Munich Cancer Registry

- Survival
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ICD-10 C56: Ovarian cancer

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	6,430
Diseases	6,432
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/bC56__E-ICD-10-C56-Ovarian-cancer-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
C56	Malignant neoplasm of ovary

... if not existing any of ...

Topography codes (ICD-O-3 2000) used for specifying cancer site

Code	Description
C48.-	Retroperitoneum and peritoneum
C49.-	Connective, subcutaneous and other soft tissues
C57.0	Other and unspecified female genital organs: Fallopian tube

Extra-ovarian carcinomas are additionally excluded by internal coding.

INCIDENCE

Table 1

All patients with invasive cancer by year of diagnosis, proportions of DCO, multiple primaries, deaths, and active follow-up (incl. DCO)

Year of diagnosis	Cases n	DCO cases n	Prop. DCO %	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %	
1998	276	36	13.0	18.1	81.5	99.3	
1999	258	25	9.7	21.3	77.9	98.8	
2000	262	32	12.2	24.4	75.6	98.5	
2001	233	34	14.6	22.7	74.2	98.3	
2002	431	74	17.2	29.5	80.0	98.8	#
2003	445	73	16.4	23.6	76.0	98.0	
2004	386	59	15.3	24.1	78.8	96.4	
2005	363	47	12.9	24.0	77.1	96.7	
2006	405	42	10.4	22.0	74.3	97.5	
2007	488	68	13.9	25.4	70.5	89.8	#
2008	493	62	12.6	20.9	66.9	83.8	
2009	400	44	11.0	22.3	62.3	81.0	
2010	442	55	12.4	27.1	61.1	83.9	
2011	417	53	12.7	24.0	58.0	82.3	
2012	402	36	9.0	23.4	49.0	82.3	
2013	423	46	10.9	21.7	38.8	99.1	
2014	308	44	14.3	23.7	26.0	94.5	##
1998-2014	6432	830	12.9	23.6	65.9	92.1	

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 including DCO cases
(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	276	23.5	12.8	17.5	20.8
1999	258	21.7	10.8	15.4	18.8
2000	262	21.8	11.1	15.7	18.9
2001	233	19.2	10.2	13.9	16.5
2002	431	22.0	10.9	15.4	18.9
2003	445	22.6	11.5	16.1	19.4
2004	386	19.5	10.1	14.0	16.8
2005	363	18.2	8.8	12.4	15.1
2006	405	20.2	9.8	13.8	16.8
2007	488	21.1	10.2	14.5	17.5
2008	493	21.2	10.6	14.8	17.9
2009	400	17.2	8.2	11.6	14.3
2010	442	18.9	8.9	12.7	15.3
2011	417	17.7	8.5	12.0	14.6
2012	402	17.0	8.2	11.3	13.8
2013	423	17.9	9.1	12.5	14.9
2014	308	13.1	6.5	9.1	10.7
1998-2014	6432	19.2	9.5	13.3	16.1

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

Table 3

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	276	64.7	16.1	14.6	92.1	43.5	55.2	65.9	76.9	84.9
1999	258	67.2	14.2	16.5	96.5	49.4	58.3	67.6	78.2	85.1
2000	262	66.8	14.2	19.9	94.8	48.2	57.4	66.4	78.8	85.3
2001	233	64.9	15.6	26.3	98.8	42.6	55.5	65.5	76.7	85.4
2002	431	67.3	14.2	13.2	96.6	48.5	59.0	68.2	78.2	83.2
2003	445	66.5	14.9	7.6	95.3	46.7	56.8	67.4	78.1	83.5
2004	386	66.2	15.1	15.9	97.3	45.6	56.5	66.6	78.0	84.4
2005	363	67.4	14.9	19.2	96.4	45.5	57.6	68.1	79.7	84.9
2006	405	67.6	14.4	24.9	95.8	45.8	57.9	68.9	79.0	84.6
2007	488	68.0	14.4	18.3	98.1	48.1	58.4	69.4	79.2	85.8
2008	493	66.9	15.0	11.1	102	46.5	58.1	68.5	78.4	84.9
2009	400	67.4	14.9	11.2	97.6	46.7	56.8	69.4	78.7	84.5
2010	442	68.2	14.5	17.0	98.5	49.2	58.6	69.3	78.4	86.7
2011	417	67.7	13.6	4.1	94.5	50.2	59.3	69.4	77.5	83.8
2012	402	67.7	15.4	5.4	95.9	47.2	58.4	70.0	79.2	85.3
2013	423	66.7	15.1	9.1	100	48.2	57.4	68.9	77.2	84.6
2014	308	66.1	15.7	16.2	96.8	45.3	55.2	68.7	76.2	85.5
1998–2014	6432	67.0	14.8	4.1	102	47.2	57.7	68.3	78.3	84.8

Table 4

Age distribution by 5-year age group for period 2007-2014
(incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%
0-4	1	0.0	0.0
5-9	2	0.1	0.1
10-14	6	0.2	0.3
15-19	18	0.5	0.8
20-24	12	0.4	1.2
25-29	17	0.5	1.7
30-34	31	0.9	2.6
35-39	51	1.5	4.1
40-44	108	3.2	7.3
45-49	165	4.9	12.2
50-54	259	7.7	19.9
55-59	305	9.0	28.9
60-64	349	10.3	39.3
65-69	446	13.2	52.5
70-74	466	13.8	66.3
75-79	416	12.3	78.6
80-84	380	11.3	89.9
85+	341	10.1	100.0
All ages	3373	100.0	

Included in the statistics are 28.0% multiple primaries.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers for period 2007-2014

Age at diagnosis Years	Cases n	Age-spec. incidence	DCO rate n=408 %	Prop. all cancers n=89596 %
0- 4	1	0.1		0.7
5- 9	2	0.2		2.6
10-14	6	0.7		6.7
15-19	18	2.0		10.9
20-24	12	1.1		3.9
25-29	17	1.4	5.9	2.6
30-34	31	2.5		2.7
35-39	51	4.0		2.6
40-44	108	7.1	3.7	2.9
45-49	165	10.9	3.0	3.0
50-54	259	20.2	1.9	3.8
55-59	305	27.1	4.9	4.1
60-64	349	32.9	4.0	3.8
65-69	446	42.7	6.3	3.9
70-74	466	44.6	9.4	3.9
75-79	416	58.3	11.8	4.1
80-84	380	67.8	23.2	4.3
85+	341	59.0	45.5	3.3
All ages	3373		12.1	3.8
Incidence				
Raw		18.0		
WS		8.7		
ES		12.3		
BRD-S		14.9		

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).

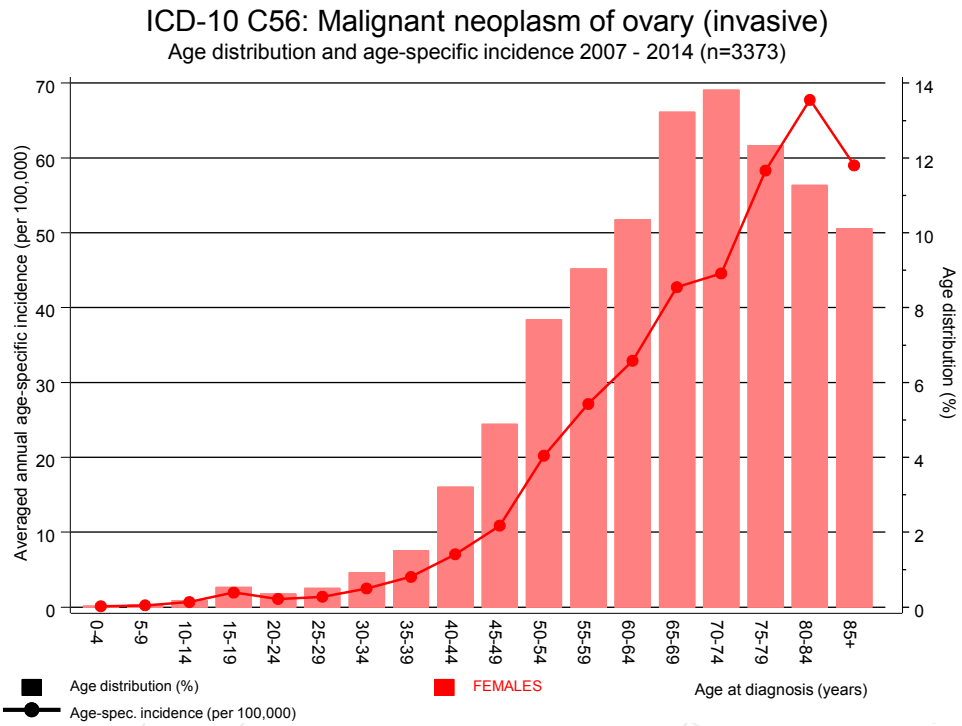

Figure 6. Age distribution and age-specific incidence

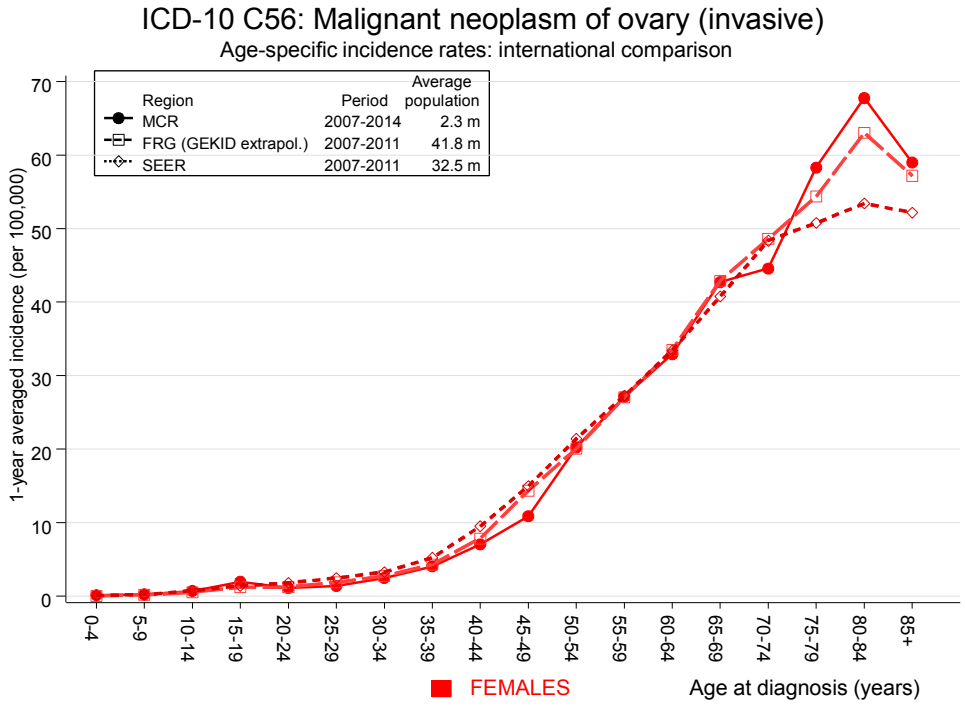

Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

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.

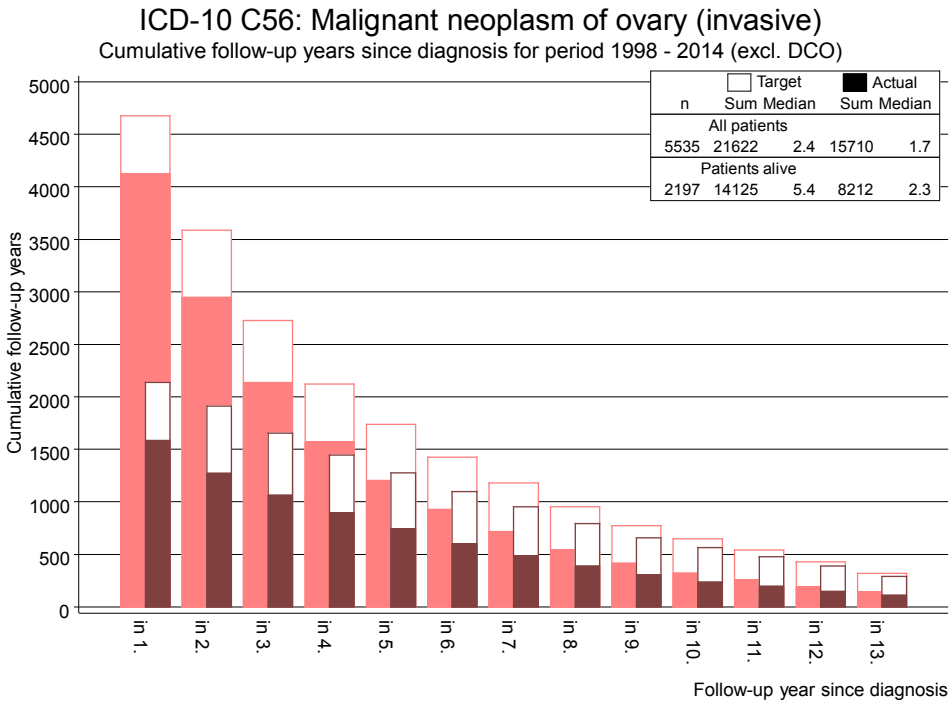

Figure 7. Cumulative follow-up years depending on time since diagnosis

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 %
C03-C06	Oral cavity	2	1.0	2.1	0.3	7.5		0.7	
C15	Oesophagus	2	0.9	2.1	0.3	7.7		0.7	50.0
C16	Stomach	19	5.2	3.7	2.2	5.7	#	8.8	10.5
C17	Small intestine	8	0.8	10.6	4.6	20.9	#	4.6	
C18	Colon	54	14.6	3.7	2.8	4.8	#	25.1	20.4
C19-C20	Rectum	13	6.5	2.0	1.1	3.4	#	4.1	7.7
C22	Liver	3	1.7	1.7	0.4	5.0		0.8	33.3
C23-C24	Bile	5	2.1	2.4	0.8	5.6		1.9	40.0
C25	Pancreas	13	6.4	2.0	1.1	3.5	#	4.2	46.2
C33-C34	Lung	21	11.5	1.8	1.1	2.8	#	6.1	23.8
C43	Malign. melanoma	5	6.0	0.8	0.3	1.9		-0.6	
C46,C49	Soft tissue	2	0.9	2.3	0.3	8.1		0.7	
C48	Peritoneal	8	0.6	13.3	5.7	26.2	#	4.7	
C50	Breast	131	50.1	2.6	2.2	3.1	#	51.5	5.3
C51	Vulva	7	1.5	4.8	1.9	9.9	#	3.5	14.3
C53	Cervix uteri	12	2.3	5.2	2.7	9.1	#	6.2	16.7
C54	Corpus uteri	161	9.0	17.9	15.2	20.9	#	96.8	5.6
C55,C57	Fem. genitals un	2	0.3	6.4	0.8	23.2		1.1	
C56	Ovary	5	6.6	0.8	0.2	1.8		-1.0	
C64	Kidney	9	3.9	2.3	1.1	4.4	#	3.3	
C65	Renal pelvis	2	0.5	4.3	0.5	15.6		1.0	
C67	Bladder	6	2.7	2.2	0.8	4.9		2.1	
C70-C72	CNS cancer	3	2.2	1.4	0.3	4.0		0.5	
C73	Thyroid	9	3.1	2.9	1.3	5.5	#	3.8	11.1
C76-C79	CUP	7	2.6	2.7	1.1	5.6	#	2.8	42.9
C82-C85	NHL	13	5.9	2.2	1.2	3.8	#	4.5	7.7
C90	Mult. myeloma	6	1.8	3.2	1.2	7.1	#	2.6	16.7
C91-C96	Leukaemia	4	2.4	1.7	0.5	4.3		1.0	25.0
Other primaries		5	1.8	2.7	0.9	6.4		2.0	20.0
Not observed		0	3.4	0.0	0.0	1.1		-2.1	
All mult. primaries		537	158.2	3.4	3.1	3.7	#	241.3	10.4

Patients	5788
Median age at second malignancy (years)	68.2
Person-years	15702
Mean observation time (years)	2.7
Median observation time (years)	1.5

The occurrence of second malignancy is statistically significant.

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

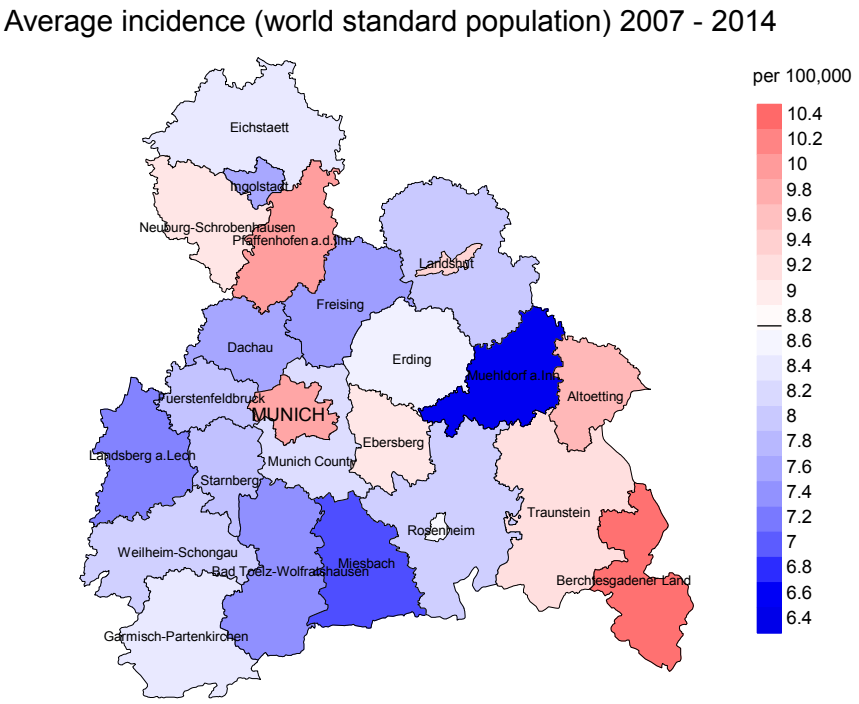

Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (8.7/100,000 WS N=3,373).

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 99 women were identified with newly diagnosed ovarian cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 9.1/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 6.7 and 12.2/100,000.

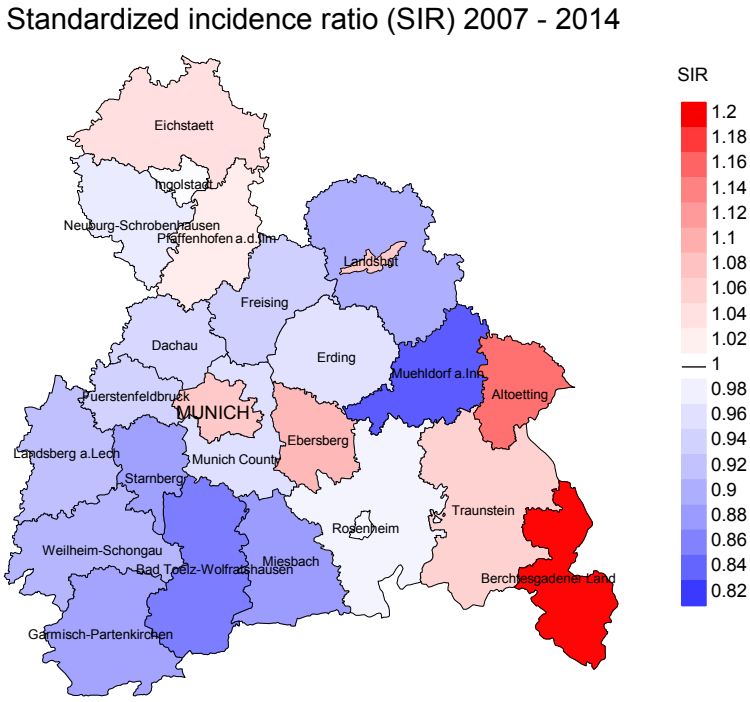

Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=3,373).

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 99 women were identified with newly diagnosed ovarian cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.09. Though, the value of this parameter may vary with an underlying probability of 99% between 0.83 and 1.41, and is therefore not statistically striking.

MORTALITY

Table 10a

Patient cohorts of incident cancers by year of diagnosis, follow-up status, proportion of DCO, deaths among the annual cohorts and proportion of available death certificates (with respect to registry area expansion from 2.51 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 %	Prop. DCO %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	276	99.3	13.0	225	81.5	88.4
1999	258	98.8	9.7	201	77.9	95.0
2000	262	98.5	12.2	198	75.6	94.4
2001	233	98.3	14.6	173	74.2	98.3
2002	431	98.8	17.2	345	80.0	97.4
2003	445	98.0	16.4	338	76.0	97.6
2004	386	96.4	15.3	304	78.8	98.4
2005	363	96.7	12.9	280	77.1	98.9
2006	405	97.5	10.4	301	74.3	98.0
2007	488	89.8	13.9	344	70.5	98.5
2008	493	83.8	12.6	330	66.9	97.3
2009	400	81.0	11.0	249	62.3	98.4
2010	442	83.9	12.4	270	61.1	98.1
2011	417	82.3	12.7	242	58.0	97.5
2012	402	82.3	9.0	197	49.0	97.5
2013	423	99.1	10.9	164	38.8	96.3
2014	308	94.5	14.3	80	26.0	96.3
1998-2014	6432	92.1	12.9	4241	65.9	97.1

Table 10b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased the same year of cancer diagnosis
(incl. DCO)
(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	Prop. deaths with death certific. %	Deaths in same year n	Prop. deaths in same year %
1998	276	186	87.6	65	23.6
1999	258	191	86.9	56	21.7
2000	262	177	90.4	59	22.5
2001	233	201	93.5	56	24.0
2002	431	313	96.5	135	31.3
2003	445	295	99.0	117	26.3
2004	386	291	98.3	104	26.9
2005	363	306	98.0	89	24.5
2006	405	287	96.2	101	24.9
2007	488	332	98.8	120	24.6
2008	493	356	100.0	121	24.5
2009	400	358	99.4	94	23.5
2010	442	354	98.6	118	26.7
2011	417	334	96.7	105	25.2
2012	402	289	96.5	83	20.6
2013	423	368	98.4	101	23.9
2014	308	274	99.3	74	24.0
1998-2014	6432	4912	96.9	1598	24.8

Table 10c

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 2.51 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	186	79.6	20.4	94.5
1999	191	82.2	17.8	93.4
2000	177	89.3	10.7	95.0
2001	201	88.1	11.9	93.6
2002	313	87.2	12.8	94.4
2003	295	88.8	11.2	92.8
2004	291	90.4	9.6	93.4
2005	306	92.2	7.8	95.0
2006	287	86.8	13.2	94.9
2007	332	90.7	9.3	93.9
2008	356	93.0	7.0	95.2
2009	358	88.8	11.2	93.5
2010	354	93.8	6.2	96.3
2011	334	87.1	12.9	92.3
2012	289	86.9	13.1	93.5
2013	368	88.0	12.0	91.4
2014	274	88.3	11.7	92.6
1998-2014	4912	88.7	11.3	93.8

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	186	74.6	73.4	79.8	74.7
1999	191	74.3	72.0	79.7	75.2
2000	177	72.9	73.0	70.8	73.7
2001	201	73.1	70.1	86.6	72.0
2002	313	73.7	72.5	82.9	73.1
2003	295	74.3	73.2	84.3	73.3
2004	291	73.7	73.2	83.0	73.3
2005	306	73.6	72.0	84.2	72.7
2006	287	74.6	73.3	82.9	74.0
2007	332	75.8	74.1	83.9	75.0
2008	356	74.6	74.0	87.7	74.2
2009	358	72.7	71.9	81.0	72.1
2010	354	75.0	74.8	85.1	74.9
2011	334	73.1	71.9	82.8	72.5
2012	289	76.0	74.3	86.8	74.7
2013	368	74.7	74.0	87.3	74.2
2014	274	74.2	73.7	83.6	73.7
1998-2014	4912	74.2	73.1	83.5	73.7

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	148	12.6	0.54	5.5	0.43	8.3	0.48	10.6	0.51
1999	157	13.2	0.61	5.7	0.53	8.7	0.56	11.3	0.60
2000	158	13.2	0.60	5.6	0.51	8.5	0.54	11.1	0.58
2001	177	14.6	0.76	6.5	0.64	9.6	0.69	12.1	0.73
2002	273	13.9	0.63	6.2	0.57	9.2	0.60	11.7	0.62
2003	262	13.3	0.59	5.7	0.49	8.4	0.53	11.0	0.57
2004	263	13.3	0.68	5.6	0.56	8.3	0.59	10.7	0.64
2005	282	14.2	0.78	6.1	0.69	9.0	0.73	11.5	0.76
2006	249	12.4	0.61	5.2	0.53	7.6	0.55	9.9	0.59
2007	301	13.0	0.62	5.2	0.51	7.8	0.54	10.3	0.59
2008	331	14.3	0.67	5.7	0.54	8.5	0.57	11.2	0.62
2009	318	13.7	0.80	5.9	0.72	8.6	0.74	10.9	0.76
2010	332	14.2	0.75	5.4	0.60	8.2	0.64	10.9	0.71
2011	291	12.3	0.70	5.2	0.61	7.7	0.64	9.8	0.67
2012	251	10.6	0.62	4.1	0.50	6.2	0.55	8.2	0.59
2013	324	13.7	0.77	5.3	0.59	8.0	0.64	10.5	0.70
2014	242	10.3	0.79	4.1	0.63	6.2	0.68	8.0	0.75
1998-2014	4359	13.0	0.68	5.4	0.57	8.1	0.60	10.4	0.65

Table 13

Age distribution of age at death (cancer-related) for period 2007-2014
(**incl. multiple primaries**)

Age at death Years	Cases n	%	Cum.%
15-19	2	0.1	0.1
20-24	0	0.0	0.1
25-29	4	0.2	0.3
30-34	5	0.2	0.5
35-39	12	0.5	1.0
40-44	34	1.4	2.4
45-49	79	3.3	5.7
50-54	101	4.2	9.9
55-59	153	6.4	16.3
60-64	200	8.4	24.7
65-69	312	13.0	37.7
70-74	419	17.5	55.2
75-79	386	16.1	71.4
80-84	341	14.3	85.7
85+	343	14.3	100.0
All ages	2391	100.0	

Included in the statistics are 28.0% multiple primaries.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**incl. multiple primaries**)

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	2	0.2	0.11	9.1
20-24		0.0		
25-29	4	0.3	0.24	6.3
30-34	5	0.4	0.16	4.5
35-39	12	1.0	0.24	4.7
40-44	34	2.2	0.31	5.4
45-49	79	5.2	0.48	6.5
50-54	101	7.9	0.39	5.7
55-59	153	13.6	0.50	5.9
60-64	200	18.9	0.57	5.6
65-69	312	29.9	0.70	6.0
70-74	419	40.1	0.90	6.4
75-79	386	54.1	0.93	6.1
80-84	341	60.8	0.90	5.2
85+	343	59.4	1.01	4.0
All ages	2391			5.5
Mortality				
Raw		12.8	0.71	
WS		5.1	0.58	
ES		7.6	0.62	
BRD-S		10.0	0.67	
PYLL-70				
per 100,000		60.1		
ES		51.0		
AYLL-70		10.6		

The rates underestimate the prognosis if other synchronous cancers are prognostic unfavorable.

Table 15

Multiple primaries in deaths in period 1998–2014

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C16	Stomach	50	3.6	14	28.0	7	14.0	29	58.0
C18	Colon	149	10.8	66	44.3	31	20.8	52	34.9
C19–C20	Rectum	52	3.8	22	42.3	13	25.0	17	32.7
C23–C24	Bile	15	1.1	7	46.7	2	13.3	6	40.0
C25	Pancreas	45	3.3	10	22.2	5	11.1	30	66.7
C33–C34	Lung	43	3.1	6	14.0	7	16.3	30	69.8
C43	Malign. melanoma	44	3.2	29	65.9	1	2.3	14	31.8
C44	Skin others	36	2.6	18	50.0	7	19.4	11	30.6
C48	Peritoneal	46	3.3	26	56.5	8	17.4	12	26.1
C50	Breast	437	31.7	298	68.2	40	9.2	99	22.7
C51	Vulva	11	0.8	2	18.2	3	27.3	6	54.5
C53	Cervix uteri	65	4.7	44	67.7	16	24.6	5	7.7
C54	Corpus uteri	129	9.4	32	24.8	79	61.2	18	14.0
C55,C57	Fem. genitals un	12	0.9	4	33.3	3	25.0	5	41.7
C56	Ovary	11	0.8					11	100.0
C64	Kidney	22	1.6	10	45.5	2	9.1	10	45.5
C67	Bladder	32	2.3	17	53.1	1	3.1	14	43.8
C70–C72	CNS cancer	16	1.2	4	25.0	3	18.8	9	56.3
C73	Thyroid	22	1.6	18	81.8	1	4.5	3	13.6
C76–C79	CUP	26	1.9	13	50.0	3	11.5	10	38.5
C82–C85	NHL	33	2.4	18	54.5	4	12.1	11	33.3
C91–C96	Leukaemia	15	1.1	2	13.3	1	6.7	12	80.0
Other primaries		67	4.9	21	31.3	10	14.9	36	53.7
All mult. primaries		1378	100.0	681	49.4	247	17.9	450	32.7

Multiple primaries with number of cases 1 to 9 are pooled in category “Other primaries”

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 multiple malignancy.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**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	2	0.2	0.11	10.0
20-24		0.0		
25-29	2	0.2	0.14	3.4
30-34	4	0.3	0.13	4.2
35-39	10	0.8	0.23	4.4
40-44	31	2.0	0.33	5.6
45-49	61	4.0	0.48	6.0
50-54	81	6.3	0.39	5.5
55-59	127	11.3	0.53	5.9
60-64	161	15.2	0.59	5.7
65-69	248	23.8	0.68	6.0
70-74	333	31.9	0.93	6.6
75-79	315	44.2	0.99	6.5
80-84	274	48.9	0.93	5.4
85+	284	49.1	1.05	4.2
All ages	1933			5.6
Mortality				
Raw		10.3	0.72	
WS		4.1	0.58	
ES		6.2	0.63	
BRD-S		8.0	0.68	
PYLL-70				
per 100,000		48.8		
ES		41.4		
AYLL-70		10.6		

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**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	2	0.2	0.11	11.1
20-24		0.0		
25-29	2	0.2	0.14	3.6
30-34	3	0.2	0.10	3.6
35-39	7	0.6	0.17	3.4
40-44	29	1.9	0.31	5.7
45-49	57	3.8	0.47	6.2
50-54	73	5.7	0.37	5.5
55-59	120	10.7	0.51	6.4
60-64	146	13.8	0.56	6.0
65-69	225	21.6	0.64	6.6
70-74	307	29.4	0.90	7.4
75-79	274	38.4	0.91	6.9
80-84	238	42.4	0.84	5.8
85+	246	42.6	0.92	4.4
All ages	1729			6.0
Mortality				
Raw		9.2	0.67	
WS		3.7	0.55	
ES		5.6	0.59	
BRD-S		7.2	0.63	
PYLL-70				
per 100,000		44.5		
ES		37.7		
AYLL-70		10.6		

* See corresponding tables with multiple primaries.

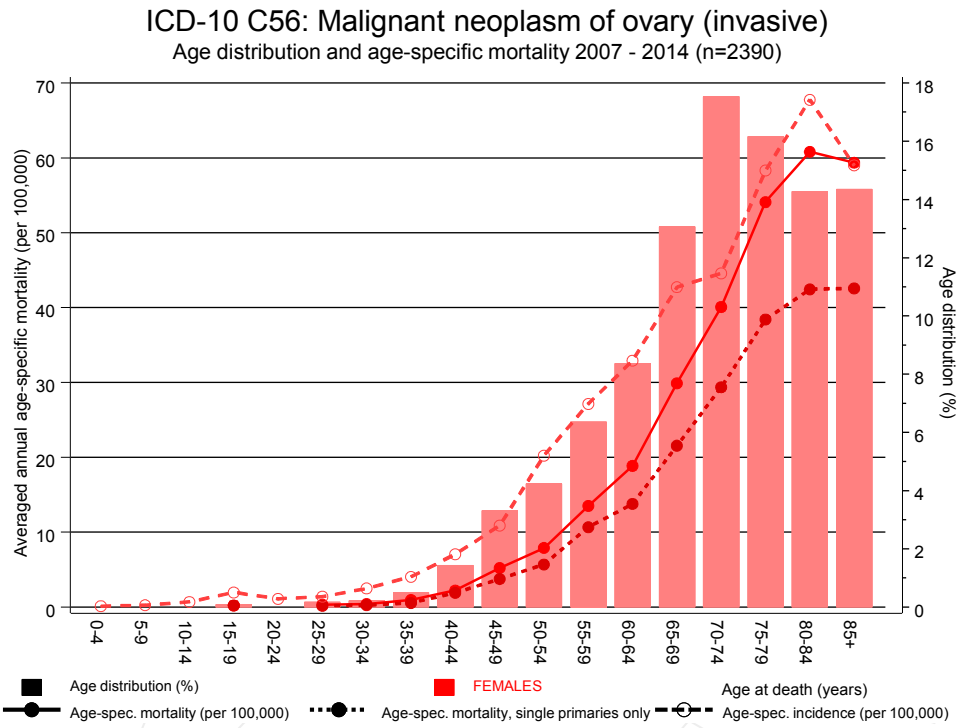

Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

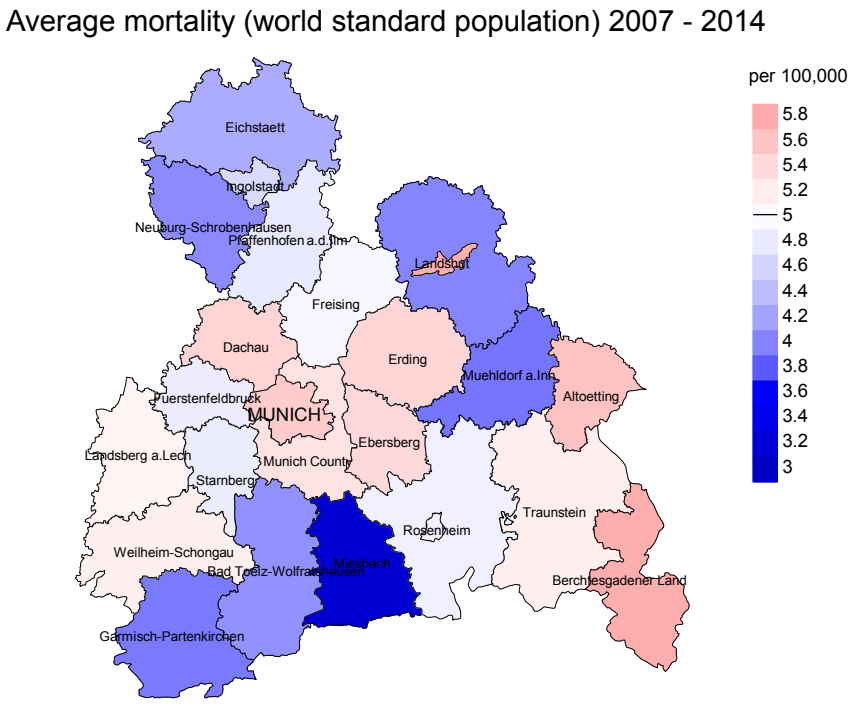

Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2014. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (5.0/100,000 WS N=2,371).

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 72 women died from ovarian cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 5.4/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 3.8 and 7.6/100,000.

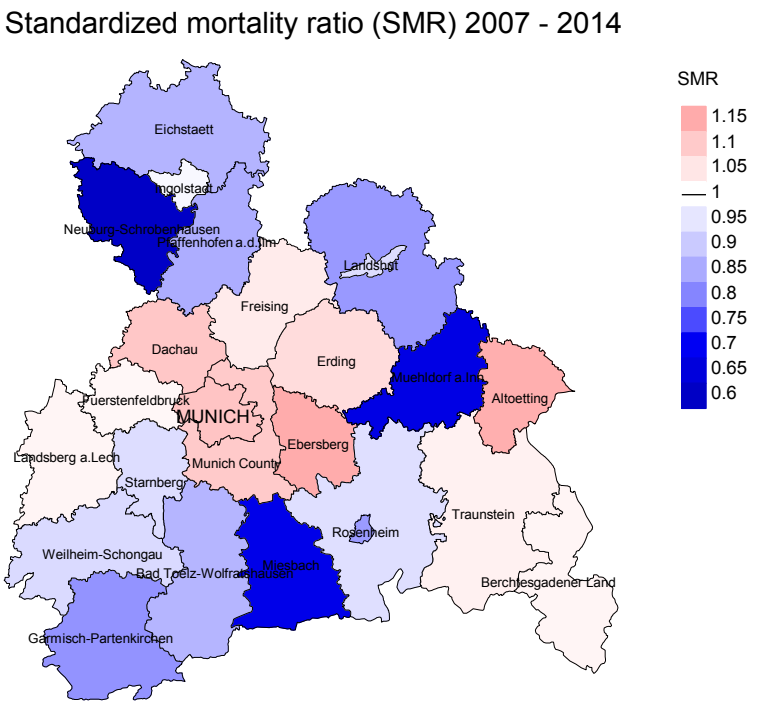

Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=2,371).

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 72 women died from ovarian cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.15. Though, the value of this parameter may vary with an underlying probability of 99% between 0.83 and 1.54, 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

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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