Munich Cancer Registry

- Survival
- Selection Matrix
- Homepage

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

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

Cancer statistics: Baseline statistics

C67: Bladder cancer

Year of diagnosis	1998-2011
Patients	6996
Diseases	7001
Creation date	04/02/2013
Export date	01/03/2013
Population	4.5 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C67__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	309	21	6.8	29.8	76.7	98.7
1999	286	20	7.0	35.3	75.2	99.0
2000	288	29	10.1	33.3	73.6	99.0
2001	302	21	7.0	37.4	68.9	98.3
2002	614	77	12.5	36.6	75.9	98.2
2003	605	73	12.1	35.7	72.1	97.9
2004	572	65	11.4	38.6	70.6	98.4
2005	545	53	9.7	35.0	62.6	97.1
2006	620	48	7.7	33.9	66.1	94.2
2007	621	46	7.4	36.1	57.5	86.8 ##
2008	625	60	9.6	38.9	60.5	79.0
2009	616	54	8.8	39.4	60.6	81.8
2010	557	58	10.4	39.7	50.4	92.8
2011	441	47	10.7	37.2	37.4	77.1 ###
1998-2011	7001	672	9.6	36.6	64.0	91.9

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	309	217	92	70.2
1999	286	220	66	76.9
2000	288	194	94	67.4
2001	302	200	102	66.2
2002	614	441	173	71.8
2003	605	448	157	74.0
2004	572	409	163	71.5
2005	545	383	162	70.3
2006	620	449	171	72.4
2007	621	437	184	70.4
2008	625	450	175	72.0
2009	616	448	168	72.7
2010	557	392	165	70.4
2011	441	322	119	73.0
1998-2011	7001	5010	1991	71.6

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	217	92	19.6	7.8	11.6	3.0	18.1	4.7	24.8	6.2
1999	220	66	19.7	5.6	11.4	2.2	17.7	3.5	24.0	4.7
2000	194	94	17.0	7.8	9.4	2.7	15.1	4.3	21.8	6.1
2001	200	102	17.3	8.4	10.1	3.0	15.4	4.8	20.2	6.7
2002	441	173	23.7	8.8	12.4	3.2	19.8	5.0	27.7	6.8
2003	448	157	23.9	8.0	12.5	2.8	19.7	4.5	27.2	6.1
2004	409	163	21.7	8.2	11.1	2.7	17.4	4.5	24.1	6.3
2005	383	162	20.2	8.1	10.0	2.9	15.7	4.5	21.9	6.0
2006	449	171	23.4	8.5	11.6	3.2	18.2	4.9	25.1	6.5
2007	437	184	19.7	8.0	9.6	2.9	15.1	4.5	20.3	6.2
2008	450	175	20.2	7.5	9.4	2.7	15.1	4.2	20.9	5.5
2009	448	168	20.1	7.2	9.3	2.4	14.7	3.8	20.3	5.2
2010	392	165	17.4	7.0	8.1	2.1	12.6	3.5	16.9	4.8
2011	322	119	14.3	5.1	6.7	1.9	10.4	2.9	13.9	3.7
1998-2011	5010	1991	19.9	7.6	9.9	2.7	15.6	4.2	21.4	5.7

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	309	72.3	12.9	26.3	96.1	55.1	64.9	73.2	82.5	88.1
1999	286	71.1	10.9	42.1	94.1	55.6	63.7	71.8	78.8	85.3
2000	288	73.6	10.2	45.0	99.7	59.7	65.5	74.7	80.6	86.5
2001	302	71.8	12.0	30.9	95.8	55.8	63.2	72.9	80.8	87.1
2002	614	73.9	10.7	36.1	99.5	60.2	66.7	74.5	81.7	88.1
2003	605	73.4	11.7	25.4	103	59.3	65.6	74.4	81.7	88.0
2004	572	73.5	11.6	33.3	99.0	58.7	64.8	75.4	81.5	87.9
2005	545	73.5	11.8	28.0	101	58.9	65.2	74.5	82.0	87.8
2006	620	73.2	12.0	3.0	101	57.6	66.1	74.3	81.8	87.0
2007	621	73.1	11.6	1.3	101	57.0	66.6	73.6	81.4	86.9
2008	625	74.1	11.7	6.6	100	57.8	67.3	75.3	82.6	87.7
2009	616	74.2	11.0	39.9	103	59.1	66.8	75.2	82.6	87.4
2010	557	74.0	12.0	31.5	100	56.9	66.7	75.3	83.3	88.3
2011	441	73.2	12.7	1.5	97.6	56.7	65.3	74.2	82.6	88.5
1998-2011	7001	73.4	11.7	1.3	103	58.0	65.9	74.4	81.9	87.6

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	217	71.3	12.5	26.3	95.6	55.4	64.3	72.2	79.8	87.1
1999	220	70.3	10.8	42.6	94.1	55.6	62.9	70.5	78.1	85.0
2000	194	71.8	10.1	45.0	99.7	58.4	64.2	73.7	78.9	84.1
2001	200	69.6	11.1	44.0	95.1	54.1	61.6	69.5	77.7	85.4
2002	441	72.9	10.2	37.0	97.6	60.0	65.8	73.4	80.2	86.0
2003	448	72.4	11.2	25.4	101	58.9	65.2	73.0	80.1	86.5
2004	409	71.9	11.3	37.8	98.8	58.0	63.6	73.0	79.9	85.7
2005	383	72.3	10.7	38.6	101	59.0	64.8	73.7	80.0	84.7
2006	449	72.6	11.2	3.0	101	58.2	65.8	73.3	80.5	85.8
2007	437	72.4	11.3	1.3	101	56.9	66.4	72.5	80.1	86.7
2008	450	73.7	11.3	37.5	100	57.6	66.8	74.4	81.6	87.2
2009	448	73.3	10.7	46.0	97.4	58.0	66.4	74.4	81.4	86.5
2010	392	72.1	11.7	31.5	99.1	56.0	64.9	72.7	81.0	86.5
2011	322	72.8	12.1	1.5	95.4	57.0	65.3	73.7	81.4	87.5
1998-2011	5010	72.3	11.2	1.3	101	57.7	65.0	73.1	80.4	86.2

Table 3b

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	92	74.5	13.5	31.4	96.1	55.0	67.5	77.3	85.7	89.0
1999	66	74.0	10.7	42.1	91.3	56.4	70.1	75.7	80.3	86.0
2000	94	77.2	9.7	56.1	94.5	62.6	70.4	78.8	85.9	89.2
2001	102	76.2	12.4	30.9	95.8	57.6	68.2	77.9	84.8	90.1
2002	173	76.4	11.5	36.1	99.5	62.6	68.0	78.5	85.1	89.3
2003	157	76.3	12.6	25.4	103	60.0	69.2	78.6	85.0	90.7
2004	163	77.7	11.5	33.3	99.0	59.5	72.4	79.0	86.1	90.6
2005	162	76.2	13.7	28.0	98.8	57.9	66.5	79.7	85.8	91.8
2006	171	74.8	13.7	4.3	96.7	56.1	67.5	76.8	84.6	91.3
2007	184	74.8	12.1	34.4	98.4	57.7	68.2	77.3	83.8	87.8
2008	175	75.1	12.7	6.6	97.0	58.5	68.2	76.9	85.4	88.2
2009	168	76.6	11.6	39.9	103	61.4	68.6	78.9	84.9	89.2
2010	165	78.8	11.6	37.0	100	64.0	71.1	81.0	87.3	91.1
2011	119	74.3	14.2	12.3	97.6	54.1	64.9	74.8	85.0	90.7
1998-2011	1991	76.0	12.4	4.3	103	58.6	68.6	78.3	85.2	90.1

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	0.1	0.1	3	0.1	0.1	1	0.1	0.1
5-9	1	0.0	0.1			0.1	1	0.1	0.1
10-14	1	0.0	0.1			0.1	1	0.1	0.2
15-19	0	0.0	0.1			0.1			0.2
20-24	0	0.0	0.1			0.1			0.2
25-29	4	0.1	0.1	2	0.0	0.1	2	0.1	0.3
30-34	7	0.1	0.2	2	0.0	0.1	5	0.3	0.5
35-39	22	0.3	0.6	14	0.3	0.4	8	0.4	0.9
40-44	51	0.7	1.3	39	0.8	1.2	12	0.6	1.5
45-49	125	1.8	3.1	91	1.8	3.0	34	1.7	3.2
50-54	247	3.5	6.6	188	3.8	6.8	59	3.0	6.2
55-59	429	6.1	12.7	326	6.5	13.3	103	5.2	11.4
60-64	725	10.4	23.1	592	11.8	25.1	133	6.7	18.0
65-69	963	13.8	36.8	770	15.4	40.5	193	9.7	27.7
70-74	1072	15.3	52.1	803	16.0	56.5	269	13.5	41.2
75-79	1173	16.8	68.9	870	17.4	73.9	303	15.2	56.5
80-84	1033	14.8	83.7	681	13.6	87.4	352	17.7	74.1
85+	1144	16.3	100.0	629	12.6	100.0	515	25.9	100.0
All ages	7001	100.0		5010	100.0		1991	100.0	

Included in the statistics are 50.5% multiple primaries in males and 35.7% 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=390 %	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			0.0	0.0				
20-24			0.0	0.0				
25-29	2	2	0.1	0.1			0.2	0.2
30-34	2	5	0.1	0.3			0.2	0.3
35-39	14	8	0.6	0.4			0.7	0.2
40-44	39	12	1.7	0.6	2.6		1.4	0.2
45-49	91	34	4.7	1.8	1.1		2.0	0.5
50-54	188	59	11.3	3.4	0.5	1.7	2.6	0.6
55-59	326	103	20.9	6.3	0.9	1.9	2.6	0.9
60-64	592	133	38.9	8.3	2.2	2.3	3.1	0.9
65-69	770	193	56.5	13.0	3.2	4.7	3.3	1.2
70-74	803	269	77.9	21.8	4.2	2.6	3.7	1.8
75-79	870	303	128.7	30.5	7.6	6.6	5.2	2.1
80-84	680	352	167.4	44.3	12.5	15.6	6.2	2.6
85+	628	515	226.4	69.3	25.6	35.7	7.6	3.5
All ages	5008	1991			7.8	14.1	3.8	1.5
Incidence								
Raw			19.9	7.6				
WS			9.9	2.7				
ES			15.6	4.2				
BRD-S			21.4	5.7				

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 1998-2011
MALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C03-C06	Oral cavity	6	1.6	3.8	1.4	8.3	#	3.9	16.7
C07-C08	Salivary gland	2	0.5	3.9	0.5	14.1		1.3	
C09-C10	Oropharynx	3	1.9	1.6	0.3	4.6		1.0	
C12-C13	Hypopharynx	3	1.0	2.9	0.6	8.4		1.7	
C15	Oesophagus	9	3.6	2.5	1.1	4.7	#	4.8	22.2
C16	Stomach	18	10.8	1.7	1.0	2.6		6.4	
C17	Small intestine	3	1.0	3.1	0.6	9.0		1.8	
C18	Colon	49	24.8	2.0	1.5	2.6	#	21.5	6.1
C19-C20	Rectum	23	12.7	1.8	1.1	2.7	#	9.2	13.0
C22	Liver	11	6.2	1.8	0.9	3.2		4.3	9.1
C23-C24	Bile	5	2.3	2.2	0.7	5.0		2.4	20.0
C25	Pancreas	19	8.3	2.3	1.4	3.6	#	9.5	36.8
C26	GI cancer	2	0.3	5.9	0.7	21.5		1.5	50.0
C32	Larynx	3	2.1	1.4	0.3	4.2		0.8	
C33-C34	Lung	102	27.2	3.8	3.1	4.6	#	66.5	12.7
C43	Malign. melanoma	16	7.9	2.0	1.2	3.3	#	7.2	
C46,C49	Soft tissue	2	1.2	1.7	0.2	6.0		0.7	
C48	Peritoneal	2	0.1	13.6	1.6	49.2	#	1.6	50.0
C60	Penis	2	0.5	3.8	0.5	13.9		1.3	
C61	Prostate	505	68.0	7.4	6.8	8.1	#	388.3	5.9
C64	Kidney	38	7.6	5.0	3.5	6.8	#	27.0	21.1
C65	Renal pelvis	25	1.0	26.1	16.9	38.5	#	21.4	
C66	Ureter	18	0.5	34.7	20.6	54.8	#	15.5	
C67	Bladder	3	11.1	0.3	0.1	0.8	#	-7.2	33.3
C68	Urethra	12	0.1	135.6	70.1	236.9	#	10.6	
C70-C72	CNS cancer	4	2.9	1.4	0.4	3.5		1.0	
C76-C79	CUP	14	4.2	3.4	1.8	5.6	#	8.7	14.3
C82-C85	NHL	13	9.2	1.4	0.8	2.4		3.4	15.4
C90	Mult. myeloma	6	3.0	2.0	0.7	4.3		2.6	
C91-C96	Leukaemia	8	3.8	2.1	0.9	4.1		3.7	50.0
Other primaries		4	2.2	1.8	0.5	4.6		1.6	
Not observed		0	4.7	0.0	0.0	0.8	#	-4.1	
All mult. primaries		930	232.3	4.0	3.8	4.3	#	620.0	8.6

Patients	3680
Mean age at second malignancy (years)	72.4
Person-years	11253
Mean observation time (years)	3.1
Median observation time (years)	2.0

The occurrence of second malignancy is statistically significant.

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

Table 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 %
C16	Stomach	5	2.4	2.1	0.7	4.8		6.7	20.0
C18	Colon	10	6.4	1.6	0.7	2.9		9.3	10.0
C19-C20	Rectum	8	2.6	3.1	1.3	6.1	#	14.1	
C23-C24	Bile	2	1.0	2.1	0.3	7.6		2.7	50.0
C25	Pancreas	10	2.7	3.7	1.8	6.9	#	19.1	30.0
C33-C34	Lung	18	3.5	5.2	3.1	8.2	#	37.9	16.7
C50	Breast	27	14.1	1.9	1.3	2.8	#	33.5	11.1
C53	Cervix uteri	8	0.6	13.1	5.6	25.7	#	19.3	12.5
C54	Corpus uteri	6	2.8	2.2	0.8	4.7		8.5	
C56	Ovary	5	2.2	2.2	0.7	5.2		7.2	20.0
C64	Kidney	12	1.4	8.7	4.5	15.1	#	27.7	33.3
C65	Renal pelvis	15	0.2	87.1	48.8	143.7	#	38.7	
C66	Ureter	7	0.1	89.1	35.8	183.7	#	18.0	
C68	Urethra	2	0.0	114.4	13.9	413.3	#	5.2	
C76-C79	CUP	2	1.1	1.8	0.2	6.4		2.3	
C82-C85	NHL	3	2.2	1.4	0.3	4.1		2.2	33.3
C91-C96	Leukaemia	4	0.9	4.4	1.2	11.2	#	8.1	25.0
Other primaries		15	5.9	2.5	1.4	4.2	#	23.7	13.3
Not observed		0	3.5	0.0	0.0	1.1		-9.1	
All mult. primaries		159	53.6	3.0	2.5	3.5	#	274.9	13.8

Patients	1419
Mean age at second malignancy (years)	75.5
Person-years	3836
Mean observation time (years)	2.7
Median observation time (years)	1.4

The occurrence of second malignancy is statistically significant.

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

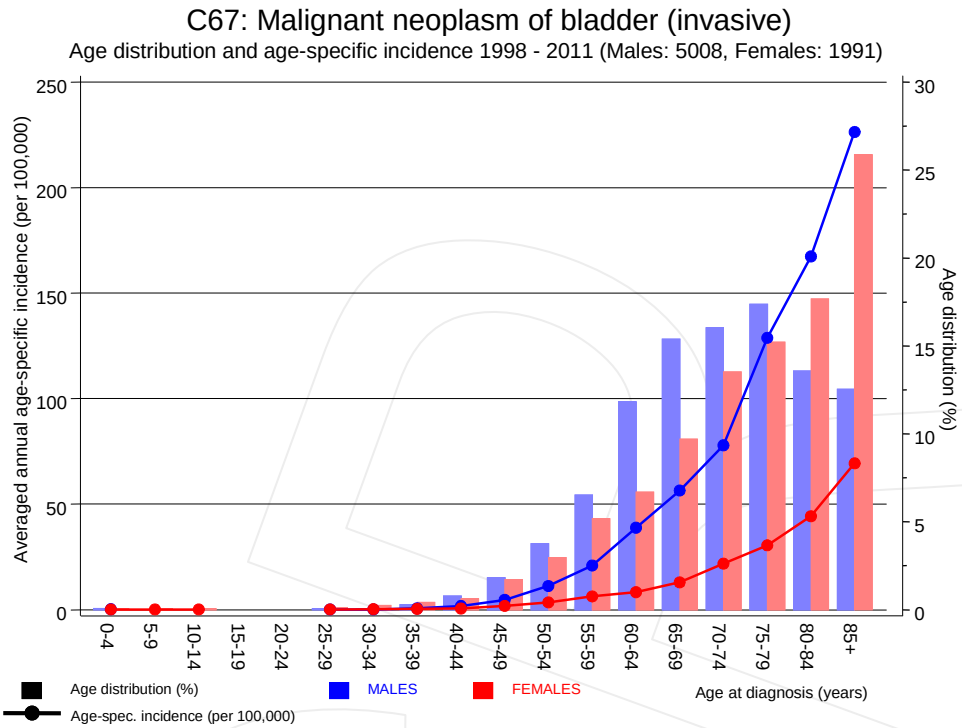


Figure 7. Age distribution and age-specific incidence

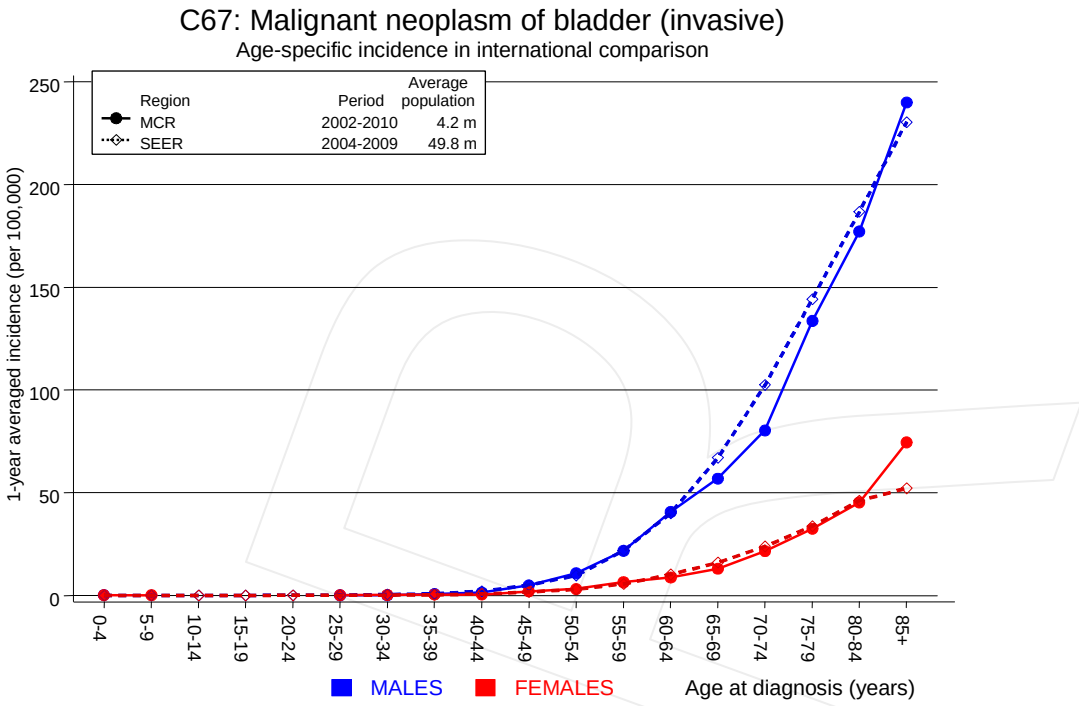


Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

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.

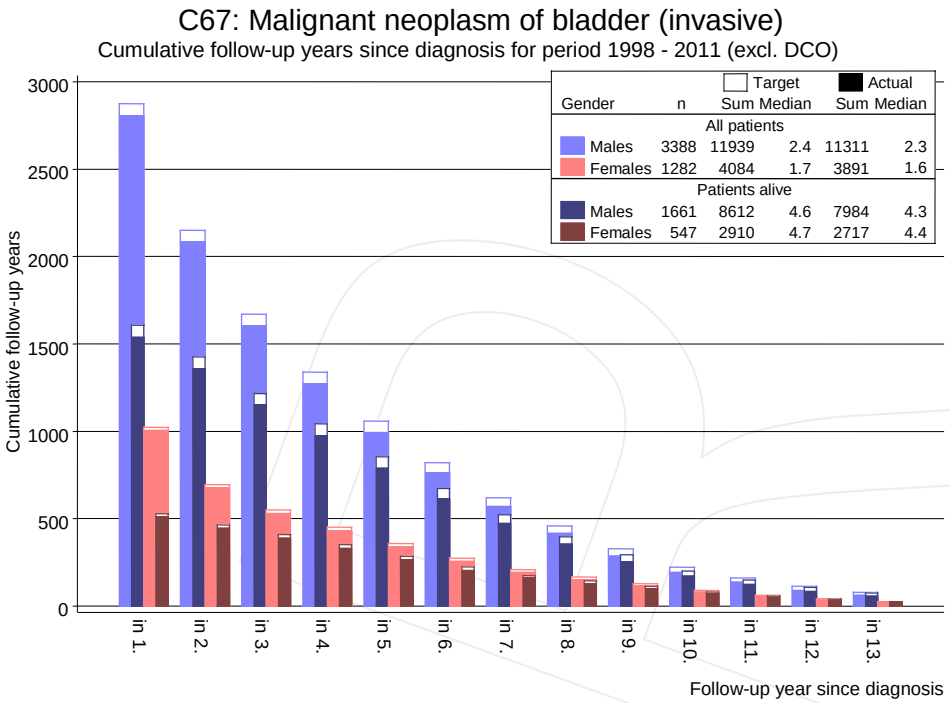
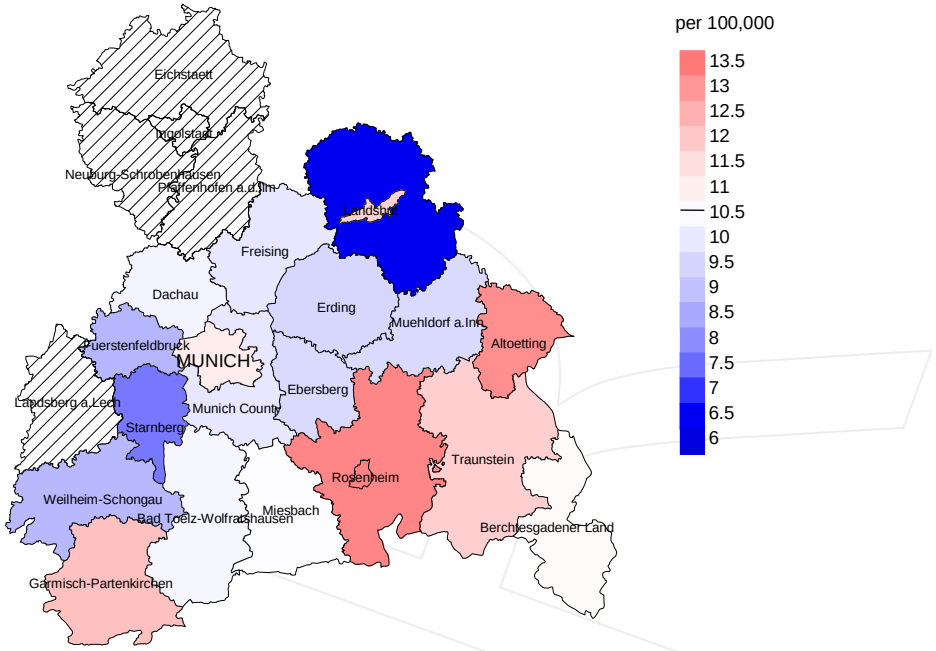


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

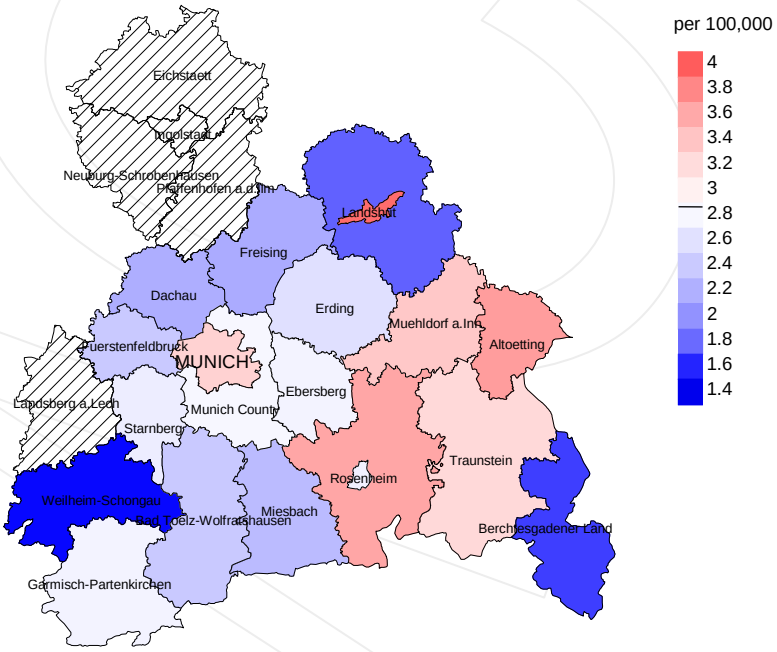
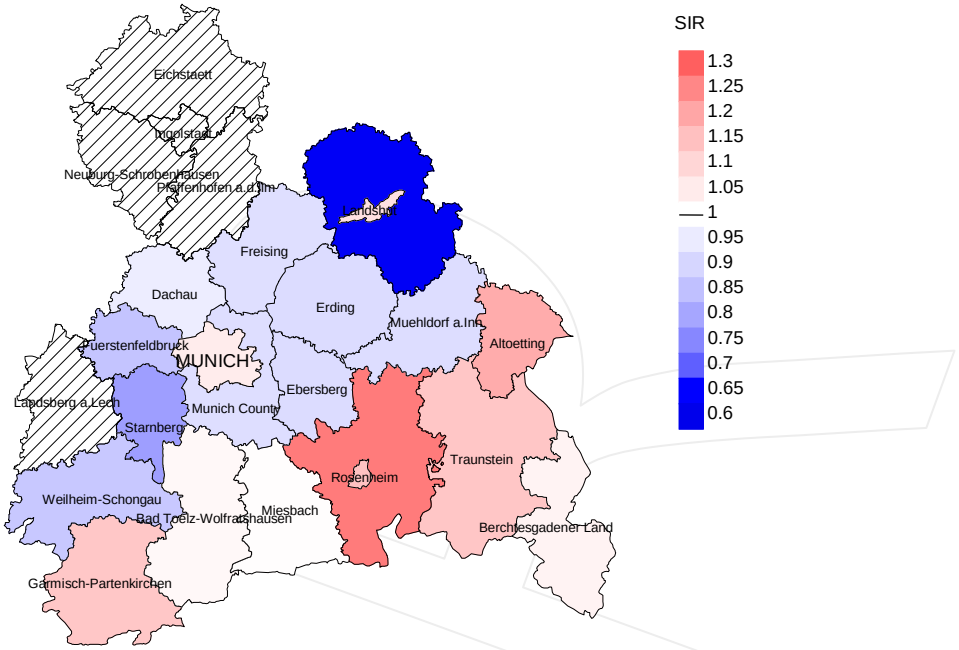


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 10.6/100,000 WS N=2,464, females 2.9/100,000 WS N=964). 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 25 women were identified with newly diagnosed bladder cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 2.8/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.4 and 4.9/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males



Standardized incidence ratio (SIR) 2003 - 2008: Females

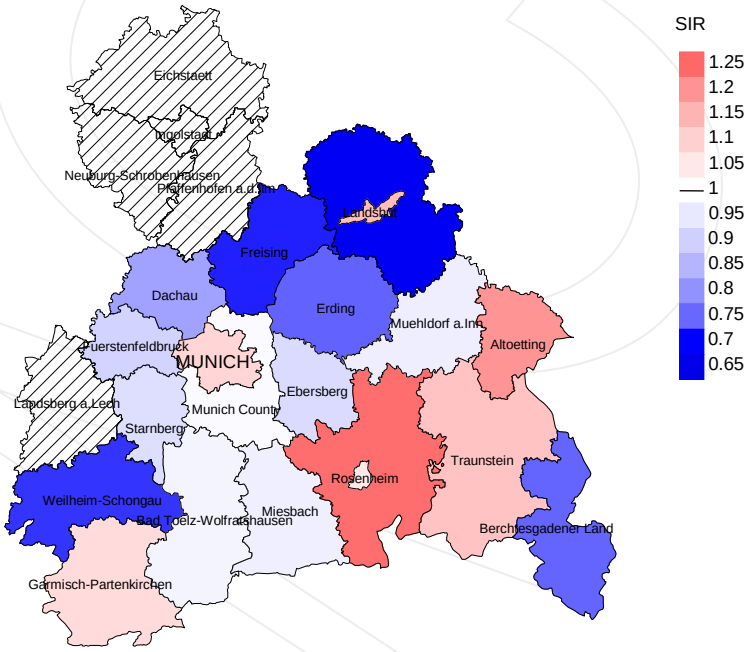


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=2,464, females N=964). 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 25 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 0.92. Though, the value of this parameter may vary with an underlying probability of 99% between 0.52 and 1.51, 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	309	98.7	6.8	237	76.7	93.7
1999	286	99.0	7.0	215	75.2	96.3
2000	288	99.0	10.1	212	73.6	96.7
2001	302	98.3	7.0	208	68.9	94.7
2002	614	98.2	12.5	466	75.9	97.2
2003	605	97.9	12.1	436	72.1	97.7
2004	572	98.4	11.4	404	70.6	99.0
2005	545	97.1	9.7	341	62.6	97.4
2006	620	94.2	7.7	410	66.1	99.5
2007	621	86.8	7.4	357	57.5	98.3
2008	625	79.0	9.6	378	60.5	99.5
2009	616	81.8	8.8	373	60.6	98.7
2010	557	92.8	10.4	281	50.4	97.2
2011	441	77.1	10.7	165	37.4	93.9
1998-2011	7001	91.9	9.6	4483	64.0	97.5

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	309	252	91.7	68	22.0
1999	286	221	94.6	65	22.7
2000	288	231	95.2	64	22.2
2001	302	221	95.9	52	17.2
2002	614	340	96.2	151	24.6
2003	605	419	97.4	148	24.5
2004	572	411	97.3	136	23.8
2005	545	426	97.7	115	21.1
2006	620	430	97.2	131	21.1
2007	621	502	97.6	134	21.6
2008	625	483	98.6	142	22.7
2009	616	540	99.3	171	27.8
2010	557	557	98.7	154	27.6
2011	441	438	99.1	109	24.7
1998-2011	7001	5471	97.4	1640	23.4

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	252	63.1	36.9	83.5
1999	221	64.3	35.7	80.9
2000	231	66.7	33.3	85.0
2001	221	65.6	34.4	84.4
2002	340	71.5	28.5	85.9
2003	419	67.3	32.7	83.3
2004	411	70.8	29.2	86.0
2005	426	69.2	30.8	83.7
2006	430	70.9	29.1	83.0
2007	502	73.1	26.9	84.3
2008	483	71.4	28.6	83.0
2009	540	71.3	28.7	85.6
2010	557	68.8	31.2	83.3
2011	438	68.3	31.7	83.9
1998-2011	5471	69.4	30.6	84.0

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	168	78.4	77.6	79.7	78.8
1999	156	78.0	76.5	80.3	77.2
2000	164	77.3	75.7	79.9	77.1
2001	146	77.6	76.4	79.9	77.0
2002	236	77.1	75.5	80.9	76.3
2003	314	76.9	75.4	79.8	76.3
2004	288	77.9	76.9	80.1	77.2
2005	302	77.2	76.0	79.7	76.5
2006	287	77.0	75.6	80.3	76.5
2007	354	77.2	76.5	79.1	76.8
2008	350	77.8	76.6	80.8	76.8
2009	389	78.3	76.4	82.7	77.4
2010	388	78.2	76.5	82.3	77.4
2011	303	77.3	75.9	80.4	76.5
1998-2011	3845	77.6	76.2	80.5	76.9

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	84	80.6	79.8	82.9	80.9
1999	65	79.5	79.3	80.1	79.8
2000	67	79.3	78.8	81.0	79.4
2001	75	82.5	81.1	85.4	82.1
2002	104	80.0	78.6	84.2	80.2
2003	105	80.6	80.4	81.2	80.1
2004	123	81.2	79.8	85.8	80.7
2005	124	81.2	80.6	83.1	81.2
2006	143	80.8	78.6	86.3	79.8
2007	148	80.1	78.7	84.0	79.5
2008	133	80.2	78.4	84.9	79.5
2009	151	79.0	77.7	82.7	78.3
2010	169	81.5	80.1	84.3	81.1
2011	135	80.6	76.6	88.1	78.2
1998-2011	1626	80.5	79.1	84.3	80.0

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	98	8.8	0.45	4.7	0.40	8.3	0.46	12.7	0.51
1999	94	8.4	0.43	4.6	0.40	7.8	0.44	11.8	0.49
2000	102	9.0	0.53	4.8	0.51	8.1	0.54	12.3	0.56
2001	95	8.2	0.48	4.3	0.42	7.4	0.48	11.2	0.56
2002	165	8.9	0.37	4.4	0.36	7.4	0.37	10.9	0.39
2003	206	11.0	0.46	5.5	0.44	9.0	0.46	13.1	0.48
2004	198	10.5	0.48	5.0	0.45	8.5	0.49	12.5	0.52
2005	204	10.8	0.53	4.9	0.49	8.3	0.53	12.6	0.57
2006	203	10.6	0.45	4.9	0.42	8.1	0.45	11.7	0.47
2007	257	11.6	0.59	5.1	0.54	8.7	0.58	12.8	0.63
2008	249	11.2	0.55	4.7	0.50	8.0	0.53	12.0	0.57
2009	273	12.2	0.61	5.2	0.56	8.6	0.59	12.3	0.61
2010	271	12.0	0.69	5.0	0.61	8.3	0.66	12.0	0.71
2011	211	9.4	0.66	3.9	0.59	6.5	0.62	9.1	0.65
1998-2011	2626	10.4	0.52	4.8	0.48	8.0	0.52	11.8	0.55

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	61	5.2	0.66	1.6	0.53	2.7	0.57	4.1	0.66
1999	48	4.0	0.73	1.3	0.57	2.1	0.61	3.1	0.65
2000	52	4.3	0.55	1.3	0.50	2.2	0.52	3.2	0.53
2001	50	4.1	0.49	1.2	0.38	2.0	0.41	3.1	0.47
2002	78	4.0	0.45	1.3	0.40	2.1	0.42	2.9	0.43
2003	76	3.9	0.48	1.2	0.41	2.0	0.44	2.7	0.45
2004	93	4.7	0.57	1.4	0.52	2.4	0.52	3.3	0.53
2005	91	4.6	0.56	1.2	0.42	2.1	0.47	3.2	0.53
2006	102	5.1	0.60	1.6	0.49	2.6	0.52	3.6	0.56
2007	110	4.8	0.60	1.4	0.50	2.4	0.52	3.4	0.55
2008	96	4.1	0.55	1.3	0.47	2.1	0.50	3.0	0.53
2009	112	4.8	0.67	1.5	0.62	2.4	0.64	3.4	0.66
2010	112	4.8	0.68	1.3	0.62	2.2	0.64	3.2	0.66
2011	88	3.8	0.74	1.2	0.63	2.0	0.68	2.8	0.75
1998-2011	1169	4.4	0.59	1.3	0.50	2.2	0.53	3.2	0.56

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	0.1	0.1		0.0		2	0.2	0.2
40-44	8	0.2	0.3	6	0.2	0.2	2	0.2	0.3
45-49	31	0.8	1.1	19	0.7	0.9	12	1.0	1.4
50-54	75	2.0	3.1	50	1.9	2.8	25	2.1	3.5
55-59	142	3.7	6.8	109	4.1	7.0	33	2.8	6.3
60-64	235	6.2	13.0	191	7.3	14.2	44	3.8	10.1
65-69	395	10.4	23.3	301	11.4	25.7	94	8.0	18.1
70-74	551	14.5	37.8	413	15.7	41.3	138	11.8	29.9
75-79	692	18.2	56.0	503	19.1	60.4	189	16.2	46.1
80-84	771	20.3	76.3	526	20.0	80.4	245	21.0	67.1
85+	901	23.7	100.0	516	19.6	100.0	385	32.9	100.0
All ages	3803	100.0		2634	100.0		1169	100.0	

Included in the statistics are 50.5% multiple primaries in males and 35.7% 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	0.25		0.4
40-44	6	2	0.3	0.15	0.1	0.17	0.8	0.2
45-49	19	12	1.0	0.21	0.6	0.35	1.2	0.7
50-54	50	25	3.0	0.27	1.5	0.42	1.8	1.0
55-59	109	33	7.0	0.33	2.0	0.32	2.1	0.8
60-64	191	44	12.5	0.32	2.7	0.33	2.5	0.8
65-69	301	94	22.1	0.39	6.3	0.49	2.9	1.3
70-74	413	138	40.0	0.51	11.2	0.51	3.7	1.7
75-79	503	189	74.4	0.58	19.0	0.62	4.6	2.1
80-84	526	245	129.5	0.77	30.8	0.70	6.0	2.6
85+	516	385	186.0	0.82	51.8	0.75	7.2	3.4
All ages	2634	1169					3.9	1.9
Mortality								
Raw			10.5	0.53	4.4	0.59		
WS			4.8	0.48	1.3	0.50		
ES			8.1	0.52	2.2	0.53		
BRD-S			11.9	0.55	3.2	0.56		
PYLL-70								
per 100,000			22.1		8.0			
ES			19.2		6.8			
AYLL-70			7.4		8.5			

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	13	0.8	3	23.1	1	7.7	9	69.2
C09-C10 Oropharynx	13	0.8	6	46.2			7	53.8
C15 Oesophagus	18	1.0	5	27.8	1	5.6	12	66.7
C16 Stomach	46	2.7	12	26.1	3	6.5	31	67.4
C18 Colon	103	6.0	60	58.3	10	9.7	33	32.0
C19-C20 Rectum	54	3.1	25	46.3	4	7.4	25	46.3
C22 Liver	18	1.0	6	33.3	2	11.1	10	55.6
C25 Pancreas	34	2.0	2	5.9	3	8.8	29	85.3
C32 Larynx	20	1.2	15	75.0			5	25.0
C33-C34 Lung	224	13.0	31	13.8	12	5.4	181	80.8
C43 Malign. melanoma	35	2.0	22	62.9	1	2.9	12	34.3
C44 Skin others	58	3.4	23	39.7	4	6.9	31	53.4
C61 Prostate	598	34.8	185	30.9	172	28.8	241	40.3
C64 Kidney	72	4.2	32	44.4	12	16.7	28	38.9
C65 Renal pelvis	81	4.7	18	22.2	12	14.8	51	63.0
C66 Ureter	63	3.7	22	34.9	12	19.0	29	46.0
C67 Bladder	75	4.4			1	1.3	74	98.7
C68 Urethra	22	1.3	3	13.6	9	40.9	10	45.5
C68 Urinary org.	14	0.8	2	14.3	3	21.4	9	64.3
C70-C72 CNS cancer	15	0.9	4	26.7			11	73.3
C76-C79 CUP	20	1.2	4	20.0	2	10.0	14	70.0
C82-C85 NHL	32	1.9	16	50.0	4	12.5	12	37.5
C90 Mult. myeloma	10	0.6	4	40.0			6	60.0
C91-C96 Leukaemia	20	1.2	2	10.0	2	10.0	16	80.0
Other primaries	60	3.5	27	45.0	3	5.0	30	50.0
All mult. primaries	1718	100.0	529	30.8	273	15.9	916	53.3

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 1998-2011
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C16	Stomach	11	2.0	4	36.4	1	9.1	6	54.5
C18	Colon	47	8.6	26	55.3	2	4.3	19	40.4
C19-C20	Rectum	18	3.3	11	61.1	1	5.6	6	33.3
C25	Pancreas	15	2.8	1	6.7	1	6.7	13	86.7
C33-C34	Lung	38	7.0	4	10.5	4	10.5	30	78.9
C43	Malign. melanoma	7	1.3	4	57.1			3	42.9
C44	Skin others	11	2.0	3	27.3			8	72.7
C50	Breast	99	18.2	65	65.7	6	6.1	28	28.3
C53	Cervix uteri	48	8.8	39	81.3	5	10.4	4	8.3
C54	Corpus uteri	30	5.5	24	80.0	4	13.3	2	6.7
C56	Ovary	13	2.4	4	30.8	1	7.7	8	61.5
C64	Kidney	23	4.2	11	47.8	4	17.4	8	34.8
C65	Renal pelvis	37	6.8	16	43.2	4	10.8	17	45.9
C66	Ureter	27	5.0	15	55.6	3	11.1	9	33.3
C67	Bladder	28	5.1					28	100.0
C73	Thyroid	5	0.9	4	80.0			1	20.0
C76-C79	CUP	11	2.0	1	9.1			10	90.9
C82-C85	NHL	10	1.8	4	40.0	1	10.0	5	50.0
C91-C96	Leukaemia	12	2.2			2	16.7	10	83.3
Other primaries		55	10.1	23	41.8	6	10.9	26	47.3
All mult. primaries		545	100.0	259	47.5	45	8.3	241	44.2

Multiple primaries with number of cases n<5 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	0.29		0.5
40-44	5	1	0.2	0.15	0.0	0.11	0.7	0.1
45-49	16	11	0.8	0.19	0.6	0.41	1.1	0.7
50-54	41	19	2.5	0.26	1.1	0.37	1.6	0.9
55-59	88	28	5.6	0.32	1.7	0.35	2.0	0.8
60-64	159	29	10.4	0.33	1.8	0.28	2.4	0.6
65-69	219	71	16.1	0.38	4.8	0.47	2.6	1.2
70-74	267	97	25.9	0.49	7.9	0.48	3.0	1.5
75-79	365	139	54.0	0.61	14.0	0.62	4.4	1.9
80-84	361	190	88.9	0.80	23.9	0.71	5.4	2.5
85+	360	300	129.8	0.83	40.4	0.73	6.5	3.2
All ages	1881	887					3.5	1.8
Mortality								
Raw			7.5	0.51	3.4	0.57		
WS			3.5	0.47	1.0	0.48		
ES			5.8	0.50	1.7	0.51		
BRD-S			8.4	0.55	2.4	0.55		
PYLL-70								
per 100,000			17.8		6.3			
ES			15.6		5.4			
AYLL-70			7.7		8.8			

* 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	0.29		0.5
40-44	5		0.2	0.16	0.0		0.8	
45-49	15	10	0.8	0.19	0.5	0.42	1.1	0.7
50-54	35	17	2.1	0.27	1.0	0.35	1.5	0.9
55-59	63	24	4.0	0.29	1.5	0.32	1.5	0.8
60-64	118	25	7.8	0.31	1.6	0.28	2.0	0.6
65-69	150	59	11.0	0.34	4.0	0.43	2.1	1.2
70-74	174	78	16.9	0.40	6.3	0.44	2.3	1.4
75-79	247	106	36.6	0.50	10.7	0.53	3.6	1.7
80-84	250	159	61.5	0.64	20.0	0.63	4.7	2.5
85+	271	266	97.7	0.68	35.8	0.67	6.0	3.3
All ages	1328	746					2.9	1.7
Mortality								
Raw			5.3	0.44	2.8	0.52		
WS			2.5	0.40	0.8	0.44		
ES			4.1	0.43	1.4	0.47		
BRD-S			6.0	0.46	2.0	0.50		
PYLL-70								
per 100,000			13.8		5.4			
ES			12.1		4.7			
AYLL-70			8.1		8.9			

* See corresponding tables with multiple primaries.

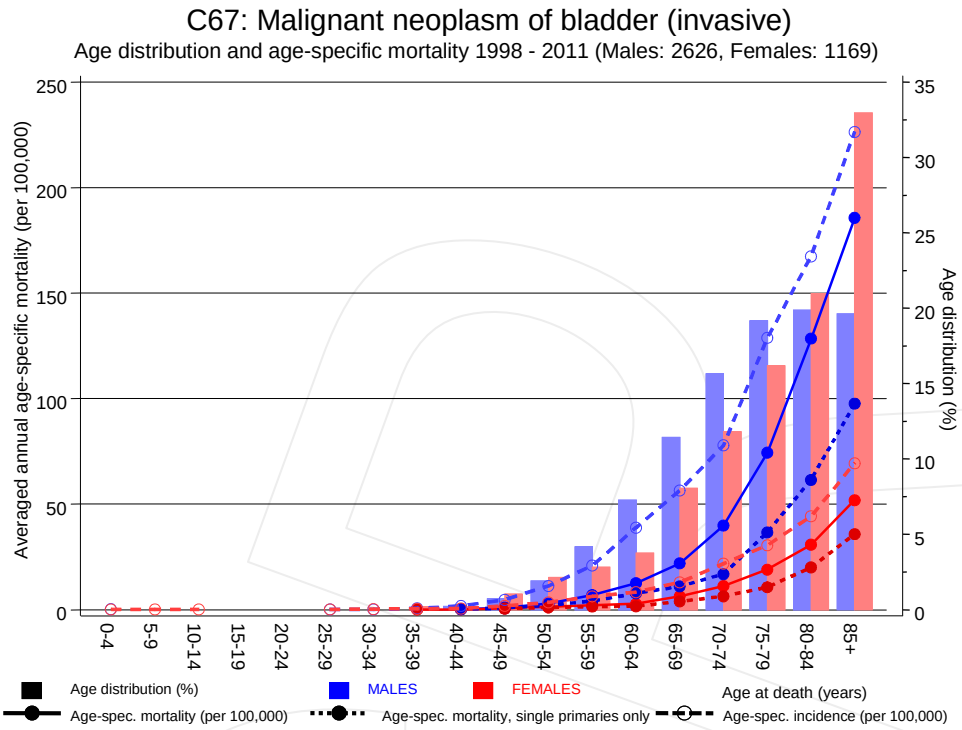
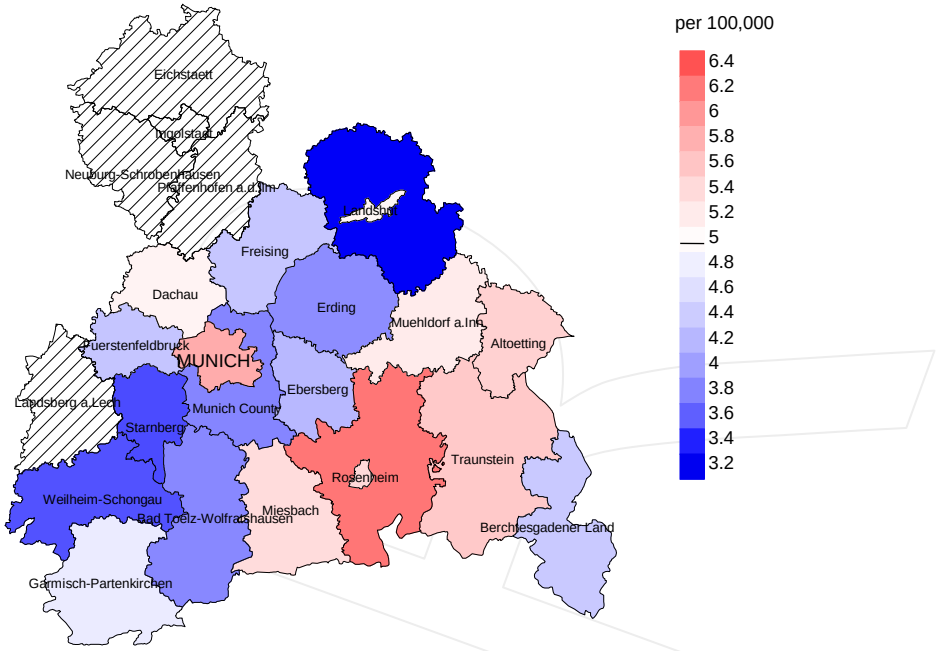


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

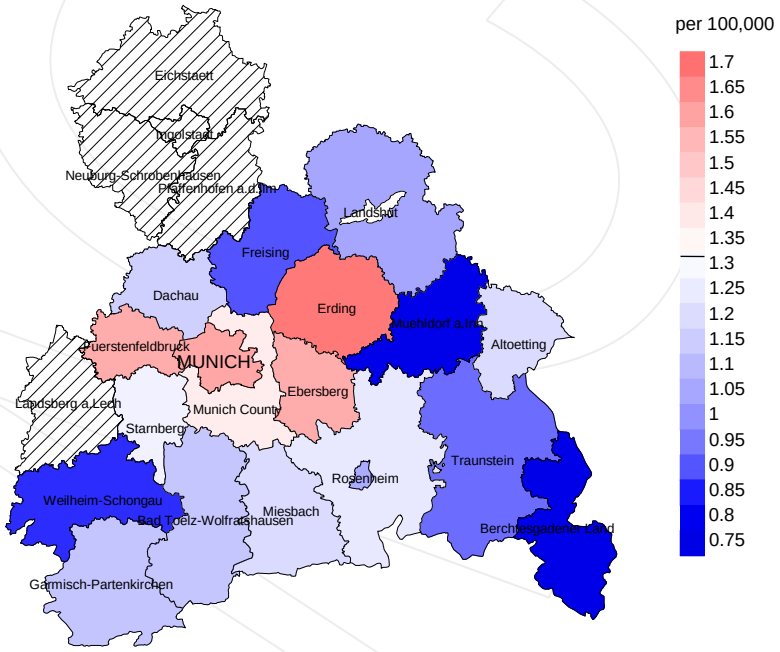
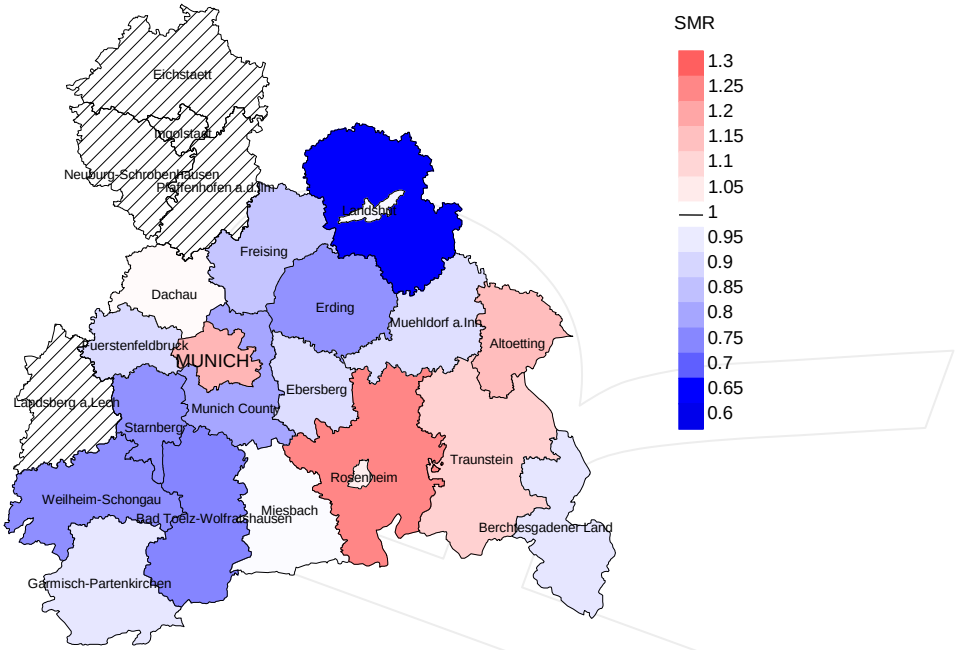


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 5.0/100,000 WS N=1,255, females 1.3/100,000 WS N=537). 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 16 women died from bladder cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 1.6/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.7 and 3.2/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males



Standardized mortality ratio (SMR) 2003 - 2008: Females

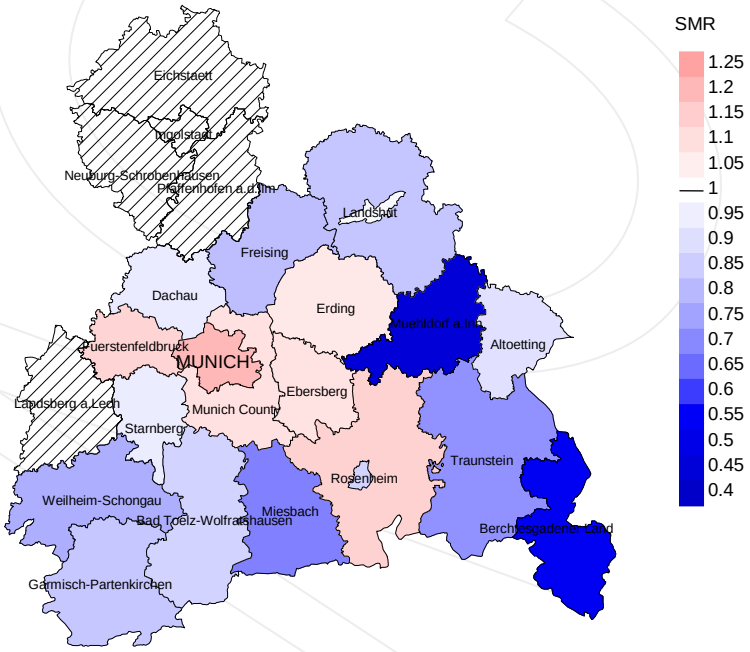


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=1,255, females N=537). 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 16 women died from bladder cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.09. Though, the value of this parameter may vary with an underlying probability of 99% between 0.51 and 2.00, 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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