Munich Cancer Registry

- Survival
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ICD-10 C64: Kidney cancer

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	10,012
Diseases	10,221
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/bC64__E-ICD-10-C64-Kidney-cancer-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
C64	Malignant neoplasm of kidney, except renal pelvis

INCIDENCE

Table 1

All patients with invasive cancer by year of diagnosis, proportions of DCO, multiple primaries, deaths, and active follow-up (incl. DCO)

Year of diagnosis	Cases n	DCO cases n	Prop. DCO %	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %
1998	394	36	9.1	30.5	58.6	97.2
1999	390	29	7.4	29.7	59.7	96.4
2000	361	35	9.7	31.0	59.0	96.7
2001	352	43	12.2	29.0	58.8	97.4
2002	607	89	14.7	33.8	64.3	97.5 #
2003	618	68	11.0	30.4	57.4	96.3
2004	624	74	11.9	34.6	50.3	96.6
2005	654	38	5.8	34.9	44.6	95.4
2006	638	47	7.4	33.5	46.4	91.7
2007	744	72	9.7	31.5	44.9	76.6 #
2008	761	64	8.4	31.8	39.6	63.1
2009	777	72	9.3	34.7	39.1	63.2
2010	757	62	8.2	30.4	33.0	58.4
2011	686	45	6.6	27.4	34.4	60.6
2012	692	52	7.5	29.8	30.8	61.1
2013	599	49	8.2	28.9	22.0	98.5
2014	567	53	9.3	23.5	15.0	98.4 ##
1998-2014	10221	928	9.1	31.1	42.9	82.4

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 with invasive cancer
by year of diagnosis and gender
(incl. DCO)

Year of diagnosis	All n	Males n	Females n	Prop. males %
1998	394	244	150	61.9
1999	390	239	151	61.3
2000	361	238	123	65.9
2001	352	211	141	59.9
2002	607	363	244	59.8
2003	618	386	232	62.5
2004	624	387	237	62.0
2005	654	417	237	63.8
2006	638	406	232	63.6
2007	744	478	266	64.2
2008	761	491	270	64.5
2009	777	482	295	62.0
2010	757	483	274	63.8
2011	686	437	249	63.7
2012	692	458	234	66.2
2013	599	386	213	64.4
2014	567	361	206	63.7
1998-2014	10221	6467	3754	63.3

Table 2

Incidence measures by year of diagnosis including DCO cases
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002,
and from 3.96 to 4.64 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	244	150	22.0	12.8	14.2	6.2	19.9	8.8	23.9	11.0
1999	239	151	21.4	12.7	13.2	6.6	19.0	9.2	23.4	11.1
2000	238	123	20.9	10.2	13.3	4.8	18.7	7.0	22.5	8.8
2001	211	141	18.2	11.6	11.0	5.4	15.8	8.0	19.6	9.9
2002	363	244	19.5	12.5	11.4	5.8	16.6	8.4	20.7	10.6
2003	386	232	20.6	11.8	12.4	5.4	17.3	7.7	21.0	9.7
2004	387	237	20.6	12.0	12.2	5.5	17.1	7.9	20.9	9.9
2005	417	237	22.0	11.9	12.6	5.6	18.0	7.9	21.6	10.1
2006	406	232	21.2	11.5	12.2	5.7	17.0	7.8	20.6	9.5
2007	478	266	21.6	11.5	12.2	5.3	17.2	7.3	21.1	9.3
2008	491	270	22.1	11.6	12.3	5.6	17.4	7.9	21.1	9.8
2009	482	295	21.6	12.7	11.9	5.9	16.8	8.3	20.8	10.4
2010	483	274	21.4	11.7	11.5	4.7	16.3	7.0	20.0	9.0
2011	437	249	19.1	10.6	10.4	5.3	14.6	7.0	17.8	8.6
2012	458	234	20.0	9.9	10.7	4.1	15.3	6.1	18.8	8.0
2013	386	213	16.9	9.0	9.2	4.3	13.0	5.9	15.9	7.3
2014	361	206	15.8	8.7	8.4	3.9	12.1	5.7	14.8	7.1
1998-2014	6467	3754	20.2	11.2	11.5	5.2	16.2	7.4	19.8	9.3

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)
(incl. DCO)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	394	65.1	13.7	2.8	99.7	49.4	58.7	65.8	74.6	79.5
1999	390	65.2	13.5	1.1	94.3	49.6	57.6	65.4	74.9	81.8
2000	361	65.5	13.2	0.3	93.5	48.8	57.9	66.2	74.9	80.8
2001	352	66.5	12.4	1.9	96.4	51.8	59.0	66.3	75.6	80.6
2002	607	67.6	13.2	0.1	96.2	50.0	60.7	68.9	76.8	82.3
2003	618	66.9	13.6	0.4	96.2	50.6	60.3	67.8	75.8	82.7
2004	624	66.6	13.8	0.0	94.1	49.0	60.3	67.7	76.1	81.8
2005	654	66.6	12.9	0.7	95.1	51.3	59.7	67.7	75.3	81.3
2006	638	66.3	14.3	0.2	95.5	48.4	59.6	67.9	75.4	81.7
2007	744	67.1	14.5	1.2	99.1	48.3	60.5	69.0	76.3	82.7
2008	761	66.7	13.9	0.2	98.1	49.7	59.2	68.2	76.2	82.8
2009	777	67.3	14.5	0.5	96.9	49.9	59.6	69.7	77.1	82.7
2010	757	67.9	13.5	5.4	100	48.5	59.6	70.1	77.1	83.6
2011	686	67.2	15.2	0.5	96.9	49.9	60.5	69.7	76.7	83.6
2012	692	67.9	13.5	1.4	93.1	50.7	60.3	69.9	77.5	83.0
2013	599	67.1	14.5	0.3	97.3	49.7	59.2	69.4	77.0	82.5
2014	567	67.6	13.2	1.2	97.0	50.8	59.6	69.4	76.3	82.8
1998-2014	10221	66.9	13.8	0.0	100	49.7	59.6	68.5	76.3	82.4

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	244	63.2	13.4	5.0	91.9	46.7	56.4	64.3	72.1	78.1
1999	239	64.3	12.8	2.3	88.4	49.7	57.5	64.5	72.2	80.3
2000	238	63.6	13.4	0.3	93.5	47.6	56.2	64.9	72.0	78.5
2001	211	64.9	11.1	1.9	89.9	51.8	58.6	64.3	72.9	78.7
2002	363	65.9	13.0	0.1	96.2	47.2	58.5	67.6	74.7	80.4
2003	386	64.7	13.3	0.4	96.2	48.0	59.2	65.3	73.1	78.7
2004	387	64.8	13.9	0.0	93.6	48.6	58.0	66.3	73.6	79.9
2005	417	65.1	11.5	0.7	92.4	51.2	58.8	65.8	73.0	78.1
2006	406	64.9	13.0	0.8	95.4	48.4	59.1	66.6	73.4	78.5
2007	478	65.5	13.2	2.6	93.1	48.3	58.6	67.5	74.1	80.4
2008	491	65.6	13.4	0.2	98.1	49.1	57.9	67.5	74.4	81.2
2009	482	66.0	14.1	0.5	96.1	49.6	58.6	68.6	75.6	81.4
2010	483	65.5	12.9	5.4	93.5	47.2	56.7	68.3	74.6	80.8
2011	437	66.6	13.1	1.5	96.9	50.0	59.9	68.5	75.0	82.5
2012	458	66.2	13.9	1.4	93.1	48.4	57.5	69.0	75.8	82.4
2013	386	66.1	13.6	0.9	94.1	49.0	58.5	67.3	75.9	81.8
2014	361	66.4	13.2	1.2	97.0	48.6	58.6	67.8	75.3	81.0
1998-2014	6467	65.4	13.2	0.0	98.1	48.8	58.3	66.9	74.3	80.4

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	150	68.1	13.7	2.8	99.7	55.6	61.3	69.8	76.8	83.7
1999	151	66.6	14.4	1.1	94.3	49.4	57.7	67.1	77.6	83.9
2000	123	69.1	12.2	37.2	91.4	54.5	60.6	70.5	77.9	85.7
2001	141	68.8	13.8	30.6	96.4	52.1	61.3	70.4	78.8	85.1
2002	244	70.0	13.1	2.4	93.6	54.7	63.7	72.3	78.9	83.8
2003	232	70.6	13.2	2.5	95.2	54.3	63.9	72.0	80.2	85.3
2004	237	69.4	13.4	18.5	94.1	52.5	63.5	70.6	78.5	84.7
2005	237	69.2	14.8	4.2	95.1	51.8	62.4	72.4	79.7	83.7
2006	232	68.6	16.2	0.2	95.5	49.6	61.1	71.7	79.2	85.7
2007	266	70.1	16.3	1.2	99.1	49.3	66.0	72.3	79.8	85.8
2008	270	68.7	14.6	0.6	96.1	51.7	61.6	69.5	78.8	84.1
2009	295	69.3	15.1	1.7	96.9	50.7	63.0	71.4	79.7	84.5
2010	274	72.1	13.6	5.4	100	54.3	65.9	73.0	81.1	88.0
2011	249	68.4	18.2	0.5	96.5	47.2	63.4	72.9	79.3	85.3
2012	234	71.3	12.0	9.7	92.4	56.2	65.7	73.0	80.0	83.5
2013	213	68.9	15.9	0.3	97.3	51.0	61.3	71.9	78.9	84.5
2014	206	69.6	12.9	25.7	94.3	52.1	61.4	71.0	79.2	85.8
1998-2014	3754	69.5	14.5	0.2	100	52.1	62.6	71.7	79.1	85.0

Table 4

Age distribution by 5-year age group and gender for period 2007-2014 (incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	41	0.7	0.7	19	0.5	0.5	22	1.1	1.1
5-9	15	0.3	1.0	8	0.2	0.8	7	0.3	1.4
10-14	3	0.1	1.1	2	0.1	0.8	1	0.0	1.5
15-19	2	0.0	1.1	1	0.0	0.8	1	0.0	1.5
20-24	6	0.1	1.2	3	0.1	0.9	3	0.1	1.7
25-29	12	0.2	1.4	7	0.2	1.1	5	0.2	1.9
30-34	33	0.6	2.0	20	0.6	1.7	13	0.6	2.6
35-39	85	1.5	3.5	61	1.7	3.4	24	1.2	3.8
40-44	137	2.5	6.0	96	2.7	6.1	41	2.0	5.8
45-49	238	4.3	10.2	195	5.5	11.5	43	2.1	8.0
50-54	360	6.4	16.7	269	7.5	19.0	91	4.5	12.5
55-59	484	8.7	25.4	352	9.8	28.9	132	6.6	19.1
60-64	588	10.5	35.9	414	11.6	40.5	174	8.7	27.8
65-69	903	16.2	52.1	586	16.4	56.9	317	15.8	43.5
70-74	945	16.9	69.0	644	18.0	74.9	301	15.0	58.5
75-79	816	14.6	83.6	452	12.6	87.5	364	18.1	76.7
80-84	546	9.8	93.4	295	8.2	95.7	251	12.5	89.2
85+	369	6.6	100.0	152	4.3	100.0	217	10.8	100.0
All ages	5583	100.0		3576	100.0		2007	100.0	

Included in the statistics are 39.7% multiple primaries in males and 32.1% in females.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 2007-2014

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=232 %	Females DCO rate n=235 %	Males Prop.all cancers n=91183 %	Females Prop.all cancers n=89596 %
0- 4	17	22	1.9	2.7			9.6	15.9
5- 9	8	7	0.9	0.8			8.3	9.0
10-14	2	1	0.2	0.1			2.0	1.1
15-19	1	1	0.1	0.1			0.5	0.6
20-24	3	3	0.3	0.3			0.8	1.0
25-29	7	5	0.6	0.4			1.3	0.8
30-34	20	13	1.6	1.0			2.6	1.1
35-39	61	24	4.7	1.9			5.3	1.2
40-44	94	41	5.8	2.7	1.1		5.1	1.1
45-49	190	43	12.0	2.8	0.5	2.3	5.9	0.8
50-54	262	91	20.2	7.1	2.7		5.4	1.3
55-59	342	131	32.2	11.7	1.8	3.1	4.7	1.8
60-64	409	172	41.6	16.2	2.0		3.8	1.9
65-69	576	314	59.9	30.1	3.6	2.2	3.7	2.7
70-74	640	299	70.3	28.6	4.1	5.7	3.8	2.5
75-79	450	360	81.7	50.5	8.9	9.4	3.6	3.6
80-84	292	249	83.6	44.4	19.9	20.9	3.4	2.8
85+	152	216	65.7	37.4	42.1	55.6	2.5	2.1
All ages	3526	1992			6.6	11.8	3.9	2.2
Incidence								
Raw			19.5	10.6				
WS			10.6	4.8				
ES			15.0	6.8				
BRD-S			18.5	8.6				

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).

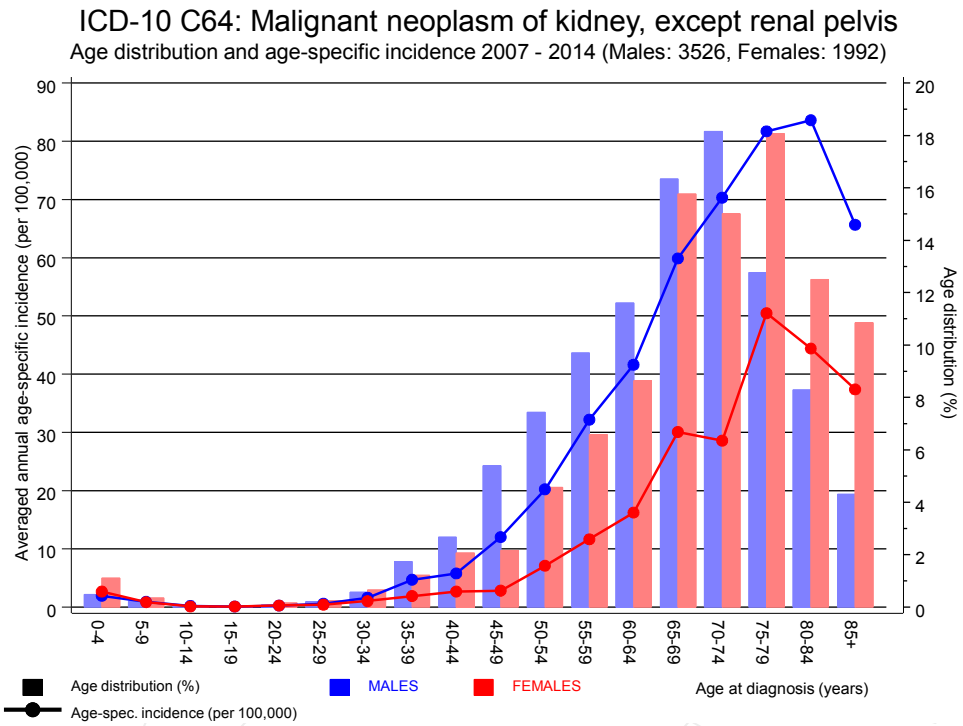


Figure 6. Age distribution and age-specific incidence

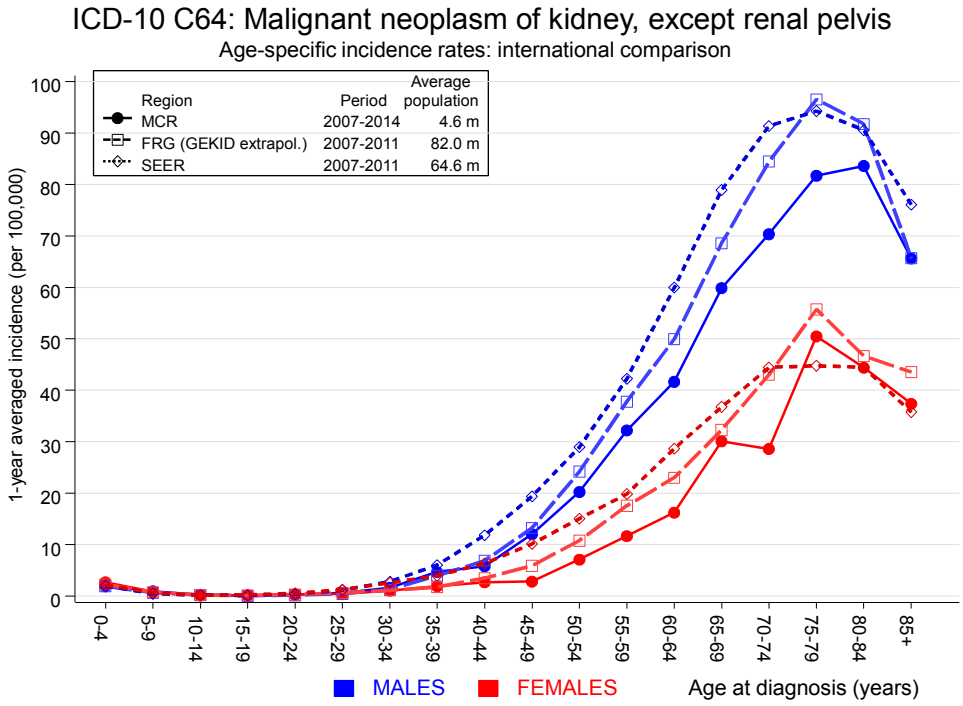


Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

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, 2014. http://www.gekid.de. Last access: 02/11/2015

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.

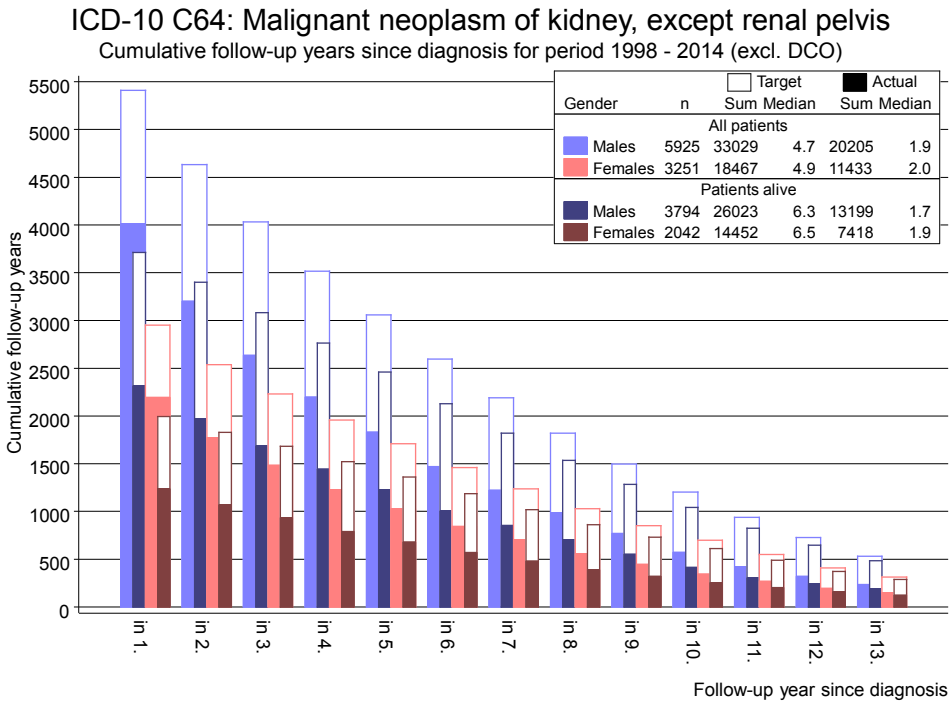


Figure 7. Cumulative follow-up years depending on time since diagnosis

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 %
C03-C06	Oral cavity	5	2.7	1.8	0.6	4.2		1.1	
C09-C10	Oropharynx	13	3.4	3.8	2.0	6.5	#	4.8	
C12-C13	Hypopharynx	4	1.9	2.1	0.6	5.4		1.1	
C15	Oesophagus	12	6.0	2.0	1.0	3.5	#	3.1	16.7
C16	Stomach	23	13.3	1.7	1.1	2.6	#	4.9	17.4
C17	Small intestine	7	1.7	4.2	1.7	8.7	#	2.7	
C18	Colon	81	32.4	2.5	2.0	3.1	#	24.5	7.4
C19-C20	Rectum	33	18.1	1.8	1.3	2.6	#	7.5	
C21	Anus/canal	2	0.7	2.9	0.4	10.5		0.7	50.0
C22	Liver	26	9.1	2.8	1.9	4.2	#	8.5	11.5
C23-C24	Bile	5	3.2	1.6	0.5	3.7		0.9	20.0
C25	Pancreas	28	11.9	2.3	1.6	3.4	#	8.1	25.0
C32	Larynx	9	3.4	2.6	1.2	5.0	#	2.8	
C33-C34	Lung	113	39.2	2.9	2.4	3.5	#	37.3	8.0
C38,C45	Mesothelioma	2	2.2	0.9	0.1	3.3		-0.1	50.0
C40-C41	Bone	2	0.3	7.7	0.9	28.0		0.9	
C43	Malign. melanoma	43	13.8	3.1	2.3	4.2	#	14.8	2.3
C46,C49	Soft tissue	10	1.7	5.7	2.8	10.5	#	4.2	
C48	Peritoneal	3	0.2	12.4	2.6	36.3	#	1.4	33.3
C61	Prostate	287	98.4	2.9	2.6	3.3	#	95.3	2.8
C62	Testis	6	0.8	7.2	2.6	15.6	#	2.6	
C64	Kidney	148	11.7	12.7	10.7	14.9	#	68.8	1.4
C65	Renal pelvis	11	1.4	7.9	4.0	14.2	#	4.9	
C66	Ureter	7	0.8	8.9	3.6	18.3	#	3.1	
C67	Bladder	42	14.6	2.9	2.1	3.9	#	13.8	2.4
C70-C72	CNS cancer	8	4.4	1.8	0.8	3.6		1.8	
C73	Thyroid	11	2.1	5.2	2.6	9.2	#	4.5	9.1
C76-C79	CUP	7	5.5	1.3	0.5	2.6		0.8	14.3
C81	Hodgkin lymphoma	2	0.7	2.8	0.3	10.1		0.6	
C82-C85	NHL	52	13.2	3.9	2.9	5.2	#	19.6	5.8
C90	Mult. myeloma	10	4.2	2.4	1.1	4.4	#	2.9	
C91-C96	Leukaemia	14	5.4	2.6	1.4	4.4	#	4.3	14.3
Other primaries		10	4.7	2.1	1.0	3.9	#	2.7	10.0
Not observed		0	1.5	0.0	0.0	2.5		-0.8	
All mult. primaries		1036	334.8	3.1	2.9	3.3	#	354.1	5.3

Patients	5892
Median age at second malignancy (years)	70.8
Person-years	19804
Mean observation time (years)	3.4
Median observation time (years)	1.8

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

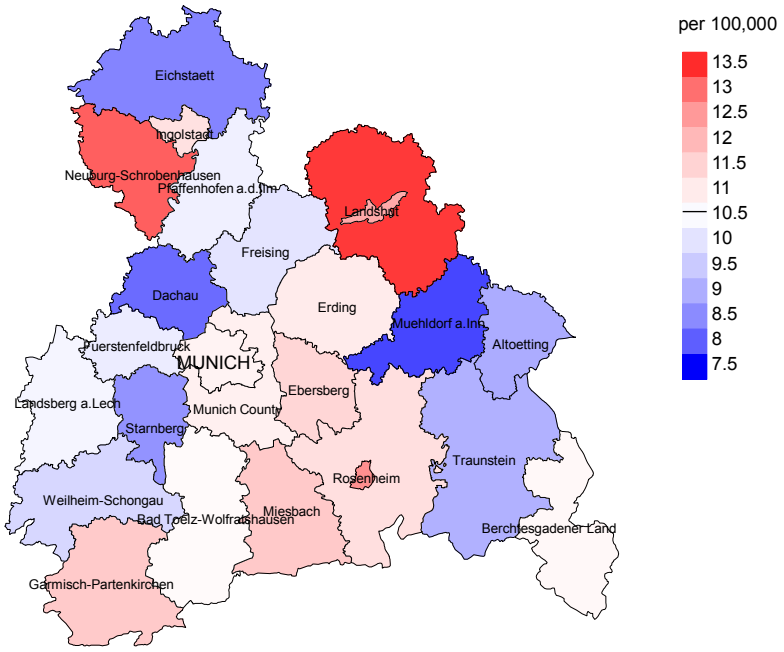
Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C15	Oesophagus	2	0.8	2.5	0.3	9.1		1.1	
C16	Stomach	11	5.2	2.1	1.1	3.8	#	5.2	
C17	Small intestine	2	0.6	3.1	0.4	11.4		1.2	
C18	Colon	31	14.4	2.1	1.5	3.0	#	14.7	3.2
C19–C20	Rectum	10	6.1	1.6	0.8	3.0		3.5	10.0
C22	Liver	6	1.7	3.6	1.3	7.8	#	3.9	16.7
C23–C24	Bile	9	2.1	4.3	2.0	8.1	#	6.1	22.2
C25	Pancreas	15	6.4	2.3	1.3	3.9	#	7.6	26.7
C33–C34	Lung	32	9.8	3.3	2.2	4.6	#	19.8	12.5
C43	Malign. melanoma	10	4.8	2.1	1.0	3.9	#	4.7	
C46,C49	Soft tissue	2	0.8	2.6	0.3	9.3		1.1	
C50	Breast	83	39.6	2.1	1.7	2.6	#	38.6	4.8
C51	Vulva	3	1.4	2.1	0.4	6.1		1.4	33.3
C53	Cervix uteri	4	1.6	2.4	0.7	6.3		2.1	
C54	Corpus uteri	16	7.7	2.1	1.2	3.4	#	7.4	6.3
C56	Ovary	8	5.7	1.4	0.6	2.8		2.0	12.5
C64	Kidney	60	3.6	16.6	12.7	21.4	#	50.2	1.7
C65	Renal pelvis	4	0.5	8.7	2.4	22.4	#	3.2	
C66	Ureter	4	0.2	16.8	4.6	43.1	#	3.3	25.0
C67	Bladder	15	2.7	5.5	3.1	9.1	#	10.9	6.7
C70–C72	CNS cancer	4	1.9	2.1	0.6	5.3		1.9	25.0
C73	Thyroid	19	2.1	9.2	5.5	14.4	#	15.1	5.3
C76–C79	CUP	7	2.6	2.7	1.1	5.6	#	3.9	14.3
C82–C85	NHL	19	5.5	3.4	2.1	5.4	#	12.0	10.5
C90	Mult. myeloma	4	1.8	2.2	0.6	5.7		2.0	
C91–C96	Leukaemia	7	2.3	3.0	1.2	6.3	#	4.2	14.3
Other primaries		5	2.2	2.3	0.8	5.4		2.5	20.0
Not observed		0	3.8	0.0	0.0	1.0	#	-3.4	
All mult. primaries		392	138.0	2.8	2.6	3.1	#	226.2	7.7

Patients	3285
Median age at second malignancy (years)	73.1
Person-years	11233
Mean observation time (years)	3.4
Median observation time (years)	1.8

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

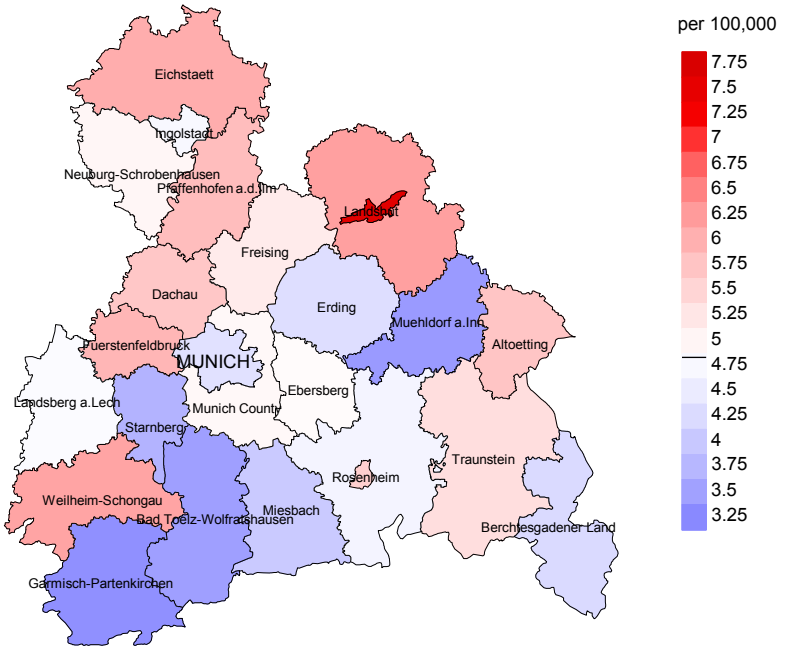
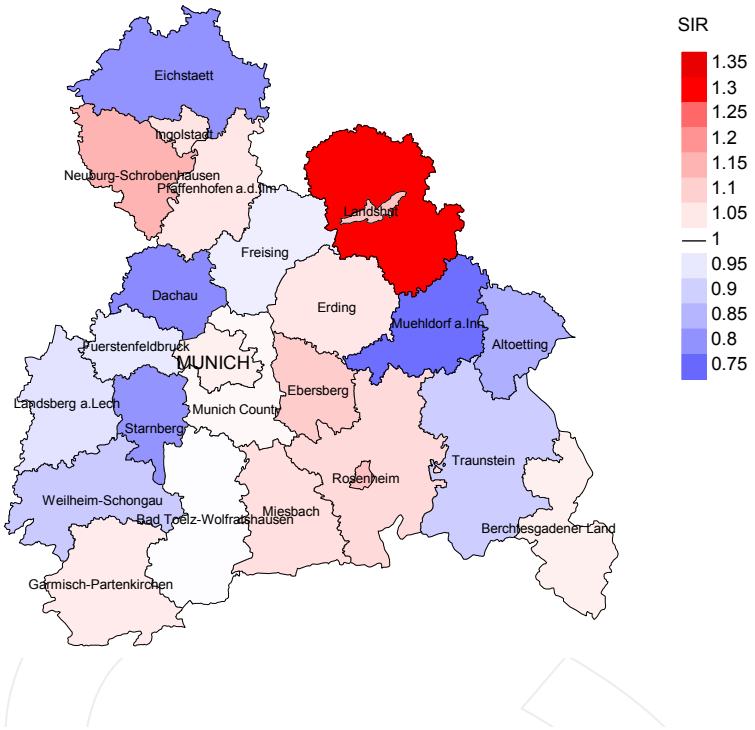


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 10.6/100,000 WS N=3,526, females 4.8/100,000 WS N=1,992).

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 61 women were identified with newly diagnosed kidney cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 4.9/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 3.3 and 7.0/100,000.

Standardized incidence ratio (SIR) 2007 - 2014: Males



Standardized incidence ratio (SIR) 2007 - 2014: Females

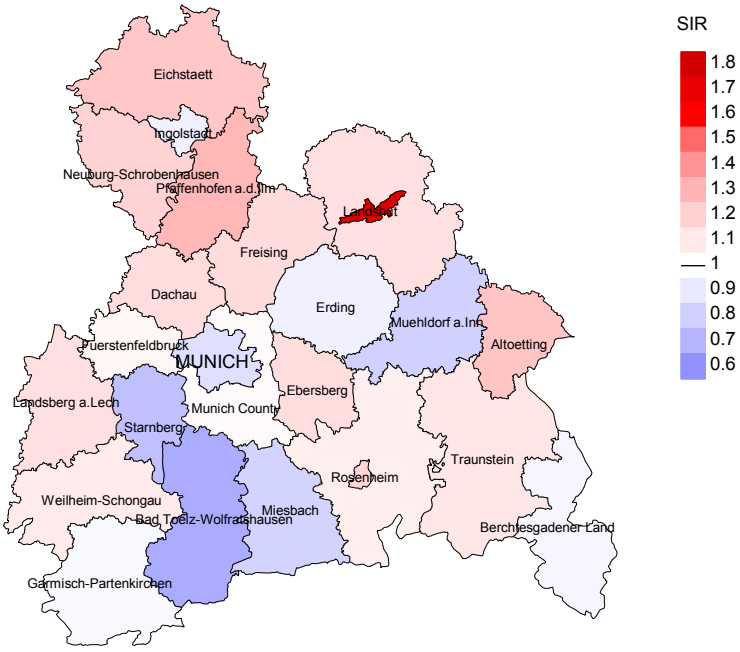


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=3,526, females N=1,992).

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 61 women were identified with newly diagnosed kidney cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.15. Though, the value of this parameter may vary with an underlying probability of 99% between 0.80 and 1.58, 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 4.64 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	394	97.2	9.1	231	58.6	93.5
1999	390	96.4	7.4	233	59.7	94.4
2000	361	96.7	9.7	213	59.0	96.2
2001	352	97.4	12.2	207	58.8	98.6
2002	607	97.5	14.7	390	64.3	96.7
2003	618	96.3	11.0	355	57.4	98.3
2004	624	96.6	11.9	314	50.3	97.1
2005	654	95.4	5.8	292	44.6	98.3
2006	638	91.7	7.4	296	46.4	98.0
2007	744	76.6	9.7	334	44.9	98.8
2008	761	63.1	8.4	301	39.6	99.7
2009	777	63.2	9.3	304	39.1	98.7
2010	757	58.4	8.2	250	33.0	98.8
2011	686	60.6	6.6	236	34.4	97.9
2012	692	61.1	7.5	213	30.8	96.7
2013	599	98.5	8.2	132	22.0	98.5
2014	567	98.4	9.3	85	15.0	96.5
1998-2014	10221	82.4	9.1	4386	42.9	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 4.64 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	394	213	93.9	58	14.7
1999	390	212	95.3	63	16.2
2000	361	207	95.2	54	15.0
2001	352	219	95.0	57	16.2
2002	607	322	96.9	125	20.6
2003	618	328	97.0	114	18.4
2004	624	342	96.5	110	17.6
2005	654	309	95.1	75	11.5
2006	638	345	97.7	91	14.3
2007	744	379	98.2	114	15.3
2008	761	408	99.0	108	14.2
2009	777	426	99.1	129	16.6
2010	757	455	98.5	119	15.7
2011	686	415	98.3	104	15.2
2012	692	477	98.3	117	16.9
2013	599	451	98.9	92	15.4
2014	567	397	99.0	78	13.8
1998-2014	10221	5905	97.5	1608	15.7

Table 10c

Annual cohorts of deaths, proportion of cancer-related and non-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 4.64 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	213	64.8	35.2	79.5
1999	212	71.7	28.3	84.7
2000	207	71.5	28.5	81.7
2001	219	73.1	26.9	85.6
2002	322	70.2	29.8	85.6
2003	328	73.5	26.5	86.2
2004	342	69.0	31.0	81.8
2005	309	72.2	27.8	82.3
2006	345	69.9	30.1	77.2
2007	379	71.8	28.2	79.6
2008	408	69.6	30.4	80.9
2009	426	72.1	27.9	80.6
2010	455	66.6	33.4	76.6
2011	415	63.6	36.4	78.7
2012	477	60.6	39.4	71.2
2013	451	62.3	37.7	73.8
2014	397	59.2	40.8	68.4
1998-2014	5905	67.7	32.3	78.8

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	142	71.1	69.4	76.8	70.1
1999	138	73.5	71.4	81.4	72.4
2000	124	72.4	68.7	79.5	71.5
2001	147	69.7	67.7	74.9	69.4
2002	188	73.8	73.2	74.6	73.8
2003	196	73.7	71.3	77.8	73.0
2004	203	73.7	72.4	77.2	73.6
2005	186	73.6	71.8	80.3	72.2
2006	220	73.1	71.3	77.0	72.3
2007	230	74.2	72.4	79.8	73.1
2008	265	74.5	72.7	78.1	73.9
2009	268	74.6	72.7	79.9	72.9
2010	276	75.4	74.1	78.3	74.4
2011	269	75.8	72.5	80.7	74.4
2012	275	77.0	74.8	80.7	75.5
2013	276	77.3	74.3	81.3	75.6
2014	252	78.7	75.3	82.3	76.7
1998-2014	3655	74.7	72.8	79.3	73.6

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	71	80.8	77.7	82.3	81.1
1999	74	77.8	76.5	84.4	78.3
2000	83	76.5	76.5	76.9	77.8
2001	72	79.0	77.8	82.3	78.0
2002	134	78.1	75.7	82.5	76.9
2003	132	78.3	76.9	80.3	77.9
2004	139	81.1	79.9	83.1	80.8
2005	123	78.7	75.3	82.6	76.2
2006	125	79.4	78.7	80.5	78.6
2007	149	80.1	79.0	82.2	80.1
2008	143	80.4	78.1	83.8	78.1
2009	158	81.1	77.5	85.7	78.8
2010	179	81.3	79.1	85.7	80.3
2011	146	81.7	78.7	87.4	79.8
2012	202	80.4	77.6	84.1	78.3
2013	175	80.6	77.5	85.0	78.8
2014	145	82.7	79.8	85.8	80.7
1998-2014	2250	80.2	77.9	83.8	78.9

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	99	8.9	0.41	5.2	0.37	8.1	0.41	10.9	0.45
1999	99	8.8	0.42	5.1	0.39	8.0	0.42	10.9	0.47
2000	89	7.8	0.38	4.5	0.34	6.9	0.38	9.5	0.43
2001	109	9.4	0.52	5.4	0.49	8.2	0.52	10.6	0.54
2002	136	7.3	0.38	3.9	0.34	6.3	0.38	8.7	0.42
2003	148	7.9	0.39	4.3	0.35	6.5	0.38	8.9	0.43
2004	144	7.7	0.38	4.0	0.33	6.2	0.37	8.4	0.41
2005	132	7.0	0.33	3.5	0.29	5.4	0.31	7.3	0.35
2006	162	8.5	0.41	4.3	0.36	6.4	0.39	8.6	0.43
2007	176	7.9	0.38	3.9	0.33	6.1	0.36	8.3	0.40
2008	183	8.2	0.38	3.9	0.32	6.1	0.35	8.4	0.40
2009	197	8.8	0.41	4.1	0.35	6.3	0.38	8.8	0.43
2010	182	8.1	0.38	3.6	0.32	5.7	0.35	8.0	0.40
2011	178	7.8	0.41	3.6	0.35	5.5	0.38	7.4	0.42
2012	168	7.4	0.37	3.1	0.29	5.0	0.33	7.0	0.38
2013	182	8.0	0.48	3.4	0.38	5.4	0.42	7.6	0.48
2014	143	6.3	0.40	2.7	0.32	4.3	0.36	6.0	0.41
1998-2014	2527	7.9	0.40	3.9	0.34	6.0	0.38	8.2	0.42

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	39	3.3	0.26	1.1	0.18	1.8	0.21	2.5	0.23
1999	53	4.5	0.36	1.7	0.27	2.7	0.30	3.7	0.34
2000	59	4.9	0.48	1.8	0.38	2.9	0.41	4.1	0.47
2001	51	4.2	0.36	1.5	0.28	2.5	0.31	3.5	0.36
2002	90	4.6	0.37	1.7	0.30	2.7	0.32	3.6	0.35
2003	93	4.7	0.41	1.7	0.32	2.7	0.35	3.7	0.39
2004	92	4.7	0.40	1.5	0.29	2.4	0.32	3.5	0.36
2005	92	4.6	0.40	1.7	0.33	2.6	0.34	3.5	0.36
2006	79	3.9	0.34	1.3	0.23	2.0	0.26	2.9	0.31
2007	97	4.2	0.37	1.3	0.24	2.1	0.29	3.2	0.34
2008	101	4.4	0.38	1.4	0.25	2.3	0.29	3.2	0.33
2009	111	4.8	0.38	1.7	0.28	2.6	0.32	3.5	0.34
2010	121	5.2	0.44	1.6	0.34	2.6	0.37	3.9	0.43
2011	86	3.6	0.35	1.2	0.23	1.9	0.28	2.7	0.31
2012	121	5.1	0.52	1.6	0.40	2.6	0.44	3.9	0.49
2013	99	4.2	0.47	1.3	0.32	2.2	0.36	3.0	0.42
2014	92	3.9	0.45	1.2	0.31	1.9	0.34	2.8	0.40
1998-2014	1476	4.4	0.40	1.5	0.29	2.4	0.32	3.3	0.37

Table 13

Age distribution of age at death (cancer-related) for period 2007-2014
(**incl. multiple primaries**)

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
5-9	2	0.1	0.1	2	0.1	0.1			0.0
10-14	0	0.0	0.1			0.1			0.0
15-19	0	0.0	0.1			0.1			0.0
20-24	1	0.0	0.1	1	0.1	0.2			0.0
25-29	2	0.1	0.2	1	0.1	0.3	1	0.1	0.1
30-34	2	0.1	0.3	2	0.1	0.4			0.1
35-39	5	0.2	0.5	2	0.1	0.5	3	0.4	0.5
40-44	13	0.6	1.1	7	0.5	1.0	6	0.7	1.2
45-49	31	1.3	2.4	23	1.6	2.6	8	0.9	2.1
50-54	70	3.0	5.4	52	3.6	6.2	18	2.1	4.2
55-59	105	4.5	10.0	82	5.6	11.8	23	2.7	6.9
60-64	186	8.0	18.0	137	9.4	21.1	49	5.7	12.7
65-69	289	12.5	30.5	189	12.9	34.1	100	11.7	24.4
70-74	417	18.0	48.5	302	20.7	54.8	115	13.5	37.9
75-79	444	19.2	67.7	279	19.1	73.9	165	19.3	57.2
80-84	413	17.8	85.6	223	15.3	89.1	190	22.3	79.5
85+	334	14.4	100.0	159	10.9	100.0	175	20.5	100.0
All ages	2314	100.0		1461	100.0		853	100.0	

Included in the statistics are 39.7% multiple primaries in males and 32.1% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**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	2		0.2	0.25	0.0		9.5	
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	1		0.1	0.33	0.0		2.1	
25-29	1	1	0.1	0.14	0.1	0.20	1.6	1.6
30-34	2		0.2	0.10	0.0		2.3	
35-39	2	3	0.2	0.03	0.2	0.13	1.1	1.2
40-44	7	6	0.4	0.07	0.4	0.15	1.5	0.9
45-49	23	8	1.5	0.12	0.5	0.19	2.2	0.7
50-54	52	18	4.0	0.19	1.4	0.20	2.8	1.0
55-59	82	23	7.7	0.23	2.0	0.17	2.7	0.9
60-64	137	49	13.9	0.33	4.6	0.28	2.9	1.4
65-69	189	100	19.6	0.32	9.6	0.32	2.6	1.9
70-74	302	115	33.2	0.47	11.0	0.38	3.3	1.7
75-79	279	165	50.7	0.62	23.1	0.45	3.3	2.6
80-84	223	190	63.8	0.76	33.9	0.76	3.0	2.9
85+	159	175	68.7	1.05	30.3	0.81	2.6	2.0
All ages	1461	853					2.9	2.0
Mortality								
Raw			8.1	0.41	4.6	0.43		
WS			3.7	0.34	1.5	0.30		
ES			5.7	0.38	2.4	0.34		
BRD-S			7.9	0.42	3.4	0.39		
PYLL-70								
per 100,000			28.1		10.8			
ES			25.1		8.9			
AYLL-70			9.0		8.2			

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

Table 15a

Multiple primaries in deaths in period 1998-2014
MALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C09-C10	Oropharynx	19	1.3	8	42.1	2	10.5	9	47.4
C15	Oesophagus	19	1.3	4	21.1	1	5.3	14	73.7
C16	Stomach	50	3.5	17	34.0	4	8.0	29	58.0
C18	Colon	117	8.2	40	34.2	23	19.7	54	46.2
C19-C20	Rectum	56	3.9	15	26.8	15	26.8	26	46.4
C22	Liver	38	2.7	5	13.2	8	21.1	25	65.8
C23-C24	Bile	13	0.9	2	15.4	1	7.7	10	76.9
C25	Pancreas	39	2.7	1	2.6	6	15.4	32	82.1
C32	Larynx	14	1.0	10	71.4	1	7.1	3	21.4
C33-C34	Lung	173	12.1	29	16.8	26	15.0	118	68.2
C43	Malign. melanoma	44	3.1	24	54.5	4	9.1	16	36.4
C44	Skin others	48	3.4	16	33.3	3	6.3	29	60.4
C46,C49	Soft tissue	12	0.8	5	41.7	2	16.7	5	41.7
C61	Prostate	280	19.6	103	36.8	38	13.6	139	49.6
C64	Kidney	95	6.6			29	30.5	66	69.5
C65	Renal pelvis	23	1.6	4	17.4	10	43.5	9	39.1
C66	Ureter	21	1.5	7	33.3	5	23.8	9	42.9
C67	Bladder	126	8.8	53	42.1	20	15.9	53	42.1
C70-C72	CNS cancer	33	2.3	10	30.3	5	15.2	18	54.5
C73	Thyroid	12	0.8	4	33.3			8	66.7
C76-C79	CUP	22	1.5	11	50.0	2	9.1	9	40.9
C82-C85	NHL	50	3.5	9	18.0	9	18.0	32	64.0
C90	Mult. myeloma	29	2.0	8	27.6	6	20.7	15	51.7
C91-C96	Leukaemia	27	1.9	5	18.5	2	7.4	20	74.1
Other primaries		69	4.8	27	39.1	8	11.6	34	49.3
All mult. primaries		1429	100.0	417	29.2	230	16.1	782	54.7

Multiple primaries with number of cases 1 to 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 1998–2014
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C16	Stomach	24	3.5	6	25.0	8	33.3	10	41.7
C18	Colon	47	6.9	14	29.8	7	14.9	26	55.3
C19–C20	Rectum	22	3.2	5	22.7	5	22.7	12	54.5
C22	Liver	9	1.3	2	22.2	3	33.3	4	44.4
C23–C24	Bile	13	1.9			4	30.8	9	69.2
C25	Pancreas	37	5.5	2	5.4	5	13.5	30	81.1
C33–C34	Lung	61	9.0	7	11.5	9	14.8	45	73.8
C43	Malign. melanoma	23	3.4	12	52.2	2	8.7	9	39.1
C44	Skin others	20	2.9	12	60.0			8	40.0
C50	Breast	135	19.9	66	48.9	15	11.1	54	40.0
C53	Cervix uteri	16	2.4	9	56.3	1	6.3	6	37.5
C54	Corpus uteri	26	3.8	13	50.0	4	15.4	9	34.6
C56	Ovary	29	4.3	9	31.0	7	24.1	13	44.8
C64	Kidney	39	5.8			13	33.3	26	66.7
C67	Bladder	37	5.5	11	29.7	9	24.3	17	45.9
C70–C72	CNS cancer	25	3.7	4	16.0	5	20.0	16	64.0
C73	Thyroid	21	3.1	8	38.1	1	4.8	12	57.1
C76–C79	CUP	13	1.9	2	15.4	1	7.7	10	76.9
C82–C85	NHL	24	3.5	7	29.2	6	25.0	11	45.8
C91–C96	Leukaemia	16	2.4	2	12.5	3	18.8	11	68.8
Other primaries		41	6.0	15	36.6	9	22.0	17	41.5
All mult. primaries		678	100.0	206	30.4	117	17.3	355	52.4

Multiple primaries with number of cases 1 to 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 2007-2014
(**First 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	2		0.2	0.25	0.0		10.0	
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	1		0.1	0.33	0.0		2.3	
25-29	1	1	0.1	0.14	0.1	0.20	1.8	1.7
30-34	2		0.2	0.11	0.0		2.3	
35-39	2	3	0.2	0.04	0.2	0.13	1.2	1.3
40-44	6	5	0.4	0.07	0.3	0.14	1.4	0.9
45-49	22	6	1.4	0.12	0.4	0.16	2.4	0.6
50-54	36	15	2.8	0.16	1.2	0.19	2.3	1.0
55-59	68	19	6.4	0.24	1.7	0.17	2.6	0.9
60-64	114	34	11.6	0.33	3.2	0.24	2.9	1.2
65-69	146	84	15.2	0.35	8.0	0.33	2.6	2.0
70-74	223	83	24.5	0.49	7.9	0.36	3.2	1.6
75-79	195	133	35.4	0.66	18.6	0.48	3.1	2.7
80-84	149	144	42.7	0.82	25.7	0.83	2.8	2.9
85+	113	146	48.8	1.16	25.3	0.86	2.6	2.2
All ages	1080	673					2.8	2.0
Mortality								
Raw			6.0	0.40	3.6	0.43		
WS			2.8	0.33	1.2	0.29		
ES			4.3	0.37	1.9	0.33		
BRD-S			5.8	0.42	2.7	0.39		
PYLL-70								
per 100,000			23.2		8.7			
ES			20.7		7.3			
AYLL-70			9.3		8.2			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**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	2		0.2	0.25	0.0		10.0	
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	1		0.1	0.33	0.0		2.6	
25-29	1	1	0.1	0.14	0.1	0.20	2.0	1.8
30-34	2		0.2	0.11	0.0		2.4	
35-39	2	1	0.2	0.04	0.1	0.04	1.3	0.5
40-44	6	3	0.4	0.07	0.2	0.09	1.5	0.6
45-49	18	5	1.1	0.11	0.3	0.14	2.1	0.5
50-54	31	13	2.4	0.15	1.0	0.17	2.2	1.0
55-59	55	15	5.2	0.22	1.3	0.14	2.4	0.8
60-64	97	23	9.9	0.31	2.2	0.18	2.8	0.9
65-69	119	72	12.4	0.32	6.9	0.31	2.5	2.1
70-74	159	58	17.5	0.40	5.5	0.28	2.8	1.4
75-79	127	99	23.1	0.49	13.9	0.38	2.6	2.5
80-84	89	109	25.5	0.53	19.4	0.66	2.2	2.7
85+	69	111	29.8	0.73	19.2	0.69	2.0	2.0
All ages	778	510					2.5	1.8
Mortality								
Raw			4.3	0.32	2.7	0.34		
WS			2.1	0.27	0.9	0.23		
ES			3.2	0.30	1.4	0.27		
BRD-S			4.2	0.33	2.0	0.31		
PYLL-70								
per 100,000			19.8		6.6			
ES			17.8		5.4			
AYLL-70			9.5		7.8			

* See corresponding tables with multiple primaries.

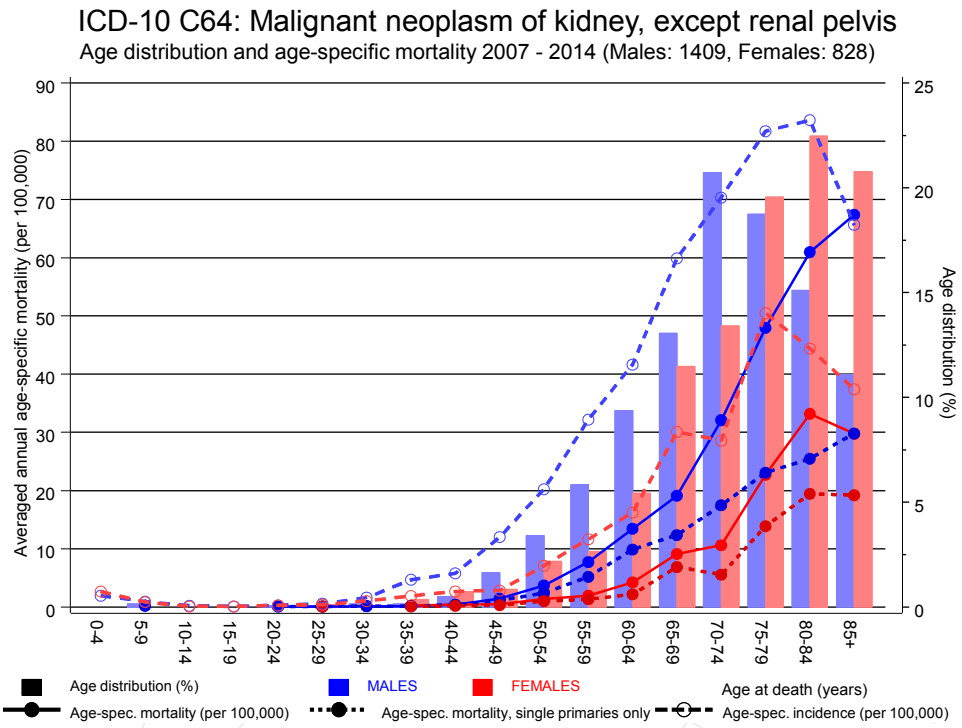
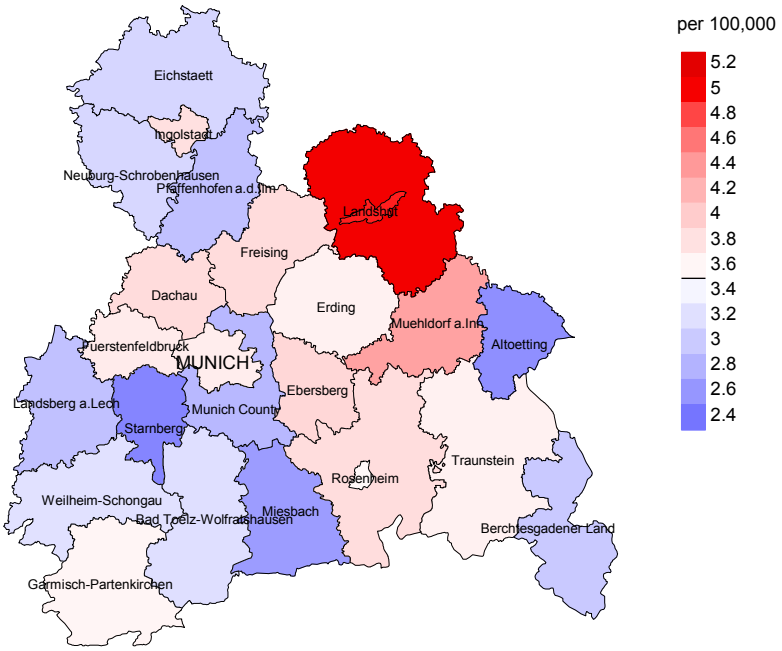


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

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



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

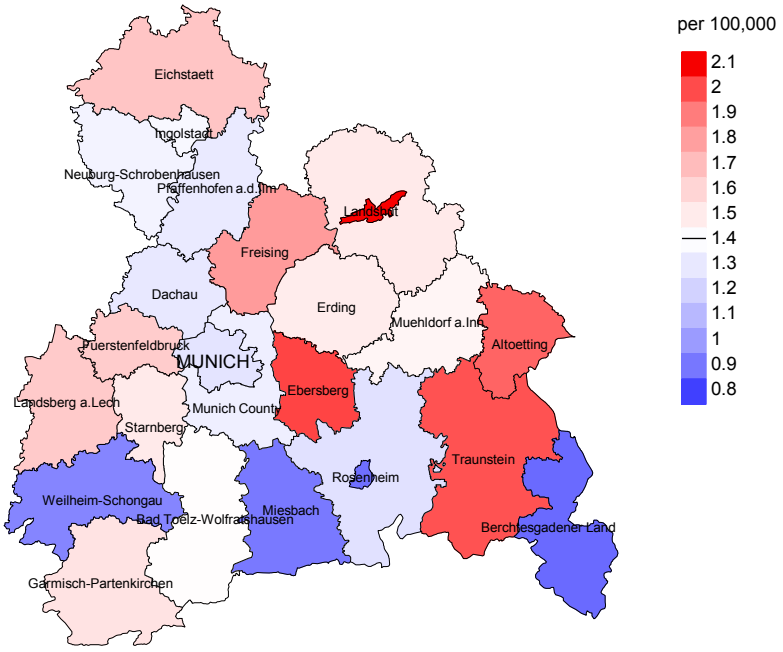
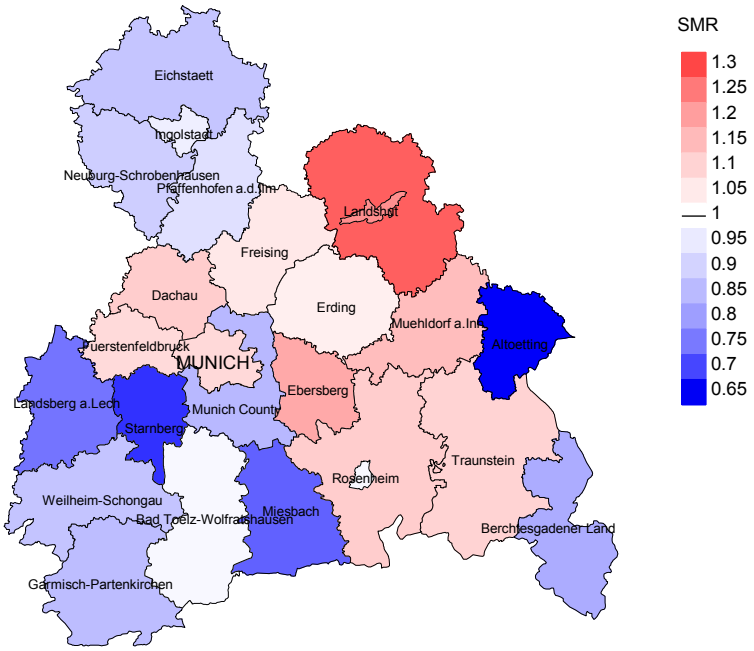


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2014. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 3.5/100,000 WS N=1,400, females 1.4/100,000 WS N=826).

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 33 women died from kidney cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 2.0/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.1 and 3.4/100,000.

Standardized mortality ratio (SMR) 2007 - 2014: Males



Standardized mortality ratio (SMR) 2007 - 2014: Females

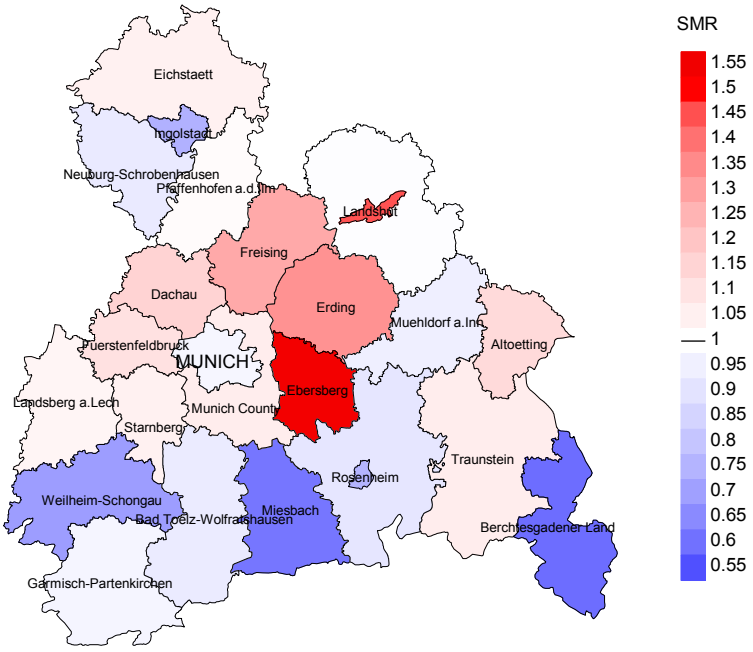


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=1,400, females N=826).

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 33 women died from kidney cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.55. Though, the value of this parameter may vary with an underlying probability of 99% between 0.94 and 2.38, 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, 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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