Munich Cancer Registry

- Survival
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- Homepage

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

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

Cancer statistics: Baseline statistics

C61: Prostate cancer

Year of diagnosis	1998-2011
Patients	35928
Diseases	35930
Creation date	04/02/2013
Export date	01/03/2013
Population (males)	2.2 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C61__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.

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	1546	144	9.3	25.4	60.8	98.1
1999	1498	109	7.3	24.0	56.7	98.5
2000	1680	138	8.2	22.1	52.0	98.4
2001	1745	109	6.2	23.3	45.4	97.6
2002	3304	305	9.2	22.8	44.9	97.1
2003	3217	225	7.0	22.6	39.0	96.5
2004	3172	220	6.9	21.6	35.1	96.5
2005	3078	195	6.3	19.8	32.3	94.5
2006	2984	180	6.0	20.6	29.2	89.4
2007	3433	241	7.0	19.1	26.7	72.6 ##
2008	3048	194	6.4	18.0	23.6	52.3
2009	2760	171	6.2	20.1	22.4	60.9
2010	2426	186	7.7	18.5	18.5	88.0
2011	2039	180	8.8	17.1	14.2	66.2 ###
1998-2011	35930	2597	7.2	20.8	33.9	85.0

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 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	Cases n	Incidence raw	Incidence WS	Incidence ES	Incidence BRD-S
1998	1546	139.5	82.8	127.5	172.9
1999	1498	133.8	78.2	119.1	156.8
2000	1680	147.5	84.8	129.8	172.2
2001	1745	150.6	85.9	131.1	172.3
2002	3304	177.3	97.0	147.9	193.3
2003	3217	171.6	93.0	140.3	181.3
2004	3172	168.6	89.3	134.0	172.5
2005	3078	162.5	84.5	126.6	163.2
2006	2984	155.8	79.7	119.3	153.7
2007	3433	155.0	79.7	118.7	151.0
2008	3048	136.9	68.0	101.8	130.8
2009	2760	123.7	61.5	91.2	115.4
2010	2426	107.6	53.1	79.1	100.2
2011	2039	90.5	43.9	65.7	83.9
1998-2011	35930	143.0	74.6	112.0	144.2

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

Table 3

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	1546	70.7	9.7	47.0	99.8	58.2	63.3	70.2	77.7	84.2
1999	1498	70.1	9.5	43.0	99.5	58.2	62.8	69.9	76.3	83.8
2000	1680	70.3	9.3	40.6	97.8	58.8	63.4	69.8	76.6	83.2
2001	1745	70.0	9.3	43.6	100	58.6	63.1	69.8	76.3	82.1
2002	3304	70.6	9.5	42.6	102	59.1	63.7	69.9	76.7	83.5
2003	3217	70.0	9.2	35.2	101	58.7	63.7	69.2	75.7	82.2
2004	3172	70.0	9.2	40.0	100	59.1	63.8	69.0	76.0	82.2
2005	3078	70.1	9.1	38.4	101	58.9	64.1	69.2	75.9	82.4
2006	2984	70.4	8.9	41.6	98.6	59.5	64.7	69.4	76.0	82.8
2007	3433	70.1	9.2	37.6	99.9	59.0	64.4	69.4	75.8	82.5
2008	3048	70.5	9.0	25.1	101	59.4	65.3	70.1	75.8	82.4
2009	2760	70.2	9.1	44.4	105	59.1	65.0	69.9	75.4	82.3
2010	2426	70.6	9.3	38.4	102	59.2	64.6	70.5	76.0	83.1
2011	2039	70.9	9.5	40.0	109	59.1	65.4	70.9	76.2	83.3
1998-2011	35930	70.3	9.2	25.1	109	59.0	64.2	69.7	76.1	82.8

Table 4

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

Age at diagnosis Years	Cases n	%	Cum.%
25-29	1	0.0	0.0
30-34	0	0.0	0.0
35-39	13	0.0	0.0
40-44	59	0.2	0.2
45-49	334	0.9	1.1
50-54	1071	3.0	4.1
55-59	2968	8.3	12.4
60-64	5758	16.0	28.4
65-69	8219	22.9	51.3
70-74	7269	20.2	71.5
75-79	4851	13.5	85.0
80-84	2865	8.0	93.0
85+	2522	7.0	100.0
All ages	35930	100.0	

Included in the statistics are 25.5% multiple primaries.

Table 5

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

Age at diagnosis Years	Cases n	Age-spec. incidence	DCO rate n=2597 %	Prop. all cancers n=132509 %
0- 4		0.0		
5- 9		0.0		
10-14		0.0		
15-19		0.0		
20-24		0.0		
25-29	1	0.1		0.1
30-34		0.0		
35-39	13	0.6		0.7
40-44	59	2.6		2.1
45-49	334	17.2	0.3	7.5
50-54	1071	64.1	0.1	14.7
55-59	2968	190.2	0.2	23.8
60-64	5758	378.3	0.7	30.6
65-69	8218	603.0	1.2	35.1
70-74	7269	704.8	2.3	33.5
75-79	4851	717.9	7.4	28.8
80-84	2865	705.3	20.5	26.0
85+	2522	909.2	53.1	30.5
All ages	35929		7.2	27.1
Incidence				
Raw		143.0		
WS		74.6		
ES		112.0		
BRD-S		144.2		

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 6

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998-2011

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C03-C06	Oral cavity	12	17.1	0.7	0.4	1.2		-0.4	
C07-C08	Salivary gland	12	5.2	2.3	1.2	4.0	#	0.6	25.0
C09-C10	Oropharynx	21	21.2	1.0	0.6	1.5		-0.0	
C12-C13	Hypopharynx	14	11.9	1.2	0.6	2.0		0.2	7.1
C15	Oesophagus	60	39.7	1.5	1.2	1.9	#	1.7	11.7
C16	Stomach	157	106.0	1.5	1.3	1.7	#	4.3	8.9
C17	Small intestine	26	10.4	2.5	1.6	3.7	#	1.3	3.8
C18	Colon	393	250.4	1.6	1.4	1.7	#	12.0	4.1
C19-C20	Rectum	217	136.2	1.6	1.4	1.8	#	6.8	4.6
C21	Anus/canal	6	4.2	1.4	0.5	3.1		0.1	
C22	Liver	67	66.0	1.0	0.8	1.3		0.1	16.4
C23-C24	Bile	29	23.4	1.2	0.8	1.8		0.5	17.2
C25	Pancreas	169	85.2	2.0	1.7	2.3	#	7.0	24.9
C32	Larynx	31	23.5	1.3	0.9	1.9		0.6	3.2
C33-C34	Lung	403	288.7	1.4	1.3	1.5	#	9.6	7.9
C38,C45	Mesothelioma	25	16.0	1.6	1.0	2.3	#	0.8	4.0
C40-C41	Bone	7	1.5	4.6	1.8	9.4	#	0.5	
C43	Malign. melanoma	181	85.6	2.1	1.8	2.4	#	8.0	1.7
C46,C49	Soft tissue	18	12.2	1.5	0.9	2.3		0.5	
C48	Peritoneal	6	1.6	3.7	1.4	8.1	#	0.4	
C50	Breast	8	6.0	1.3	0.6	2.6		0.2	
C60	Penis	10	5.2	1.9	0.9	3.5		0.4	
C62	Testis	7	3.5	2.0	0.8	4.1		0.3	14.3
C64	Kidney	203	82.6	2.5	2.1	2.8	#	10.1	4.9
C65	Renal pelvis	27	9.8	2.7	1.8	4.0	#	1.4	
C66	Ureter	14	5.5	2.6	1.4	4.3	#	0.7	
C67	Bladder	316	107.6	2.9	2.6	3.3	#	17.5	3.8
C68	Urethra	7	0.9	7.5	3.0	15.5	#	0.5	
C69	Eye melanoma	9	2.7	3.4	1.6	6.4	#	0.5	
C70-C72	CNS cancer	58	30.6	1.9	1.4	2.5	#	2.3	5.2
C73	Thyroid	27	13.3	2.0	1.3	3.0	#	1.1	
C76-C79	CUP	69	41.0	1.7	1.3	2.1	#	2.3	2.9
C81	Hodgkin lymphoma	7	4.0	1.8	0.7	3.6		0.3	
C82-C85	NHL	161	93.8	1.7	1.5	2.0	#	5.6	5.6
C90	Mult. myeloma	63	31.0	2.0	1.6	2.6	#	2.7	14.3
C91-C96	Leukaemia	72	37.9	1.9	1.5	2.4	#	2.9	34.7
Other primaries		34	751.6	0.0	0.0	0.1	#	-60.2	23.5
Not observed		0	1.0	0.0	0.0	3.8		-0.1	
All mult. primaries		2946	2434.0	1.2	1.2	1.3	#	42.9	7.7

Patients	26125
Mean age at second malignancy (years)	74.2
Person-years	119270
Mean observation time (years)	4.6
Median observation time (years)	4.1

The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 to 5 are pooled in category "Other primaries".

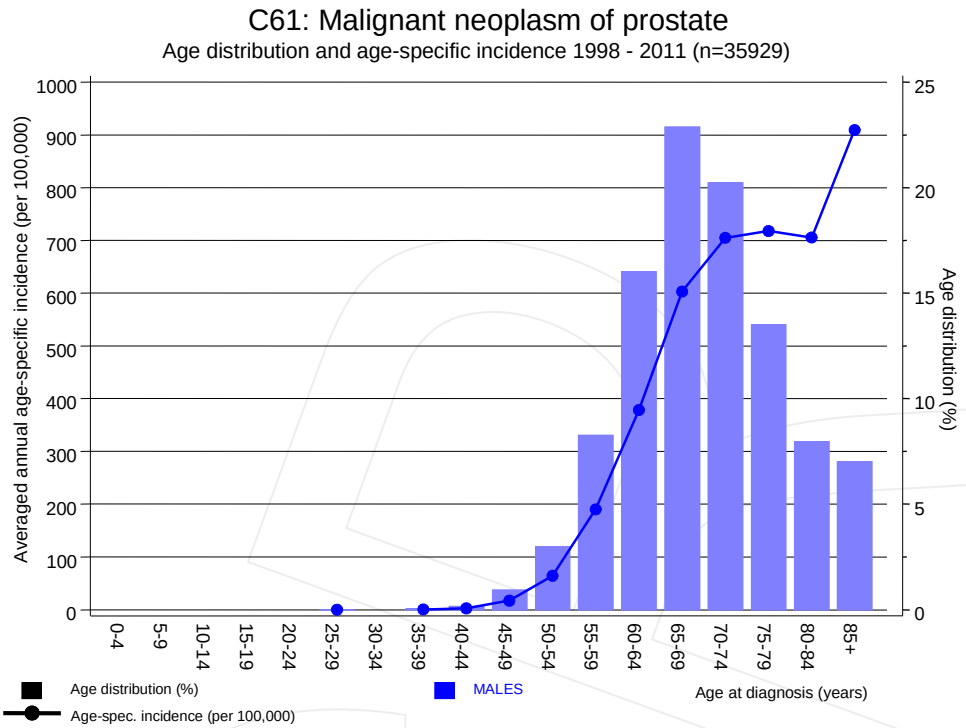

Figure 7. Age distribution and age-specific incidence

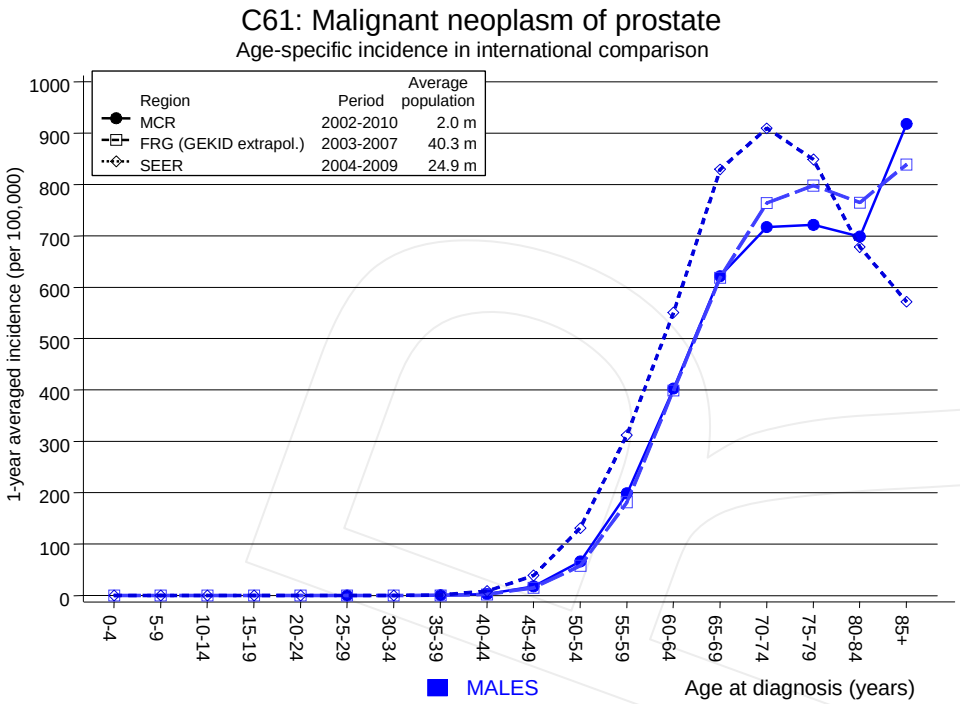

Figure 7a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

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.

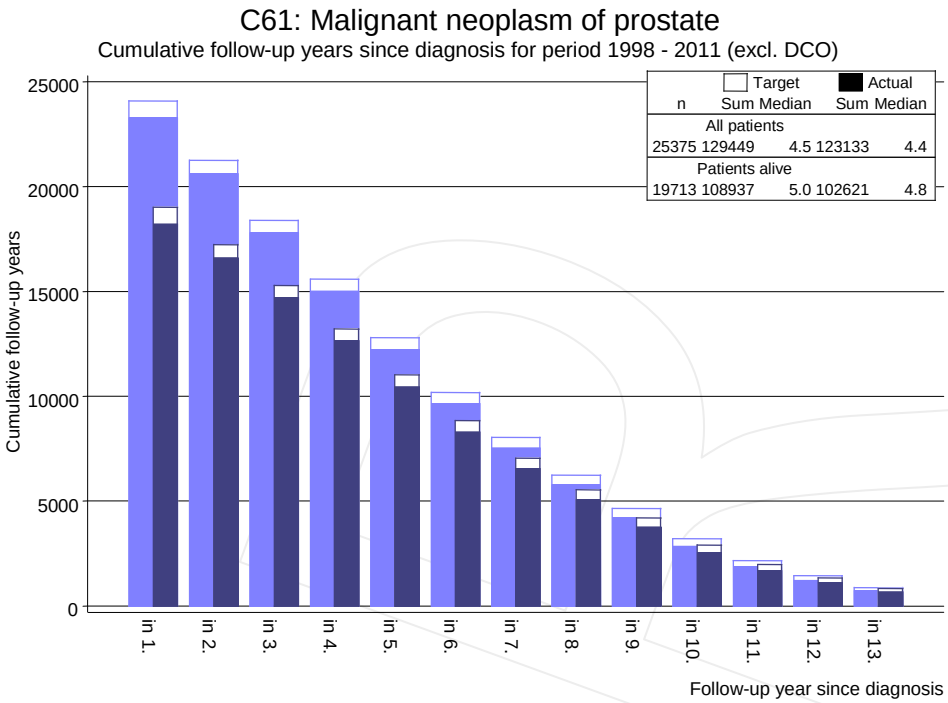

Figure 8. Cumulative follow-up years depending on time since diagnosis

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

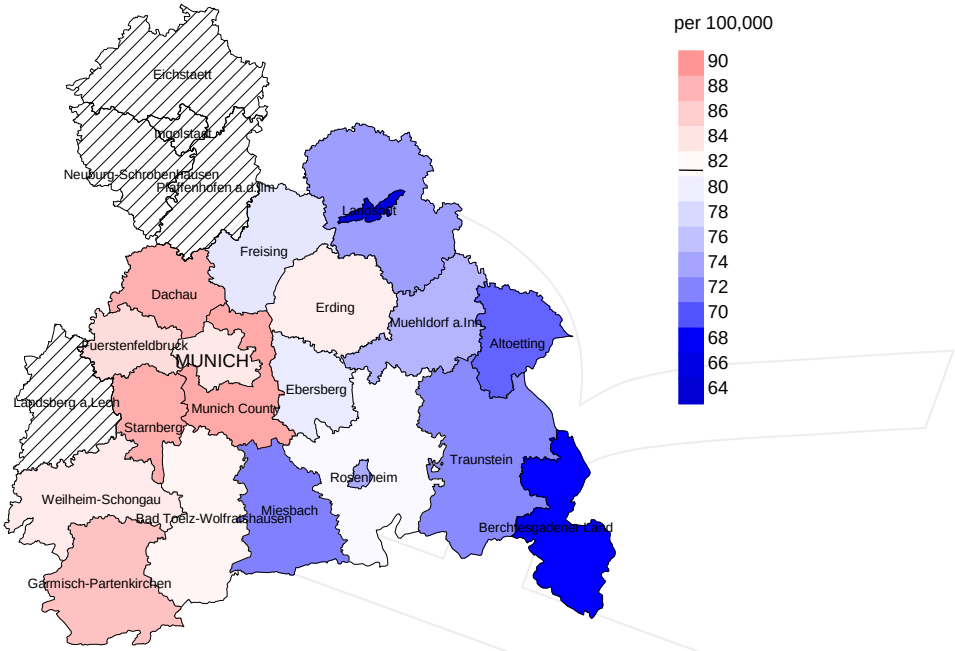

Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (81.6/100,000 WS N=18,058). 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 61,449 male residents (averaged) in the period from 2003 to 2008 a total of 563 men were identified with newly diagnosed prostate cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 79.7/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 71.1 and 89.1/100,000.

Standardized incidence ratio (SIR) 2003 - 2008

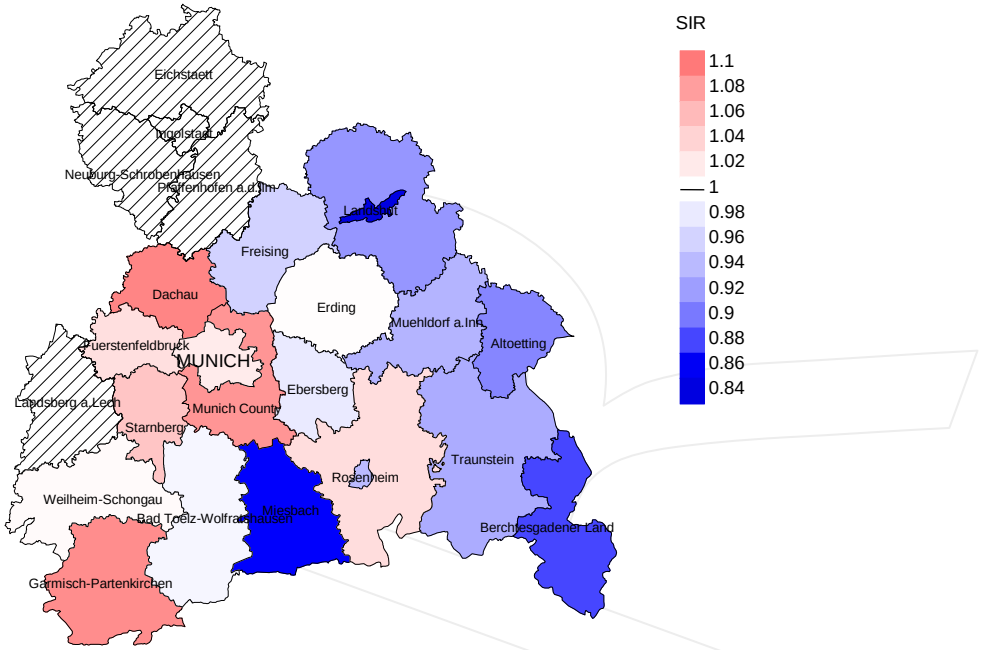

Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=18,058). 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 61,449 male residents (averaged) in the period from 2003 to 2008 a total of 563 men were identified with newly diagnosed prostate cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.98. Though, the value of this parameter may vary with an underlying probability of 99% between 0.88 and 1.09, 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	1546	98.1	9.3	940	60.8	96.1
1999	1498	98.5	7.3	850	56.7	95.6
2000	1680	98.4	8.2	873	52.0	95.5
2001	1745	97.6	6.2	792	45.4	96.1
2002	3304	97.1	9.2	1483	44.9	97.6
2003	3217	96.5	7.0	1254	39.0	98.1
2004	3172	96.5	6.9	1112	35.1	98.6
2005	3078	94.5	6.3	995	32.3	97.8
2006	2984	89.4	6.0	870	29.2	98.6
2007	3433	72.6	7.0	918	26.7	98.6
2008	3048	52.3	6.4	720	23.6	99.3
2009	2760	60.9	6.2	617	22.4	98.2
2010	2426	88.0	7.7	449	18.5	98.2
2011	2039	66.2	8.8	290	14.2	98.3
1998-2011	35930	85.0	7.2	12163	33.9	97.6

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	1546	658	94.5	196	12.7
1999	1498	613	94.1	143	9.5
2000	1680	634	95.0	161	9.6
2001	1745	662	92.4	151	8.7
2002	3304	989	95.4	373	11.3
2003	3217	1049	97.4	274	8.5
2004	3172	1045	97.3	260	8.2
2005	3078	1149	96.6	235	7.6
2006	2984	1211	97.2	233	7.8
2007	3433	1381	97.2	301	8.8
2008	3048	1493	98.9	264	8.7
2009	2760	1530	98.2	233	8.4
2010	2426	1644	98.5	255	10.5
2011	2039	1654	99.2	222	10.9
1998-2011	35930	15712	97.2	3301	9.2

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	658	55.9	44.1	80.4
1999	613	58.2	41.8	77.8
2000	634	58.7	41.3	77.9
2001	662	53.9	46.1	76.0
2002	989	60.1	39.9	77.6
2003	1049	63.4	36.6	76.2
2004	1045	59.8	40.2	74.9
2005	1149	61.4	38.6	73.5
2006	1211	61.4	38.6	75.8
2007	1381	63.0	37.0	73.8
2008	1493	59.3	40.7	69.9
2009	1530	57.2	42.8	69.7
2010	1644	59.7	40.3	71.7
2011	1654	58.7	41.3	69.2
1998-2011	15712	59.6	40.4	73.6

Table 11

Means of age at death according to the grouping in Table 10

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	658	79.4	77.8	81.4	79.1
1999	613	79.4	77.6	82.0	79.2
2000	634	79.9	78.8	81.5	80.0
2001	662	80.0	78.6	81.6	80.1
2002	989	79.0	77.6	81.2	78.7
2003	1049	78.8	77.0	81.9	78.1
2004	1045	79.4	77.5	82.3	78.7
2005	1149	79.6	77.6	82.7	78.5
2006	1211	79.3	77.7	81.7	78.6
2007	1381	79.2	77.9	81.5	78.6
2008	1493	79.4	77.3	82.4	78.2
2009	1530	79.6	77.6	82.4	78.7
2010	1644	79.7	78.0	82.3	78.9
2011	1654	80.3	78.7	82.6	79.3
1998-2011	15712	79.5	77.8	82.1	78.8

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 12

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

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	368	33.2	0.24	18.1	0.22	31.4	0.25	48.0	0.28
1999	357	31.9	0.24	17.0	0.22	29.5	0.25	44.7	0.28
2000	372	32.7	0.22	17.0	0.20	30.1	0.23	45.9	0.27
2001	357	30.8	0.20	15.9	0.19	28.2	0.22	42.7	0.25
2002	594	31.9	0.18	15.7	0.16	27.0	0.18	40.0	0.21
2003	665	35.5	0.21	17.0	0.18	29.2	0.21	43.7	0.24
2004	625	33.2	0.20	15.2	0.17	26.3	0.20	40.0	0.23
2005	705	37.2	0.23	16.3	0.19	28.4	0.22	43.9	0.27
2006	744	38.9	0.25	16.9	0.21	29.2	0.24	43.9	0.29
2007	870	39.3	0.25	16.7	0.21	28.9	0.24	43.5	0.29
2008	886	39.8	0.29	16.4	0.24	28.0	0.28	42.3	0.32
2009	875	39.2	0.32	15.8	0.26	26.9	0.29	40.1	0.35
2010	982	43.6	0.40	16.9	0.32	29.0	0.37	43.5	0.43
2011	971	43.1	0.48	16.4	0.37	28.6	0.44	43.4	0.52
1998-2011	9371	37.3	0.26	16.4	0.22	28.4	0.25	42.8	0.30

Table 13

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

Age at death Years	Cases n	%	Cum.%
25-29	1	0.0	0.0
30-34	0	0.0	0.0
35-39	0	0.0	0.0
40-44	6	0.1	0.1
45-49	15	0.2	0.2
50-54	56	0.6	0.8
55-59	179	1.9	2.7
60-64	484	5.2	7.9
65-69	1064	11.4	19.3
70-74	1572	16.8	36.0
75-79	1981	21.1	57.2
80-84	1952	20.8	78.0
85+	2062	22.0	100.0
All ages	9372	100.0	

Included in the statistics are 25.5% multiple primaries.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2011
(**incl. multiple primaries**)

Age at death Years	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4		0.0		
5- 9		0.0		
10-14		0.0		
15-19		0.0		
20-24		0.0		
25-29	1	0.1	1.00	1.1
30-34		0.0		
35-39		0.0		
40-44	6	0.3	0.10	0.8
45-49	15	0.8	0.04	1.0
50-54	56	3.4	0.05	2.0
55-59	179	11.5	0.06	3.5
60-64	484	31.8	0.08	6.3
65-69	1064	78.1	0.13	10.3
70-74	1572	152.4	0.22	14.2
75-79	1981	293.2	0.41	18.2
80-84	1952	480.5	0.68	22.3
85+	2062	743.4	0.82	28.9
All ages	9372			14.0
Mortality				
Raw		37.3	0.26	
WS		16.4	0.22	
ES		28.4	0.25	
BRD-S		42.8	0.30	
PYLL-70				
per 100,000		44.2		
ES		36.9		
AYLL-70		5.6		

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

Table 15

Multiple primaries in deaths in period 1998-2011

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C15	Oesophagus	85	1.8	16	18.8	6	7.1	63	74.1
C16	Stomach	231	4.9	51	22.1	21	9.1	159	68.8
C18	Colon	505	10.7	190	37.6	37	7.3	278	55.0
C19-C20	Rectum	297	6.3	117	39.4	29	9.8	151	50.8
C22	Liver	113	2.4	8	7.1	5	4.4	100	88.5
C23-C24	Bile	49	1.0	7	14.3	4	8.2	38	77.6
C25	Pancreas	243	5.1	15	6.2	12	4.9	216	88.9
C32	Larynx	55	1.2	30	54.5	5	9.1	20	36.4
C33-C34	Lung	624	13.2	79	12.7	41	6.6	504	80.8
C43	Malign. melanoma	210	4.4	107	51.0	8	3.8	95	45.2
C44	Skin others	207	4.4	62	30.0	12	5.8	133	64.3
C64	Kidney	242	5.1	110	45.5	34	14.0	98	40.5
C65	Renal pelvis	40	0.8	10	25.0	7	17.5	23	57.5
C67	Bladder	825	17.4	342	41.5	224	27.2	259	31.4
C70-C72	CNS cancer	108	2.3	12	11.1	4	3.7	92	85.2
C76-C79	CUP	117	2.5	18	15.4	15	12.8	84	71.8
C82-C85	NHL	193	4.1	62	32.1	33	17.1	98	50.8
C90	Mult. myeloma	79	1.7	13	16.5	6	7.6	60	75.9
C91-C96	Leukaemia	147	3.1	10	6.8	12	8.2	125	85.0
Other primaries		363	7.7	133	36.6	23	6.3	207	57.0
All mult. primaries		4733	100.0	1392	29.4	538	11.4	2803	59.2

Multiple primaries with number of cases n<40 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	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4		0.0		
5- 9		0.0		
10-14		0.0		
15-19		0.0		
20-24		0.0		
25-29		0.0		
30-34		0.0		
35-39		0.0		
40-44	4	0.2	0.08	0.6
45-49	13	0.7	0.04	0.9
50-54	45	2.7	0.05	1.8
55-59	148	9.5	0.05	3.3
60-64	390	25.6	0.07	6.0
65-69	866	63.5	0.12	10.3
70-74	1276	123.7	0.20	14.5
75-79	1634	241.8	0.40	19.5
80-84	1605	395.1	0.69	24.1
85+	1719	619.7	0.83	31.3
All ages	7700			14.2
Mortality				
Raw		30.6	0.25	
WS		13.5	0.20	
ES		23.3	0.24	
BRD-S		35.2	0.28	
PYLL-70				
per 100,000		35.7		
ES		29.9		
AYLL-70		5.5		

* 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	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4		0.0		
5- 9		0.0		
10-14		0.0		
15-19		0.0		
20-24		0.0		
25-29		0.0		
30-34		0.0		
35-39		0.0		
40-44	3	0.1	0.06	0.5
45-49	13	0.7	0.04	1.0
50-54	40	2.4	0.04	1.8
55-59	129	8.3	0.05	3.2
60-64	300	19.7	0.06	5.2
65-69	644	47.3	0.10	8.8
70-74	899	87.2	0.16	12.1
75-79	1108	164.0	0.31	16.2
80-84	1150	283.1	0.55	21.5
85+	1332	480.2	0.68	29.7
All ages	5618			12.2
Mortality				
Raw		22.4	0.20	
WS		9.9	0.17	
ES		17.1	0.19	
BRD-S		25.6	0.23	
PYLL-70				
per 100,000		28.8		
ES		24.3		
AYLL-70		5.8		

* See corresponding tables with multiple primaries.

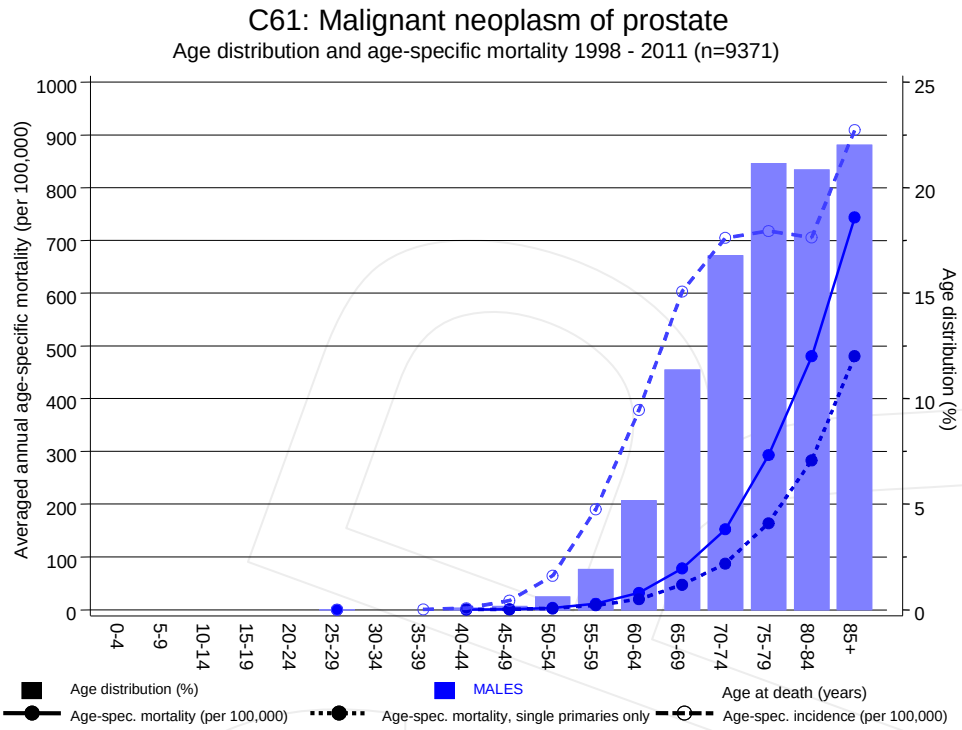

Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

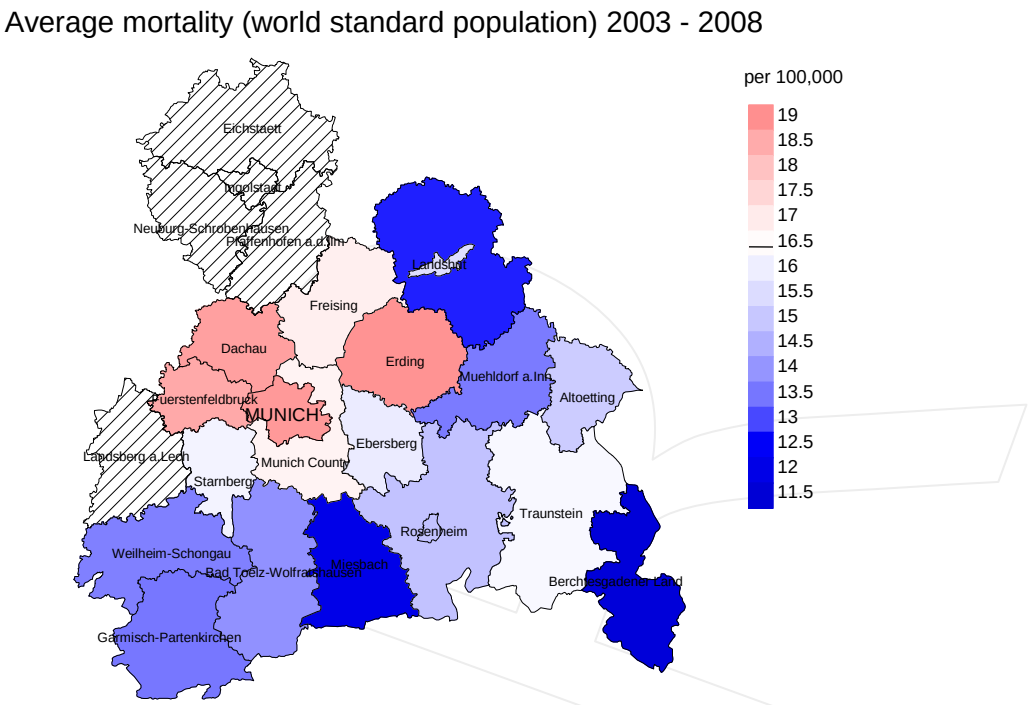

Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (16.4/100,000 WS N=4,330). 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 61,449 male residents (averaged) in the period from 2003 to 2008 a total of 131 men died from prostate cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 15.9/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 12.5 and 20.1/100,000.

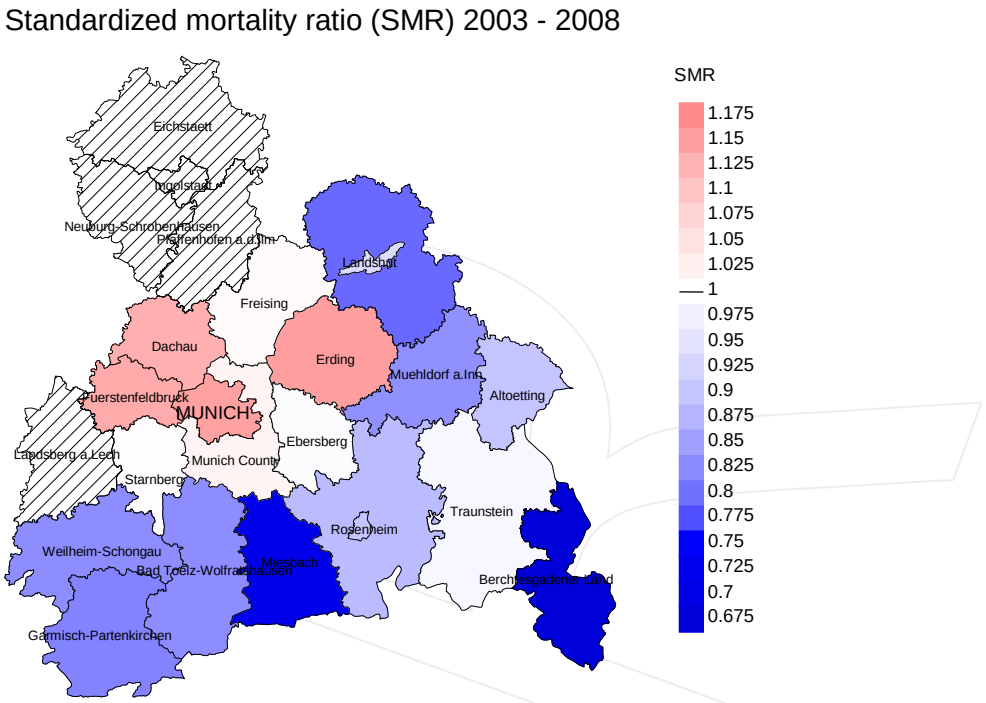

Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=4,330). 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 61,449 male residents (averaged) in the period from 2003 to 2008 a total of 131 men died from prostate cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.00. Though, the value of this parameter may vary with an underlying probability of 99% between 0.79 and 1.24, 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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