

Munich Cancer Registry



- ▶ Survival
- ▶ Selection Matrix
- ▶ Homepage
- ▶ *Deutsch*

ICD-10 C56: Ovarian cancer

Incidence and Mortality

Year of diagnosis	1998-2016
Patients	7,273
Diseases	7,275
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/bC56__E-ICD-10-C56-Ovarian-cancer-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
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

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	280	40	14.3	12.1	5.7	82.1	98.2
1999	261	27	10.3	13.1	5.7	78.2	98.1
2000	268	36	13.4	14.1	5.6	79.1	98.1
2001	235	35	14.9	14.2	5.4	76.6	97.0
2002	430	74	17.2	15.9	5.3	80.9	98.6 #
2003	445	73	16.4	15.3	5.1	76.9	97.8
2004	385	59	15.3	15.2	4.9	80.0	96.6
2005	364	47	12.9	15.3	4.6	78.8	95.6
2006	407	42	10.3	15.3	4.4	76.4	97.8
2007	488	68	13.9	15.6	4.2	73.6	89.3 #
2008	497	62	12.5	15.5	3.9	70.4	82.3
2009	400	44	11.0	15.5	3.7	67.8	81.8
2010	446	56	12.6	15.9	3.4	68.6	83.0
2011	421	53	12.6	16.1	2.6	66.7	82.4
2012	404	36	8.9	16.2	2.3	62.4	81.2
2013	440	48	10.9	16.3	1.9	55.7	82.5
2014	398	48	12.1	16.5	1.6	46.5	84.2
2015	364	44	12.1	16.5	1.2	45.6	97.3
2016	342	34	9.9	16.6	0.9	27.2	66.4 ##
1998-2016	7275	926	12.7	16.6	5.7	67.8	89.3

7,275 cases diagnosed 1998-2016 are related to a total of 7,273 patients. Currently, in 1,758 (24.2 %) of these 7,273 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 1,443 / 275 / 40 (19.8 % / 3.8 % / 0.5 %) 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 398 cases has been diagnosed, of which 16.5 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 1.6 % 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	280	23.8	12.9	17.7	21.1
1999	261	22.0	10.9	15.6	19.0
2000	268	22.3	11.3	16.0	19.4
2001	235	19.3	10.3	14.1	16.6
2002	430	22.0	10.9	15.4	18.8
2003	445	22.6	11.5	16.1	19.4
2004	385	19.5	10.0	14.0	16.7
2005	364	18.3	8.9	12.5	15.2
2006	407	20.3	9.8	13.9	16.9
2007	488	21.1	10.2	14.5	17.5
2008	497	21.4	10.7	14.9	18.1
2009	400	17.2	8.2	11.6	14.3
2010	446	19.1	9.0	12.8	15.5
2011	421	18.0	8.7	12.2	14.9
2012	404	17.1	8.2	11.4	13.8
2013	440	18.5	9.2	12.7	15.2
2014	398	16.5	8.1	11.1	13.3
2015	364	15.0	7.2	10.1	12.1
2016	342	13.9	6.5	9.1	11.1
1998-2016	7275	19.0	9.3	13.0	15.8

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.	10%	25%	Median		
		Mean	dev.					50%	75%	90%
1998	280	64.9	16.1	14.6	92.1	43.8	55.3	66.6	77.0	85.1
1999	261	67.3	14.2	16.5	96.5	49.8	58.3	67.7	78.3	85.1
2000	268	66.9	14.2	19.9	94.8	47.3	57.5	66.4	78.8	85.3
2001	235	64.8	15.6	26.3	98.8	42.3	55.0	65.5	76.8	85.4
2002	430	67.3	14.2	13.2	96.6	48.2	59.0	68.2	78.2	83.3
2003	445	66.5	14.9	7.6	95.3	46.7	56.8	67.4	78.1	83.5
2004	385	66.3	15.0	15.9	97.3	45.8	56.6	66.6	78.0	84.4
2005	364	67.4	14.9	19.2	96.4	45.5	57.5	68.1	79.7	84.9
2006	407	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	497	66.9	15.0	11.1	102	46.5	57.9	68.4	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	446	68.2	14.5	17.0	98.5	49.2	58.5	69.2	78.4	86.7
2011	421	67.6	13.6	4.1	94.5	50.2	58.8	69.4	77.4	83.6
2012	404	67.7	15.5	5.4	95.9	47.8	58.7	70.0	79.2	85.3
2013	440	66.7	15.0	9.1	100	48.1	57.4	68.9	77.2	84.5
2014	398	66.8	15.9	13.3	96.8	45.3	56.9	70.0	78.4	85.2
2015	364	67.0	15.0	16.5	101	47.5	56.8	68.1	77.9	85.1
2016	342	67.6	14.3	14.3	94.7	49.6	58.4	69.0	78.5	84.5
1998–2016	7275	67.1	14.8	4.1	102	47.3	57.7	68.4	78.3	84.8

Table 4

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

Age at diagnosis Years	Cases n	%	Cum.%
0–4	1	0.0	0.0
5–9	2	0.0	0.1
10–14	8	0.2	0.3
15–19	20	0.5	0.7
20–24	16	0.4	1.1
25–29	23	0.5	1.7
30–34	39	0.9	2.6
35–39	63	1.5	4.1
40–44	134	3.2	7.3
45–49	213	5.1	12.4
50–54	322	7.7	20.0
55–59	387	9.2	29.2
60–64	427	10.2	39.4
65–69	544	13.0	52.4
70–74	557	13.3	65.6
75–79	562	13.4	79.0
80–84	467	11.1	90.1
85+	415	9.9	100.0
All ages	4200	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=493 %	Prop. all cancers n=112253 %
0- 4	1	0.1		0.7
5- 9	2	0.2		2.4
10-14	8	0.7		7.9
15-19	20	1.7		9.7
20-24	16	1.2		4.2
25-29	23	1.5	4.3	2.7
30-34	39	2.4	2.6	2.6
35-39	63	3.9		2.5
40-44	134	7.5	3.7	2.9
45-49	213	11.2	2.3	3.1
50-54	322	18.8	1.9	3.7
55-59	387	26.3	4.9	4.1
60-64	427	32.1	4.0	3.8
65-69	544	41.9	6.4	3.9
70-74	557	44.0	8.4	3.8
75-79	562	56.1	12.5	4.2
80-84	467	66.0	21.4	4.3
85+	415	56.5	45.1	3.3
All ages	4200		11.7	3.7
Incidence				
Raw		17.7		
WS		8.6		
ES		12.0		
BRD-S		14.5		

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 C56: Malignant neoplasm of ovary (invasive)

Age distribution and age-specific incidence 2007 - 2016 (n=4200)

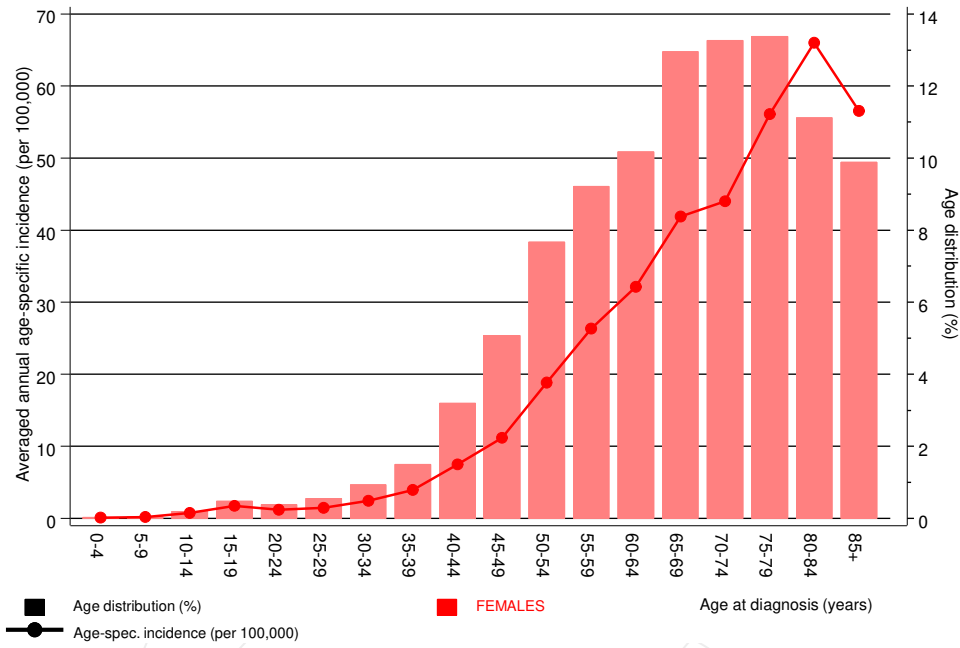


Figure 6. Age distribution (mean=67.4 yrs, median=69.2 yrs) and age-specific incidence.

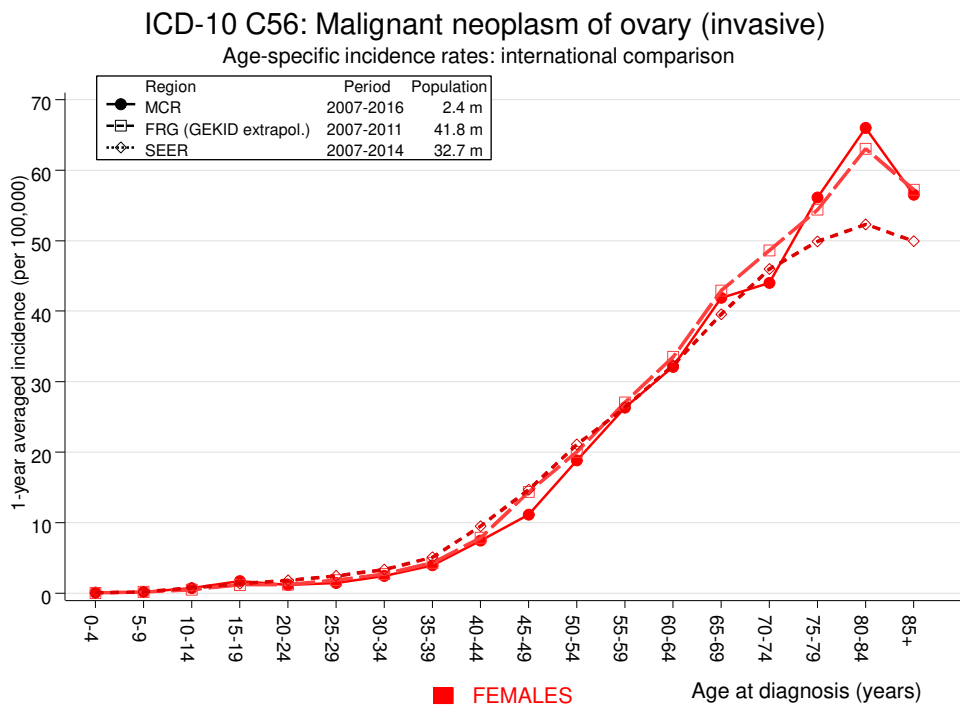


Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

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	2	1.1	1.8	0.2	6.5	0.5	
C09-C10 Oropharynx	2	0.8	2.4	0.3	8.6	0.6	
C15 Oesophagus	2	1.2	1.7	0.2	6.2	0.5	50.0
C16 Stomach	22	6.0	3.7	2.3	5.6 #	8.7	9.1
C17 Small intestine	10	0.9	10.7	5.1	19.6 #	4.9	
C18 Colon	60	16.8	3.6	2.7	4.6 #	23.4	21.7
C19-C20 Rectum	14	7.4	1.9	1.0	3.2 #	3.6	7.1
C22 Liver	5	2.1	2.3	0.8	5.5	1.6	20.0
C23-C24 Bile	6	2.4	2.5	0.9	5.4	1.9	50.0
C25 Pancreas	16	7.7	2.1	1.2	3.4 #	4.5	43.8
C33-C34 Lung	27	13.9	1.9	1.3	2.8 #	7.1	22.2
C43 Malign. melanoma	5	7.2	0.7	0.2	1.6	-1.2	
C46,C49 Soft tissue	3	1.1	2.8	0.6	8.3	1.1	
C48 Peritoneal	10	0.7	14.0	6.7	25.7 #	5.0	
C50 Breast	139	58.7	2.4	2.0	2.8 #	43.5	5.0
C51 Vulva	7	1.7	4.0	1.6	8.3 #	2.9	14.3
C53 Cervix uteri	12	2.7	4.5	2.3	7.9 #	5.1	16.7
C54 Corpus uteri	176	10.5	16.8	14.4	19.5 #	89.7	5.7
C55,C57 Fem. genitals un	3	0.4	8.4	1.7	24.6 #	1.4	66.7
C56 Ovary	6	7.6	0.8	0.3	1.7	-0.9	
C64 Kidney	9	4.4	2.0	0.9	3.9	2.5	
C65 Renal pelvis	2	0.5	3.7	0.4	13.4	0.8	
C67 Bladder	7	3.2	2.2	0.9	4.5	2.1	
C70-C72 CNS cancer	5	2.6	2.0	0.6	4.6	1.3	20.0
C73 Thyroid	9	3.6	2.5	1.1	4.7 #	2.9	11.1
C76-C79 CUP	8	3.1	2.6	1.1	5.2 #	2.7	37.5
C82-C85 NHL	14	7.0	2.0	1.1	3.4 #	3.8	7.1
C90 Mult. myeloma	7	2.2	3.2	1.3	6.6 #	2.6	14.3
C91-C96 Leukaemia	4	2.8	1.4	0.4	3.6	0.6	25.0
Others, specified	6	2.5	2.4	0.9	5.2	1.9	16.7
Not observed	0	2.7	0.0	0.0	1.3	-1.5	
All further malignancies	598	185.5	3.2	3.0	3.5 #	223.5	10.9

Patients	6337
Median age at next malignancy (years)	68.6
Person-years	18453
Mean observation time (years)	2.9
Median observation time (years)	1.7

The occurrence of further malignancy listed is statistically significant.

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

Average incidence (world standard population) 2007 - 2016

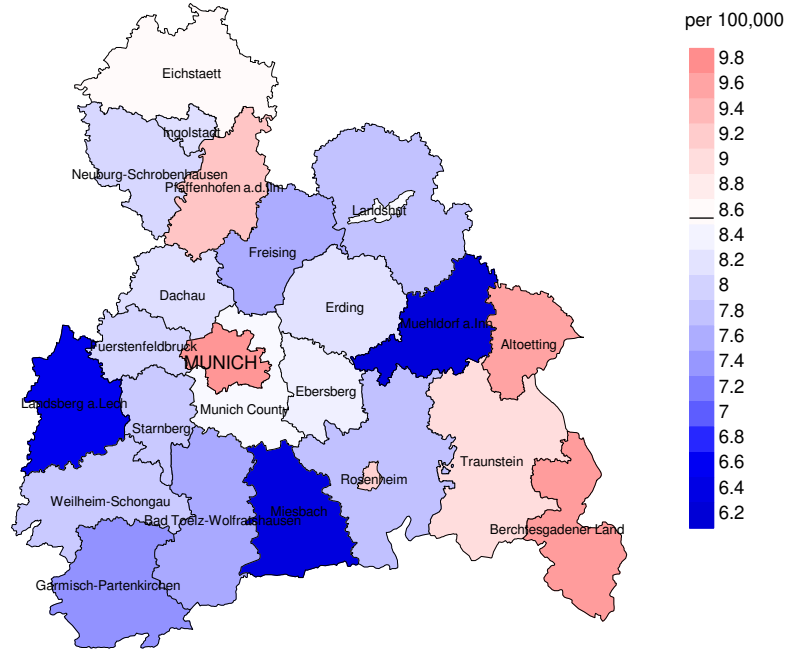


Figure 8a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (8.6/100,000 WS N=4,200).

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 115 women were identified with newly diagnosed ovarian cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 8.4/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 6.3 and 11.0/100,000.

Standardized incidence ratio (SIR) 2007 - 2016

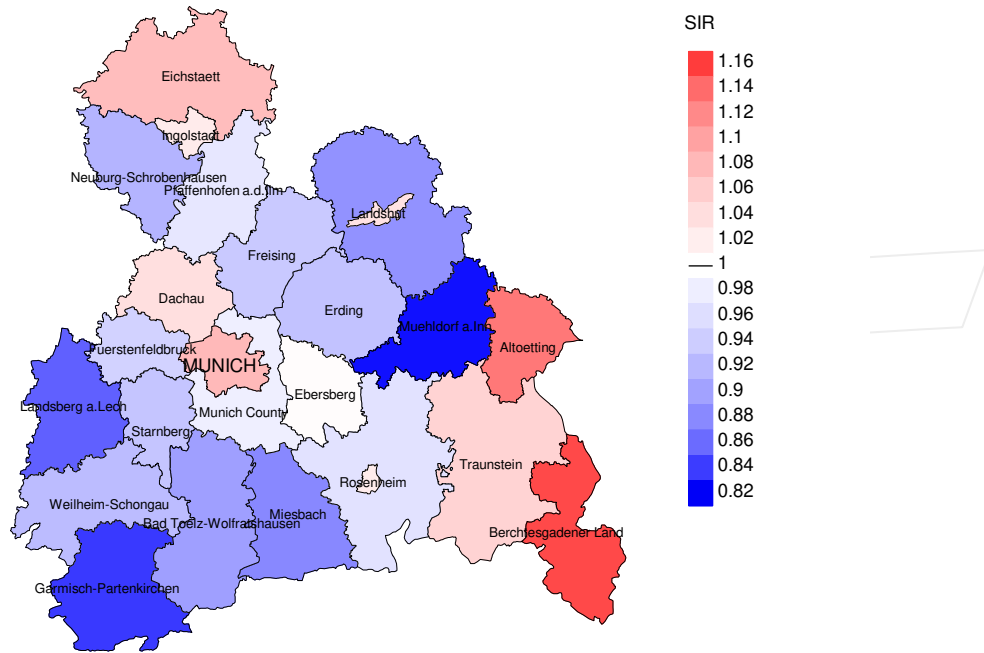


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (N=4,200).

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 115 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 1.00. Though, the value of this parameter may vary with an underlying probability of 99% between 0.78 and 1.27, 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	280	98.2	14.3	230	82.1	88.3
1999	261	98.1	10.3	204	78.2	95.1
2000	268	98.1	13.4	212	79.1	94.8
2001	235	97.0	14.9	180	76.6	98.9
2002	430	98.6	17.2	348	80.9	97.4
2003	445	97.8	16.4	342	76.9	97.7
2004	385	96.6	15.3	308	80.0	98.4
2005	364	95.6	12.9	287	78.8	98.6
2006	407	97.8	10.3	311	76.4	97.4
2007	488	89.3	13.9	359	73.6	98.3
2008	497	82.3	12.5	350	70.4	96.9
2009	400	81.8	11.0	271	67.8	98.9
2010	446	83.0	12.6	306	68.6	97.1
2011	421	82.4	12.6	281	66.7	97.5
2012	404	81.2	8.9	252	62.4	98.4
2013	440	82.5	10.9	245	55.7	95.1
2014	398	84.2	12.1	185	46.5	97.3
2015	364	97.3	12.1	166	45.6	91.6
2016	342	66.4	9.9	93	27.2	83.9
1998-2016	7275	89.3	12.7	4930	67.8	96.6

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	280	186	87.6	69	24.6
1999	261	191	86.9	58	22.2
2000	268	177	90.4	63	23.5
2001	235	201	93.5	58	24.7
2002	430	313	96.5	135	31.4
2003	445	295	99.0	117	26.3
2004	385	290	98.3	104	27.0
2005	364	306	98.0	89	24.5
2006	407	287	96.2	101	24.8
2007	488	332	98.8	120	24.6
2008	497	356	100.0	121	24.3
2009	400	358	99.4	94	23.5
2010	446	355	98.3	118	26.5
2011	421	333	97.0	104	24.7
2012	404	288	96.5	83	20.5
2013	440	368	98.4	101	23.0
2014	398	306	98.4	101	25.4
2015	364	355	97.5	99	27.2
2016	342	307	97.4	80	23.4
1998-2016	7275	5604	96.9	1815	24.9

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	186	79.0	21.0	94.5
1999	191	81.7	18.3	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	290	90.7	9.3	93.3
2005	306	92.5	7.5	95.0
2006	287	87.1	12.9	94.9
2007	332	90.7	9.3	93.9
2008	356	93.3	6.7	95.2
2009	358	88.5	11.5	93.5
2010	355	93.8	6.2	96.3
2011	333	87.4	12.6	92.3
2012	288	86.8	13.2	93.5
2013	368	88.0	12.0	91.4
2014	306	89.2	10.8	93.4
2015	355	85.9	14.1	89.6
2016	307	88.9	11.1	92.0
1998-2016	5604	88.7	11.3	93.5

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	186	74.6	73.5	79.0	74.7
1999	191	74.3	72.4	79.6	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	290	73.6	73.2	82.5	73.2
2005	306	73.6	72.0	83.7	72.7
2006	287	74.6	73.2	83.0	74.0
2007	332	75.8	74.1	83.9	75.0
2008	356	74.6	74.0	87.8	74.2
2009	358	72.7	71.9	81.1	72.1
2010	355	74.9	74.8	85.1	74.9
2011	333	73.0	71.9	82.7	72.5
2012	288	76.1	74.4	86.8	74.9
2013	368	74.7	74.0	87.3	74.2
2014	306	74.2	73.7	83.7	73.7
2015	355	75.2	74.0	84.4	74.4
2016	307	73.6	72.4	81.6	73.0
1998-2016	5604	74.3	73.2	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 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	147	12.5	0.53	5.5	0.42	8.3	0.47	10.5	0.50
1999	156	13.1	0.60	5.6	0.52	8.6	0.55	11.3	0.59
2000	158	13.2	0.59	5.6	0.50	8.5	0.53	11.1	0.57
2001	177	14.6	0.75	6.5	0.64	9.6	0.68	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	283	14.2	0.78	6.1	0.69	9.0	0.73	11.5	0.76
2006	250	12.4	0.61	5.2	0.53	7.7	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	332	14.3	0.67	5.7	0.53	8.5	0.57	11.2	0.62
2009	317	13.6	0.79	5.9	0.71	8.6	0.74	10.8	0.76
2010	333	14.2	0.75	5.4	0.60	8.2	0.64	10.9	0.70
2011	291	12.4	0.69	5.2	0.60	7.7	0.63	9.9	0.66
2012	250	10.6	0.62	4.0	0.49	6.2	0.54	8.1	0.59
2013	324	13.6	0.74	5.3	0.57	7.9	0.62	10.3	0.68
2014	273	11.3	0.69	4.4	0.55	6.6	0.60	8.6	0.64
2015	305	12.5	0.84	4.9	0.68	7.3	0.72	9.5	0.78
2016	273	11.1	0.80	4.8	0.74	7.0	0.76	8.6	0.78
1998-2016	4968	13.0	0.68	5.3	0.57	7.9	0.61	10.3	0.65

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	2	0.1	0.1
20-24	1	0.0	0.1
25-29	6	0.2	0.3
30-34	8	0.3	0.6
35-39	16	0.5	1.1
40-44	43	1.4	2.5
45-49	99	3.3	5.8
50-54	127	4.2	10.1
55-59	195	6.5	16.6
60-64	262	8.7	25.3
65-69	384	12.8	38.1
70-74	518	17.3	55.4
75-79	495	16.5	71.9
80-84	419	14.0	85.9
85+	424	14.1	100.0
All ages	2999	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	2	0.2	0.10	9.1
20-24	1	0.1	0.06	3.0
25-29	6	0.4	0.26	8.2
30-34	8	0.5	0.21	6.7
35-39	16	1.0	0.25	5.6
40-44	43	2.4	0.32	6.4
45-49	99	5.2	0.46	7.6
50-54	127	7.4	0.39	6.4
55-59	195	13.3	0.50	6.8
60-64	262	19.7	0.61	7.0
65-69	384	29.6	0.71	7.2
70-74	518	40.9	0.93	7.6
75-79	495	49.4	0.88	7.1
80-84	419	59.2	0.90	6.1
85+	424	57.8	1.02	4.6
All ages	2999			6.5
Mortality				
Raw		12.7	0.71	
WS		5.1	0.59	
ES		7.6	0.63	
BRD-S		9.8	0.67	
PYLL-70				
per 100,000		61.2		
ES		51.4		
AYLL-70		10.7		

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 ←%
C16 Stomach	54	3.7	14	25.9	6	11.1	34	63.0
C18 Colon	164	11.1	74	45.1	31	18.9	59	36.0
C19–C20 Rectum	54	3.7	23	42.6	14	25.9	17	31.5
C23–C24 Bile	16	1.1	7	43.8	2	12.5	7	43.8
C25 Pancreas	47	3.2	10	21.3	5	10.6	32	68.1
C33–C34 Lung	53	3.6	8	15.1	9	17.0	36	67.9
C43 Malign. melanoma	41	2.8	28	68.3	1	2.4	12	29.3
C44 Skin others	52	3.5	23	44.2	10	19.2	19	36.5
C48 Peritoneal	55	3.7	34	61.8	9	16.4	12	21.8
C50 Breast	474	32.1	331	69.8	40	8.4	103	21.7
C51 Vulva	11	0.7	2	18.2	2	18.2	7	63.6
C53 Cervix uteri	60	4.1	43	71.7	12	20.0	5	8.3
C54 Corpus uteri	149	10.1	32	21.5	97	65.1	20	13.4
C55,C57 Fem. genitals un	13	0.9	4	30.8	3	23.1	6	46.2
C64 Kidney	24	1.6	12	50.0	2	8.3	10	41.7
C67 Bladder	23	1.6	9	39.1	1	4.3	13	56.5
C70–C72 CNS cancer	12	0.8	1	8.3	2	16.7	9	75.0
C73 Thyroid	25	1.7	21	84.0	1	4.0	3	12.0
C76–C79 CUP	32	2.2	15	46.9	4	12.5	13	40.6
C82–C85 NHL	34	2.3	18	52.9	4	11.8	12	35.3
Others, specified	82	5.6	22	26.8	11	13.4	49	59.8
All further malignancies	1475	100.0	731	49.6	266	18.0	478	32.4

Further malignancies with number of cases 1 to 10 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	2	0.2	0.10	10.0
20-24	1	0.1	0.07	3.2
25-29	3	0.2	0.15	4.5
30-34	7	0.4	0.18	6.6
35-39	13	0.8	0.24	5.1
40-44	39	2.2	0.34	6.6
45-49	77	4.0	0.46	6.8
50-54	101	5.9	0.40	6.0
55-59	164	11.2	0.53	6.9
60-64	207	15.6	0.62	6.8
65-69	305	23.5	0.70	7.2
70-74	415	32.8	0.97	7.8
75-79	403	40.2	0.94	7.4
80-84	337	47.6	0.92	6.3
85+	352	48.0	1.07	4.8
All ages	2426			6.6
Mortality				
Raw		10.2	0.73	
WS		4.1	0.59	
ES		6.1	0.64	
BRD-S		7.9	0.68	
PYLL-70				
per 100,000		49.6		
ES		41.7		
AYLL-70		10.8		

* 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	2	0.2	0.10	10.5
20-24	1	0.1	0.07	3.2
25-29	3	0.2	0.15	4.6
30-34	6	0.4	0.16	5.8
35-39	10	0.6	0.19	4.0
40-44	37	2.1	0.34	6.3
45-49	73	3.8	0.45	6.5
50-54	92	5.4	0.38	5.6
55-59	155	10.5	0.52	6.6
60-64	187	14.1	0.59	6.2
65-69	278	21.4	0.67	6.7
70-74	379	29.9	0.93	7.4
75-79	358	35.7	0.88	6.8
80-84	295	41.7	0.83	5.8
85+	303	41.3	0.93	4.3
All ages	2179			6.1
Mortality				
Raw		9.2	0.68	
WS		3.7	0.56	
ES		5.5	0.60	
BRD-S		7.1	0.64	
PYLL-70				
per 100,000		45.8		
ES		38.5		
AYLL-70		10.8		

* See corresponding tables with multiple malignancies.

ICD-10 C56: Malignant neoplasm of ovary (invasive)
 Age distribution and age-specific mortality 2007 - 2016 (n=2999)

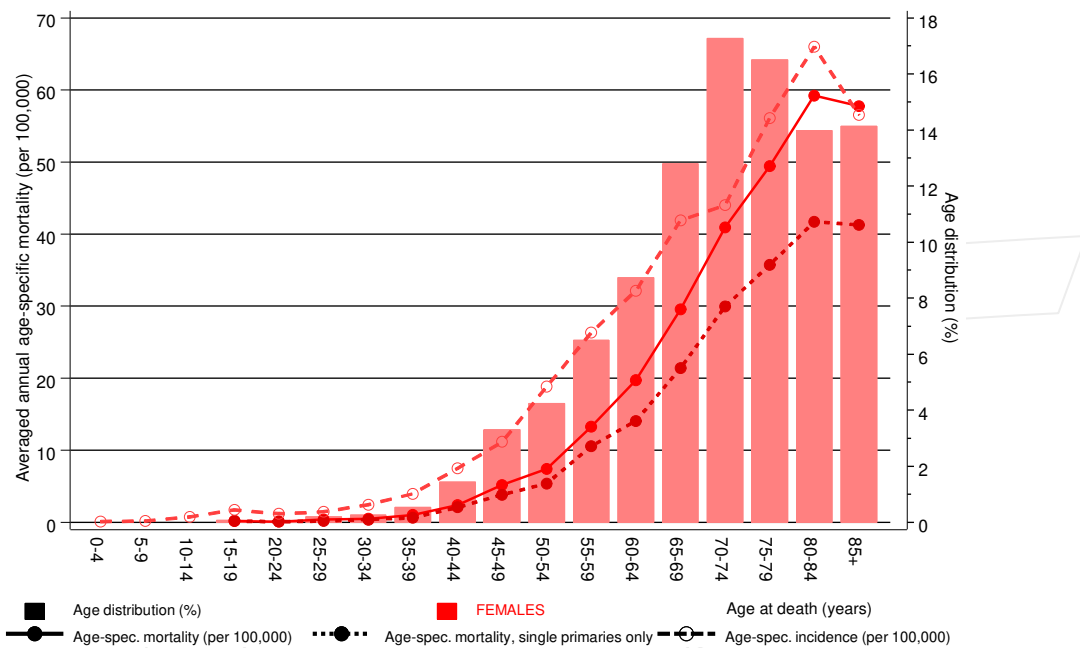


Figure 17. Distribution of age at death (bars; n=mean=68.4 yrs, median=69.9 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (world standard population) 2007 - 2016

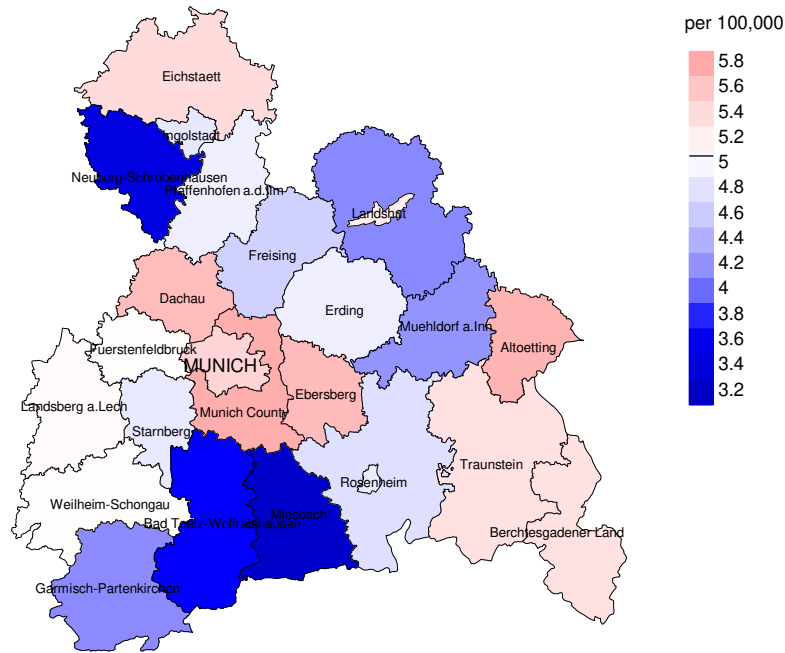


Figure 18a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2016. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (5.1/100,000 WS N=2,999).

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 92 women died from ovarian cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 5.7/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 4.1 and 7.7/100,000.

Standardized mortality ratio (SMR) 2007 - 2016

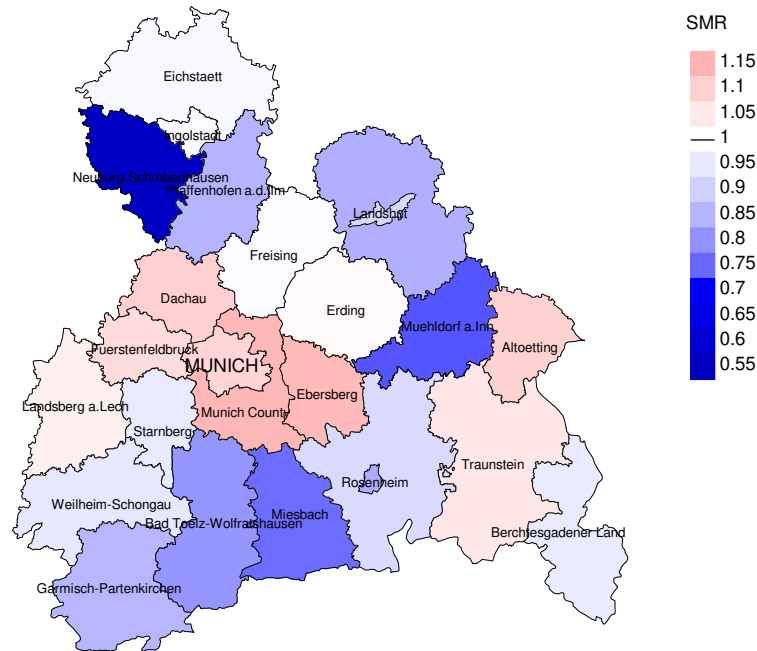


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (N=2,999).

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 92 women died from ovarian cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.14. Though, the value of this parameter may vary with an underlying probability of 99% between 0.86 and 1.48, 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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