Munich Cancer Registry

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ICD-10 C43: Malignant melanoma

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	15,418
Diseases	16,145
Creation date	04/13/2016
Export date	12/23/2015
Population	4.64 m

Munich Cancer Registry at Munich Cancer Center
Marchioninistr. 15
Munich, 81377
Germany

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

http://www.tumorregister-muenchen.de/en/facts/base/bC43__E-ICD-10-C43-Malignant-melanoma-incidence-and-mortality.pdf

Global Statements about the statistics on the Internet −
Baseline Statistics (grey button), **Survival** (red button)

In these analyses, the clinics and physicians of Upper Bavaria and the city and county of Landshut[#], with a total of 4.64 million inhabitants, account for the frequency of cancer diseases[##] and the achieved long term results. Additionally, the long term survival evaluated by the Munich Cancer Registry (MCR) is compared with the results of the population-based registry in the USA (SEER), which is useful for checking the consistency of the data on an international level.

In comparing several tables, inconsistent figures may be detected. This is based on the fact that different patient cohorts are included in the base calculation, for example when proportions of multiple tumors or DCO-cases[###] are concerned. In other cases the individual tumor diagnosis is the basis for calculation, for example with incidence.

The foot notes describe the currentness of the data. The baseline statistics and survival data are updated annually. This yearly analysis comprises the Annual Report of the MCR.

Clinics and physicians have access to essentially more detailed data, with which they can check, compare and in the best case optimize their own data and results.

We would be pleased to receive corrections, critique and useful suggestions. Just send an e-mail to tumor@ibe.med.uni-muenchen.de.

Munich Cancer Registry, April 2016

[#] Base data has been collected since 1998. An increase in new diseases is apparent, which is an effect of two extensions in the MCR catchment area (from a base population of 2.51 million to 3.96 in 2002, and to 4.52 million in 2007).

[##] Due to the high frequency and good prognosis of non-malignant skin cancer (C44), no systematic ascertainment is performed for this diagnosis. C44 is not designated as a primary, but rather as a secondary tumor.

[###] DCO (death certificate only) identifies a cancer case that first becomes available to the MCR through the death certificate.

ICD-10 codes (ICD-10 2015) used for specifying cancer site

Code	Description
C43.-	Malignant melanoma of skin
C43.0	Malignant melanoma of lip
C43.1	Malignant melanoma of eyelid, including canthus
C43.2	Malignant melanoma of ear and external auricular canal
C43.3	Malignant melanoma of other and unspecified parts of face
C43.4	Malignant melanoma of scalp and neck
C43.5	Malignant melanoma of trunk
C43.6	Malignant melanoma of upper limb, including shoulder
C43.7	Malignant melanoma of lower limb, including hip
C43.8	Overlapping malignant melanoma of skin
C43.9	Malignant melanoma of skin, unspecified

INCIDENCE

Table 1

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

Year of diagnosis	Cases n	DCO cases n	Prop. DCO %	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %	
1998	475	10	2.1	33.7	39.6	96.6	
1999	460	9	2.0	34.1	34.8	97.2	
2000	516	7	1.4	34.5	36.8	96.9	
2001	520	8	1.5	34.8	36.7	97.5	
2002	879	15	1.7	31.9	32.7	96.5	#
2003	804	17	2.1	28.1	32.2	94.5	
2004	898	23	2.6	31.1	34.0	94.4	
2005	897	12	1.3	31.2	30.1	93.1	
2006	921	15	1.6	32.7	30.1	88.5	
2007	1045	16	1.5	31.1	25.3	61.2	#
2008	1197	21	1.8	33.7	25.2	56.3	
2009	1181	22	1.9	35.1	22.5	51.7	
2010	1371	19	1.4	33.4	19.3	50.7	
2011	1522	21	1.4	32.2	15.1	46.2	
2012	1377	23	1.7	32.5	13.5	49.2	
2013	1396	20	1.4	33.5	7.8	98.5	
2014	686	14	2.0	30.2	5.8	98.0	##
1998-2014	16145	272	1.7	32.5	23.5	74.7	

The increases of incident cases in 2002 and 2007 reflect the expansion to additional registry areas.

Please be aware that data of recent annual patient cohorts may not yet be fully processed. The years under evaluation can be found in the respective headings.

Table 1a

All patients with invasive cancer
by year of diagnosis and gender
(incl. DCO)

Year of diagnosis	All n	Males n	Females n	Prop. males %
1998	475	240	235	50.5
1999	460	215	245	46.7
2000	516	281	235	54.5
2001	520	266	254	51.2
2002	879	465	414	52.9
2003	804	396	408	49.3
2004	898	449	449	50.0
2005	897	474	423	52.8
2006	921	470	451	51.0
2007	1045	532	513	50.9
2008	1197	639	558	53.4
2009	1181	646	535	54.7
2010	1371	726	645	53.0
2011	1522	787	735	51.7
2012	1377	731	646	53.1
2013	1396	792	604	56.7
2014	686	382	304	55.7
1998-2014	16145	8491	7654	52.6

Table 2

Incidence measures by year of diagnosis including DCO cases
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002,
and from 3.96 to 4.64 m as of 2007, respectively)

Year of diagnosis	Males n	Females n	Males Inc. raw	Fem. Inc. raw	Males Inc. WS	Fem. Inc. WS	Males Inc. ES	Fem. Inc. ES	Males Inc. BRD-S	Fem. Inc. BRD-S
1998	240	235	21.7	20.0	14.8	12.1	19.4	15.8	22.6	17.9
1999	215	245	19.2	20.6	13.1	13.3	17.1	16.8	19.8	19.0
2000	281	235	24.7	19.6	16.0	13.0	21.6	16.1	25.1	18.3
2001	266	254	23.0	20.9	14.6	13.3	19.8	17.0	23.3	19.0
2002	465	414	25.0	21.1	15.8	13.6	21.4	17.0	24.7	19.0
2003	396	408	21.1	20.7	13.2	13.2	17.8	16.7	21.1	18.4
2004	449	449	23.9	22.7	14.7	14.1	19.8	18.0	24.1	20.3
2005	474	423	25.0	21.3	15.4	13.2	20.9	17.0	24.5	19.1
2006	470	451	24.5	22.5	14.6	13.3	20.1	17.3	24.1	19.7
2007	532	513	24.0	22.2	14.1	13.5	19.6	17.4	23.5	19.6
2008	639	558	28.7	24.0	16.9	14.0	23.0	18.3	26.9	20.7
2009	646	535	28.9	23.0	16.0	13.4	22.4	17.5	27.0	20.0
2010	726	645	32.2	27.6	18.3	16.6	25.2	21.4	30.4	24.1
2011	787	735	34.4	31.1	19.7	19.1	27.0	24.1	32.3	27.2
2012	731	646	32.0	27.4	17.5	16.3	24.5	21.1	29.7	24.0
2013	792	604	34.7	25.6	19.1	15.2	26.7	19.7	32.6	22.4
2014	382	304	16.7	12.9	9.0	7.5	12.7	9.7	15.7	11.1
1998-2014	8491	7654	26.5	22.9	15.8	14.0	21.6	18.0	25.9	20.3

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

Table 3

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	475	57.6	16.8	17.2	96.2	33.5	47.0	58.8	70.0	78.6
1999	460	56.6	17.4	9.1	93.5	32.3	42.4	57.9	70.1	79.2
2000	516	56.8	17.1	15.6	98.4	33.4	43.2	58.4	69.5	78.9
2001	520	57.7	16.8	21.1	94.3	33.6	44.2	59.5	69.7	79.6
2002	879	58.5	17.4	7.6	99.0	34.1	44.7	60.6	71.5	80.5
2003	804	58.5	16.6	8.1	97.6	36.1	45.3	60.8	70.5	80.3
2004	898	59.4	16.5	15.6	95.6	36.5	46.3	61.6	72.3	80.4
2005	897	59.9	16.1	11.4	96.6	37.0	48.8	62.1	71.0	79.9
2006	921	61.4	16.5	3.1	102	38.4	49.0	64.0	73.3	82.2
2007	1045	60.8	16.8	14.6	99.9	37.7	48.3	63.3	73.1	81.7
2008	1197	61.4	16.0	14.1	99.3	39.4	49.7	64.8	72.7	80.5
2009	1181	62.5	15.6	13.9	101	40.6	50.3	65.5	73.8	81.6
2010	1371	61.4	16.5	4.9	98.5	38.5	49.4	64.7	73.4	81.6
2011	1522	60.8	16.7	4.9	98.3	37.9	48.1	62.9	73.6	81.4
2012	1377	62.3	15.9	0.2	98.2	40.7	50.3	64.8	74.5	81.6
2013	1396	62.1	16.0	17.5	103	40.6	50.2	64.0	74.4	81.6
2014	686	63.0	16.2	23.5	105	40.4	50.6	66.2	75.2	82.4
1998-2014	16145	60.6	16.5	0.2	105	37.2	48.4	62.8	73.0	81.1

Table 3a

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	240	56.7	16.0	17.2	93.0	32.6	47.2	58.8	68.2	76.2
1999	215	56.9	16.3	9.1	89.6	33.4	44.5	58.6	68.5	78.4
2000	281	58.4	15.2	15.6	92.3	34.8	51.3	59.8	69.1	76.8
2001	266	58.6	15.6	23.6	92.1	34.6	46.9	60.8	68.6	79.2
2002	465	60.1	15.4	7.6	98.4	37.0	50.5	63.2	70.8	77.3
2003	396	60.0	15.2	11.9	91.5	37.2	49.9	62.8	71.1	78.5
2004	449	60.8	15.7	15.6	94.1	38.1	49.9	63.2	73.5	80.5
2005	474	61.0	15.1	17.4	96.6	38.7	52.0	63.2	71.1	78.6
2006	470	62.4	15.3	3.1	95.4	39.7	52.3	65.0	73.2	79.7
2007	532	62.0	15.5	14.6	98.8	40.2	50.4	64.3	73.3	81.3
2008	639	62.2	14.5	14.1	93.5	41.9	53.0	65.5	72.1	78.4
2009	646	64.0	14.2	17.8	96.0	42.8	53.8	67.1	74.3	80.4
2010	726	63.6	15.3	4.9	98.5	41.7	54.2	66.6	74.4	81.4
2011	787	62.9	15.0	15.4	96.9	40.5	53.4	66.3	73.8	80.5
2012	731	64.3	14.2	19.7	93.8	44.6	54.0	67.5	74.7	81.2
2013	792	64.0	15.1	17.5	103	43.2	52.7	66.8	75.4	82.3
2014	382	64.8	15.0	23.5	97.7	44.2	53.0	67.8	75.8	82.3
1998-2014	8491	62.1	15.2	3.1	103	40.0	52.0	64.6	73.2	80.2

Table 3b

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	235	58.5	17.5	18.0	96.2	33.7	46.8	58.8	72.0	81.7
1999	245	56.4	18.4	19.9	93.5	32.0	40.6	56.7	71.3	79.9
2000	235	54.8	19.0	18.3	98.4	30.8	38.4	52.7	70.5	82.3
2001	254	56.8	18.0	21.1	94.3	33.0	41.8	57.5	71.1	80.9
2002	414	56.6	19.2	17.4	99.0	31.8	39.3	56.1	72.3	83.9
2003	408	57.1	17.8	8.1	97.6	35.1	41.7	58.4	69.8	81.7
2004	449	58.0	17.2	18.8	95.6	36.2	43.8	59.4	71.8	80.2
2005	423	58.6	17.2	11.4	96.1	34.9	45.0	59.0	70.8	81.6
2006	451	60.3	17.6	14.1	102	36.1	46.8	62.0	73.8	83.7
2007	513	59.6	17.9	14.9	99.9	34.9	45.6	61.9	72.6	82.9
2008	558	60.5	17.5	14.5	99.3	37.4	45.8	63.4	73.3	83.3
2009	535	60.8	17.0	13.9	101	38.5	47.2	63.1	73.6	82.8
2010	645	58.9	17.4	15.1	94.1	36.1	44.9	60.3	72.2	81.8
2011	735	58.6	18.0	4.9	98.3	33.9	44.9	58.7	73.3	82.0
2012	646	60.1	17.4	0.2	98.2	37.9	47.5	60.6	73.9	83.4
2013	604	59.6	16.7	18.4	94.2	35.9	47.2	61.3	72.7	80.3
2014	304	60.7	17.4	24.1	105	35.9	47.4	60.9	73.8	84.0
1998-2014	7654	58.9	17.7	0.2	105	34.9	45.2	59.8	72.6	82.2

Table 4

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

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	3	0.0	0.0	1	0.0	0.0	2	0.0	0.0
5-9	3	0.0	0.1	1	0.0	0.0	2	0.0	0.1
10-14	5	0.1	0.1	2	0.0	0.1	3	0.1	0.2
15-19	36	0.4	0.5	19	0.4	0.4	17	0.4	0.5
20-24	90	0.9	1.4	31	0.6	1.0	59	1.3	1.8
25-29	200	2.0	3.4	52	1.0	2.0	148	3.3	5.1
30-34	287	2.9	6.4	107	2.0	4.1	180	4.0	9.1
35-39	418	4.3	10.7	189	3.6	7.7	229	5.0	14.1
40-44	663	6.8	17.4	281	5.4	13.0	382	8.4	22.5
45-49	812	8.3	25.7	381	7.3	20.3	431	9.5	32.0
50-54	789	8.1	33.8	395	7.5	27.9	394	8.7	40.7
55-59	785	8.0	41.9	441	8.4	36.3	344	7.6	48.3
60-64	904	9.2	51.1	513	9.8	46.1	391	8.6	56.9
65-69	1308	13.4	64.5	802	15.3	61.4	506	11.1	68.0
70-74	1333	13.6	78.1	838	16.0	77.4	495	10.9	78.9
75-79	943	9.6	87.8	572	10.9	88.3	371	8.2	87.1
80-84	661	6.8	94.5	390	7.4	95.8	271	6.0	93.1
85+	535	5.5	100.0	220	4.2	100.0	315	6.9	100.0
All ages	9775	100.0		5235	100.0		4540	100.0	

Included in the statistics are 53.8% multiple primaries in males and 34.4% in females.

Table 5

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

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=72 %	Females DCO rate n=83 %	Males Prop.all cancers n=91183 %	Females Prop.all cancers n=89596 %
0- 4	1	2	0.1	0.2			0.6	1.4
5- 9	1	2	0.1	0.2			1.0	2.6
10-14	2	3	0.2	0.3			2.0	3.4
15-19	19	17	2.0	1.9			8.8	10.3
20-24	31	59	2.8	5.4			8.3	19.0
25-29	51	146	4.2	11.9	2.0		9.1	22.1
30-34	105	176	8.4	14.1			13.6	15.2
35-39	187	227	14.4	18.0	0.5		16.2	11.4
40-44	276	379	17.0	24.8		0.3	15.1	10.1
45-49	375	421	23.7	27.8	0.3		11.6	7.7
50-54	384	386	29.7	30.2	0.5	0.3	7.9	5.7
55-59	429	340	40.4	30.3	0.2	0.9	5.9	4.6
60-64	507	385	51.6	36.3	0.4		4.7	4.2
65-69	774	498	80.4	47.7	0.8	0.6	5.0	4.4
70-74	811	489	89.1	46.8	1.5	1.2	4.8	4.1
75-79	536	367	97.3	51.5	1.1	2.7	4.3	3.7
80-84	375	268	107.4	47.8	5.6	4.5	4.4	3.0
85+	212	311	91.6	53.8	9.0	15.1	3.5	3.0
All ages	5076	4476			1.4	1.9	5.6	5.0
Incidence								
Raw			28.1	23.9				
WS			15.9	14.3				
ES			22.0	18.4				
BRD-S			26.5	20.8				

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

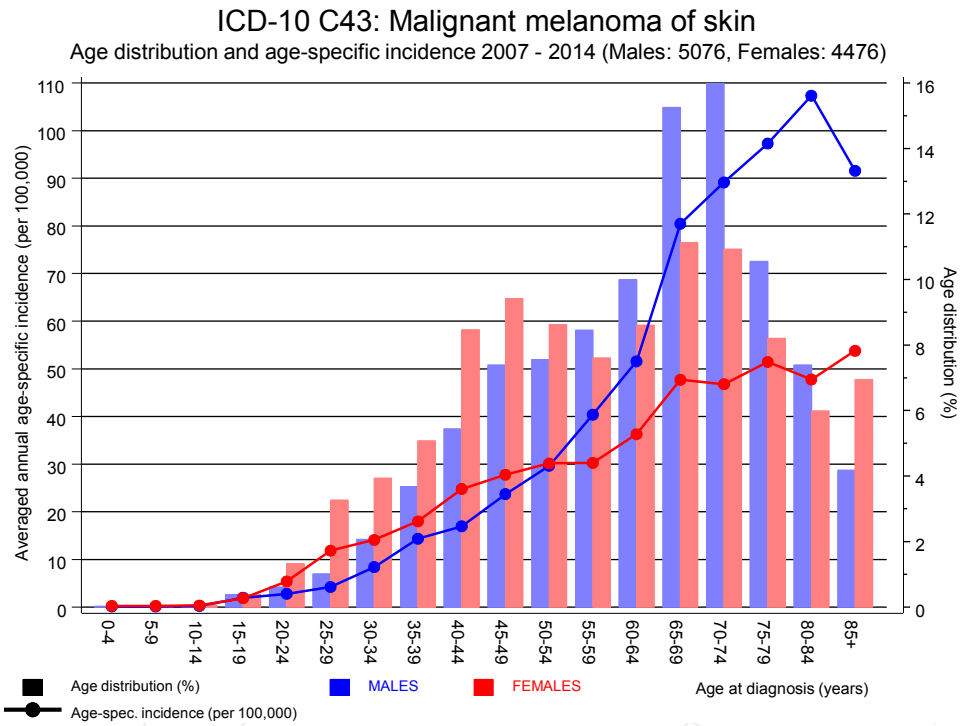


Figure 6. Age distribution and age-specific incidence

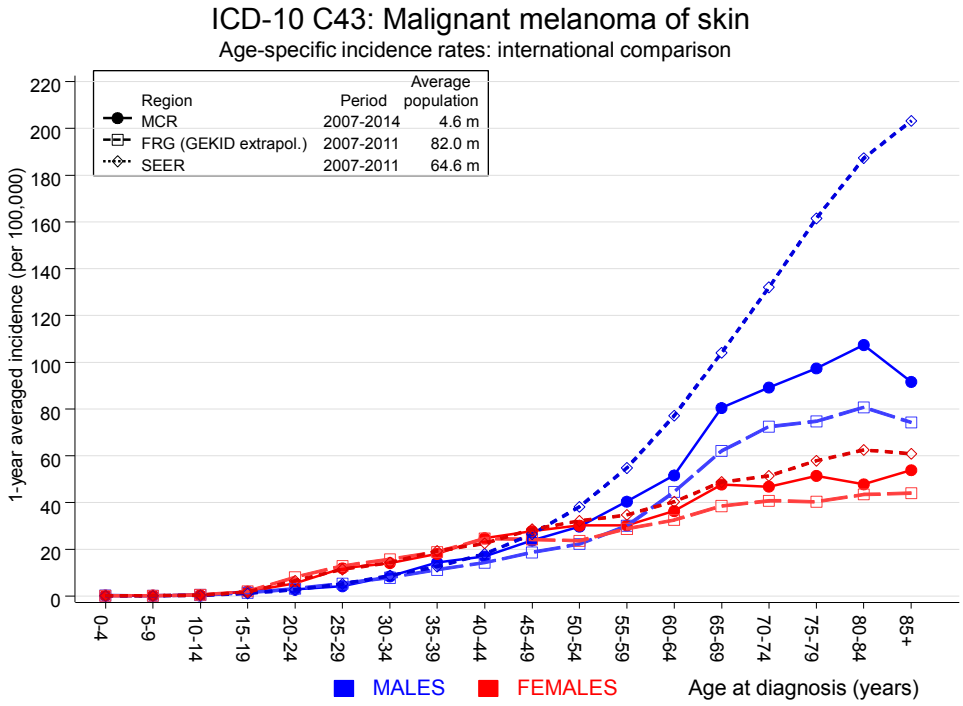


Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Extrapolated age-specific patient population of Germany, data status middle of 2010. Association of Population-based Cancer Registries in Germany (GEKID e.V.). Berlin, 2014. http://www.gekid.de. Last access: 02/11/2015

Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2014, based on the November 2013 submission. http://www.seer.cancer.gov.

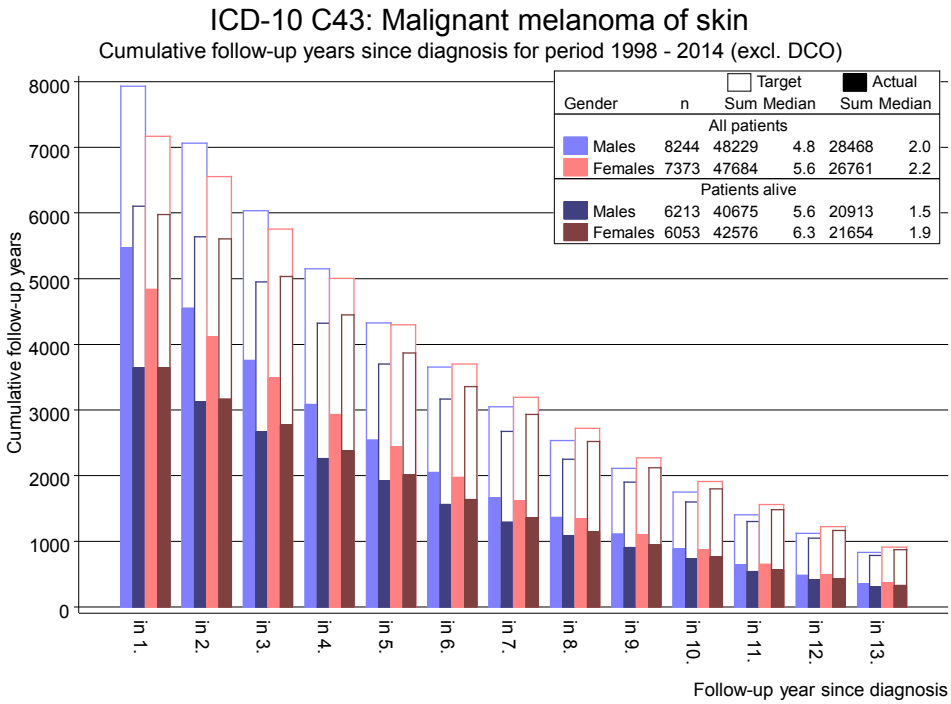


Figure 7. Cumulative follow-up years depending on time since diagnosis

The increase of the lost to follow-up rate can be interpreted as a consequence of a declining number of survivors over time.

Table 8a

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998-2014
MALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C00	Lip	3	0.4	6.8	1.4	19.9	#	1.0	
C03-C06	Oral cavity	7	3.3	2.1	0.8	4.3		1.4	14.3
C07-C08	Salivary gland	2	0.9	2.3	0.3	8.4		0.4	
C09-C10	Oropharynx	3	4.1	0.7	0.2	2.1		-0.4	
C12-C13	Hypopharynx	2	2.3	0.9	0.1	3.2		-0.1	50.0
C15	Oesophagus	10	7.0	1.4	0.7	2.6		1.1	
C16	Stomach	24	15.4	1.6	1.0	2.3		3.2	8.3
C17	Small intestine	4	2.0	2.0	0.6	5.2		0.8	
C18	Colon	73	37.0	2.0	1.5	2.5	#	13.4	4.1
C19-C20	Rectum	34	20.9	1.6	1.1	2.3	#	4.9	
C22	Liver	17	10.4	1.6	1.0	2.6		2.4	23.5
C23-C24	Bile	3	3.7	0.8	0.2	2.4		-0.3	
C25	Pancreas	41	13.9	2.9	2.1	4.0	#	10.1	9.8
C32	Larynx	3	3.9	0.8	0.2	2.2		-0.4	
C33-C34	Lung	72	44.6	1.6	1.3	2.0	#	10.2	12.5
C38,C45	Mesothelioma	8	2.5	3.2	1.4	6.3	#	2.0	
C43	Malign. melanoma	498	16.6	29.9	27.4	32.7	#	179.1	0.2
C46,C49	Soft tissue	10	2.1	4.7	2.3	8.7	#	2.9	
C50	Breast	3	1.0	3.0	0.6	8.8		0.7	
C61	Prostate	250	111.7	2.2	2.0	2.5	#	51.4	5.2
C62	Testis	2	1.7	1.1	0.1	4.1		0.1	
C64	Kidney	38	13.4	2.8	2.0	3.9	#	9.1	2.6
C65	Renal pelvis	4	1.6	2.5	0.7	6.5		0.9	
C66	Ureter	3	0.9	3.4	0.7	9.8		0.8	
C67	Bladder	29	17.1	1.7	1.1	2.4	#	4.4	
C69	Eye carcinoma	2	0.1	15.4	1.9	55.5	#	0.7	
C69	Eye melanoma	5	0.4	12.9	4.2	30.2	#	1.7	
C70-C72	CNS cancer	13	5.2	2.5	1.3	4.3	#	2.9	23.1
C73	Thyroid	18	2.7	6.7	4.0	10.6	#	5.7	
C76-C79	CUP	15	6.5	2.3	1.3	3.8	#	3.2	
C81	Hodgkin lymphoma	2	0.9	2.1	0.3	7.6		0.4	
C82-C85	NHL	51	15.4	3.3	2.5	4.4	#	13.2	9.8
C90	Mult. myeloma	12	4.9	2.5	1.3	4.3	#	2.7	25.0
C91-C96	Leukaemia	16	6.3	2.5	1.4	4.1	#	3.6	50.0
Other primaries		7	4.1	1.7	0.7	3.5		1.1	
Not observed		0	1.8	0.0	0.0	2.1		-0.7	
All mult. primaries		1284	386.8	3.3	3.1	3.5	#	333.7	4.5

Patients	7729
Median age at second malignancy (years)	71.1
Person-years	26883
Mean observation time (years)	3.5
Median observation time (years)	2.0

The occurrence of second malignancy is statistically significant.

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

Table 8b

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998–2014
FEMALES

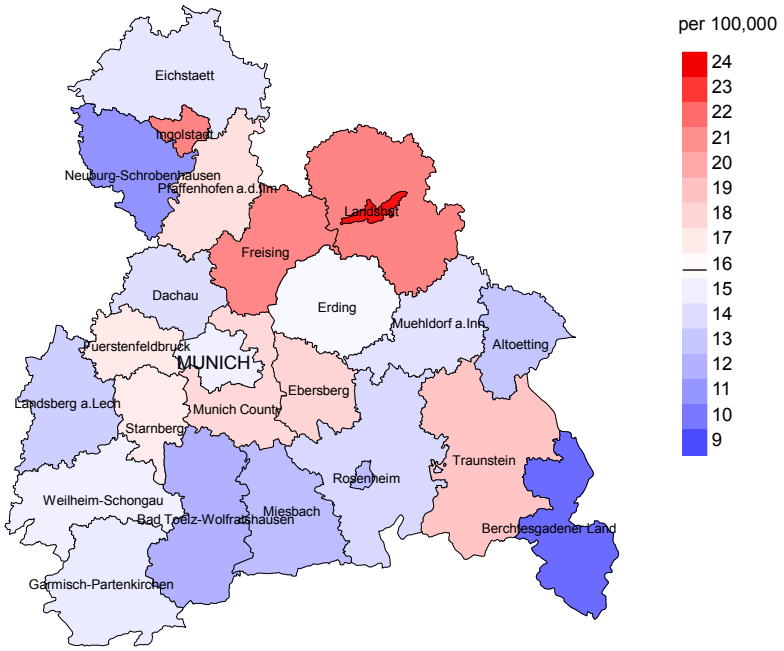
Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C03–C06	Oral cavity	2	1.4	1.4	0.2	5.1		0.2	
C09–C10	Oropharynx	2	1.0	2.0	0.2	7.3		0.4	
C15	Oesophagus	4	1.4	2.9	0.8	7.5		1.0	
C16	Stomach	14	8.1	1.7	0.9	2.9		2.3	21.4
C17	Small intestine	4	1.1	3.6	1.0	9.2		1.1	
C18	Colon	55	22.4	2.5	1.8	3.2	#	12.5	5.5
C19–C20	Rectum	12	9.7	1.2	0.6	2.2		0.9	8.3
C21	Anus/canal	4	1.3	3.2	0.9	8.2		1.0	25.0
C22	Liver	6	2.6	2.3	0.8	5.0		1.3	16.7
C23–C24	Bile	3	3.2	0.9	0.2	2.7		-0.1	33.3
C25	Pancreas	26	9.9	2.6	1.7	3.8	#	6.1	23.1
C30–C31	Sinuses	3	0.3	10.4	2.2	30.5	#	1.0	
C33–C34	Lung	32	16.5	1.9	1.3	2.7	#	5.9	15.6
C38,C45	Mesothelioma	2	0.4	4.9	0.6	17.7		0.6	50.0
C43	Malign. melanoma	230	9.5	24.2	21.2	27.6	#	84.2	
C46,C49	Soft tissue	8	1.3	5.9	2.6	11.7	#	2.5	12.5
C50	Breast	191	74.3	2.6	2.2	3.0	#	44.6	3.7
C51	Vulva	4	2.3	1.7	0.5	4.4		0.6	
C53	Cervix uteri	9	3.9	2.3	1.1	4.4	#	1.9	22.2
C54	Corpus uteri	23	12.7	1.8	1.1	2.7	#	3.9	8.7
C55,C57	Fem. genitals un	3	0.6	5.4	1.1	15.7	#	0.9	
C56	Ovary	15	9.5	1.6	0.9	2.6		2.1	
C64	Kidney	18	5.6	3.2	1.9	5.1	#	4.8	16.7
C67	Bladder	8	4.3	1.9	0.8	3.7		1.4	
C69	Eye melanoma	4	0.3	14.0	3.8	35.7	#	1.4	
C70–C72	CNS cancer	14	3.3	4.3	2.3	7.2	#	4.1	21.4
C73	Thyroid	23	4.9	4.7	2.9	7.0	#	6.9	4.3
C76–C79	CUP	11	4.1	2.7	1.3	4.8	#	2.6	
C82–C85	NHL	20	8.8	2.3	1.4	3.5	#	4.3	10.0
C90	Mult. myeloma	6	2.7	2.2	0.8	4.8		1.3	33.3
C91–C96	Leukaemia	11	3.7	2.9	1.5	5.3	#	2.8	27.3
Other primaries		4	1.9	2.1	0.6	5.3		0.8	25.0
Not observed		0	4.4	0.0	0.0	0.8	#	-1.7	
All mult. primaries		771	237.3	3.2	3.0	3.5	#	203.9	6.4

Patients	7132
Median age at second malignancy (years)	69.3
Person-years	26174
Mean observation time (years)	3.7
Median observation time (years)	2.2

The occurrence of second malignancy is statistically significant.

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

Average incidence (world standard population) 2007 - 2014: Males



Average incidence (world standard population) 2007 - 2014: Females

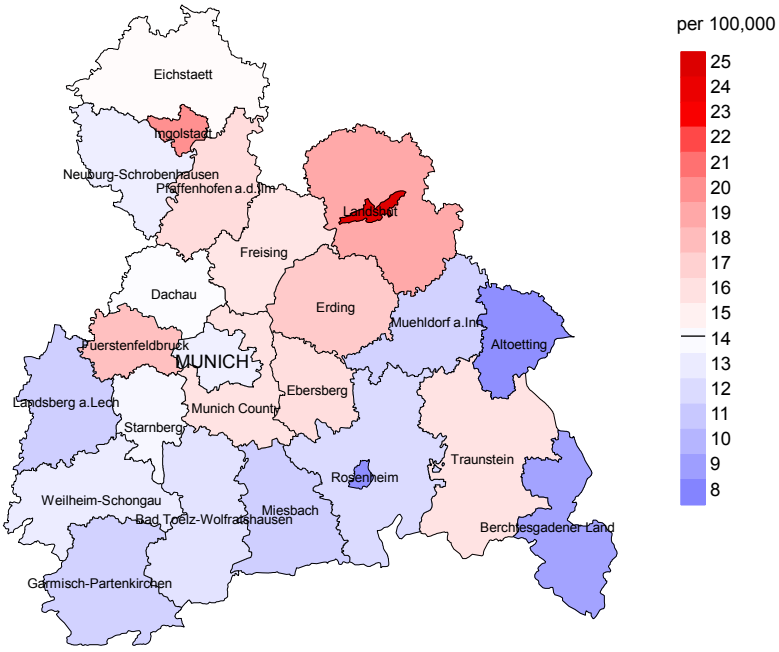
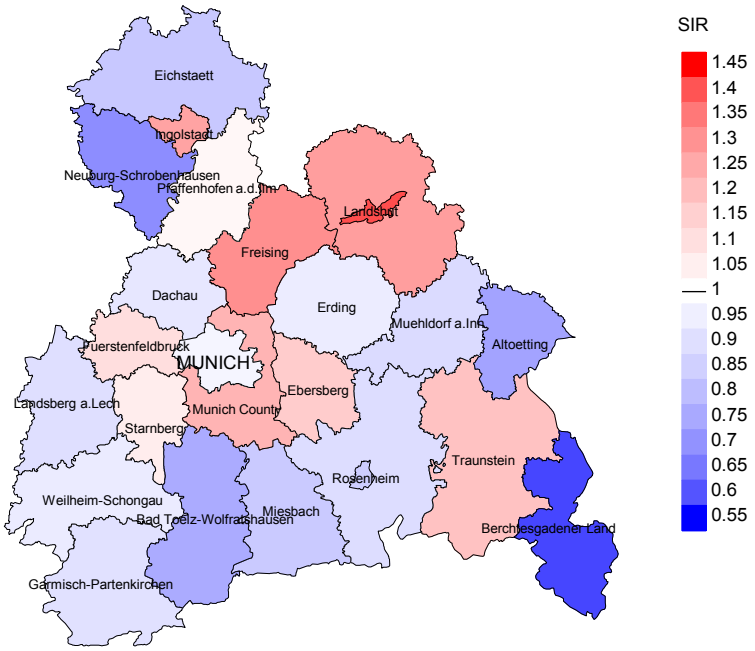


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 15.8/100,000 WS N=5,076, females 14.2/100,000 WS N=4,476).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,347 female residents (averaged) in the period from 2007 to 2014 a total of 140 women were identified with newly diagnosed malignant melanoma. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 16.2/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 12.5 and 21.0/100,000.

Standardized incidence ratio (SIR) 2007 - 2014: Males



Standardized incidence ratio (SIR) 2007 - 2014: Females

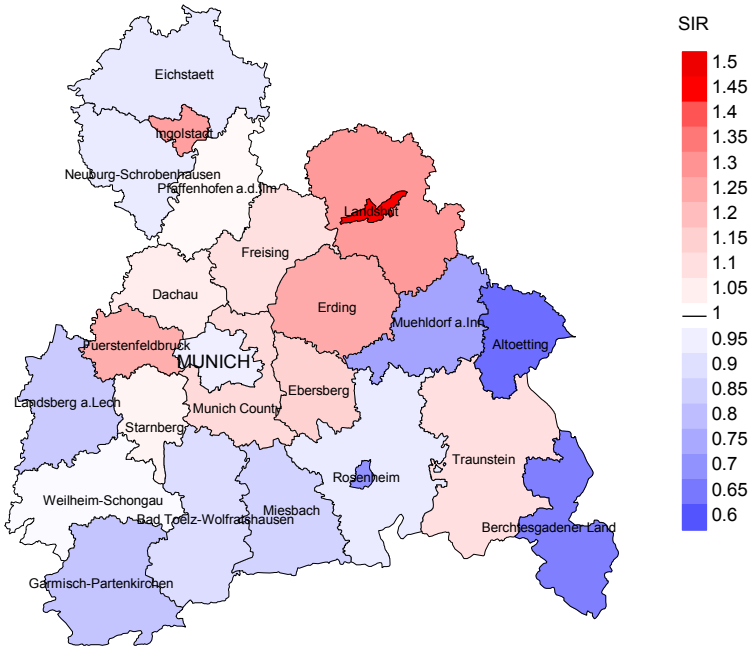


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=5,076, females N=4,476).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,924 female residents (averaged) in the period from 2007 to 2014 a total of 140 women were identified with newly diagnosed malignant melanoma. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.14. Though, the value of this parameter may vary with an underlying probability of 99% between 0.91 and 1.42, and is therefore not statistically striking.

MORTALITY

Table 10a

Patient cohorts of incident cancers by year of diagnosis, follow-up status, proportion of DCO, deaths among the annual cohorts and proportion of available death certificates (with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.64 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Prop. DCO %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	475	96.6	2.1	188	39.6	90.4
1999	460	97.2	2.0	160	34.8	94.4
2000	516	96.9	1.4	190	36.8	91.1
2001	520	97.5	1.5	191	36.7	96.3
2002	879	96.5	1.7	287	32.7	95.5
2003	804	94.5	2.1	259	32.2	97.7
2004	898	94.4	2.6	305	34.0	96.7
2005	897	93.1	1.3	270	30.1	97.0
2006	921	88.5	1.6	277	30.1	96.8
2007	1045	61.2	1.5	264	25.3	97.3
2008	1197	56.3	1.8	302	25.2	97.4
2009	1181	51.7	1.9	266	22.5	98.9
2010	1371	50.7	1.4	265	19.3	97.7
2011	1522	46.2	1.4	230	15.1	96.1
2012	1377	49.2	1.7	186	13.5	95.7
2013	1396	98.5	1.4	109	7.8	98.2
2014	686	98.0	2.0	40	5.8	85.0
1998-2014	16145	74.7	1.7	3789	23.5	96.1

Table 10b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased the same year of cancer diagnosis
(incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.64 m as of 2007, respectively)

Year of diagnosis/ death	Incident cases n	Deaths n	Prop. deaths with death certific. %	Deaths in same year n	Prop. deaths in same year %
1998	475	127	89.8	10	2.1
1999	460	118	90.7	13	2.8
2000	516	183	90.2	17	3.3
2001	520	168	91.1	18	3.5
2002	879	239	95.4	29	3.3
2003	804	259	90.7	31	3.9
2004	898	281	96.8	52	5.8
2005	897	318	95.6	31	3.5
2006	921	298	95.3	34	3.7
2007	1045	373	98.1	36	3.4
2008	1197	402	98.3	52	4.3
2009	1181	410	97.8	47	4.0
2010	1371	376	97.9	50	3.6
2011	1522	439	98.4	62	4.1
2012	1377	473	96.2	58	4.2
2013	1396	518	97.9	52	3.7
2014	686	466	98.7	27	3.9
1998-2014	16145	5448	96.3	619	3.8

Table 10c

Annual cohorts of deaths, proportion of cancer-related and non-cancer-related deaths, and cancer recorded on death certificates (incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.64 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	127	59.1	40.9	67.5
1999	118	63.6	36.4	77.6
2000	183	66.7	33.3	75.2
2001	168	60.7	39.3	69.3
2002	239	63.6	36.4	68.9
2003	259	61.4	38.6	72.3
2004	281	66.9	33.1	70.2
2005	318	62.6	37.4	67.8
2006	298	59.1	40.9	65.8
2007	373	63.5	36.5	68.3
2008	402	57.7	42.3	64.1
2009	410	65.1	34.9	68.8
2010	376	65.4	34.6	71.5
2011	439	57.2	42.8	63.7
2012	473	60.3	39.7	64.2
2013	518	59.5	40.5	66.5
2014	466	62.4	37.6	66.1
1998-2014	5448	61.8	38.2	67.7

Table 11a

Medians of age at death according to the grouping in Table 10
MALES

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	75	73.9	69.1	79.5	70.2
1999	67	74.9	69.8	85.2	71.1
2000	94	74.2	68.1	82.0	70.2
2001	85	73.1	65.1	79.3	66.2
2002	131	72.8	68.6	81.3	68.6
2003	134	73.3	70.1	79.3	71.7
2004	148	74.3	71.5	80.9	72.6
2005	176	74.8	70.9	82.3	71.0
2006	157	74.4	71.1	80.5	71.6
2007	207	75.4	70.2	81.0	70.5
2008	209	78.0	74.4	82.7	74.3
2009	235	74.6	71.0	82.7	71.2
2010	201	76.2	72.7	81.6	73.7
2011	239	78.6	74.4	84.4	75.8
2012	280	75.9	73.3	82.3	73.8
2013	284	76.9	74.4	81.6	74.4
2014	271	78.4	74.7	84.3	74.8
1998-2014	2993	75.8	72.4	81.9	73.1

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 11b

Medians of age at death according to the grouping in Table 10
FEMALES

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	52	79.5	72.9	86.4	74.7
1999	51	78.3	75.6	79.2	78.0
2000	89	78.1	75.0	84.6	75.6
2001	83	83.4	78.9	87.6	79.6
2002	108	82.0	68.4	85.4	70.9
2003	125	80.7	70.2	88.0	73.4
2004	133	81.6	74.3	84.7	74.3
2005	142	82.2	77.5	87.2	77.0
2006	141	81.8	76.5	88.0	76.5
2007	166	77.9	71.3	86.9	71.5
2008	193	82.6	74.0	86.9	77.9
2009	175	82.2	75.8	87.7	77.4
2010	175	81.1	74.7	86.3	74.9
2011	200	82.2	73.4	86.8	75.8
2012	193	83.3	73.3	88.4	74.2
2013	234	83.8	78.2	87.4	78.5
2014	195	83.5	76.0	87.4	75.7
1998-2014	2455	81.7	74.7	87.0	75.8

By 2010, life expectancy at birth was 77.5 years for boys and 82.6 years for girls.

Deaths of patients are considered to be cancer-related, in case that fact was recorded on the death certificate, or patients had suffered from metastasis or recurrence.

Table 12a

Mortality measures (cancer-related death) and mortality-incidence-index
by year of death
MALES

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	48	4.3	0.20	2.7	0.18	4.0	0.21	5.3	0.24
1999	43	3.8	0.20	2.3	0.18	3.5	0.21	4.5	0.23
2000	63	5.5	0.23	3.3	0.21	5.0	0.24	6.4	0.26
2001	59	5.1	0.22	3.1	0.21	4.5	0.23	5.9	0.25
2002	96	5.2	0.21	2.9	0.19	4.4	0.21	5.8	0.24
2003	91	4.9	0.23	2.8	0.21	4.2	0.24	5.2	0.25
2004	110	5.8	0.25	3.1	0.22	4.7	0.25	6.3	0.27
2005	123	6.5	0.27	3.4	0.23	5.1	0.25	6.8	0.29
2006	97	5.1	0.21	2.6	0.18	3.9	0.20	5.2	0.22
2007	131	5.9	0.25	3.0	0.22	4.6	0.25	6.1	0.27
2008	133	6.0	0.22	2.8	0.17	4.4	0.20	6.3	0.24
2009	163	7.3	0.26	3.8	0.25	5.5	0.26	7.1	0.28
2010	138	6.1	0.20	2.9	0.16	4.4	0.18	6.0	0.20
2011	147	6.4	0.19	2.9	0.15	4.4	0.17	6.2	0.20
2012	176	7.7	0.25	3.5	0.21	5.4	0.23	7.2	0.25
2013	184	8.1	0.24	3.5	0.19	5.6	0.21	7.6	0.24
2014	172	7.5	0.46	3.3	0.37	5.2	0.41	7.1	0.46
1998-2014	1974	6.2	0.24	3.1	0.20	4.7	0.23	6.4	0.25

Table 12b

Mortality measures (cancer-related death) and mortality-incidence-index
by year of death
FEMALES

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	27	2.3	0.12	1.0	0.09	1.5	0.10	1.8	0.10
1999	32	2.7	0.13	1.1	0.08	1.7	0.10	2.3	0.12
2000	59	4.9	0.25	2.2	0.17	3.2	0.20	4.2	0.23
2001	44	3.6	0.17	1.4	0.11	2.2	0.13	2.8	0.15
2002	56	2.9	0.14	1.4	0.10	1.9	0.11	2.3	0.12
2003	68	3.5	0.17	1.6	0.12	2.3	0.14	2.8	0.15
2004	78	3.9	0.18	1.7	0.12	2.5	0.14	3.1	0.15
2005	76	3.8	0.18	1.4	0.11	2.2	0.13	3.0	0.16
2006	79	3.9	0.18	1.5	0.11	2.3	0.13	3.1	0.16
2007	106	4.6	0.21	2.0	0.15	2.9	0.17	3.8	0.19
2008	99	4.3	0.18	1.7	0.12	2.6	0.14	3.3	0.16
2009	106	4.6	0.20	1.8	0.13	2.6	0.15	3.5	0.17
2010	108	4.6	0.17	1.7	0.11	2.6	0.12	3.3	0.14
2011	104	4.4	0.14	1.8	0.10	2.7	0.11	3.3	0.12
2012	110	4.7	0.17	1.9	0.12	2.8	0.14	3.4	0.14
2013	124	5.3	0.21	1.9	0.13	2.9	0.15	3.8	0.17
2014	119	5.0	0.40	1.9	0.26	2.8	0.29	3.7	0.34
1998-2014	1395	4.2	0.18	1.7	0.12	2.5	0.14	3.2	0.16

Table 13

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

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
15-19	2	0.1	0.1	2	0.1	0.1			0.0
20-24	4	0.2	0.3	2	0.1	0.3	2	0.2	0.2
25-29	6	0.3	0.5	5	0.4	0.7	1	0.1	0.3
30-34	14	0.6	1.1	8	0.6	1.3	6	0.6	1.0
35-39	20	0.9	2.0	14	1.0	2.3	6	0.6	1.6
40-44	46	2.0	4.0	23	1.7	4.0	23	2.4	4.0
45-49	84	3.7	7.7	39	2.9	6.9	45	4.8	8.8
50-54	99	4.3	12.0	47	3.5	10.4	52	5.5	14.3
55-59	114	5.0	17.0	67	5.0	15.4	47	5.0	19.3
60-64	180	7.9	24.9	113	8.4	23.8	67	7.1	26.4
65-69	277	12.1	37.0	165	12.3	36.1	112	11.9	38.3
70-74	384	16.8	53.8	269	20.0	56.1	115	12.2	50.5
75-79	349	15.3	69.0	225	16.7	72.8	124	13.2	63.7
80-84	339	14.8	83.9	208	15.5	88.3	131	13.9	77.6
85+	369	16.1	100.0	158	11.7	100.0	211	22.4	100.0
All ages	2287	100.0		1345	100.0		942	100.0	

Included in the statistics are 53.8% multiple primaries in males and 34.4% in females.

Table 14

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

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19	2		0.2	0.11	0.0		5.6	
20-24	2	2	0.2	0.06	0.2	0.03	4.2	7.1
25-29	5	1	0.4	0.10	0.1	0.01	8.1	1.6
30-34	8	6	0.6	0.07	0.5	0.03	9.1	5.5
35-39	14	6	1.1	0.07	0.5	0.03	7.9	2.3
40-44	23	23	1.4	0.08	1.5	0.06	5.0	3.6
45-49	39	45	2.5	0.10	3.0	0.10	3.8	3.7
50-54	47	52	3.6	0.12	4.1	0.13	2.5	2.9
55-59	67	47	6.3	0.15	4.2	0.14	2.2	1.8
60-64	113	67	11.5	0.22	6.3	0.17	2.4	1.9
65-69	165	112	17.2	0.21	10.7	0.22	2.3	2.1
70-74	269	115	29.6	0.32	11.0	0.23	2.9	1.7
75-79	225	124	40.9	0.39	17.4	0.33	2.6	2.0
80-84	208	131	59.6	0.53	23.4	0.48	2.8	2.0
85+	158	211	68.2	0.72	36.5	0.67	2.6	2.4
All ages	1345	942					2.7	2.2
Mortality								
Raw			7.4	0.26	5.0	0.21		
WS			3.4	0.21	2.0	0.14		
ES			5.3	0.23	3.0	0.16		
BRD-S			7.3	0.27	3.8	0.18		
PYLL-70								
per 100,000			34.9		28.3			
ES			30.7		24.0			
AYLL-70			11.5		12.4			

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

Table 15a

Multiple primaries in deaths in period 1998–2014
MALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03–C06	Oral cavity	11	0.8	4	36.4	1	9.1	6	54.5
C16	Stomach	37	2.5	9	24.3	1	2.7	27	73.0
C18	Colon	89	6.1	34	38.2	3	3.4	52	58.4
C19–C20	Rectum	62	4.3	21	33.9			41	66.1
C22	Liver	22	1.5	3	13.6			19	86.4
C25	Pancreas	47	3.2	2	4.3	2	4.3	43	91.5
C33–C34	Lung	121	8.3	9	7.4	9	7.4	103	85.1
C38,C45	Mesothelioma	12	0.8	2	16.7			10	83.3
C43	Malign. melanoma	199	13.6			60	30.2	139	69.8
C44	Skin others	228	15.6	54	23.7	62	27.2	112	49.1
C46,C49	Soft tissue	13	0.9	4	30.8	1	7.7	8	61.5
C61	Prostate	247	16.9	109	44.1	8	3.2	130	52.6
C64	Kidney	41	2.8	16	39.0	4	9.8	21	51.2
C67	Bladder	74	5.1	30	40.5	2	2.7	42	56.8
C70–C72	CNS cancer	34	2.3	6	17.6			28	82.4
C76–C79	CUP	18	1.2	1	5.6	1	5.6	16	88.9
C82–C85	NHL	62	4.3	28	45.2	3	4.8	31	50.0
C90	Mult. myeloma	21	1.4	5	23.8	1	4.8	15	71.4
C91–C96	Leukaemia	34	2.3	4	11.8	2	5.9	28	82.4
Other primaries		86	5.9	28	32.6	5	5.8	53	61.6
All mult. primaries		1458	100.0	369	25.3	165	11.3	924	63.4

Multiple primaries with number of cases 1 to 10 are pooled in category “Other primaries”

ICD-10 C44 (Other malignant neoplasms of skin) is not systematically recorded by MCR and therefore not considered for evaluation as a particular primary but at least as a multiple malignancy.

Table 15b

Multiple primaries in deaths in period 1998-2014
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C16	Stomach	25	2.7	4	16.0			21	84.0
C18	Colon	48	5.3	12	25.0	3	6.3	33	68.8
C19-C20	Rectum	19	2.1	8	42.1	1	5.3	10	52.6
C23-C24	Bile	13	1.4	2	15.4			11	84.6
C25	Pancreas	43	4.7	1	2.3	1	2.3	41	95.3
C33-C34	Lung	61	6.7	4	6.6			57	93.4
C43	Malign. melanoma	119	13.0			20	16.8	99	83.2
C44	Skin others	80	8.8	21	26.3	21	26.3	38	47.5
C46,C49	Soft tissue	12	1.3	3	25.0	2	16.7	7	58.3
C50	Breast	208	22.8	94	45.2	11	5.3	103	49.5
C53	Cervix uteri	21	2.3	10	47.6	2	9.5	9	42.9
C54	Corpus uteri	27	3.0	11	40.7			16	59.3
C56	Ovary	34	3.7	11	32.4	1	2.9	22	64.7
C64	Kidney	19	2.1	7	36.8	3	15.8	9	47.4
C67	Bladder	15	1.6	3	20.0			12	80.0
C70-C72	CNS cancer	23	2.5	2	8.7	2	8.7	19	82.6
C73	Thyroid	10	1.1	4	40.0			6	60.0
C76-C79	CUP	15	1.6	2	13.3	2	13.3	11	73.3
C82-C85	NHL	32	3.5	13	40.6	1	3.1	18	56.3
C90	Mult. myeloma	12	1.3	4	33.3			8	66.7
C91-C96	Leukaemia	16	1.8					16	100.0
Other primaries		61	6.7	23	37.7	4	6.6	34	55.7
All mult. primaries		913	100.0	239	26.2	74	8.1	600	65.7

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

ICD-10 C44 (Other malignant neoplasms of skin) is not systematically recorded by MCR and therefore not considered for evaluation as a particular primary but at least as a multiple malignancy.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**First primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	Males MI-index	Females Age-spec. mortal.	Females MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19	1		0.1	0.05	0.0		3.0	
20-24	2	2	0.2	0.06	0.2	0.03	4.7	7.7
25-29	4	1	0.3	0.08	0.1	0.01	7.3	1.7
30-34	8	6	0.6	0.08	0.5	0.04	9.3	6.3
35-39	14	5	1.1	0.08	0.4	0.02	8.5	2.2
40-44	22	20	1.4	0.09	1.3	0.06	5.2	3.6
45-49	35	31	2.2	0.11	2.0	0.08	3.8	3.0
50-54	42	36	3.2	0.13	2.8	0.11	2.6	2.4
55-59	59	42	5.6	0.17	3.7	0.14	2.3	2.0
60-64	89	55	9.1	0.23	5.2	0.17	2.3	1.9
65-69	127	78	13.2	0.24	7.5	0.21	2.2	1.9
70-74	181	89	19.9	0.36	8.5	0.26	2.6	1.8
75-79	130	82	23.6	0.47	11.5	0.33	2.1	1.7
80-84	130	92	37.2	0.62	16.4	0.49	2.4	1.8
85+	95	154	41.0	0.98	26.6	0.71	2.2	2.3
All ages	939	693					2.4	2.0
Mortality								
Raw			5.2	0.26	3.7	0.19		
WS			2.5	0.21	1.5	0.12		
ES			3.8	0.23	2.2	0.14		
BRD-S			5.0	0.26	2.8	0.16		
PYLL-70								
per 100,000			30.7		22.3			
ES			26.9		19.0			
AYLL-70			12.2		12.8			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**Single primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	Males MI-index	Females Age-spec. mortal.	Females MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19	1		0.1	0.05	0.0		3.0	
20-24	2	2	0.2	0.06	0.2	0.04	5.1	8.3
25-29	4	1	0.3	0.09	0.1	0.01	7.8	1.8
30-34	8	5	0.6	0.08	0.4	0.03	9.4	6.0
35-39	14	5	1.1	0.08	0.4	0.02	8.9	2.4
40-44	20	16	1.2	0.08	1.0	0.05	5.0	3.1
45-49	33	24	2.1	0.11	1.6	0.07	3.8	2.6
50-54	36	28	2.8	0.12	2.2	0.09	2.5	2.1
55-59	48	29	4.5	0.15	2.6	0.11	2.1	1.5
60-64	59	37	6.0	0.17	3.5	0.13	1.7	1.5
65-69	76	42	7.9	0.17	4.0	0.13	1.6	1.2
70-74	111	47	12.2	0.27	4.5	0.16	2.0	1.1
75-79	66	47	12.0	0.28	6.6	0.22	1.4	1.2
80-84	67	49	19.2	0.38	8.7	0.30	1.6	1.2
85+	46	90	19.9	0.58	15.6	0.46	1.3	1.6
All ages	591	422					1.9	1.5
Mortality								
Raw			3.3	0.18	2.3	0.13		
WS			1.7	0.15	1.0	0.09		
ES			2.5	0.17	1.4	0.10		
BRD-S			3.1	0.18	1.7	0.11		
PYLL-70								
per 100,000			26.4		17.1			
ES			23.2		14.7			
AYLL-70			14.0		14.3			

* See corresponding tables with multiple primaries.

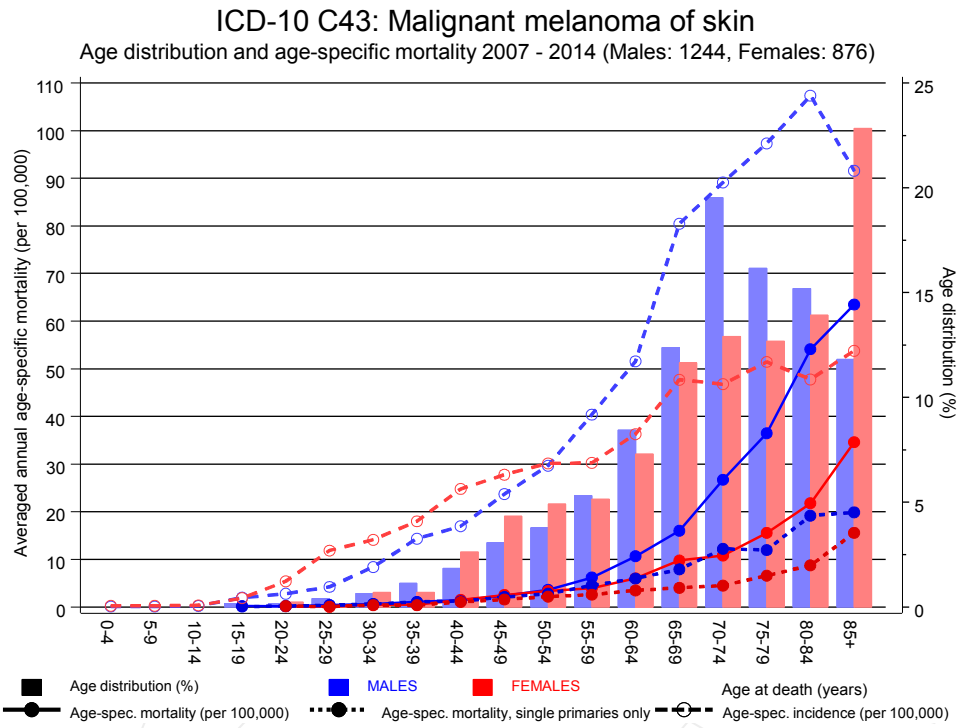
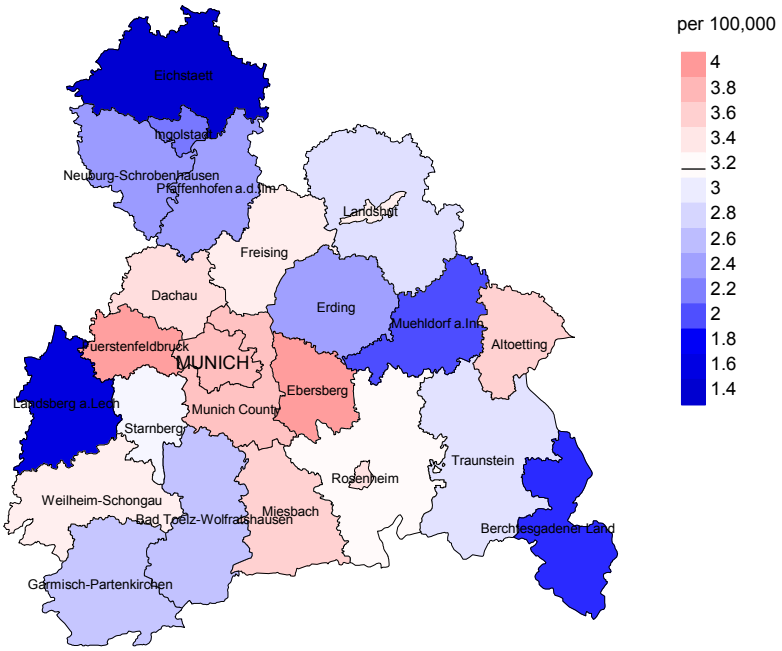


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (world standard population) 2007 - 2014: Males



Average mortality (world standard population) 2007 - 2014: Females

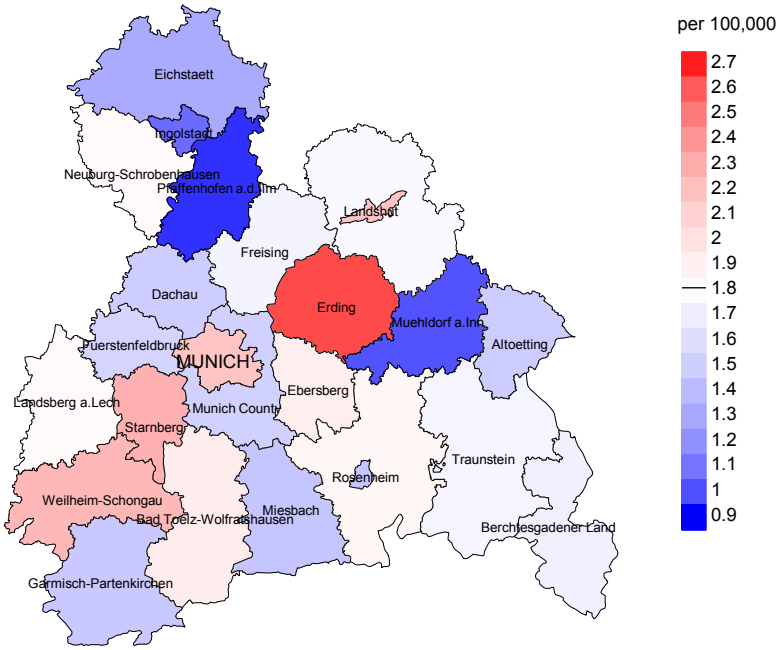
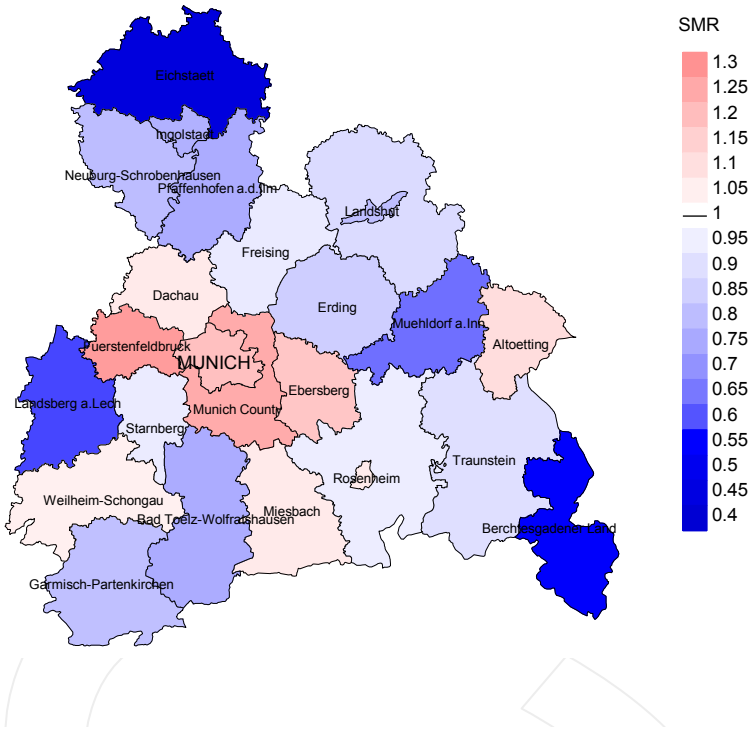


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2014. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 3.2/100,000 WS N=1,232, females 1.8/100,000 WS N=868).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,347 female residents (averaged) in the period from 2007 to 2014 a total of 24 women died from malignant melanoma. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 1.9/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.0 and 3.5/100,000.

Standardized mortality ratio (SMR) 2007 - 2014: Males



Standardized mortality ratio (SMR) 2007 - 2014: Females

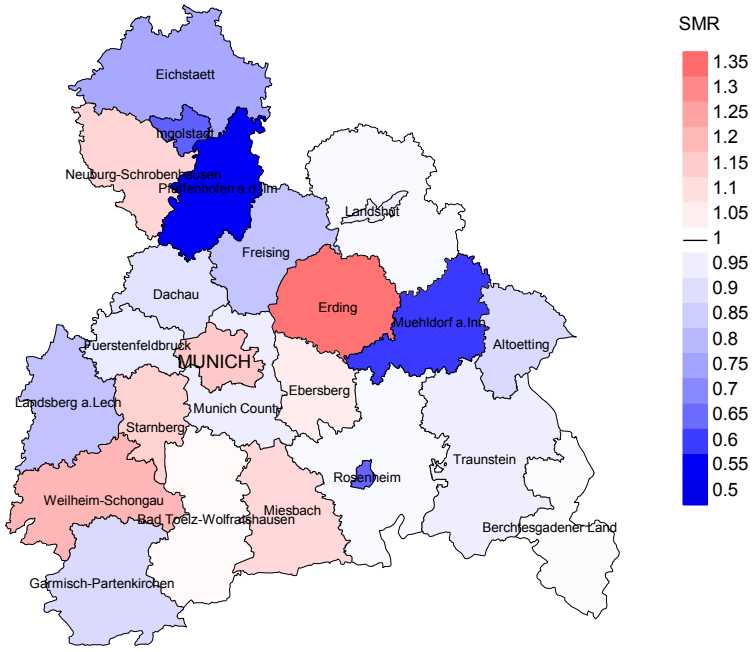


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=1,232, females N=868).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,924 female residents (averaged) in the period from 2007 to 2014 a total of 24 women died from malignant melanoma. 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 0.58 and 1.75, and is therefore not statistically striking.

Statistical Notes

In all tables and figures the respective reference values should be carefully considered. The incidence rates include diagnoses (with multiple primary), and death certificate only (DCO) cases, where applicable. For mortality statistics patients, diagnoses and progressive course of disease are presented. In the calculations, all courses of disease are considered whereby progressions occurred and/or death certificate identified progressive cancers were ascertained. Additionally there are three groups of disease course to consider:

1. **All multiple primaries included**

   The mortality statistic describes the tumor-specific death, independent of any malignancy. The patient perspective, induced secondary malignancies, and the problem of multiple malignancies from the same primary tumor all have reasons for their inclusion.

2. **First singular primary** (no information about other prior or synchronous malignancy)

   The mortality statistic describes the cancer-related death for patients who have no therapeutic restrictions due to a previous or synchronous cancer. These statistics are comparable to studies that have exclusion criteria based on a second malignancy.

3. **Single primary** (no information about other prior, syn- or metachronous malignancy)

   The mortality statistic describes the tumor-specific death that occurs without any impact through secondary primaries, earlier, synchronous, later or induced. Precisely the difference between disease group 1 and 2 highlight the magnitude of the problem of secondary malignancies.

For this reason differences appear concerning official mono-causal mortality statistics. To judge the maximum deviation, 2 further tables are presented. In the first table the distribution of secondary malignancies before, at or after the described cancer are shown, that could be an alternative cause of death. In the second table, the age-specific mortality rates for all courses of disease, without designation of secondary malignancies are shown.

A previously minimally acknowledged statistic is the **age at death**, which allows for a good assessment of the quality of classification of the apparent tumor-specific death. For assumed tumor-independent deaths, the age of death should be estimated from the age of diagnosis and the normal life expectancy, whereas tumor-dependent deaths can be estimated from the age of diagnosis plus the average tumor-specific life expectancy. The comparison of different tumors demonstrates this association, if the causes of cancer and the competing cause of death are independent of each other (e.g. breast and colon versus head/neck and lung).

The index from mortality and incidence (Mortality-Incidence ratio, **MI-index**) is a statistic that allows for the evaluation of the quality of data. For diseases with poor prognoses, comparable values are obtained from all age groups, because to a large extent, the numerator and denominator contain the same cases. For tumors with a good prognosis, increasing and decreasing incidence and age-specific differences in prognosis can more strongly alter the MI- index. Additionally, attention should be paid to the confidence intervals where fewer cases are reported.

The complexity of problems identified here emphasizes the importance of relative survival data for the appropriate analysis of long term results.

As a measurement of the burden of disease, the number of potential life years loss due to premature deaths in a cohort can be calculated (**PYLL**, potential years of life lost, standardized per 100,000 persons or per European standard) as well as the average loss of life years per individual (**AYLL**, average years of life lost). Depending upon the analytic aim (health economy, prevention, health care research) different methods exist for the generation of these measurements. In the results presented here, the age for a premature death is considered to be before 70 years, according to the guidelines of the OECD and the WHO (as seen in the abbreviation PYLL-70 or AYLL-70).

Shortcuts

FRG	Federal Republic of Germany
GEKID	Association of Population-based Cancer Registries in Germany (Gesellschaft der epidemiologischen Krebsregister in Deutschland e.V.)
MCR	Munich Cancer Registry (Tumorregister München)
SEER	Surveillance, Epidemiology, and End Results (USA)
AYLL-70	Average years of life lost prior to age 70 given a person dies before that age
BRD-S	German standard population
DCO	Death certificate only
EAR	Excess absolute risk = excess cancer cases (O - E) per 10,000 person-years
ES	European standard population (old)
LCL	Lower confidence limit
MI-index	Ratio between mortality and incidence
PYLL-70	Potential years of life lost prior to age 70 given a person dies before that age
SIR	Standardized incidence ratio
SMR	Standardized mortality ratio
UCL	Upper confidence limit
WS	World standard population

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