Munich Cancer Registry

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ICD-10 C51: Vulva cancer

Incidence and Mortality

Year of diagnosis	1998-2020
Patients	2,172
Diseases	2,176
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/bC51__E-ICD-10-C51-Vulva-cancer-incidence-and-mortality.pdf

Index of figures and tables

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
C51.-	Malignant neoplasm of vulva
C51.0	Labium majus
C51.1	Labium minus
C51.2	Clitoris
C51.8	Overlapping lesion of vulva
C51.9	Vulva, 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	45	3	6.7	11.1	10.6	82.2	97.8
1999	37	3	8.1	8.5	10.4	83.8	100.0
2000	40	5	12.5	11.5	10.5	82.5	100.0
2001	37	4	10.8	10.7	10.4	83.8	97.3
2002	71	5	7.0	10.0	10.3	74.6	98.6 #
2003	77	5	6.5	13.7	10.2	84.4	98.7
2004	75	5	6.7	14.9	10.0	78.7	98.7
2005	92	6	6.5	15.6	9.9	76.1	96.7
2006	89	1	1.1	15.5	9.4	68.5	96.6
2007	109	4	3.7	15.3	9.2	67.9	95.4 #
2008	109	4	3.7	15.6	8.8	67.9	100.0
2009	104	3	2.9	15.3	8.3	66.3	98.1
2010	139	4	2.9	15.7	8.0	64.7	99.3
2011	115	6	5.2	16.0	7.2	60.0	100.0
2012	125	3	2.4	16.2	6.7	51.2	99.2
2013	102	4	3.9	16.1	6.3	47.1	97.1
2014	136	6	4.4	17.1	5.9	46.3	99.3
2015	123	3	2.4	17.8	5.8	46.3	95.1
2016	112	1	0.9	18.3	5.4	43.8	98.2
2017	115	4	3.5	18.6	5.6	36.5	100.0
2018	120	1	0.8	19.0	5.3	32.5	100.0
2019	107			19.0	4.5	26.2	99.1
2020	97			19.1	3.2	14.4	99.0 ##
1998-2020	2176	80	3.7	19.1	10.6	56.1	98.4

2,176 cases diagnosed 1998-2020 are related to a total of 2,172 patients. Currently, in 629 (29.0 %) of these 2,172 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 477 / 110 / 42 (22.0 % / 5.1 % / 1.9 %) 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 120 cases has been diagnosed, of which 19.0 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 5.3 % 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	45	3.8	1.7	2.5	3.3
1999	37	3.1	1.2	1.9	2.5
2000	40	3.3	1.5	2.2	2.8
2001	37	3.0	1.4	2.0	2.6
2002	71	3.6	1.5	2.3	3.0
2003	77	3.9	1.4	2.2	3.0
2004	75	3.8	1.6	2.3	3.0
2005	92	4.6	1.7	2.6	3.7
2006	89	4.4	1.8	2.6	3.4
2007	109	4.7	1.9	2.9	3.8
2008	109	4.7	1.8	2.8	3.6
2009	104	4.5	1.8	2.6	3.4
2010	139	5.9	2.4	3.5	4.5
2011	115	4.9	1.8	2.8	3.6
2012	125	5.3	2.3	3.3	4.1
2013	102	4.3	1.6	2.4	3.1
2014	136	5.6	2.3	3.4	4.4
2015	123	5.1	2.2	3.1	4.0
2016	112	4.6	2.0	2.8	3.4
2017	115	4.7	2.0	2.9	3.5
2018	120	4.8	2.1	3.0	3.6
2019	107	4.3	1.6	2.4	3.2
2020	97	3.9	1.4	2.2	2.9
1998–2020	2176	4.5	1.8	2.7	3.5

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	45	71.3	13.5	36.3	93.3	52.1	65.7	73.3	80.4	87.2
1999	37	71.8	15.5	34.3	94.0	48.7	62.4	75.6	84.8	88.0
2000	40	69.6	16.3	34.5	92.3	42.8	59.5	74.5	83.1	88.2
2001	37	69.8	13.3	33.3	89.1	49.6	61.0	70.0	80.0	86.2
2002	71	71.1	16.0	26.9	96.1	46.6	64.9	75.0	81.7	89.4
2003	77	74.5	14.9	34.3	94.8	50.2	63.8	80.0	85.7	91.0
2004	75	72.0	14.8	32.7	95.5	50.7	61.1	76.3	83.9	88.6
2005	92	74.3	13.7	34.9	96.9	53.8	67.1	78.0	83.4	89.4
2006	89	72.9	14.3	34.6	97.2	47.7	65.3	74.5	83.4	88.7
2007	109	71.6	14.2	34.1	96.7	48.6	62.9	75.1	82.6	86.8
2008	109	73.3	13.9	28.7	96.9	52.4	65.9	75.3	83.5	89.2
2009	104	72.6	15.2	24.9	100	50.5	64.4	76.6	84.5	88.3
2010	139	71.9	13.5	36.5	95.1	48.6	65.0	73.4	82.1	88.7
2011	115	72.9	14.8	30.3	98.5	49.7	63.0	75.7	83.9	89.1
2012	125	70.5	15.0	27.3	101	47.7	62.0	73.4	82.2	86.9
2013	102	73.3	14.1	28.6	98.6	51.7	66.4	76.1	82.8	88.4
2014	136	70.7	13.9	23.0	99.0	51.5	61.8	74.6	80.2	85.3
2015	123	69.6	13.8	30.1	95.2	49.4	61.1	72.7	80.6	84.0
2016	112	69.8	16.2	31.9	99.1	48.8	55.2	72.9	83.9	88.9
2017	115	70.5	14.3	28.5	95.5	50.2	62.0	73.0	80.2	87.6
2018	120	70.5	14.3	33.4	95.4	50.6	61.6	72.1	81.1	88.7
2019	107	72.2	13.5	29.1	95.6	54.5	63.2	76.1	81.8	87.5
2020	97	72.9	13.0	34.9	101	54.6	66.6	75.5	81.8	87.2
1998–2020	2176	71.7	14.4	23.0	101	50.5	63.0	74.7	82.4	88.1

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	2	0.1	0.1
25-29	6	0.4	0.5
30-34	11	0.7	1.2
35-39	26	1.6	2.8
40-44	37	2.3	5.1
45-49	69	4.3	9.4
50-54	89	5.5	14.9
55-59	105	6.5	21.4
60-64	125	7.7	29.1
65-69	164	10.2	39.3
70-74	205	12.7	52.0
75-79	265	16.4	68.4
80-84	235	14.6	83.0
85+	274	17.0	100.0
All ages	1613	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=43 %	Prop. all cancers n=155051 %
0- 4		0.0		
5- 9		0.0		
10-14		0.0		
15-19		0.0		
20-24	2	0.1		0.4
25-29	6	0.3		0.5
30-34	11	0.5		0.5
35-39	26	1.1		0.7
40-44	36	1.5		0.6
45-49	69	2.7		0.7
50-54	89	3.5		0.7
55-59	105	4.8		0.8
60-64	125	6.6	0.8	0.8
65-69	164	9.0		0.9
70-74	205	11.9	0.5	1.0
75-79	265	17.6	1.9	1.4
80-84	235	22.1	2.1	1.5
85+	274	26.3	11.3	1.7
All ages	1612		2.7	1.0
Incidence				
Raw		4.8		
WS		1.9		
ES		2.9		
BRD-S		3.6		

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).

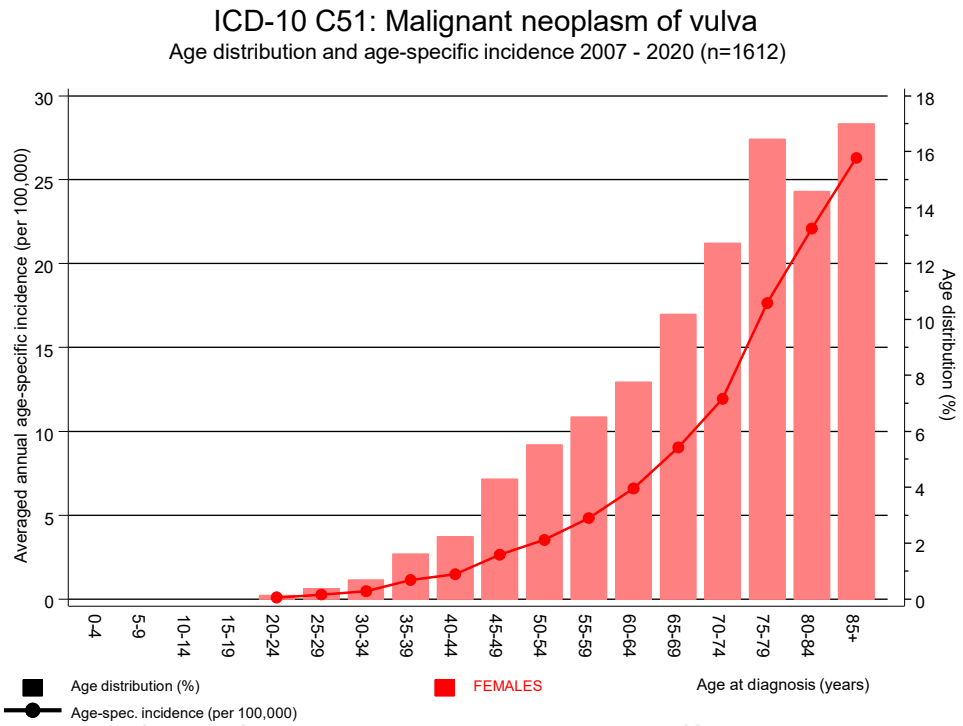

Figure 6. Age distribution (mean=71.5 yrs, median=74.3 yrs) and age-specific incidence.

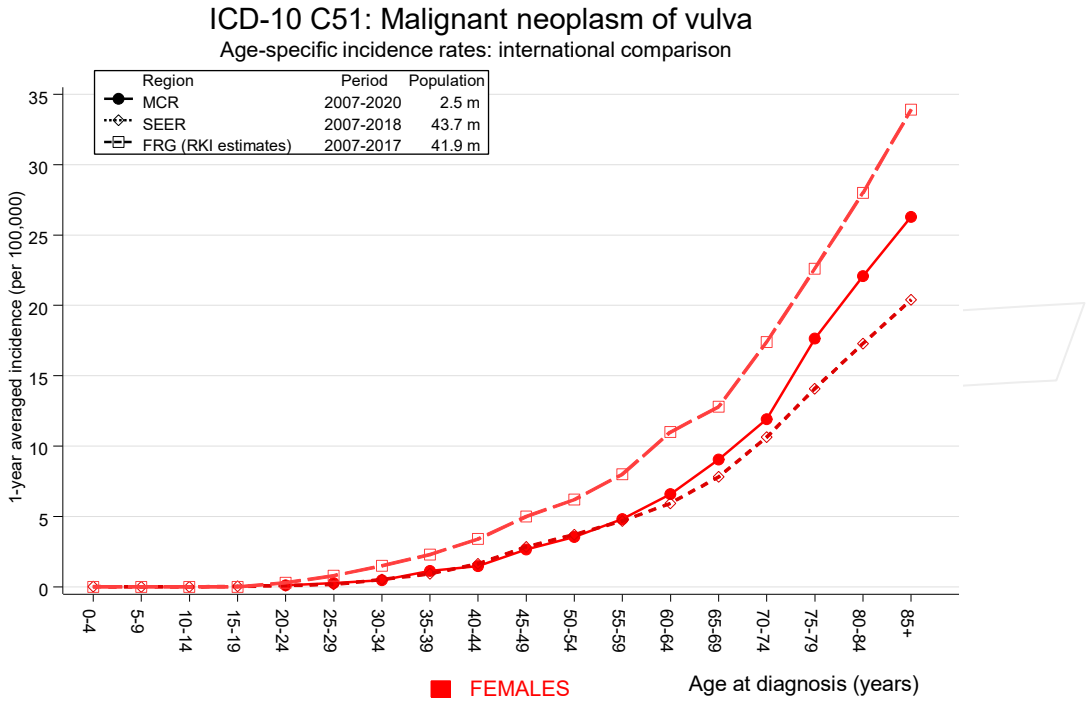

Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, RKI estimates) and SEER (Surveillance, Epidemiology, and End Results, USA).

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	3	0.5	6.4	1.3	18.7	#	3.5	
C16	Stomach	6	3.3	1.8	0.7	3.9		3.7	
C18	Colon	18	9.4	1.9	1.1	3.0	#	11.8	22.2
C19–C20	Rectum	5	3.6	1.4	0.5	3.3		2.0	
C21	Anus/canal	12	0.5	24.8	12.8	43.4	#	15.8	
C22	Liver	2	1.2	1.7	0.2	6.2		1.1	
C23–C24	Bile	5	1.4	3.6	1.2	8.4	#	5.0	
C25	Pancreas	3	4.6	0.7	0.1	1.9		−2.2	
C30–C31	Sinuses	1	0.1	8.0	0.2	44.6		1.2	
C32	Larynx	1	0.1	7.1	0.2	39.5		1.2	
C33–C34	Lung	29	6.3	4.6	3.1	6.6	#	31.1	10.3
C43	Malign. melanoma	12	3.2	3.7	1.9	6.5	#	12.0	33.3
C46,C49	Soft tissue	2	0.5	3.9	0.5	14.2		2.0	
C50	Breast	50	25.2	2.0	1.5	2.6	#	34.1	12.0
C51	Vulva	4	1.1	3.8	1.0	9.7	#	4.0	
C52	Vagina	3	0.2	16.5	3.4	48.3	#	3.9	
C53	Cervix uteri	9	1.0	8.7	4.0	16.5	#	10.9	11.1
C54	Corpus uteri	12	4.6	2.6	1.4	4.6	#	10.2	
C56	Ovary	9	3.4	2.6	1.2	5.0	#	7.7	22.2
C64	Kidney	1	2.0	0.5	0.0	2.7		−1.4	
C65	Renal pelvis	2	0.3	6.8	0.8	24.5		2.3	
C67	Bladder	6	2.0	3.0	1.1	6.5	#	5.5	
C68	Urethra	2	0.0	85.0	10.3	307.1	#	2.7	
C70–C72	CNS cancer	2	1.1	1.9	0.2	6.7		1.3	50.0
C73	Thyroid	1	1.1	0.9	0.0	4.9		−0.2	
C76–C79	CUP	4	1.8	2.2	0.6	5.6		3.0	
C81	Hodgkin lymphoma	2	0.1	13.5	1.6	48.9	#	2.5	
C82–C85	NHL	10	3.5	2.8	1.4	5.2	#	8.9	
C90	Mult. myeloma	1	1.1	0.9	0.0	5.0		−0.2	
C91–C96	Leukaemia	4	1.4	2.9	0.8	7.3		3.6	75.0
C96	Systemic	1	0.0	35.1	0.9	195.5		1.3	100.0
Not observed		0	3.5	0.0	0.0	1.1		−4.8	
All further malignancies		222	88.3	2.5	2.2	2.9	#	183.6	11.3

Patients	2095
Median age at next malignancy (years)	74.0
Person-years	7280
Mean observation time (years)	3.5
Median observation time (years)	1.7

The occurrence of further specified malignancy is statistically significant.

Average incidence (Germany 1987 standard population) 2007 - 2020

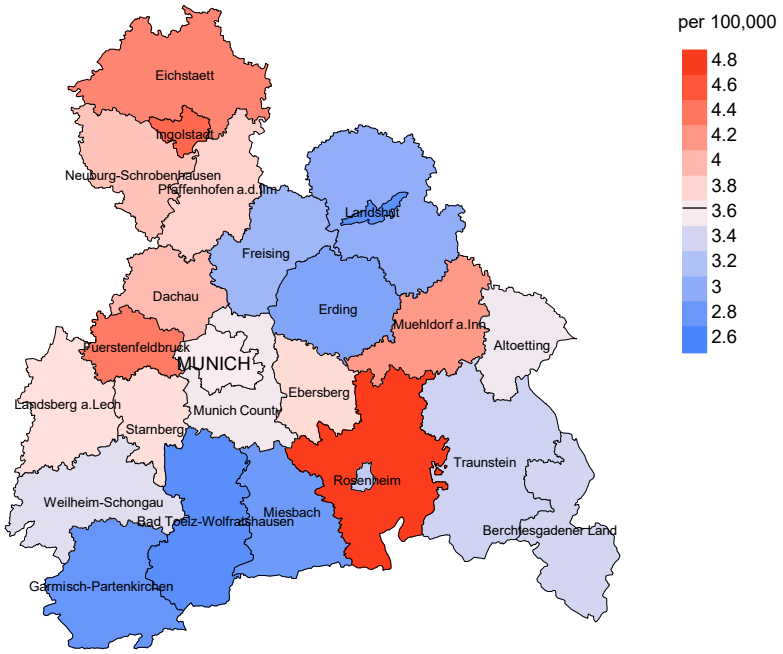

Figure 8a. Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (3.6/100,000 WS N=1,612).

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 47 women were identified with newly diagnosed vulva cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 3.8/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 2.5 and 5.5/100,000.

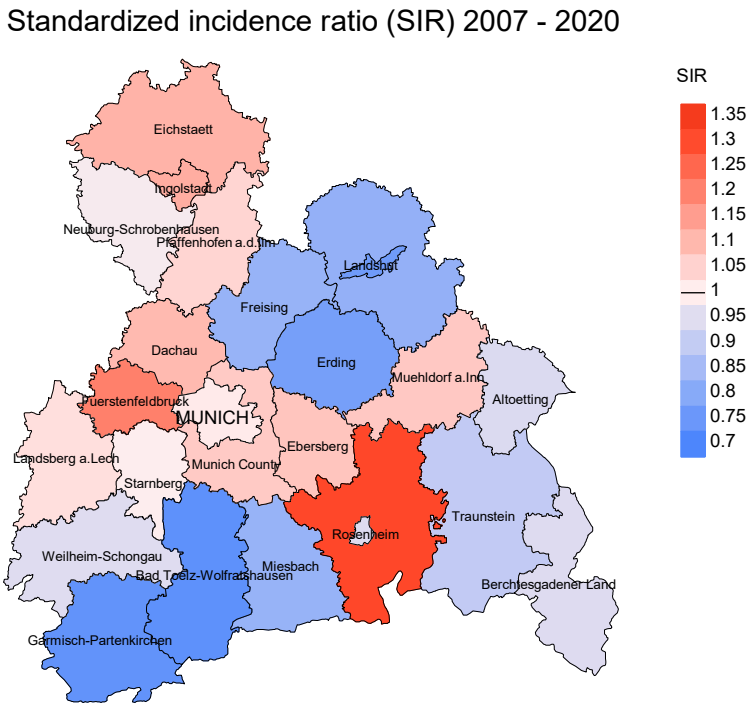

Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (N=1,612).

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 47 women were identified with newly diagnosed vulva cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.07. Though, the value of this parameter may vary with an underlying probability of 99% between 0.71 and 1.55, 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	45	97.8	6.7	37	82.2	89.2
1999	37	100.0	8.1	31	83.8	90.3
2000	40	100.0	12.5	33	82.5	84.8
2001	37	97.3	10.8	31	83.8	96.8
2002	71	98.6	7.0	53	74.6	96.2
2003	77	98.7	6.5	65	84.4	98.5
2004	75	98.7	6.7	59	78.7	98.3
2005	92	96.7	6.5	70	76.1	94.3
2006	89	96.6	1.1	61	68.5	95.1
2007	109	95.4	3.7	74	67.9	95.9
2008	109	100.0	3.7	74	67.9	91.9
2009	104	98.1	2.9	69	66.3	94.2
2010	139	99.3	2.9	90	64.7	93.3
2011	115	100.0	5.2	69	60.0	92.8
2012	125	99.2	2.4	64	51.2	87.5
2013	102	97.1	3.9	48	47.1	93.8
2014	136	99.3	4.4	63	46.3	90.5
2015	123	95.1	2.4	57	46.3	91.2
2016	112	98.2	0.9	49	43.8	85.7
2017	115	100.0	3.5	42	36.5	88.1
2018	120	100.0	0.8	39	32.5	64.1
2019	107	99.1		28	26.2	78.6
2020	97	99.0		14	14.4	85.7
1998-2020	2176	98.4	3.7	1220	56.1	91.5

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	45	24	75.0	4	8.9
1999	37	27	81.5	6	16.2
2000	40	31	96.8	5	12.5
2001	37	29	89.7	4	10.8
2002	71	40	95.0	12	16.9
2003	77	44	97.7	11	14.3
2004	75	53	100.0	11	14.7
2005	92	51	100.0	12	13.0
2006	89	49	95.9	5	5.6
2007	109	64	95.3	14	12.8
2008	109	67	100.0	17	15.6
2009	104	59	98.3	7	6.7
2010	139	68	100.0	17	12.2
2011	115	83	98.8	16	13.9
2012	125	86	97.7	17	13.6
2013	102	66	97.0	7	6.9
2014	136	67	97.0	12	8.8
2015	123	73	100.0	10	8.1
2016	112	78	100.0	11	9.8
2017	115	90	96.7	8	7.0
2018	120	82	69.5	9	7.5
2019	107	73	45.2	7	6.5
2020	97	79	94.9	4	4.1
1998-2020	2176	1383	92.6	226	10.4

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	24	70.8	29.2	83.3
1999	27	59.3	40.7	95.5
2000	31	61.3	38.7	76.7
2001	29	62.1	37.9	80.8
2002	40	72.5	27.5	73.7
2003	44	75.0	25.0	79.1
2004	53	73.6	26.4	84.9
2005	51	64.7	35.3	74.5
2006	49	59.2	40.8	74.5
2007	64	70.3	29.7	82.0
2008	67	67.2	32.8	71.6
2009	59	62.7	37.3	77.6
2010	68	63.2	36.8	73.5
2011	83	67.5	32.5	76.8
2012	86	60.5	39.5	73.8
2013	66	54.5	45.5	71.9
2014	67	68.7	31.3	76.9
2015	73	53.4	46.6	63.0
2016	78	71.8	28.2	75.6
2017	90	53.3	46.7	62.1
2018	82	52.4	47.6	71.9
2019	73	32.9	67.1	57.6
2020	79	35.4	64.6	69.3
1998-2020	1383	60.1	39.9	73.8

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	24	82.7	77.8	87.0	83.0
1999	27	79.5	73.6	84.3	76.9
2000	31	84.7	85.4	84.6	85.4
2001	29	79.3	78.6	80.5	79.0
2002	40	81.9	81.9	83.7	81.9
2003	44	82.3	78.2	88.9	77.9
2004	53	83.4	83.2	84.5	83.2
2005	51	83.2	81.4	85.1	82.9
2006	49	80.2	77.7	84.7	78.3
2007	64	82.7	80.8	87.4	81.0
2008	67	85.5	81.8	86.5	82.5
2009	59	82.9	81.1	84.9	82.6
2010	68	82.4	81.5	84.9	82.0
2011	83	83.9	79.1	86.0	79.4
2012	86	84.9	81.2	88.2	83.4
2013	66	84.5	80.1	88.3	81.5
2014	67	81.5	80.4	87.8	80.4
2015	73	83.0	78.5	87.7	79.8
2016	78	82.5	81.1	85.7	80.7
2017	90	85.4	81.5	88.4	82.1
2018	82	80.6	79.6	83.0	79.5
2019	73	85.8	81.8	87.8	81.8
2020	79	82.3	81.8	82.5	82.0
1998–2020	1383	83.0	80.8	85.9	81.3

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	17	1.4	0.38	0.5	0.31	0.8	0.32	1.1	0.33
1999	16	1.3	0.43	0.5	0.45	0.8	0.44	1.1	0.43
2000	19	1.6	0.48	0.4	0.27	0.7	0.34	1.1	0.38
2001	18	1.5	0.49	0.5	0.38	0.9	0.42	1.2	0.46
2002	29	1.5	0.41	0.4	0.27	0.7	0.32	1.1	0.36
2003	33	1.7	0.43	0.6	0.41	0.9	0.42	1.3	0.42
2004	39	2.0	0.52	0.6	0.36	0.9	0.40	1.3	0.43
2005	33	1.7	0.36	0.5	0.30	0.8	0.31	1.2	0.32
2006	29	1.4	0.33	0.5	0.25	0.8	0.29	1.2	0.34
2007	45	1.9	0.41	0.6	0.29	0.9	0.32	1.4	0.37
2008	45	1.9	0.41	0.6	0.32	0.9	0.34	1.3	0.35
2009	37	1.6	0.36	0.5	0.26	0.8	0.29	1.1	0.31
2010	43	1.8	0.31	0.5	0.23	0.9	0.25	1.3	0.29
2011	56	2.4	0.49	0.8	0.44	1.2	0.44	1.6	0.44
2012	52	2.2	0.42	0.6	0.25	1.0	0.30	1.5	0.37
2013	36	1.5	0.35	0.5	0.31	0.8	0.33	1.0	0.34
2014	46	1.9	0.34	0.6	0.27	0.9	0.28	1.3	0.29
2015	39	1.6	0.32	0.5	0.21	0.8	0.24	1.1	0.28
2016	56	2.3	0.50	0.7	0.34	1.1	0.38	1.5	0.43
2017	48	1.9	0.42	0.6	0.29	0.9	0.32	1.3	0.36
2018	43	1.7	0.36	0.6	0.28	0.9	0.30	1.2	0.32
2019	24	1.0	0.22	0.3	0.16	0.4	0.17	0.6	0.18
2020	30	1.2	0.31	0.4	0.27	0.6	0.27	0.8	0.29
1998-2020	833	1.7	0.38	0.5	0.29	0.8	0.31	1.2	0.34

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			
25-29			
30-34	1	0.2	0.2
35-39	3	0.5	0.7
40-44	5	0.8	1.5
45-49	5	0.8	2.3
50-54	15	2.5	4.8
55-59	16	2.7	7.5
60-64	26	4.3	11.8
65-69	62	10.3	22.2
70-74	64	10.7	32.8
75-79	86	14.3	47.2
80-84	127	21.2	68.3
85+	190	31.7	100.0
All ages	600	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		0.0		
25-29		0.0		
30-34	1	0.0	0.09	0.6
35-39	3	0.1	0.12	0.7
40-44	5	0.2	0.14	0.6
45-49	5	0.2	0.07	0.3
50-54	15	0.6	0.17	0.6
55-59	16	0.7	0.15	0.4
60-64	26	1.4	0.21	0.5
65-69	62	3.4	0.38	0.9
70-74	64	3.7	0.31	0.7
75-79	86	5.7	0.32	0.9
80-84	127	11.9	0.54	1.4
85+	190	18.2	0.69	1.6
All ages	600			1.0
Mortality				
Raw		1.8	0.37	
WS		0.5	0.28	
ES		0.9	0.30	
BRD-S		1.2	0.33	
PYLL-70				
per 100,000		4.2		
ES		3.5		
AYLL-70		9.0		

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 ←%
C00	Lip	2	0.6	2	100.0				
C03–C06	Oral cavity	3	0.8	2	66.7			1	33.3
C09–C10	Oropharynx	1	0.3	1	100.0				
C12–C13	Hypopharynx	2	0.6	2	100.0				
C15	Oesophagus	1	0.3					1	100.0
C16	Stomach	12	3.4	4	33.3			8	66.7
C18	Colon	27	7.6	11	40.7	1	3.7	15	55.6
C19–C20	Rectum	12	3.4	8	66.7	1	8.3	3	25.0
C21	Anus/canal	9	2.5	5	55.6			4	44.4
C22	Liver	4	1.1	1	25.0			3	75.0
C23–C24	Bile	3	0.8					3	100.0
C25	Pancreas	4	1.1	1	25.0			3	75.0
C30–C31	Sinuses	1	0.3					1	100.0
C32	Larynx	2	0.6	2	100.0				
C33–C34	Lung	36	10.1	7	19.4	4	11.1	25	69.4
C43	Malign. melanoma	15	4.2	3	20.0	2	13.3	10	66.7
C44	Skin others	22	6.2	7	31.8	4	18.2	11	50.0
C46,C49	Soft tissue	4	1.1	1	25.0	1	25.0	2	50.0
C48	Peritoneal	1	0.3	1	100.0				
C50	Breast	66	18.5	49	74.2	3	4.5	14	21.2
C51	Vulva	14	3.9					14	100.0
C52	Vagina	3	0.8	1	33.3	1	33.3	1	33.3
C53	Cervix uteri	21	5.9	14	66.7	4	19.0	3	14.3
C54	Corpus uteri	25	7.0	20	80.0	3	12.0	2	8.0
C55,C57	Fem. genitals un	2	0.6	1	50.0			1	50.0
C56	Ovary	17	4.8	8	47.1	2	11.8	7	41.2
C64	Kidney	4	1.1	3	75.0			1	25.0
C65	Renal pelvis	2	0.6					2	100.0
C67	Bladder	9	2.5	2	22.2	1	11.1	6	66.7
C68	Urethra	3	0.8	1	33.3			2	66.7
C70–C72	CNS cancer	2	0.6	1	50.0			1	50.0
C76–C79	CUP	5	1.4			2	40.0	3	60.0
C81	Hodgkin lymphoma	2	0.6	2	100.0				
C82–C85	NHL	11	3.1	4	36.4			7	63.6
C90	Mult. myeloma	3	0.8	1	33.3			2	66.7
C91–C96	Leukaemia	5	1.4	1	20.0			4	80.0
C96	Systemic	1	0.3			1	100.0		
All further malignancies		356	100.0	166	46.6	30	8.4	160	44.9

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		0.0		
25-29		0.0		
30-34	1	0.0	0.11	0.6
35-39	3	0.1	0.14	0.8
40-44	3	0.1	0.10	0.4
45-49	5	0.2	0.09	0.3
50-54	10	0.4	0.15	0.4
55-59	11	0.5	0.13	0.3
60-64	19	1.0	0.18	0.5
65-69	51	2.8	0.38	0.9
70-74	50	2.9	0.30	0.7
75-79	59	3.9	0.30	0.8
80-84	98	9.2	0.56	1.4
85+	149	14.3	0.72	1.6
All ages	459			0.9
Mortality				
Raw		1.4	0.36	
WS		0.4	0.26	
ES		0.7	0.29	
BRD-S		0.9	0.32	
PYLL-70				
per 100,000		3.2		
ES		2.7		
AYLL-70		8.9		

* 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		0.0		
25-29		0.0		
30-34		0.0		
35-39	3	0.1	0.14	0.8
40-44	3	0.1	0.10	0.4
45-49	5	0.2	0.10	0.4
50-54	7	0.3	0.11	0.3
55-59	10	0.5	0.13	0.3
60-64	16	0.8	0.18	0.4
65-69	32	1.8	0.28	0.6
70-74	45	2.6	0.31	0.7
75-79	42	2.8	0.24	0.6
80-84	80	7.5	0.51	1.2
85+	128	12.3	0.64	1.4
All ages	371			0.8
Mortality				
Raw		1.1	0.32	
WS		0.3	0.23	
ES		0.5	0.26	
BRD-S		0.7	0.28	
PYLL-70				
per 100,000		2.6		
ES		2.2		
AYLL-70		9.7		

* See corresponding tables with multiple malignancies.

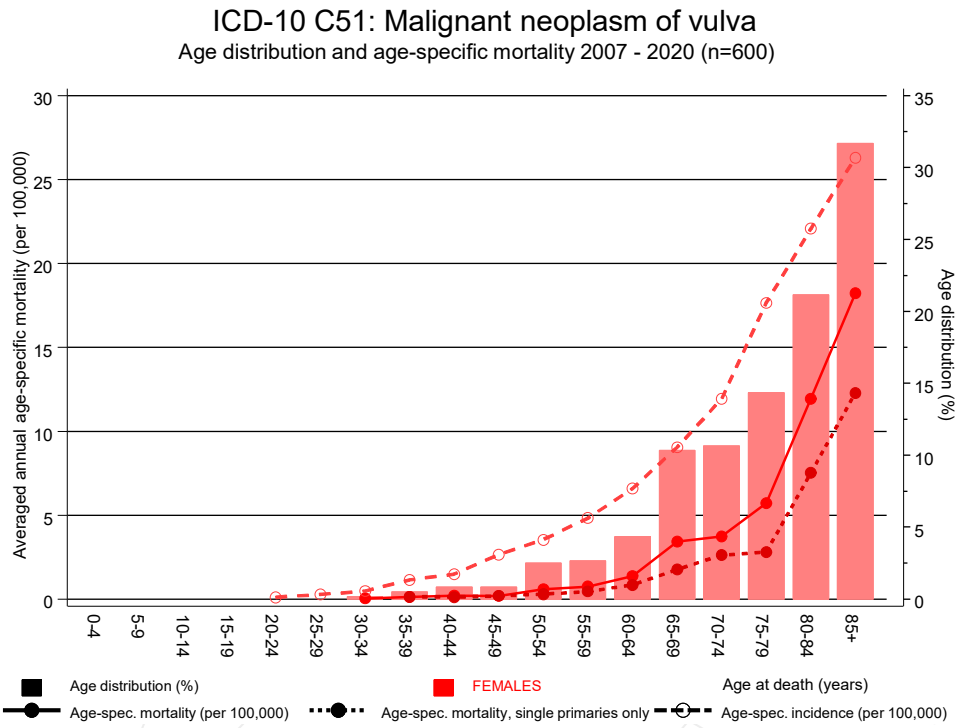

Figure 17. Distribution of age at death (bars; n=mean=74.6 yrs, median=76.8 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

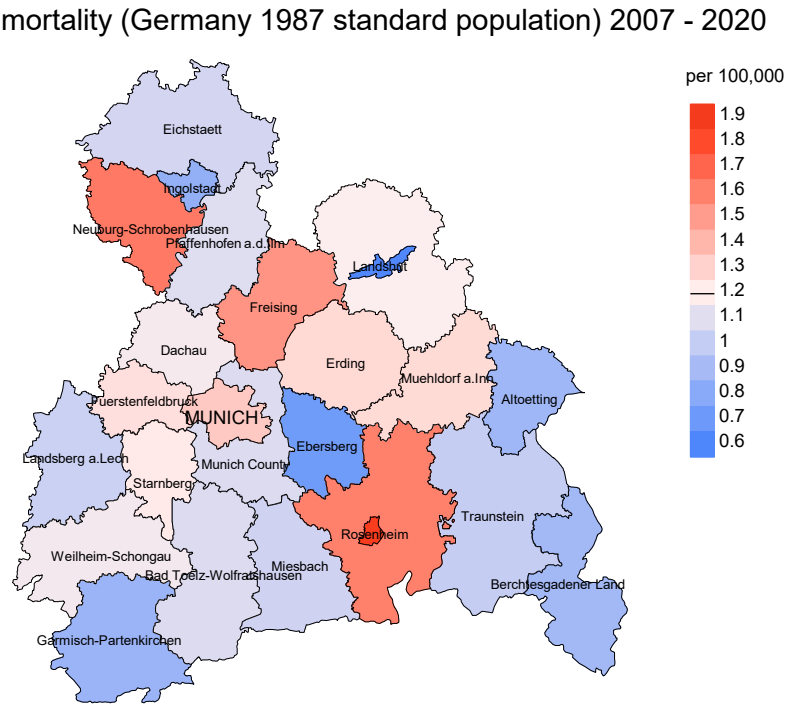

Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2020. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (1.2/100,000 WS N=600).

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 11 women died from vulva cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.7/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.3 and 1.6/100,000.

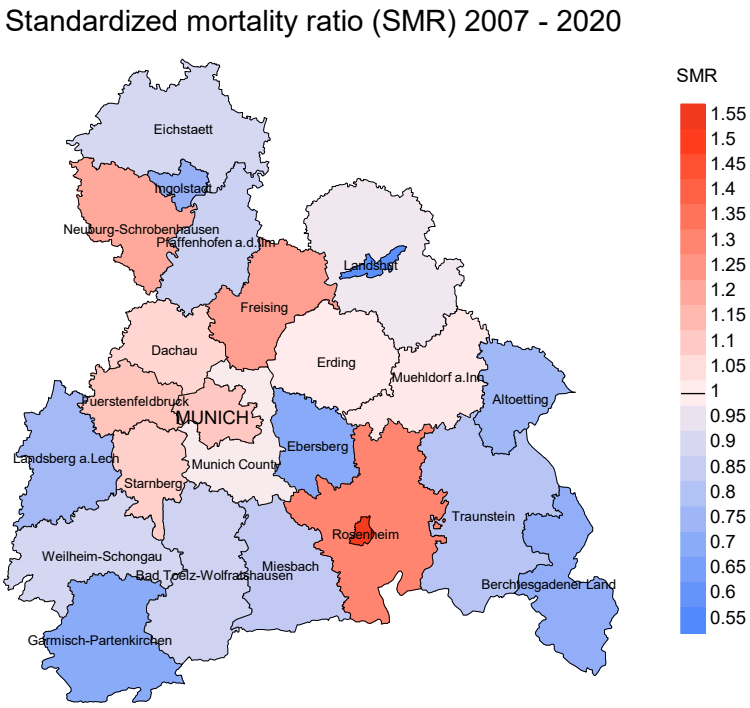

Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (N=600).

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 11 women died from vulva cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.69. Though, the value of this parameter may vary with an underlying probability of 99% between 0.27 and 1.44, 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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