Munich Cancer Registry

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

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

Cancer statistics: Baseline statistics

C43: Malignant melanoma

Year of diagnosis	1998-2012
Patients	12,899
Diseases	13,434
Creation date	03/20/2014
Export date	02/12/2014
Population	4.5 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C43__E.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 4.5 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. The time-delayed acquisition of data and the occasionally high DCO-rates indicate optimizing reserves, among others, because of current financial and legal conditions that hinder the analyses.

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, March 2014

[#] 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). Death certificates from 2013 are incorporated into these analyses.

[##] 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. A high proportion of DCO cases (≥5%) in particular cancer types indicate insufficient participation of specific cancer specializations.

INCIDENCE

Table 1

Patient cohorts by year of diagnosis including DCO cases and multiple primaries, and with proportion of deaths and active follow-up

Year of diagnosis	Cases n	DCO cases n	Prop. DCO %	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %	
1998	472	10	2.1	32.0	38.1	97.5	
1999	460	9	2.0	33.0	31.5	97.0	
2000	507	7	1.4	32.9	34.1	98.0	
2001	521	8	1.5	33.4	33.2	97.7	
2002	873	14	1.6	29.6	30.1	97.0	#
2003	798	17	2.1	27.1	29.9	95.5	#
2004	887	24	2.7	29.5	32.2	96.6	#
2005	887	12	1.4	29.3	27.8	94.0	#
2006	906	14	1.5	30.1	27.0	89.4	#
2007	1028	16	1.6	29.5	22.1	67.8	# ##
2008	1171	21	1.8	31.5	21.9	53.3	
2009	1148	22	1.9	32.2	18.1	48.6	
2010	1323	21	1.6	30.5	14.8	48.6	
2011	1409	21	1.5	29.0	10.2	45.1	
2012	1044	25	2.4	29.1	7.6	97.4	###
1998-2012	13434	241	1.8	30.3	22.8	75.9	

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

Since 2007 the percentage of actively followed patients sharply declined compared to the previous years. This is a consequence of ambiguous data protection rules that currently forbid cancer registries in Bavaria to obtain the essential life status informations from competent registration offices.

Please be aware that data of recent annual patient cohorts may not yet be fully processed. Therefore, the presented figures and tables are potentially related to different time periods as pointed out in the respective headlines or legends.

Table 1a

Patient cohorts by year of diagnosis and gender
including DCO cases

Year of diagnosis	All n	Males n	Females n	Prop. males %
1998	472	239	233	50.6
1999	460	215	245	46.7
2000	507	276	231	54.4
2001	521	267	254	51.2
2002	873	461	412	52.8
2003	798	393	405	49.2
2004	887	444	443	50.1
2005	887	466	421	52.5
2006	906	463	443	51.1
2007	1028	523	505	50.9
2008	1171	628	543	53.6
2009	1148	626	522	54.5
2010	1323	703	620	53.1
2011	1409	731	678	51.9
2012	1044	557	487	53.4
1998-2012	13434	6992	6442	52.0

Table 2

Incidence measures by year of diagnosis and gender including DCO cases
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002,
and from 3.96 to 4.52 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	239	233	21.6	19.8	14.8	12.1	19.4	15.7	22.5	17.8
1999	215	245	19.2	20.6	13.1	13.3	17.1	16.8	19.8	19.0
2000	276	231	24.2	19.2	15.8	12.9	21.2	15.9	24.7	18.0
2001	267	254	23.0	20.9	14.7	13.3	19.9	17.0	23.3	19.0
2002	461	412	24.7	21.0	15.7	13.5	21.3	16.9	24.4	18.9
2003	393	405	21.0	20.6	13.2	13.1	17.7	16.6	20.9	18.2
2004	444	443	23.6	22.4	14.5	13.9	19.6	17.8	23.8	20.0
2005	466	421	24.6	21.2	15.1	13.1	20.6	17.0	24.0	19.0
2006	463	443	24.2	22.1	14.4	13.2	19.8	17.0	23.7	19.4
2007	523	505	23.6	21.9	13.9	13.3	19.2	17.1	23.1	19.3
2008	628	543	28.2	23.4	16.6	13.6	22.6	17.8	26.4	20.1
2009	626	522	28.0	22.4	15.6	13.0	21.7	17.0	26.2	19.4
2010	703	620	31.2	26.5	17.8	16.2	24.4	20.7	29.4	23.2
2011	731	678	32.0	28.7	18.4	17.7	25.2	22.3	30.0	25.1
2012	557	487	24.4	20.6	13.2	12.2	18.5	15.9	22.5	18.1
1998-2012	6992	6442	25.5	22.4	15.3	13.8	21.0	17.7	24.9	19.9

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)
(incl. DCO)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	472	57.5	16.8	17.2	96.2	33.5	46.9	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	507	56.6	17.2	15.6	98.4	33.3	43.0	58.3	69.3	78.9
2001	521	57.7	16.8	21.1	94.3	33.6	44.4	59.5	69.7	79.5
2002	873	58.4	17.4	7.6	99.0	34.1	44.6	60.5	71.3	80.5
2003	798	58.5	16.6	8.1	97.6	36.1	45.3	60.8	70.5	80.3
2004	887	59.3	16.6	15.6	95.6	36.5	46.2	61.6	72.3	80.5
2005	887	59.8	16.2	11.4	96.6	36.8	48.5	62.1	71.1	79.9
2006	906	61.3	16.5	3.1	102	38.2	48.9	63.9	73.2	82.2
2007	1028	60.8	16.8	14.6	99.9	37.7	48.3	63.3	73.1	81.7
2008	1171	61.5	16.0	14.1	99.3	39.3	49.7	64.7	72.7	80.6
2009	1148	62.5	15.6	13.9	101	40.6	50.1	65.6	73.7	81.4
2010	1323	61.2	16.5	4.9	98.5	38.1	49.0	64.1	73.4	81.5
2011	1409	60.7	16.6	4.9	98.3	37.7	47.9	62.5	73.3	80.8
2012	1044	62.4	15.6	6.9	97.6	40.8	50.9	65.1	74.4	81.1
1998-2012	13434	60.2	16.6	3.1	102	36.8	47.9	62.4	72.5	80.8

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	239	56.7	16.0	17.2	93.0	32.6	47.0	58.8	68.3	76.2
1999	215	56.9	16.3	9.1	89.6	33.4	44.5	58.6	68.5	78.4
2000	276	58.3	15.3	15.6	92.3	34.7	50.5	59.8	69.2	77.3
2001	267	58.6	15.6	23.6	92.1	34.6	46.9	60.8	68.6	79.2
2002	461	60.0	15.3	7.6	98.4	37.0	50.4	63.2	70.8	77.1
2003	393	59.9	15.2	11.9	91.5	37.6	50.2	62.8	71.1	78.1
2004	444	60.7	15.7	15.6	94.1	38.1	49.8	63.2	73.5	80.5
2005	466	61.0	15.1	17.4	96.6	38.6	50.9	63.3	71.1	78.6
2006	463	62.4	15.4	3.1	95.4	39.7	51.9	65.0	73.2	79.8
2007	523	62.1	15.4	14.6	98.8	40.5	50.4	64.3	73.3	81.3
2008	628	62.2	14.5	14.1	93.5	41.9	53.0	65.5	71.9	78.5
2009	626	63.8	14.2	17.8	96.0	42.8	53.7	67.0	74.0	80.4
2010	703	63.5	15.4	4.9	98.5	41.6	53.8	66.6	74.4	81.3
2011	731	62.8	14.9	17.6	96.9	40.6	53.1	66.2	73.6	80.3
2012	557	64.4	14.0	21.9	93.8	44.7	54.5	67.9	74.6	80.9
1998-2012	6992	61.6	15.2	3.1	98.8	39.3	51.7	64.1	72.6	79.7

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	233	58.5	17.5	18.0	96.2	33.7	46.8	58.8	71.3	81.7
1999	245	56.4	18.4	19.9	93.5	32.0	40.6	56.7	71.3	79.9
2000	231	54.5	19.0	18.3	98.4	30.8	37.9	52.3	70.4	81.5
2001	254	56.8	18.0	21.1	94.3	33.0	41.8	57.5	71.1	80.9
2002	412	56.6	19.3	17.4	99.0	31.8	39.3	56.1	72.2	83.9
2003	405	57.0	17.8	8.1	97.6	35.1	41.8	58.4	69.6	81.6
2004	443	57.9	17.3	18.8	95.6	36.2	43.6	59.4	71.8	80.2
2005	421	58.6	17.2	11.4	96.1	34.9	45.0	59.0	70.8	81.6
2006	443	60.1	17.6	14.1	102	35.7	46.7	61.8	73.5	83.7
2007	505	59.5	18.0	14.9	99.9	34.9	45.6	61.6	72.9	83.3
2008	543	60.6	17.5	14.5	99.3	37.4	45.8	63.4	73.7	83.3
2009	522	60.8	17.0	13.9	101	38.5	46.9	63.2	73.6	82.7
2010	620	58.6	17.4	15.1	94.1	35.6	44.8	59.5	72.1	81.8
2011	678	58.4	18.1	4.9	98.3	33.2	44.9	58.7	73.0	81.6
2012	487	60.2	17.0	6.9	97.6	38.5	47.8	60.4	73.7	82.5
1998-2012	6442	58.6	17.8	4.9	102	34.6	44.6	59.5	72.4	82.2

Table 4

Age distribution by 5-year age group and gender for period 1998-2012 (incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	3	0.0	0.0	2	0.0	0.0	1	0.0	0.0
5-9	6	0.0	0.1	3	0.0	0.1	3	0.0	0.1
10-14	10	0.1	0.1	5	0.1	0.1	5	0.1	0.1
15-19	54	0.4	0.5	25	0.4	0.5	29	0.5	0.6
20-24	163	1.2	1.8	63	0.9	1.4	100	1.6	2.1
25-29	336	2.5	4.3	104	1.5	2.9	232	3.6	5.7
30-34	523	3.9	8.2	219	3.1	6.0	304	4.7	10.5
35-39	775	5.8	13.9	328	4.7	10.7	447	6.9	17.4
40-44	908	6.8	20.7	379	5.4	16.1	529	8.2	25.6
45-49	1028	7.7	28.3	473	6.8	22.9	555	8.6	34.2
50-54	1032	7.7	36.0	500	7.2	30.0	532	8.3	42.5
55-59	1219	9.1	45.1	683	9.8	39.8	536	8.3	50.8
60-64	1462	10.9	56.0	868	12.4	52.2	594	9.2	60.0
65-69	1749	13.0	69.0	1078	15.4	67.6	671	10.4	70.4
70-74	1560	11.6	80.6	960	13.7	81.4	600	9.3	79.8
75-79	1112	8.3	88.9	641	9.2	90.5	471	7.3	87.1
80-84	820	6.1	95.0	413	5.9	96.5	407	6.3	93.4
85+	674	5.0	100.0	248	3.5	100.0	426	6.6	100.0
All ages	13434	100.0		6992	100.0		6442	100.0	

Included in the statistics are 46.0% multiple primaries in males and 29.8% in females.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 1998-2012

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=107 %	Females DCO rate n=134 %	Males Prop.all cancers n=146755 %	Females Prop.all cancers n=142297 %
0- 4	2	1	0.1	0.1			0.7	0.4
5- 9	3	3	0.2	0.2			1.8	2.7
10-14	5	5	0.4	0.4			3.4	3.1
15-19	25	29	1.8	2.1			7.8	10.9
20-24	62	100	3.8	6.1		1.0	11.2	20.6
25-29	102	225	5.5	12.0	1.0		11.5	22.0
30-34	218	302	10.3	14.7			15.4	16.0
35-39	323	444	13.8	20.0		0.5	15.3	12.6
40-44	374	524	15.4	22.8	0.3	0.4	12.5	9.0
45-49	470	548	21.8	25.9	0.9	0.2	9.5	6.9
50-54	490	522	26.5	27.6	0.4		6.1	5.1
55-59	665	529	39.1	29.7	0.6	0.4	4.9	4.1
60-64	848	584	51.5	33.6	0.5	0.9	4.1	3.6
65-69	1041	662	70.9	41.3	1.2	0.5	4.0	3.7
70-74	921	593	79.5	43.0	1.7	1.5	3.8	3.5
75-79	608	467	80.7	42.7	2.5	3.2	3.2	2.9
80-84	396	403	87.2	46.7	7.8	6.2	3.2	2.7
85+	239	421	77.1	51.4	7.1	16.4	2.6	2.6
All ages	6792	6362			1.6	2.1	4.6	4.5
Incidence								
Raw			24.7	22.2				
WS			15.0	13.6				
ES			20.4	17.5				
BRD-S			24.2	19.7				

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).

Table 6a

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998-2012
MALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C03-C06	Oral cavity	7	2.6	2.7	1.1	5.6	#	2.1	14.3
C09-C10	Oropharynx	4	3.2	1.3	0.3	3.2		0.4	
C15	Oesophagus	6	5.1	1.2	0.4	2.6		0.4	
C16	Stomach	14	11.9	1.2	0.6	2.0		1.0	14.3
C18	Colon	47	28.1	1.7	1.2	2.2	#	9.2	4.3
C19-C20	Rectum	25	16.2	1.5	1.0	2.3	#	4.3	
C22	Liver	9	7.8	1.2	0.5	2.2		0.6	33.3
C25	Pancreas	26	10.1	2.6	1.7	3.8	#	7.7	7.7
C32	Larynx	2	3.0	0.7	0.1	2.4		-0.5	
C33-C34	Lung	46	33.6	1.4	1.0	1.8	#	6.0	8.7
C38,C45	Mesothelioma	7	1.9	3.8	1.5	7.8	#	2.5	
C43	Malign. melanoma	280	11.5	24.3	21.5	27.3	#	129.8	
C46,C49	Soft tissue	6	1.6	3.8	1.4	8.4	#	2.1	
C61	Prostate	168	84.8	2.0	1.7	2.3	#	40.2	4.2
C62	Testis	2	1.4	1.4	0.2	5.0		0.3	
C64	Kidney	25	10.1	2.5	1.6	3.7	#	7.2	
C67	Bladder	20	12.4	1.6	1.0	2.5		3.7	
C69	Eye carcinoma	2	0.1	21.5	2.6	77.7	#	0.9	
C69	Eye melanoma	2	0.3	6.7	0.8	24.1		0.8	
C70-C72	CNS cancer	10	4.0	2.5	1.2	4.6	#	2.9	30.0
C73	Thyroid	13	2.0	6.4	3.4	10.9	#	5.3	
C76-C79	CUP	9	4.9	1.8	0.8	3.5		2.0	
C82-C85	NHL	31	11.4	2.7	1.9	3.9	#	9.5	6.5
C90	Mult. myeloma	6	3.6	1.7	0.6	3.6		1.2	33.3
C91-C96	Leukaemia	9	4.6	2.0	0.9	3.7		2.1	44.4
Other primaries		7	8.6	0.8	0.3	1.7		-0.8	
Not observed		0	5.7	0.0	0.0	0.7	#	-2.7	
All mult. primaries		783	290.3	2.7	2.5	2.9	#	238.3	4.1

Patients	4368
Mean age at second malignancy (years)	70.0
Person-years	20677
Mean observation time (years)	4.7
Median observation time (years)	4.0

The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 are pooled in category "Other primaries".

Table 6b

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998-2012
FEMALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C15	Oesophagus	3	1.0	3.0	0.6	8.9		1.0	
C16	Stomach	7	6.4	1.1	0.4	2.2		0.3	14.3
C17	Small intestine	3	0.8	3.7	0.8	10.7		1.1	
C18	Colon	37	17.5	2.1	1.5	2.9	#	9.4	5.4
C19-C20	Rectum	9	7.8	1.2	0.5	2.2		0.6	11.1
C21	Anus/canal	2	1.0	2.0	0.2	7.4		0.5	50.0
C22	Liver	4	1.9	2.1	0.6	5.3		1.0	25.0
C23-C24	Bile	3	2.5	1.2	0.2	3.5		0.2	33.3
C25	Pancreas	12	7.4	1.6	0.8	2.8		2.2	25.0
C33-C34	Lung	22	12.3	1.8	1.1	2.7	#	4.7	18.2
C43	Malign. melanoma	129	7.1	18.3	15.3	21.7	#	59.2	
C46,C49	Soft tissue	4	1.0	3.9	1.1	10.0	#	1.4	25.0
C50	Breast	124	57.5	2.2	1.8	2.6	#	32.3	2.4
C53	Cervix uteri	6	3.1	1.9	0.7	4.1		1.4	33.3
C54	Corpus uteri	14	9.7	1.4	0.8	2.4		2.1	7.1
C56	Ovary	9	7.5	1.2	0.5	2.3		0.7	
C64	Kidney	7	4.3	1.6	0.7	3.4		1.3	14.3
C67	Bladder	4	3.2	1.2	0.3	3.2		0.4	
C69	Eye melanoma	2	0.2	8.2	1.0	29.5		0.9	
C70-C72	CNS cancer	12	2.6	4.6	2.4	8.1	#	4.6	16.7
C73	Thyroid	16	4.1	3.9	2.2	6.4	#	5.8	6.3
C76-C79	CUP	5	3.1	1.6	0.5	3.7		0.9	
C82-C85	NHL	14	6.7	2.1	1.1	3.5	#	3.5	14.3
C90	Mult. myeloma	3	2.1	1.4	0.3	4.2		0.4	33.3
C91-C96	Leukaemia	8	2.8	2.8	1.2	5.6	#	2.5	25.0
Other primaries		5	3.0	1.7	0.5	3.9		1.0	20.0
Not observed		0	6.4	0.0	0.0	0.6	#	-3.1	
All mult. primaries		464	183.2	2.5	2.3	2.8	#	136.4	6.7

Patients	4128
Mean age at second malignancy (years)	65.8
Person-years	20590
Mean observation time (years)	5.0
Median observation time (years)	4.3

The occurrence of second malignancy is statistically significant.

Observed second malignancies with count 1 are pooled in category "Other primaries".

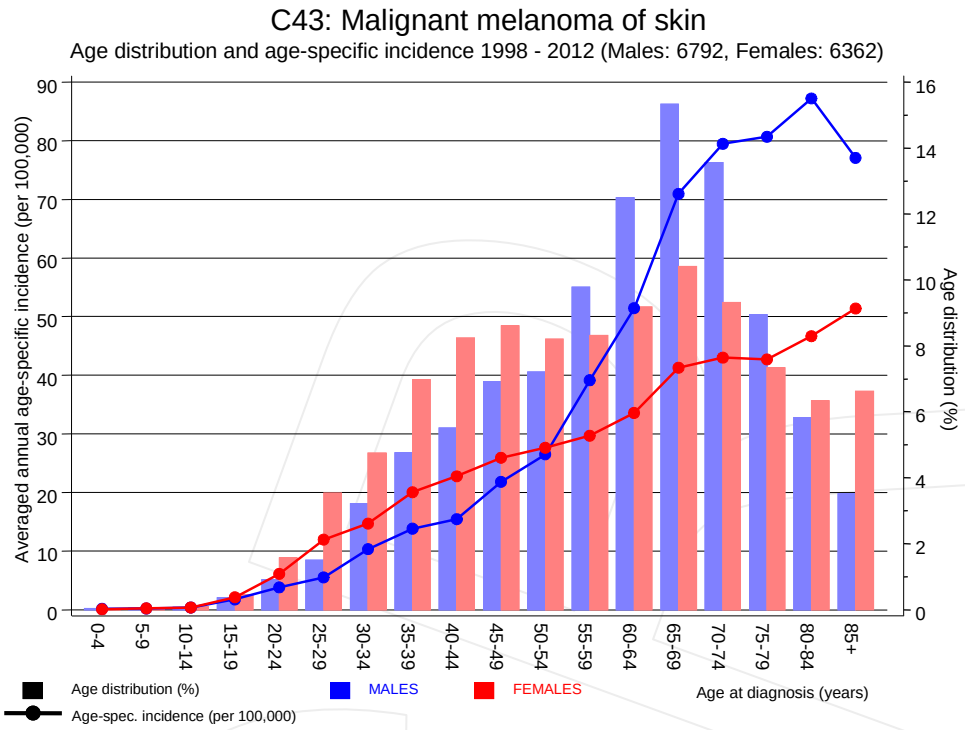


Figure 7. Age distribution and age-specific incidence

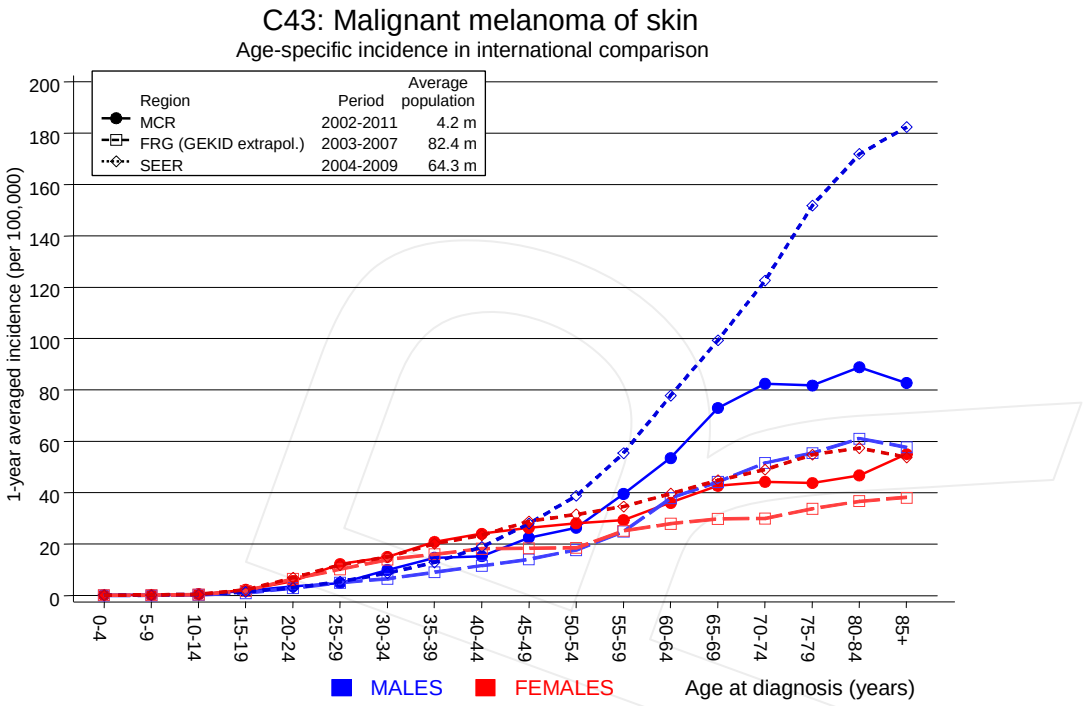


Figure 7a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

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, 2011. http://www.gekid.de. Last access: 05/12/2011

Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2012, based on the November 2011 submission. http://www.seer.cancer.gov.

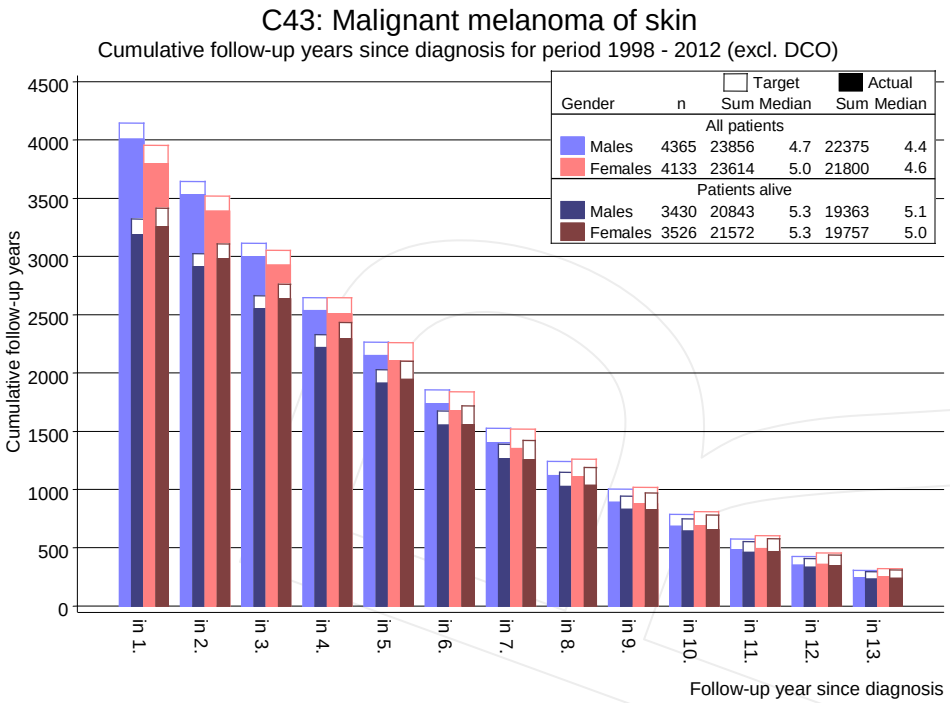
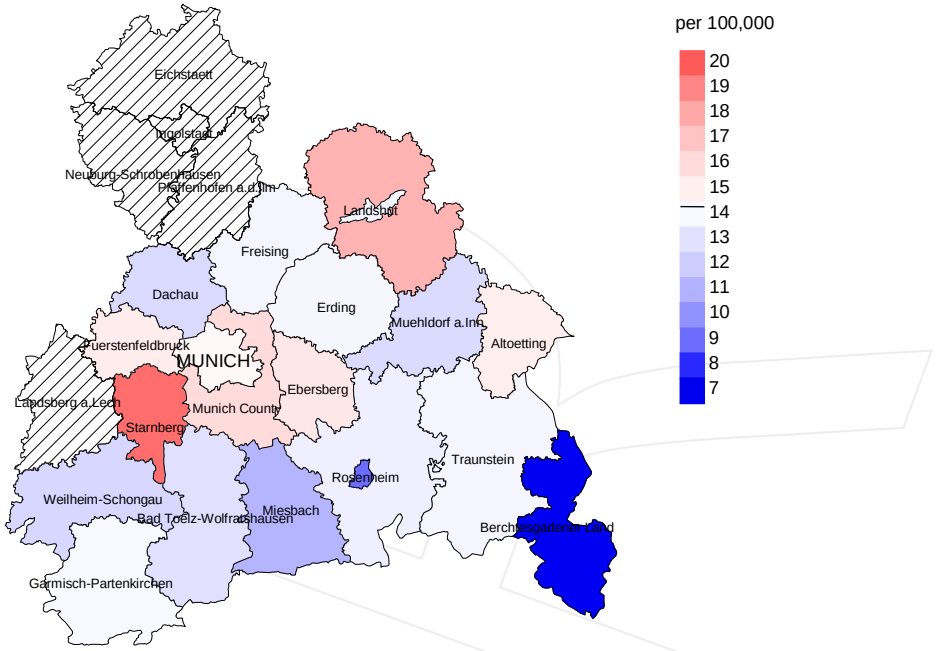


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

Average incidence (world standard population) 2003 - 2008: Males



Average incidence (world standard population) 2003 - 2008: Females

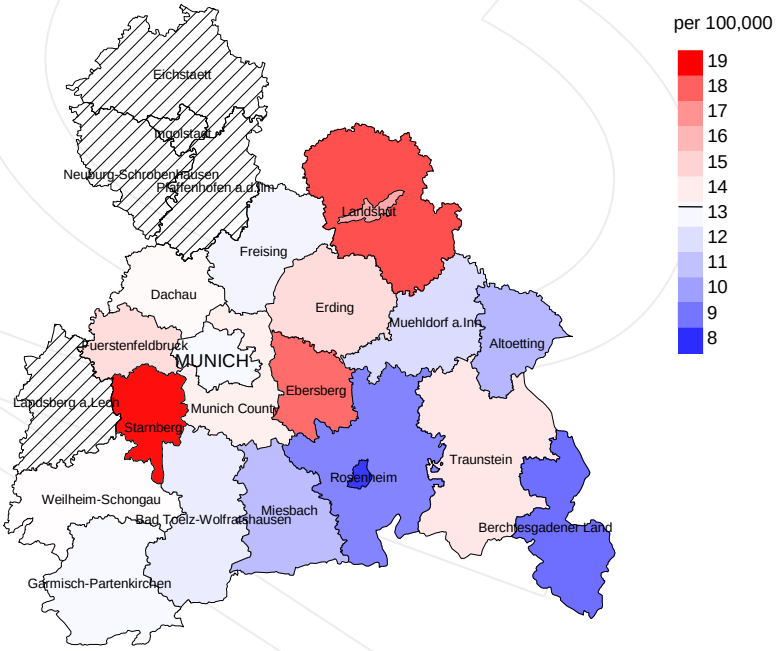
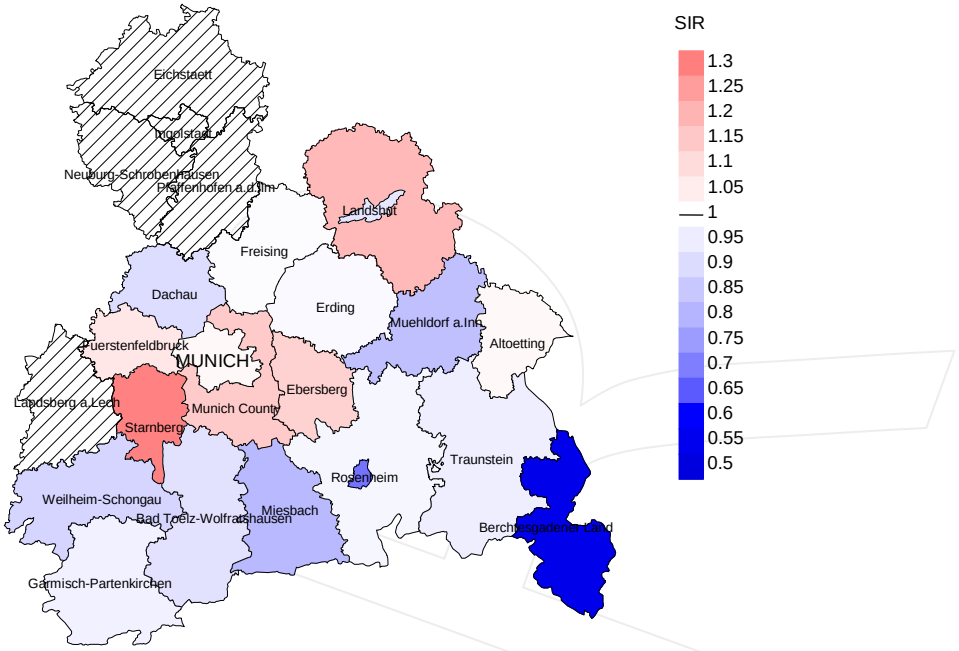


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 14.3/100,000 WS N=2,723, females 13.3/100,000 WS N=2,633). Since cancer data are not available in some counties until 2007, the local incidence rates were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 104 women were identified with newly diagnosed malignant melanoma. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 17.8/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 13.2 and 23.8/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males



Standardized incidence ratio (SIR) 2003 - 2008: Females

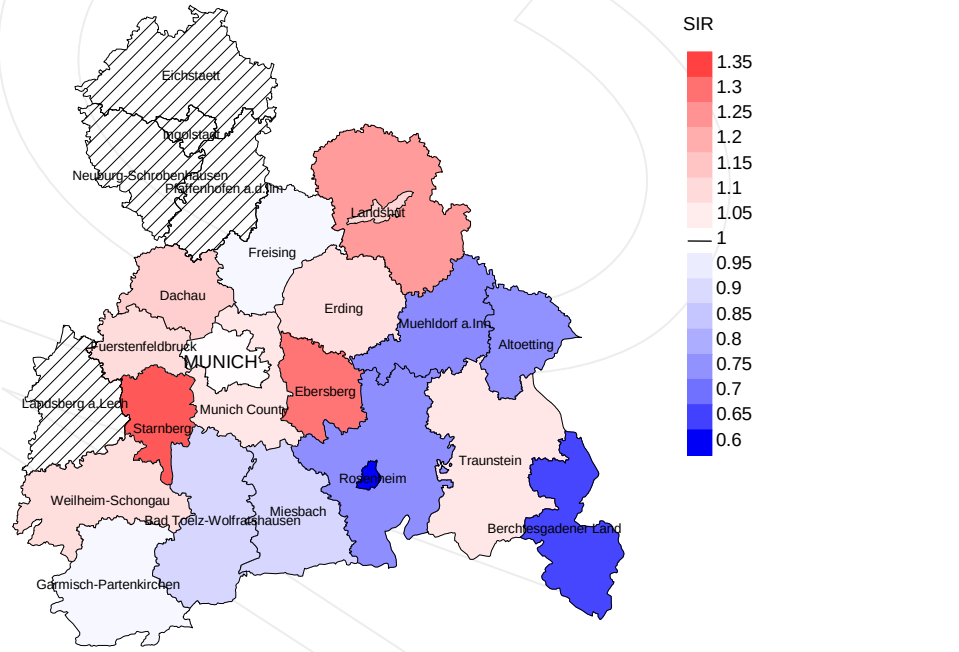


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=2,723, females N=2,633). Since cancer data are not available in some counties until 2007, the local SIR values were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 104 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 1.30. Though, the value of this parameter may vary with an underlying probability of 99% between 0.99 and 1.66, 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 4.52 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	472	97.5	2.1	180	38.1	90.6
1999	460	97.0	2.0	145	31.5	93.1
2000	507	98.0	1.4	173	34.1	89.0
2001	521	97.7	1.5	173	33.2	96.5
2002	873	97.0	1.6	263	30.1	95.4
2003	798	95.5	2.1	239	29.9	97.5
2004	887	96.6	2.7	286	32.2	97.6
2005	887	94.0	1.4	247	27.8	95.1
2006	906	89.4	1.5	245	27.0	96.7
2007	1028	67.8	1.6	227	22.1	97.8
2008	1171	53.3	1.8	257	21.9	97.7
2009	1148	48.6	1.9	208	18.1	99.0
2010	1323	48.6	1.6	196	14.8	98.5
2011	1409	45.1	1.5	144	10.2	94.4
2012	1044	97.4	2.4	79	7.6	96.2
1998-2012	13434	75.9	1.8	3062	22.8	96.0

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 4.52 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	472	127	89.8	10	2.1
1999	460	118	90.7	13	2.8
2000	507	183	90.2	17	3.4
2001	521	167	91.0	18	3.5
2002	873	239	95.4	29	3.3
2003	798	259	90.7	31	3.9
2004	887	279	96.8	52	5.9
2005	887	317	95.6	31	3.5
2006	906	298	95.3	34	3.8
2007	1028	373	98.1	36	3.5
2008	1171	404	98.0	53	4.5
2009	1148	410	97.8	47	4.1
2010	1323	376	97.9	52	3.9
2011	1409	439	98.6	62	4.4
2012	1044	455	97.8	53	5.1
1998-2012	13434	4444	96.0	538	4.0

Table 10c

Annual cohorts of deaths, proportion of cancer-related and not 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 4.52 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. not 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	167	61.1	38.9	69.7
2002	239	63.6	36.4	68.9
2003	259	61.4	38.6	72.3
2004	279	66.7	33.3	70.0
2005	317	62.5	37.5	67.7
2006	298	59.1	40.9	65.8
2007	373	63.5	36.5	68.3
2008	404	57.9	42.1	64.4
2009	410	65.1	34.9	68.8
2010	376	65.2	34.8	71.5
2011	439	57.4	42.6	63.7
2012	455	60.0	40.0	64.5
1998-2012	4444	61.9	38.1	68.1

Table 11a

Means 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 (not cancer-related) Years	Age at death (according to death certificate) Years
1998	75	70.9	66.4	78.9	67.3
1999	67	73.6	69.5	81.1	71.0
2000	94	71.4	66.7	81.1	68.7
2001	84	68.3	63.2	79.6	65.4
2002	131	71.4	68.4	79.5	68.5
2003	134	71.3	67.5	79.3	69.1
2004	146	72.5	70.0	79.8	70.9
2005	176	72.4	68.5	81.2	69.5
2006	158	72.8	69.1	78.9	69.8
2007	207	72.9	68.9	79.8	69.0
2008	210	75.6	71.8	82.5	71.7
2009	235	72.8	68.2	83.0	68.9
2010	201	74.2	71.7	79.7	72.4
2011	240	76.1	72.4	81.9	73.6
2012	270	75.3	72.2	80.6	72.7
1998-2012	2428	73.3	69.6	80.7	70.4

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

Means 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 (not cancer-related) Years	Age at death (according to death certificate) Years
1998	52	75.9	69.2	83.0	73.4
1999	51	74.3	72.1	78.0	73.3
2000	89	74.5	69.9	83.6	71.5
2001	83	79.0	72.5	86.3	73.5
2002	108	75.9	67.1	85.3	69.1
2003	125	76.8	69.6	85.3	71.2
2004	133	77.8	72.6	85.1	72.6
2005	141	79.6	74.7	85.1	75.0
2006	140	79.2	74.0	85.8	74.1
2007	166	76.1	70.7	85.6	71.4
2008	194	79.2	72.4	86.3	74.5
2009	175	78.2	72.8	86.1	73.8
2010	175	78.3	73.6	85.9	74.7
2011	199	78.5	71.9	85.8	73.4
2012	185	79.0	72.8	87.0	73.6
1998-2012	2016	77.9	72.0	85.5	73.2

By 2010, life expectancy for a newborn male in Germany is 77.5 years compared with 82.6 years for his female counterpart.

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	0.21	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	0.22	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	0.24	2.8	0.21	4.2	0.24	5.2	0.26
2004	108	5.7	0.25	3.0	0.22	4.6	0.24	6.2	0.27
2005	123	6.5	0.27	3.4	0.23	5.1	0.26	6.8	0.29
2006	98	5.1	0.22	2.6	0.19	4.0	0.21	5.3	0.23
2007	131	5.9	0.26	3.0	0.23	4.6	0.25	6.1	0.27
2008	135	6.1	0.22	2.9	0.18	4.5	0.20	6.4	0.25
2009	163	7.3	0.27	3.8	0.25	5.5	0.26	7.1	0.29
2010	137	6.1	0.20	2.9	0.16	4.4	0.18	5.9	0.21
2011	148	6.5	0.21	2.9	0.16	4.5	0.18	6.2	0.22
2012	169	7.4	0.31	3.3	0.26	5.2	0.28	6.9	0.31
1998-2012	1612	5.9	0.24	3.0	0.20	4.6	0.23	6.1	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	0.26	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	0.16
2005	75	3.8	0.18	1.4	0.10	2.1	0.13	2.9	0.15
2006	78	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	0.20
2008	99	4.3	0.19	1.7	0.13	2.6	0.15	3.3	0.17
2009	106	4.6	0.20	1.8	0.14	2.6	0.15	3.5	0.18
2010	108	4.6	0.18	1.7	0.11	2.6	0.13	3.3	0.15
2011	104	4.4	0.16	1.8	0.10	2.7	0.12	3.3	0.13
2012	105	4.4	0.22	1.8	0.15	2.6	0.17	3.2	0.18
1998-2012	1145	4.0	0.18	1.6	0.12	2.4	0.14	3.1	0.16

Table 13

Age distribution of age at death (cancer-related) for period 1998-2012
(**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	0.1	0.2	3	0.2	0.3	1	0.1	0.1
25-29	12	0.4	0.6	8	0.5	0.8	4	0.3	0.4
30-34	28	1.0	1.6	17	1.0	1.8	11	0.9	1.3
35-39	49	1.7	3.3	31	1.8	3.6	18	1.5	2.8
40-44	72	2.5	5.8	43	2.5	6.1	29	2.4	5.3
45-49	109	3.8	9.5	60	3.5	9.6	49	4.1	9.4
50-54	131	4.5	14.0	69	4.0	13.7	62	5.2	14.5
55-59	192	6.6	20.6	117	6.9	20.5	75	6.3	20.8
60-64	266	9.2	29.8	166	9.7	30.3	100	8.4	29.2
65-69	362	12.5	42.3	235	13.8	44.0	127	10.6	39.8
70-74	434	15.0	57.3	289	17.0	61.0	145	12.1	51.9
75-79	411	14.2	71.4	258	15.1	76.1	153	12.8	64.7
80-84	411	14.2	85.6	232	13.6	89.7	179	15.0	79.7
85+	418	14.4	100.0	175	10.3	100.0	243	20.3	100.0
All ages	2901	100.0		1705	100.0		1196	100.0	

Included in the statistics are 46.0% multiple primaries in males and 29.8% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2012
(**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		0.1	0.08	0.0		4.8	
20-24	3	1	0.2	0.05	0.1	0.01	3.6	2.1
25-29	8	4	0.4	0.08	0.2	0.02	8.3	3.7
30-34	17	11	0.8	0.08	0.5	0.04	9.7	5.2
35-39	31	18	1.3	0.09	0.8	0.04	8.1	3.6
40-44	43	29	1.8	0.11	1.3	0.05	5.3	2.7
45-49	60	49	2.8	0.13	2.3	0.09	3.5	2.6
50-54	69	62	3.7	0.14	3.3	0.12	2.2	2.2
55-59	117	75	6.9	0.17	4.2	0.14	2.1	1.7
60-64	166	100	10.1	0.19	5.7	0.17	2.0	1.7
65-69	235	127	16.0	0.22	7.9	0.19	2.1	1.7
70-74	289	145	24.9	0.30	10.5	0.24	2.3	1.6
75-79	258	153	34.2	0.40	14.0	0.32	2.1	1.6
80-84	232	179	51.1	0.56	20.7	0.44	2.3	1.7
85+	175	243	56.4	0.71	29.7	0.57	2.2	1.9
All ages	1705	1196					2.3	1.8
Mortality								
Raw			6.2	0.24	4.2	0.19		
WS			3.2	0.21	1.7	0.12		
ES			4.8	0.23	2.5	0.14		
BRD-S			6.5	0.26	3.3	0.16		
PYLL-70								
per 100,000			37.4		25.3			
ES			32.8		21.8			
AYLL-70			12.3		13.0			

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

Table 15a

Multiple primaries in deaths in period 1998-2012
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	10	0.9	4	40.0			6	60.0
C16 Stomach	32	2.9	9	28.1			23	71.9
C18 Colon	70	6.4	25	35.7	2	2.9	43	61.4
C19-C20 Rectum	53	4.9	19	35.8			34	64.2
C22 Liver	20	1.8	3	15.0			17	85.0
C25 Pancreas	37	3.4	1	2.7	1	2.7	35	94.6
C33-C34 Lung	96	8.8	7	7.3	8	8.3	81	84.4
C38,C45 Mesothelioma	12	1.1	2	16.7			10	83.3
C43 Malign. melanoma	141	13.0			38	27.0	103	73.0
C44 Skin others	125	11.5	28	22.4	30	24.0	67	53.6
C46,C49 Soft tissue	12	1.1	4	33.3	1	8.3	7	58.3
C61 Prostate	194	17.8	86	44.3	5	2.6	103	53.1
C64 Kidney	33	3.0	13	39.4	3	9.1	17	51.5
C67 Bladder	55	5.1	26	47.3	1	1.8	28	50.9
C70-C72 CNS cancer	27	2.5	6	22.2			21	77.8
C76-C79 CUP	15	1.4	1	6.7	1	6.7	13	86.7
C82-C85 NHL	47	4.3	23	48.9	3	6.4	21	44.7
C90 Mult. myeloma	14	1.3	3	21.4	1	7.1	10	71.4
C91-C96 Leukaemia	25	2.3	3	12.0	1	4.0	21	84.0
Other primaries	70	6.4	26	37.1	4	5.7	40	57.1
All mult. primaries	1088	100.0	289	26.6	99	9.1	700	64.3

Multiple primaries with number of cases n<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 1998-2012
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C16	Stomach	19	2.7	3	15.8			16	84.2
C18	Colon	38	5.4	9	23.7	2	5.3	27	71.1
C19-C20	Rectum	18	2.6	8	44.4	1	5.6	9	50.0
C23-C24	Bile	12	1.7	1	8.3			11	91.7
C25	Pancreas	36	5.2	1	2.8	1	2.8	34	94.4
C33-C34	Lung	49	7.0	4	8.2	1	2.0	44	89.8
C43	Malign. melanoma	77	11.0			12	15.6	65	84.4
C44	Skin others	45	6.4	12	26.7	9	20.0	24	53.3
C46,C49	Soft tissue	10	1.4	3	30.0	2	20.0	5	50.0
C50	Breast	161	23.0	72	44.7	10	6.2	79	49.1
C51	Vulva	8	1.1	5	62.5	1	12.5	2	25.0
C53	Cervix uteri	19	2.7	11	57.9			8	42.1
C54	Corpus uteri	25	3.6	11	44.0			14	56.0
C56	Ovary	30	4.3	9	30.0	1	3.3	20	66.7
C64	Kidney	12	1.7	6	50.0	1	8.3	5	41.7
C67	Bladder	13	1.9	3	23.1			10	76.9
C69	Eye melanoma	12	1.7	10	83.3			2	16.7
C70-C72	CNS cancer	17	2.4	1	5.9	1	5.9	15	88.2
C73	Thyroid	8	1.1	4	50.0			4	50.0
C76-C79	CUP	11	1.6	2	18.2	1	9.1	8	72.7
C82-C85	NHL	28	4.0	10	35.7	1	3.6	17	60.7
C90	Mult. myeloma	8	1.1	3	37.5			5	62.5
C91-C96	Leukaemia	12	1.7					12	100.0
Other primaries		31	4.4	12	38.7	1	3.2	18	58.1
All mult. primaries		699	100.0	200	28.6	45	6.4	454	64.9

Multiple primaries with number of cases n<6 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 1998-2012
(**Singular primaries only** *)

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	1		0.1	0.04	0.0		2.6	
20-24	2	1	0.1	0.03	0.1	0.01	2.6	2.3
25-29	7	4	0.4	0.07	0.2	0.02	7.8	3.9
30-34	16	11	0.8	0.08	0.5	0.04	9.3	5.9
35-39	29	17	1.2	0.10	0.8	0.04	8.1	3.8
40-44	41	26	1.7	0.12	1.1	0.05	5.5	2.8
45-49	57	38	2.6	0.13	1.8	0.08	3.7	2.3
50-54	61	51	3.3	0.14	2.7	0.11	2.3	2.1
55-59	102	68	6.0	0.18	3.8	0.15	2.1	1.8
60-64	136	84	8.3	0.20	4.8	0.17	1.9	1.7
65-69	182	94	12.4	0.24	5.9	0.18	2.0	1.5
70-74	210	116	18.1	0.35	8.4	0.26	2.1	1.6
75-79	175	106	23.2	0.47	9.7	0.30	1.9	1.3
80-84	158	131	34.8	0.68	15.2	0.43	2.1	1.6
85+	115	183	37.1	0.82	22.3	0.58	1.9	1.8
All ages	1292	930					2.2	1.7
Mortality								
Raw			4.7	0.25	3.2	0.17		
WS			2.5	0.21	1.4	0.12		
ES			3.7	0.23	2.0	0.13		
BRD-S			4.9	0.26	2.5	0.15		
PYLL-70								
per 100,000			33.2		21.8			
ES			28.9		18.9			
AYLL-70			13.0		13.6			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2012
(**Single primaries only** *)

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	1		0.1	0.04	0.0		2.6	
20-24	2	1	0.1	0.04	0.1	0.01	2.7	2.5
25-29	7	4	0.4	0.08	0.2	0.02	8.3	4.1
30-34	14	10	0.7	0.07	0.5	0.04	8.4	5.9
35-39	29	16	1.2	0.10	0.7	0.04	8.5	3.9
40-44	39	21	1.6	0.12	0.9	0.05	5.5	2.4
45-49	52	35	2.4	0.13	1.7	0.08	3.6	2.4
50-54	54	42	2.9	0.14	2.2	0.10	2.2	1.9
55-59	82	51	4.8	0.17	2.9	0.13	1.9	1.5
60-64	99	56	6.0	0.18	3.2	0.13	1.6	1.3
65-69	120	55	8.2	0.20	3.4	0.12	1.5	1.0
70-74	132	66	11.4	0.28	4.8	0.18	1.6	1.1
75-79	98	67	13.0	0.32	6.1	0.22	1.3	1.0
80-84	80	87	17.6	0.41	10.1	0.32	1.4	1.2
85+	54	120	17.4	0.46	14.7	0.42	1.1	1.4
All ages	863	631					1.7	1.3
Mortality								
Raw			3.1	0.19	2.2	0.13		
WS			1.8	0.17	1.0	0.09		
ES			2.5	0.18	1.4	0.10		
BRD-S			3.2	0.20	1.8	0.12		
PYLL-70								
per 100,000			28.9		18.0			
ES			25.3		15.6			
AYLL-70			14.4		15.1			

* See corresponding tables with multiple primaries.

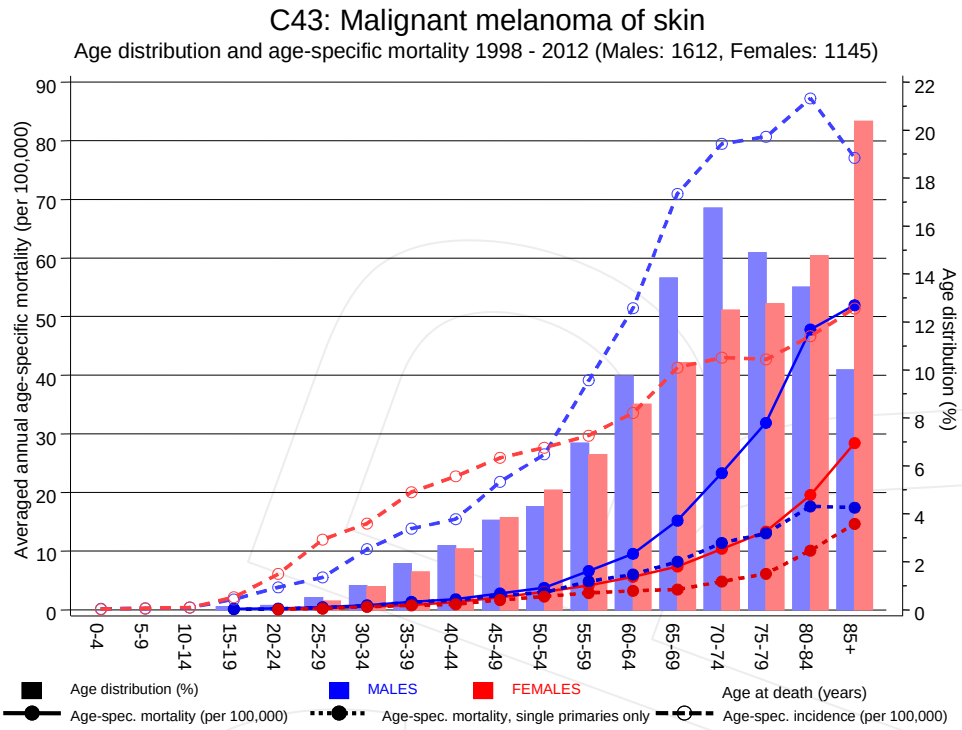
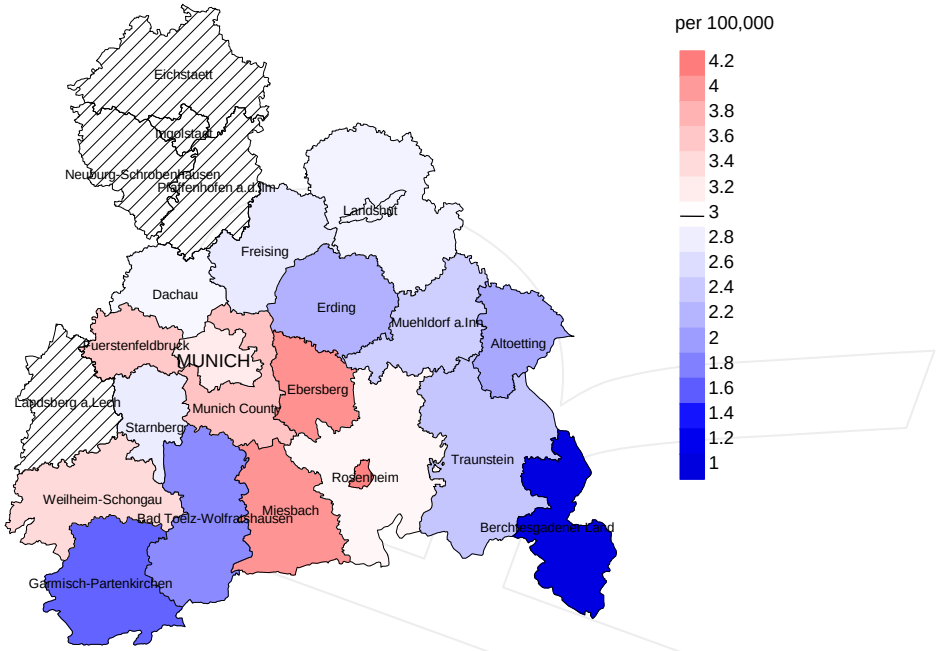


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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) 2003 - 2008: Males



Average mortality (world standard population) 2003 - 2008: Females

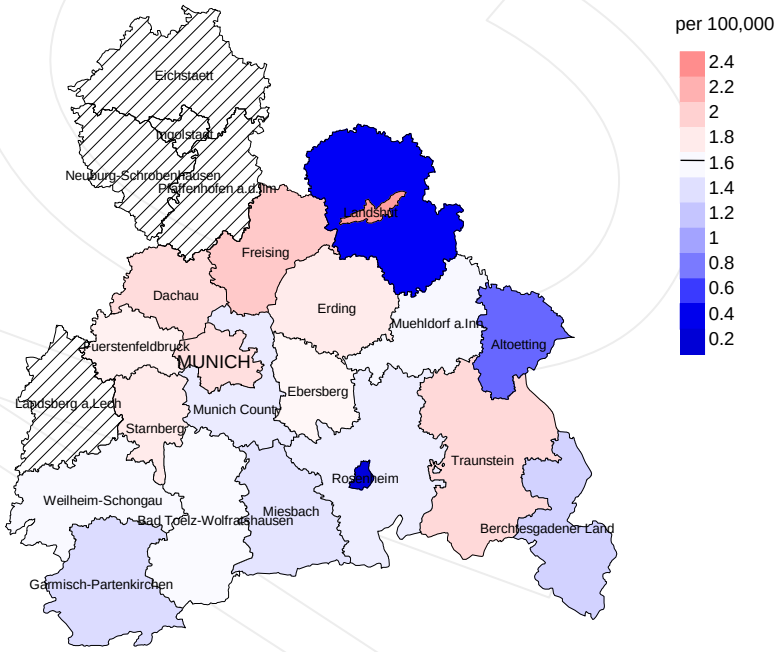
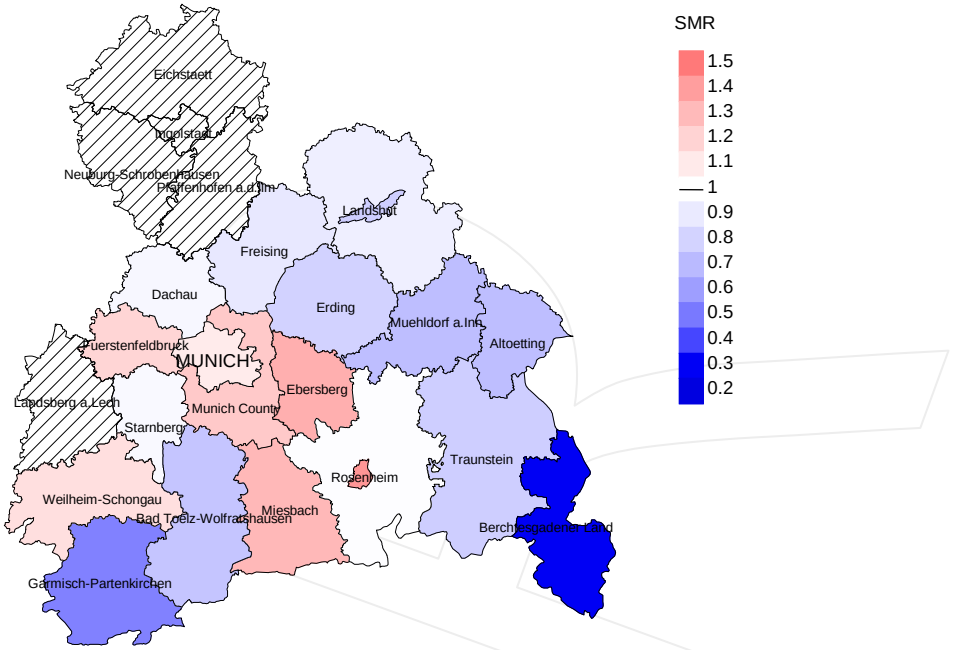


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 3.0/100,000 WS N=667, females 1.6/100,000 WS N=485). Since cancer data are not available in some counties until 2007, the local mortality rates were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 15 women died from malignant melanoma. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 1.7/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.7 and 3.6/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males



Standardized mortality ratio (SMR) 2003 - 2008: Females

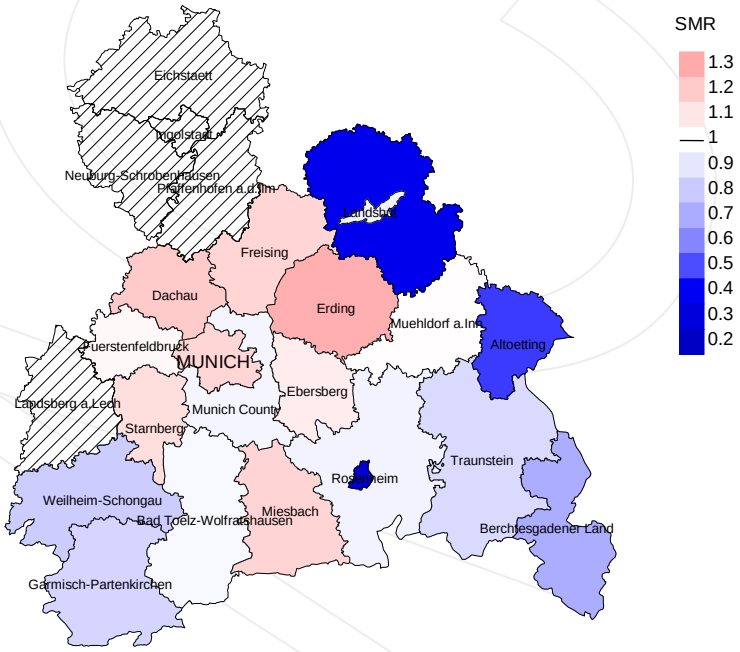


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=667, females N=485). Since cancer data are not available in some counties until 2007, the local SMR values were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 15 women died from malignant melanoma. Therefore, the mean standardized mortality ratio (SMR) 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 0.49 and 2.02, 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. 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 tumor-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

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)
FRG	Federal Republic of Germany
GEKID	Association of Population-based Cancer Registries in Germany (Gesellschaft der epidemiologischen Krebsregister in Deutschland e.V.)
LCL	Lower confidence limit
MI-index	Ratio between mortality and incidence
MCR	Munich Cancer Registry (Tumorregister München)
PYLL-70	Potential years of life lost prior to age 70 given a person dies before that age
SEER	Surveillance, Epidemiology, and End Results (USA)
SIR	Standardized incidence ratio
SMR	Standardized mortality ratio
UCL	Upper confidence limit
WS	World standard population

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