Munich Cancer Registry

- Survival
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- *Deutsch*

ICD-10 C53-C55: Uterine cancer

Incidence and Mortality

Year of diagnosis	1998-2020
Patients	17,599
Diseases	17,683
Creation date	12/21/2021
Database export	12/20/2021
Population (females)	2.50 m

Munich Cancer Registry
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https://www.tumorregister-muenchen.de/en

https://www.tumorregister-muenchen.de/en/facts/base/bC5355E-ICD-10-C53-C55-Uterine-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, December 2021

[#] 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
C53.-	Malignant neoplasm of cervix uteri
C53.0	Endocervix
C53.1	Exocervix
C53.8	Overlapping lesion of cervix uteri
C53.9	Cervix uteri, unspecified
C54.-	Malignant neoplasm of corpus uteri
C54.0	Isthmus uteri
C54.1	Endometrium
C54.2	Myometrium
C54.3	Fundus uteri
C54.8	Overlapping lesion of corpus uteri
C54.9	Corpus uteri, unspecified
C55	Malignant neoplasm of uterus, part unspecified

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	488	24	4.9	9.0	10.4	60.7	93.2
1999	509	27	5.3	9.7	10.2	58.2	92.7
2000	476	23	4.8	10.3	9.9	56.3	95.0
2001	508	27	5.3	10.3	9.7	55.9	92.7
2002	767	48	6.3	10.2	9.5	57.9	95.8 #
2003	768	53	6.9	9.9	9.2	57.2	94.4
2004	763	49	6.4	10.1	8.8	56.2	94.9
2005	803	36	4.5	10.2	8.5	52.4	93.0
2006	754	26	3.4	10.0	8.2	47.6	91.4
2007	883	45	5.1	10.1	8.0	51.0	90.6 #
2008	916	36	3.9	10.2	7.5	45.1	97.9
2009	894	29	3.2	10.4	7.0	46.1	96.2
2010	838	43	5.1	10.6	6.6	44.9	97.4
2011	869	25	2.9	10.8	6.2	40.7	96.4
2012	883	45	5.1	11.3	5.8	43.4	97.2
2013	908	36	4.0	11.5	5.3	42.1	97.4
2014	903	27	3.0	11.7	4.8	37.7	96.1
2015	821	35	4.3	11.8	4.2	34.2	94.2
2016	844	22	2.6	12.2	3.9	29.6	99.3
2017	875	29	3.3	12.3	3.2	24.3	99.0
2018	847	21	2.5	12.4	3.3	23.5	99.3
2019	711			12.5	2.2	17.0	99.4
2020	655	2	0.3	12.5	1.4	12.5	99.5 ##
1998-2020	17683	708	4.0	12.5	10.4	42.4	96.0

17,683 cases diagnosed 1998-2020 are related to a total of 17,599 patients. Currently, in 4,161 (23.6 %) of these 17,599 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 3,387 / 630 / 144 (19.2 % / 3.6 % / 0.8 %) 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 retreived from the respective headings.

How to interpret:
In 2018, a subgroup of 847 cases has been diagnosed, of which 12.4 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 3.3 % 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 4.94 m as of 2007, respectively)

Year of diagnosis	Cases n	Incidence raw	Incidence WS	Incidence ES	Incidence BRD-S
1998	488	41.5	23.0	31.6	37.1
1999	509	42.9	23.5	32.1	37.6
2000	476	39.6	21.8	29.9	35.1
2001	508	41.8	22.7	31.2	36.6
2002	767	39.2	21.0	28.8	33.9
2003	768	39.0	20.5	28.5	33.3
2004	763	38.6	20.2	28.1	33.0
2005	803	40.4	21.6	29.5	34.1
2006	754	37.5	20.0	27.4	31.8
2007	883	38.2	20.4	28.1	32.5
2008	916	39.5	21.0	28.8	33.2
2009	894	38.4	20.8	28.4	32.6
2010	838	35.8	18.4	25.5	30.0
2011	869	37.2	19.6	26.8	31.1
2012	883	37.4	19.0	26.3	30.8
2013	908	38.1	19.7	27.1	31.7
2014	903	37.5	19.5	26.7	31.1
2015	821	33.7	17.7	24.2	27.9
2016	844	34.4	18.5	25.1	28.7
2017	875	35.5	19.1	26.0	29.7
2018	847	34.1	18.0	24.6	28.3
2019	711	28.6	15.0	20.6	23.8
2020	655	26.4	14.3	19.4	22.0
1998–2020	17683	36.6	19.4	26.6	30.8

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	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	488	63.5	14.7	23.8	95.5	41.7	53.5	64.4	74.5	82.7
1999	509	63.4	15.9	24.4	99.9	39.5	52.8	64.3	75.5	83.7
2000	476	63.0	14.9	23.9	93.1	40.4	53.7	63.5	75.2	80.8
2001	508	64.0	15.2	22.9	96.0	41.1	54.2	64.3	74.9	82.7
2002	767	64.2	15.1	25.9	96.1	41.1	54.6	65.6	75.8	82.3
2003	768	65.2	14.7	27.3	99.4	43.6	56.0	65.4	76.3	83.8
2004	763	64.9	14.7	21.0	99.8	43.1	55.5	65.7	76.1	83.1
2005	803	64.2	15.0	24.0	100	41.6	54.9	66.0	73.9	83.5
2006	754	64.3	15.2	22.9	99.4	42.2	53.9	65.3	75.3	83.4
2007	883	64.0	15.0	22.0	99.2	42.1	54.4	66.1	74.8	82.6
2008	916	64.0	14.6	24.0	97.1	43.4	53.7	66.4	73.8	82.6
2009	894	64.1	14.9	23.1	102	42.3	54.2	65.0	74.2	83.0
2010	838	65.0	15.0	25.1	98.7	43.2	54.7	67.0	76.1	84.1
2011	869	64.0	15.2	25.7	95.6	42.0	53.5	66.5	74.8	83.3
2012	883	65.3	14.9	0.3	97.8	44.3	55.3	67.6	75.9	83.9
2013	908	64.6	15.2	22.1	99.7	43.7	54.5	65.4	76.3	83.5
2014	903	64.2	15.6	22.0	99.0	40.3	53.3	66.1	75.9	83.0
2015	821	64.6	14.8	27.2	102	44.4	54.1	65.7	75.5	83.0
2016	844	63.5	15.1	22.4	96.7	41.5	53.7	64.7	75.4	82.2
2017	875	63.7	14.4	28.3	96.6	43.9	54.6	64.6	74.8	80.9
2018	847	64.1	14.6	22.0	97.8	43.5	53.9	64.7	75.9	82.1
2019	711	63.7	14.5	22.5	95.5	42.5	54.5	64.8	75.8	81.0
2020	655	63.0	15.0	23.0	99.0	42.0	53.1	63.5	74.5	82.3
1998–2020	17683	64.2	14.9	0.3	102	42.6	54.3	65.5	75.3	82.8

Table 4

Age distribution by 5-year age group for period 2007-2020
(incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%
0-4	1	0.0	0.0
5-9	0	0.0	0.0
10-14	0	0.0	0.0
15-19	0	0.0	0.0
20-24	12	0.1	0.1
25-29	114	1.0	1.1
30-34	298	2.5	3.6
35-39	431	3.6	7.2
40-44	622	5.3	12.5
45-49	709	6.0	18.5
50-54	981	8.3	26.7
55-59	1274	10.8	37.5
60-64	1328	11.2	48.7
65-69	1466	12.4	61.1
70-74	1568	13.2	74.3
75-79	1334	11.3	85.6
80-84	886	7.5	93.1
85+	823	6.9	100.0
All ages	11847	100.0	

Table 5

Age-specific incidence, DCO rate and proportion of all cancers for period 2007-2020

Age at diagnosis Years	Cases n	Age-spec. incidence	DCO rate n=388 %	Prop. all cancers n=155051 %
0- 4	1	0.1	100.0	0.6
5- 9		0.0		
10-14		0.0		
15-19		0.0		
20-24	12	0.6		2.3
25-29	113	5.0		9.5
30-34	297	13.0		13.8
35-39	431	19.0	0.2	12.3
40-44	621	25.7	0.2	10.1
45-49	705	27.1	0.4	7.5
50-54	981	39.1	0.4	7.9
55-59	1273	58.5	0.6	9.6
60-64	1325	69.8	0.8	8.5
65-69	1462	80.6	1.6	7.7
70-74	1564	91.0	1.7	7.9
75-79	1331	88.6	2.7	6.8
80-84	882	82.9	8.0	5.7
85+	820	78.7	24.6	5.0
All ages	11818		3.3	7.6
Incidence				
Raw		35.2		
WS		18.6		
ES		25.4		
BRD-S		29.4		

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

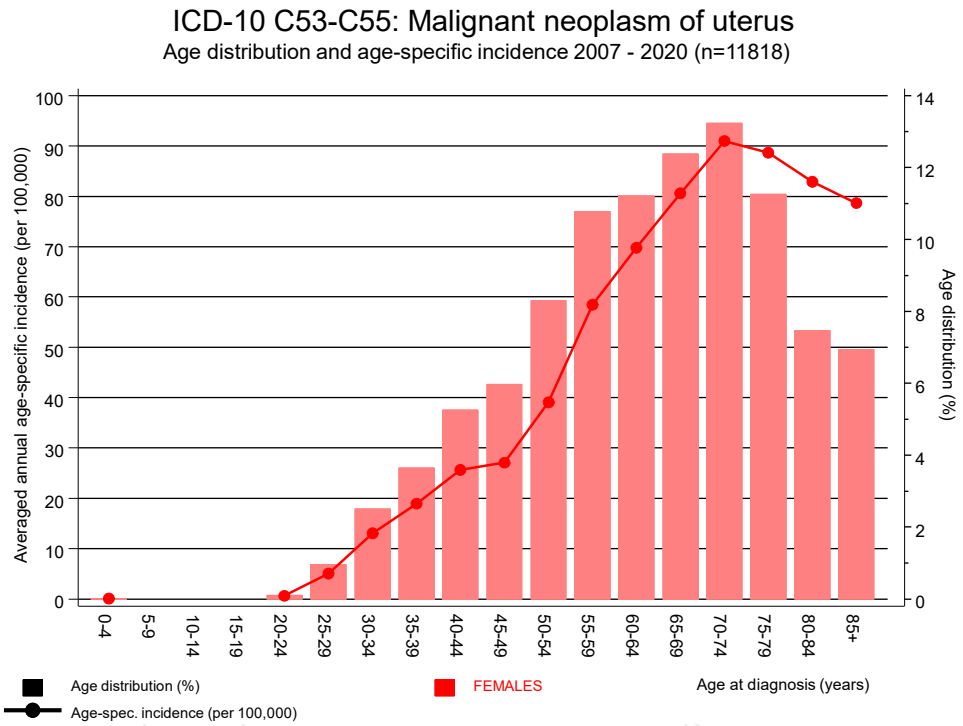

Figure 6. Age distribution (mean=64.2 yrs, median=65.6 yrs) and age-specific incidence.

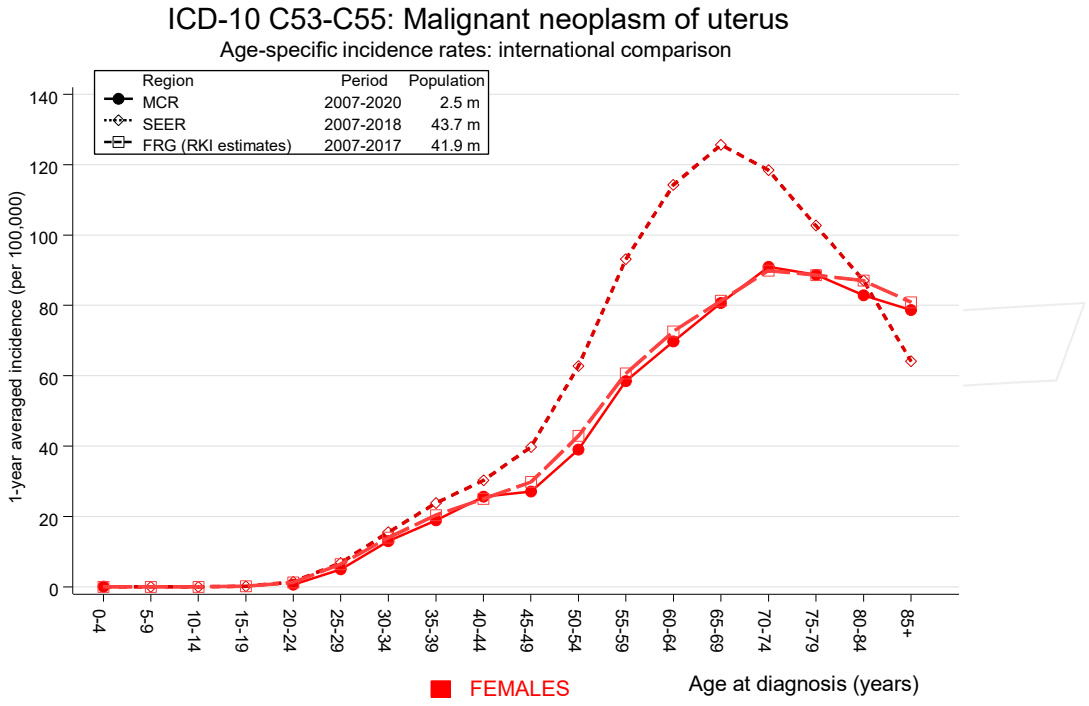

Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, RKI estimates) and SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Estimated age-specific patient population of Germany, latest update: 16 March 2021. German Centre for Cancer Registry Data, Robert Koch Institute (RKI), based on data of the population based cancer registries. http://www.krebsdaten.de. Last access: 08/17/2021
Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 21 Regs Research Data, released April 2021, based on the November 2020 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 1998–2020

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C03–C06	Oral cavity	6	4.1	1.5	0.5	3.2		0.3	
C09–C10	Oropharynx	9	3.0	3.0	1.4	5.8	#	0.9	
C15	Oesophagus	12	4.6	2.6	1.3	4.5	#	1.1	8.3
C16	Stomach	42	23.5	1.8	1.3	2.4	#	2.7	16.7
C17	Small intestine	15	3.8	4.0	2.2	6.5	#	1.7	
C18	Colon	179	67.4	2.7	2.3	3.1	#	16.4	8.9
C19–C20	Rectum	61	27.8	2.2	1.7	2.8	#	4.9	9.8
C21	Anus/canal	10	4.0	2.5	1.2	4.7	#	0.9	10.0
C22	Liver	17	8.6	2.0	1.1	3.2	#	1.2	5.9
C23–C24	Bile	25	9.8	2.5	1.6	3.8	#	2.2	12.0
C25	Pancreas	70	32.3	2.2	1.7	2.7	#	5.6	25.7
C26	GI cancer	4	1.1	3.5	1.0	9.1		0.4	50.0
C33–C34	Lung	181	53.1	3.4	2.9	3.9	#	18.8	11.6
C40–C41	Bone	5	0.7	7.4	2.4	17.4	#	0.6	
C43	Malign. melanoma	51	27.7	1.8	1.4	2.4	#	3.4	
C46,C49	Soft tissue	16	4.0	4.0	2.3	6.4	#	1.8	
C48	Peritoneal	28	2.9	9.6	6.4	13.9	#	3.7	
C50	Breast	571	219.4	2.6	2.4	2.8	#	51.8	2.6
C51	Vulva	24	7.4	3.2	2.1	4.8	#	2.4	4.2
C52	Vagina	14	1.3	10.7	5.8	17.9	#	1.9	
C53	Cervix uteri	34	9.7	3.5	2.4	4.9	#	3.6	35.3
C54	Corpus uteri	37	39.3	0.9	0.7	1.3		−0.3	35.1
C55,C57	Fem. genitals un	14	1.5	9.6	5.2	16.1	#	1.8	85.7
C56	Ovary	343	28.3	12.1	10.9	13.5	#	46.4	11.1
C64	Kidney	40	16.5	2.4	1.7	3.3	#	3.5	10.0
C65	Renal pelvis	8	2.2	3.6	1.6	7.2	#	0.9	
C66	Ureter	7	1.2	6.0	2.4	12.3	#	0.9	
C67	Bladder	41	13.6	3.0	2.2	4.1	#	4.0	7.3
C70–C72	CNS cancer	16	9.2	1.7	1.0	2.8		1.0	25.0
C73	Thyroid	31	12.1	2.6	1.7	3.6	#	2.8	
C76–C79	CUP	29	12.5	2.3	1.6	3.3	#	2.4	3.4
C81	Hodgkin lymphoma	5	1.3	3.8	1.2	8.8	#	0.5	
C82–C85	NHL	55	27.5	2.0	1.5	2.6	#	4.1	3.6
C90	Mult. myeloma	11	8.6	1.3	0.6	2.3		0.4	9.1
C91–C96	Leukaemia	34	10.3	3.3	2.3	4.6	#	3.5	14.7
Others, specified		22	9.6	2.3	1.4	3.5	#	1.8	
Not observed		0	1.6	0.0	0.0	2.3		−0.2	
All further malignancies		2067	711.4	2.9	2.8	3.0	#	199.7	9.0

Patients	16914
Median age at next malignancy (years)	70.9
Person-years	67891
Mean observation time (years)	4.0
Median observation time (years)	2.1

The occurrence of further specified malignancy is statistically significant.

Further observed malignancies with count 1 to 3 are pooled in category “Others, specified”.

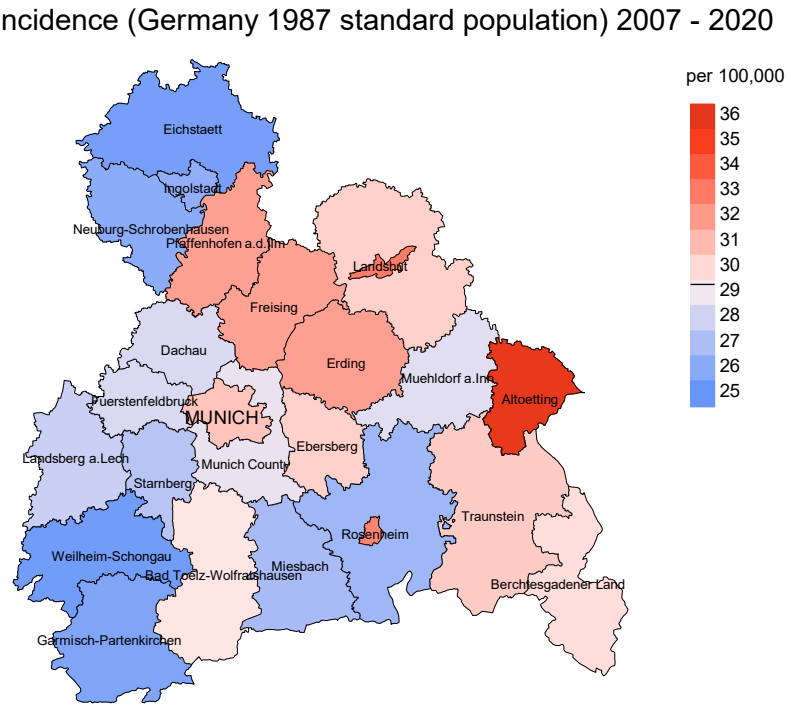

Figure 8a. Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (29.4/100,000 WS N=11,818).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,727 female residents (averaged) in the period from 2007 to 2020 a total of 340 women were identified with newly diagnosed uterine cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 30.3/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 26.2 and 34.9/100,000.

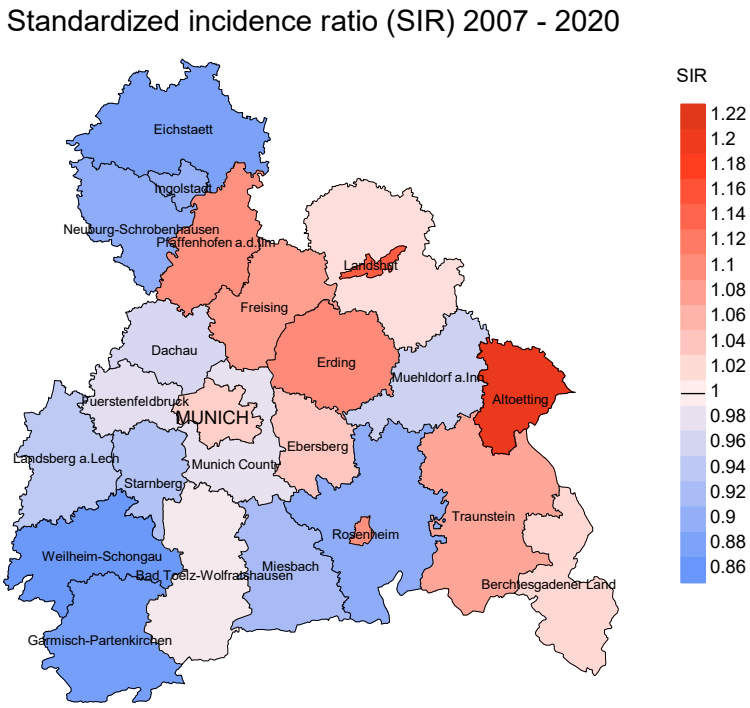

Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (N=11,818).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,153 female residents (averaged) in the period from 2007 to 2020 a total of 340 women were identified with newly diagnosed uterine cancer. 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 0.90 and 1.19, 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 4.94 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	488	93.2	4.9	296	60.7	88.9
1999	509	92.7	5.3	296	58.2	91.2
2000	476	95.0	4.8	268	56.3	93.3
2001	508	92.7	5.3	284	55.9	94.7
2002	767	95.8	6.3	444	57.9	93.5
2003	768	94.4	6.9	439	57.2	94.1
2004	763	94.9	6.4	429	56.2	94.4
2005	803	93.0	4.5	421	52.4	93.3
2006	754	91.4	3.4	359	47.6	95.3
2007	883	90.6	5.1	450	51.0	93.6
2008	916	97.9	3.9	413	45.1	95.2
2009	894	96.2	3.2	412	46.1	94.9
2010	838	97.4	5.1	376	44.9	94.1
2011	869	96.4	2.9	354	40.7	96.0
2012	883	97.2	5.1	383	43.4	94.0
2013	908	97.4	4.0	382	42.1	91.1
2014	903	96.1	3.0	340	37.7	92.4
2015	821	94.2	4.3	281	34.2	89.0
2016	844	99.3	2.6	250	29.6	83.6
2017	875	99.0	3.3	213	24.3	79.3
2018	847	99.3	2.5	199	23.5	70.9
2019	711	99.4		121	17.0	80.2
2020	655	99.5	0.3	82	12.5	90.2
1998-2020	17683	96.0	4.0	7492	42.4	91.8

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 4.94 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	488	239	89.5	48	9.8
1999	509	256	91.4	51	10.0
2000	476	266	92.9	51	10.7
2001	508	229	91.7	44	8.7
2002	767	387	95.6	82	10.7
2003	768	467	96.4	93	12.1
2004	763	423	96.9	82	10.7
2005	803	438	95.0	71	8.8
2006	754	415	96.1	55	7.3
2007	883	491	96.9	93	10.5
2008	916	489	98.8	72	7.9
2009	894	517	99.0	70	7.8
2010	838	526	98.7	79	9.4
2011	869	579	97.4	80	9.2
2012	883	533	98.3	99	11.2
2013	908	595	97.8	89	9.8
2014	903	569	98.2	80	8.9
2015	821	553	97.6	63	7.7
2016	844	563	98.6	64	7.6
2017	875	616	96.6	76	8.7
2018	847	481	64.9	58	6.8
2019	711	443	42.9	38	5.3
2020	655	567	83.1	44	6.7
1998–2020	17683	10642	92.4	1582	8.9

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 4.94 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	239	57.7	42.3	77.1
1999	256	60.9	39.1	75.2
2000	266	59.0	41.0	72.1
2001	229	50.7	49.3	72.9
2002	387	62.8	37.2	76.5
2003	467	64.5	35.5	77.1
2004	423	63.6	36.4	73.9
2005	438	63.9	36.1	74.8
2006	415	59.5	40.5	71.7
2007	491	62.3	37.7	70.6
2008	489	62.2	37.8	69.6
2009	517	59.2	40.8	67.2
2010	526	63.7	36.3	72.1
2011	579	61.3	38.7	70.2
2012	533	59.8	40.2	69.1
2013	595	60.3	39.7	68.0
2014	569	60.3	39.7	70.8
2015	553	56.8	43.2	63.3
2016	563	60.0	40.0	68.8
2017	616	55.5	44.5	62.0
2018	481	48.0	52.0	56.4
2019	443	40.4	59.6	70.0
2020	567	42.9	57.1	62.4
1998-2020	10642	58.1	41.9	69.5

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	239	77.6	71.7	82.2	76.2
1999	256	79.3	76.2	84.4	78.9
2000	266	79.8	77.1	83.1	78.0
2001	229	79.9	75.3	82.3	77.6
2002	387	79.3	73.8	84.6	75.8
2003	467	78.6	74.2	83.7	76.4
2004	423	78.6	73.4	84.5	75.2
2005	438	80.1	74.2	84.2	76.8
2006	415	79.8	74.3	85.5	76.2
2007	491	81.3	74.7	86.0	77.5
2008	489	79.9	72.6	85.8	74.9
2009	517	80.1	73.8	86.0	75.1
2010	526	79.8	73.9	85.4	75.6
2011	579	79.5	74.1	85.6	75.3
2012	533	80.5	76.4	87.0	77.0
2013	595	79.5	74.5	86.5	76.0
2014	569	78.7	75.1	85.2	76.1
2015	553	80.8	76.1	86.5	76.8
2016	563	79.5	76.0	85.6	76.9
2017	616	80.6	75.6	86.7	76.6
2018	481	79.8	73.3	84.6	75.1
2019	443	79.7	72.9	83.1	76.2
2020	567	81.7	74.5	84.7	78.2
1998–2020	10642	79.8	74.7	85.1	76.4

By 2018, Bavarians' life expectancy at birth is estimated at 79.3 years for boys and 83.8 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	138	11.7	0.29	5.4	0.24	7.8	0.25	10.0	0.27
1999	156	13.1	0.31	5.4	0.23	8.1	0.25	11.0	0.29
2000	157	13.1	0.33	5.1	0.23	7.9	0.27	10.8	0.31
2001	116	9.5	0.23	4.0	0.18	6.0	0.19	7.9	0.22
2002	243	12.4	0.32	5.3	0.25	7.9	0.27	10.2	0.30
2003	301	15.3	0.39	6.4	0.31	9.7	0.34	12.5	0.38
2004	269	13.6	0.35	5.8	0.29	8.6	0.31	11.0	0.34
2005	280	14.1	0.35	5.6	0.26	8.4	0.28	10.8	0.32
2006	247	12.3	0.33	4.9	0.24	7.4	0.27	9.6	0.30
2007	306	13.3	0.35	5.2	0.26	7.8	0.28	10.0	0.31
2008	304	13.1	0.33	5.4	0.26	8.0	0.28	10.2	0.31
2009	306	13.2	0.34	5.3	0.26	7.9	0.28	10.1	0.31
2010	335	14.3	0.40	5.7	0.31	8.5	0.33	10.8	0.36
2011	355	15.2	0.41	5.9	0.30	8.8	0.33	11.3	0.36
2012	319	13.5	0.36	4.9	0.26	7.5	0.29	10.0	0.33
2013	360	15.1	0.40	5.8	0.30	8.7	0.32	11.3	0.36
2014	343	14.2	0.38	5.3	0.27	8.0	0.30	10.6	0.34
2015	314	12.9	0.38	4.7	0.27	7.2	0.30	9.4	0.34
2016	338	13.8	0.40	5.1	0.27	7.7	0.31	10.1	0.35
2017	342	13.9	0.39	5.1	0.27	7.7	0.30	10.1	0.34
2018	231	9.3	0.27	3.8	0.21	5.6	0.23	6.9	0.25
2019	179	7.2	0.25	3.0	0.20	4.3	0.21	5.5	0.23
2020	243	9.8	0.37	3.8	0.27	5.6	0.29	7.2	0.33
1998-2020	6182	12.8	0.35	5.1	0.26	7.6	0.28	9.8	0.32

Table 12

Age distribution of age at death (cancer-related) for period 2007-2020
(**incl. multiple malignancies**)

Age at death Years	Cases n	%	Cum.%
0-4			
5-9			
10-14			
15-19			
20-24	1	0.0	0.0
25-29	5	0.1	0.1
30-34	17	0.4	0.5
35-39	56	1.3	1.8
40-44	96	2.2	4.1
45-49	132	3.1	7.2
50-54	194	4.5	11.7
55-59	270	6.3	18.0
60-64	323	7.6	25.6
65-69	490	11.5	37.1
70-74	578	13.5	50.6
75-79	694	16.2	66.8
80-84	637	14.9	81.7
85+	782	18.3	100.0
All ages	4275	100.0	

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers for period 2007-2020
(**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	1	0.1	0.08	2.3
25-29	5	0.2	0.04	5.1
30-34	17	0.7	0.06	9.4
35-39	56	2.5	0.13	13.7
40-44	96	4.0	0.15	11.2
45-49	132	5.1	0.19	7.9
50-54	194	7.7	0.20	7.3
55-59	270	12.4	0.21	7.1
60-64	323	17.0	0.24	6.5
65-69	490	27.0	0.34	7.0
70-74	578	33.6	0.37	6.6
75-79	694	46.2	0.52	7.1
80-84	637	59.8	0.72	6.8
85+	782	75.0	0.95	6.5
All ages	4275			6.9
Mortality				
Raw		12.7	0.36	
WS		4.9	0.27	
ES		7.4	0.29	
BRD-S		9.5	0.32	
PYLL-70				
per 100,000		66.3		
ES		55.8		
AYLL-70		11.8		

Table 14

Further malignancies in deaths in period 1998–2020

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03–C06	Oral cavity	17	0.6	4	23.5			13	76.5
C09–C10	Oropharynx	16	0.5	6	37.5			10	62.5
C15	Oesophagus	19	0.6	2	10.5			17	89.5
C16	Stomach	73	2.4	7	9.6	3	4.1	63	86.3
C17	Small intestine	13	0.4	3	23.1	2	15.4	8	61.5
C18	Colon	265	8.7	63	23.8	21	7.9	181	68.3
C19–C20	Rectum	154	5.1	51	33.1	2	1.3	101	65.6
C21	Anus/canal	31	1.0	10	32.3			21	67.7
C22	Liver	25	0.8	2	8.0	1	4.0	22	88.0
C23–C24	Bile	43	1.4	6	14.0			37	86.0
C25	Pancreas	125	4.1	2	1.6	4	3.2	119	95.2
C33–C34	Lung	305	10.0	20	6.6	14	4.6	271	88.9
C43	Malign. melanoma	85	2.8	46	54.1	2	2.4	37	43.5
C44	Skin others	118	3.9	50	42.4	6	5.1	62	52.5
C46,C49	Soft tissue	20	0.7	6	30.0	1	5.0	13	65.0
C48	Peritoneal	24	0.8	1	4.2	10	41.7	13	54.2
C50	Breast	748	24.6	358	47.9	71	9.5	319	42.6
C51	Vulva	44	1.4	6	13.6	8	18.2	30	68.2
C52	Vagina	24	0.8	3	12.5	7	29.2	14	58.3
C53	Cervix uteri	55	1.8	28	50.9	5	9.1	22	40.0
C54	Corpus uteri	36	1.2	20	55.6	5	13.9	11	30.6
C55,C57	Fem. genitals un	14	0.5	3	21.4	3	21.4	8	57.1
C56	Ovary	264	8.7	24	9.1	135	51.1	105	39.8
C64	Kidney	54	1.8	16	29.6	5	9.3	33	61.1
C65	Renal pelvis	13	0.4	2	15.4			11	84.6
C66	Ureter	13	0.4					13	100.0
C67	Bladder	124	4.1	11	8.9	15	12.1	98	79.0
C69	Eye melanoma	9	0.3	6	66.7			3	33.3
C70–C72	CNS cancer	36	1.2	6	16.7			30	83.3
C73	Thyroid	28	0.9	12	42.9			16	57.1
C76–C79	CUP	52	1.7	7	13.5	4	7.7	41	78.8
C82–C85	NHL	65	2.1	22	33.8	4	6.2	39	60.0
C90	Mult. myeloma	17	0.6	2	11.8			15	88.2
C91–C96	Leukaemia	52	1.7	10	19.2	4	7.7	38	73.1
Others, specified		57	1.9	16	28.1	2	3.5	39	68.4
All further malignancies		3038	100.0	831	27.4	334	11.0	1873	61.7

Further malignancies with number of cases 1 to 8 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 2007-2020
(**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	1	0.1	0.10	2.4
25-29	5	0.2	0.05	5.5
30-34	14	0.6	0.05	8.8
35-39	54	2.4	0.13	14.6
40-44	90	3.7	0.16	11.9
45-49	115	4.4	0.19	8.0
50-54	166	6.6	0.19	7.4
55-59	231	10.6	0.21	7.2
60-64	269	14.2	0.24	6.6
65-69	390	21.5	0.32	7.0
70-74	463	26.9	0.37	6.8
75-79	557	37.1	0.53	7.4
80-84	492	46.2	0.74	6.8
85+	632	60.6	1.03	6.7
All ages	3479			7.1
Mortality				
Raw		10.4	0.35	
WS		4.1	0.26	
ES		6.1	0.28	
BRD-S		7.8	0.31	
PYLL-70				
per 100,000		58.0		
ES		48.9		
AYLL-70		12.3		

* See corresponding tables with multiple malignancies.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2020
(**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	1	0.1	0.11	2.5
25-29	5	0.2	0.05	5.7
30-34	14	0.6	0.05	8.9
35-39	53	2.3	0.14	14.6
40-44	81	3.3	0.15	10.9
45-49	100	3.8	0.18	7.0
50-54	141	5.6	0.18	6.4
55-59	182	8.4	0.17	5.8
60-64	212	11.2	0.20	5.3
65-69	284	15.7	0.26	5.3
70-74	307	17.9	0.28	4.7
75-79	386	25.7	0.41	5.3
80-84	305	28.7	0.50	4.4
85+	414	39.7	0.72	4.6
All ages	2485			5.2
Mortality				
Raw		7.4	0.27	
WS		3.1	0.21	
ES		4.5	0.23	
BRD-S		5.7	0.25	
PYLL-70				
per 100,000		49.6		
ES		42.1		
AYLL-70		13.1		

* See corresponding tables with multiple malignancies.

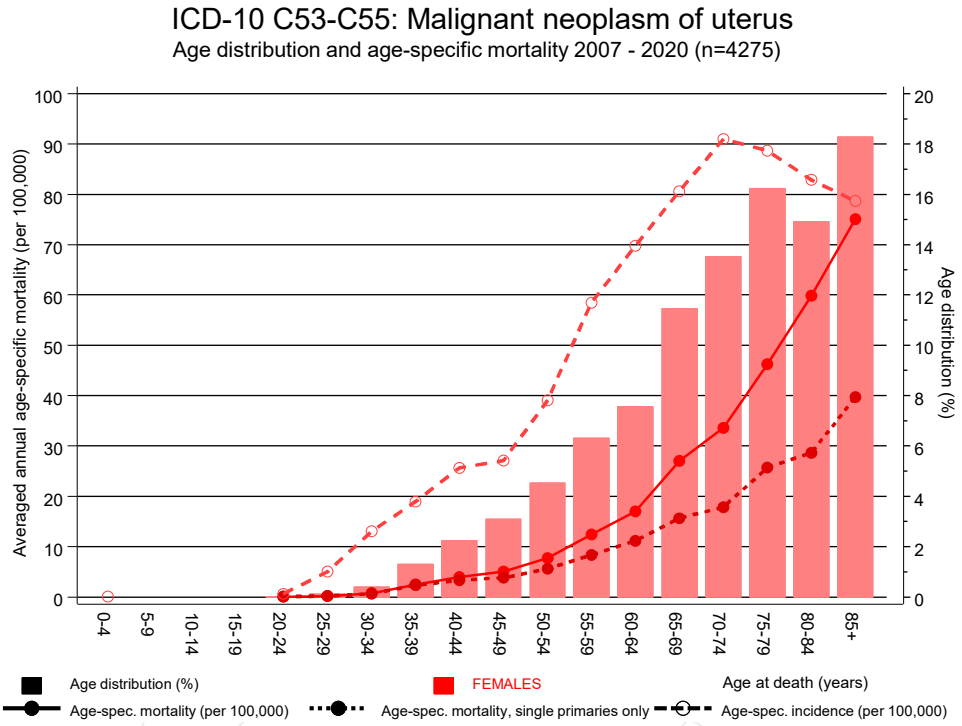

Figure 17. Distribution of age at death (bars; n=mean=65.7 yrs, median=67.6 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

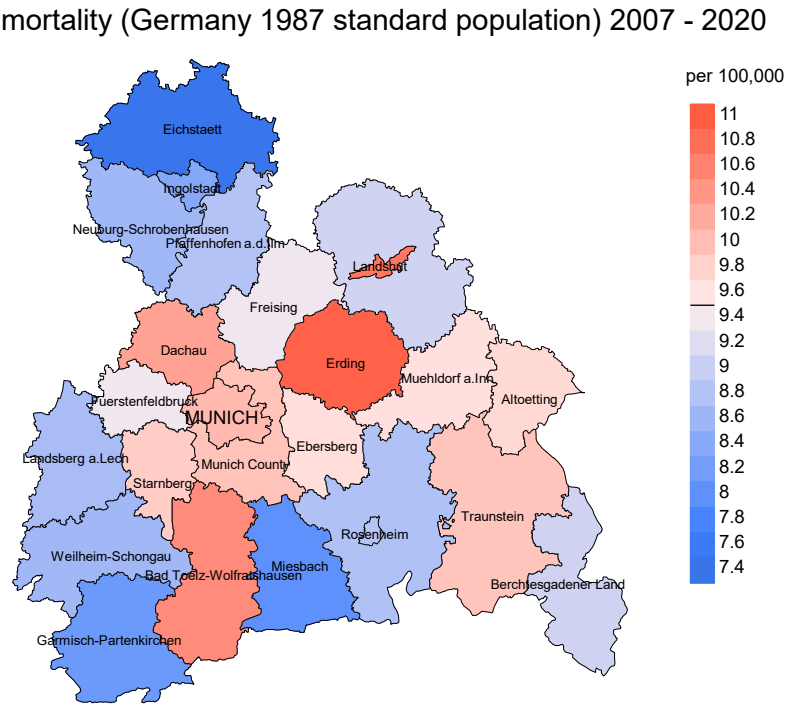

Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2020. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (9.5/100,000 WS N=4,275).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,727 female residents (averaged) in the period from 2007 to 2020 a total of 121 women died from uterine cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 9.7/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 7.5 and 12.3/100,000.

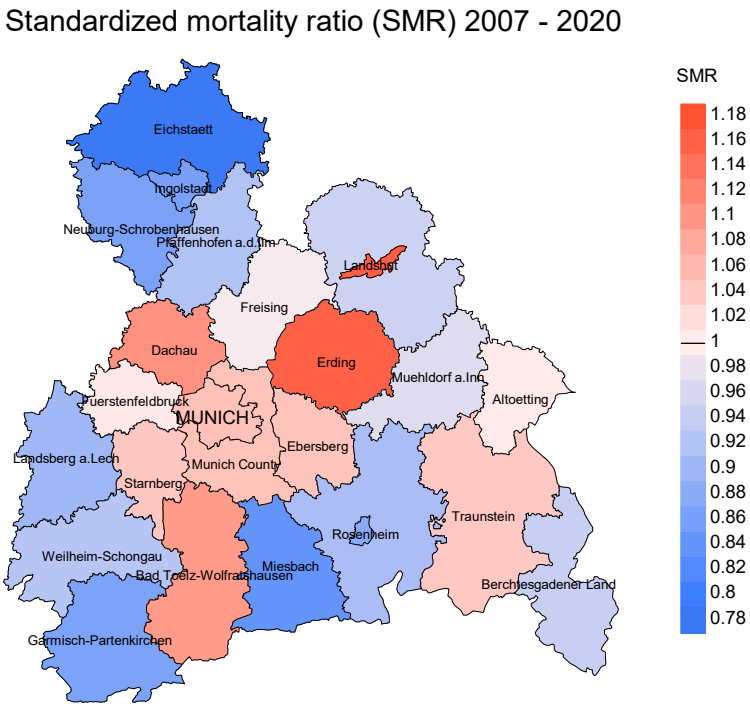

Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (N=4,275).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,153 female residents (averaged) in the period from 2007 to 2020 a total of 121 women died from uterine cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.05. Though, the value of this parameter may vary with an underlying probability of 99% between 0.82 and 1.32, 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 ratio of mortality and incidence (mortality-to-incidence ratio, **MIR**, **MI-Index**) is a statistical index 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 MIR. 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 (FRG) 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 of mortality to incidence, MIR
FRG	Federal Republic of Germany

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