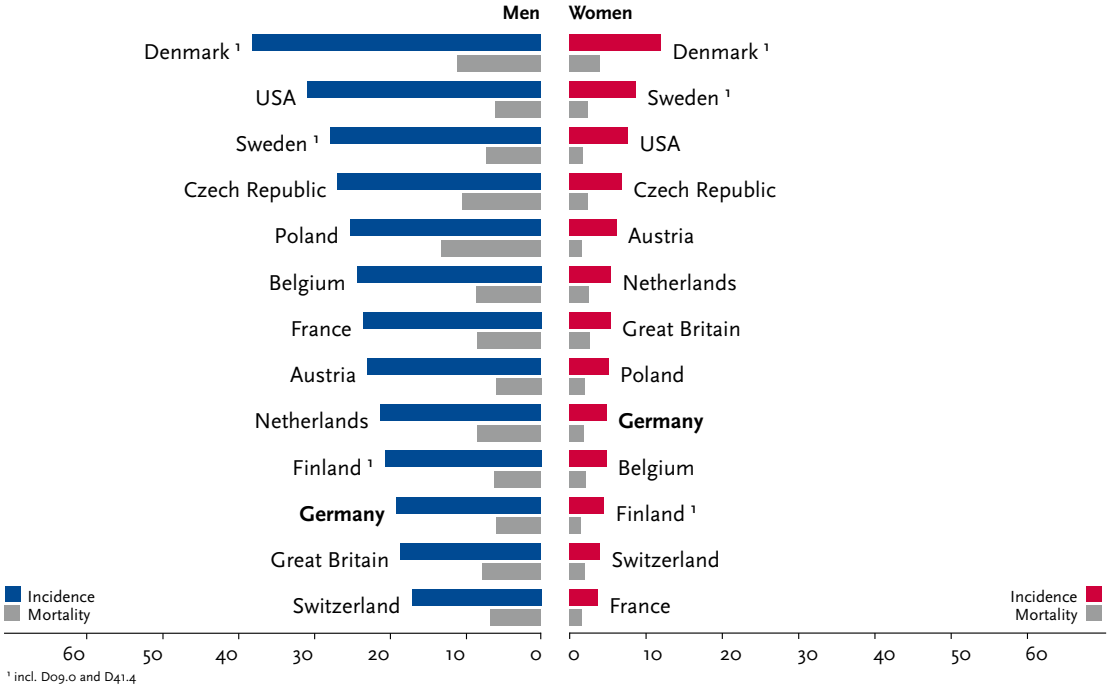



**Figure 3.21.6**
**International comparison of age-standardised incidence and mortality rates, by sex, ICD-10 C67, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*




1 incl. D09.0 and D41.4

## 3.22 Central nervous system

**Table 3.22.1**
**Overview of key epidemiological parameters for Germany, ICD-10 C70 – C72**

| | 2009 | | 2010 | | Prediction for 2014 | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Incident cases | 3,990 | 3,050 | 3,890 | 3,030 | 4,200 | 3,200 |
| Crude incidence rate[1] | 9.9 | 7.3 | 9.7 | 7.3 | 10.6 | 7.7 |
| Standardised incidence rate[1,2] | 8.1 | 5.3 | 7.9 | 5.2 | 8.1 | 5.3 |
| Median age at diagnosis | 62 | 67 | 61 | 67 | | |
| Deaths | 3,130 | 2,609 | 3,087 | 2,559 | | |
| Crude mortality rate[1] | 7.8 | 6.3 | 7.7 | 6.1 | | |
| Standardised mortality rate[1,2] | 6.0 | 4.1 | 5.8 | 3.9 | | |
| 5-year prevalence | 6,900 | 5,400 | 6,900 | 5,300 | | |
| Absolute 5-year survival rate (2009-2010)[3] | | | 21 (14-25) | 21 (17-31) | | |
| Relative 5-year survival rate (2009-2010)[3] | | | 22 (15-27) | 22 (18-32) | | |

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

### Epidemiology

Cancers of the central nervous system (CNS) predominantly affect the brain, including the brain stem. The remaining 5 % are cancers of the meninges, cranial nerves, and the spinal nerves in the cauda equina. Malignant neoplasms of the central nervous system originate from glial cells, nerve sheaths and meninges. Histologically, approximately two thirds are accounted for by glioblastomas, as well as astrocytomas in particular (15 %) and other gliomatous tumours.

In 2010 nearly 7,000 people developed cancer of the central nervous system in Germany, of whom around 3,000 were women and 4,000 men. Men show higher incidence and mortality rates in all age groups than women and have a median age at diagnosis of 61 years, 6 years younger than for women, though CNS tumours do occur at earlier age in both sexes as well.

Following increases in mortality rates through the 1980s to the mid-1990s, especially among the more advanced age groups, since the millennium have the incidence rates remained constant and the mortality rates have fallen in Germany. However, with the demographic change, the absolute number of malignant neoplasms occurring in men has continued to rise, and is significantly higher than in women.

The relative 5-year survival rates for patients with cancer of the central nervous system have improved slightly and are currently 22 % for both sexes, although the prognosis for glioblastomas of the brain is at 8 % considerably worse.

### Risk factors

The causes of the various brain tumours are still largely unclear. The only exception are the rare hereditary tumour syndromes, who are associated with a significantly higher risk of brain tumours. Following therapeutic radiation of the head in childhood (from 1910 - late 1950s due to tinea capitis) there is a slightly higher risk of developing a brain tumour after a long period of latency. Computed tomography during childhood can also marginally increase the risk of a brain tumour. In contrast, there is no indication from available data that either the use of ionising radiation in diagnostic imaging procedures or exposure to radiation in other contexts causes any discernible risk. Further, current thinking is that neither environmental factors nor electromagnetic radiation (mobile telephones) contribute to an increased risk. There is similarly no evidence that viruses or toxic substances cause brain tumours in humans.

First-degree relatives of patients with brain tumours have a slightly higher risk of themselves developing a brain tumour. Genetic mutations are presumably also involved in this marginal familial increased risk.

**Figure 3.22.1a**
**Age-standardised incidence and mortality rates, by sex, ICD-10 C70 – C72, Germany 1999 – 2010**
*per 100,000 (European standard)*

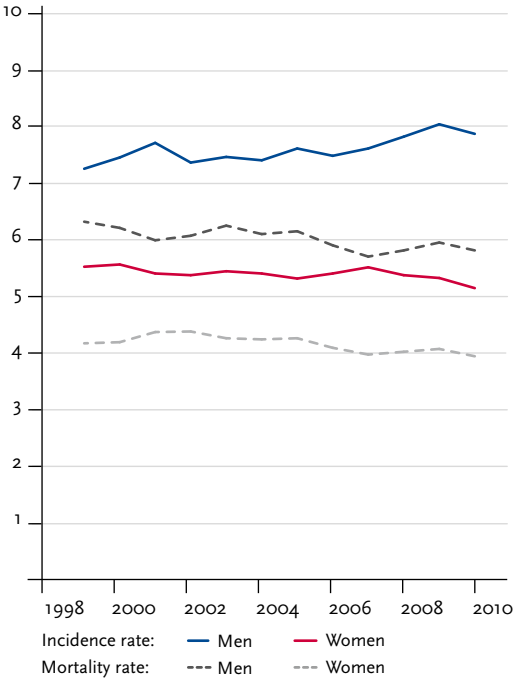



**Figure 3.22.1b**
**Absolute numbers of incident cases and deaths, by sex, ICD-10 C70 – C72, Germany 1999 – 2010**

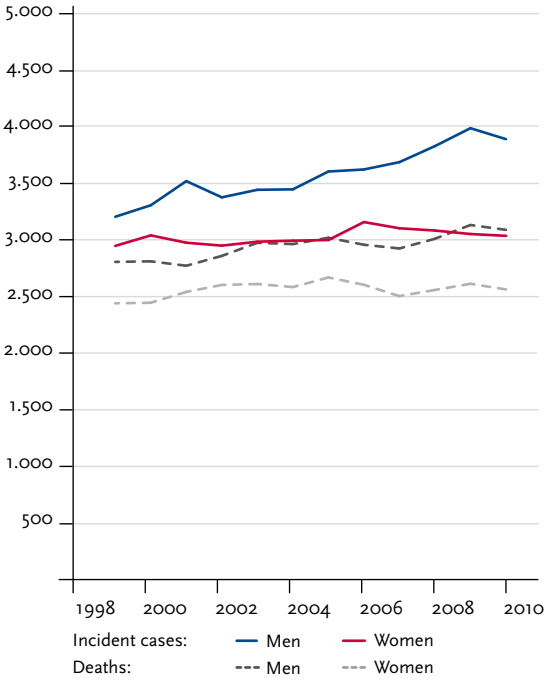



**Figure 3.22.2**
**Age-specific incidence rates by sex, ICD-10 C70 – C72, Germany 2009 – 2010**
*per 100,000*

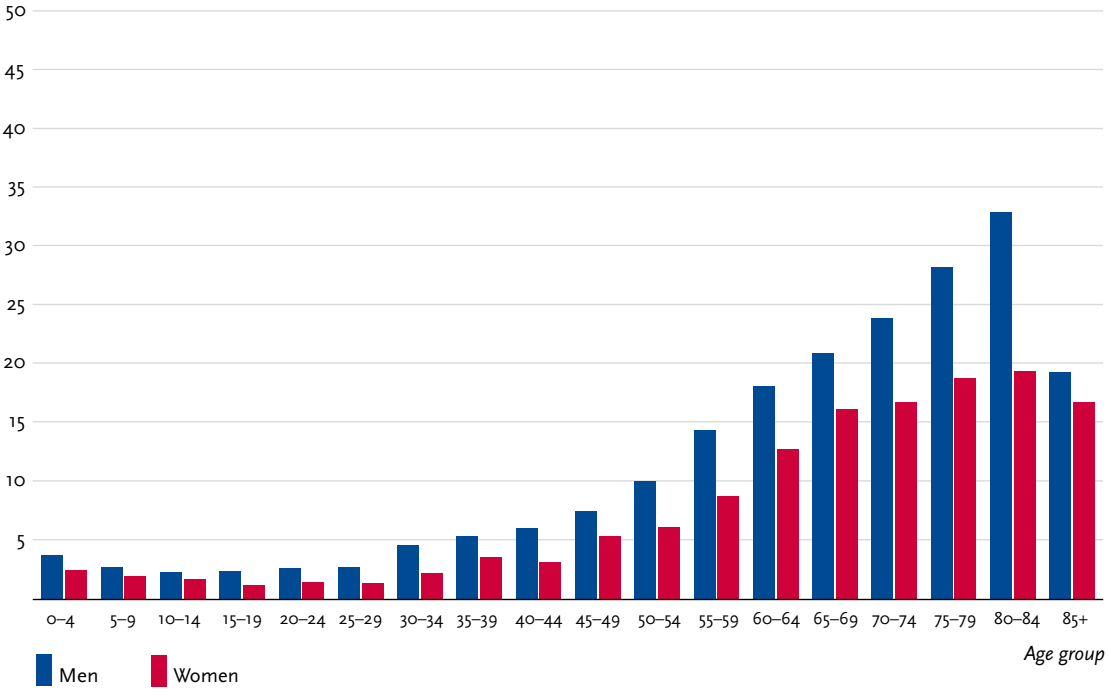


**Table 3.22.2**
**Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C70 – C72, database 2010**

| | 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 1,700) | 0.6% | (1 in 160) | <0.1% | (1 in 3,200) | 0.6% | (1 in 180) |
| 45 years | 0.1% | (1 in 1,200) | 0.6% | (1 in 170) | 0.1% | (1 in 1,500) | 0.5% | (1 in 190) |
| 55 years | 0.2% | (1 in 660) | 0.5% | (1 in 190) | 0.1% | (1 in 760) | 0.5% | (1 in 200) |
| 65 years | 0.2% | (1 in 500) | 0.4% | (1 in 240) | 0.2% | (1 in 520) | 0.4% | (1 in 250) |
| 75 years | 0.2% | (1 in 460) | 0.3% | (1 in 350) | 0.2% | (1 in 510) | 0.3% | (1 in 380) |
| Lifetime risk | | | 0.7% | (1 in 130) | | | 0.6% | (1 in 170) |
| **Women aged** | **in the next ten years** | | **ever** | | **in the next ten years** | | **ever** | |
| 35 years | <0.1% | (1 in 2,700) | 0.5% | (1 in 190) | <0.1% | (1 in 5,300) | 0.5% | (1 in 210) |
| 45 years | 0.1% | (1 in 1,800) | 0.5% | (1 in 200) | <0.1% | (1 in 2,500) | 0.5% | (1 in 220) |
| 55 years | 0.1% | (1 in 1,000) | 0.5% | (1 in 220) | 0.1% | (1 in 1,100) | 0.4% | (1 in 240) |
| 65 years | 0.2% | (1 in 620) | 0.4% | (1 in 270) | 0.1% | (1 in 690) | 0.4% | (1 in 280) |
| 75 years | 0.2% | (1 in 630) | 0.2% | (1 in 420) | 0.2% | (1 in 610) | 0.2% | (1 in 420) |
| Lifetime risk | | | 0.6% | (1 in 170) | | | 0.5% | (1 in 200) |

**Figure 3.22.3**
**Distribution of T-stages at first diagnosis by sex**
*T-stages are not defined for tumours of the central nervous system.*

**Figure 3.22.4a**
**Absolute survival rates up to 5 years after first diagnosis, by sex, ICD-10 C70 – C72, Germany 2009 – 2010**

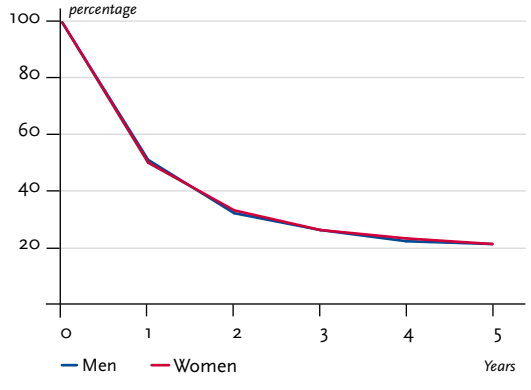



**Figure 3.22.4b**
**Relative survival rates up to 5 years after first diagnosis, by sex, ICD-10 C70 – C72, Germany 2009 – 2010**

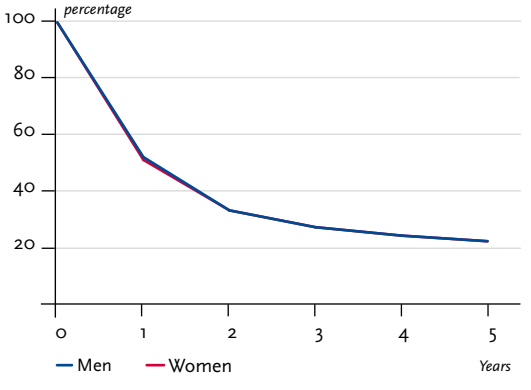


**Figure 3.22.5**
**Registered age-standardised incidence and mortality rates in German federal states, by sex, ICD-10 C70 – C72, 2009 – 2010**
*per 100,000 (European standard)*

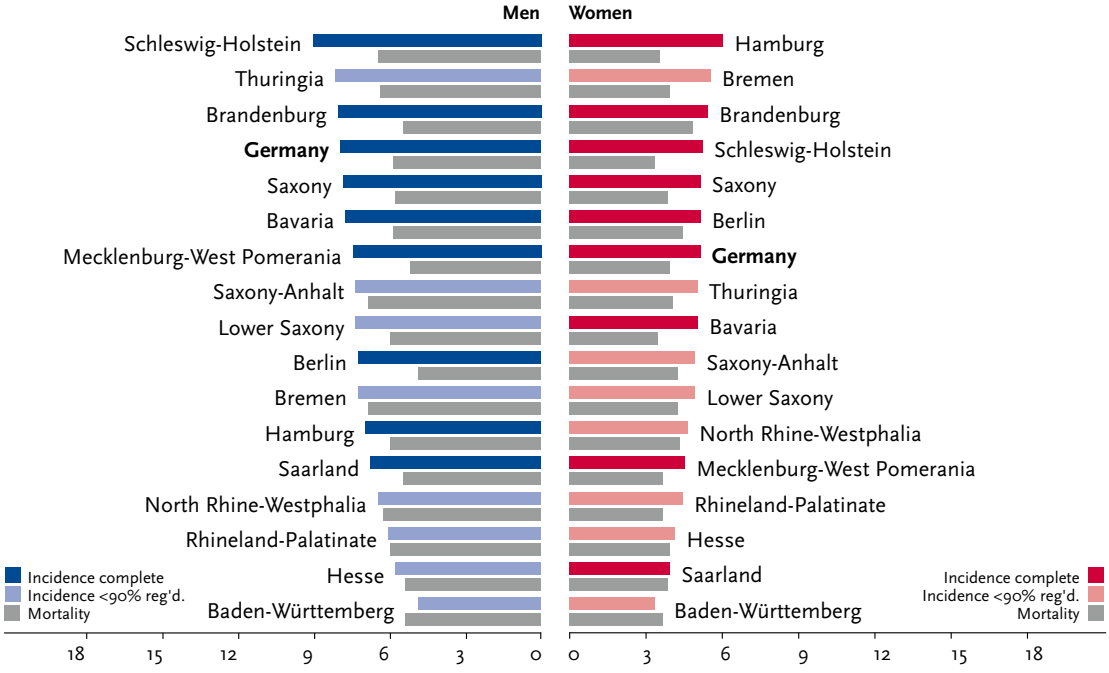
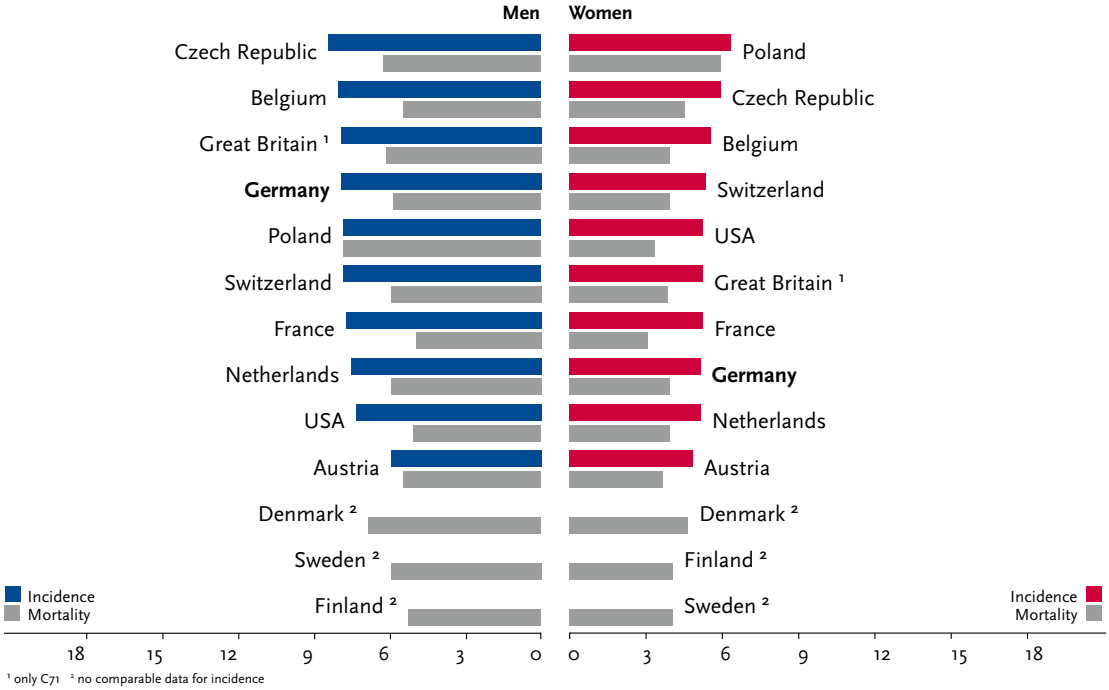



**Figure 3.22.6**
**International comparison of age-standardised incidence and mortality rates, by sex, ICD-10 C70 – C72, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*




¹ only C71 ² no comparable data for incidence

## 3.23 Thyroid gland

**Table 3.23.1**
**Overview of key epidemiological parameters for Germany, ICD-10 C73**

| | 2009 | | 2010 | | Prediction for 2014 | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Incident cases | 1,800 | 4,340 | 1,670 | 4,220 | 2,100 | 5,100 |
| Crude incidence rate[1] | 4.5 | 10.4 | 4.2 | 10.1 | 5.2 | 12.4 |
| Standardised incidence rate[1,2] | 3.7 | 9.0 | 3.5 | 8.7 | 4.2 | 10.9 |
| Median age at diagnosis | 56 | 52 | 56 | 52 | | |
| Deaths | 262 | 429 | 275 | 431 | | |
| Crude mortality rate[1] | 0.7 | 1.0 | 0.7 | 1.0 | | |
| Standardised mortality rate[1,2] | 0.5 | 0.5 | 0.5 | 0.5 | | |
| 5-year prevalence | 6,900 | 17,600 | 7,200 | 18,500 | | |
| Absolute 5-year survival rate (2009-2010)[3] | | | 82 (70-89) | 89 (74-92) | | |
| Relative 5-year survival rate (2009-2010)[3] | | | 88 (76-95) | 93 (78-96) | | |

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

### Epidemiology

Annually in Germany approximately 4,200 women and 1,700 men are diagnosed with thyroid cancer. The median age at diagnosis is 52 years for women and 56 for men, though the cancer does also occur at a younger age, especially in women.

Histologically, cases most frequently are papillary adenocarcinomas (72 %) and follicular adenocarcinomas (12 %), rarer forms are medullary and anaplastic carcinoma (each 2-3 %).

In the period from 1999 to 2010, the mortality rates in both men and women in Germany have decreased slightly, whilst the age-standardised incidence rates for both sexes have increased considerably. Papillary carcinomas – very favourable from the point of view of prognosis – were exclusively responsible for this increase, predominantly in younger adults. This trend is observed in other countries to a similar extent and is most likely attributable to improved examination methods (e.g. ultrasound) which are used in the course of clarifying other thyroid disorders or other internal illnesses. Within Germany, the highest incidence rates by far are to be observed in Bavaria, which corresponds with similarly high rates in Austria.

The majority of cancers of the thyroid gland are diagnosed at an early stage, especially among women (T1) and have a favourable prognosis with relative 5-year survival rates of 93 % among women and 88 % among men. Anaplastic carcinomas constitute an exception to this (12 %).

### Risk factors

The only proven, albeit comparatively rare environmental risk factor is exposure to ionising radiation, particularly in childhood. This would also include radiotherapy which extends to the thyroid gland. There is no clear proof of other environmental, dietary or lifestyle factors. It is also unclear why women are more frequently affected than men. Many patients have a history of iodine deficiency or benign thyroid complaints such as struma (goitre) and adenoma, which increase the risk of developing thyroid carcinomas. About a fifth of patients with a rare medullary thyroid carcinoma have hereditary genetic mutations with autosomal dominant inheritance. Medullary thyroid carcinomas can also occur together with other endocrine tumours – as part of a so-called type 2 multiple endocrine neoplasia (MEN 2). A genetic component is also suspected for papillary thyroid carcinomas.

**Figure 3.23.1a**
**Age-standardised incidence and mortality rates, by sex, ICD-10 C73, Germany 1999 – 2010**
*per 100,000 (European standard)*

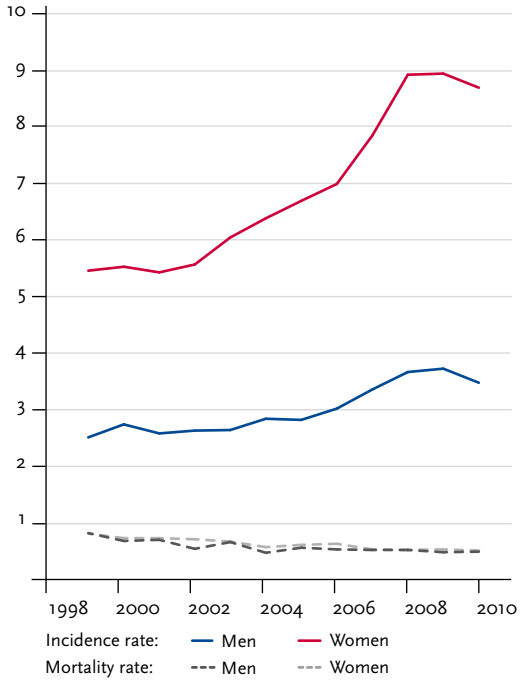



**Figure 3.23.1b**
**Absolute numbers of incident cases and deaths, by sex, ICD-10 C73, Germany 1999 – 2010**

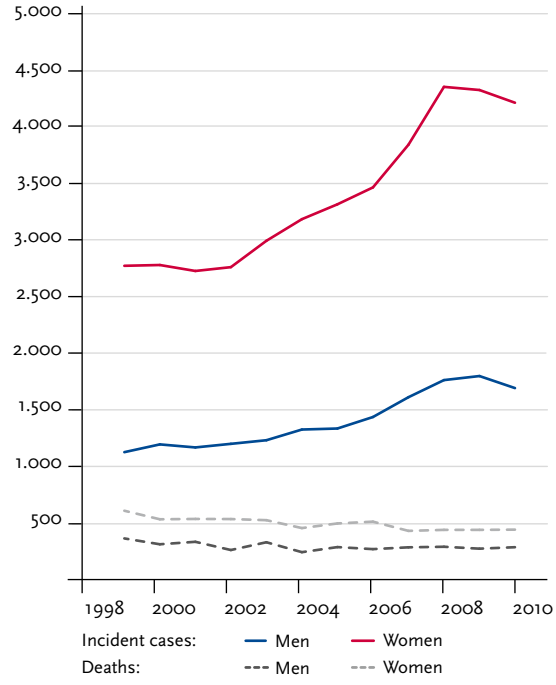



**Figure 3.23.2**
**Age-specific incidence rates by sex, ICD-10 C73, Germany 2009 – 2010**
*per 100,000*

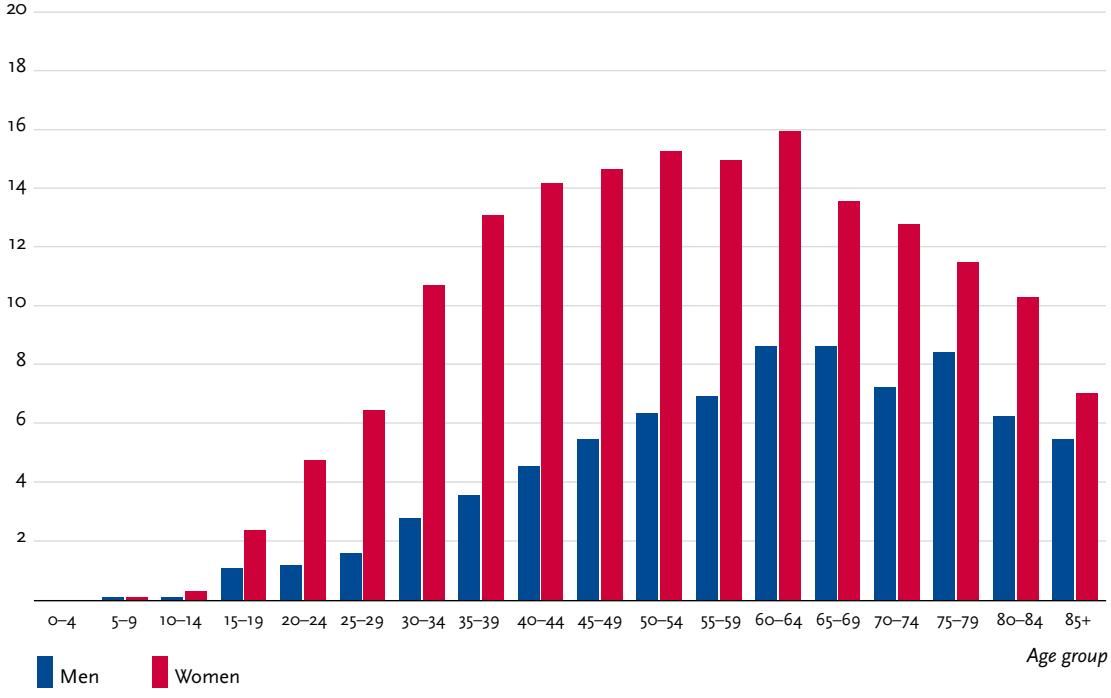


**Table 3.23.2**
**Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C73, database 2010**

| | Risk of developing cancer | | | | Mortality risk | | | |
|---|---|---|---|---|---|---|---|---|
| **Men aged** | **in the next ten years** | | **ever** | | **in the next ten years** | | **ever** | |
| 25 years | <0.1% | (1 in 4,900) | 0.3% | (1 in 350) | <0.1% | (1 in 245,000) | 0.1% | (1 in 1,800) |
| 35 years | <0.1% | (1 in 2,600) | 0.3% | (1 in 370) | <0.1% | (1 in 82,000) | 0.1% | (1 in 1,800) |
| 45 years | 0.1% | (1 in 1,700) | 0.2% | (1 in 420) | <0.1% | (1 in 32,000) | 0.1% | (1 in 1,800) |
| 55 years | 0.1% | (1 in 1,400) | 0.2% | (1 in 540) | <0.1% | (1 in 11,000) | 0.1% | (1 in 1,800) |
| 65 years | 0.1% | (1 in 1,400) | 0.1% | (1 in 800) | <0.1% | (1 in 4,900) | 0.1% | (1 in 2,000) |
| 75 years | 0.1% | (1 in 1,900) | 0.1% | (1 in 1,500) | <0.1% | (1 in 3,600) | <0.1% | (1 in 2,600) |
| Lifetime risk | | | 0.3% | (1 in 330) | | | 0.1% | (1 in 1,800) |
| **Women aged** | **in the next ten years** | | **ever** | | **in the next ten years** | | **ever** | |
| 25 years | 0.1% | (1 in 1,200) | 0.7% | (1 in 140) | <0.1% | (1 in 228,000) | 0.1% | (1 in 1,100) |
| 35 years | 0.1% | (1 in 740) | 0.6% | (1 in 160) | <0.1% | (1 in 107,000) | 0.1% | (1 in 1,100) |
| 45 years | 0.1% | (1 in 700) | 0.5% | (1 in 200) | <0.1% | (1 in 48,000) | 0.1% | (1 in 1,100) |
| 55 years | 0.2% | (1 in 660) | 0.4% | (1 in 270) | <0.1% | (1 in 11,000) | 0.1% | (1 in 1,100) |
| 65 years | 0.1% | (1 in 800) | 0.2% | (1 in 420) | <0.1% | (1 in 5,000) | 0.1% | (1 in 1,200) |
| 75 years | 0.1% | (1 in 1,000) | 0.1% | (1 in 790) | <0.1% | (1 in 2,600) | 0.1% | (1 in 1,400) |
| Lifetime risk | | | 0.8% | (1 in 130) | | | 0.1% | (1 in 1,200) |

**Figure 3.23.3**
**Distribution of T-stages at first diagnosis by sex (top: all cases; bottom: only valid reports)**
**ICD-10 C73, Germany 2009 – 2010**

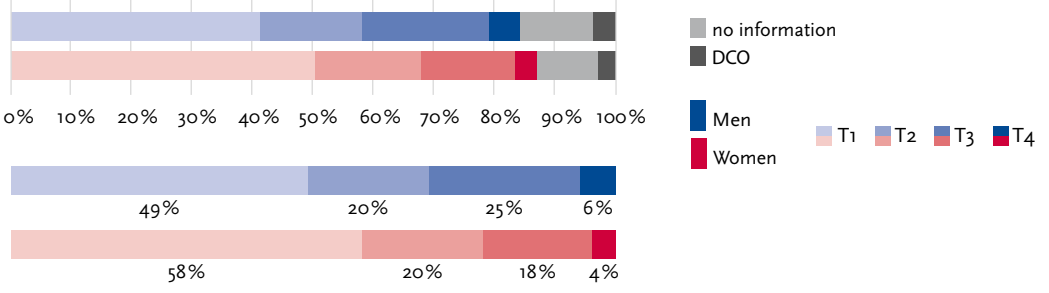



**Figure 3.23.4a**
**Absolute survival rates up to 5 years after first diagnosis, by sex, ICD-10 C73, Germany 2009 – 2010**

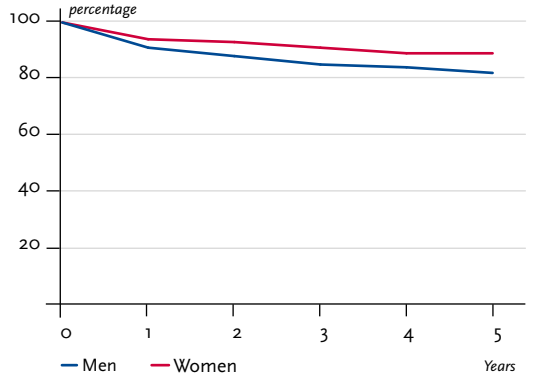



**Figure 3.23.4b**
**Relative survival rates up to 5 years after first diagnosis, by sex, ICD-10 C73, Germany 2009 – 2010**

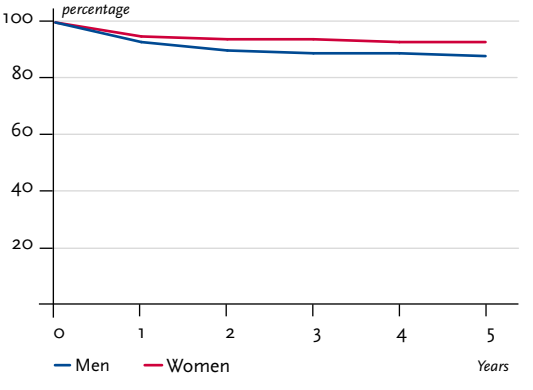


**Figure 3.23.5**
**Registered age-standardised incidence and mortality rates in German federal states, by sex, ICD-10 C73, 2009 – 2010**
*per 100,000 (European standard)*

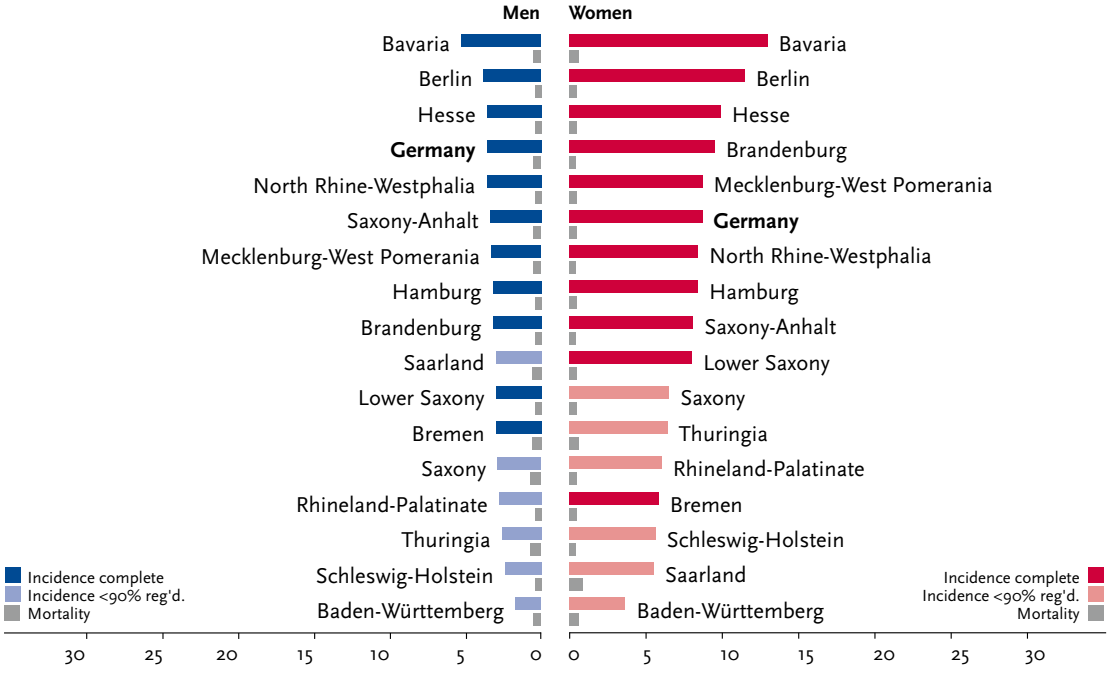
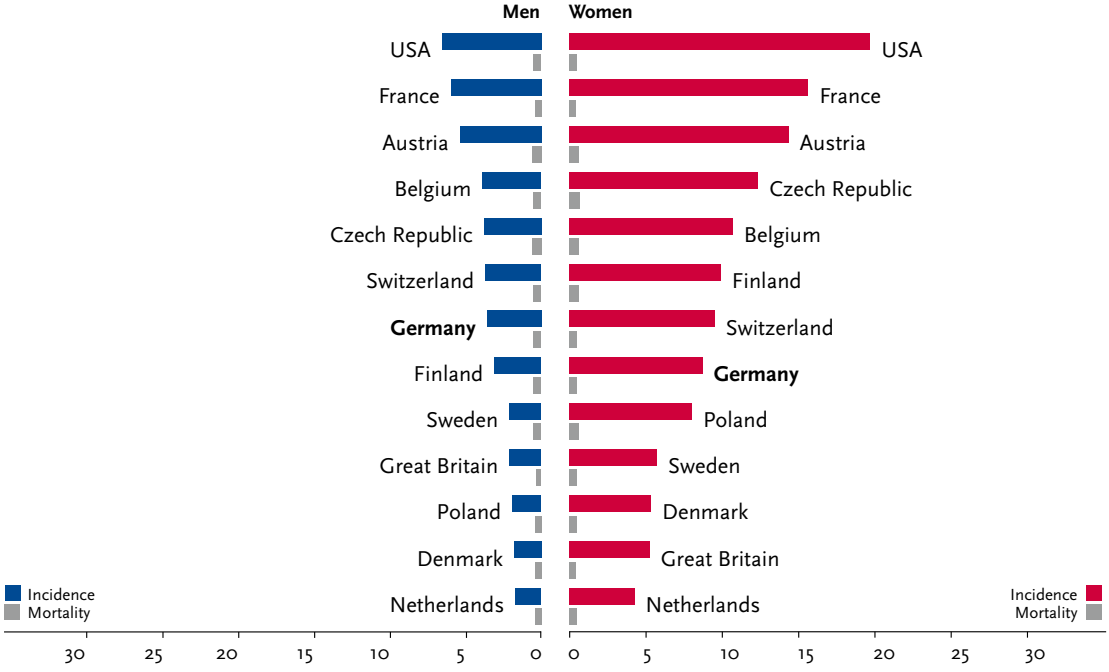



**Figure 3.23.6**
**International comparison of age-standardised incidence and mortality rates, by sex, ICD-10 C73, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*



## 3.24 Hodgkin's lymphoma

**Table 3.24.1**
**Overview of key epidemiological parameters for Germany, ICD-10 C81**

| | 2009 | | 2010 | | Prediction for 2014 | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Incident cases | 1,260 | 950 | 1,260 | 940 | 1,300 | 900 |
| Crude incidence rate[1] | 3.1 | 2.3 | 3.1 | 2.3 | 3.2 | 2.3 |
| Standardised incidence rate[1,2] | 2.9 | 2.2 | 2.9 | 2.2 | 3.0 | 2.2 |
| Median age at diagnosis | 43 | 40 | 45 | 41 | | |
| Deaths | 173 | 139 | 169 | 147 | | |
| Crude mortality rate[1] | 0.4 | 0.3 | 0.4 | 0.4 | | |
| Standardised mortality rate[1,2] | 0.3 | 0.2 | 0.3 | 0.2 | | |
| 5-year prevalence | 5,100 | 3,900 | 5,200 | 3,900 | | |
| Absolute 5-year survival rate (2009-2010)[3] | | | 79 (70-87) | 82 (69-89) | | |
| Relative 5-year survival rate (2009-2010)[3] | | | 83 (75-92) | 85 (72-92) | | |

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

### Epidemiology

Hodgkin's lymphoma is distinguished from non-Hodgkin lymphomas histologically by the presence of Reed-Sternberg giant cells in the bone marrow. Hodgkin's lymphoma is a rare disease, and in Germany some 1,260 men and 940 women were diagnosed with it in 2010. It can occur at any age, and about one patient in ten was under 20 years of age at diagnosis. The risk of developing Hodgkin's lymphoma at any stage in life is 0.2 % for both men and women.

In recent years the incidence rates, and the absolute number of new cases annually, have shown no discernible trends, while ever fewer people are dying of Hodgkin's lymphoma. The mortality rate in Germany in 2010 was just over 300, almost 200 fewer than ten years previously. The prognosis is correspondingly favourable, with some 80 % of adult patients still alive 5 years after diagnosis. Due to the chronic relapsing nature of the disease, the long-term prognosis is also determined by side effects of therapy (including secondary tumours).

### Risk factors

The risk factors for Hodgkin's lymphoma are not completely understood. It remains unclear whether lifestyle-related risk factors or environmental risks are responsible for the development of Hodgkin's lymphoma. It is possible that the risk is increased by a long-term cigarette smoking habit.

As with non-Hodgkin lymphomas, congenital and acquired characteristics of the immune system and viral infections are topics of debate, although their influence cannot be quantified and it is not possible to ascribe a definite cause for any individual patient.

It has long been suspected that the Epstein-Barr virus (EBV), the cause of glandular fever (infectious mononucleosis), and retroviruses (e.g. HTLV and HIV) are involved. The results of recent studies confirm that EBV infection plays an important part in the development of Hodgkin's lymphoma. Other viruses, such as the hepatitis B virus, may also be involved in the development of Hodgkin's lymphoma.

The children and siblings of patients with Hodgkin's lymphoma have a much higher risk of developing the disease themselves. Researchers are therefore paying increasing attention to hereditary factors. However, research has not yet identified any risk-enhancing and inheritable gene mutations.

**Figure 3.24.1a**
**Age-standardised incidence and mortality rates, by sex, ICD-10 C81, Germany 1999 – 2010**
*per 100,000 (European standard)*

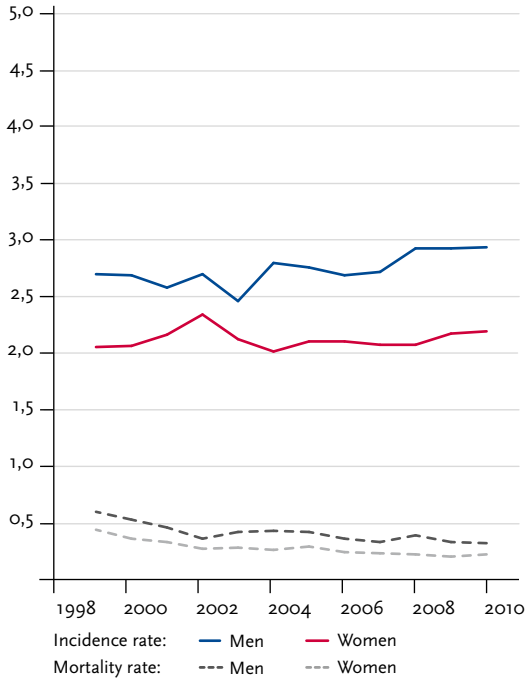



**Figure 3.24.1b**
**Absolute numbers of incident cases and deaths, by sex, ICD-10 C81, Germany 1999 – 2010**

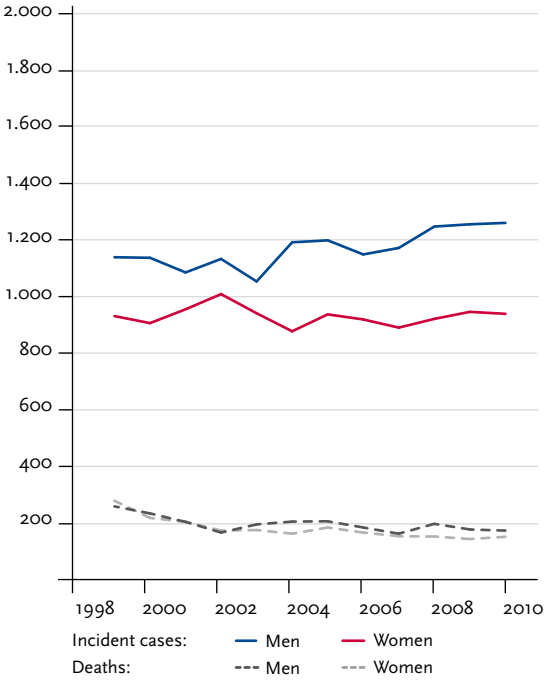



**Figure 3.24.2**
**Age-specific incidence rates by sex, ICD-10 C81, Germany 2009 – 2010**
*per 100,000*

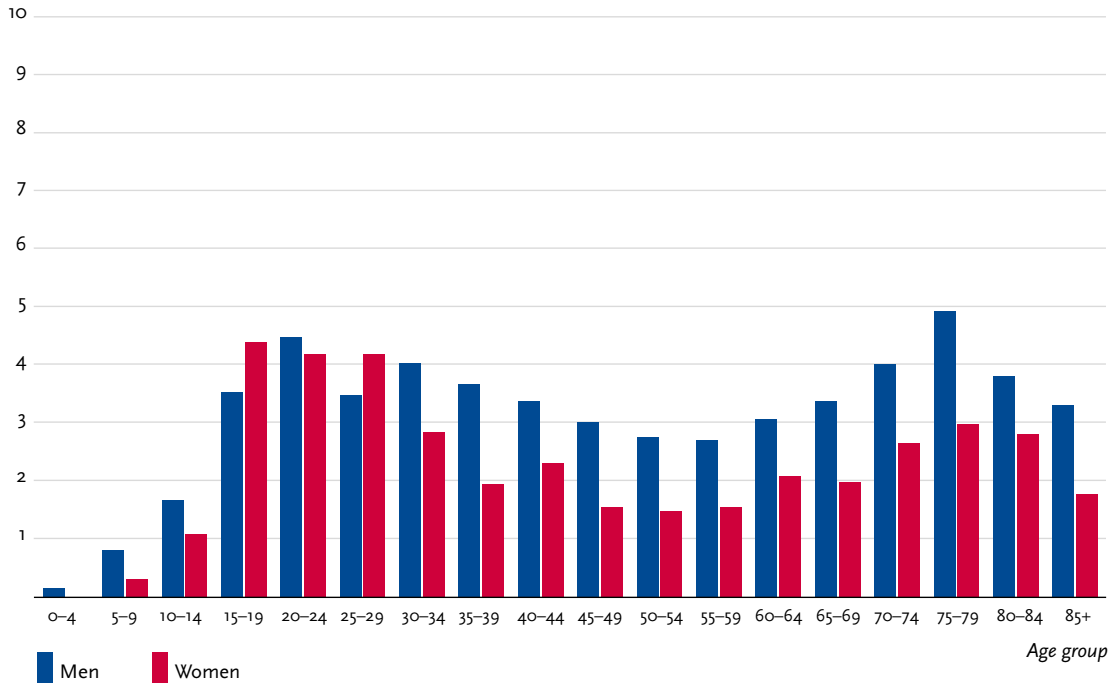


**Table 3.24.2**
**Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C81, database 2010**

| | 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 2,600) | 0.2% | (1 in 450) | <0.1% | (1 in 210,000) | <0.1% | (1 in 2,800) |
| 25 years | <0.1% | (1 in 2,700) | 0.2% | (1 in 540) | <0.1% | (1 in 75,000) | <0.1% | (1 in 2,800) |
| 35 years | <0.1% | (1 in 2,800) | 0.1% | (1 in 670) | <0.1% | (1 in 54,000) | <0.1% | (1 in 2,900) |
| 45 years | <0.1% | (1 in 3,200) | 0.1% | (1 in 860) | <0.1% | (1 in 37,000) | <0.1% | (1 in 3,100) |
| 55 years | <0.1% | (1 in 3,600) | 0.1% | (1 in 1,100) | <0.1% | (1 in 25,000) | <0.1% | (1 in 3,200) |
| Lifetime risk | | | 0.2% | (1 in 420) | | | <0.1% | (1 in 2,800) |
| **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 570) | <0.1% | (1 in 129,000) | <0.1% | (1 in 3,400) |
| 25 years | <0.1% | (1 in 2,700) | 0.1% | (1 in 760) | <0.1% | (1 in 96,000) | <0.1% | (1 in 3,500) |
| 35 years | <0.1% | (1 in 5,300) | 0.1% | (1 in 1,100) | <0.1% | (1 in 95,000) | <0.1% | (1 in 3,600) |
| 45 years | <0.1% | (1 in 6,600) | 0.1% | (1 in 1,300) | <0.1% | (1 in 56,000) | <0.1% | (1 in 3,700) |
| 55 years | <0.1% | (1 in 5,300) | 0.1% | (1 in 1,600) | <0.1% | (1 in 48,000) | <0.1% | (1 in 3,900) |
| Lifetime risk | | | 0.2% | (1 in 550) | | | <0.1% | (1 in 3,400) |

**Figure 3.24.3**
**Distribution of T-stages at first diagnosis by sex**
*T-stages are not defined for Hodgkin's lymphoma.*

**Figure 3.24.4a**
**Absolute survival rates up to 5 years after first diagnosis, by sex, ICD-10 C81, Germany 2009 – 2010**

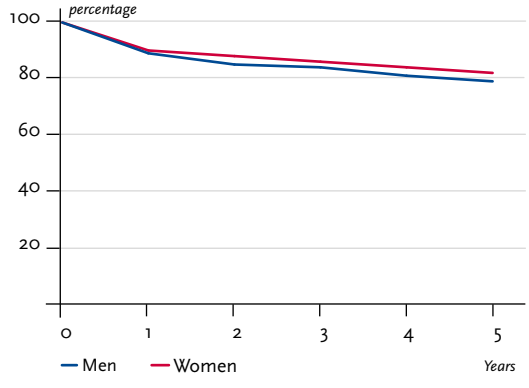



**Figure 3.24.4b**
**Relative survival rates up to 5 years after first diagnosis, by sex, ICD-10 C81, Germany 2009 – 2010**

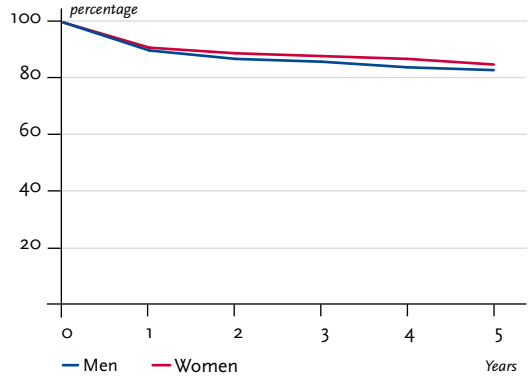


**Figure 3.24.5**
**Registered age-standardised incidence and mortality rates in German federal states, by sex, ICD-10 C81, 2009 – 2010**
*per 100,000 (European standard)*

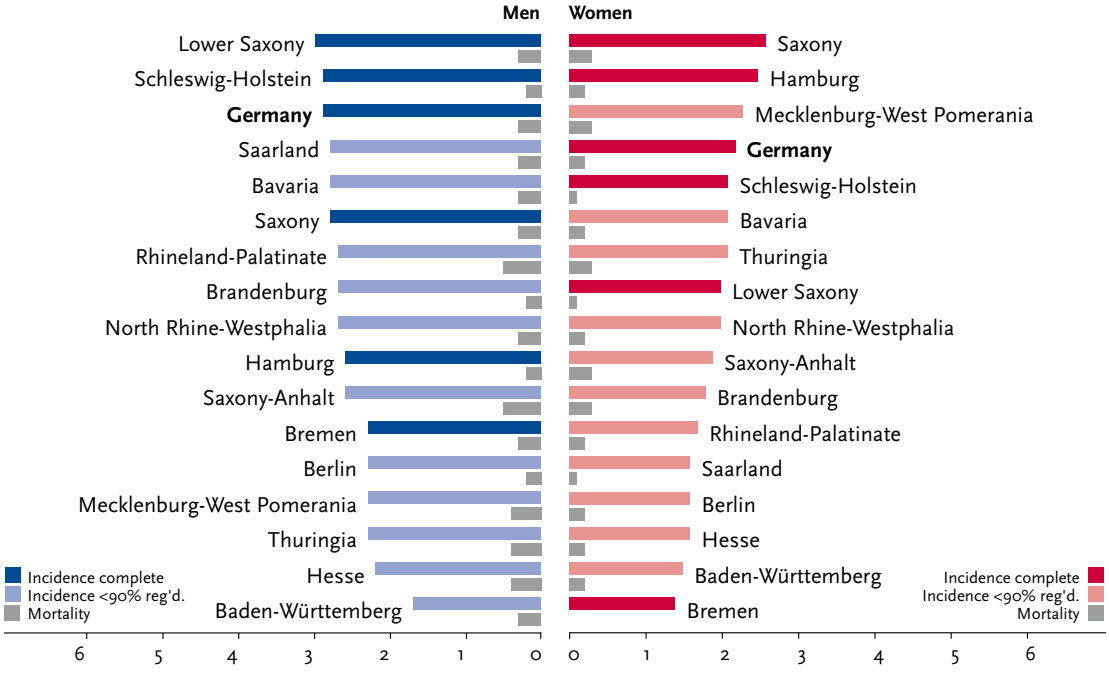
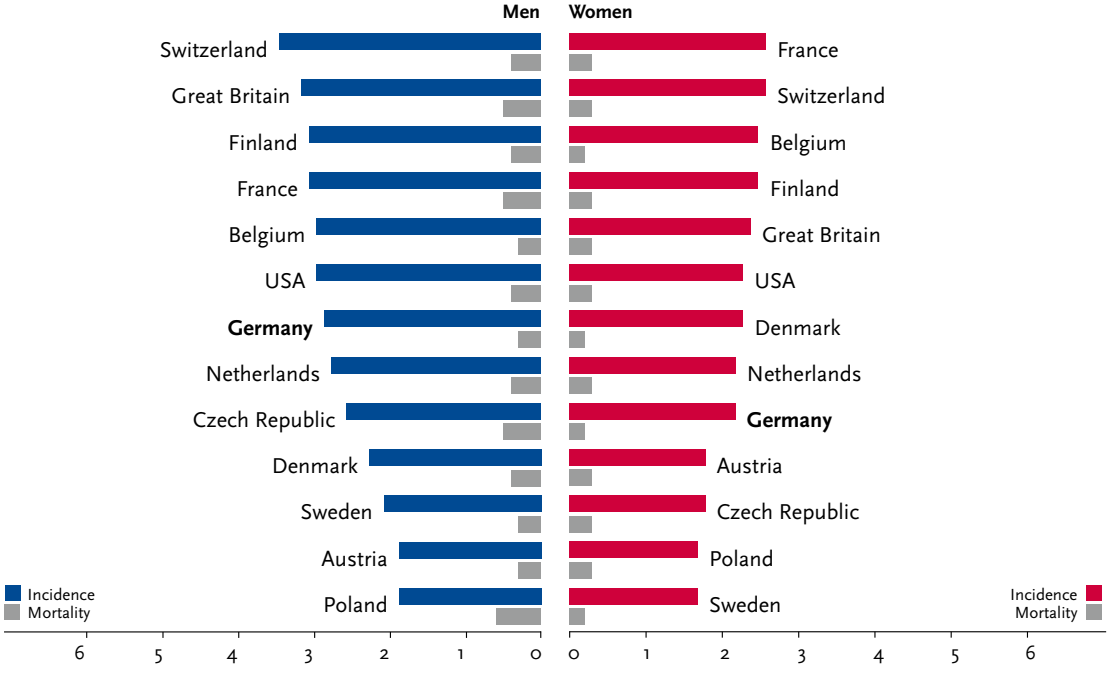



**Figure 3.24.6**
**International comparison of age-standardised incidence and mortality rates, by sex, ICD-10 C81, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*



## 3.25 Non-Hodgkin lymphomas

**Table 3.25.1**
**Overview of key epidemiological parameters for Germany, ICD-10 C82 – C85**

| | 2009 | | 2010 | | Prediction for 2014 | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Incident cases | 8,480 | 7,360 | 8,590 | 7,640 | 9,400 | 7,900 |
| Crude incidence rate[1] | 21.1 | 17.6 | 21.4 | 18.3 | 23.7 | 19.1 |
| Standardised incidence rate[1,2] | 15.6 | 10.7 | 15.5 | 11.2 | 16.0 | 11.1 |
| Median age at diagnosis | 68 | 71 | 69 | 71 | | |
| Deaths | 2,998 | 2,658 | 3,082 | 2,921 | | |
| Crude mortality rate[1] | 7.5 | 6.4 | 7.7 | 7.0 | | |
| Standardised mortality rate[1,2] | 5.1 | 3.1 | 5.2 | 3.3 | | |
| 5-year prevalence | 27,400 | 24,800 | 28,200 | 25,300 | | |
| Absolute 5-year survival rate (2009-2010)[3] | | | 58 (49-64) | 59 (53-63) | | |
| Relative 5-year survival rate (2009-2010)[3] | | | 67 (57-74) | 67 (61-71) | | |

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

### Epidemiology

Non-Hodgkin lymphomas originate from cells of the lymphatic system, mostly from B-lymphocytes. A distinction is made between high-grade and low-grade malignancy forms. In 2010, some 16,000 people were diagnosed with non-Hodgkin lymphoma in Germany. The disease occurs as early as in childhood and the risk of developing it rises almost steadily with increasing age. The median age at diagnosis for men was 69 years, and for women 71 years.

The significant increases in the age-standardised incidence rates should be seen within the context of falling rates for leukaemias, since chronic lymphatic leukaemias are now classified clinically under the low-grade malignancy non-Hodgkin lymphomas. The age-standardised mortality rates increased until the 1990s, but have fallen in the last ten years. Approximately 6,000 people in Germany die of this disease annually.

With a relative 5-year survival rate for both men and women of 67 %, the prognosis for non-Hodgkin lymphomas is generally favourable, although in individual cases it depends on age, as well as on type and distribution of the disease. Some forms, even highly malignant ones, can now be treated with the prospect of a permanent cure.

### Risk factors

Risk factors for non-Hodgkin lymphoma can only rarely be conclusively identified. Immunodeficiency (hereditary, because of HIV infection, or due to immunosuppressive treatment) is associated with an increased risk, as are a number of rare autoimmune diseases. Nuclear radiation can also cause malign lymphomas. Viruses and other pathogens also contribute to the development of some lymphomas. For example, the link between infection with the Epstein-Barr virus (EBV, glandular fever) and Burkitt's lymphoma, which occurs predominantly in Africa, has been proven. Chronic infection of the stomach with the Helicobacter pylori bacterium can lead to a lymphoma of the gastric mucosa (MALT lymphoma). Certain T-cell lymphomas that are rare in Europe are found clustered in carriers of the human T-cell leukaemia virus (HTLV-1). Studies suggest that certain types of lymphoma are more likely to develop in people chronically infected with hepatitis viruses (type B or C). Environmental pollutants such as heavy metals, organic solvents as well as some herbicides, insecticides and fungicides are being discussed as causes of malign lymphomas. Smoking and being overweight appear to play a role, particularly for aggressive lymphomas. Regular exercise may reduce the risk. New studies suggest that hereditary genetic variations could affect the risk of developing the disease, without being a direct cause of the lymphomas.

**Figure 3.25.1a**
**Age-standardised incidence and mortality rates, by sex, ICD-10 C82 – C85, Germany 1999 – 2010**
*per 100,000 (European standard)*

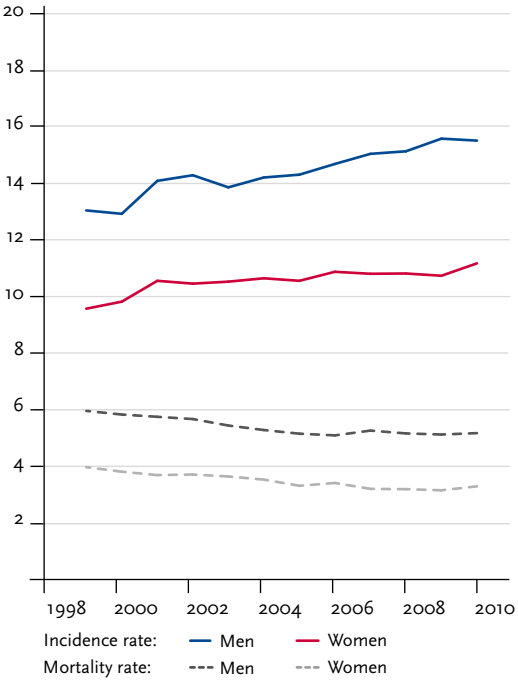



**Figure 3.25.1b**
**Absolute numbers of incident cases and deaths, by sex, ICD-10 C82 – C85, Germany 1999 – 2010**

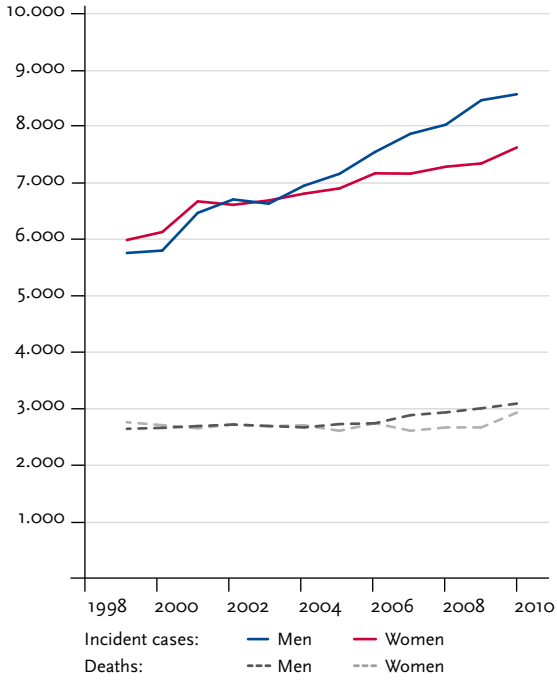



**Figure 3.25.2**
**Age-specific incidence rates by sex, ICD-10 C82 – C85, Germany 2009 – 2010**
*per 100,000*

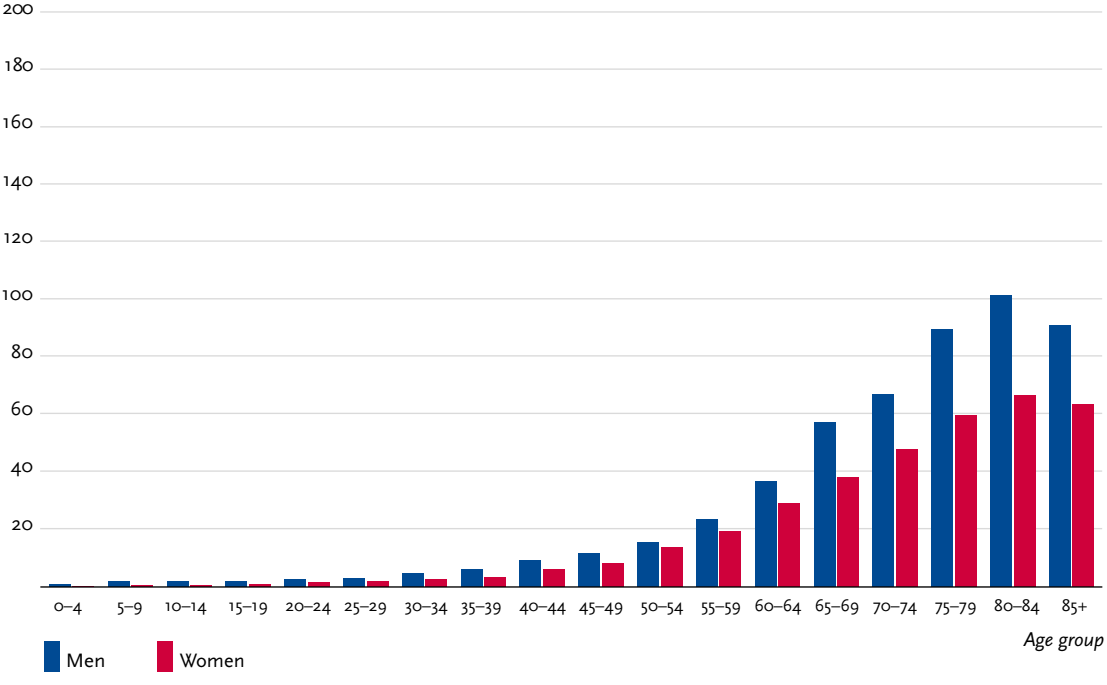


**Table 3.25.2**
**Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C82 – C85, database 2010**

| | 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 1,200) | 1.7% | (1 in 60) | <0.1% | (1 in 8,400) | 0.7% | (1 in 140) |
| 45 years | 0.1% | (1 in 720) | 1.6% | (1 in 62) | <0.1% | (1 in 3,500) | 0.7% | (1 in 150) |
| 55 years | 0.3% | (1 in 340) | 1.5% | (1 in 66) | 0.1% | (1 in 1,200) | 0.7% | (1 in 150) |
| 65 years | 0.6% | (1 in 180) | 1.4% | (1 in 73) | 0.2% | (1 in 510) | 0.7% | (1 in 150) |
| 75 years | 0.7% | (1 in 140) | 1.0% | (1 in 97) | 0.4% | (1 in 270) | 0.6% | (1 in 170) |
| Lifetime risk | | | 1.7% | (1 in 58) | | | 0.7% | (1 in 150) |
| **Women 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 69) | <0.1% | (1 in 21,000) | 0.6% | (1 in 170) |
| 45 years | 0.1% | (1 in 920) | 1.4% | (1 in 71) | <0.1% | (1 in 6,700) | 0.6% | (1 in 170) |
| 55 years | 0.3% | (1 in 400) | 1.3% | (1 in 75) | 0.1% | (1 in 2,100) | 0.6% | (1 in 170) |
| 65 years | 0.4% | (1 in 240) | 1.1% | (1 in 88) | 0.1% | (1 in 760) | 0.6% | (1 in 170) |
| 75 years | 0.5% | (1 in 190) | 0.8% | (1 in 120) | 0.3% | (1 in 330) | 0.5% | (1 in 190) |
| Lifetime risk | | | 1.5% | (1 in 68) | | | 0.6% | (1 in 170) |

**Figure 3.25.3**
**Distribution of T-stages at first diagnosis by sex**
*T-stages are not defined for non-Hodgkin lymphomas.*

**Table 3.25.3**
**Proportion of the various non-Hodgkin lymphomas for all new diagnoses C82 – C85, by sex, Germany 2009 – 2010**

| | C82[1] | C83[2] | C84[3] | C85[4] |
|---|---|---|---|---|
| Men | 18% | 46% | 10% | 26% |
| Women | 24% | 42% | 7% | 28% |

1 Follicular/nodular non-Hodgkin lymphoma
2 Diffuse non-Hodgkin lymphoma
3 Peripheral and cutaneous T-cell lymphomas
4 Other and unspecified types of non-Hodgkin lymphomas

**Figure 3.25.4a**
**Absolute survival rates up to 5 years after first diagnosis, by sex, ICD-10 C82 – C85, Germany 2009 – 2010**

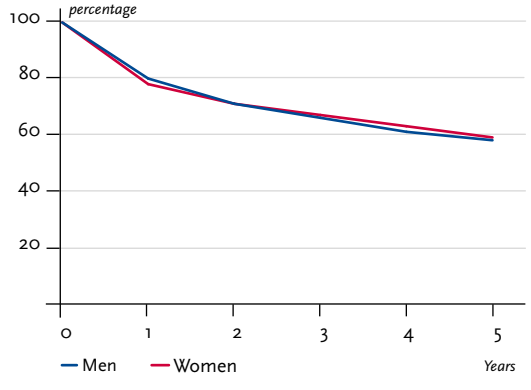



**Figure 3.25.4b**
**Relative survival rates up to 5 years after first diagnosis, by sex, ICD-10 C82 – C85, Germany 2009 – 2010**

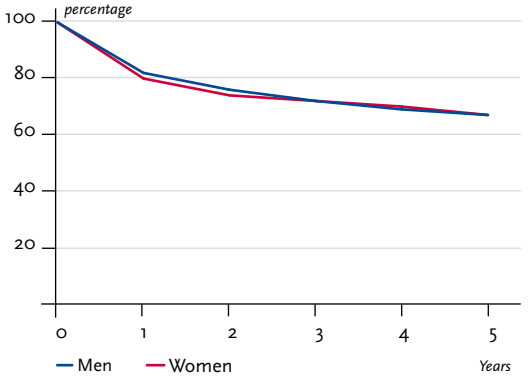


**Figure 3.25.5**
**Registered age-standardised incidence and mortality rates in German federal states, by sex, ICD-10 C82 – C85, 2009 – 2010**
*per 100,000 (European standard)*

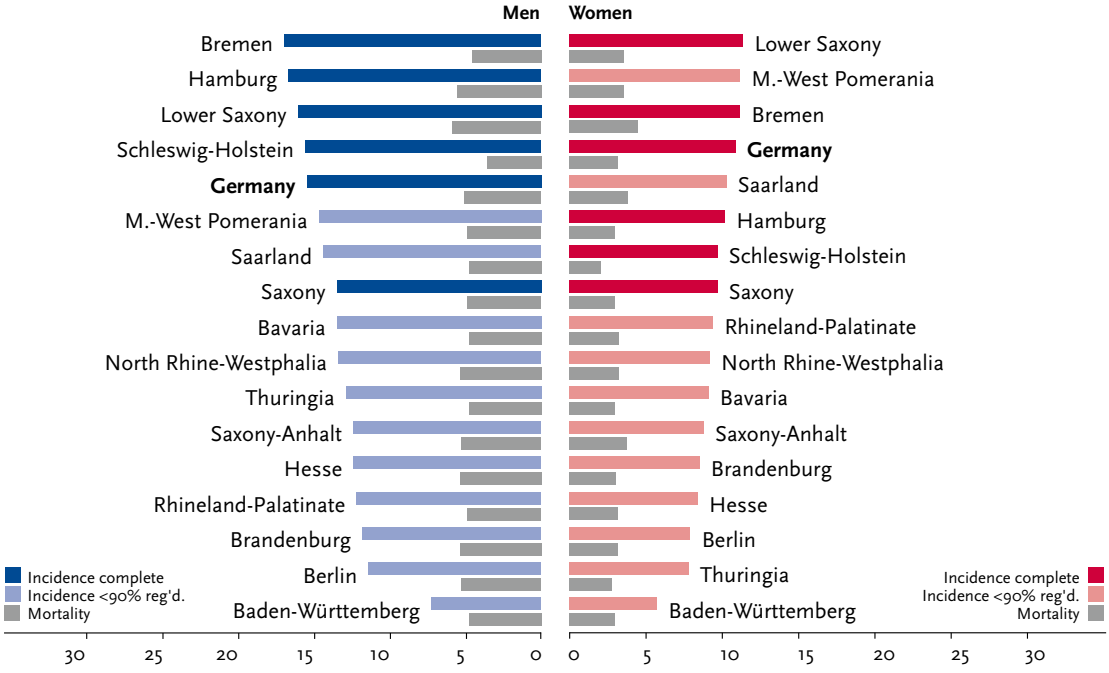
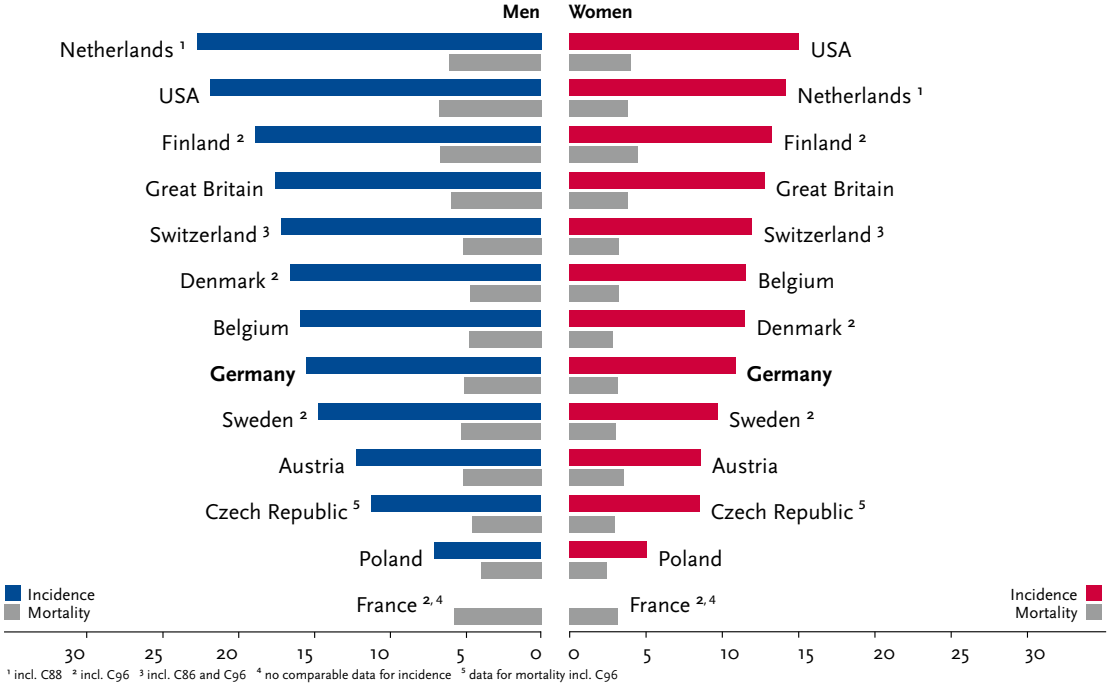



**Figure 3.25.6**
**International comparison of age-standardised incidence and mortality rates, by sex, ICD-10 C82 – C85, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*




1 incl. C88 2 incl. C96 3 incl. C86 and C96 4 no comparable data for incidence 5 data for mortality incl. C96

## 3.26 Multiple myeloma

**Table 3.26.1**
**Overview of key epidemiological parameters for Germany, ICD-10 C90**

| | 2009 | | 2010 | | Prediction for 2014 | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Incident cases | 3,260 | 2,910 | 3,360 | 2,780 | 3,600 | 3,000 |
| Crude incidence rate[1] | 8.1 | 7.0 | 8.4 | 6.7 | 9.2 | 7.4 |
| Standardised incidence rate[1,2] | 5.6 | 3.9 | 5.7 | 3.7 | 5.7 | 3.9 |
| Median age at diagnosis | 71 | 74 | 71 | 74 | | |
| Deaths | 1,809 | 1,828 | 1,981 | 1,850 | | |
| Crude mortality rate[1] | 4.5 | 4.4 | 4.9 | 4.4 | | |
| Standardised mortality rate[1,2] | 3.0 | 2.1 | 3.2 | 2.2 | | |
| 5-year prevalence | 9,000 | 8,200 | 9,200 | 8,100 | | |
| Absolute 5-year survival rate (2009-2010)[3] | | | 39 (31-49) | 40 (32-46) | | |
| Relative 5-year survival rate (2009-2010)[3] | | | 45 (37-57) | 45 (36-52) | | |

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

### Epidemiology

Plasmacytoma is a malignant proliferation of antibody-producing plasma cells. The disease mostly occurs initially in the bone marrow where it forms multiple myeloma with corresponding complications such as bone fractures and bone pain or blood count changes. In approximately 5% of cases involvement of other organs not associated with bone marrow leads to diagnosis.

In Germany, in 2010 approximately 3,360 men and 2,780 women were newly diagnosed with the illness. The risk of developing the disease increases significantly in advanced years with cases being extremely rare before the age of 45 years (approximately 2% of all cases). Following age-standardisation the incidence rates for women and men were almost constant with the mortality rates in contrast for both genders declining slightly.

Given a relative 5-year survival rate of approximately 45% in both women and men, the prognosis is relatively unfavourable. Even after maximum therapy, e.g. autologous stem cell transplant, a permanent cure is not to be expected. However, the course of the illness may in some cases be asymptomatic for a relatively long period, and during therapy temporary remissions may be possible.

### Risk factors

The causes of the development of plasmacytomas (multiple myeloma) are largely still not yet understood. A monoclonal gammopathy of undetermined significance (MGUS) is considered to be the preliminary stage of the multiple myeloma. Recognised risk factors for multiple myeloma are advanced age and the male sex. Chronic infections such as HIV-infection or infection with the hepatitis C virus are associated with an increased risk of developing a multiple myeloma. There are currently conflicting opinions as to whether certain lifestyle habits or exposure to environmental toxins or radiation significantly increase the risk of developing a myeloma. According to more recent study data, being very overweight is linked with increased risk. Familial clustering has been observed though there is no definite evidence of heredity to date. However, variations in incidence within different population groups also point to genetic factors. People of black African origin are probably more frequently affected than white North Americans, Europeans or Asians.

**Figure 3.26.1a**
**Age-standardised incidence and mortality rates, by sex, ICD-10 C90, Germany 1999 – 2010**
*per 100,000 (European standard)*

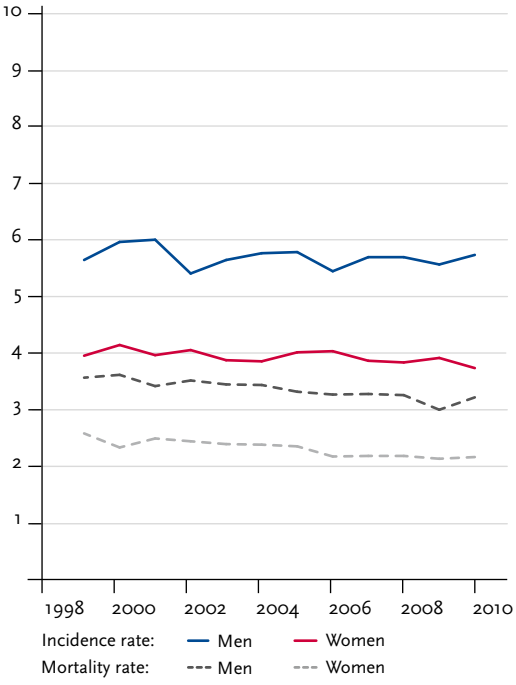



**Figure 3.26.1b**
**Absolute numbers of incident cases and deaths, by sex, ICD-10 C90, Germany 1999 – 2010**

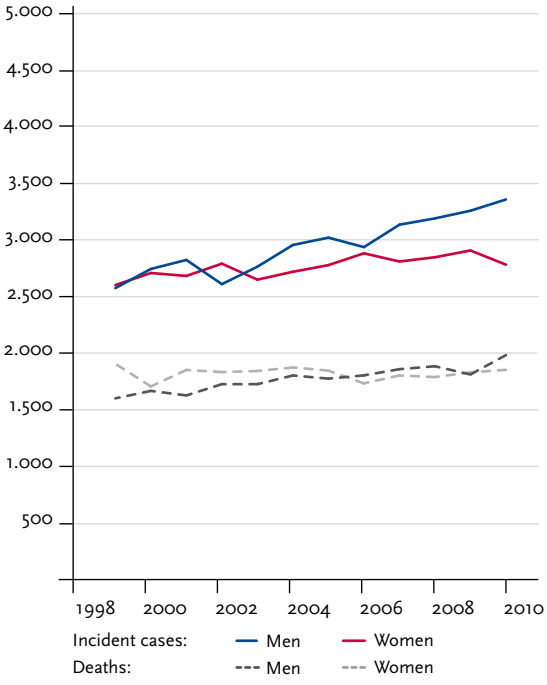



**Figure 3.26.2**
**Age-specific incidence rates by sex, ICD-10 C90, Germany 2009 – 2010**
*per 100,000*

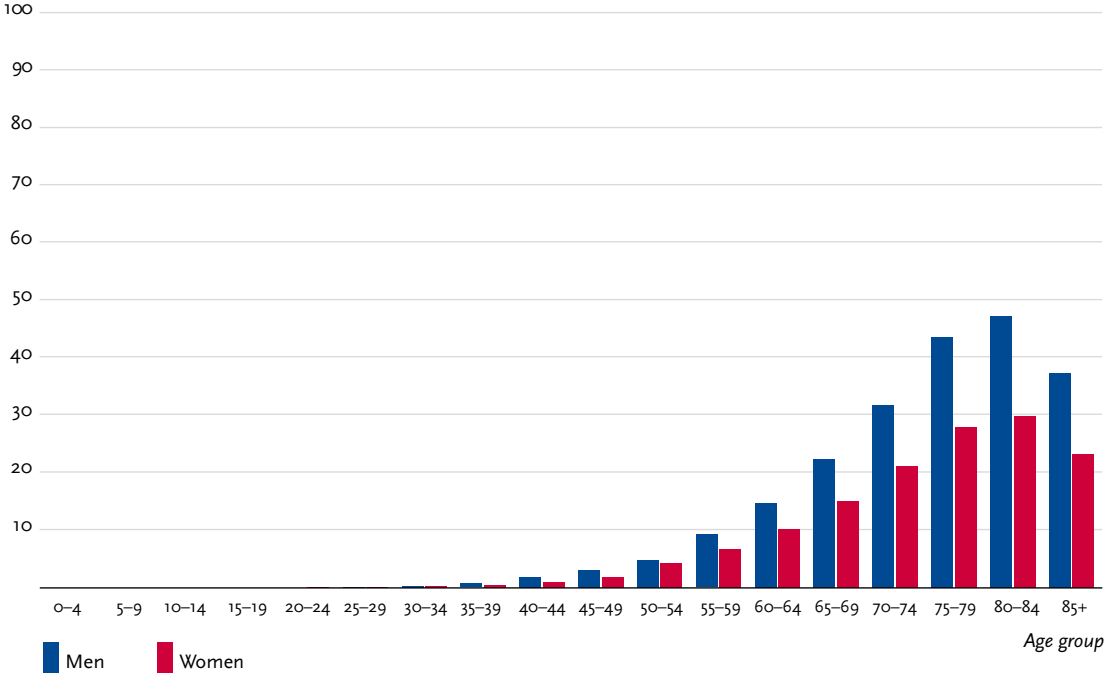


**Table 3.26.2**
**Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C90, database 2010**

| | 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 7,300) | 0.7% | (1 in 140) | <0.1% | (1 in 34,000) | 0.4% | (1 in 230) |
| 45 years | <0.1% | (1 in 2,300) | 0.7% | (1 in 150) | <0.1% | (1 in 7,700) | 0.4% | (1 in 220) |
| 55 years | 0.1% | (1 in 800) | 0.7% | (1 in 150) | 0.1% | (1 in 1,900) | 0.5% | (1 in 220) |
| 65 years | 0.2% | (1 in 420) | 0.6% | (1 in 160) | 0.1% | (1 in 690) | 0.4% | (1 in 230) |
| 75 years | 0.3% | (1 in 300) | 0.5% | (1 in 210) | 0.2% | (1 in 420) | 0.4% | (1 in 270) |
| Lifetime risk | | | 0.7% | (1 in 150) | | | 0.4% | (1 in 230) |
| **Women aged** | **in the next ten years** | | **ever** | | **in the next ten years** | | **ever** | |
| 35 years | <0.1% | (1 in 13,000) | 0.5% | (1 in 190) | <0.1% | (1 in 58,000) | 0.4% | (1 in 270) |
| 45 years | <0.1% | (1 in 2,900) | 0.5% | (1 in 190) | <0.1% | (1 in 11,000) | 0.4% | (1 in 270) |
| 55 years | 0.1% | (1 in 1,200) | 0.5% | (1 in 190) | <0.1% | (1 in 2,600) | 0.4% | (1 in 270) |
| 65 years | 0.2% | (1 in 610) | 0.5% | (1 in 220) | 0.1% | (1 in 990) | 0.4% | (1 in 280) |
| 75 years | 0.2% | (1 in 430) | 0.3% | (1 in 300) | 0.2% | (1 in 540) | 0.3% | (1 in 340) |
| Lifetime risk | | | 0.5% | (1 in 190) | | | 0.4% | (1 in 270) |

**Figure 3.26.3**
**Distribution of T-stages at first diagnosis by sex**
*T-stages are not defined for multiple myeloma.*

**Figure 3.26.4a**
**Absolute survival rates up to 5 years after first diagnosis, by sex, ICD-10 C90, Germany 2009 – 2010**

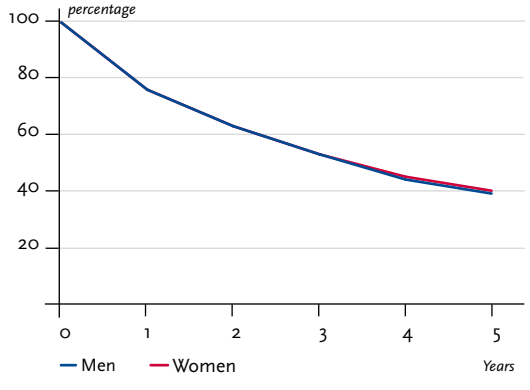



**Figure 3.26.4b**
**Relative survival rates up to 5 years after first diagnosis, by sex, ICD-10 C90, Germany 2009 – 2010**

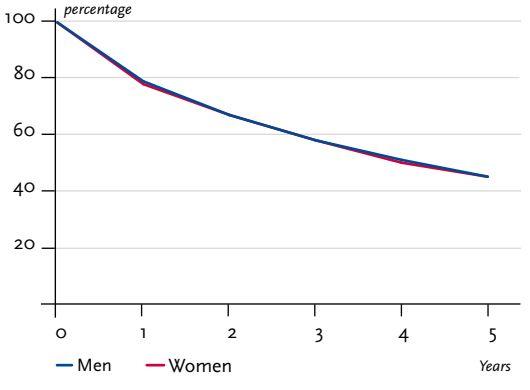


**Figure 3.26.5**
**Registered age-standardised incidence and mortality rates in German federal states, by sex, ICD-10 C90, 2009 – 2010**
*per 100,000 (European standard)*

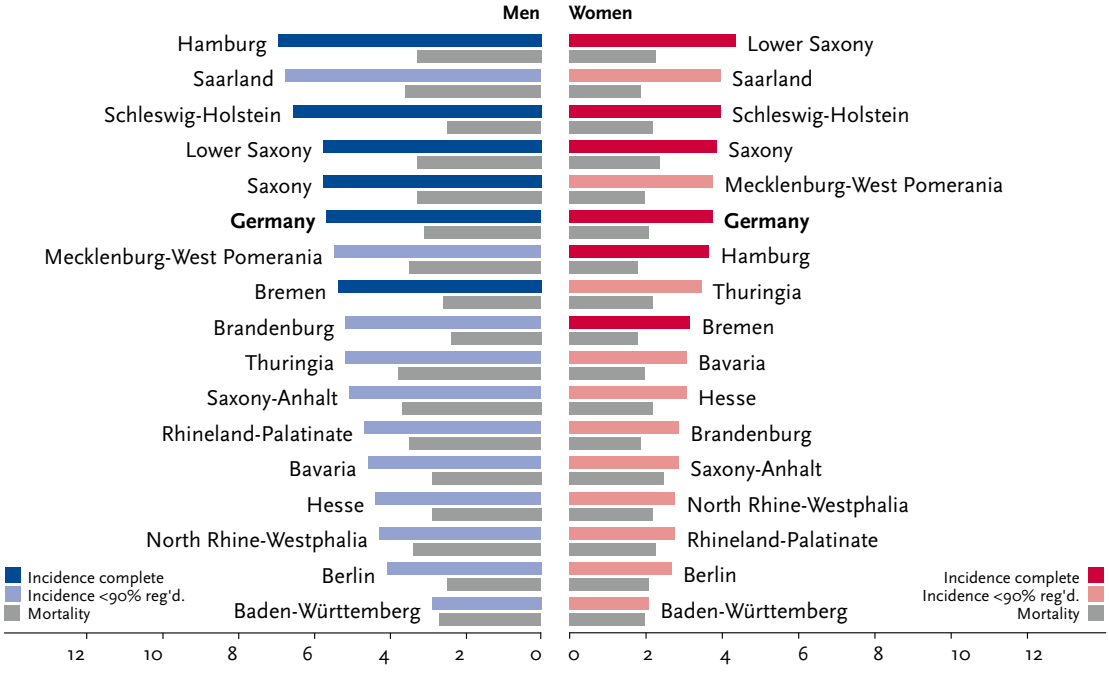
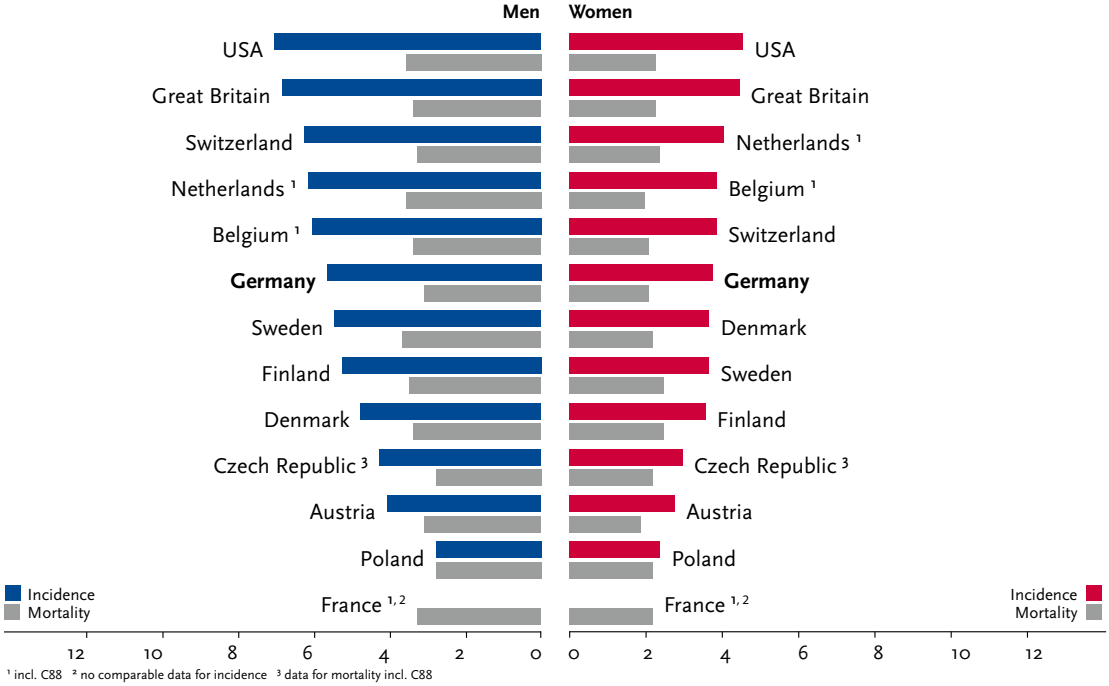



**Figure 3.26.6**
**International comparison of age-standardised incidence and mortality rates, by sex, ICD-10 C90, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*




1 incl. C88 2 no comparable data for incidence 3 data for mortality incl. C88

## 3.27 Leukaemias

**Table 3.27.1**
**Overview of key epidemiological parameters for Germany, ICD-10 C91 – C95**

| | 2009 | | 2010 | | Prediction for 2014 | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Incident cases | 6,550 | 5,180 | 6,640 | 4,920 | 6,800 | 5,300 |
| Crude incidence rate[1] | 16.3 | 12.7 | 16.6 | 11.8 | 17.2 | 12.9 |
| Standardised incidence rate[1,2] | 12.4 | 8.3 | 12.4 | 7.7 | 12.0 | 8.0 |
| Median age at diagnosis | 69 | 72 | 70 | 72 | | |
| Deaths | 3,799 | 3,308 | 3,942 | 3,304 | | |
| Crude mortality rate[1] | 9.5 | 7.9 | 9.8 | 7.9 | | |
| Standardised mortality rate[1,2] | 6.5 | 4.1 | 6.5 | 4.0 | | |
| 5-year prevalence | 20,100 | 15,400 | 20,200 | 15,100 | | |
| Absolute 5-year survival rate (2009-2010)[3] | | | 47 (35-54) | 47 (37-54) | | |
| Relative 5-year survival rate (2009-2010)[3] | | | 55 (41-62) | 53 (42-61) | | |

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

### Epidemiology

In 2010, some 11,500 people in Germany were diagnosed with leukaemia, 6 % of whom were under 15 years of age. The incidence risk for leukaemia falls with increasing age among children and young adults independent of gender. Above the age of 30 the risk increases again continuously, with a higher incidence among men than women. More than a third of the diagnosed cases were chronic lymphatic leukaemia (CLL) and over a quarter of the cases were acute myeloid leukaemia (AML).

The age-standardised incidence rates are declining among both sexes. However, in view of the vague distinction between CLL and non-Hodgkin lymphomas (C82-C85), this trend should be interpreted carefully, especially since the incidence of the latter has increased to a similar extent. The age-standardised mortality rates for both sexes have declined continuously in recent years.

The prognosis for leukaemia depends on its form and the age of the subject at diagnosis. It is most favourable by far for the leukaemia forms in childhood, whereas in adults the acute forms still have a poorer prognosis.

Overall, about half of adult patients are still alive five years after diagnosis. However, a permanent cure is rarely achieved, e.g. after a risky stem cell transplantation.

### Risk factors

The risk factors known to cause acute leukaemia include ionising radiation in radiotherapy, cytostatic drugs in chemotherapy for cancer, and probably also various chemicals (e.g. at the workplace). If, for example, occupational contact with benzene is a causal factor, then leukaemia can be recognised as an occupational disease.

However, none of these risk factors is found in the medical history of most patients. In particular the causes of chronic leukaemias are unclear.

The possible influence of dietary habits and lifestyle is under discussion, particularly for chronic lymphatic leukaemias. So far, however, there is no proof of such influences for this or for other chronic and acute forms of leukaemia.

A number of comparatively rare genetic mutations can increase the incidence risk for leukaemia, including trisomy of chromosome 21. Research is being carried out into other genetic changes.

The influence of viruses has not been conclusively proved and is also the subject of research. There is also a debate as to whether insufficient training of the immune system in childhood contributes towards increased risk, with no conclusion having yet been reached. No link to exposure to electromagnetic fields of any origin has been proved.

**Figure 3.27.1a**
**Age-standardised incidence and mortality rates, by sex, ICD-10 C91 – C95, Germany 1999 – 2010**
*per 100,000 (European standard)*

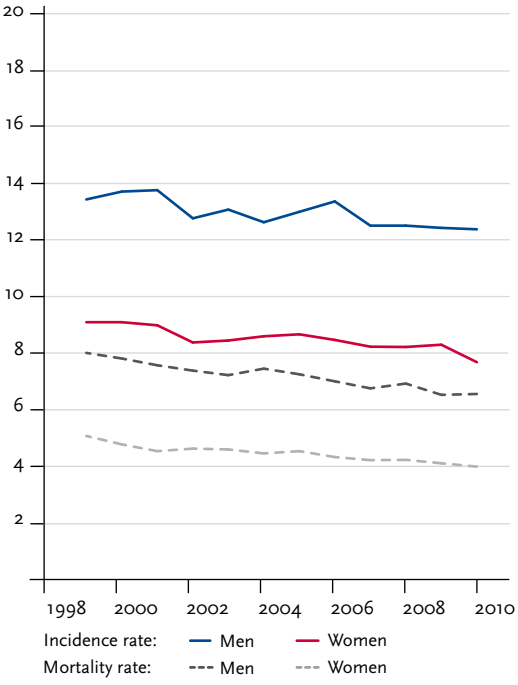



**Figure 3.27.1b**
**Absolute numbers of incident cases and deaths, by sex, ICD-10 C91 – C95, Germany 1999 – 2010**

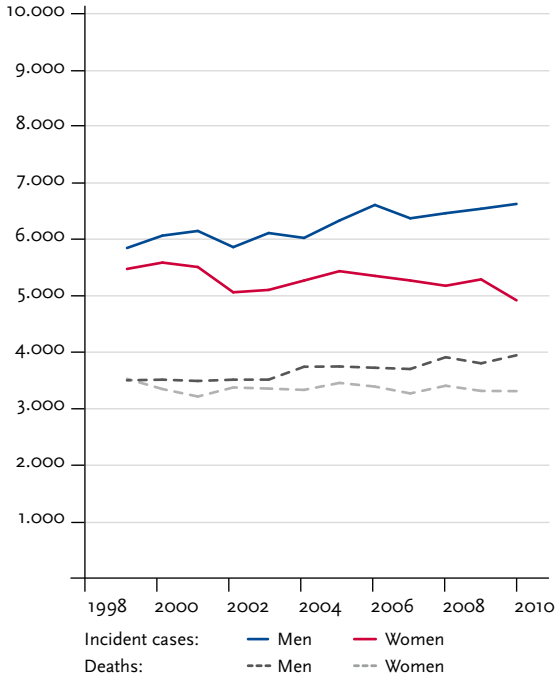



**Figure 3.27.2**
**Age-specific incidence rates by sex, ICD-10 C91 – C95, Germany 2009 – 2010**
*per 100,000*

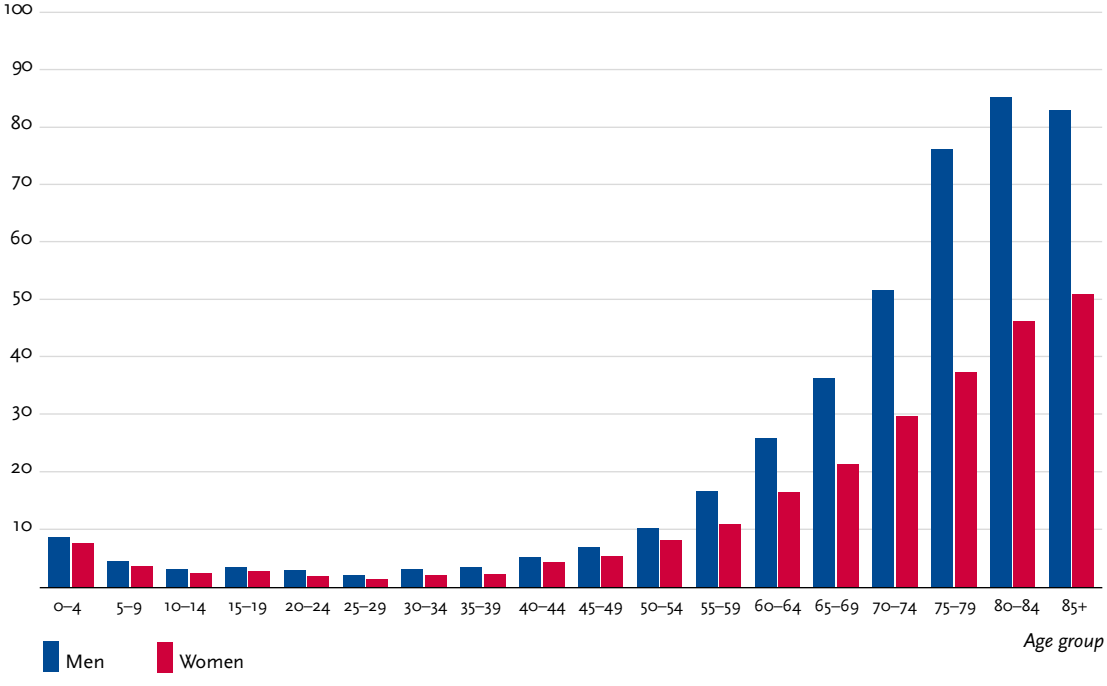


**Table 3.27.2**
**Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C91 – C95, database 2010**

| | 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 2,300) | 1.3% | (1 in 79) | <0.1% | (1 in 9,000) | 0.9% | (1 in 110) |
| 45 years | 0.1% | (1 in 1,200) | 1.2% | (1 in 81) | <0.1% | (1 in 3,200) | 0.9% | (1 in 110) |
| 55 years | 0.2% | (1 in 490) | 1.2% | (1 in 83) | 0.1% | (1 in 1,200) | 0.9% | (1 in 110) |
| 65 years | 0.4% | (1 in 250) | 1.1% | (1 in 90) | 0.3% | (1 in 400) | 0.9% | (1 in 110) |
| 75 years | 0.6% | (1 in 160) | 0.9% | (1 in 110) | 0.5% | (1 in 200) | 0.8% | (1 in 120) |
| Lifetime risk | | | 1.4% | (1 in 72) | | | 0.9% | (1 in 110) |
| **Women aged** | **in the next ten years** | | **ever** | | **in the next ten years** | | **ever** | |
| 35 years | <0.1% | (1 in 3,300) | 0.9% | (1 in 110) | <0.1% | (1 in 10,000) | 0.7% | (1 in 150) |
| 45 years | 0.1% | (1 in 1,500) | 0.9% | (1 in 120) | <0.1% | (1 in 5,000) | 0.7% | (1 in 150) |
| 55 years | 0.1% | (1 in 770) | 0.8% | (1 in 120) | 0.1% | (1 in 1,700) | 0.7% | (1 in 150) |
| 65 years | 0.2% | (1 in 430) | 0.7% | (1 in 140) | 0.1% | (1 in 690) | 0.6% | (1 in 160) |
| 75 years | 0.3% | (1 in 290) | 0.6% | (1 in 180) | 0.3% | (1 in 330) | 0.6% | (1 in 180) |
| Lifetime risk | | | 1.0% | (1 in 100) | | | 0.7% | (1 in 150) |

**Figure 3.27.3**
**Distribution of T-stages at first diagnosis by sex**
*T-stages are not defined for leukaemias.*

**Table 3.27.3**
**Proportion of the various leukaemia forms for all new diagnoses C91 – C95, by sex, Germany 2009 – 2010**

| | ALL[1] | CLL[2] | AML[3] | CML[4] | others[5] |
|---|---|---|---|---|---|
| Men | 8% | 40% | 24% | 10% | 18% |
| Women | 8% | 34% | 30% | 10% | 18% |

[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 3.27.4a**
**Absolute survival rates up to 5 years after first diagnosis, by sex, ICD-10 C91 – C95, Germany 2009 – 2010**

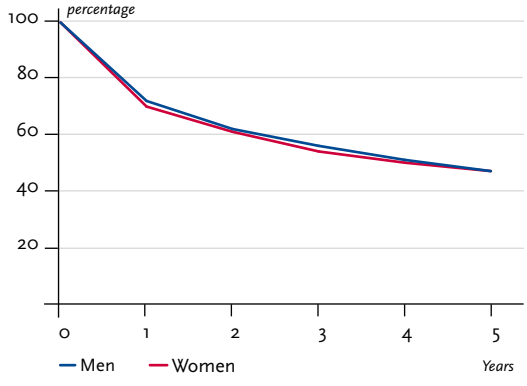



**Figure 3.27.4b**
**Relative survival rates up to 5 years after first diagnosis, by sex, ICD-10 C91 – C95, Germany 2009 – 2010**

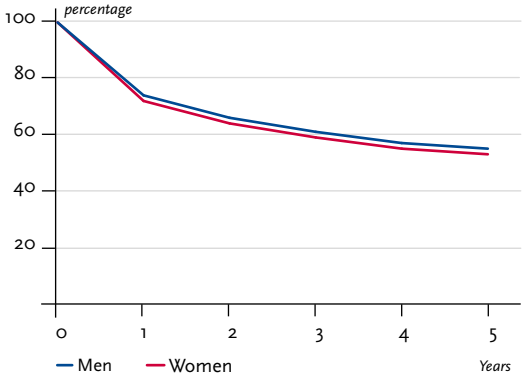


**Figure 3.27.5**
**Registered age-standardised incidence and mortality rates in German federal states, by sex, ICD-10 C91 – C95, 2009 – 2010**
*per 100,000 (European standard)*

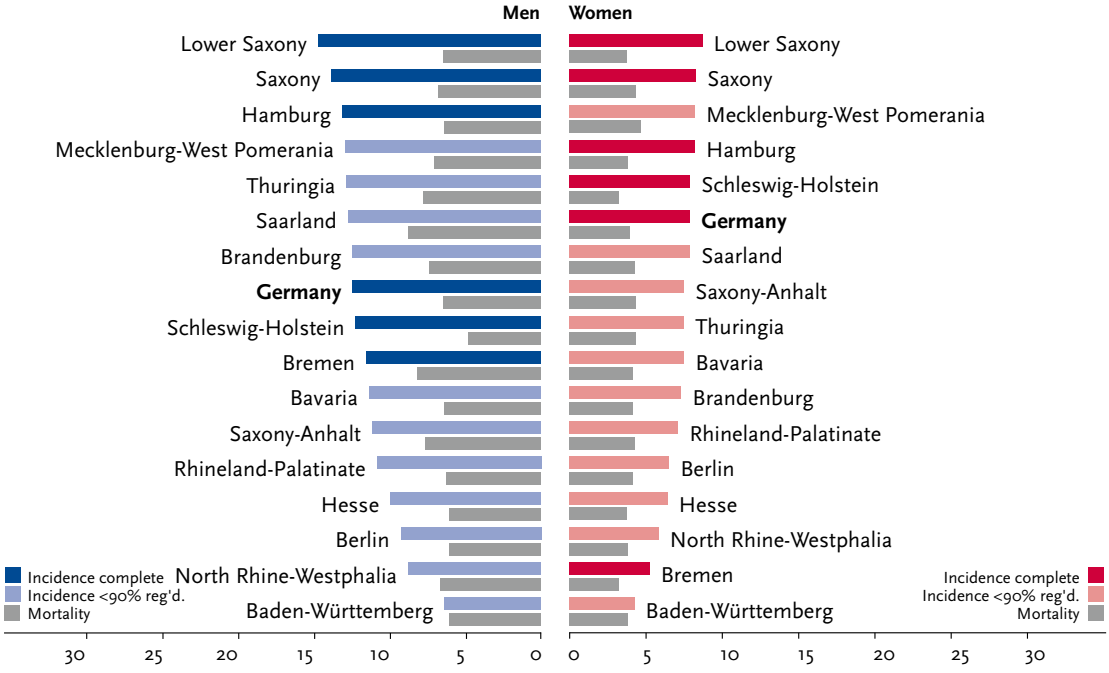
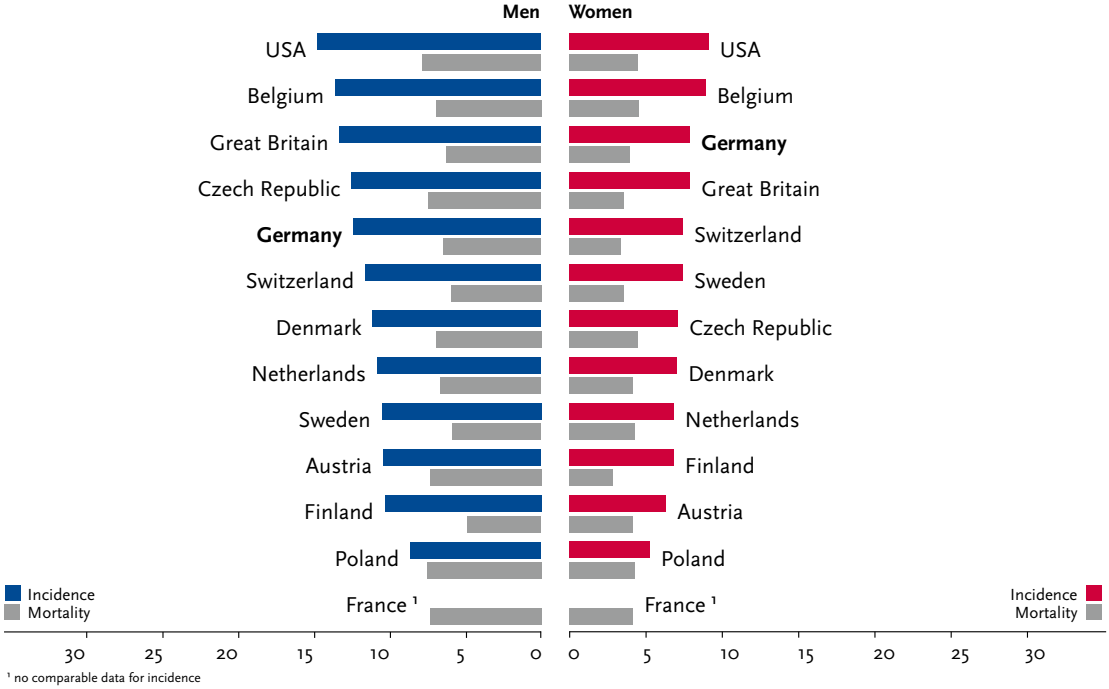



**Figure 3.27.6**
**International comparison of age-standardised incidence and mortality rates, by sex, ICD-10 C91 – C95, 2009 – 2010 or latest available year (details and sources, see appendix)**
*per 100,000 (European standard)*




1 no comparable data for incidence

## 3.28 Rare cancer sites and non-melanoma skin cancer

### Rare malignant tumours

A good 5% of all malignant neoplasms excluding non-melanoma skin cancer affect sites which have not been covered in the preceding chapters. Of these, approximately half again are malignant tumours of unspecified site (C80) or other and ill-defined sites (C26, C76). The remainder are presented in Table 3.28.1. Detailled results regarding estimated nationwide incidence and mortality, for instance according to age group and year of diagnosis, can be found at www.krebsdaten.de.

**Table 3.28.1**
**Frequency, median age at diagnosis and survival rates for rare malignant tumours in Germany (2010)**

| Cancer site | ICD-10 | Incident cases | | Deaths | | Ø age at diagnosis | | rel. 5-Y-SR[1] |
|---|---|---|---|---|---|---|---|---|
| | | Men | Women | Men | Women | Men | Women | total |
| Small intestine | C17 | 990 | 840 | 255 | 254 | 68 | 70 | 57 |
| Nasal cavity, nasal sinuses and middle ear | C30–C31 | 510 | 320 | 125 | 56 | 64 | 65 | 58 |
| Mediastinum and other intrathoracic organs | C37–C39 | 300 | 210 | 189 | 138 | 67 | 70 | 46 |
| Bone and articular cartilage | C40–C41 | 400 | 350 | 239 | 197 | 51 | 57 | 62 |
| Soft tissue (without Mesothelioma) | C46–C49 | 2,010 | 1,870 | 660 | 760 | 66 | 68 | 57 |
| Vagina and other female genital organs | C52, C57–C58 | | 1,020 | | 478 | | 71 | 53 |
| Penis and other male genital organs | C60, C63 | 890 | | 199 | | 70 | | 70 |
| Urinary tract exc. kidney and bladder | C65–C66, C68 | 1,480 | 940 | 1,878 | 883 | 73 | 75 | 44 |
| Eye | C69 | 440 | 410 | 117 | 120 | 65 | 65 | 65 |
| Adrenal gland and other endocrine glands | C74–C75 | 160 | 200 | 263 | 252 | 55 | 60 | 46 |
| Waldenström macroglobulinaemia[2] | C88, C96 | 170 | 140 | 86 | 70 | 69 | 72 | 78 |

[1] relative 5-year survival rate in percentage, men and women, period 2009-2010
[2] and other malignant neoplasms of lymphoid, haematopoietic and related tissue 170 890

### Non-melanoma skin cancer

Non-melanoma skin cancers can mainly be divided into basal cell carcinomas (basaliomas) and squamous-cell carcinomas, both of which occur particularly in advanced age (Table 3.28.2). The most important risk factor for both forms is the long-term impact of the ultraviolet part of sunshine, which is why they are particularly located on the face or on the head and neck.

The basalioma metastasises only in very rare exceptional circumstances and therefore is not usually life-threatening. It can however grow destructively in the surrounding tissue and can considerably affect quality of life given an unfavourable site. The relative survival rate of over 100% for basalioma can be probably be explained by the fact that suspicious skin changes especially in old age are more likely to heal completely in otherwise healthy people.

In the case of squamous-cell carcinoma, metastases occur somewhat more frequently, the prognosis is however generally good. An acquired immune deficiency and/or supression through medication, for example following transplant surgery, can encourage the occurrence of this tumour.

Rare forms of skin cancer include, amongst others, Merkel-cell tumours, fibrosarcoma and carcinoma of the sebaceous and sweat glands. In cause of death statistics, no differentiation can be made between the various forms of non-melanoma skin cancer.

**Table 3.28.2**
**Frequency, median age at diagnosis and survival rates for types of non-melanoma skin cancer in Germany (2010)**

| Cancer site | ICD-O-3 | Incident cases | | Deaths | | Ø age at diagnosis | | rel. 5-Y-SR[1] |
|---|---|---|---|---|---|---|---|---|
| | | Men | Women | Men | Women | Men | Women | total |
| Basaliomas | 809-811 | 77,800 | 73,800 | | | 71 | 71 | 104 |
| Squamous cell carcinomas | 805-808 | 22,000 | 14,700 | | | 76 | 79 | 95 |
| unspecific histology | 800-804 | 400 | 300 | | | 75 | 78 | 80 |
| other types | other | 900 | 700 | | | 73 | 75 | 81 |
| total | all | 101,100 | 89,500 | 346 | 275 | 72 | 72 | 102 |

[1] relative 5-year survival rate in percentage, men and women, period 2009-2010

# 4 Cancer in children

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, since beginning its work in 1980. Close cooperation with the Society for Paediatric Oncology and Haematology (GPOH) and its associated hospitals was part of the GCCR's original conception. This is a characteristic feature of the registry which cannot be easily applied to adult oncology. This nationwide, population based childhood cancer registry with a high level of data quality and a degree of completeness of over 95 % (since about 1987) has been built up covering the whole of Germany. The GCCR thus meets international standards for population based cancer registries. A further characteristic of the GCCR is that it has implemented an active, open-end, long-term follow-up observation system which continues long into adulthood. In this way, the registry also provides the basis for research into long-term effects and secondary tumours, and for studies with long-term survivors in general. The registry population comprises children who are diagnosed with a malignant disease or a histologically benign brain tumour before their 15th birthday and are part of the resident population of the Federal Republic of Germany when diagnosed. Cancer cases in eastern Germany have also been registered since 1991. The current data pool consists of over 52,000 cancer cases. Since 1 January 2009, the GCCR has been registering all children and adolescents up to the age of 18 years (i.e. who are diagnosed before their 18th birthday) on the basis of the "Agreement of the Joint Federal Committee on Quality-Assurance Measures for the In-Patient Care of Children and Adolescents with Haemato-Oncological Diseases (GBA)". 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.

## Incidence of childhood cancers

About 1,800 cases of childhood cancer are newly diagnosed every year in Germany. With an overall population of approx. 11 million children under the age of 15 years, this means an annual incidence of about 16.0 per 100,000 children in this age group. The likelihood that a newborn child will develop a malignant disease within the first 15 years of his/her life is 0.2 %. In other words, a malignant cancer is diagnosed in approx. one in 420 children up to their 15th birthday.

## Range of diagnoses

The pattern of cancer diagnoses in children is completely different from that of adults. For example, children are mostly affected by embryonal tumours (neuroblastomas, retinoblastomas, nephroblastomas, medulloblastomas, embryonic rhabdomyosarcomas or germ-cell tumours); carcinomas, by contrast, are very rare in childhood (making up about 2 % of all malignant diseases). The largest diagnostic groups are leukaemias (33.8 %), CNS tumours (24.0 %) and lymphomas (11.1 %). Overall cancer incidence among children under the age of five is about twice as high as in the 5- to 14-year-old age group. The median age at onset among the under-15-year-olds is five years, eleven months. Boys are diagnosed with cancer 1.2 times more frequently than girls.

## Leukaemias

Leukaemias make up more than a third of all cancers among the under-15-year-olds. The most common single diagnosis overall (26.3 %) is acute lym-

**Figure 4.1**
**Cancer in children (determined for the period 2003 – 2012)**

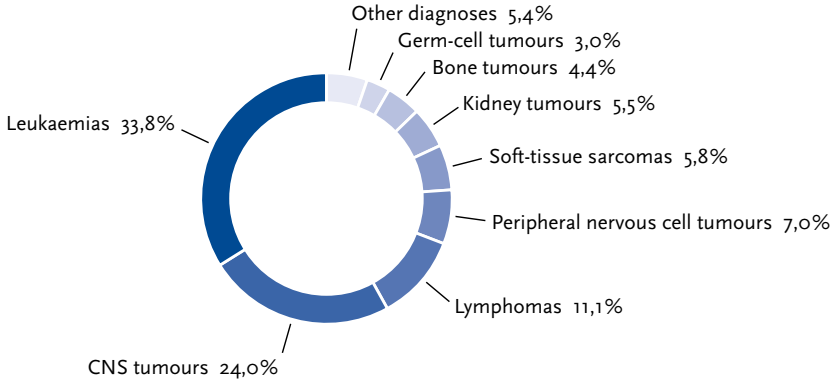
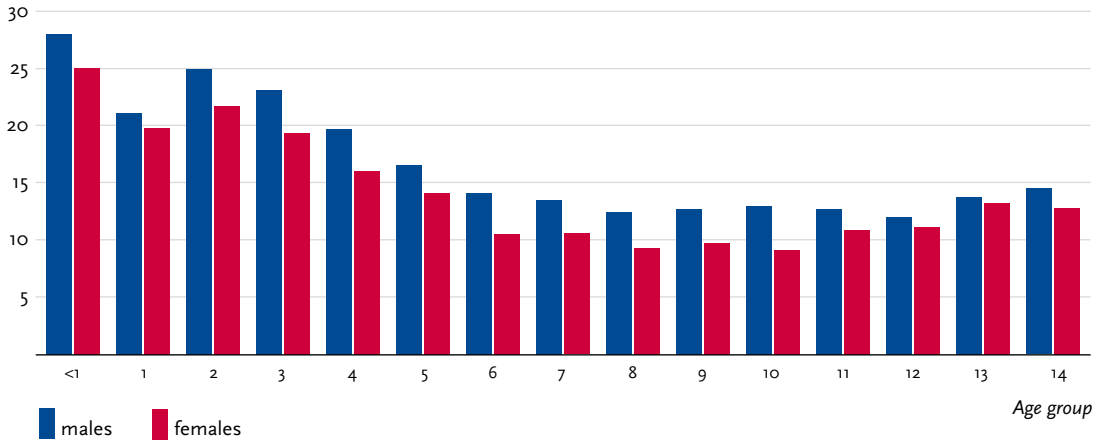


**Figure 4.2**
**Incident cases by age and sex, all childhood malignancies**
*Number of cases per 100,000 by age group, determinded for the period 2003 – 2012*

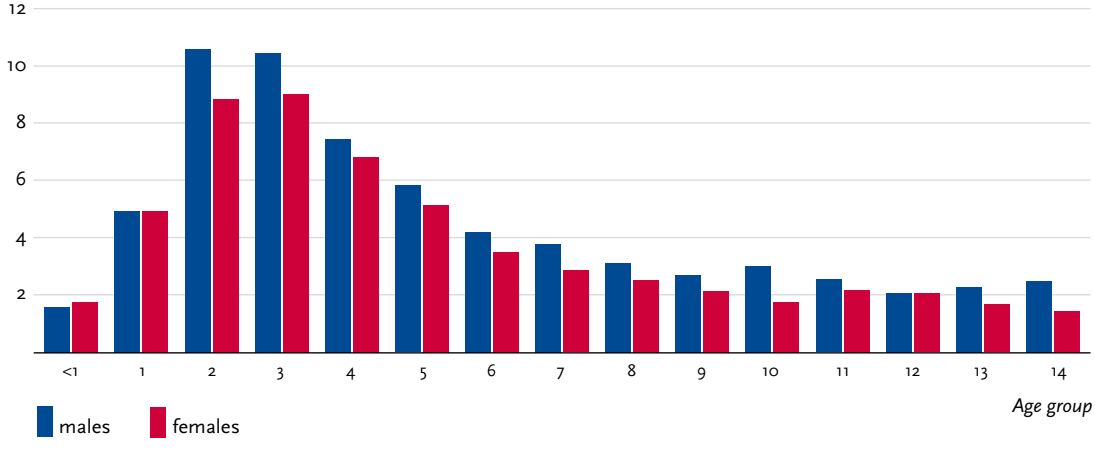



phatic leukaemia (ALL). It occurs more than twice as frequently among children under the age of five as in the other age groups. 4.4 % of all childhood malignancies are acute myeloid leukaemias (AML). AML is most common among children under the age of two. The survival prospects for AML are markedly lower than for ALL. The causes of leukaemias in childhood remain largely uncertain, even today. For a long time, environmental influences were suspected of causing childhood leukaemias. Since then it has been shown that the number of cases caused by most environmental factors (low-dose ionising radiation, non-ionising radiation and pesticides) is quite small after all, even if a weak association with leukaemias in childhood cannot be ruled out. A number of clues have meanwhile strengthened hypotheses that assign a key role to infectious pathogens in the development of childhood leukaemias. Especially children with an insufficiently modulated immune system in infancy can have a higher risk of developing leukaemia.

## CNS tumours

The most common single diagnoses among CNS tumours are astrocytomas (total: 11.1 %), intracranial and intraspinal embryonal tumours (4.6 %) and ependymomas (2.4 %). The increase in the incidence of CNS tumours observed in a number of western countries over the past decades may be connected with general changes in environmental factors and related exposures. For example, a number of epidemiological studies is looking into the possible influence of ionising radiation, electromagnetic fields, pesticides, the mother's diet and genetic aspects.

**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 2003 – 2012*



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

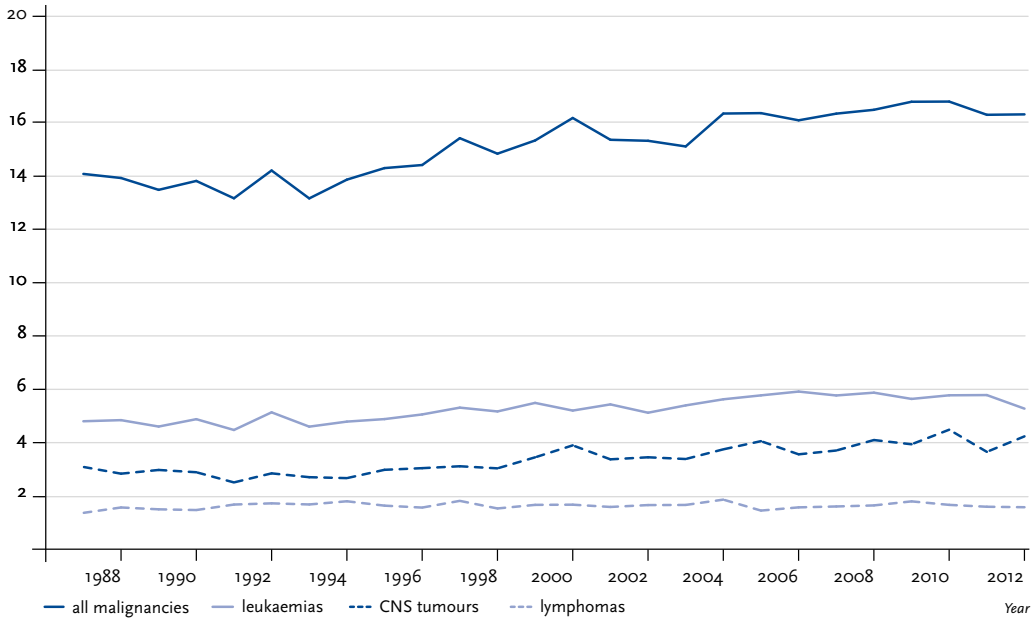
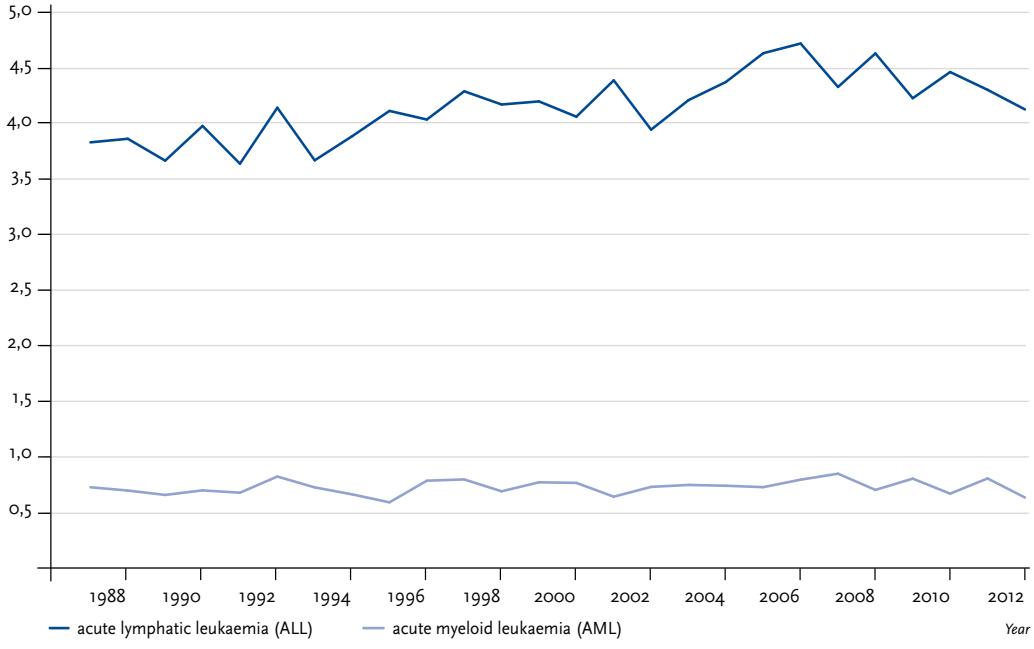



**Figure 4.5**
**Trends of the incidence of childhood leukaemias, myeloproliferative and myelodysplastic disorders**
*Number of cases per 100,000 (age standardised), including eastern Germany since 1991*



## Lymphomas

The most common lymphomas are non-Hodgkin lymphomas (NHL), including Burkitt's lymphoma (total: 6.4 %) and Hodgkin's lymphoma (4.7 %). The chances of survival with Hodgkin's lymphoma are among the best in paediatric oncology. Children with congenital or acquired immunodeficiency and those who have had immunosuppressive therapy are at increased risk of developing NHL. An association is suspected between lymphomas and ionising radiation; this has not, however, been substantiated.

## Other common malignant diseases

Other common malignant diseases in childhood include neuroblastomas (nerve-cell tumours), nephroblastomas (kidney tumours), germ-cell tumours, bone tumours and rhabdomyosarcomas (tumours of the skeletal musculature). Among these malignancies, the prognosis for children with nephroblastoma or a germ-cell tumour is much more favourable than for the others.

## Survival

Children with cancer make up fewer than 1% of all cancer patients. However, malignant neoplasms are the second most common cause of death among children. Fortunately, the survival rates have improved dramatically over the last 30 years thanks to significantly more differentiated diagnostics and the use of multimodal therapy concepts. In the early 1980s the chances of children with cancer being still alive five years after diagnosis were 67 %; this figure has risen to 84 % since then. Looking at all patients of the registry population who were diagnosed between 2001 and 2010 and followed up, the overall chance of survival is 84 % after five years, 82 % after ten years, and 81 % after 15 years. The encouraging increase in the number of long-term survivors is increasingly focusing attention on the long-term observation of former paediatric cancer patients. The GCCR provides an ideal data basis for carrying out studies with long-term survivors. As the above figures show, it is already possible to provide information on long-term survival (for example after 15 years) and to estimate the risk of developing a second malignancy after cancer in childhood. Examples of further research possibilities include the incidence of other long-term effects, such as the possible effects of therapy on fertility, and studies examining the health risks of the descendants of fathers and mothers who had childhood cancer. About 22,000 of the more than 37,000 patients currently known to be alive have been under observation by the registry for at least ten years. About three quarters of these patients are at least 18 years old.

**Table 4.1**
**Incidence and survival rates for the most common diagnoses, determined for the period 2001 – 2010**

| Cancer sites | Incidence* | Survival rate in %** | | |
|---|---|---|---|---|
| | | after 5 years | after 10 years | after 15 years |
| Hodgkin's lymphomas | 0.6 | 98 | 98 | 97 |
| Retinoblastomas | 0.4 | 98 | 97 | 97 |
| Germ-cell tumours | 0.5 | 95 | 94 | 94 |
| Nephroblastomas | 1.0 | 93 | 92 | 92 |
| Lymphoid leukaemias | 4.4 | 91 | 89 | 88 |
| Non-Hodgkin lymphomas | 0.6 | 89 | 88 | 86 |
| Astrocytomas | 1.7 | 81 | 79 | 77 |
| Neuroblastomas and ganglioneuroblastomas | 1.4 | 79 | 76 | 75 |
| Osteosarcomas | 0.3 | 76 | 72 | 71 |
| Rhabdomyosarcomas | 0.5 | 72 | 71 | 69 |
| Acute myeloid leukaemias | 0.7 | 72 | 70 | 69 |
| Ewing's tumours and related bone sarcomas | 0.3 | 70 | 66 | 65 |
| Intracranial and intraspinal embryonal tumours | 0.8 | 67 | 60 | 56 |
| All malignancies | 16.4 | 84 | 82 | 81 |

* Related to 100,000 children under the age of 15, age standardised (standard: Segi world population), children diagnosed 2003 – 2012
** 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

## Literature on childhood cancer


Brenner H, Spix C. Combining cohort and period methods for retrospective time trend analyses of long-term cancer patient survival rates. Br J Cancer. 2003;89(7):1260-5.

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Kaatsch P, Scheidemann-Wesp U, Schuz J. Maternal use of antibiotics and cancer in the offspring: results of a case-control study in Germany. Cancer Causes Control. 2010;21(8):1335-45.

Kaatsch P, Spix C. German Childhood Cancer Registry - Annual Report 2011 (1980-2010). Mainz: Institute of Medical Biostatistics, Epidemiology and Informatics (IMBEI) at the University Medical Center of the Johannes-Gutenberg University Mainz; 2012.

Kaatsch PS, C.; Jung, I.; Blettner, M. Leukämien bei unter 5-jährigen Kindern in der Umgebung deutscher Kernkraftwerke - Schlusswort. Dtsch Ärztebl. 2009;106(23):394.

Roman E, Lightfoot T, Smith AG, Forman MR, Linet MS, Robison L, et al. Childhood acute lymphoblastic leukaemia and birthweight: Insights from a pooled analysis of case-control data from Germany, the United Kingdom and the United States. Eur J Cancer. 2012.

Schmiedel S, Blettner M, Kaatsch P, Schuz J. Spatial clustering and space-time clusters of leukemia among children in Germany, 1987-2007. Eur J Epidemiol. 2010;25(9):627-33.

Schuz J, Grell K, Kinsey S, Linet MS, Link MP, Mezei G, et al. Extremely low-frequency magnetic fields and survival from childhood acute lymphoblastic leukemia: an international follow-up study. Blood Cancer J. 2012;2:e98.

Spix C, Kaatsch P, Schüz J. Umweltfaktoren bei Leukämieerkrankungen im Kindesalter. pädiat prax. 2013;80:233-54.

Spix C, Schulze-Rath R, Kaatsch P, Blettner M. Case-control study on risk factors for leukaemia and brain tumours in children under 5 years in Germany. Klin Padiatr. 2009;221(6):362-8.

# Appendix

## The German Centre for Cancer Registry Data (Zentrum für Krebsregisterdaten, ZfKD)

After the Federal Cancer Registry Data Act (Bundeskrebsregisterdatengesetz – BKRG) came into force in August 2009, the German Centre for Cancer Registry Data was set up as an independent division within the Robert Koch Institute's Department of Epidemiology and Health Reporting 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 analyse these data
- to publish the findings on cancer incidence in Germany and its development over time together with the Association of Population based Cancer Registries in Germany (GEKID)
- to conduct a nationwide record linkage with the data from the different state cancer registries to discover any duplicate notifications and to inform the cancer registries accordingly
- to compile, update and extrapolate a dataset from the reviewed data from the state cancer registries
- to regularly estimate and analyse survival rates, stage distribution at diagnosis of the respective cancer, and other indicators, particularly on prevalence, the risk of developing and dying of the disease, and how these indicators develop over time
- to examine data from various states to determine any regional differences in selected cancer sites
- to provide a dataset for evaluating health-policy measures of cancer prevention, cancer screening, cancer treatment and healthcare
- to conduct analyses and studies on all aspects of cancer
- to write a comprehensive report on cancer in Germany every five years
- to further enhance methods and standardisation rules on data collection and data transfer, and to analyse the data together with the state cancer registries
- to collaborate in scientific bodies as well as European and international organisations on
- cancer registration and cancer epidemiology

The work of the German Centre for Cancer Registry Data is supported by a scientific advisory board with an office at the RKI. This advisory board can also give permission for the dataset at the Centre for Cancer Registry Data to be made available to third parties on application – i.e. in addition to the state cancer registries – if a justified and, in particular, scientific interest can be substantiated. Further information on the German Centre for Cancer Registry Data is available on the Internet at www.krebsdaten.de.

Staff of the German Centre for Cancer Registry Data:

Dr Klaus Kraywinkel (section head)

Nadia Baras
Dr Benjamin Barnes
Dr Joachim Bertz
Nina Buttmann-Schweiger
Dr Stefan Dahm
Dennis Dampke
Manuela Franke
Dr Jörg Haberland
Stefan Meisegeier
Ina Schönfeld
Carolin Werner
Antje Wienecke
Dr Ute Wolf

## Association of Population-based Cancer Registries in Germany

The Association of Population-based Cancer Registries in Germany (GEKID) was formed in 2004 as a registered, non-profit-making association. GEKID's members include not only all Germany's population-based cancer registries, 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 the German Centre for Cancer Registry Data based at the Robert Koch Institute (RKI). GEKID also participates actively in a wide range of scientific committees especially in working groups preparing the establishment of nationwide clinical cancer registration.

The association's primary task is to standardise as far as possible the content and methodology of cancer registration, despite the differences in legislation between the federal states. The comparability of results from the cancer registries can only be assured by nationwide cooperation. To promote such cooperation, GEKID published "The Manual of Population-based Cancer Registration" in 2008. Furthermore, GEKID is a joint point of contact for the population-based cancer registries on all issues of common interest and represents the registries at the European level, e.g. in the European Network of Cancer Registries (ENCR). 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 and explain the aims of population-based cancer registration
- to engage in joint information activities and thus help the individual cancer registries achieve and maintain complete registration
- to define standards on content as a basis for the comparability of population-based cancer registries
- to coordinate tasks involving all the 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

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

Contacts for the Association of Population-based Cancer Registries in Germany (Gesellschaft der epidemiologischen Krebsregister in Deutschland e.V., GEKID) (see address section):

Prof Dr Alexander Katalinic
(Chair of GEKID, Schleswig-Holstein Cancer Registry)
Dr Stefan Hentschel
(1st Vice-chair, Hamburg Cancer Registry)
Roland Stabenow
(2nd Vice-chair, Joint Cancer Registry)

## KID – The Cancer Information Service provided by the German Cancer Research Centre

The cancer Information service "KID" was set up in 1986 to provide personal telephone contacts for patients and their relatives with questions regarding cancer. Nowadays, medical staff provides up-to-the minute, scientifically sound answers to around 30,000 questions every year by phone, by e-mail and in consultation surgeries in both Heidelberg and Dresden. This encompasses not only patients, relatives and interested citizens - even representatives from expert groups concerned with the care of cancer patients turn to the Cancer Information Service. The information on offer is individually tailored to the needs of the various target groups:

- Patients, their relatives and friends are provided with answers to their questions relating to diagnosis and cancer treatment options, on living with the disease and links to additional points of contact within the healthcare system. However, interested citizens with questions on risk factors, cancer prevention and early detection or on cancer research can also obtain comprehensive information by contacting the Cancer Information Service. This strengthens the health literacy of individuals and creates the basis for active interaction and joint decision-making between patients or beneficiaries and the attending physicians.

- Specialists professionally concerned with the subject of cancer receive quick and reliable pertinent information on the basis of the best available scientific evidence. Through clearly structured preparation, research results are made transparent and directly usable for patient care. Source references, individually compiled for experts in the written e-mail replies, enable more in-depth study of relevant literature.

Via its website www.krebsinformationsdienst.de the Cancer Information Service conveys the latest knowledge about cancer, useful addresses and tips on further links and information material. Between 200,000 and 300,000 individual visitors per month use this facility. For specialist groups, the website offers an introduction into a wealth of cancer-related topics and provides references to further scientific sources. On the social networking site Facebook, the service posts breaking news and invites discussion.

The Cancer Information Service is provided by the German Cancer research Centre in Heidelberg, the largest bio-medical research establishment 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. As a result, the service can provide 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 accompanying research the Cancer Information Service also provides feedback on how the care situation in Germany is directly experienced by cancer patients and their relatives.

Further information on the remit and workings of the Cancer Information Service can be found (in German) by following the link: www.krebsinformationsdienst.de/wirueberuns.php

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

Contact partners at the Cancer Information Service - KID (also see address section):
Dr. Susanne Weg-Remers
Head of the Cancer Information Service (KID)
Dr. Regine Hagmann
Head of Working Group "Knowledge Management" at KID

## Addresses

Krebsregister **Baden-Württemberg** (Baden-Württemberg Cancer Registry)
Epidemiologisches Krebsregister (Population-based Cancer Registry)
Deutsches Krebsforschungszentrum (German Cancer Research Centre)
Im Neuenheimer Feld 581
69120 Heidelberg
Telephone: 06221/42 42 20 Telefax: 06221/42 22 03
Email: ekr-bw@dkfz.de
Internet: www.krebsregister-bw.de

Vertrauensstelle* Baden-Württemberg (Baden-Württemberg Confidentiality Unit)
Deutsche Rentenversicherung (German Pension Insurance) Baden-Württemberg
Gartenstr. 105
76135 Karlsruhe
Telephone: 0721/82 57 90 00 Telefax: 0721/82 59 97 90 99
Email: vs@drv-bw.de

Klinische Landesregisterstelle* (Clinical State Registration Unit)
Baden-Württembergische Krankenhausgesellschaft e.V. (Baden-Württemberg Hospital Association)
Birkenwaldstr. 151
70191 Stuttgart
Telephone: 0711/2 57 77 70 Telefax: 0711/2 57 77 79
Email: info@klr-krbw.de

Bevölkerungsbezogenes Krebsregister **Bayern** (Bavaria Population-based Cancer Registry)
Registerstelle* (Registry Unit)
Östliche Stadtmauerstr. 30
91054 Erlangen
Telephone: 09131/8 53 60 35 Telefax: 09131/8 53 60 40
Email: krebsregister@ekr.med.uni-erlangen.de
Internet: www.krebsregister-bayern.de

Vertrauensstelle* (Confidentiality Unit)
Klinikum Nürnberg-Nord
Professor-Ernst-Nathan-Str. 1
90419 Nürnberg
Telephone: 0911/3 78 67 38 Telefax: 0911/3 78 76 19
Email: vertrauensstelle@klinikum-nuernberg.de
Internet: www.krebsregister-bayern.de

Gemeinsames Krebsregister der Länder **Berlin, Brandenburg, Mecklenburg-Vorpommern, Sachsen-Anhalt** und der Freistaaten **Sachsen** und **Thüringen** (Joint Cancer Registry of Berlin, Brandenburg, Mecklenburg-West Pomerania, Saxony-Anhalt, Saxony and Thuringia), GKR
Brodauer Str. 16-22
12621 Berlin
Telephone: 030/56 58 14 01 (R) Telefax: 030/56 58 14 44 (R)
030/56 58 13 15 (V) 030/56 58 13 33 (V)
Email: registerstelle@gkr.berlin.de
vertrauensstelle@gkr.berlin.de
Internet: www.berlin.de/gkr/

Epidemiologisches Krebsregister **Bremen** (Bremen Cancer Registry)
Leibniz-Institut für Präventionsforschung und Epidemiologie (Leibniz Institute for Prevention Research and Epidemiology), BIPS GmbH
Achterstr. 30
28359 Bremen
Telephone: 0421/2 18 569 61 (R) Telefax: 0421/2 18 569 41 (R)
0421/2 18 569 99 (V)
Email: krebsregister@bips.uni-bremen.de (R)
vbkr.kvhb@t-online.de (V)
Internet: www.krebsregister.bremen.de

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

**Hamburgisches** Krebsregister (Hamburg Cancer Registry)
Behörde für Soziales, Familie, Gesundheit und Verbraucherschutz
(State Ministry of Social Affairs, Family, Health and Consumer Protection)
Billstr. 80A
20539 Hamburg
Telephone: 040/4 28 37 22 11 Telefax: 040/4 27 31 00 94
Email: HamburgischesKrebsregister@bgv.hamburg.de
Internet: www.hamburg.de/krebsregister

Krebsregister **Hessen** (Hesse Cancer Registry)
Registerstelle* (Registry Unit)
Hessisches Landesprüfungs- und Untersuchungsamt im Gesundheitswesen
(Hesse State Health Office), HLPUG
Wolframstr. 33
35683 Dillenburg
Telephone: 02771/32 06 39 Telefax: 02771/3 66 71
Email: stefan.gawrich@hlpug.hessen.de
Internet: www.hlpug.de

Vertrauensstelle* (Confidentiality Unit) of Hesse Cancer Registry at
Landesärztekammer Hessen (Hesse State Medical Council)
Im Vogelsgesang 3
60488 Frankfurt/Main
Telephone: 069/7 89 04 50 Telefax: 069/78 90 45 29
Email: vertrauensstelle@laekh.de
Internet: www.laekh.de

Epidemiologisches Krebsregister **Niedersachsen** (Lower Saxony Population-based Cancer Registry)
OFFIS CARE GmbH
Industriestr. 9
26121 Oldenburg
Telephone: 0441/3 61 05 60 (R) Telefax: 0441/36 10 56 10 (R)
0511/4 50 53 56 (V) 0511/4 50 51 32 (V)
Email: registerstelle@krebsregister-niedersachsen.de (R)
vertrauensstelle.ekn@nlga.niedersachsen.de (V)
Internet: www.krebsregister-niedersachsen.de

Epidemiologisches Krebsregister **Nordrhein-Westfalen** gGmbH
(North Rhine-Westphalia Population-based Cancer Registry)
Robert-Koch-Str. 40
48149 Münster
Telephone: 0251/8 35 85 71 Telefax: 0251/8 35 85 77
Email: info@krebsregister.nrw.de
Internet: www.krebsregister.nrw.de

Krebsregister **Rheinland-Pfalz** (Rhineland-Palatinate Cancer Registry)
Registerstelle* (Registry Unit)
Institut für Medizinische Biometrie, Epidemiologie und Informatik
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Obere Zahlbacher Str. 69
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Email: krebsregister@imbei.uni-mainz.de
Internet: www.krebsregister-rheinland-pfalz.de

Vertrauensstelle* (Confidentiality Unit)
Am Pulverturm 13
55131 Mainz
Telephone: 06131/17 30 02 Telefax: 06131/17 32 47
Email: krebsregister@mail.uni-mainz.de
Internet: www.krebsregister-rheinland-pfalz.de

Epidemiologisches Krebsregister **Saarland** (Saarland Population-based Cancer Registry)
Ministerium für Soziales, Gesundheit, Frauen und Familie
(Ministry of Social Affairs, Health, Women and Family)
Präsident-Baltz-Str. 5
66119 Saarbrücken
Telephone: 0681/5 01 59 82 (R) Telefax: 0681/5 01 59 98 (R)
0681/5 01 58 05 (V)
Email: krebsregister@gbe-ekr.saarland.de
Internet: www.krebsregister.saarland.de

Krebsregister **Schleswig-Holstein** (Schleswig-Holstein Cancer Registry)
Institut für Krebsepidemiologie e.V. (Institute of Cancer Epidemiology)
Ratzeburger Allee 160, Haus 50
23538 Lübeck
Telephone: 0451/5 00 54 40 Telefax: 0451/5 00 54 55
Email: info@krebsregister-sh.de
Internet: www.krebsregister-sh.de

Vertrauensstelle* (Confidentiality Unit)
Ärztekammer Schleswig-Holstein (Schleswig-Holstein Medical Council)
Bismarckallee 8-12
23795 Bad Segeberg
Telephone: 04551/80 31 04 Telefax: 04551/80 31 88

**Deutsches Kinderkrebsregister** (German Childhood Cancer Registry)
Institut für Medizinische Biometrie, Epidemiologie und Informatik
(Institute of Medical Biostatistics, Epidemiology and Informatics), IMBEI
Obere Zahlbacher Str. 69
55131 Mainz
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Email: kinderkrebsregister@imbei.uni-mainz.de
Internet: www.kinderkrebsregister.de

**Further contacts:**

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General-Pape-Str. 62-66
12101 Berlin
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E-Mail: krebsdaten@rki.de
Internet: www.krebsdaten.de

Bundesministerium für Gesundheit (Federal Ministry of Health)
53107 Bonn
Referat 311 Telephone: 0228/9 94 41 15 10 Telefax: 0228/9 94 41 49 62
Referat 315 Telephone: 0228/9 94 41 31 08 Telefax: 0228/9 94 41 49 38
E-Mail: poststelle@bmg.bund.de
Internet: www.bmg.bund.de

Cancer Information Service
German Cancer Research Centre
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69120 Heidelberg
Telephone: 06221/42 28 90 (secretariat)
E-Mail: krebsinformationsdienst@dkfz.de
Internet: www.krebsinformationsdienst.de

* To protect patients' confidentiality, responsibility for cancer registration in Germany is often divided between Confidentiality Units (Vertrauensstellen, V) and Registry Units (Registerstellen, R). Cancer morbidity and mortality notifications are sent to the Confidentiality Units, where personal information is anonymised. Along with the corresponding medical data, these anonymised data are then sent to the Registration Units, which are responsible for maintaining and analysing the registry database.

## Sources for international comparison of cancer incidence and mortality rates

(for the years 2009 – 2010, if not otherwise stated. Access date: June to October 2013)

**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:**
National Cancer Registry
http://epid.coi.waw.pl/krn/english/

**Czech Republic:**
Institute of Health Information and Statistics of the Czech Republic (UZIS)
Cancer Incidence 2009 (2010) in the Czech Republic (http://www.uzis.cz/)
SVOD Web Portal (http://www.svod.cz/?sec=aktuality&lang=en)

**Switzerland:**
Foundation National Institute for Cancer Epidemiology and Registration
http://www.nicer.org/NicerReportFiles/report/atlas.html?&geog=0
(mean value for the years 2006 to 2010)

**Belgium:**
Incidence:
Belgian Cancer Registry
http://www.kankerregister.org/
Mortality:
Ministerie van den Vlaamse Gemeenschap
https://www.wiv-isp.be/epidemio/spma/
(Mortality data only for the year 2009)

**France:**
Institut de veille sanitaire
Binder-Foucard F, Belot A, Delafosse P, Remontet L, Woronoff A-S, Bossard N.
Estimation nationale de l'incidence et de la mortalité par cancer en France entre 1980 et 2012.
Partie 1 - Tumeurs solides. Saint-Maurice (Fra): Institut de veille sanitaire; 2013.
Alain Monnereau, Laurent Remontet, Marc Maynadié, Florence Binder-Foucard, Aurélien Belot, Xavier Troussard, Nadine Bossard Estimation nationale de l'incidence des cancers en France entre 1980 et 2012 Partie 2 – Hémopathies malignes. Saint-Maurice (Fra): Institut de veille sanitaire, 2013.
Rates based on european standard (for 2009): personal communication Aurelien Belot

**USA:**
National Cancer Institute Surveillance Epidemiology and End Results
http://seer.cancer.gov/canques/incidence.html

**Great Britain:**
Office for National Statistics
www.ons.gov.uk/ons/rel/cancer-unit/cancer-incidence-and-mortality/2008-2010/rft-cancer-incidence-and-mortality-in-the-uk--2008-2010.xls
(mean value for the years 2008 to 2010)
Data for C18-C21, C22, C45, C51, C54-C55 and C73 for the years 2009 to 2010: Cancer Research UK
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**Austria:**
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**Supplements:**
Additional mortality values were extracted from IARC WHO Cancer Mortality Database:
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Literature on cancer risk factors is available on request at the editors (RKI, German Centre for Cancer Registry Data).

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The “Cancer in Germany” report is published every two years by the Association of Population-based Cancer Registries in Germany (GEKID) and the German Centre for Cancer Registry Data (ZfKD) at the Robert Koch Institute. The results contained in this, the ninth edition are based on data up to 2010. In the meantime, population-based cancer registration has achieved nationwide coverage in Germany. However, because reliable data is not yet available from all federal states, it is still necessary for the ZfKD to estimate figures in some areas.

Included for the first time in this edition are chapters on pleura mesothelioma and vulvar cancer. Altogether, this report presents the most important epidemiological measured values and current trends for 26 different types of cancer. Details are contained with regard to disease incidence and mortality, along with regional and international comparisons, as well as illustrations of the distribution of tumour stages and of survival prospects.
As in earlier editions, details on cancer in children are presented in a separate chapter by the German Childhood Cancer Registry.

For the year 2010, the number of new cases of cancer in Germany was estimated by the ZfKD at approximately 477,300, of which 252,400 cases were among men and 224,900 in women. This means the number of new cases annually has increased by around 71,500 since the year 2000. This is primarily to be attributed to the continually growing proportion of older people within our population. The most frequently occurring types of cancer are breast cancer with around 70,300 new cases, prostate cancer (just under 66,000) and bowel cancer (62,400). Among women an increase is to be reported in the age-standardised incidence rates for breast cancer and malignant melanoma, as well as for tumours of the lung, thyroid, vulva, oral cavity and pharynx. Declining incidence rates were observed in cancerous diseases of the stomach, gall bladder and biliary tract, the bowel and the ovaries. In men, incidence rates since the year 2000 have increased with regard to malignant melanoma, prostate cancer and liver cancer whereas in contrast incidence rates fell in tumours of the stomach, lungs, oesophagus and the bladder. For 2014, the ZfKD estimates about half a million new cases of cancer in Germany.

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