Munich Cancer Registry

- Survival
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- *Deutsch*

ICD-10 D09.0, D41.4: Bladder tumor

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	8,633
Diseases	8,638
Creation date	04/13/2016
Export date	12/23/2015
Population	4.64 m

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

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

http://www.tumorregister-muenchen.de/en/facts/base/bD0941E-ICD-10-D09.0-D41.4-Bladder-tumor-incidence-and-mortality.pdf

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

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

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

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

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

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

Munich Cancer Registry, April 2016

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

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

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

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

Code	Description
D09.0	Carcinoma in situ: Bladder
D41.4	Neoplasm of uncertain or unknown behaviour of urinary organs: Bladder

INCIDENCE

Table 1

All patients by year of diagnosis,
proportions of multiple primaries, deaths, and active follow-up

Year of diagnosis	Cases n	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %
1998	283	33.6	64.7	97.9
1999	284	38.7	55.6	99.3
2000	284	41.5	58.8	97.5
2001	264	41.7	51.5	99.2
2002	445	40.4	49.4	98.2 #
2003	446	39.7	45.7	93.5
2004	556	40.3	43.9	94.4
2005	544	42.5	40.3	93.6
2006	506	41.3	33.4	87.0
2007	662	39.7	35.3	73.3 #
2008	613	39.3	25.9	60.0
2009	634	40.2	25.9	59.6
2010	657	36.7	23.4	57.4
2011	675	36.4	19.0	59.6
2012	679	37.4	15.2	66.7
2013	620	33.9	11.8	98.1
2014	486	28.2	4.3	97.5 ##
1998-2014	8638	38.2	31.7	80.7

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

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

Table 1a

All patients
by year of diagnosis and gender

Year of diagnosis	All n	Males n	Females n	Prop. males %
1998	283	210	73	74.2
1999	284	202	82	71.1
2000	284	213	71	75.0
2001	264	196	68	74.2
2002	445	327	118	73.5
2003	446	334	112	74.9
2004	556	398	158	71.6
2005	544	414	130	76.1
2006	506	394	112	77.9
2007	662	521	141	78.7
2008	613	462	151	75.4
2009	634	474	160	74.8
2010	657	505	152	76.9
2011	675	514	161	76.1
2012	679	523	156	77.0
2013	620	488	132	78.7
2014	486	397	89	81.7
1998–2014	8638	6572	2066	76.1

Table 2

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

Year of diagnosis	Males n	Females n	Males Inc. raw	Fem. Inc. raw	Males Inc. WS	Fem. Inc. WS	Males Inc. ES	Fem. Inc. ES	Males Inc. BRD-S	Fem. Inc. BRD-S
1998	210	73	19.0	6.2	11.5	2.8	17.3	4.1	23.0	5.4
1999	202	82	18.0	6.9	10.8	3.0	16.2	4.5	21.9	5.8
2000	213	71	18.7	5.9	10.9	2.5	16.6	3.8	22.1	5.1
2001	196	68	16.9	5.6	9.6	2.8	14.8	4.1	20.4	5.2
2002	327	118	17.6	6.0	9.8	2.7	14.8	4.1	19.5	5.2
2003	334	112	17.8	5.7	10.0	2.7	14.7	3.9	18.8	4.8
2004	398	158	21.2	8.0	11.4	3.5	17.2	5.1	22.6	6.5
2005	414	130	21.9	6.5	11.3	3.0	17.3	4.3	23.4	5.3
2006	394	112	20.6	5.6	10.8	2.2	16.2	3.4	21.0	4.5
2007	521	141	23.5	6.1	12.0	2.7	18.1	4.0	23.9	5.0
2008	462	151	20.8	6.5	10.3	2.9	15.5	4.3	20.4	5.3
2009	474	160	21.2	6.9	10.6	2.9	15.9	4.3	20.7	5.6
2010	505	152	22.4	6.5	10.6	2.8	16.1	4.1	21.7	5.1
2011	514	161	22.5	6.8	10.3	3.0	15.7	4.4	21.0	5.4
2012	523	156	22.9	6.6	10.7	2.8	16.3	4.1	21.5	5.2
2013	488	132	21.4	5.6	10.0	2.2	15.2	3.3	20.3	4.3
2014	397	89	17.4	3.8	8.1	1.5	12.3	2.2	16.4	2.9
1998-2014	6572	2066	20.5	6.2	10.5	2.7	15.8	4.0	20.9	5.0

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

Table 3

Age distribution parameters by year of diagnosis (All patients)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	283	68.0	13.0	22.9	98.1	50.7	58.7	69.7	77.8	84.0
1999	284	68.9	12.5	18.9	96.7	54.6	60.1	70.0	78.0	84.1
2000	284	69.6	11.2	34.0	94.0	54.0	62.0	71.7	77.5	84.1
2001	264	69.6	10.7	28.4	90.7	55.0	62.3	71.0	77.5	82.5
2002	445	68.9	11.6	28.3	93.8	54.1	61.3	70.6	77.3	82.6
2003	446	67.8	11.8	28.8	92.0	52.0	60.9	68.5	75.8	82.2
2004	556	69.3	11.8	23.3	93.9	53.7	62.3	69.7	77.7	83.6
2005	544	69.9	11.8	18.4	95.3	56.4	62.8	71.1	78.1	83.9
2006	506	70.0	11.0	24.7	97.4	56.9	63.3	69.9	78.0	83.8
2007	662	69.7	11.9	21.7	96.5	54.3	63.5	70.7	78.5	83.6
2008	613	69.8	11.2	23.8	94.9	54.3	63.8	70.3	78.1	83.4
2009	634	69.8	11.9	28.5	95.9	53.7	62.8	71.3	78.2	83.3
2010	657	70.6	11.2	22.4	96.9	55.3	64.3	72.0	78.4	83.6
2011	675	71.4	10.7	28.4	97.8	57.0	65.5	71.9	78.7	84.8
2012	679	71.0	11.5	32.6	97.7	54.9	64.5	72.2	79.2	85.2
2013	620	71.4	11.9	18.3	99.0	55.4	64.6	72.7	80.3	85.3
2014	486	71.4	10.9	20.9	101	57.3	65.6	72.7	78.6	84.4
1998-2014	8638	70.0	11.6	18.3	101	54.9	63.1	71.2	78.3	83.8

Table 3a

Age distribution parameters by year of diagnosis (MALES)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	210	67.0	12.2	28.9	91.4	51.2	58.0	68.5	76.3	82.2
1999	202	68.0	12.4	18.9	92.9	54.5	60.5	69.1	77.0	83.4
2000	213	68.8	10.9	40.8	94.0	53.3	61.6	70.6	76.4	83.8
2001	196	69.9	10.7	28.4	90.7	55.7	62.3	71.0	77.7	83.5
2002	327	68.5	11.3	28.3	93.0	55.2	61.1	70.2	76.7	81.9
2003	334	67.7	11.3	30.2	92.0	52.6	60.7	68.4	75.5	81.8
2004	398	68.7	11.9	23.3	93.9	52.7	61.5	69.4	77.0	83.4
2005	414	70.0	11.5	18.4	95.3	56.8	63.2	71.8	77.6	82.9
2006	394	69.2	11.2	24.7	94.9	55.4	62.7	69.1	77.7	83.6
2007	521	69.6	11.6	21.7	93.9	53.5	63.4	70.7	78.1	83.0
2008	462	69.7	11.0	29.6	94.2	54.3	64.2	70.2	77.9	82.8
2009	474	69.3	12.0	28.5	95.2	53.7	62.7	70.6	78.1	82.8
2010	505	70.5	10.8	25.6	90.8	55.4	64.3	72.1	78.2	83.2
2011	514	71.8	10.5	28.4	93.7	56.8	66.7	72.4	79.1	84.7
2012	523	70.9	11.4	32.6	97.0	55.4	64.6	72.1	78.7	84.6
2013	488	71.3	12.0	18.3	99.0	55.3	64.7	72.7	80.1	85.2
2014	397	71.1	10.9	20.9	93.5	56.7	65.7	72.4	78.3	84.1
1998-2014	6572	69.8	11.4	18.3	99.0	54.8	63.1	71.0	77.9	83.5

Table 3b

Age distribution parameters by year of diagnosis (FEMALES)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	73	71.1	14.8	22.9	98.1	46.9	65.0	74.4	81.5	86.0
1999	82	70.9	12.5	43.4	96.7	55.9	59.8	72.4	79.7	85.1
2000	71	72.0	11.8	34.0	91.8	55.4	65.2	74.3	79.7	85.6
2001	68	68.7	10.8	45.2	87.5	52.8	61.8	71.5	76.2	81.8
2002	118	70.2	12.4	38.7	93.8	52.5	61.4	72.1	79.4	85.2
2003	112	68.2	13.1	28.8	90.4	49.6	62.1	69.7	78.1	82.9
2004	158	70.6	11.7	36.9	92.6	55.5	63.6	70.3	79.9	85.0
2005	130	69.6	12.8	32.0	94.6	53.8	61.2	69.6	79.6	85.3
2006	112	72.8	9.9	47.0	97.4	59.7	65.4	72.5	80.9	83.9
2007	141	70.0	13.0	22.2	96.5	54.8	64.1	70.7	79.3	84.2
2008	151	70.2	11.8	23.8	94.9	54.4	62.0	70.9	79.4	84.9
2009	160	71.1	11.8	36.0	95.9	54.3	64.5	72.1	78.6	85.3
2010	152	70.8	12.2	22.4	96.9	55.0	64.0	71.6	79.2	85.1
2011	161	70.1	11.1	30.4	97.8	58.0	62.9	70.6	76.9	85.0
2012	156	71.1	11.8	40.2	97.7	53.1	64.0	72.2	79.5	86.2
2013	132	72.0	11.7	41.6	95.2	55.5	63.7	72.6	81.6	86.0
2014	89	72.7	10.8	45.2	101	58.9	64.9	73.4	79.8	85.6
1998-2014	2066	70.7	12.0	22.2	101	54.9	63.1	71.7	79.5	85.1

Table 4

Age distribution by 5-year age group and gender for period 2007-2014

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
15-19	1	0.0	0.0	1	0.0	0.0			0.0
20-24	7	0.1	0.2	3	0.1	0.1	4	0.4	0.4
25-29	10	0.2	0.4	9	0.2	0.3	1	0.1	0.4
30-34	19	0.4	0.7	17	0.4	0.8	2	0.2	0.6
35-39	27	0.5	1.3	23	0.6	1.4	4	0.4	1.0
40-44	74	1.5	2.7	59	1.5	2.9	15	1.3	2.3
45-49	119	2.4	5.1	94	2.4	5.3	25	2.2	4.5
50-54	232	4.6	9.7	172	4.4	9.7	60	5.3	9.7
55-59	353	7.0	16.8	265	6.8	16.6	88	7.7	17.4
60-64	506	10.1	26.8	380	9.8	26.3	126	11.0	28.5
65-69	794	15.8	42.6	636	16.4	42.7	158	13.8	42.3
70-74	1022	20.3	63.0	791	20.4	63.1	231	20.2	62.5
75-79	802	16.0	78.9	637	16.4	79.5	165	14.4	77.0
80-84	627	12.5	91.4	487	12.5	92.0	140	12.3	89.2
85+	433	8.6	100.0	310	8.0	100.0	123	10.8	100.0
All ages	5026	100.0		3884	100.0		1142	100.0	

Included in the statistics are 50.8% multiple primaries in males and 46.3% in females.

Table 5

Age-specific incidence
for period 2007-2014

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.
0- 4			0.0	0.0
5- 9			0.0	0.0
10-14			0.0	0.0
15-19	1		0.1	0.0
20-24	3	4	0.3	0.4
25-29	9	1	0.7	0.1
30-34	17	2	1.4	0.2
35-39	23	4	1.8	0.3
40-44	59	15	3.6	1.0
45-49	94	25	5.9	1.6
50-54	172	60	13.3	4.7
55-59	265	88	25.0	7.8
60-64	380	126	38.7	11.9
65-69	636	158	66.1	15.1
70-74	791	231	86.9	22.1
75-79	636	165	115.5	23.1
80-84	487	140	139.4	25.0
85+	310	123	133.9	21.3
All ages	3883	1142		
Incidence				
Raw			21.5	6.1
WS			10.3	2.6
ES			15.6	3.8
BRD-S			20.7	4.9

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

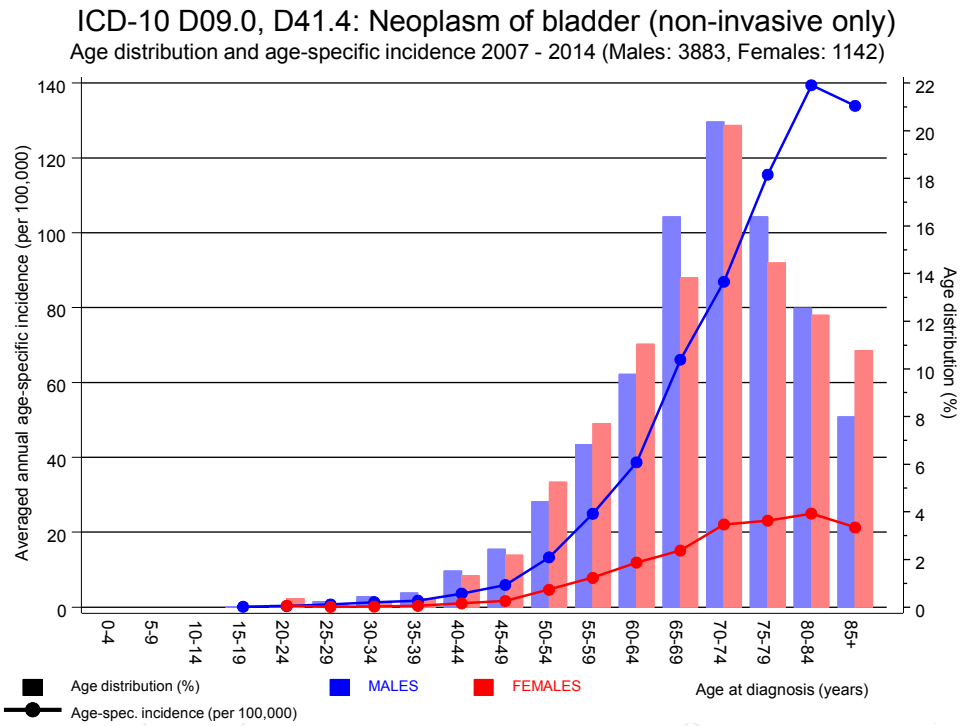


Figure 6. Age distribution and age-specific incidence

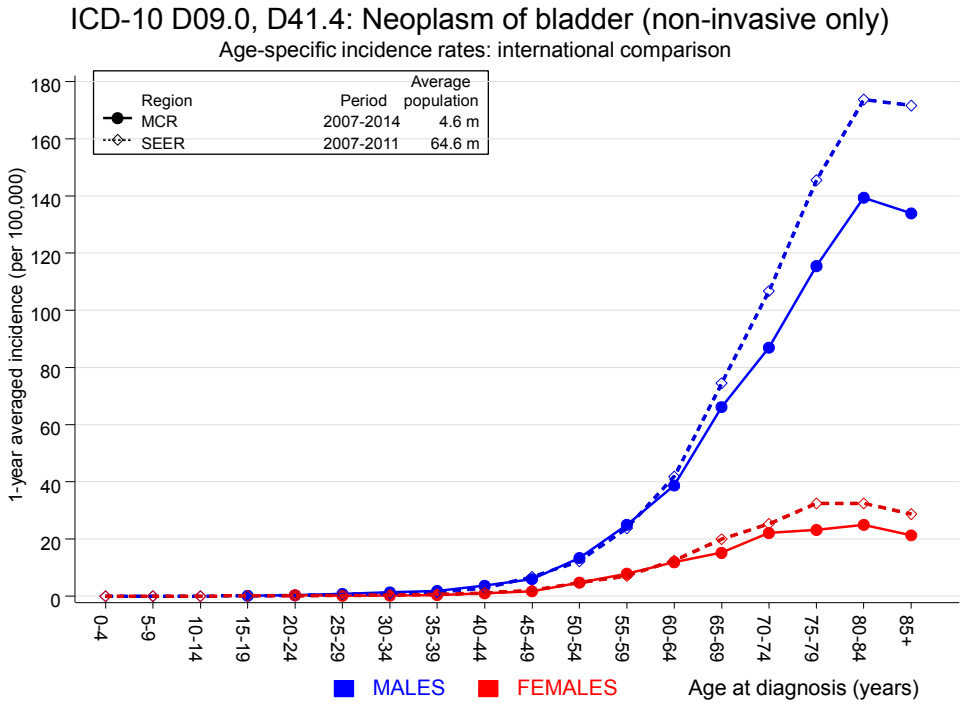


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

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

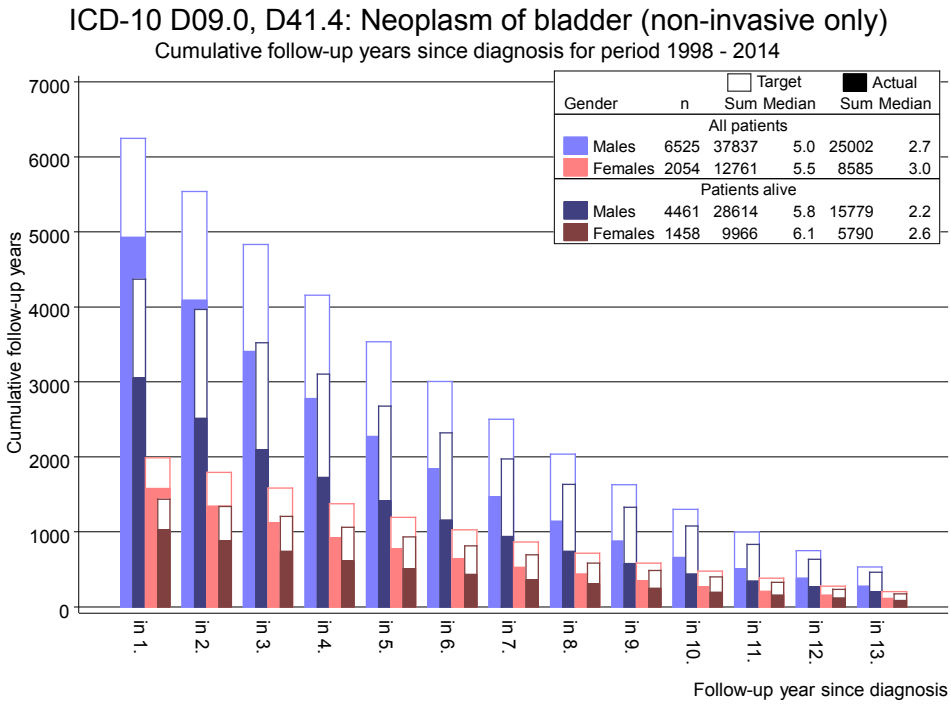


Figure 7. Cumulative follow-up years depending on time since diagnosis

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

Table 8a

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

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C00	Lip	2	0.6	3.2	0.4	11.5		0.6	
C03-C06	Oral cavity	8	3.4	2.3	1.0	4.6	#	1.8	
C09-C10	Oropharynx	7	4.0	1.7	0.7	3.6		1.2	14.3
C12-C13	Hypopharynx	5	2.2	2.3	0.7	5.3		1.1	
C15	Oesophagus	14	8.2	1.7	0.9	2.9		2.3	7.1
C16	Stomach	30	21.8	1.4	0.9	2.0		3.3	3.3
C17	Small intestine	5	2.4	2.1	0.7	4.8		1.0	
C18	Colon	82	51.4	1.6	1.3	2.0	#	12.3	9.8
C19-C20	Rectum	34	26.0	1.3	0.9	1.8		3.2	
C21	Anus/canal	3	1.0	3.0	0.6	8.8		0.8	
C22	Liver	30	13.3	2.3	1.5	3.2	#	6.7	13.3
C23-C24	Bile	9	5.1	1.8	0.8	3.4		1.6	44.4
C25	Pancreas	34	18.9	1.8	1.2	2.5	#	6.1	11.8
C32	Larynx	9	4.4	2.0	0.9	3.9		1.8	
C33-C34	Lung	181	56.9	3.2	2.7	3.7	#	49.9	9.4
C38,C45	Mesothelioma	5	3.2	1.5	0.5	3.6		0.7	
C40-C41	Bone	2	0.4	5.6	0.7	20.2		0.7	
C43	Malign. melanoma	40	19.7	2.0	1.5	2.8	#	8.2	
C46,C49	Soft tissue	3	2.7	1.1	0.2	3.2		0.1	
C50	Breast	5	1.3	3.9	1.3	9.1	#	1.5	
C60	Penis	2	1.2	1.7	0.2	6.2		0.3	100.0
C61	Prostate	528	143.6	3.7	3.4	4.0	#	154.6	5.3
C62	Testis	3	0.8	3.7	0.8	10.8		0.9	
C64	Kidney	51	16.3	3.1	2.3	4.1	#	13.9	17.6
C65	Renal pelvis	75	2.2	34.2	26.9	42.9	#	29.3	
C66	Ureter	46	1.3	36.3	26.6	48.5	#	18.0	
C67	Bladder	232	24.8	9.4	8.2	10.7	#	83.3	
C68	Urethra	16	0.4	40.6	23.2	66.0	#	6.3	
C70-C72	CNS cancer	13	6.1	2.1	1.1	3.6	#	2.8	15.4
C73	Thyroid	5	2.6	1.9	0.6	4.4		1.0	
C76-C79	CUP	13	8.9	1.5	0.8	2.5		1.6	
C81	Hodgkin lymphoma	3	0.9	3.2	0.7	9.4		0.8	33.3
C82-C85	NHL	37	20.5	1.8	1.3	2.5	#	6.7	8.1
C90	Mult. myeloma	9	6.6	1.4	0.6	2.6		1.0	33.3
C91-C96	Leukaemia	21	8.8	2.4	1.5	3.6	#	4.9	33.3
Other primaries		6	3.2	1.9	0.7	4.0		1.1	16.7
Not observed		0	3.5	0.0	0.0	1.0		-1.4	
All mult. primaries		1568	498.8	3.1	3.0	3.3	#	430.0	6.1

Patients	6468
Median age at second malignancy (years)	74.5
Person-years	24868
Mean observation time (years)	3.8
Median observation time (years)	2.7

The occurrence of second malignancy is statistically significant.

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

Table 8b

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

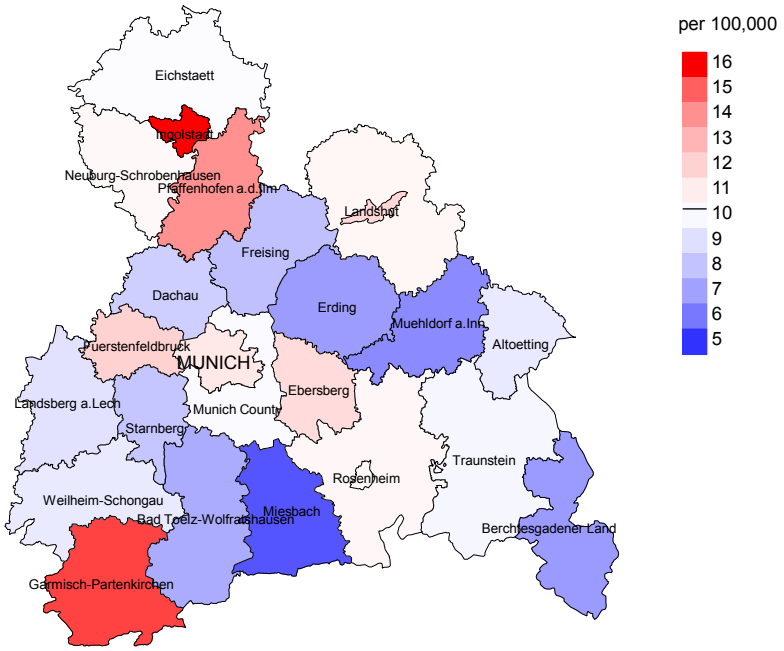
Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C15	Oesophagus	2	0.7	3.1	0.4	11.1		1.6	
C16	Stomach	9	4.6	2.0	0.9	3.8		5.2	11.1
C17	Small intestine	3	0.5	5.9	1.2	17.1	#	2.9	
C18	Colon	16	12.5	1.3	0.7	2.1		4.1	6.3
C19–C20	Rectum	9	5.0	1.8	0.8	3.4		4.6	
C22	Liver	5	1.4	3.5	1.1	8.3	#	4.2	20.0
C23–C24	Bile	3	1.8	1.6	0.3	4.8		1.4	66.7
C25	Pancreas	12	5.6	2.2	1.1	3.8	#	7.5	25.0
C33–C34	Lung	38	7.8	4.9	3.4	6.7	#	35.4	
C43	Malign. melanoma	6	3.8	1.6	0.6	3.5		2.6	
C50	Breast	55	31.2	1.8	1.3	2.3	#	28.0	3.6
C51	Vulva	2	1.3	1.6	0.2	5.8		0.9	
C53	Cervix uteri	2	1.3	1.6	0.2	5.6		0.8	100.0
C54	Corpus uteri	9	6.0	1.5	0.7	2.9		3.5	11.1
C56	Ovary	8	4.6	1.8	0.8	3.5		4.0	
C64	Kidney	9	2.9	3.2	1.4	6.0	#	7.2	11.1
C65	Renal pelvis	21	0.4	55.9	34.6	85.5	#	24.2	
C66	Ureter	20	0.2	103.9	63.5	160.5	#	23.2	
C67	Bladder	52	2.5	21.1	15.8	27.7	#	58.1	
C70–C72	CNS cancer	4	1.5	2.7	0.7	6.8		2.9	25.0
C73	Thyroid	2	1.5	1.3	0.2	4.8		0.6	
C76–C79	CUP	4	2.3	1.7	0.5	4.4		2.0	
C82–C85	NHL	10	4.5	2.2	1.1	4.1	#	6.4	30.0
C90	Mult. myeloma	4	1.5	2.7	0.7	7.0		3.0	
C91–C96	Leukaemia	3	2.0	1.5	0.3	4.5		1.2	33.3
Other primaries		5	1.6	3.2	1.0	7.5	#	4.0	40.0
Not observed		0	4.1	0.0	0.0	0.9	#	-4.8	
All mult. primaries		313	112.7	2.8	2.5	3.1	#	234.9	6.7

Patients	2034
Median age at second malignancy (years)	76.2
Person-years	8526
Mean observation time (years)	4.2
Median observation time (years)	3.0

The occurrence of second malignancy is statistically significant.

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

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



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

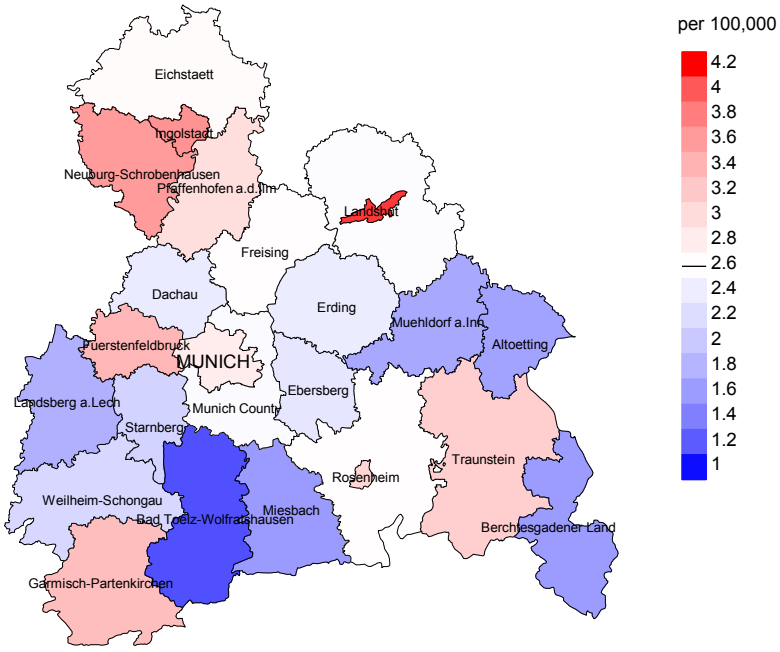
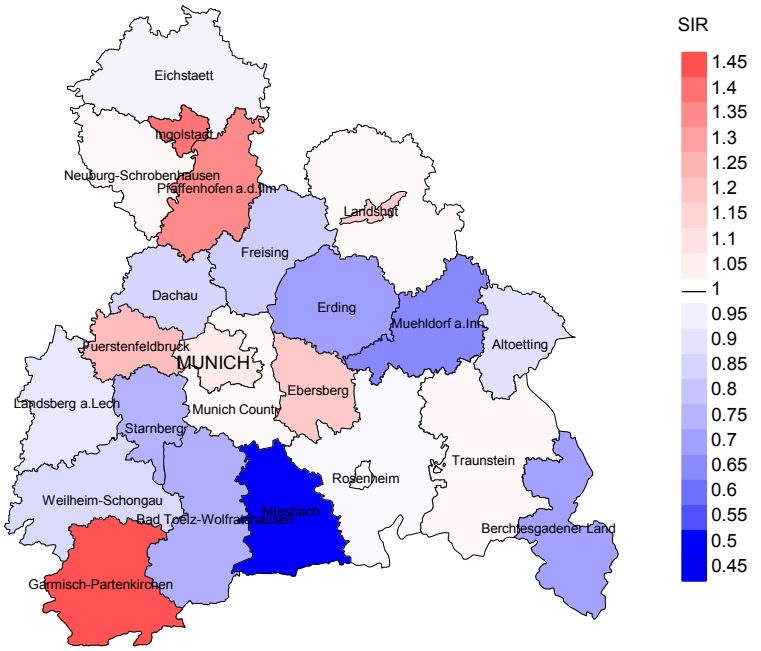


Figure 9a. Map of cancer incidence (world standard population) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 10.3/100,000 WS N=3,883, females 2.6/100,000 WS N=1,142).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,347 female residents (averaged) in the period from 2007 to 2014 a total of 26 women were identified with newly diagnosed bladder tumor. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 2.3/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.2 and 4.0/100,000.

Standardized incidence ratio (SIR) 2007 - 2014: Males



Standardized incidence ratio (SIR) 2007 - 2014: Females

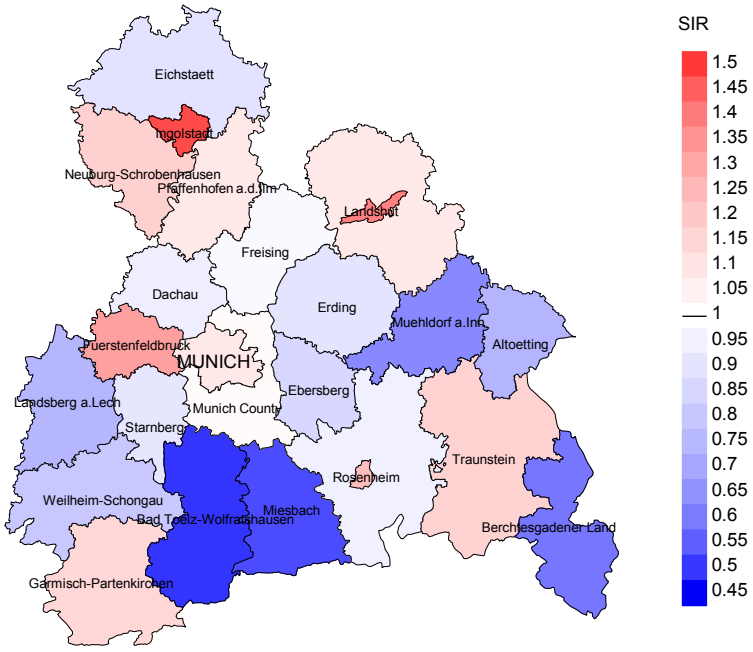


Figure 9b. Map of standardized incidence ratio (SIR) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=3,883, females N=1,142).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,924 female residents (averaged) in the period from 2007 to 2014 a total of 26 women were identified with newly diagnosed bladder tumor. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.85. Though, the value of this parameter may vary with an underlying probability of 99% between 0.48 and 1.39, and is therefore not statistically striking.

MORTALITY

Table 10a

Patient cohorts of incident cancers by year of diagnosis, follow-up status, and deaths among the annual cohorts

(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.64 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	283	97.9	183	64.7	92.9
1999	284	99.3	158	55.6	97.5
2000	284	97.5	167	58.8	94.0
2001	264	99.2	136	51.5	99.3
2002	445	98.2	220	49.4	95.5
2003	446	93.5	204	45.7	96.6
2004	556	94.4	244	43.9	98.4
2005	544	93.6	219	40.3	99.1
2006	506	87.0	169	33.4	97.0
2007	662	73.3	234	35.3	99.1
2008	613	60.0	159	25.9	98.7
2009	634	59.6	164	25.9	97.0
2010	657	57.4	154	23.4	98.7
2011	675	59.6	128	19.0	98.4
2012	679	66.7	103	15.2	95.1
2013	620	98.1	73	11.8	95.9
2014	486	97.5	21	4.3	85.7
1998-2014	8638	80.7	2736	31.7	97.1

Table 10b

Annual cohorts of incident cancers and deaths,
and cases deceased the same year of cancer diagnosis

(with respect to registry area expansion from 2.51 to 3.96 m as of 2002,
and from 3.96 to 4.64 m as of 2007, respectively)

Year of diagnosis/ death	Incident cases n	Deaths n	Deaths in same year n	Prop. deaths in same year %
1998	283	96	6	2.1
1999	284	102	8	2.8
2000	284	103	4	1.4
2001	264	124	7	2.7
2002	445	167	7	1.6
2003	446	184	7	1.6
2004	556	211	14	2.5
2005	544	211	17	3.1
2006	506	219	11	2.2
2007	662	264	12	1.8
2008	613	261	13	2.1
2009	634	280	18	2.8
2010	657	320	10	1.5
2011	675	374	27	4.0
2012	679	393	29	4.3
2013	620	389	22	3.5
2014	486	418	16	3.3
1998-2014	8638	4116	228	2.6

Table 10c

Annual cohorts of deaths, and proportion of cancer-related and non-cancer-related deaths

(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.64 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	96	39.6	60.4	59.3
1999	102	30.4	69.6	51.6
2000	103	41.7	58.3	50.5
2001	124	38.7	61.3	53.1
2002	167	46.1	53.9	60.2
2003	184	38.0	62.0	59.3
2004	211	44.5	55.5	60.2
2005	211	50.2	49.8	58.7
2006	219	52.5	47.5	64.2
2007	264	46.2	53.8	61.2
2008	261	46.4	53.6	55.8
2009	280	42.9	57.1	55.3
2010	320	40.9	59.1	54.1
2011	374	44.1	55.9	62.1
2012	393	46.1	53.9	60.5
2013	389	43.2	56.8	57.6
2014	418	42.3	57.7	58.8
1998-2014	4116	43.9	56.1	58.4

Table 11a

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	74	82.5	82.8	82.4	82.6
1999	64	78.1	79.2	76.5	78.1
2000	78	79.6	75.7	80.9	76.5
2001	89	80.4	79.6	81.4	79.6
2002	138	81.3	77.2	82.8	79.1
2003	138	79.4	76.7	81.2	77.8
2004	147	80.4	78.9	83.8	79.8
2005	147	81.4	79.1	83.4	80.6
2006	161	79.1	77.8	80.2	77.0
2007	191	80.7	78.6	81.6	80.0
2008	198	80.8	79.0	82.0	79.9
2009	213	81.1	80.6	81.3	81.4
2010	252	83.8	81.2	84.8	82.4
2011	284	82.1	81.0	83.0	81.4
2012	312	81.9	80.3	83.3	80.4
2013	310	83.5	79.9	85.0	81.1
2014	330	82.5	81.9	82.6	81.4
1998-2014	3126	81.4	79.5	82.7	80.3

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

Table 11b

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	22	86.6	83.6	87.0	82.7
1999	38	82.4	77.9	83.2	79.2
2000	25	87.6	86.2	89.3	86.2
2001	35	83.4	82.0	84.5	82.0
2002	29	87.4	82.5	88.8	86.6
2003	46	86.2	80.3	89.1	82.6
2004	64	85.2	81.8	85.9	84.4
2005	64	82.3	79.0	84.1	79.8
2006	58	83.3	80.4	83.9	80.8
2007	73	83.1	81.6	86.7	81.6
2008	63	85.1	82.6	86.6	82.6
2009	67	85.3	79.4	87.0	82.7
2010	68	84.9	80.0	87.4	80.0
2011	90	84.0	80.8	85.7	81.2
2012	81	84.7	78.6	88.9	79.5
2013	79	84.8	79.9	88.1	81.3
2014	88	87.8	83.3	88.3	84.0
1998-2014	990	84.8	80.9	86.8	82.1

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

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

Table 12a

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

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	31	2.8	0.15	1.5	0.13	2.7	0.15	4.1	0.18
1999	21	1.9	0.10	1.0	0.09	1.8	0.11	2.6	0.12
2000	35	3.1	0.16	1.7	0.15	2.8	0.17	4.1	0.19
2001	34	2.9	0.17	1.6	0.16	2.7	0.18	3.9	0.19
2002	68	3.6	0.21	1.8	0.19	3.1	0.21	4.5	0.23
2003	56	3.0	0.17	1.5	0.15	2.5	0.17	3.6	0.19
2004	71	3.8	0.18	1.7	0.15	3.0	0.17	4.7	0.21
2005	75	4.0	0.18	1.8	0.15	3.0	0.18	4.6	0.20
2006	89	4.6	0.23	1.9	0.18	3.4	0.21	5.4	0.26
2007	88	4.0	0.17	1.7	0.15	3.0	0.17	4.4	0.18
2008	96	4.3	0.21	1.7	0.17	3.0	0.20	4.8	0.23
2009	91	4.1	0.19	1.6	0.15	2.8	0.18	4.3	0.21
2010	101	4.5	0.20	1.7	0.16	3.1	0.19	4.5	0.21
2011	126	5.5	0.25	2.0	0.20	3.6	0.23	5.3	0.25
2012	153	6.7	0.29	2.4	0.23	4.3	0.26	6.5	0.30
2013	131	5.7	0.27	2.1	0.21	3.7	0.24	5.6	0.28
2014	149	6.5	0.38	2.4	0.29	4.3	0.35	6.4	0.39
1998-2014	1415	4.4	0.22	1.9	0.18	3.3	0.21	4.9	0.23

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	7	0.6	0.10	0.2	0.06	0.3	0.07	0.4	0.08
1999	10	0.8	0.12	0.3	0.10	0.5	0.11	0.6	0.11
2000	8	0.7	0.11	0.1	0.05	0.3	0.07	0.4	0.08
2001	14	1.2	0.21	0.3	0.12	0.6	0.14	0.8	0.16
2002	9	0.5	0.08	0.1	0.04	0.2	0.05	0.3	0.06
2003	14	0.7	0.13	0.2	0.08	0.4	0.09	0.5	0.10
2004	23	1.2	0.15	0.3	0.10	0.6	0.11	0.8	0.12
2005	31	1.6	0.24	0.5	0.18	0.8	0.20	1.2	0.22
2006	26	1.3	0.23	0.4	0.17	0.6	0.19	0.9	0.20
2007	34	1.5	0.24	0.4	0.15	0.7	0.17	1.0	0.20
2008	25	1.1	0.17	0.2	0.08	0.4	0.10	0.7	0.14
2009	29	1.2	0.18	0.3	0.11	0.6	0.13	0.9	0.16
2010	30	1.3	0.20	0.3	0.12	0.6	0.14	0.9	0.17
2011	39	1.7	0.24	0.5	0.15	0.8	0.17	1.1	0.20
2012	28	1.2	0.18	0.4	0.13	0.6	0.15	0.9	0.17
2013	37	1.6	0.28	0.4	0.20	0.7	0.22	1.0	0.24
2014	28	1.2	0.31	0.3	0.19	0.5	0.21	0.7	0.24
1998-2014	392	1.2	0.19	0.3	0.12	0.6	0.14	0.8	0.16

Statistical Notes

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

1. **All multiple primaries included**

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

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

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

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

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

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

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

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

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

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

Shortcuts

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

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