Munich Cancer Registry

- Survival
- Selection Matrix
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- *Deutsch*

ICD-10 D05: Breast cancer i.s. (women)

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	4,862
Diseases	4,938
Creation date	04/13/2016
Export date	12/23/2015
Population (females)	2.36 m

Munich Cancer Registry at Munich Cancer Center
Marchioninistr. 15
Munich, 81377
Germany

http://www.tumorregister-muenchen.de/en

http://www.tumorregister-muenchen.de/en/facts/base/bD05f_E-ICD-10-D05-Breast-cancer-i.s.-women-incidence-and-mortality.pdf

Global Statements about the statistics on the Internet −
Baseline Statistics (grey button), **Survival** (red button)

In these analyses, the clinics and physicians of Upper Bavaria and the city and county of Landshut[#], with a total of 4.64 million inhabitants, account for the frequency of cancer diseases[##] and the achieved long term results. Additionally, the long term survival evaluated by the Munich Cancer Registry (MCR) is compared with the results of the population-based registry in the USA (SEER), which is useful for checking the consistency of the data on an international level.

In comparing several tables, inconsistent figures may be detected. This is based on the fact that different patient cohorts are included in the base calculation, for example when proportions of multiple tumors or DCO-cases[###] are concerned. In other cases the individual tumor diagnosis is the basis for calculation, for example with incidence.

The foot notes describe the currentness of the data. The baseline statistics and survival data are updated annually. This yearly analysis comprises the Annual Report of the MCR.

Clinics and physicians have access to essentially more detailed data, with which they can check, compare and in the best case optimize their own data and results.

We would be pleased to receive corrections, critique and useful suggestions. Just send an e-mail to tumor@ibe.med.uni-muenchen.de.

Munich Cancer Registry, April 2016

[#] Base data has been collected since 1998. An increase in new diseases is apparent, which is an effect of two extensions in the MCR catchment area (from a base population of 2.51 million to 3.96 in 2002, and to 4.52 million in 2007).

[##] Due to the high frequency and good prognosis of non-malignant skin cancer (C44), no systematic ascertainment is performed for this diagnosis. C44 is not designated as a primary, but rather as a secondary tumor.

[###] DCO (death certificate only) identifies a cancer case that first becomes available to the MCR through the death certificate.

ICD-10 codes (ICD-10 2015) used for specifying cancer site

Code	Description
D05.-	Carcinoma in situ of breast
D05.0	Lobular carcinoma in situ
D05.1	Intraductal carcinoma in situ
D05.7	Other carcinoma in situ of breast
D05.9	Carcinoma in situ of breast, unspecified

Gender: Female

INCIDENCE

Table 1

All patients by year of diagnosis,
proportions of multiple primaries, deaths, and active follow-up

Year of diagnosis	Cases n	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %
1998	111	49.5	21.6	91.0
1999	128	42.2	24.2	97.7
2000	139	41.7	22.3	94.2
2001	163	46.6	18.4	97.5
2002	218	40.4	15.1	91.7 #
2003	219	36.1	11.4	95.4
2004	269	36.4	13.8	93.7
2005	312	33.7	9.6	94.6
2006	316	38.3	8.5	87.3
2007	345	39.1	6.4	67.0 #
2008	406	29.1	3.9	47.5
2009	406	29.8	7.9	51.5
2010	428	27.6	2.3	50.2
2011	412	24.3	3.2	55.6
2012	384	30.5	2.9	69.3
2013	374	23.8	0.8	98.1
2014	308	23.4		95.8 ##
1998-2014	4938	32.5	7.6	76.0

The increases of incident cases in 2002 and 2007 reflect the expansion to additional registry areas.

Please be aware that data of recent annual patient cohorts may not yet be fully processed. The years under evaluation can be found in the respective headings.

Table 2

Incidence measures by year of diagnosis
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002,
and from 3.96 to 4.64 m as of 2007, respectively)

Year of diagnosis	Cases n	Incidence raw	Incidence WS	Incidence ES	Incidence BRD-S
1998	111	9.4	6.3	8.3	8.8
1999	128	10.8	7.0	9.4	10.1
2000	139	11.6	7.1	9.7	10.6
2001	163	13.4	8.7	11.6	12.5
2002	218	11.1	7.3	9.9	10.6
2003	219	11.1	7.1	9.5	10.3
2004	269	13.6	8.3	11.2	12.1
2005	312	15.7	9.5	12.7	13.8
2006	316	15.7	9.9	13.3	14.3
2007	345	14.9	9.2	12.3	13.3
2008	406	17.5	10.9	14.5	15.4
2009	406	17.5	10.8	14.5	15.4
2010	428	18.3	11.5	15.4	16.4
2011	412	17.5	10.7	14.3	15.4
2012	384	16.3	10.0	13.5	14.4
2013	374	15.8	9.8	13.2	14.2
2014	308	13.1	8.0	10.7	11.6
1998-2014	4938	14.8	9.2	12.3	13.3

The computation of the incidence measures includes all primaries, irrespective of first or subsequent malignancy.

Table 3

Age distribution parameters by year of diagnosis

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	111	56.6	10.8	28.5	89.2	44.4	49.3	56.3	62.3	69.0
1999	128	58.4	10.3	40.9	88.2	45.9	50.5	57.8	63.3	72.4
2000	139	59.6	12.0	30.9	85.6	43.9	51.1	59.0	67.8	77.5
2001	163	57.9	11.8	26.0	93.0	42.6	49.8	58.1	65.5	72.6
2002	218	58.3	11.2	34.3	88.8	45.5	50.3	57.9	64.8	74.2
2003	219	59.1	11.3	33.3	91.7	43.9	50.2	58.8	67.6	73.6
2004	269	60.8	10.8	32.5	90.7	46.8	53.5	62.1	67.6	74.1
2005	312	60.0	11.6	30.0	91.4	43.2	52.5	61.5	66.8	73.6
2006	316	59.5	10.8	33.8	84.9	45.5	50.9	60.7	67.2	73.2
2007	345	60.0	11.7	26.3	90.8	43.8	51.5	61.0	67.8	73.9
2008	406	59.5	11.4	34.0	92.5	43.7	51.1	59.7	67.6	71.7
2009	406	59.8	11.1	26.2	89.6	44.7	51.9	60.8	67.3	72.9
2010	428	59.3	10.8	27.2	89.8	45.1	51.7	59.5	67.0	72.6
2011	412	60.1	11.1	30.8	92.5	45.4	51.0	60.6	68.5	73.8
2012	384	60.1	11.5	31.1	92.7	46.8	51.0	60.1	67.7	74.5
2013	374	58.9	11.9	28.7	88.6	44.7	50.4	57.5	68.1	74.5
2014	308	59.3	12.6	27.4	93.5	45.1	50.4	58.3	69.1	75.5
1998–2014	4938	59.5	11.4	26.0	93.5	44.8	51.1	59.6	67.4	73.7

Table 4

Age distribution by 5-year age group for period 2007-2014

Age at diagnosis Years	Cases n	%	Cum.%
25-29	9	0.3	0.3
30-34	30	1.0	1.3
35-39	78	2.5	3.8
40-44	196	6.4	10.2
45-49	293	9.6	19.8
50-54	506	16.5	36.3
55-59	426	13.9	50.2
60-64	483	15.8	66.0
65-69	523	17.1	83.1
70-74	271	8.8	91.9
75-79	130	4.2	96.1
80-84	61	2.0	98.1
85+	57	1.9	100.0
All ages	3063	100.0	

Included in the statistics are 33.2% multiple primaries.

Table 5

Age-specific incidence
for period 2007-2014

Age at diagnosis Years	Cases n	Age-spec. incidence
0- 4		0.0
5- 9		0.0
10-14		0.0
15-19		0.0
20-24		0.0
25-29	9	0.7
30-34	30	2.4
35-39	78	6.2
40-44	192	12.6
45-49	289	19.1
50-54	504	39.4
55-59	423	37.6
60-64	480	45.3
65-69	521	49.9
70-74	269	25.7
75-79	128	17.9
80-84	60	10.7
85+	57	9.9
All ages	3040	
Incidence		
Raw		16.2
WS		10.0
ES		13.5
BRD-S		14.4

The age-specific incidence characterizes the disease risk in a particular age group. The age distribution depends on the patient population frequency in each age group and reflects the tangible clinical picture of everyday patients care (see following chart).

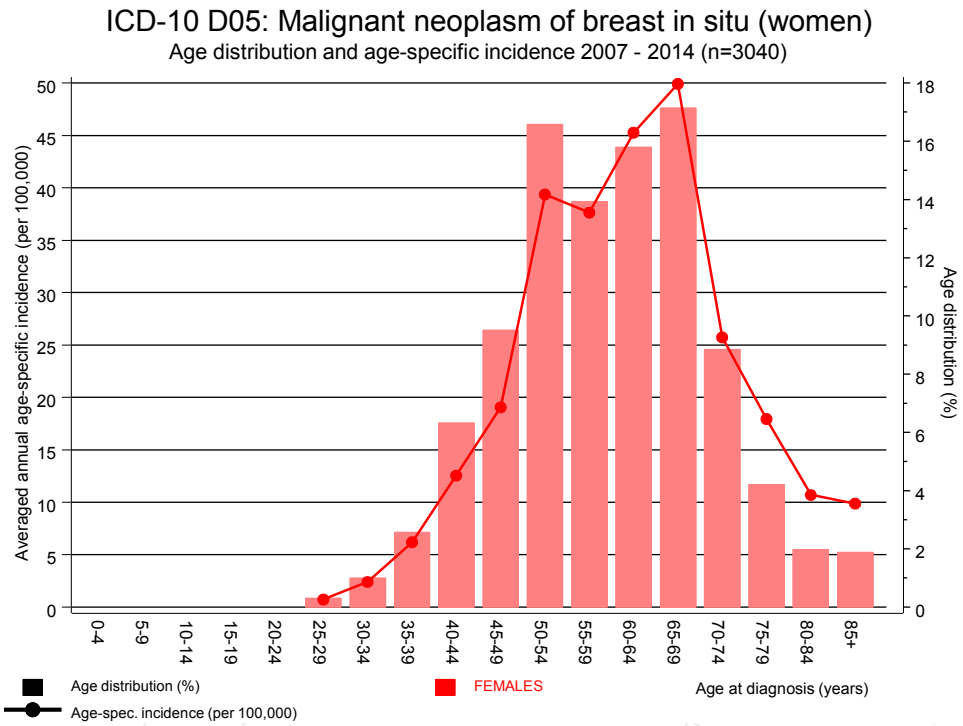

Figure 6. Age distribution and age-specific incidence

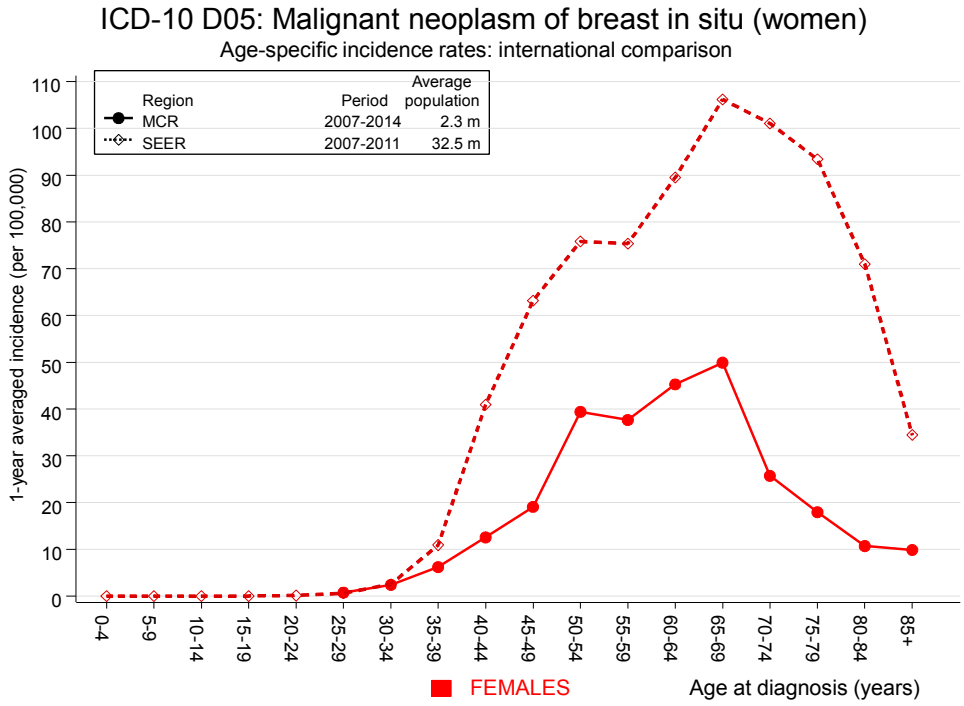

Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2014, based on the November 2013 submission. http://www.seer.cancer.gov.

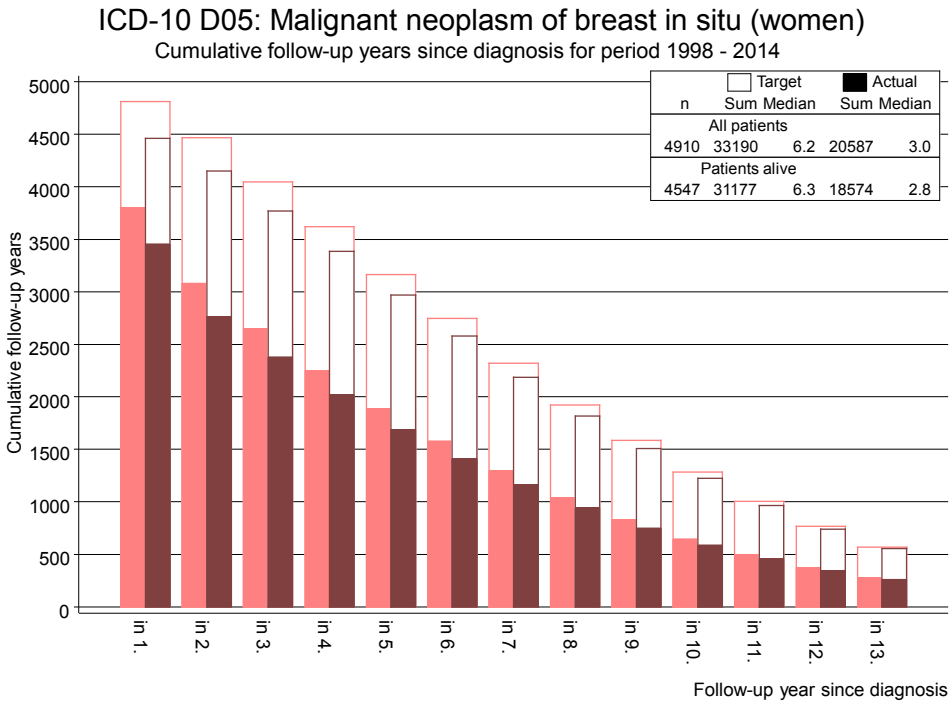

Figure 7. Cumulative follow-up years depending on time since diagnosis

The increase of the lost to follow-up rate can be interpreted as a consequence of a declining number of survivors over time.

Table 8

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998-2014

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C15	Oesophagus	2	1.2	1.7	0.2	6.0		0.4	
C16	Stomach	7	5.1	1.4	0.5	2.8		0.9	
C17	Small intestine	3	1.0	3.0	0.6	8.9		1.0	
C18	Colon	19	15.0	1.3	0.8	2.0		2.0	
C19-C20	Rectum	15	7.1	2.1	1.2	3.5	#	3.9	
C22	Liver	4	1.9	2.1	0.6	5.3		1.0	50.0
C23-C24	Bile	3	2.1	1.4	0.3	4.1		0.4	
C25	Pancreas	23	6.9	3.4	2.1	5.0	#	8.0	8.7
C33-C34	Lung	27	14.5	1.9	1.2	2.7	#	6.2	
C43	Malign. melanoma	15	7.7	1.9	1.1	3.2	#	3.6	
C46,C49	Soft tissue	5	1.0	4.9	1.6	11.4	#	2.0	
C48	Peritoneal	2	0.8	2.6	0.3	9.3		0.6	
C50	Breast	513	64.6	7.9	7.3	8.7	#	221.5	
C51	Vulva	3	1.6	1.9	0.4	5.5		0.7	
C54	Corpus uteri	26	11.0	2.4	1.5	3.5	#	7.4	3.8
C55,C57	Fem. genitals un	2	0.3	7.6	0.9	27.4		0.9	
C56	Ovary	17	7.7	2.2	1.3	3.5	#	4.6	5.9
C64	Kidney	5	4.3	1.2	0.4	2.7		0.3	
C65	Renal pelvis	2	0.5	3.9	0.5	14.1		0.7	
C70-C72	CNS cancer	6	2.6	2.3	0.9	5.1		1.7	16.7
C73	Thyroid	5	4.2	1.2	0.4	2.7		0.4	
C76-C79	CUP	3	2.6	1.1	0.2	3.3		0.2	33.3
C82-C85	NHL	18	6.6	2.7	1.6	4.3	#	5.6	
C90	Mult. myeloma	4	2.0	2.0	0.6	5.2		1.0	
C91-C96	Leukaemia	8	2.6	3.1	1.3	6.1	#	2.7	12.5
Other primaries		7	5.3	1.3	0.5	2.7		0.8	
Not observed		0	7.6	0.0	0.0	0.5	#	-3.7	
All mult. primaries		744	187.9	4.0	3.7	4.3	#	274.7	1.2

Patients	4802
Median age at second malignancy (years)	65.7
Person-years	20243
Mean observation time (years)	4.2
Median observation time (years)	3.0

The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 are pooled in category “Other primaries”

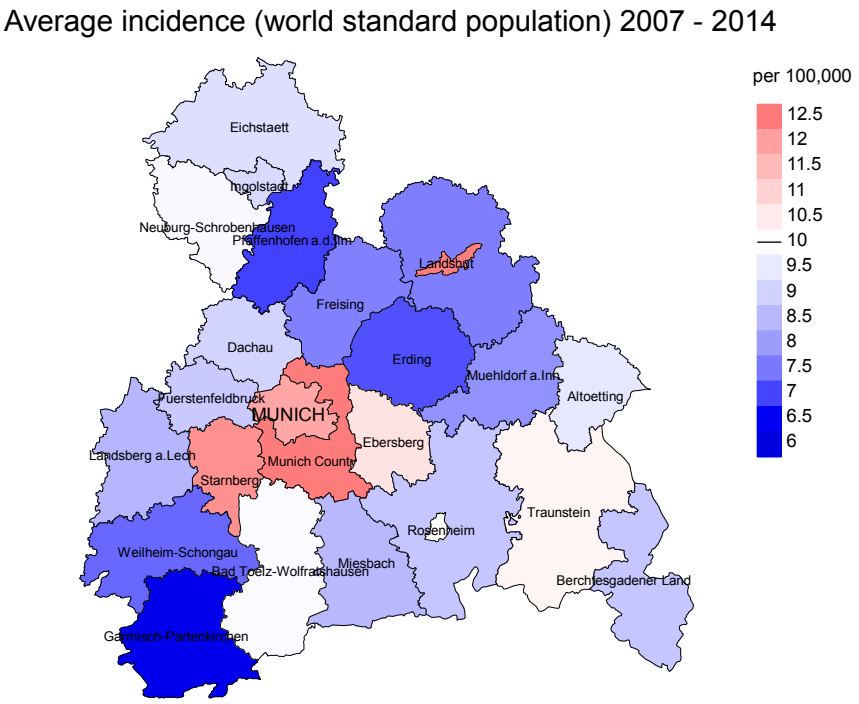

Figure 9a. Map of cancer incidence (world standard population) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (10.0/100,000 WS N=3,040).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,347 female residents (averaged) in the period from 2007 to 2014 a total of 90 women were identified with newly diagnosed breast cancer i.s. (women). Therefore, the mean incidence rate for this cancer type in this area can be calculated at 10.7/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 7.9 and 14.1/100,000.

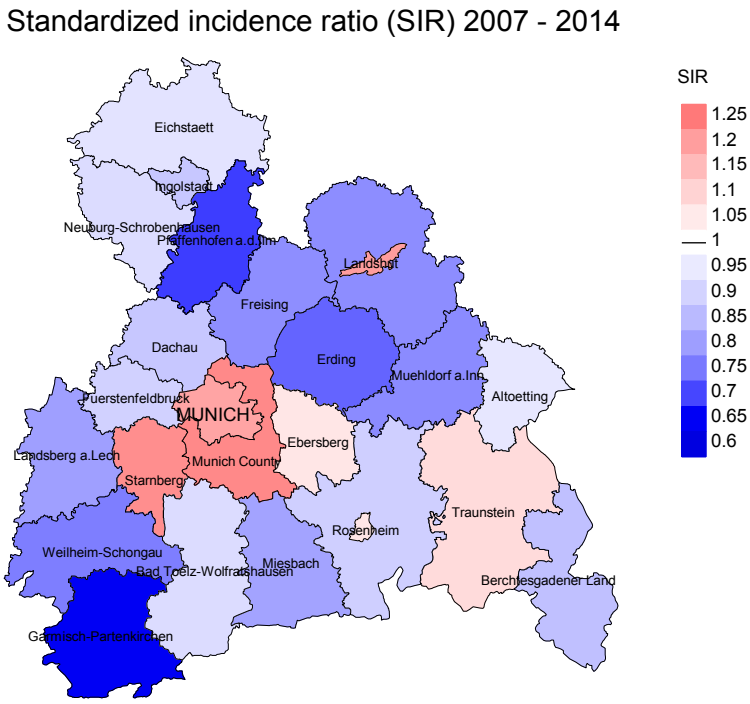

Figure 9b. Map of standardized incidence ratio (SIR) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=3,040).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,924 female residents (averaged) in the period from 2007 to 2014 a total of 90 women were identified with newly diagnosed breast cancer i.s. (women). Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.06. Though, the value of this parameter may vary with an underlying probability of 99% between 0.79 and 1.38, and is therefore not statistically striking.

MORTALITY

Table 10a

Patient cohorts of incident cancers by year of diagnosis, follow-up status, and deaths among the annual cohorts

(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.64 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	111	91.0	24	21.6	100.0
1999	128	97.7	31	24.2	96.8
2000	139	94.2	31	22.3	96.8
2001	163	97.5	30	18.4	96.7
2002	218	91.7	33	15.1	100.0
2003	219	95.4	25	11.4	100.0
2004	269	93.7	37	13.8	97.3
2005	312	94.6	30	9.6	96.7
2006	316	87.3	27	8.5	100.0
2007	345	67.0	22	6.4	95.5
2008	406	47.5	16	3.9	81.3
2009	406	51.5	32	7.9	100.0
2010	428	50.2	10	2.3	100.0
2011	412	55.6	13	3.2	100.0
2012	384	69.3	11	2.9	90.9
2013	374	98.1	3	0.8	100.0
2014	308	95.8			
1998-2014	4938	76.0	375	7.6	97.3

Table 10b

Annual cohorts of incident cancers and deaths,
and cases deceased the same year of cancer diagnosis

(with respect to registry area expansion from 2.51 to 3.96 m as of 2002,
and from 3.96 to 4.64 m as of 2007, respectively)

Year of diagnosis/ death	Incident cases n	Deaths n	Deaths in same year n	Prop. deaths in same year %
1998	111	17		
1999	128	21		
2000	139	18	1	0.7
2001	163	15		
2002	218	25		
2003	219	39		
2004	269	42		
2005	312	40	2	0.6
2006	316	44	1	0.3
2007	345	33		
2008	406	43		
2009	406	56	2	0.5
2010	428	62	1	0.2
2011	412	66	2	0.5
2012	384	55	4	1.0
2013	374	92		
2014	308	60		
1998-2014	4938	728	13	0.3

Table 10c

Annual cohorts of deaths, and proportion of cancer-related and non-cancer-related deaths

(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.64 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	17	58.8	41.2	50.0
1999	21	61.9	38.1	77.8
2000	18	44.4	55.6	60.0
2001	15	40.0	60.0	54.5
2002	25	44.0	56.0	66.7
2003	39	71.8	28.2	72.2
2004	42	57.1	42.9	65.9
2005	40	57.5	42.5	71.1
2006	44	68.2	31.8	85.0
2007	33	63.6	36.4	75.0
2008	43	51.2	48.8	65.9
2009	56	39.3	60.7	50.0
2010	62	53.2	46.8	73.3
2011	66	43.9	56.1	59.1
2012	55	56.4	43.6	75.9
2013	92	50.0	50.0	60.7
2014	60	55.0	45.0	64.4
1998-2014	728	53.6	46.4	66.4

Table 11

Medians of age at death according to the grouping in Table 10

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	17	77.3	68.1	87.1	68.1
1999	21	72.5	66.7	73.2	73.7
2000	18	79.2	63.3	83.0	76.4
2001	15	75.8	63.1	82.2	63.1
2002	25	75.6	74.8	84.7	73.2
2003	39	69.7	64.4	83.6	64.4
2004	42	73.0	65.6	82.4	66.2
2005	40	79.4	74.2	82.5	78.6
2006	44	75.8	72.2	80.0	73.8
2007	33	72.9	72.9	75.2	71.8
2008	43	79.1	69.6	84.4	71.1
2009	56	79.3	64.8	85.2	70.4
2010	62	75.8	72.4	83.3	73.3
2011	66	76.7	71.7	83.0	72.9
2012	55	79.4	71.1	83.3	78.3
2013	92	76.8	71.0	83.1	71.0
2014	60	76.3	73.2	84.3	74.2
1998-2014	728	76.4	70.3	83.3	72.1

By 2010, life expectancy at birth was 77.5 years for boys and 82.6 years for girls.

Deaths of patients are considered to be cancer-related, in case that fact was recorded on the death certificate, or patients had suffered from metastasis or recurrence.

Table 12

Mortality measures (cancer-related death) and mortality-incidence-index by year of death

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	10	0.9	0.09	0.4	0.07	0.6	0.08	0.7	0.08
1999	13	1.1	0.10	0.5	0.07	0.7	0.08	0.9	0.09
2000	8	0.7	0.06	0.3	0.04	0.5	0.05	0.6	0.05
2001	6	0.5	0.04	0.3	0.03	0.4	0.03	0.4	0.03
2002	11	0.6	0.05	0.3	0.04	0.4	0.04	0.5	0.05
2003	28	1.4	0.13	0.7	0.10	1.0	0.11	1.2	0.12
2004	24	1.2	0.09	0.6	0.08	0.9	0.08	1.0	0.08
2005	23	1.2	0.07	0.5	0.05	0.7	0.06	0.9	0.07
2006	30	1.5	0.10	0.7	0.07	1.0	0.08	1.3	0.09
2007	21	0.9	0.06	0.4	0.05	0.6	0.05	0.8	0.06
2008	22	0.9	0.05	0.4	0.04	0.6	0.04	0.7	0.05
2009	22	0.9	0.05	0.5	0.05	0.7	0.05	0.8	0.05
2010	33	1.4	0.08	0.6	0.06	0.9	0.06	1.1	0.07
2011	29	1.2	0.07	0.5	0.05	0.8	0.05	0.9	0.06
2012	31	1.3	0.08	0.6	0.06	0.8	0.06	1.0	0.07
2013	46	1.9	0.12	0.8	0.08	1.2	0.09	1.5	0.10
2014	33	1.4	0.11	0.5	0.06	0.8	0.07	1.1	0.10
1998-2014	390	1.2	0.08	0.5	0.06	0.8	0.06	0.9	0.07

Statistical Notes

In all tables and figures the respective reference values should be carefully considered. The incidence rates include diagnoses (with multiple primary), and death certificate only (DCO) cases, where applicable. For mortality statistics patients, diagnoses and progressive course of disease are presented. In the calculations, all courses of disease are considered whereby progressions occurred and/or death certificate identified progressive cancers were ascertained. Additionally there are three groups of disease course to consider:

1. **All multiple primaries included**

   The mortality statistic describes the tumor-specific death, independent of any malignancy. The patient perspective, induced secondary malignancies, and the problem of multiple malignancies from the same primary tumor all have reasons for their inclusion.

2. **First singular primary** (no information about other prior or synchronous malignancy)

   The mortality statistic describes the cancer-related death for patients who have no therapeutic restrictions due to a previous or synchronous cancer. These statistics are comparable to studies that have exclusion criteria based on a second malignancy.

3. **Single primary** (no information about other prior, syn- or metachronous malignancy)

   The mortality statistic describes the tumor-specific death that occurs without any impact through secondary primaries, earlier, synchronous, later or induced. Precisely the difference between disease group 1 and 2 highlight the magnitude of the problem of secondary malignancies.

For this reason differences appear concerning official mono-causal mortality statistics. To judge the maximum deviation, 2 further tables are presented. In the first table the distribution of secondary malignancies before, at or after the described cancer are shown, that could be an alternative cause of death. In the second table, the age-specific mortality rates for all courses of disease, without designation of secondary malignancies are shown.

A previously minimally acknowledged statistic is the **age at death**, which allows for a good assessment of the quality of classification of the apparent tumor-specific death. For assumed tumor-independent deaths, the age of death should be estimated from the age of diagnosis and the normal life expectancy, whereas tumor-dependent deaths can be estimated from the age of diagnosis plus the average tumor-specific life expectancy. The comparison of different tumors demonstrates this association, if the causes of cancer and the competing cause of death are independent of each other (e.g. breast and colon versus head/neck and lung).

The index from mortality and incidence (Mortality-Incidence ratio, **MI-index**) is a statistic that allows for the evaluation of the quality of data. For diseases with poor prognoses, comparable values are obtained from all age groups, because to a large extent, the numerator and denominator contain the same cases. For tumors with a good prognosis, increasing and decreasing incidence and age-specific differences in prognosis can more strongly alter the MI- index. Additionally, attention should be paid to the confidence intervals where fewer cases are reported.

The complexity of problems identified here emphasizes the importance of relative survival data for the appropriate analysis of long term results.

As a measurement of the burden of disease, the number of potential life years loss due to premature deaths in a cohort can be calculated (**PYLL**, potential years of life lost, standardized per 100,000 persons or per European standard) as well as the average loss of life years per individual (**AYLL**, average years of life lost). Depending upon the analytic aim (health economy, prevention, health care research) different methods exist for the generation of these measurements. In the results presented here, the age for a premature death is considered to be before 70 years, according to the guidelines of the OECD and the WHO (as seen in the abbreviation PYLL-70 or AYLL-70).

Shortcuts

FRG	Federal Republic of Germany
GEKID	Association of Population-based Cancer Registries in Germany (Gesellschaft der epidemiologischen Krebsregister in Deutschland e.V.)
MCR	Munich Cancer Registry (Tumorregister München)
SEER	Surveillance, Epidemiology, and End Results (USA)
AYLL-70	Average years of life lost prior to age 70 given a person dies before that age
BRD-S	German standard population
DCO	Death certificate only
EAR	Excess absolute risk = excess cancer cases (O - E) per 10,000 person-years
ES	European standard population (old)
LCL	Lower confidence limit
MI-index	Ratio between mortality and incidence
PYLL-70	Potential years of life lost prior to age 70 given a person dies before that age
SIR	Standardized incidence ratio
SMR	Standardized mortality ratio
UCL	Upper confidence limit
WS	World standard population

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