Munich Cancer Registry

- Survival
- Selection Matrix
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- *Deutsch*

ICD-10 C53: Cervical cancer

Incidence and Mortality

Year of diagnosis	1998-2020
Patients	5,233
Diseases	5,237
Creation date	12/21/2021
Database export	12/20/2021
Population (females)	2.50 m

Munich Cancer Registry
Cancer Registry Bavaria - Upper Bavaria Regional Center
at Klinikum Grosshadern/IBE
Marchioninistr. 15
Munich, 81377
Germany

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

https://www.tumorregister-muenchen.de/en/facts/base/bC53__E-ICD-10-C53-Cervical-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

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	148	10	6.8	4.1	8.5	52.0	91.2
1999	164	2	1.2	5.1	8.2	44.5	88.4
2000	150	8	5.3	6.7	8.0	47.3	93.3
2001	155	6	3.9	6.8	7.6	45.2	91.6
2002	239	24	10.0	6.7	7.4	51.5	94.6 #
2003	220	10	4.5	6.4	7.1	56.4	92.7
2004	220	14	6.4	6.8	6.7	52.7	96.4
2005	240	12	5.0	6.4	6.5	43.8	92.5
2006	247	8	3.2	6.2	6.3	47.8	87.0
2007	246	8	3.3	6.4	5.9	43.9	87.0 #
2008	279	8	2.9	6.5	5.7	39.4	96.1
2009	275	11	4.0	6.6	5.3	45.5	94.9
2010	253	11	4.3	7.2	5.0	43.9	98.0
2011	250	8	3.2	7.1	4.6	36.4	96.0
2012	256	18	7.0	7.5	4.4	44.5	95.7
2013	247	11	4.5	7.6	4.2	45.7	98.4
2014	266	6	2.3	7.8	4.0	29.3	95.1
2015	223	14	6.3	8.0	3.5	40.8	96.0
2016	252	4	1.6	8.3	3.4	31.0	98.4
2017	265	9	3.4	8.5	3.0	24.5	99.2
2018	237	7	3.0	8.5	3.4	27.4	99.2
2019	207			8.7	2.3	21.3	99.5
2020	198			8.7	2.1	10.6	99.5 ##
1998–2020	5237	209	4.0	8.7	8.5	39.9	95.0

5,237 cases diagnosed 1998-2020 are related to a total of 5,233 patients. Currently, in 975 (18.6 %) of these 5,233 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 815 / 139 / 21 (15.6 % / 2.7 % / 0.4 %) 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 237 cases has been diagnosed, of which 8.5 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 3.4 % 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	148	12.6	8.3	10.6	11.5
1999	164	13.8	9.4	11.7	12.6
2000	150	12.5	8.3	10.5	11.4
2001	155	12.7	8.3	10.5	11.3
2002	239	12.2	7.7	9.8	10.9
2003	220	11.2	7.1	9.1	9.9
2004	220	11.1	7.1	9.1	9.8
2005	240	12.1	7.8	9.8	10.6
2006	247	12.3	8.0	10.1	10.9
2007	246	10.7	7.1	8.9	9.3
2008	279	12.0	8.0	10.0	10.7
2009	275	11.8	7.8	9.9	10.6
2010	253	10.8	7.1	9.0	9.6
2011	250	10.7	7.3	9.1	9.6
2012	256	10.8	6.9	8.8	9.5
2013	247	10.4	7.1	8.9	9.5
2014	266	11.0	7.6	9.5	10.2
2015	223	9.2	6.1	7.7	8.1
2016	252	10.3	7.0	8.8	9.3
2017	265	10.8	7.4	9.3	9.9
2018	237	9.5	6.4	8.1	8.7
2019	207	8.3	5.7	7.2	7.6
2020	198	8.0	5.5	6.9	7.3
1998-2020	5237	10.8	7.2	9.1	9.7

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	148	53.6	16.1	23.8	89.4	34.0	41.1	50.3	65.6	79.7
1999	164	51.1	16.4	24.4	90.0	33.8	37.6	47.5	63.7	77.7
2000	150	52.9	16.5	23.9	90.7	33.7	39.6	49.6	62.7	78.9
2001	155	53.9	17.1	22.9	96.0	34.1	40.0	48.9	63.5	80.9
2002	239	55.3	18.0	25.9	96.1	34.9	39.4	51.5	70.3	81.7
2003	220	56.0	17.0	27.3	93.4	35.9	42.6	53.3	67.4	82.0
2004	220	55.2	17.1	21.0	95.2	35.7	42.0	52.0	66.6	82.6
2005	240	54.9	17.6	24.0	100	34.9	39.9	53.9	68.5	80.8
2006	247	54.5	16.7	22.9	99.4	35.6	41.3	50.5	65.1	81.3
2007	246	52.9	17.0	22.0	96.6	33.8	40.6	48.5	66.1	79.9
2008	279	53.8	15.6	24.0	92.8	35.2	42.2	50.4	66.8	75.3
2009	275	55.1	17.0	23.1	95.1	36.1	41.1	52.1	67.1	81.9
2010	253	54.8	16.4	25.1	93.2	35.4	41.9	51.9	66.3	80.7
2011	250	52.9	16.3	25.7	95.6	32.8	40.7	50.1	63.0	77.9
2012	256	56.1	16.9	25.4	95.7	35.0	42.3	54.5	69.6	80.7
2013	247	53.1	15.7	22.1	96.0	34.5	42.1	50.2	63.3	77.1
2014	266	52.6	16.2	22.0	94.6	33.7	39.1	50.6	62.9	77.1
2015	223	54.9	17.2	27.2	96.7	34.9	41.7	51.9	65.9	82.6
2016	252	53.8	16.0	22.4	91.7	33.2	40.8	52.8	64.8	77.7
2017	265	53.9	15.3	28.3	94.5	33.7	42.0	53.2	64.8	74.3
2018	237	54.8	15.8	22.0	93.2	35.6	42.7	51.9	64.9	79.4
2019	207	53.8	15.2	22.5	88.6	34.4	40.6	54.1	64.1	77.0
2020	198	53.1	15.7	23.0	99.0	34.5	39.6	50.5	65.5	76.7
1998–2020	5237	54.1	16.5	21.0	100	34.6	41.0	51.4	65.7	79.2

Table 4

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

Age at diagnosis Years	Cases n	%	Cum.%
0-4			
5-9			
10-14			
15-19			
20-24	12	0.3	0.3
25-29	104	3.0	3.4
30-34	268	7.8	11.1
35-39	365	10.6	21.7
40-44	463	13.4	35.1
45-49	394	11.4	46.5
50-54	351	10.2	56.7
55-59	347	10.0	66.7
60-64	268	7.8	74.5
65-69	244	7.1	81.5
70-74	193	5.6	87.1
75-79	160	4.6	91.7
80-84	128	3.7	95.5
85+	157	4.5	100.0
All ages	3454	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=115 %	Prop. all cancers n=155051 %
0- 4		0.0		
5- 9		0.0		
10-14		0.0		
15-19		0.0		
20-24	12	0.6		2.3
25-29	103	4.6		8.7
30-34	268	11.8		12.5
35-39	365	16.1	0.3	10.4
40-44	462	19.1		7.5
45-49	394	15.1	0.5	4.2
50-54	351	14.0	0.9	2.8
55-59	347	15.9	1.2	2.6
60-64	268	14.1	1.9	1.7
65-69	244	13.5	2.9	1.3
70-74	193	11.2	4.7	1.0
75-79	160	10.7	5.0	0.8
80-84	128	12.0	17.2	0.8
85+	157	15.1	34.4	1.0
All ages	3452		3.3	2.2
Incidence				
Raw		10.3		
WS		6.9		
ES		8.7		
BRD-S		9.3		

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).

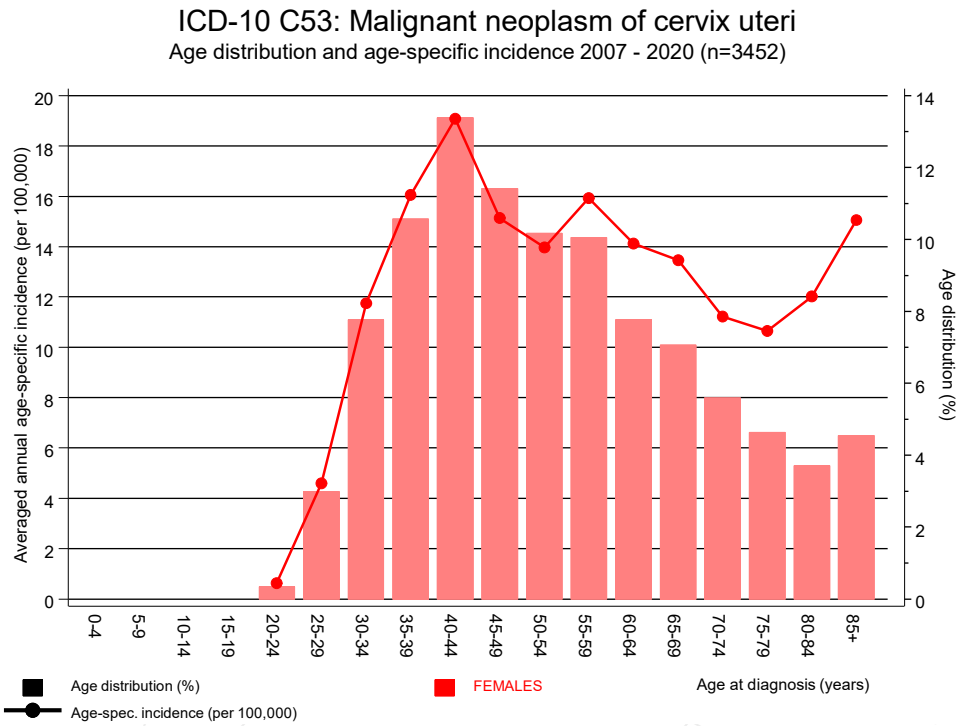

Figure 6. Age distribution (mean=54.0 yrs, median=51.5 yrs) and age-specific incidence.

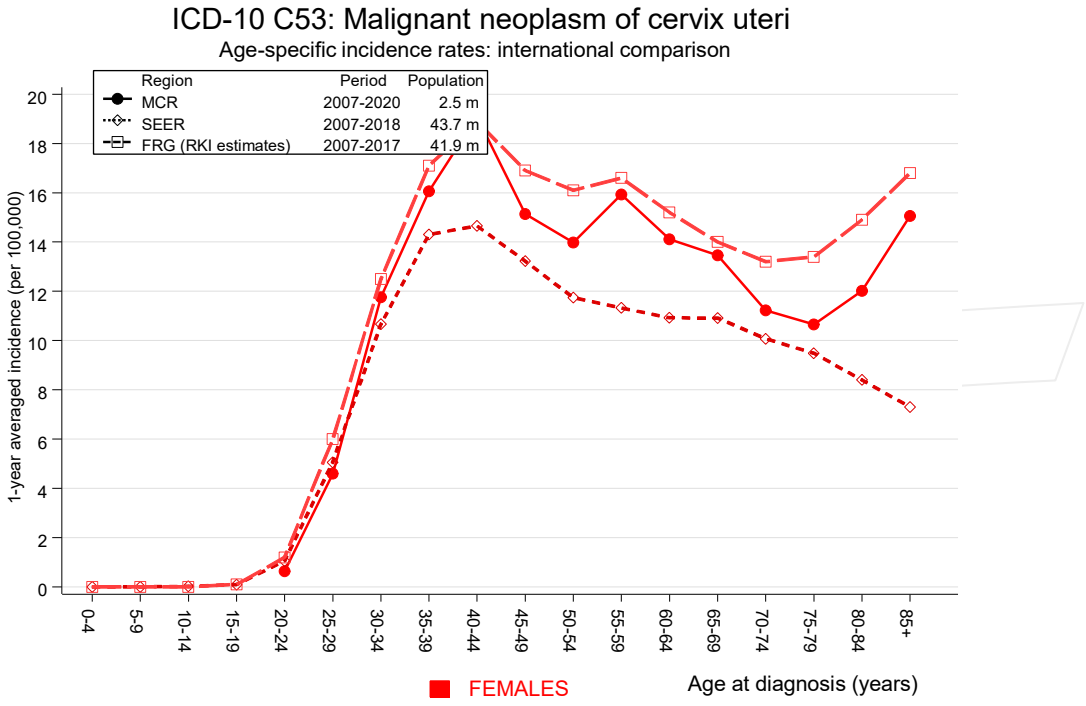

Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, RKI estimates) and SEER (Surveillance, Epidemiology, and End Results, USA).

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	2	0.8	2.6	0.3	9.2		0.6	
C07–C08	Salivary gland	2	0.2	10.1	1.2	36.4	#	0.9	
C09–C10	Oropharynx	4	0.7	6.0	1.6	15.4	#	1.7	
C12–C13	Hypopharynx	2	0.2	12.5	1.5	45.3	#	0.9	
C15	Oesophagus	5	0.8	6.5	2.1	15.2	#	2.2	
C16	Stomach	6	3.3	1.8	0.7	3.9		1.4	16.7
C18	Colon	26	9.4	2.8	1.8	4.1	#	8.5	3.8
C19–C20	Rectum	26	4.3	6.0	3.9	8.8	#	11.2	11.5
C21	Anus/canal	7	0.8	9.1	3.7	18.8	#	3.2	14.3
C22	Liver	5	1.2	4.1	1.3	9.5	#	1.9	
C23–C24	Bile	2	1.3	1.6	0.2	5.6		0.4	
C25	Pancreas	13	4.3	3.0	1.6	5.2	#	4.5	46.2
C30–C31	Sinuses	2	0.2	11.7	1.4	42.1	#	0.9	
C33–C34	Lung	63	9.0	7.0	5.4	9.0	#	27.8	9.5
C40–C41	Bone	3	0.1	22.8	4.7	66.7	#	1.5	
C43	Malign. melanoma	14	6.1	2.3	1.3	3.9	#	4.1	
C46,C49	Soft tissue	5	0.7	7.0	2.3	16.3	#	2.2	
C48	Peritoneal	3	0.5	6.1	1.3	17.8	#	1.3	
C50	Breast	95	45.4	2.1	1.7	2.6	#	25.5	2.1
C51	Vulva	9	1.1	8.1	3.7	15.3	#	4.1	
C52	Vagina	5	0.2	25.3	8.2	59.0	#	2.5	
C53	Cervix uteri	4	3.0	1.3	0.4	3.4		0.5	
C54	Corpus uteri	42	6.6	6.4	4.6	8.6	#	18.2	31.0
C55,C57	Fem. genitals un	2	0.2	10.1	1.2	36.4	#	0.9	50.0
C56	Ovary	44	4.9	8.9	6.5	12.0	#	20.1	29.5
C64	Kidney	5	2.4	2.1	0.7	4.8		1.3	
C65	Renal pelvis	2	0.3	7.1	0.9	25.5		0.9	
C66	Ureter	2	0.1	13.8	1.7	49.9	#	1.0	
C67	Bladder	13	1.8	7.3	3.9	12.4	#	5.8	7.7
C73	Thyroid	15	3.7	4.1	2.3	6.7	#	5.8	
C76–C79	CUP	7	1.7	4.0	1.6	8.3	#	2.7	
C82–C85	NHL	12	4.2	2.9	1.5	5.0	#	4.0	
C90	Mult. myeloma	3	1.2	2.5	0.5	7.3		0.9	
C91–C96	Leukaemia	11	1.6	6.9	3.4	12.3	#	4.8	9.1
Others, specified		5	1.4	3.7	1.2	8.6	#	1.9	
Not observed		0	2.8	0.0	0.0	1.3		-1.4	
All further malignancies		466	126.4	3.7	3.4	4.0	#	174.7	10.5

Patients	4993
Median age at next malignancy (years)	62.4
Person-years	19435
Mean observation time (years)	3.9
Median observation time (years)	2.0

The occurrence of further specified malignancy is statistically significant.

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

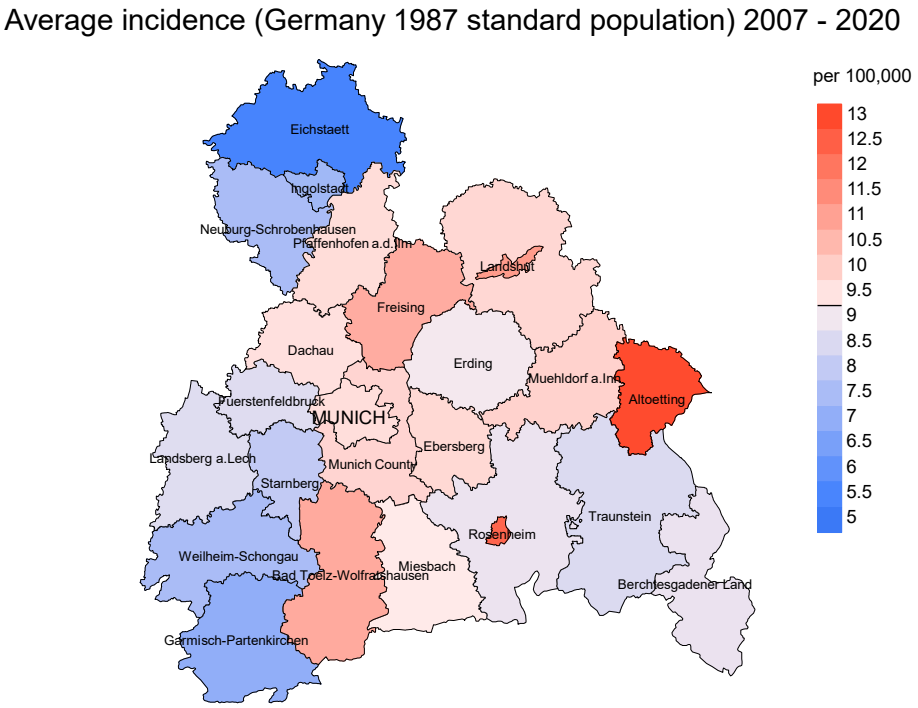

Figure 8a. Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (9.3/100,000 WS N=3,452).

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 105 women were identified with newly diagnosed cervical cancer. Therefore, the mean incidence 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 7.4 and 12.5/100,000.

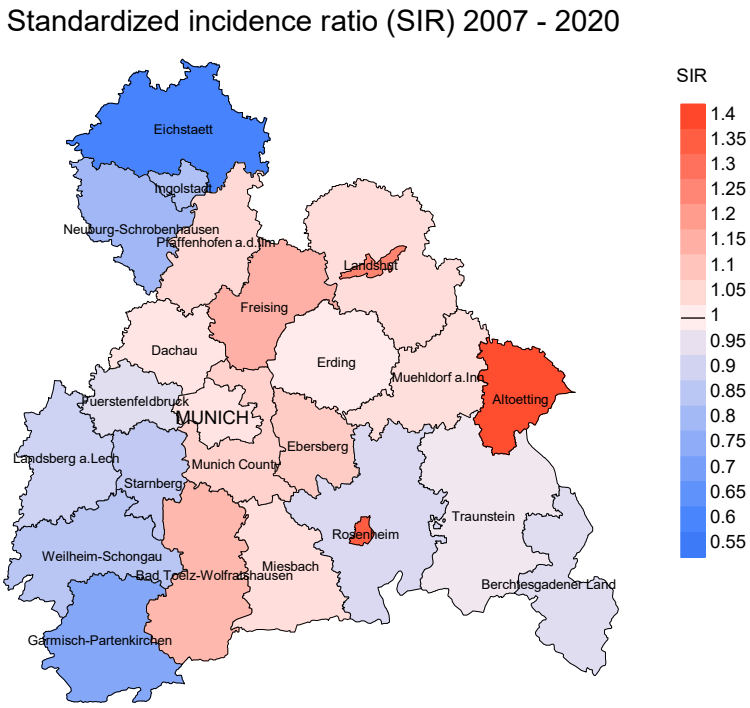

Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (N=3,452).

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 105 women were identified with newly diagnosed cervical cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.08. Though, the value of this parameter may vary with an underlying probability of 99% between 0.83 and 1.39, 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	148	91.2	6.8	77	52.0	87.0
1999	164	88.4	1.2	73	44.5	91.8
2000	150	93.3	5.3	71	47.3	97.2
2001	155	91.6	3.9	70	45.2	90.0
2002	239	94.6	10.0	123	51.5	92.7
2003	220	92.7	4.5	124	56.4	94.4
2004	220	96.4	6.4	116	52.7	95.7
2005	240	92.5	5.0	105	43.8	95.2
2006	247	87.0	3.2	118	47.8	96.6
2007	246	87.0	3.3	108	43.9	93.5
2008	279	96.1	2.9	110	39.4	99.1
2009	275	94.9	4.0	125	45.5	96.8
2010	253	98.0	4.3	111	43.9	93.7
2011	250	96.0	3.2	91	36.4	94.5
2012	256	95.7	7.0	114	44.5	95.6
2013	247	98.4	4.5	113	45.7	92.9
2014	266	95.1	2.3	78	29.3	94.9
2015	223	96.0	6.3	91	40.8	93.4
2016	252	98.4	1.6	78	31.0	78.2
2017	265	99.2	3.4	65	24.5	83.1
2018	237	99.2	3.0	65	27.4	64.6
2019	207	99.5		44	21.3	75.0
2020	198	99.5		21	10.6	100.0
1998-2020	5237	95.0	4.0	2091	39.9	92.2

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	148	91	85.7	15	10.1
1999	164	93	87.1	14	8.5
2000	150	91	91.2	15	10.0
2001	155	67	89.6	13	8.4
2002	239	134	94.0	36	15.1
2003	220	151	94.7	26	11.8
2004	220	153	96.7	26	11.8
2005	240	150	96.0	25	10.4
2006	247	143	95.1	19	7.7
2007	246	146	94.5	28	11.4
2008	279	165	98.8	24	8.6
2009	275	169	98.8	26	9.5
2010	253	175	98.9	28	11.1
2011	250	173	98.8	28	11.2
2012	256	155	96.1	39	15.2
2013	247	171	97.7	28	11.3
2014	266	155	96.8	21	7.9
2015	223	147	98.6	23	10.3
2016	252	159	98.7	17	6.7
2017	265	156	96.8	18	6.8
2018	237	137	65.7	21	8.9
2019	207	120	45.8	15	7.2
2020	198	146	82.2	8	4.0
1998–2020	5237	3247	92.2	513	9.8

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	91	59.3	40.7	83.3
1999	93	68.8	31.2	82.7
2000	91	65.9	34.1	83.1
2001	67	65.7	34.3	86.7
2002	134	70.9	29.1	82.5
2003	151	74.8	25.2	85.3
2004	153	67.3	32.7	76.4
2005	150	72.7	27.3	83.3
2006	143	64.3	35.7	79.4
2007	146	74.0	26.0	78.3
2008	165	70.3	29.7	76.1
2009	169	65.7	34.3	76.0
2010	175	74.3	25.7	81.5
2011	173	69.9	30.1	74.9
2012	155	67.1	32.9	79.2
2013	171	70.2	29.8	77.8
2014	155	67.7	32.3	81.3
2015	147	69.4	30.6	75.9
2016	159	72.3	27.7	79.6
2017	156	68.6	31.4	72.8
2018	137	63.5	36.5	68.9
2019	120	48.3	51.7	76.4
2020	146	52.7	47.3	73.3
1998-2020	3247	67.6	32.4	78.6

Table 10

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	91	74.7	70.4	80.7	74.3
1999	93	74.8	71.5	79.6	75.1
2000	91	78.1	74.8	83.5	76.2
2001	67	73.9	69.7	81.7	71.2
2002	134	74.6	65.5	87.5	68.7
2003	151	73.1	66.5	81.9	72.7
2004	153	74.9	64.6	85.0	69.9
2005	150	76.6	68.0	84.0	70.0
2006	143	74.6	68.9	84.0	72.6
2007	146	72.1	68.5	83.4	69.5
2008	165	70.2	65.8	85.7	67.0
2009	169	75.1	66.0	86.0	68.0
2010	175	69.6	63.5	80.9	65.7
2011	173	74.1	68.4	84.9	69.6
2012	155	73.3	69.7	85.8	69.7
2013	171	70.9	62.3	82.3	65.3
2014	155	73.2	68.1	78.0	70.5
2015	147	73.4	69.4	80.2	72.2
2016	159	73.6	68.1	81.6	70.9
2017	156	72.0	67.9	86.5	67.9
2018	137	68.6	63.1	80.6	65.9
2019	120	68.4	61.9	78.0	64.8
2020	146	70.5	62.2	83.4	63.9
1998–2020	3247	72.7	67.0	82.5	69.4

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	54	4.6	0.36	2.2	0.27	3.2	0.30	4.0	0.35
1999	64	5.4	0.39	2.5	0.27	3.7	0.31	4.7	0.37
2000	60	5.0	0.40	2.3	0.27	3.3	0.31	4.2	0.36
2001	44	3.6	0.28	1.7	0.21	2.4	0.23	3.0	0.27
2002	95	4.9	0.40	2.5	0.33	3.5	0.36	4.2	0.39
2003	113	5.7	0.51	2.9	0.41	4.0	0.44	4.9	0.49
2004	103	5.2	0.47	2.7	0.38	3.8	0.42	4.6	0.47
2005	109	5.5	0.45	2.6	0.33	3.7	0.38	4.4	0.41
2006	92	4.6	0.37	2.1	0.26	3.0	0.30	3.7	0.34
2007	108	4.7	0.44	2.3	0.33	3.2	0.36	3.8	0.41
2008	116	5.0	0.42	2.5	0.32	3.5	0.35	4.0	0.38
2009	111	4.8	0.41	2.4	0.31	3.3	0.34	3.9	0.37
2010	130	5.6	0.51	2.9	0.41	4.0	0.44	4.6	0.47
2011	121	5.2	0.48	2.5	0.34	3.5	0.38	4.1	0.43
2012	104	4.4	0.41	2.0	0.30	2.9	0.34	3.6	0.37
2013	120	5.0	0.49	2.7	0.38	3.7	0.42	4.3	0.45
2014	105	4.4	0.39	2.1	0.27	2.9	0.31	3.5	0.34
2015	102	4.2	0.46	2.0	0.32	2.8	0.36	3.3	0.40
2016	115	4.7	0.46	2.2	0.32	3.1	0.36	3.7	0.40
2017	107	4.3	0.40	2.2	0.29	3.0	0.32	3.5	0.36
2018	87	3.5	0.37	1.8	0.28	2.5	0.31	2.8	0.32
2019	58	2.3	0.28	1.3	0.23	1.8	0.24	1.9	0.26
2020	77	3.1	0.39	1.7	0.31	2.3	0.33	2.6	0.35
1998-2020	2195	4.5	0.42	2.3	0.31	3.2	0.35	3.7	0.38

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	0.1	0.1
25-29	5	0.3	0.4
30-34	13	0.9	1.3
35-39	53	3.6	4.9
40-44	81	5.5	10.5
45-49	104	7.1	17.6
50-54	125	8.6	26.1
55-59	164	11.2	37.4
60-64	147	10.1	47.4
65-69	169	11.6	59.0
70-74	152	10.4	69.4
75-79	145	9.9	79.3
80-84	136	9.3	88.6
85+	166	11.4	100.0
All ages	1461	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	0.05	5.1
30-34	13	0.6	0.05	7.2
35-39	53	2.3	0.15	13.0
40-44	81	3.3	0.18	9.5
45-49	104	4.0	0.26	6.2
50-54	125	5.0	0.36	4.7
55-59	164	7.5	0.47	4.3
60-64	147	7.7	0.55	2.9
65-69	169	9.3	0.69	2.4
70-74	152	8.8	0.79	1.7
75-79	145	9.7	0.91	1.5
80-84	136	12.8	1.06	1.4
85+	166	15.9	1.06	1.4
All ages	1461			2.4
Mortality				
Raw		4.3	0.42	
WS		2.2	0.32	
ES		3.0	0.35	
BRD-S		3.5	0.38	
PYLL-70				
per 100,000		45.3		
ES		38.7		
AYLL-70		14.8		

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	10	1.0	1	10.0			9	90.0
C09–C10 Oropharynx	11	1.1	5	45.5			6	54.5
C12–C13 Hypopharynx	3	0.3	1	33.3			2	66.7
C15 Oesophagus	9	0.9	1	11.1			8	88.9
C16 Stomach	19	1.9	1	5.3	1	5.3	17	89.5
C18 Colon	74	7.5	15	20.3	5	6.8	54	73.0
C19–C20 Rectum	58	5.9	13	22.4	1	1.7	44	75.9
C21 Anus/canal	18	1.8	2	11.1			16	88.9
C22 Liver	7	0.7					7	100.0
C23–C24 Bile	13	1.3	3	23.1			10	76.9
C25 Pancreas	34	3.5	1	2.9	1	2.9	32	94.1
C33–C34 Lung	138	14.0	10	7.2	10	7.2	118	85.5
C40–C41 Bone	6	0.6	1	16.7			5	83.3
C43 Malign. melanoma	25	2.5	11	44.0	1	4.0	13	52.0
C44 Skin others	25	2.5	7	28.0	1	4.0	17	68.0
C46,C49 Soft tissue	8	0.8	2	25.0			6	75.0
C48 Peritoneal	5	0.5			2	40.0	3	60.0
C50 Breast	169	17.2	49	29.0	12	7.1	108	63.9
C51 Vulva	18	1.8	3	16.7	4	22.2	11	61.1
C52 Vagina	9	0.9	1	11.1	2	22.2	6	66.7
C53 Cervix uteri	14	1.4					14	100.0
C54 Corpus uteri	45	4.6	11	24.4	6	13.3	28	62.2
C55,C57 Fem. genitals un	6	0.6			1	16.7	5	83.3
C56 Ovary	70	7.1	5	7.1	12	17.1	53	75.7
C64 Kidney	19	1.9	7	36.8	1	5.3	11	57.9
C65 Renal pelvis	7	0.7	1	14.3			6	85.7
C66 Ureter	7	0.7					7	100.0
C67 Bladder	62	6.3	5	8.1	7	11.3	50	80.6
C70–C72 CNS cancer	10	1.0					10	100.0
C73 Thyroid	11	1.1	3	27.3			8	72.7
C76–C79 CUP	20	2.0	3	15.0	3	15.0	14	70.0
C82–C85 NHL	22	2.2	6	27.3	1	4.5	15	68.2
C90 Mult. myeloma	4	0.4					4	100.0
C91–C96 Leukaemia	12	1.2	1	8.3	2	16.7	9	75.0
Others, specified	15	1.5	8	53.3			7	46.7
All further malignancies	983	100.0	177	18.0	73	7.4	733	74.6

Further malignancies with number of cases 1 to 2 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	12	0.5	0.05	7.5
35-39	51	2.2	0.15	13.8
40-44	78	3.2	0.18	10.3
45-49	93	3.6	0.26	6.5
50-54	110	4.4	0.35	4.9
55-59	144	6.6	0.47	4.5
60-64	127	6.7	0.58	3.1
65-69	143	7.9	0.72	2.6
70-74	127	7.4	0.86	1.9
75-79	125	8.3	0.98	1.7
80-84	114	10.7	1.27	1.6
85+	140	13.4	1.23	1.5
All ages	1270			2.6
Mortality				
Raw		3.8	0.42	
WS		1.9	0.31	
ES		2.7	0.34	
BRD-S		3.1	0.38	
PYLL-70				
per 100,000		41.2		
ES		35.2		
AYLL-70		15.2		

* 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	12	0.5	0.05	7.6
35-39	50	2.2	0.15	13.7
40-44	70	2.9	0.17	9.4
45-49	80	3.1	0.24	5.6
50-54	90	3.6	0.30	4.1
55-59	112	5.1	0.39	3.6
60-64	91	4.8	0.45	2.3
65-69	100	5.5	0.54	1.9
70-74	69	4.0	0.55	1.1
75-79	72	4.8	0.61	1.0
80-84	60	5.6	0.74	0.9
85+	89	8.5	0.82	1.0
All ages	901			1.9
Mortality				
Raw		2.7	0.32	
WS		1.5	0.25	
ES		2.0	0.27	
BRD-S		2.2	0.29	
PYLL-70				
per 100,000		35.3		
ES		30.4		
AYLL-70		16.3		

* See corresponding tables with multiple malignancies.

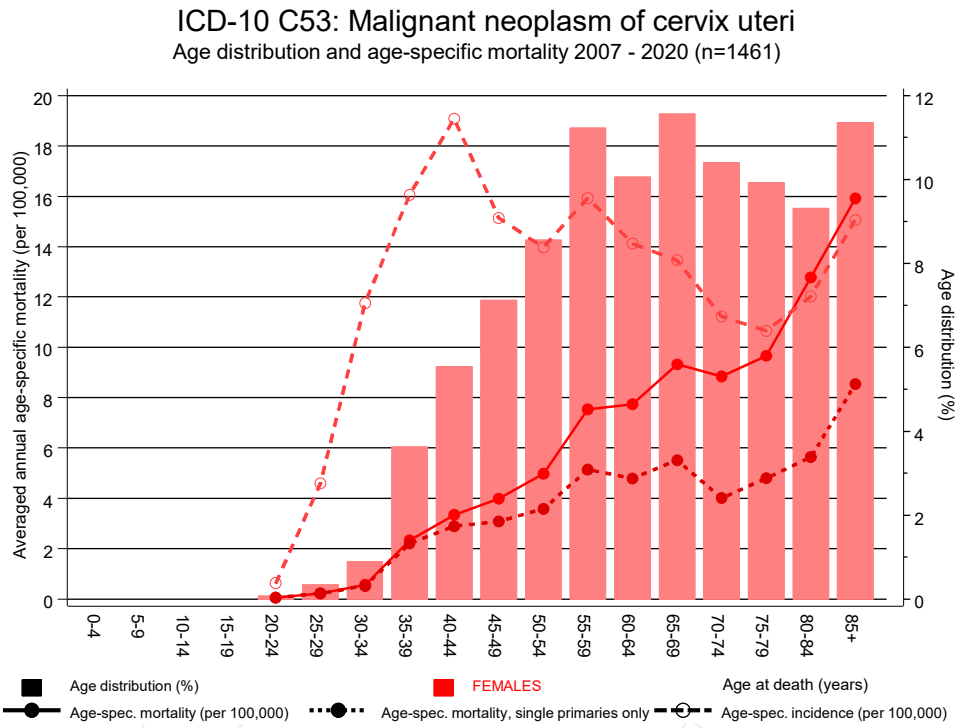

Figure 17. Distribution of age at death (bars; n=mean=57.0 yrs, median=56.0 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

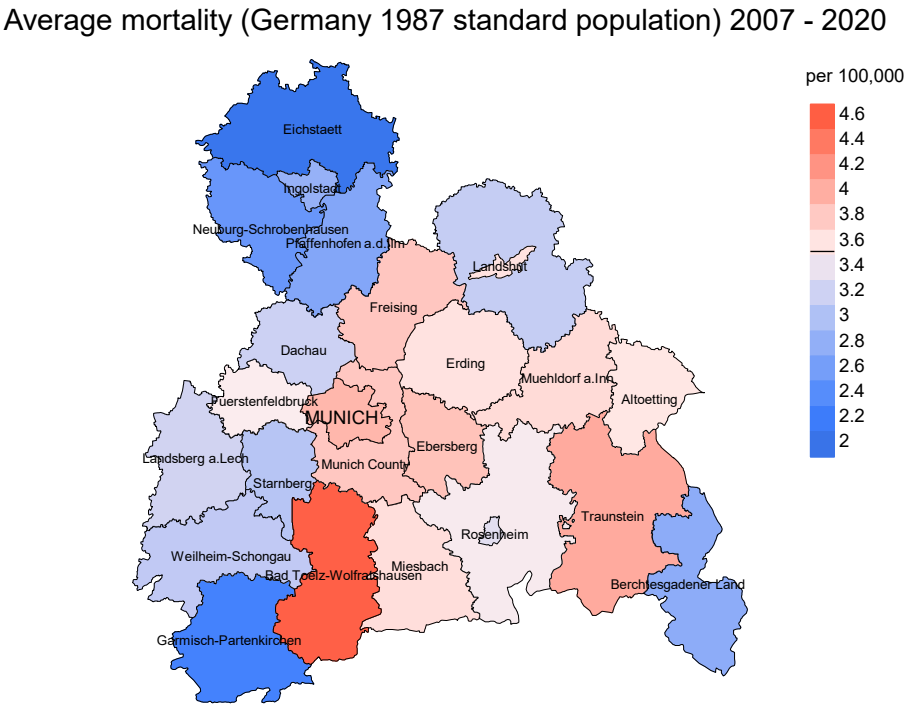

Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2020. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (3.5/100,000 WS N=1,461).

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 44 women died from cervical cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 3.9/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 2.5 and 5.7/100,000.

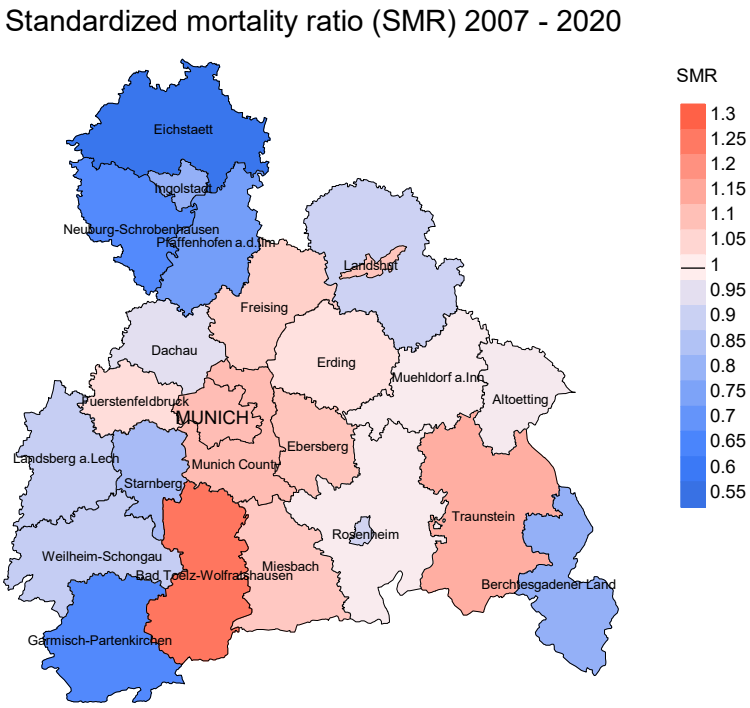

Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (N=1,461).

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 44 women died from cervical cancer. Therefore, the mean standardized mortality ratio (SMR) 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 0.71 and 1.59, 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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