Munich Cancer Registry

- Survival
- Selection Matrix
- Homepage

Munich Cancer Registry at Munich Cancer Center
Marchioninistr. 15
Munich, 81377
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http://www.tumorregister-muenchen.de/en

Cancer statistics: Baseline statistics

C67, D09.0, D41.4: Bladder cancer

Year of diagnosis	1998-2011
Patients	13213
Diseases	13363
Creation date	04/02/2013
Export date	01/03/2013
Population	4.5 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C67D_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, April 2013

[#] 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 2011 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.

ICD-10 codes used for specifying cancer site

ICD-10	Description
C67	Malignant neoplasm of bladder
D09.0	Carcinoma in situ: Bladder
D41.4	Neoplasm of uncertain or unknown behaviour of urinary organs

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	600	21	3.5	30.0	67.5	98.3
1999	574	20	3.5	34.1	62.0	99.1
2000	575	29	5.0	35.1	61.2	98.1
2001	566	21	3.7	37.3	56.9	98.6
2002	1058	77	7.3	36.9	61.6	98.3
2003	1049	73	7.0	34.3	57.2	96.6
2004	1136	65	5.7	37.3	54.4	97.2
2005	1100	54	4.9	37.0	47.7	95.8
2006	1112	48	4.3	35.1	49.1	93.0
2007	1252	46	3.7	34.6	40.8	83.5 ##
2008	1195	60	5.0	35.8	40.1	67.9
2009	1183	54	4.6	35.9	39.6	70.5
2010	1090	58	5.3	35.7	32.4	92.2
2011	873	47	5.4	33.4	22.6	73.2 ###
1998-2011	13363	673	5.0	35.4	47.8	88.8

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	600	432	168	72.0
1999	574	426	148	74.2
2000	575	410	165	71.3
2001	566	395	171	69.8
2002	1058	765	293	72.3
2003	1049	779	270	74.3
2004	1136	812	324	71.5
2005	1100	805	295	73.2
2006	1112	837	275	75.3
2007	1252	933	319	74.5
2008	1195	880	315	73.6
2009	1183	880	303	74.4
2010	1090	811	279	74.4
2011	873	661	212	75.7
1998-2011	13363	9826	3537	73.5

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	432	168	39.0	14.3	23.4	5.9	35.8	9.0	48.3	11.9
1999	426	148	38.1	12.5	22.4	5.2	34.2	8.0	46.2	10.6
2000	410	165	36.0	13.7	20.5	5.2	32.0	8.2	44.3	11.2
2001	395	171	34.1	14.1	19.6	5.8	30.2	8.9	40.4	11.9
2002	765	293	41.1	15.0	22.1	6.0	34.5	9.1	47.1	12.0
2003	779	270	41.6	13.7	22.3	5.6	34.3	8.4	45.9	10.9
2004	812	324	43.2	16.4	22.5	6.3	34.8	9.7	47.0	12.9
2005	805	295	42.5	14.8	21.5	5.9	33.4	8.9	45.8	11.5
2006	837	275	43.7	13.7	22.2	5.3	34.0	8.0	45.8	10.7
2007	933	319	42.1	13.8	21.1	5.5	32.3	8.3	43.0	11.0
2008	880	315	39.5	13.6	19.1	5.4	29.6	8.1	39.6	10.4
2009	880	303	39.4	13.0	19.0	4.9	29.2	7.5	39.1	9.9
2010	811	279	36.0	11.9	17.0	4.2	26.1	6.5	34.9	8.7
2011	661	212	29.3	9.1	13.6	3.8	21.0	5.6	28.1	6.9
1998-2011	9826	3537	39.1	13.4	20.0	5.3	30.8	8.0	41.4	10.5

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	600	70.3	13.0	22.9	98.1	52.3	62.1	71.9	79.4	86.0
1999	574	70.0	11.7	18.9	96.7	55.1	61.9	70.9	78.6	84.6
2000	575	71.6	10.9	34.0	99.7	57.4	63.4	72.7	79.6	85.8
2001	566	70.8	11.4	28.4	95.8	55.3	62.5	71.8	79.2	85.4
2002	1058	71.8	11.4	28.3	99.5	57.8	64.2	72.9	80.0	86.1
2003	1049	71.0	12.0	25.4	103	56.1	63.9	71.7	79.5	85.8
2004	1136	71.4	11.9	23.3	99.0	56.0	63.5	72.7	79.9	85.8
2005	1100	71.7	11.9	18.4	101	57.1	63.8	73.2	80.3	85.4
2006	1112	71.9	11.7	3.0	101	57.3	64.6	72.4	80.3	85.8
2007	1252	71.3	11.9	1.3	101	55.1	65.0	71.9	79.9	85.7
2008	1195	72.0	11.7	6.6	100	56.2	65.4	72.6	80.5	86.3
2009	1183	71.9	11.8	28.5	103	56.6	64.7	73.1	80.3	86.3
2010	1090	72.2	11.9	22.4	100	56.0	65.0	73.2	81.0	86.6
2011	873	72.0	11.7	1.5	97.8	56.8	65.2	72.5	80.3	86.4
1998-2011	13363	71.5	11.8	1.3	103	56.1	64.2	72.5	80.0	85.9

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	432	69.2	12.5	26.3	95.6	52.3	61.5	70.1	78.1	84.6
1999	426	69.2	11.6	18.9	94.1	55.0	61.6	69.9	77.9	84.3
2000	410	70.3	10.7	40.8	99.7	55.3	62.7	71.7	77.9	84.1
2001	395	69.7	10.9	28.4	95.1	55.1	62.1	70.1	77.8	83.6
2002	765	71.1	10.9	28.3	97.6	57.9	63.5	72.0	78.8	84.9
2003	779	70.4	11.5	25.4	101	56.4	63.5	70.9	78.2	84.3
2004	812	70.4	11.7	23.3	98.8	55.6	62.8	71.0	78.6	84.2
2005	805	71.1	11.1	18.4	101	57.6	63.8	72.5	78.9	84.0
2006	837	71.1	11.3	3.0	101	56.9	64.0	71.4	79.2	84.8
2007	933	70.8	11.6	1.3	101	55.0	64.9	71.5	79.2	84.8
2008	880	71.6	11.3	29.6	100	56.0	65.3	72.4	79.6	85.4
2009	880	71.2	11.6	28.5	97.4	56.2	64.3	72.5	79.5	85.2
2010	811	71.1	11.5	25.6	99.1	55.6	63.9	72.3	79.8	84.8
2011	661	72.0	11.3	1.5	95.4	56.9	66.0	72.6	79.5	85.5
1998-2011	9826	70.8	11.4	1.3	101	55.9	63.7	71.7	79.0	84.7

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	168	73.0	14.0	22.9	98.1	52.3	66.0	76.6	83.6	87.6
1999	148	72.4	11.7	42.1	96.7	55.9	64.0	74.4	80.1	86.0
2000	165	75.0	10.9	34.0	94.5	60.0	68.4	76.0	82.5	88.7
2001	171	73.4	12.3	30.9	95.8	55.8	66.3	74.9	82.6	88.6
2002	293	73.9	12.2	36.1	99.5	57.6	65.3	76.1	82.6	88.9
2003	270	72.8	13.4	25.4	103	54.9	65.5	74.9	82.3	89.2
2004	324	74.1	12.1	33.3	99.0	57.4	65.8	76.1	82.9	89.1
2005	295	73.4	13.7	28.0	98.8	56.5	63.7	75.3	83.9	90.1
2006	275	74.2	12.4	4.3	97.4	58.4	66.9	75.9	83.2	88.8
2007	319	72.8	12.7	22.2	98.4	55.6	65.6	73.9	82.2	86.9
2008	315	73.1	12.5	6.6	97.0	56.5	65.7	73.4	82.7	87.4
2009	303	74.0	12.2	36.0	103	57.5	66.5	75.0	83.3	88.6
2010	279	75.5	12.7	22.4	100	57.5	68.3	77.2	85.4	90.1
2011	212	72.0	13.0	12.3	97.8	56.7	63.1	72.0	82.9	88.3
1998-2011	3537	73.6	12.6	4.3	103	56.8	65.8	75.0	82.9	88.7

Table 4

Age distribution by 5-year age group and gender for period 1998-2011 (incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	4	0.0	0.0	3	0.0	0.0	1	0.0	0.0
5-9	1	0.0	0.0			0.0	1	0.0	0.1
10-14	1	0.0	0.0			0.0	1	0.0	0.1
15-19	2	0.0	0.1	2	0.0	0.1			0.1
20-24	9	0.1	0.1	4	0.0	0.1	5	0.1	0.2
25-29	23	0.2	0.3	19	0.2	0.3	4	0.1	0.3
30-34	27	0.2	0.5	18	0.2	0.5	9	0.3	0.6
35-39	64	0.5	1.0	46	0.5	0.9	18	0.5	1.1
40-44	158	1.2	2.2	116	1.2	2.1	42	1.2	2.3
45-49	308	2.3	4.5	233	2.4	4.5	75	2.1	4.4
50-54	546	4.1	8.6	419	4.3	8.8	127	3.6	8.0
55-59	975	7.3	15.8	743	7.6	16.3	232	6.6	14.6
60-64	1535	11.5	27.3	1223	12.4	28.8	312	8.8	23.4
65-69	1962	14.7	42.0	1535	15.6	44.4	427	12.1	35.5
70-74	2193	16.4	58.4	1682	17.1	61.5	511	14.4	49.9
75-79	2219	16.6	75.0	1666	17.0	78.5	553	15.6	65.5
80-84	1736	13.0	88.0	1185	12.1	90.5	551	15.6	81.1
85+	1600	12.0	100.0	932	9.5	100.0	668	18.9	100.0
All ages	13363	100.0		9826	100.0		3537	100.0	

Included in the statistics are 47.1% multiple primaries in males and 35.5% in females.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 1998-2011

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=391 %	Females DCO rate n=281 %	Males Prop.all cancers n=132509 %	Females Prop.all cancers n=129521 %
0- 4	3	1	0.2	0.1			1.1	0.5
5- 9		1	0.0	0.1				1.0
10-14		1	0.0	0.1				0.7
15-19	2		0.2	0.0			0.7	
20-24	4	5	0.3	0.3			0.8	1.1
25-29	19	4	1.1	0.2			2.4	0.4
30-34	18	9	0.9	0.5			1.4	0.5
35-39	46	18	2.1	0.9			2.3	0.6
40-44	116	42	5.2	2.0	0.9		4.2	0.8
45-49	233	75	12.0	3.9	0.4		5.2	1.0
50-54	419	127	25.1	7.4	0.2	0.8	5.7	1.4
55-59	743	231	47.6	14.1	0.4	0.9	5.9	2.0
60-64	1222	312	80.3	19.5	1.1	1.0	6.5	2.1
65-69	1532	425	112.4	28.5	1.6	2.1	6.5	2.6
70-74	1676	510	162.5	41.3	2.0	1.4	7.7	3.4
75-79	1663	551	246.1	55.4	4.0	3.6	9.9	3.7
80-84	1184	551	291.5	69.3	7.2	10.0	10.7	4.1
85+	929	668	334.9	89.9	17.3	27.5	11.2	4.6
All ages	9809	3531			4.0	8.0	7.4	2.7
Incidence								
Raw			39.0	13.4				
WS			20.0	5.3				
ES			30.7	8.0				
BRD-S			41.3	10.5				

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 1998-2011
MALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C00	Lip	2	0.6	3.1	0.4	11.2		0.5	
C03-C06	Oral cavity	12	3.9	3.1	1.6	5.4	#	2.9	8.3
C07-C08	Salivary gland	3	1.2	2.4	0.5	7.0		0.6	
C09-C10	Oropharynx	5	4.7	1.1	0.3	2.5		0.1	
C12-C13	Hypopharynx	7	2.6	2.7	1.1	5.6	#	1.6	
C15	Oesophagus	19	8.8	2.2	1.3	3.4	#	3.7	10.5
C16	Stomach	38	26.0	1.5	1.0	2.0	#	4.3	2.6
C17	Small intestine	7	2.4	3.0	1.2	6.1	#	1.7	
C18	Colon	89	59.5	1.5	1.2	1.8	#	10.6	6.7
C19-C20	Rectum	42	30.6	1.4	1.0	1.9		4.1	7.1
C22	Liver	24	14.9	1.6	1.0	2.4	#	3.3	12.5
C23-C24	Bile	11	5.6	2.0	1.0	3.5		2.0	36.4
C25	Pancreas	40	20.2	2.0	1.4	2.7	#	7.1	20.0
C26	GI cancer	2	0.8	2.5	0.3	8.9		0.4	50.0
C32	Larynx	11	5.1	2.1	1.1	3.8	#	2.1	
C33-C34	Lung	199	65.3	3.0	2.6	3.5	#	48.2	12.1
C38,C45	Mesothelioma	5	3.5	1.4	0.5	3.3		0.5	
C43	Malign. melanoma	37	19.3	1.9	1.3	2.6	#	6.4	
C46,C49	Soft tissue	4	2.9	1.4	0.4	3.5		0.4	
C48	Peritoneal	2	0.4	5.6	0.7	20.3		0.6	50.0
C50	Breast	2	1.4	1.5	0.2	5.3		0.2	
C60	Penis	2	1.3	1.6	0.2	5.7		0.3	
C61	Prostate	797	162.7	4.9	4.6	5.3	#	228.7	6.0
C62	Testis	3	1.0	3.1	0.6	9.1		0.7	
C64	Kidney	69	18.3	3.8	2.9	4.8	#	18.3	20.3
C65	Renal pelvis	55	2.3	24.0	18.0	31.2	#	19.0	
C66	Ureter	38	1.3	30.3	21.4	41.6	#	13.3	
C67	Bladder	94	26.6	3.5	2.9	4.3	#	24.3	1.1
C68	Urethra	15	0.2	69.6	39.0	114.8	#	5.3	
C70-C72	CNS cancer	9	7.0	1.3	0.6	2.4		0.7	
C73	Thyroid	5	3.0	1.7	0.5	3.9		0.7	
C76-C79	CUP	20	10.1	2.0	1.2	3.1	#	3.6	10.0
C81	Hodgkin lymphoma	2	0.9	2.3	0.3	8.2		0.4	
C82-C85	NHL	36	22.2	1.6	1.1	2.2	#	5.0	11.1
C90	Mult. myeloma	9	7.3	1.2	0.6	2.3		0.6	11.1
C91-C96	Leukaemia	19	9.3	2.1	1.2	3.2	#	3.5	42.1
Other primaries		3	1.8	1.7	0.3	4.8		0.4	
Not observed		0	4.6	0.0	0.0	0.8	#	-1.7	
All mult. primaries		1737	559.4	3.1	3.0	3.3	#	424.7	7.6

Patients	7202
Mean age at second malignancy (years)	73.1
Person-years	27731
Mean observation time (years)	3.9
Median observation time (years)	3.1

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 1998-2011
FEMALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C15	Oesophagus	2	0.7	3.0	0.4	11.0		1.4	
C16	Stomach	9	5.7	1.6	0.7	3.0		3.5	22.2
C17	Small intestine	3	0.5	5.8	1.2	17.0	#	2.6	
C18	Colon	20	15.0	1.3	0.8	2.1		5.2	5.0
C19-C20	Rectum	14	6.1	2.3	1.2	3.8	#	8.2	
C21	Anus/canal	2	0.7	3.0	0.4	11.0		1.4	
C22	Liver	2	1.6	1.3	0.2	4.6		0.5	
C23-C24	Bile	5	2.2	2.3	0.7	5.3		2.9	60.0
C25	Pancreas	16	6.2	2.6	1.5	4.2	#	10.2	25.0
C26	GI cancer	2	0.3	6.3	0.8	22.7		1.8	50.0
C33-C34	Lung	37	8.5	4.4	3.1	6.0	#	29.8	8.1
C43	Malign. melanoma	3	3.9	0.8	0.2	2.2		-0.9	33.3
C50	Breast	56	34.9	1.6	1.2	2.1	#	22.0	5.4
C53	Cervix uteri	9	1.5	6.0	2.7	11.3	#	7.8	22.2
C54	Corpus uteri	10	6.7	1.5	0.7	2.7		3.4	
C56	Ovary	9	5.4	1.7	0.8	3.2		3.7	11.1
C64	Kidney	18	3.3	5.5	3.2	8.6	#	15.4	27.8
C65	Renal pelvis	27	0.4	67.0	44.1	97.5	#	27.8	
C66	Ureter	17	0.2	91.9	53.6	147.2	#	17.6	
C67	Bladder	27	2.8	9.6	6.3	14.0	#	25.3	
C68	Urethra	2	0.0	47.3	5.7	171.0	#	2.0	
C70-C72	CNS cancer	6	1.8	3.3	1.2	7.3	#	4.4	50.0
C73	Thyroid	3	1.8	1.7	0.4	5.0		1.3	
C76-C79	CUP	3	2.6	1.1	0.2	3.4		0.4	
C82-C85	NHL	8	5.1	1.6	0.7	3.1		3.0	37.5
C90	Mult. myeloma	3	1.7	1.8	0.4	5.1		1.4	
C91-C96	Leukaemia	6	2.1	2.8	1.0	6.1	#	4.0	16.7
Other primaries		8	4.4	1.8	0.8	3.6		3.8	
Not observed		0	2.5	0.0	0.0	1.5		-2.6	
All mult. primaries		327	128.7	2.5	2.3	2.8	#	207.5	10.1

Patients	2593
Mean age at second malignancy (years)	74.7
Person-years	9556
Mean observation time (years)	3.7
Median observation time (years)	2.7

The occurrence of second malignancy is statistically significant.

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

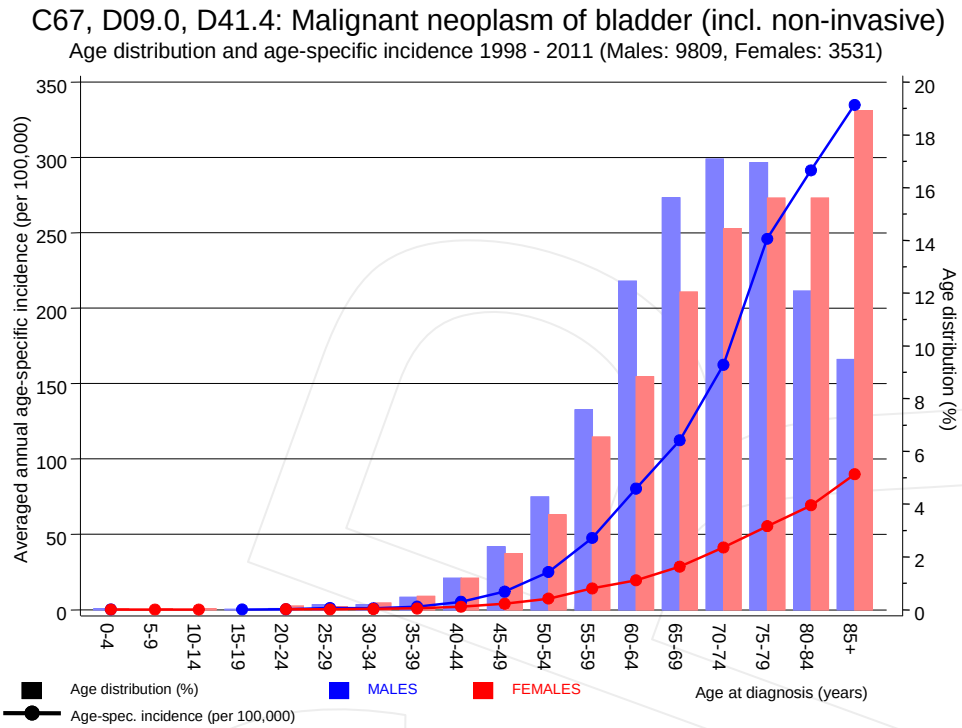


Figure 7. Age distribution and age-specific incidence

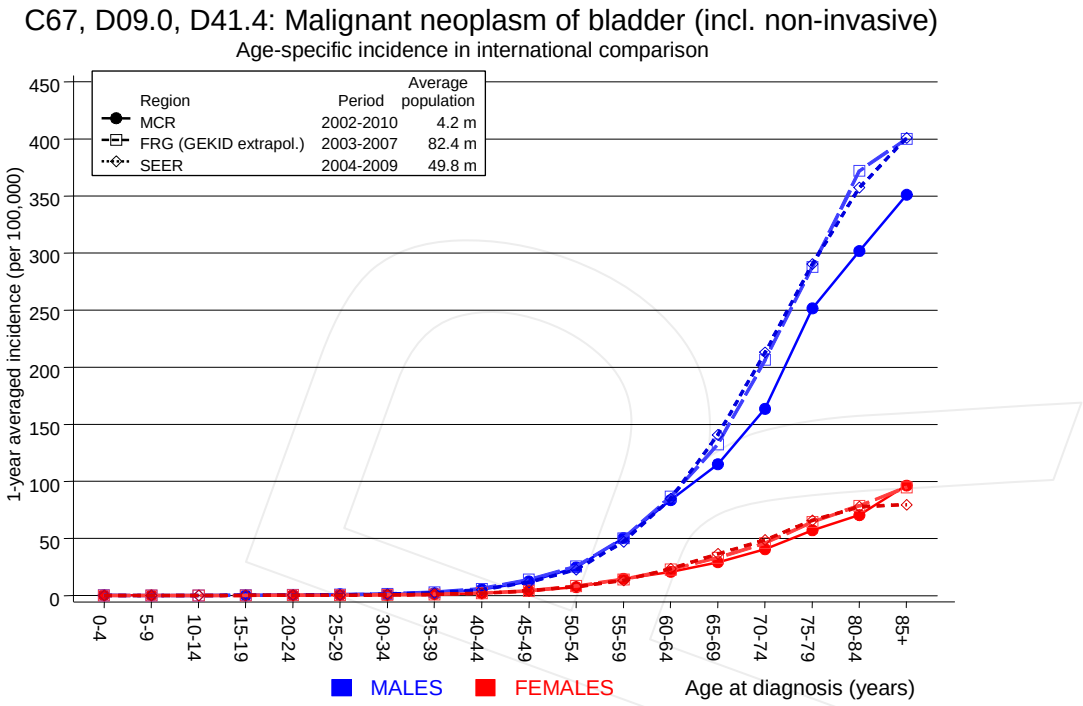


Figure 7a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

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.

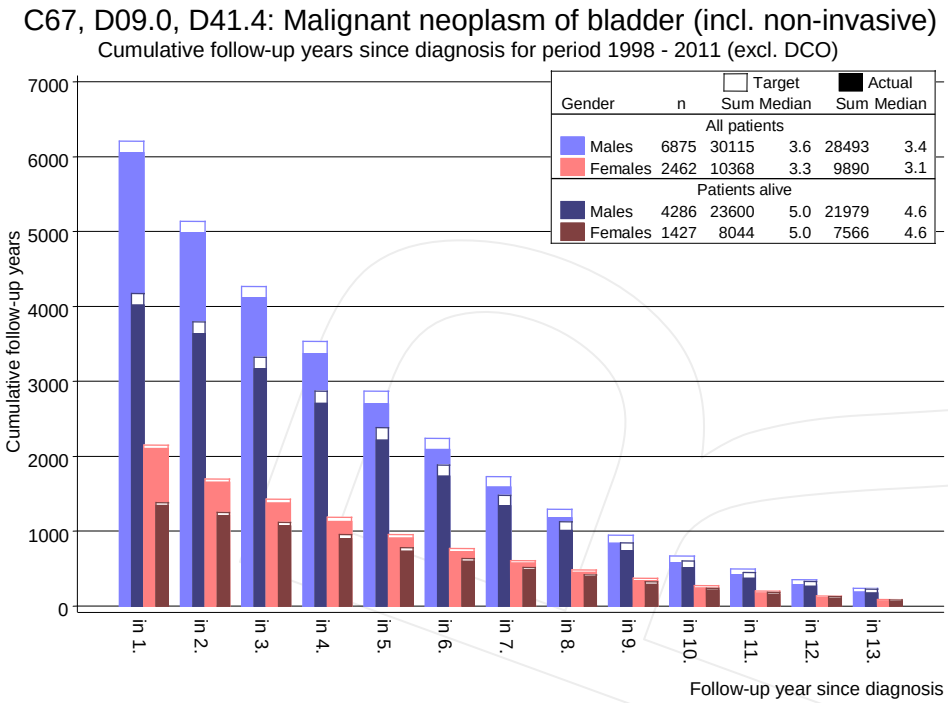
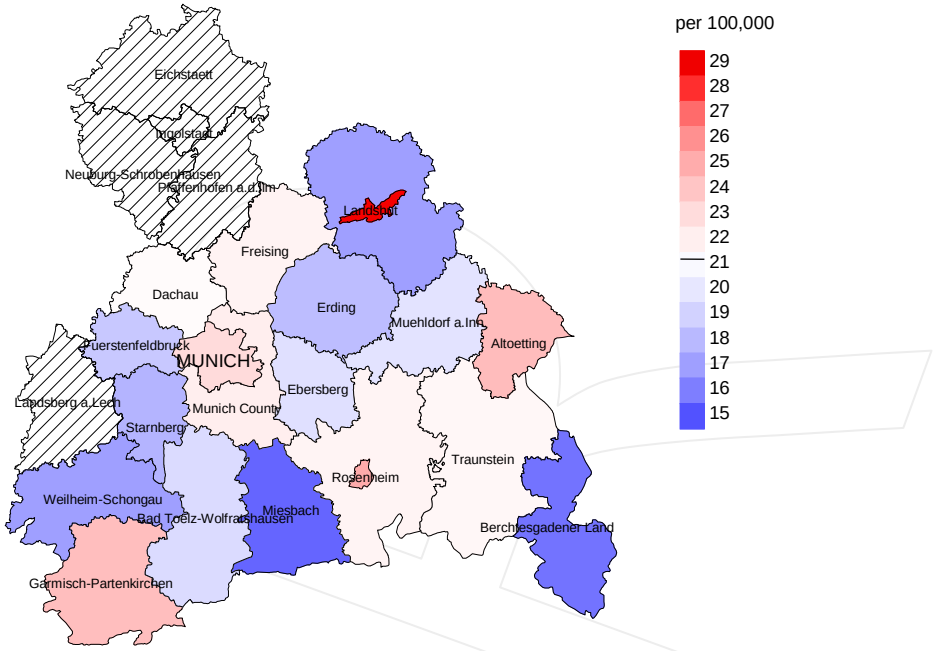


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

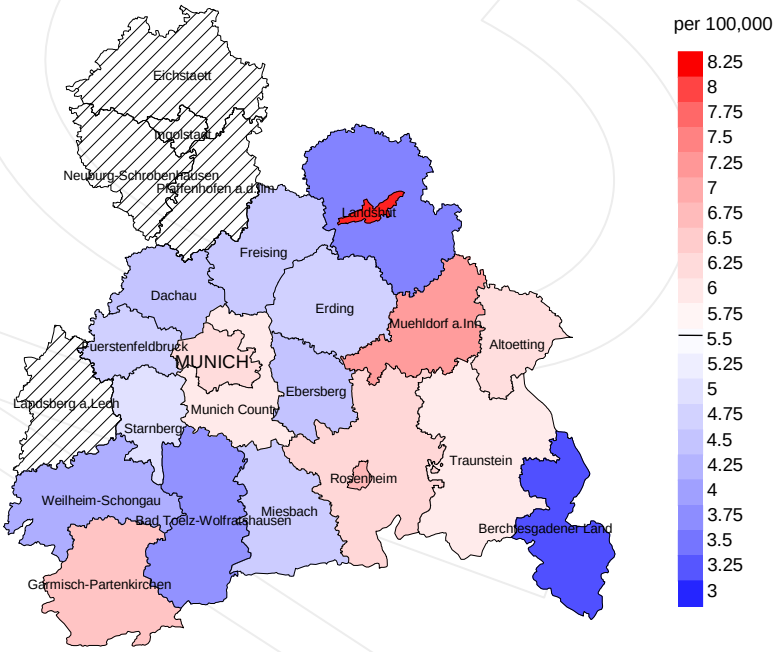
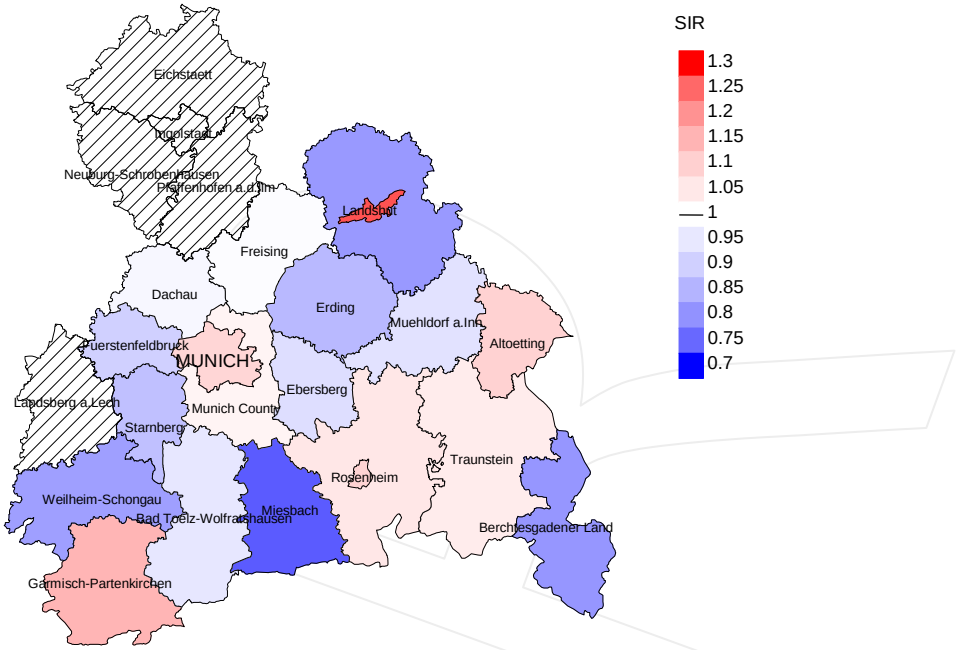


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 21.2/100,000 WS N=4,801, females 5.6/100,000 WS N=1,700). 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 39 women were identified with newly diagnosed bladder cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 4.5/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 2.7 and 7.1/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males



Standardized incidence ratio (SIR) 2003 - 2008: Females

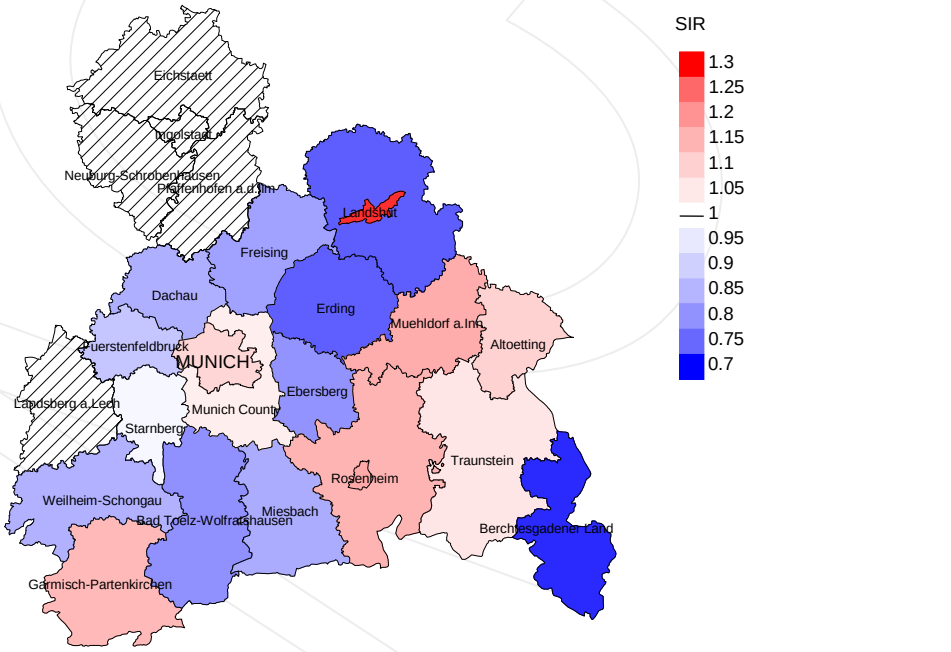


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=4,801, females N=1,700). 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 39 women were identified with newly diagnosed bladder cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.80. Though, the value of this parameter may vary with an underlying probability of 99% between 0.51 and 1.20, 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	600	98.3	3.5	405	67.5	92.8
1999	574	99.1	3.5	356	62.0	96.6
2000	575	98.1	5.0	352	61.2	95.5
2001	566	98.6	3.7	322	56.9	96.3
2002	1058	98.3	7.3	652	61.6	96.6
2003	1049	96.6	7.0	600	57.2	97.7
2004	1136	97.2	5.7	618	54.4	98.7
2005	1100	95.8	4.9	525	47.7	97.9
2006	1112	93.0	4.3	546	49.1	98.7
2007	1252	83.5	3.7	511	40.8	98.2
2008	1195	67.9	5.0	479	40.1	99.4
2009	1183	70.5	4.6	468	39.6	98.7
2010	1090	92.2	5.3	353	32.4	97.5
2011	873	73.2	5.4	197	22.6	94.4
1998-2011	13363	88.8	5.0	6384	47.8	97.4

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	600	351	91.2	74	12.3
1999	574	324	93.5	74	12.9
2000	575	336	94.0	68	11.8
2001	566	346	94.2	59	10.4
2002	1058	511	96.1	159	15.0
2003	1049	606	97.0	156	14.9
2004	1136	627	96.7	150	13.2
2005	1100	640	97.7	133	12.1
2006	1112	652	97.1	142	12.8
2007	1252	761	97.8	147	11.7
2008	1195	731	98.6	155	13.0
2009	1183	804	98.6	189	16.0
2010	1090	845	98.6	164	15.0
2011	873	767	98.8	126	14.4
1998-2011	13363	8301	97.1	1796	13.4

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	351	57.0	43.0	77.2
1999	324	54.0	46.0	72.3
2000	336	58.9	41.1	75.0
2001	346	55.8	44.2	73.3
2002	511	62.8	37.2	77.4
2003	606	58.3	41.7	76.0
2004	627	61.9	38.1	77.4
2005	640	63.1	36.9	75.4
2006	652	65.0	35.0	76.9
2007	761	63.6	36.4	75.9
2008	731	62.8	37.2	73.2
2009	804	61.4	38.6	75.2
2010	845	58.3	41.7	72.0
2011	767	56.7	43.3	73.2
1998-2011	8301	60.5	39.5	75.0

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	243	78.7	78.0	79.5	78.9
1999	219	78.0	77.0	79.2	77.4
2000	243	77.5	75.7	79.9	77.0
2001	237	78.5	76.9	80.3	77.4
2002	376	78.0	76.1	81.0	77.0
2003	452	77.3	75.4	79.9	76.3
2004	438	78.8	77.4	81.0	77.9
2005	452	78.1	76.5	80.7	77.2
2006	451	77.5	76.1	80.0	76.7
2007	541	78.1	76.8	80.4	77.4
2008	540	78.9	77.2	81.8	77.5
2009	592	78.7	76.8	81.7	77.7
2010	612	79.6	77.3	82.9	78.3
2011	558	79.1	77.3	81.5	78.2
1998-2011	5954	78.4	76.8	80.9	77.5

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	108	81.8	80.2	84.7	81.2
1999	105	80.2	78.7	82.2	79.4
2000	93	81.5	79.5	85.1	80.4
2001	109	82.5	81.0	84.6	81.8
2002	135	81.2	79.3	84.9	80.9
2003	154	81.7	80.0	84.3	80.5
2004	189	82.0	80.0	85.3	81.1
2005	188	81.0	79.9	83.1	80.8
2006	201	81.0	78.8	84.9	80.1
2007	220	81.0	79.0	84.8	79.5
2008	191	81.8	79.3	85.8	80.0
2009	212	80.2	78.0	84.3	78.8
2010	233	82.0	79.8	85.4	80.8
2011	209	81.4	77.6	86.3	78.9
1998-2011	2347	81.4	79.3	84.8	80.2

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	130	11.7	0.30	6.3	0.27	11.1	0.31	16.9	0.35
1999	115	10.3	0.27	5.6	0.25	9.6	0.28	14.4	0.31
2000	137	12.0	0.33	6.5	0.32	10.9	0.34	16.4	0.37
2001	130	11.2	0.33	5.9	0.30	10.2	0.34	15.2	0.38
2002	233	12.5	0.30	6.2	0.28	10.6	0.31	15.4	0.33
2003	261	13.9	0.34	6.9	0.31	11.5	0.33	16.6	0.36
2004	271	14.4	0.33	6.7	0.30	11.6	0.33	17.3	0.37
2005	282	14.9	0.35	6.7	0.31	11.4	0.34	17.4	0.38
2006	296	15.5	0.35	7.0	0.31	11.7	0.35	17.3	0.38
2007	341	15.4	0.37	6.8	0.32	11.6	0.36	16.9	0.40
2008	340	15.3	0.39	6.3	0.33	10.9	0.37	16.6	0.42
2009	358	16.0	0.41	6.7	0.35	11.3	0.39	16.3	0.42
2010	354	15.7	0.44	6.4	0.38	10.8	0.42	15.7	0.45
2011	319	14.2	0.48	5.7	0.42	9.7	0.46	13.9	0.50
1998-2011	3567	14.2	0.36	6.4	0.32	10.9	0.36	16.1	0.39

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	70	6.0	0.42	1.8	0.30	3.1	0.34	4.7	0.40
1999	60	5.1	0.41	1.6	0.31	2.7	0.34	3.9	0.37
2000	61	5.1	0.37	1.5	0.29	2.6	0.32	3.7	0.33
2001	63	5.2	0.37	1.5	0.25	2.5	0.28	3.9	0.33
2002	88	4.5	0.30	1.4	0.23	2.3	0.25	3.3	0.27
2003	92	4.7	0.34	1.4	0.25	2.4	0.28	3.3	0.30
2004	117	5.9	0.36	1.8	0.28	2.9	0.30	4.1	0.32
2005	122	6.1	0.41	1.7	0.29	2.9	0.33	4.3	0.38
2006	128	6.4	0.47	1.9	0.37	3.2	0.40	4.5	0.42
2007	143	6.2	0.45	1.8	0.33	3.0	0.36	4.4	0.40
2008	119	5.1	0.38	1.5	0.28	2.5	0.31	3.6	0.35
2009	136	5.8	0.45	1.8	0.37	2.9	0.39	4.2	0.42
2010	139	5.9	0.50	1.7	0.39	2.8	0.42	3.9	0.46
2011	116	5.0	0.55	1.5	0.40	2.5	0.45	3.5	0.51
1998-2011	1454	5.5	0.41	1.6	0.31	2.7	0.34	3.9	0.37

Table 13

Age distribution of age at death (cancer-related) for period 1998-2011
(**incl. multiple primaries**)

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
35-39	2	0.0	0.0			0.0	2	0.1	0.1
40-44	10	0.2	0.2	6	0.2	0.2	4	0.3	0.4
45-49	34	0.7	0.9	22	0.6	0.8	12	0.8	1.2
50-54	82	1.6	2.5	56	1.5	2.3	26	1.8	3.0
55-59	168	3.3	5.8	130	3.6	5.9	38	2.6	5.5
60-64	297	5.8	11.6	244	6.7	12.6	53	3.6	9.1
65-69	527	10.3	21.9	404	11.1	23.7	123	8.3	17.4
70-74	747	14.6	36.5	566	15.6	39.2	181	12.2	29.6
75-79	937	18.3	54.8	697	19.2	58.4	240	16.2	45.8
80-84	1058	20.7	75.4	746	20.5	78.9	312	21.1	66.9
85+	1258	24.6	100.0	768	21.1	100.0	490	33.1	100.0
All ages	5120	100.0		3639	100.0		1481	100.0	

Included in the statistics are 47.1% multiple primaries in males and 35.5% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2011
(**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			0.0		0.0			
20-24			0.0		0.0			
25-29			0.0		0.0			
30-34			0.0		0.0			
35-39		2	0.0		0.1	0.11		0.4
40-44	6	4	0.3	0.05	0.2	0.10	0.8	0.4
45-49	22	12	1.1	0.09	0.6	0.16	1.4	0.7
50-54	56	26	3.4	0.13	1.5	0.20	2.0	1.0
55-59	130	38	8.3	0.17	2.3	0.16	2.5	0.9
60-64	244	53	16.0	0.20	3.3	0.17	3.2	1.0
65-69	404	123	29.6	0.26	8.3	0.29	3.9	1.7
70-74	566	181	54.9	0.34	14.7	0.35	5.1	2.3
75-79	697	240	103.1	0.42	24.1	0.43	6.4	2.7
80-84	746	312	183.7	0.63	39.2	0.57	8.5	3.3
85+	768	490	276.9	0.82	66.0	0.73	10.8	4.3
All ages	3639	1481					5.4	2.4
Mortality								
Raw			14.5	0.37	5.6	0.42		
WS			6.5	0.33	1.7	0.32		
ES			11.1	0.36	2.8	0.35		
BRD-S			16.5	0.40	4.0	0.38		
PYLL-70								
per 100,000			26.8		9.2			
ES			23.3		7.8			
AYLL-70			7.1		8.1			

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

Table 15a

Multiple primaries in deaths in period 1998-2011
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	20	0.8	6	30.0	1	5.0	13	65.0
C09-C10 Oropharynx	20	0.8	9	45.0	1	5.0	10	50.0
C15 Oesophagus	32	1.2	7	21.9	1	3.1	24	75.0
C16 Stomach	85	3.2	23	27.1	9	10.6	53	62.4
C18 Colon	170	6.5	73	42.9	18	10.6	79	46.5
C19-C20 Rectum	87	3.3	43	49.4	6	6.9	38	43.7
C22 Liver	35	1.3	7	20.0	3	8.6	25	71.4
C25 Pancreas	75	2.9	5	6.7	4	5.3	66	88.0
C32 Larynx	26	1.0	19	73.1	1	3.8	6	23.1
C33-C34 Lung	390	14.8	45	11.5	19	4.9	326	83.6
C43 Malign. melanoma	49	1.9	29	59.2	1	2.0	19	38.8
C44 Skin others	78	3.0	26	33.3	4	5.1	48	61.5
C61 Prostate	823	31.3	254	30.9	223	27.1	346	42.0
C64 Kidney	108	4.1	47	43.5	17	15.7	44	40.7
C65 Renal pelvis	128	4.9	35	27.3	20	15.6	73	57.0
C66 Ureter	93	3.5	35	37.6	20	21.5	38	40.9
C67 Bladder	75	2.9			1	1.3	74	98.7
C68 Urethra	25	1.0	3	12.0	9	36.0	13	52.0
C70-C72 CNS cancer	28	1.1	5	17.9			23	82.1
C76-C79 CUP	29	1.1	4	13.8	5	17.2	20	69.0
C82-C85 NHL	55	2.1	24	43.6	6	10.9	25	45.5
C91-C96 Leukaemia	47	1.8	6	12.8	3	6.4	38	80.9
Other primaries	149	5.7	50	33.6	10	6.7	89	59.7
All mult. primaries	2627	100.0	755	28.7	382	14.5	1490	56.7

Multiple primaries with number of cases n<20 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 1998-2011
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C16	Stomach	19	2.4	5	26.3	1	5.3	13	68.4
C18	Colon	65	8.2	31	47.7	2	3.1	32	49.2
C19-C20	Rectum	22	2.8	12	54.5	1	4.5	9	40.9
C23-C24	Bile	9	1.1					9	100.0
C25	Pancreas	27	3.4	1	3.7	1	3.7	25	92.6
C33-C34	Lung	68	8.6	7	10.3	6	8.8	55	80.9
C43	Malign. melanoma	12	1.5	9	75.0			3	25.0
C44	Skin others	15	1.9	4	26.7			11	73.3
C50	Breast	137	17.3	89	65.0	7	5.1	41	29.9
C51	Vulva	8	1.0	5	62.5			3	37.5
C53	Cervix uteri	53	6.7	42	79.2	5	9.4	6	11.3
C54	Corpus uteri	41	5.2	32	78.0	4	9.8	5	12.2
C56	Ovary	25	3.1	7	28.0	1	4.0	17	68.0
C64	Kidney	33	4.2	14	42.4	5	15.2	14	42.4
C65	Renal pelvis	64	8.1	30	46.9	9	14.1	25	39.1
C66	Ureter	36	4.5	20	55.6	6	16.7	10	27.8
C67	Bladder	28	3.5					28	100.0
C70-C72	CNS cancer	12	1.5	5	41.7			7	58.3
C73	Thyroid	8	1.0	6	75.0			2	25.0
C76-C79	CUP	12	1.5	1	8.3			11	91.7
C82-C85	NHL	16	2.0	6	37.5	2	12.5	8	50.0
C91-C96	Leukaemia	19	2.4	2	10.5	2	10.5	15	78.9
Other primaries		65	8.2	19	29.2	8	12.3	38	58.5
All mult. primaries		794	100.0	347	43.7	60	7.6	387	48.7

Multiple primaries with number of cases n<7 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 1998-2011
(**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			0.0		0.0			
20-24			0.0		0.0			
25-29			0.0		0.0			
30-34			0.0		0.0			
35-39		2	0.0		0.1	0.13		0.5
40-44	5	2	0.2	0.05	0.1	0.06	0.7	0.2
45-49	19	11	1.0	0.09	0.6	0.18	1.4	0.7
50-54	45	19	2.7	0.12	1.1	0.17	1.8	0.9
55-59	101	32	6.5	0.16	2.0	0.17	2.3	0.9
60-64	196	33	12.9	0.20	2.1	0.13	3.0	0.7
65-69	289	88	21.2	0.25	5.9	0.27	3.4	1.5
70-74	372	122	36.1	0.31	9.9	0.31	4.2	1.9
75-79	489	179	72.4	0.42	18.0	0.43	5.8	2.5
80-84	516	234	127.0	0.65	29.4	0.54	7.7	3.1
85+	551	387	198.6	0.84	52.1	0.73	10.0	4.2
All ages	2583	1109					4.8	2.2
Mortality								
Raw			10.3	0.35	4.2	0.40		
WS			4.7	0.30	1.2	0.29		
ES			7.9	0.34	2.1	0.32		
BRD-S			11.7	0.38	3.0	0.36		
PYLL-70								
per 100,000			21.1		7.0			
ES			18.4		5.9			
AYLL-70			7.3		8.4			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2011
(**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			0.0		0.0			
20-24			0.0		0.0			
25-29			0.0		0.0			
30-34			0.0		0.0			
35-39		2	0.0		0.1	0.14		0.5
40-44	5	1	0.2	0.05	0.0	0.03	0.8	0.1
45-49	18	10	0.9	0.09	0.5	0.18	1.4	0.7
50-54	38	17	2.3	0.12	1.0	0.16	1.7	0.9
55-59	67	26	4.3	0.12	1.6	0.15	1.6	0.8
60-64	130	27	8.5	0.16	1.7	0.13	2.3	0.7
65-69	172	63	12.6	0.19	4.2	0.21	2.4	1.3
70-74	203	83	19.7	0.21	6.7	0.24	2.7	1.5
75-79	282	124	41.7	0.30	12.5	0.34	4.1	2.0
80-84	302	178	74.3	0.45	22.4	0.45	5.6	2.8
85+	372	312	134.1	0.64	42.0	0.62	8.3	3.9
All ages	1589	843					3.4	2.0
Mortality								
Raw			6.3	0.26	3.2	0.33		
WS			2.9	0.23	0.9	0.25		
ES			4.9	0.25	1.6	0.27		
BRD-S			7.2	0.28	2.2	0.30		
PYLL-70								
per 100,000			15.2		5.8			
ES			13.3		4.9			
AYLL-70			8.0		8.9			

* See corresponding tables with multiple primaries.

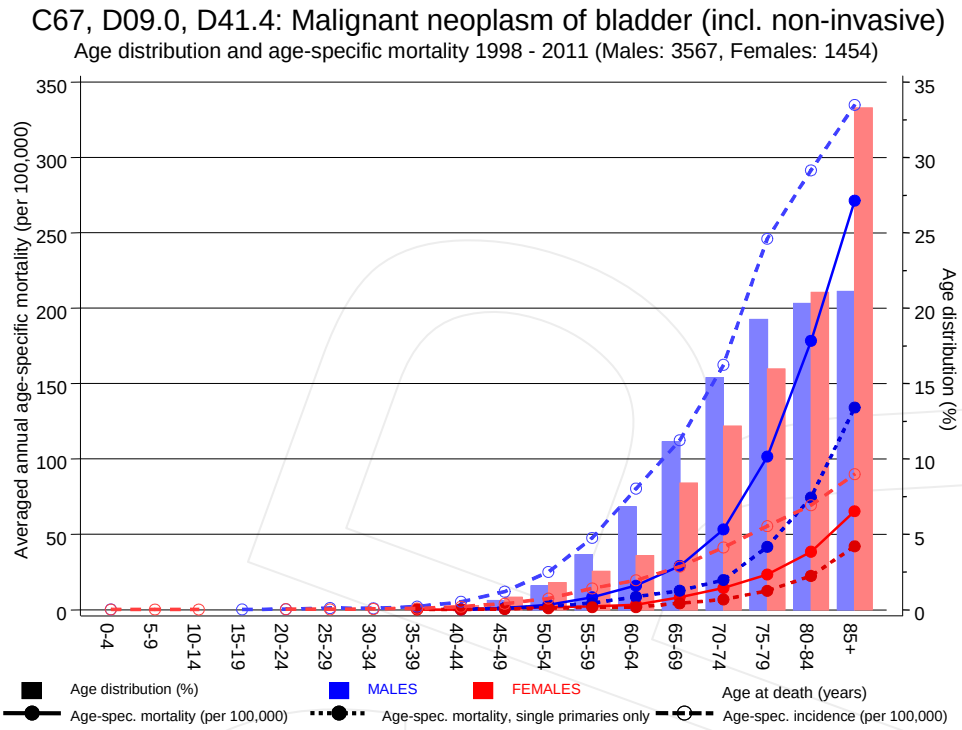
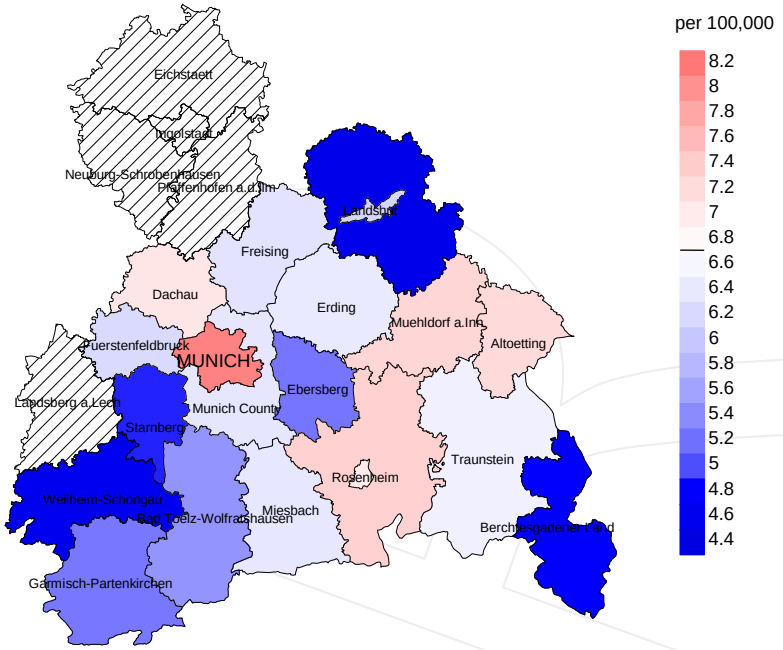


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

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



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

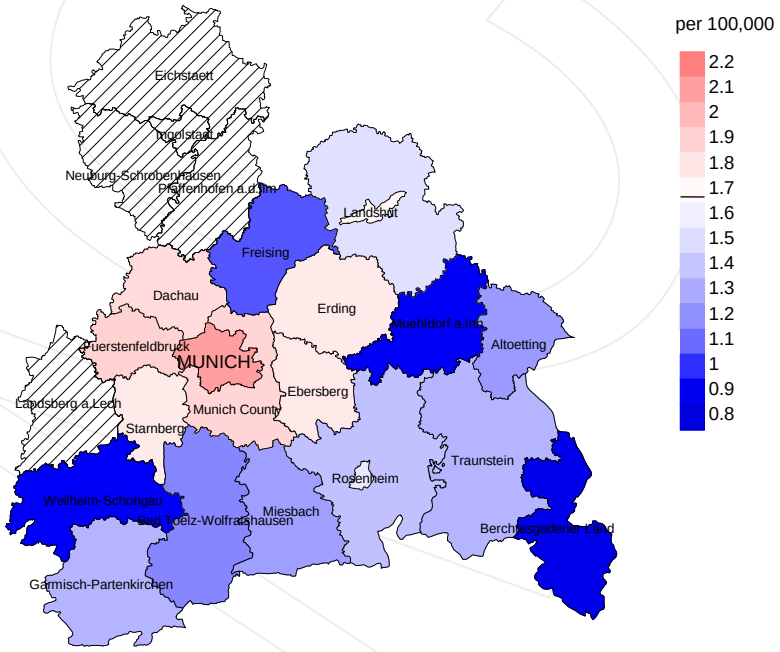
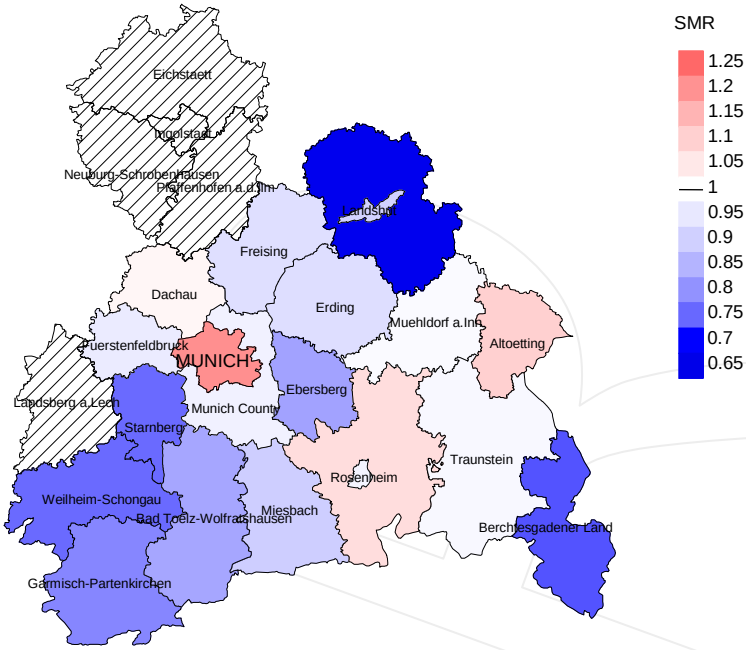


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 6.7/100,000 WS N=1,716, females 1.7/100,000 WS N=688). 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 18 women died from bladder cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 1.8/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.8 and 3.5/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males



Standardized mortality ratio (SMR) 2003 - 2008: Females

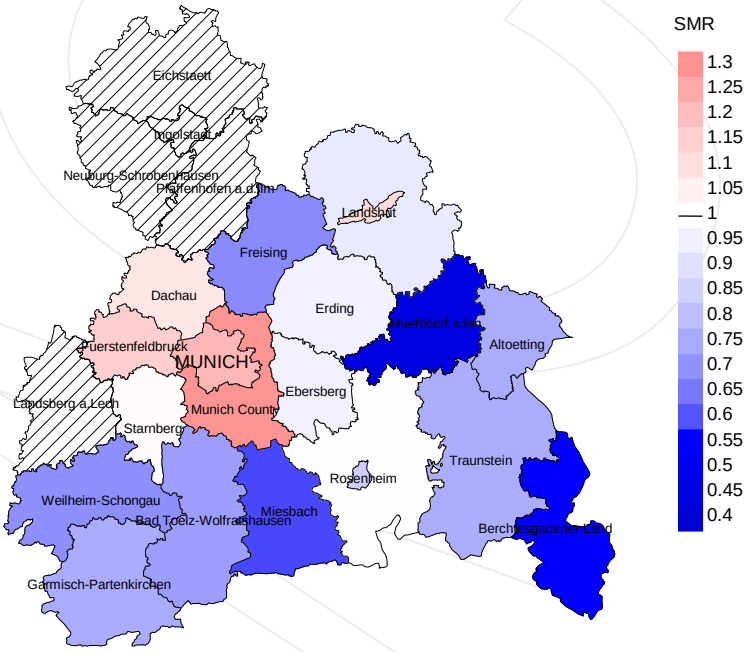


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=1,716, females N=688). 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 18 women died from bladder cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.95. Though, the value of this parameter may vary with an underlying probability of 99% between 0.47 and 1.70, 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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