

Munich Cancer Registry



- ▶ Survival
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ICD-10 C50: Breast cancer (women)

Incidence and Mortality

Year of diagnosis	1998-2016
Patients	59,157
Diseases	61,951
Creation date	08/21/2018
Export date	08/09/2018
Population (females)	2.43 m




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<https://www.tumorregister-muenchen.de/en>

https://www.tumorregister-muenchen.de/en/facts/base/bC50f_E-ICD-10-C50-Breast-cancer-women-incidence-and-mortality.pdf

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**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 4.69 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, August 2018

[#] 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 2.65 million to 4.10 in 2002, and to 4.69 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
C50.-	Malignant neoplasm of breast
C50.0	Nipple and areola
C50.1	Central portion of breast
C50.2	Upper-inner quadrant of breast
C50.3	Lower-inner quadrant of breast
C50.4	Upper-outer quadrant of breast
C50.5	Lower-outer quadrant of breast
C50.6	Axillary tail of breast
C50.8	Overlapping lesion of breast
C50.9	Breast, unspecified

Gender: Female

INCIDENCE

Table 1

Cases with invasive cancer by year of diagnosis, proportions of DCO, further malignancies, deaths, and active follow-up (incl. DCO)

Year of diagnosis	All cases n	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	1915	110	5.7	13.5	9.5	57.4	95.3
1999	1955	91	4.7	12.6	9.2	51.8	94.0
2000	1965	82	4.2	13.0	8.9	51.5	95.8
2001	1991	94	4.7	13.2	8.7	48.0	94.2
2002	3371	264	7.8	13.1	8.4	49.7	95.2 #
2003	3149	240	7.6	13.1	8.0	49.6	94.9
2004	3258	194	6.0	13.2	7.6	43.8	93.7
2005	3368	191	5.7	13.3	7.2	42.1	94.1
2006	3324	133	4.0	13.5	6.8	36.9	90.9
2007	3663	186	5.1	13.6	6.4	37.3	72.7 #
2008	4044	168	4.2	13.8	5.9	32.2	60.4
2009	4102	188	4.6	14.0	5.4	31.0	60.8
2010	4009	170	4.2	14.2	4.9	28.4	59.9
2011	3916	166	4.2	14.5	4.5	25.7	59.2
2012	3940	134	3.4	14.7	4.0	22.8	58.8
2013	3861	155	4.0	14.9	3.4	20.0	60.8
2014	3689	146	4.0	15.1	2.9	15.4	73.2
2015	3312	147	4.4	15.4	2.4	12.1	97.6
2016	3119	146	4.7	15.5	1.8	8.1	59.7 ##
1998-2016	61951	3005	4.9	15.5	9.5	32.9	76.9

61,951 cases diagnosed 1998-2016 are related to a total of 59,157 patients. Currently, in 13,654 (23.1 %) of these 59,157 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 11,431 / 1,852 / 371 (19.3 % / 3.1 % / 0.6 %) patients exist having 2 / 3 / 4+ malignancies.

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 retrieved from the respective headings.

How to interpret:

In 2014, a subgroup of 3,689 cases has been diagnosed, of which 15.1 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 2.9 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 2

Incidence measures by year of diagnosis including DCO cases
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.81 m as of 2007, respectively)

Year of diagnosis	Cases n	Incidence raw	Incidence WS	Incidence ES	Incidence BRD-S
1998	1915	162.8	92.8	127.7	144.9
1999	1955	164.8	94.2	129.0	146.5
2000	1965	163.6	91.9	126.8	144.5
2001	1991	163.7	93.8	128.8	146.6
2002	3371	172.2	95.2	131.3	151.3
2003	3149	159.9	86.3	119.4	138.0
2004	3258	164.8	90.7	124.2	142.7
2005	3368	169.3	92.1	126.7	145.2
2006	3324	165.5	90.6	123.7	141.1
2007	3663	158.6	86.0	118.2	135.0
2008	4044	174.3	94.1	129.0	148.4
2009	4102	176.4	95.5	131.1	149.7
2010	4009	171.3	90.6	125.0	143.0
2011	3916	167.5	88.3	121.5	139.5
2012	3940	167.0	87.4	120.3	138.9
2013	3861	161.9	85.0	116.5	134.2
2014	3689	153.2	79.5	109.5	126.2
2015	3312	136.1	70.5	97.1	112.3
2016	3119	127.0	65.2	89.9	104.5
1998-2016	61951	161.5	87.1	119.7	137.4

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

Table 3

Age distribution parameters by year of diagnosis
(incl. DCO)

Year of diagnosis	Cases n	Std.		Min.	Max.	Median				
		Mean	dev.			10%	25%	50%	75%	90%
1998	1915	62.6	13.9	28.4	97.5	45.4	52.9	60.9	72.9	82.7
1999	1955	62.3	14.1	23.9	99.3	43.9	52.5	61.3	73.1	81.4
2000	1965	63.0	14.0	20.4	100	44.7	53.3	61.9	74.0	81.8
2001	1991	62.5	13.9	24.3	97.7	44.4	52.8	61.6	73.0	81.2
2002	3371	64.1	14.3	21.5	99.4	45.3	53.8	63.4	75.0	82.6
2003	3149	64.3	14.5	24.4	105	44.3	54.2	64.0	75.6	83.0
2004	3258	63.8	14.4	18.8	98.9	44.7	53.6	63.9	74.5	83.3
2005	3368	64.2	14.1	21.7	102	45.2	54.8	64.1	74.1	83.2
2006	3324	63.6	14.2	23.3	102	43.9	53.5	64.6	72.9	82.7
2007	3663	64.1	14.4	20.7	103	44.7	53.3	64.8	73.8	83.9
2008	4044	64.0	14.0	21.6	109	44.9	53.7	64.9	73.5	82.6
2009	4102	64.0	13.9	25.0	109	45.3	53.5	64.5	73.5	83.0
2010	4009	64.5	14.1	25.2	105	45.8	53.3	65.2	74.3	83.9
2011	3916	64.4	14.3	21.7	102	45.6	52.8	64.9	74.5	84.0
2012	3940	64.4	14.1	23.9	101	45.7	52.9	64.9	74.9	82.8
2013	3861	64.3	14.5	23.8	108	45.6	52.6	64.8	75.1	83.7
2014	3689	64.7	14.2	21.5	106	46.2	52.7	65.2	75.3	83.3
2015	3312	64.5	14.3	22.7	101	46.2	52.7	65.5	75.6	82.7
2016	3119	64.7	14.5	23.4	103	45.8	52.8	65.9	76.1	82.4
1998-2016	61951	64.0	14.2	18.8	109	45.2	53.2	64.2	74.5	83.0

Table 4

Age distribution by 5-year age group for period 2007-2016
(incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%
0-4			
5-9			
10-14			
15-19			
20-24	14	0.0	0.0
25-29	135	0.4	0.4
30-34	376	1.0	1.4
35-39	884	2.3	3.7
40-44	2014	5.3	9.1
45-49	3402	9.0	18.1
50-54	3992	10.6	28.7
55-59	3630	9.6	38.4
60-64	4376	11.6	50.0
65-69	5151	13.7	63.7
70-74	4406	11.7	75.4
75-79	3758	10.0	85.3
80-84	2575	6.8	92.2
85+	2942	7.8	100.0
All ages	37655	100.0	

Table 5

Age-specific incidence, DCO rate and proportion of all cancers for period 2007-2016

Age at diagnosis Years	Cases n	Age-spec. incidence	DCO rate n=1606 %	Prop. all cancers n=112253 %
0- 4		0.0		
5- 9		0.0		
10-14		0.0		
15-19		0.0		
20-24	14	1.0		3.7
25-29	133	8.5	0.8	15.9
30-34	372	23.3		25.2
35-39	879	55.1	0.7	35.2
40-44	1983	110.7	0.5	43.6
45-49	3327	174.3	0.6	48.4
50-54	3896	227.7	0.5	44.9
55-59	3541	240.9	0.8	37.9
60-64	4268	321.0	1.0	37.8
65-69	5008	385.6	1.3	35.7
70-74	4276	337.8	2.3	28.9
75-79	3619	361.3	4.2	27.1
80-84	2481	350.7	11.1	22.7
85+	2856	389.1	31.1	22.4
All ages	36653		4.4	32.7
Incidence				
Raw		154.8		
WS		82.1		
ES		112.7		
BRD-S		129.5		

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).

ICD-10 C50: Malignant neoplasm of breast (women)

Age distribution and age-specific incidence 2007 - 2016 (n=36653)

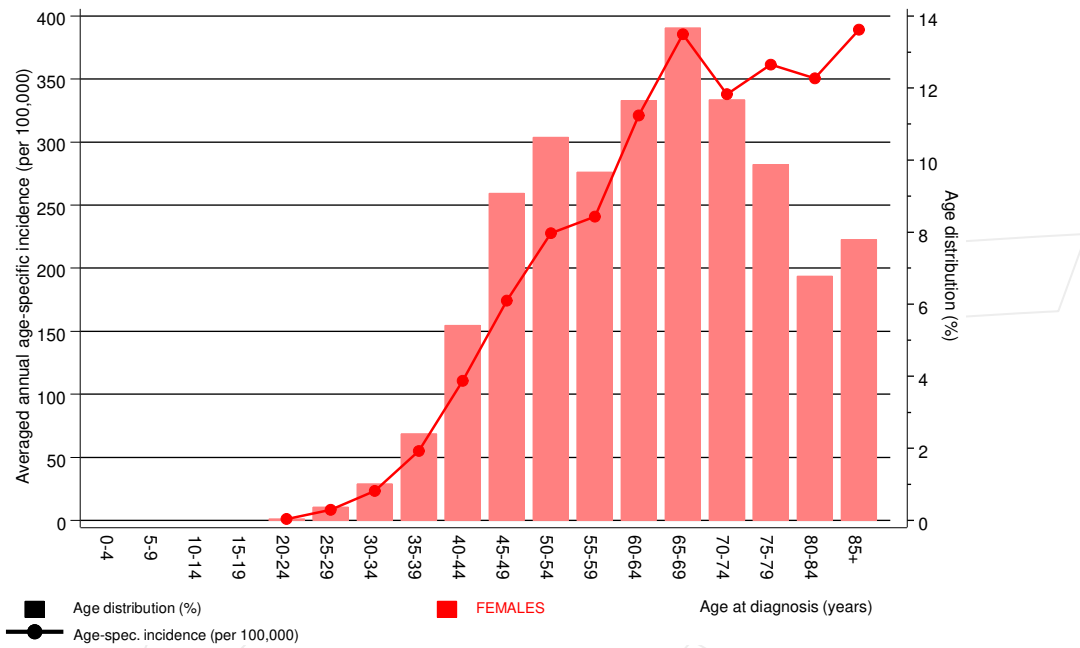


Figure 6. Age distribution (mean=64.3 yrs, median=64.9 yrs) and age-specific incidence.

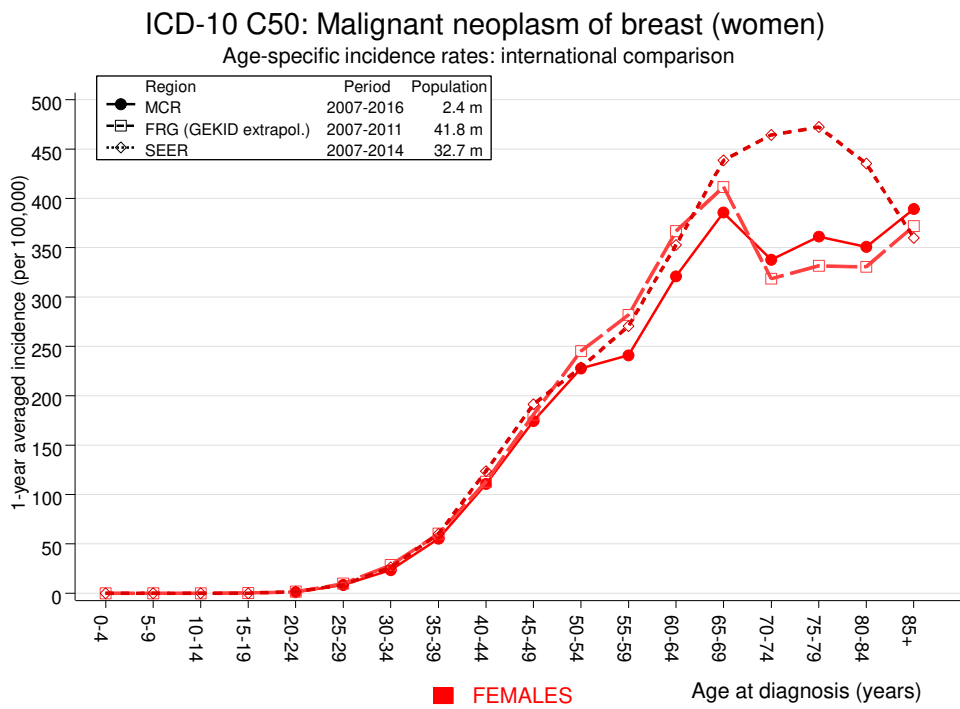


Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Extrapolated age-specific patient population of Germany, data status middle of 2010. Association of Population-based Cancer Registries in Germany (GEKID e.V.). Berlin, 2014. <http://www.gekid.de>. Last access: 02/11/2015
 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>.

Table 7

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of further malignancies for period 1998–2016

Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C03-C06 Oral cavity	27	15.2	1.8	1.2	2.6 #	0.5	
C07-C08 Salivary gland	13	4.0	3.3	1.8	5.6 #	0.4	7.7
C09-C10 Oropharynx	19	11.3	1.7	1.0	2.6 #	0.3	
C15 Oesophagus	38	16.1	2.4	1.7	3.2 #	0.9	13.2
C16 Stomach	186	81.4	2.3	2.0	2.6 #	4.3	9.1
C17 Small intestine	31	12.9	2.4	1.6	3.4 #	0.7	
C18 Colon	404	228.8	1.8	1.6	1.9 #	7.2	7.7
C19-C20 Rectum	159	99.4	1.6	1.4	1.9 #	2.4	6.9
C21 Anus/canal	28	13.7	2.0	1.4	3.0 #	0.6	3.6
C22 Liver	45	29.1	1.5	1.1	2.1 #	0.7	28.9
C23-C24 Bile	51	33.0	1.5	1.2	2.0 #	0.7	17.6
C25 Pancreas	220	106.9	2.1	1.8	2.3 #	4.6	24.5
C26 GI cancer	10	4.0	2.5	1.2	4.6 #	0.2	50.0
C30-C31 Sinuses	9	3.4	2.7	1.2	5.1 #	0.2	11.1
C33-C34 Lung	406	188.7	2.2	1.9	2.4 #	8.9	13.3
C43 Malign. melanoma	209	98.1	2.1	1.9	2.4 #	4.5	2.4
C46,C49 Soft tissue	51	14.2	3.6	2.7	4.7 #	1.5	3.9
C48 Peritoneal	20	9.7	2.1	1.3	3.2 #	0.4	
C50 Breast	2738	793.9	3.4	3.3	3.6 #	79.7	
C51 Vulva	55	24.1	2.3	1.7	3.0 #	1.3	1.8
C52 Vagina	9	4.5	2.0	0.9	3.8 #	0.2	11.1
C53 Cervix uteri	63	35.8	1.8	1.4	2.3 #	1.1	12.7
C54 Corpus uteri	305	139.7	2.2	1.9	2.4 #	6.8	2.0
C55,C57 Fem. genitals un	10	5.1	2.0	0.9	3.6 #	0.2	40.0
C56 Ovary	223	101.5	2.2	1.9	2.5 #	5.0	7.6
C64 Kidney	130	59.1	2.2	1.8	2.6 #	2.9	6.9
C65 Renal pelvis	14	7.4	1.9	1.0	3.2 #	0.3	
C67 Bladder	79	44.1	1.8	1.4	2.2 #	1.4	7.6
C70-C72 CNS cancer	49	34.0	1.4	1.1	1.9 #	0.6	16.3
C73 Thyroid	84	48.2	1.7	1.4	2.2 #	1.5	3.6
C76-C79 CUP	42	42.6	1.0	0.7	1.3 #	-0.0	4.8
C81 Hodgkin lymphoma	11	4.7	2.3	1.2	4.2 #	0.3	9.1
C82-C85 NHL	169	94.5	1.8	1.5	2.1 #	3.1	3.6
C90 Mult. myeloma	52	29.6	1.8	1.3	2.3 #	0.9	17.3
C91-C96 Leukaemia	115	38.4	3.0	2.5	3.6 #	3.1	12.2
Others, specified	59	35.6	1.7	1.3	2.1 #	1.0	3.4
Not observed	0	1.5	0.0	0.0	2.4 #	-0.1	
All further malignancies	6133	2514.0	2.4	2.4	2.5 #	148.4	5.0
Patients		53793					
Median age at next malignancy (years)		69.7					
Person-years		243945					
Mean observation time (years)		4.5					
Median observation time (years)		3.2					

The occurrence of further malignancy listed is statistically significant.

Observed further malignancies with count 1 to 7 are pooled in category "Others, specified".

Average incidence (world standard population) 2007 - 2016

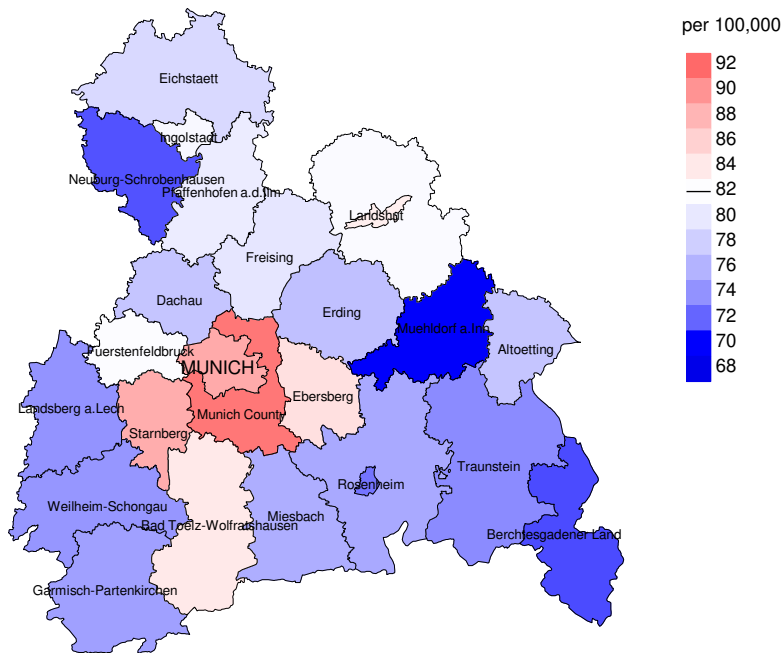


Figure 8a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (82.1/100,000 WS N=36,653).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 1,052 women were identified with newly diagnosed breast cancer (women). Therefore, the mean incidence rate for this cancer type in this area can be calculated at 84.7/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 77.6 and 92.3/100,000.

Standardized incidence ratio (SIR) 2007 - 2016

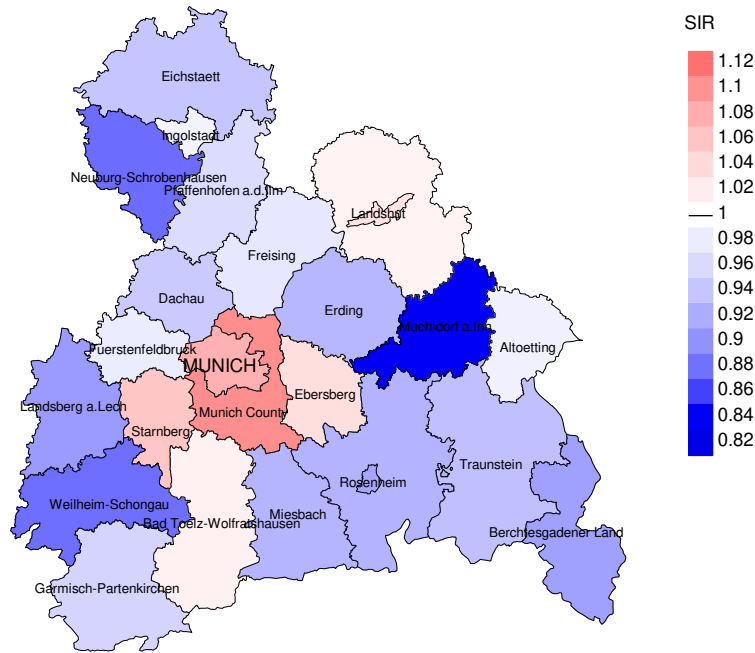


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (N=36,653).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 1,052 women were identified with newly diagnosed breast cancer (women). Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.04. Though, the value of this parameter may vary with an underlying probability of 99% between 0.96 and 1.12, and is therefore not statistically striking.

MORTALITY

Table 9a

Annual cohorts: Incident cancers, follow-up status, proportion of DCO, deaths among the annual cohorts and proportion of available death certificates (with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.81 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Prop. DCO %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	1915	95.3	5.7	1099	57.4	93.9
1999	1955	94.0	4.7	1013	51.8	95.2
2000	1965	95.8	4.2	1012	51.5	97.2
2001	1991	94.2	4.7	956	48.0	96.1
2002	3371	95.2	7.8	1675	49.7	97.9
2003	3149	94.9	7.6	1563	49.6	97.1
2004	3258	93.7	6.0	1426	43.8	97.7
2005	3368	94.1	5.7	1419	42.1	98.0
2006	3324	90.9	4.0	1227	36.9	98.0
2007	3663	72.7	5.1	1368	37.3	97.0
2008	4044	60.4	4.2	1301	32.2	97.6
2009	4102	60.8	4.6	1272	31.0	97.7
2010	4009	59.9	4.2	1138	28.4	97.6
2011	3916	59.2	4.2	1006	25.7	97.8
2012	3940	58.8	3.4	897	22.8	95.5
2013	3861	60.8	4.0	773	20.0	96.5
2014	3689	73.2	4.0	569	15.4	94.2
2015	3312	97.6	4.4	401	12.1	94.0
2016	3119	59.7	4.7	254	8.1	85.4
1998-2016	61951	76.9	4.9	20369	32.9	96.8

Table 9b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased within the same year of being diagnosed with cancer (incl. DCO)

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.81 m as of 2007, respectively)

Year of diagnosis/ death	Incident cases n	Deaths n	Prop. deaths with death certific. %	Deaths in same year n	Prop. deaths in same year %
1998	1915	818	87.2	156	8.1
1999	1955	813	87.8	120	6.1
2000	1965	838	90.5	123	6.3
2001	1991	828	90.8	122	6.1
2002	3371	1246	96.9	334	9.9
2003	3149	1377	97.2	304	9.7
2004	3258	1410	97.7	265	8.1
2005	3368	1448	97.0	275	8.2
2006	3324	1412	97.3	227	6.8
2007	3663	1578	98.0	266	7.3
2008	4044	1658	98.4	301	7.4
2009	4102	1652	98.4	250	6.1
2010	4009	1735	98.4	265	6.6
2011	3916	1830	99.0	273	7.0
2012	3940	1824	98.2	240	6.1
2013	3861	1922	98.6	266	6.9
2014	3689	1856	98.2	250	6.8
2015	3312	1980	98.6	250	7.5
2016	3119	1758	97.7	224	7.2
1998-2016	61951	27983	97.0	4511	7.3

Table 9c

Annual cohorts of deaths, proportion of cancer-related and non-cancer-related deaths, and cancer recorded on death certificates
(incl. DCO)

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.81 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer- related %	Prop. non-cancer- related %	Prop. cancer recorded on death certificate %
1998	818	69.4	30.6	84.4
1999	813	71.3	28.7	86.7
2000	838	70.8	29.2	83.1
2001	828	67.3	32.7	83.2
2002	1246	72.1	27.9	86.4
2003	1377	70.1	29.9	84.6
2004	1410	75.8	24.2	85.9
2005	1448	69.6	30.4	81.5
2006	1412	72.2	27.8	83.7
2007	1578	69.6	30.4	81.4
2008	1658	69.1	30.9	80.4
2009	1652	68.2	31.8	79.2
2010	1735	68.7	31.3	80.2
2011	1830	67.8	32.2	80.3
2012	1824	66.8	33.2	78.8
2013	1922	63.6	36.4	76.0
2014	1856	64.5	35.5	77.1
2015	1980	63.5	36.5	75.7
2016	1758	63.4	36.6	77.2
1998-2016	27983	68.1	31.9	80.6

Table 10

Medians of age at death according to the grouping in Table 9

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	818	76.4	72.9	83.5	76.0
1999	813	75.5	71.1	84.3	75.1
2000	838	76.3	71.2	85.1	74.9
2001	828	75.9	69.6	83.6	73.6
2002	1246	76.9	71.0	85.6	75.5
2003	1377	75.7	69.7	84.7	72.8
2004	1410	76.7	71.7	84.7	74.2
2005	1448	76.9	70.6	85.0	74.0
2006	1412	77.2	71.5	85.5	74.2
2007	1578	77.6	71.0	85.7	73.1
2008	1658	78.7	72.6	86.1	75.2
2009	1652	78.8	72.6	86.0	74.8
2010	1735	78.6	73.4	86.0	75.5
2011	1830	79.0	73.9	86.4	75.6
2012	1824	78.2	73.3	87.0	75.0
2013	1922	79.1	74.4	86.2	76.4
2014	1856	80.0	75.0	87.3	77.2
2015	1980	79.6	76.0	86.2	77.2
2016	1758	79.3	75.4	86.6	77.3
1998-2016	27983	78.0	73.1	85.9	75.5

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 11

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	569	48.4	0.30	21.9	0.24	32.3	0.26	40.7	0.29
1999	581	49.0	0.30	22.9	0.25	33.4	0.27	41.4	0.29
2000	594	49.5	0.31	22.9	0.25	33.5	0.27	41.5	0.29
2001	558	45.9	0.29	21.7	0.24	31.5	0.25	38.8	0.27
2002	898	45.9	0.27	20.7	0.22	30.3	0.24	37.6	0.25
2003	967	49.1	0.31	23.0	0.27	33.4	0.29	40.9	0.30
2004	1069	54.1	0.34	23.9	0.27	35.2	0.29	44.0	0.32
2005	1009	50.7	0.31	22.9	0.26	33.4	0.27	41.3	0.29
2006	1020	50.8	0.32	22.2	0.25	32.6	0.27	41.0	0.30
2007	1103	47.8	0.31	20.9	0.25	30.6	0.26	38.1	0.29
2008	1149	49.5	0.29	20.5	0.22	30.3	0.24	38.4	0.27
2009	1128	48.5	0.28	20.5	0.22	30.2	0.24	37.8	0.26
2010	1193	51.0	0.31	20.6	0.23	30.6	0.25	39.1	0.28
2011	1242	53.1	0.33	21.1	0.25	31.4	0.27	39.7	0.29
2012	1220	51.7	0.32	20.7	0.24	30.8	0.26	38.9	0.29
2013	1222	51.3	0.32	19.8	0.24	29.7	0.26	38.2	0.29
2014	1197	49.7	0.33	18.6	0.24	28.0	0.26	36.3	0.30
2015	1259	51.7	0.39	18.5	0.27	28.3	0.30	37.5	0.34
2016	1117	45.5	0.37	17.5	0.28	26.0	0.30	33.4	0.33
1998-2016	19095	49.8	0.32	20.8	0.25	30.8	0.26	38.9	0.29

Table 12

Age distribution of age at death (cancer-related) for period 2007-2016
(incl. multiple malignancies)

Age at death Years	Cases n	%	Cum.%
0-4			
5-9			
10-14			
15-19			
20-24			
25-29	9	0.1	0.1
30-34	36	0.3	0.4
35-39	98	0.8	1.2
40-44	233	2.0	3.2
45-49	437	3.7	6.9
50-54	606	5.1	12.0
55-59	806	6.8	18.8
60-64	1009	8.5	27.3
65-69	1332	11.3	38.6
70-74	1707	14.4	53.0
75-79	1682	14.2	67.2
80-84	1610	13.6	80.9
85+	2265	19.1	100.0
All ages	11830	100.0	

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2016
(incl. multiple malignancies)

Age at death Years	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4		0.0		
5- 9		0.0		
10-14		0.0		
15-19		0.0		
20-24		0.0		
25-29	9	0.6	0.07	12.3
30-34	36	2.3	0.10	30.0
35-39	98	6.1	0.11	34.4
40-44	233	13.0	0.12	34.7
45-49	437	22.9	0.13	33.4
50-54	606	35.4	0.16	30.7
55-59	806	54.8	0.23	28.3
60-64	1009	75.9	0.24	26.9
65-69	1332	102.6	0.27	25.0
70-74	1707	134.9	0.40	25.2
75-79	1682	167.9	0.46	24.0
80-84	1610	227.6	0.65	23.6
85+	2265	308.6	0.79	24.5
All ages	11830			25.5
Mortality				
Raw		50.0	0.32	
WS		19.8	0.24	
ES		29.6	0.26	
BRD-S		37.7	0.29	
PYLL-70				
per 100,000		264.1		
ES		221.4		
AYLL-70		11.5		

Table 14

Further malignancies in deaths in period 1998–2016

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C15 Oesophagus	73	1.0	6	8.2	5	6.8	62	84.9
C16 Stomach	314	4.1	64	20.4	20	6.4	230	73.2
C18 Colon	604	7.9	163	27.0	43	7.1	398	65.9
C19–C20 Rectum	257	3.4	71	27.6	18	7.0	168	65.4
C22 Liver	72	0.9	5	6.9	4	5.6	63	87.5
C23–C24 Bile	82	1.1	2	2.4	3	3.7	77	93.9
C25 Pancreas	367	4.8	18	4.9	21	5.7	328	89.4
C33–C34 Lung	666	8.7	59	8.9	48	7.2	559	83.9
C43 Malign. melanoma	224	2.9	102	45.5	11	4.9	111	49.6
C44 Skin others	293	3.8	88	30.0	28	9.6	177	60.4
C50 Breast	2066	27.1			690	33.4	1376	66.6
C53 Cervix uteri	141	1.9	82	58.2	11	7.8	48	34.0
C54 Corpus uteri	436	5.7	158	36.2	39	8.9	239	54.8
C56 Ovary	442	5.8	98	22.2	38	8.6	306	69.2
C64 Kidney	167	2.2	64	38.3	19	11.4	84	50.3
C67 Bladder	136	1.8	32	23.5	7	5.1	97	71.3
C70–C72 CNS cancer	97	1.3	11	11.3	9	9.3	77	79.4
C73 Thyroid	106	1.4	56	52.8	1	0.9	49	46.2
C76–C79 CUP	117	1.5	36	30.8	7	6.0	74	63.2
C82–C85 NHL	234	3.1	69	29.5	26	11.1	139	59.4
C90 Mult. myeloma	83	1.1	10	12.0	5	6.0	68	81.9
C91–C96 Leukaemia	142	1.9	14	9.9	6	4.2	122	85.9
Others, specified	498	6.5	132	26.5	26	5.2	340	68.3
All further malignancies	7617	100.0	1340	17.6	1085	14.2	5192	68.2

Further malignancies with number of cases 1 to 68 are pooled in category “Others, specified”.

ICD-10 C44 (Other malignant neoplasms of skin) is not systematically recorded by MCR and therefore not considered for evaluation as a particular primary but at least as a further malignancy.

Table 15

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2016
(**First primaries only ***)

Age at death Years	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4		0.0		
5- 9		0.0		
10-14		0.0		
15-19		0.0		
20-24		0.0		
25-29	9	0.6	0.07	13.4
30-34	29	1.8	0.08	27.4
35-39	89	5.6	0.11	34.6
40-44	195	10.9	0.11	32.8
45-49	368	19.3	0.12	32.5
50-54	492	28.8	0.14	29.3
55-59	636	43.3	0.21	26.6
60-64	804	60.5	0.23	26.2
65-69	1069	82.3	0.27	25.3
70-74	1331	105.2	0.41	25.1
75-79	1311	130.9	0.49	24.2
80-84	1227	173.4	0.66	23.0
85+	1741	237.2	0.79	23.7
All ages	9301			25.1
Mortality				
Raw		39.3	0.31	
WS		15.8	0.23	
ES		23.5	0.25	
BRD-S		29.8	0.28	
PYLL-70				
per 100,000		216.7		
ES		181.8		
AYLL-70		11.7		

* See corresponding tables with multiple malignancies.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2016
(**Single primaries only ***)

Age at death Years	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4		0.0		
5- 9		0.0		
10-14		0.0		
15-19		0.0		
20-24		0.0		
25-29	9	0.6	0.08	13.8
30-34	26	1.6	0.08	25.0
35-39	86	5.4	0.11	34.0
40-44	192	10.7	0.11	32.5
45-49	347	18.2	0.12	31.0
50-54	444	25.9	0.14	26.9
55-59	564	38.4	0.20	23.9
60-64	656	49.3	0.20	21.8
65-69	807	62.1	0.22	19.5
70-74	968	76.5	0.33	18.8
75-79	955	95.4	0.39	18.1
80-84	893	126.2	0.51	17.4
85+	1334	181.8	0.63	19.0
All ages	7281			20.3
Mortality				
Raw		30.8	0.26	
WS		12.9	0.20	
ES		18.9	0.21	
BRD-S		23.6	0.23	
PYLL-70				
per 100,000		195.3		
ES		164.3		
AYLL-70		12.5		

* See corresponding tables with multiple malignancies.

ICD-10 C50: Malignant neoplasm of breast (women)
Age distribution and age-specific mortality 2007 - 2016 (n=11830)

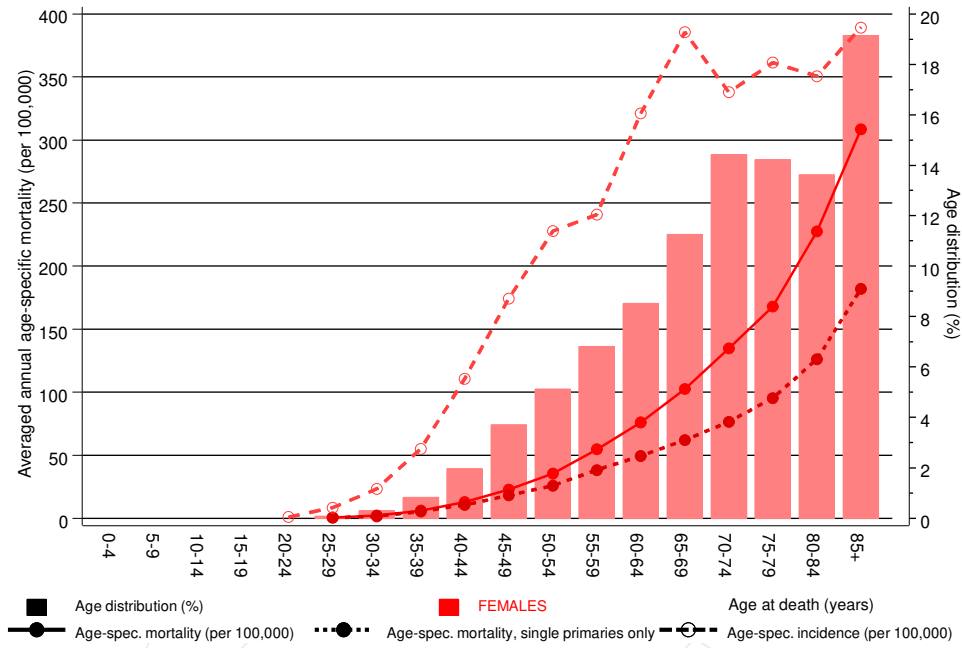


Figure 17. Distribution of age at death (bars; n=mean=65.2 yrs, median=65.7 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

The difference between age at diagnosis (Table 3) and age at breast cancer (women)-related death (see Table 10) should be considered.

Average mortality (world standard population) 2007 - 2016

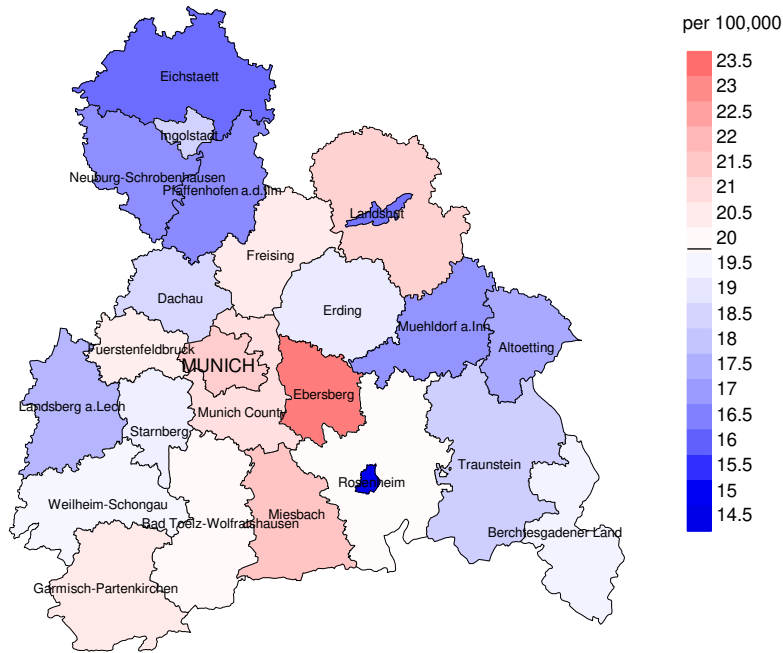


Figure 18a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2016. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (19.8/100,000 WS N=11,830).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 373 women died from breast cancer (women). Therefore, the mean mortality rate for this cancer type in this area can be calculated at 23.2/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 19.8 and 27.1/100,000.

Standardized mortality ratio (SMR) 2007 - 2016

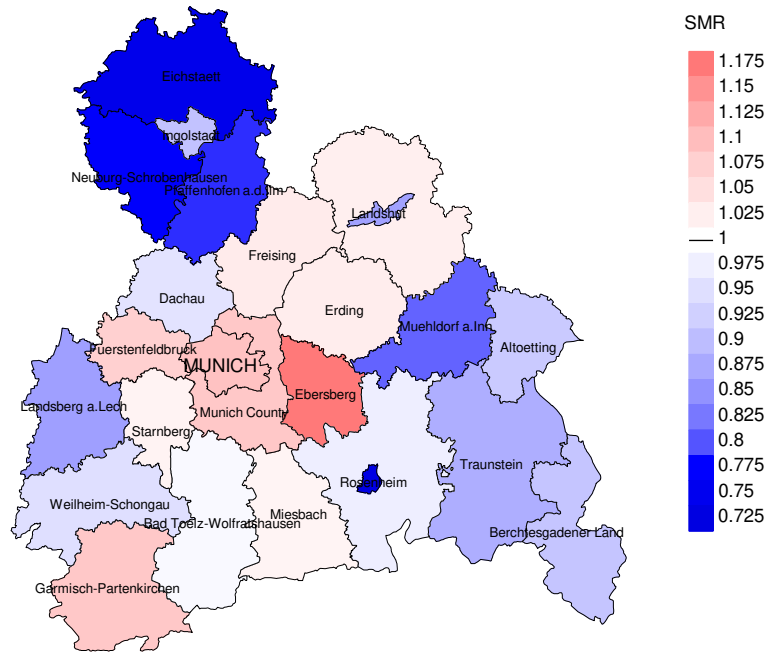


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (N=11,830).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 373 women died from breast cancer (women). Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.17. Though, the value of this parameter may vary with an underlying probability of 99% between 1.02 and 1.34, and is therefore not statistically striking.

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

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

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