

Munich Cancer Registry



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ICD-10 C18-C21: Colorectal cancer

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	46,354
Diseases	47,569
Creation date	04/13/2016
Export date	12/23/2015
Population	4.64 m



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

<http://www.tumorregister-muenchen.de/en/facts/base/bC1821E-ICD-10-C18-C21-Colorectal-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
C18.-	Malignant neoplasm of colon
C18.0	Caecum
C18.1	Appendix
C18.2	Ascending colon
C18.3	Hepatic flexure
C18.4	Transverse colon
C18.5	Splenic flexure
C18.6	Descending colon
C18.7	Sigmoid colon
C18.8	Overlapping lesion of colon
C18.9	Colon, unspecified
C19	Malignant neoplasm of rectosigmoid junction
C20	Malignant neoplasm of rectum
C21.-	Malignant neoplasm of anus and anal canal
C21.0	Anus, unspecified
C21.1	Anal canal
C21.2	Cloacogenic zone
C21.8	Overlapping lesion of rectum, anus and anal canal

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	1869	97	5.2	24.9	73.5	97.9
1999	1871	115	6.1	24.6	72.4	97.5
2000	1727	94	5.4	26.5	70.9	98.3
2001	1890	121	6.4	27.2	66.5	97.2
2002	3212	367	11.4	25.7	69.6	97.6 #
2003	3228	299	9.3	25.9	64.2	97.2
2004	3109	244	7.8	25.7	63.8	97.1
2005	3041	212	7.0	27.6	63.7	96.8
2006	3134	160	5.1	28.0	57.3	94.0
2007	3485	203	5.8	25.7	56.5	79.8 #
2008	3428	193	5.6	27.4	53.2	73.5
2009	3392	173	5.1	26.8	49.5	71.4
2010	3184	183	5.7	26.8	46.5	69.8
2011	3101	155	5.0	25.4	42.6	69.7
2012	3022	158	5.2	25.2	37.1	72.4
2013	2891	155	5.4	25.2	28.9	99.1
2014	1985	139	7.0	23.8	20.8	98.3 ##
1998–2014	47569	3068	6.4	26.1	54.4	87.2

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	1869	934	935	50.0
1999	1871	951	920	50.8
2000	1727	882	845	51.1
2001	1890	980	910	51.9
2002	3212	1687	1525	52.5
2003	3228	1705	1523	52.8
2004	3109	1639	1470	52.7
2005	3041	1590	1451	52.3
2006	3134	1691	1443	54.0
2007	3485	1908	1577	54.7
2008	3428	1879	1549	54.8
2009	3392	1885	1507	55.6
2010	3184	1764	1420	55.4
2011	3101	1688	1413	54.4
2012	3022	1641	1381	54.3
2013	2891	1643	1248	56.8
2014	1985	1089	896	54.9
1998–2014	47569	25556	22013	53.7

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	934	935	84.3	79.5	50.7	34.1	76.1	51.3	99.1	67.1
1999	951	920	85.0	77.5	50.3	33.0	76.1	49.7	99.6	64.7
2000	882	845	77.4	70.3	45.3	29.0	68.6	44.2	88.7	57.9
2001	980	910	84.6	74.8	49.5	32.1	74.1	48.2	94.8	62.7
2002	1687	1525	90.6	77.9	50.5	31.8	76.3	48.1	99.7	62.7
2003	1705	1523	91.0	77.3	50.0	31.9	75.3	47.9	97.9	61.9
2004	1639	1470	87.1	74.4	46.5	31.0	70.3	46.2	91.9	59.5
2005	1590	1451	83.9	72.9	44.6	28.7	66.9	43.4	86.8	57.0
2006	1691	1443	88.3	71.8	46.4	29.6	69.3	44.1	89.7	57.2
2007	1908	1577	86.1	68.3	44.8	27.5	66.9	41.1	86.8	53.3
2008	1879	1549	84.4	66.8	42.4	26.3	64.0	39.6	83.3	51.3
2009	1885	1507	84.5	64.8	41.9	25.5	62.7	38.3	81.9	50.0
2010	1764	1420	78.3	60.7	38.4	23.3	57.7	35.1	75.1	46.1
2011	1688	1413	73.9	59.9	36.1	23.8	53.9	35.3	69.8	45.1
2012	1641	1381	71.8	58.5	34.9	23.7	52.5	34.9	68.0	44.9
2013	1643	1248	71.9	52.9	34.4	21.6	51.9	31.8	68.1	40.8
2014	1089	896	47.7	38.0	23.5	15.5	35.1	22.9	45.4	29.3
1998-2014	25556	22013	79.8	65.9	41.4	26.6	62.2	39.9	80.6	51.7

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 patients)
(incl. DCO)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	1869	69.9	12.5	13.2	102	53.8	60.8	70.9	78.7	86.1
1999	1871	70.3	12.5	24.9	102	54.2	61.6	71.1	79.3	86.4
2000	1727	70.4	12.1	24.7	103	55.0	61.6	71.3	79.2	86.7
2001	1890	69.9	12.5	28.3	103	54.0	61.5	70.2	79.3	86.5
2002	3212	70.9	12.1	17.7	104	55.3	62.6	71.8	80.0	86.7
2003	3228	70.9	12.0	8.4	101	55.6	63.0	71.4	79.9	86.0
2004	3109	70.6	12.3	13.8	101	55.0	62.9	71.0	79.9	85.4
2005	3041	71.3	12.2	15.1	99.9	55.4	63.7	71.8	80.3	86.0
2006	3134	70.4	12.2	17.9	102	54.4	63.1	70.8	79.6	85.2
2007	3485	70.7	12.5	15.8	103	54.1	63.7	71.2	80.2	85.8
2008	3428	71.4	12.4	18.9	105	55.0	64.1	72.0	80.4	86.5
2009	3392	71.0	12.4	12.4	102	54.2	63.6	71.9	80.1	85.9
2010	3184	71.4	12.6	14.9	101	54.1	63.5	72.4	80.9	86.3
2011	3101	71.1	12.9	15.5	101	53.3	63.1	72.2	80.7	86.8
2012	3022	71.1	13.0	9.7	101	54.0	62.9	72.6	80.4	86.4
2013	2891	70.8	13.2	15.7	105	52.8	62.8	72.7	80.1	86.2
2014	1985	70.6	13.4	1.4	103	52.6	62.6	72.6	80.0	86.5
1998-2014	47569	70.8	12.5	1.4	105	54.3	62.9	71.8	80.0	86.2

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	934	67.7	11.8	31.4	98.1	53.6	59.4	68.1	75.9	83.9
1999	951	68.3	11.6	24.9	95.5	54.2	60.2	69.0	76.6	83.3
2000	882	68.2	11.0	34.4	95.9	54.2	60.3	68.0	76.5	82.7
2001	980	68.2	11.4	31.3	102	54.1	61.0	67.9	75.8	83.3
2002	1687	69.1	11.0	20.9	98.5	55.5	61.8	69.4	76.6	82.5
2003	1705	69.1	11.1	8.4	99.4	55.4	62.5	69.5	76.5	82.7
2004	1639	69.3	11.1	27.8	101	55.4	62.4	69.3	77.1	83.4
2005	1590	69.2	11.3	19.0	99.6	54.6	62.7	69.4	77.1	83.5
2006	1691	69.0	11.1	17.9	102	54.6	62.5	69.3	77.2	82.8
2007	1908	69.0	11.7	15.8	99.4	54.2	62.7	69.5	77.6	83.0
2008	1879	69.8	11.3	19.3	105	54.8	63.4	70.4	77.8	83.4
2009	1885	69.5	11.5	12.4	102	53.7	62.8	70.9	77.8	83.0
2010	1764	69.9	11.7	21.1	98.9	53.9	62.5	70.9	78.2	84.1
2011	1688	69.8	11.8	15.5	97.3	53.3	62.9	71.1	78.2	84.2
2012	1641	70.3	11.5	9.7	101	55.3	62.9	71.5	78.4	84.1
2013	1643	70.1	12.1	19.4	99.6	53.6	62.8	72.1	78.4	84.4
2014	1089	69.6	12.6	20.3	102	52.9	61.8	71.4	78.7	84.9
1998-2014	25556	69.3	11.5	8.4	105	54.3	62.2	70.1	77.5	83.5

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	935	72.0	12.8	13.2	102	54.4	62.9	74.0	81.5	87.4
1999	920	72.3	13.2	26.9	102	54.2	63.5	74.4	82.1	88.0
2000	845	72.8	12.8	24.7	103	56.0	63.0	74.8	81.7	88.3
2001	910	71.7	13.3	28.3	103	54.0	62.2	74.2	81.1	88.4
2002	1525	73.0	13.0	17.7	104	55.2	63.6	75.0	82.1	88.8
2003	1523	72.8	12.6	23.5	101	56.1	63.8	74.2	82.3	88.5
2004	1470	72.0	13.4	13.8	100	54.4	63.7	73.7	82.7	87.7
2005	1451	73.5	12.8	15.1	99.9	56.8	65.2	75.4	83.2	89.2
2006	1443	72.1	13.1	21.2	98.7	54.2	64.0	73.9	82.2	86.7
2007	1577	72.7	13.1	17.8	103	53.8	64.9	74.1	82.8	87.5
2008	1549	73.3	13.3	18.9	102	55.3	65.1	74.2	83.6	88.6
2009	1507	72.9	13.2	15.9	102	54.6	64.9	74.7	83.2	88.4
2010	1420	73.3	13.4	14.9	101	54.5	65.3	75.2	83.3	88.6
2011	1413	72.6	13.9	17.1	101	53.2	63.3	74.1	83.7	88.8
2012	1381	72.0	14.5	13.7	100	52.7	63.4	74.5	83.0	88.8
2013	1248	71.6	14.4	15.7	105	50.7	62.8	74.0	82.5	88.5
2014	896	71.8	14.3	1.4	103	51.5	63.8	74.0	82.0	88.8
1998–2014	22013	72.6	13.4	1.4	105	54.3	64.0	74.4	82.7	88.3

Table 4

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

Age at diagnosis Years	Cases			Males			Females		
	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
0–4	1	0.0	0.0			0.0	1	0.0	0.0
5–9	1	0.0	0.0	1	0.0	0.0			0.0
10–14	3	0.0	0.0	1	0.0	0.0	2	0.0	0.0
15–19	22	0.1	0.1	4	0.0	0.0	18	0.2	0.2
20–24	36	0.1	0.3	14	0.1	0.1	22	0.2	0.4
25–29	60	0.2	0.5	25	0.2	0.3	35	0.3	0.7
30–34	101	0.4	0.9	53	0.4	0.7	48	0.4	1.1
35–39	176	0.7	1.6	94	0.7	1.4	82	0.7	1.9
40–44	412	1.7	3.3	221	1.6	3.1	191	1.7	3.6
45–49	762	3.1	6.4	414	3.1	6.1	348	3.2	6.8
50–54	1209	4.9	11.4	681	5.0	11.2	528	4.8	11.6
55–59	1781	7.3	18.6	1075	8.0	19.1	706	6.4	18.0
60–64	2467	10.1	28.7	1561	11.6	30.7	906	8.2	26.3
65–69	3366	13.7	42.5	2139	15.8	46.6	1227	11.2	37.4
70–74	4110	16.8	59.2	2517	18.6	65.2	1593	14.5	51.9
75–79	3603	14.7	74.0	2062	15.3	80.5	1541	14.0	65.9
80–84	3198	13.1	87.0	1559	11.6	92.0	1639	14.9	80.9
85+	3180	13.0	100.0	1076	8.0	100.0	2104	19.1	100.0
All ages	24488	100.0		13497	100.0		10991	100.0	

Included in the statistics are 32.7% multiple primaries in males and 26.5% 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=550 %	Females DCO rate n=804 %	Males Prop.all cancers n=91183 %	Females Prop.all cancers n=89596 %
0- 4		1	0.0	0.1		100.0		0.7
5- 9	1		0.1	0.0			1.0	
10-14	1	2	0.1	0.2			1.0	2.2
15-19	4	18	0.4	2.0			1.9	10.9
20-24	14	22	1.3	2.0	7.1		3.8	7.1
25-29	23	35	1.9	2.8			4.1	5.3
30-34	53	47	4.2	3.8			6.9	4.1
35-39	91	81	7.0	6.4		3.7	7.9	4.1
40-44	219	191	13.5	12.5		0.5	12.0	5.1
45-49	408	346	25.8	22.8	1.0		12.7	6.3
50-54	665	524	51.4	40.9	1.1	1.1	13.6	7.7
55-59	1058	695	99.6	61.8	1.6	0.3	14.4	9.3
60-64	1531	895	155.9	84.4	1.6	1.5	14.2	9.7
65-69	2088	1209	217.0	115.8	1.8	1.8	13.4	10.6
70-74	2456	1563	269.9	149.5	2.8	2.5	14.5	13.2
75-79	2010	1516	365.0	212.5	3.8	4.6	16.1	15.1
80-84	1501	1618	429.7	288.5	7.5	8.0	17.5	18.4
85+	1054	2071	455.2	358.4	19.1	25.0	17.3	20.2
All ages	13177	10834			4.2	7.4	14.5	12.1
Incidence								
Raw			72.9	57.8				
WS			36.1	23.1				
ES			54.1	34.3				
BRD-S			70.2	44.4				

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).

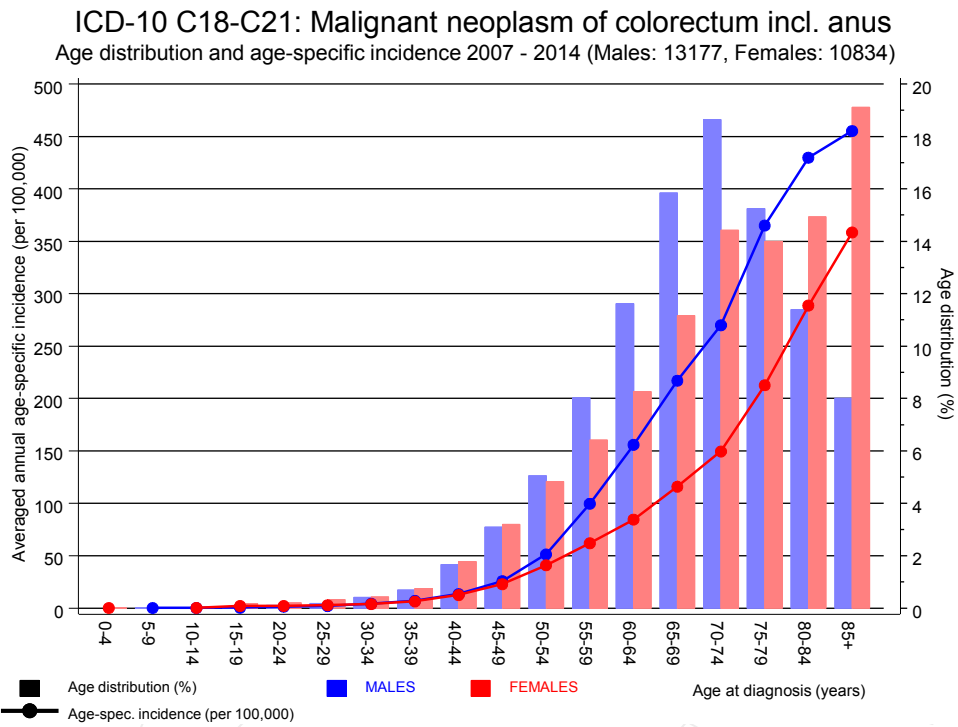


Figure 6. Age distribution and age-specific incidence

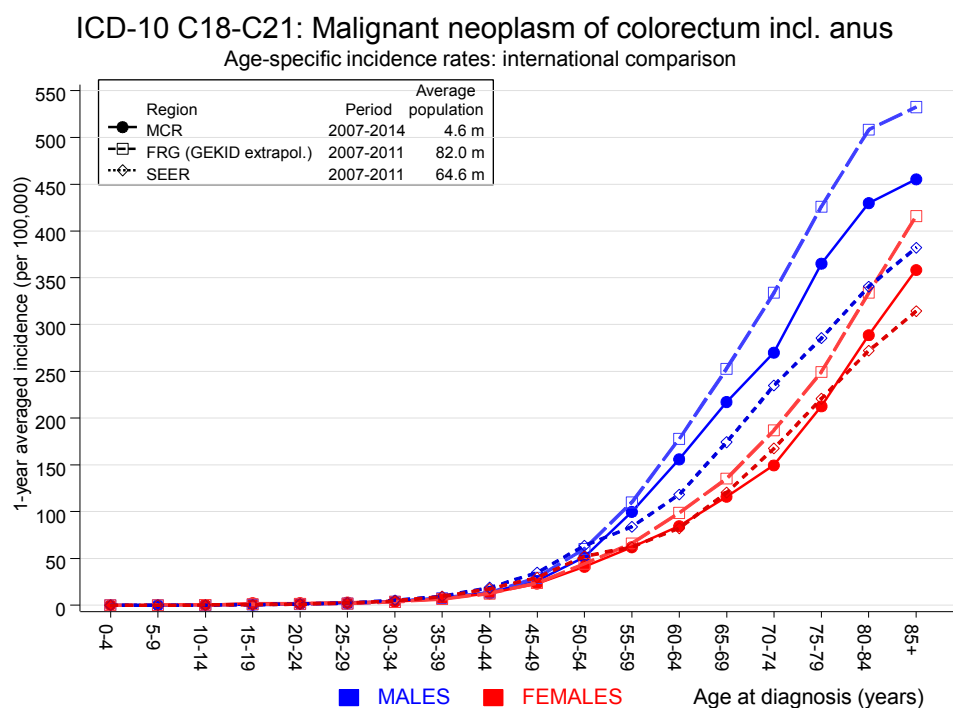


Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

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>.

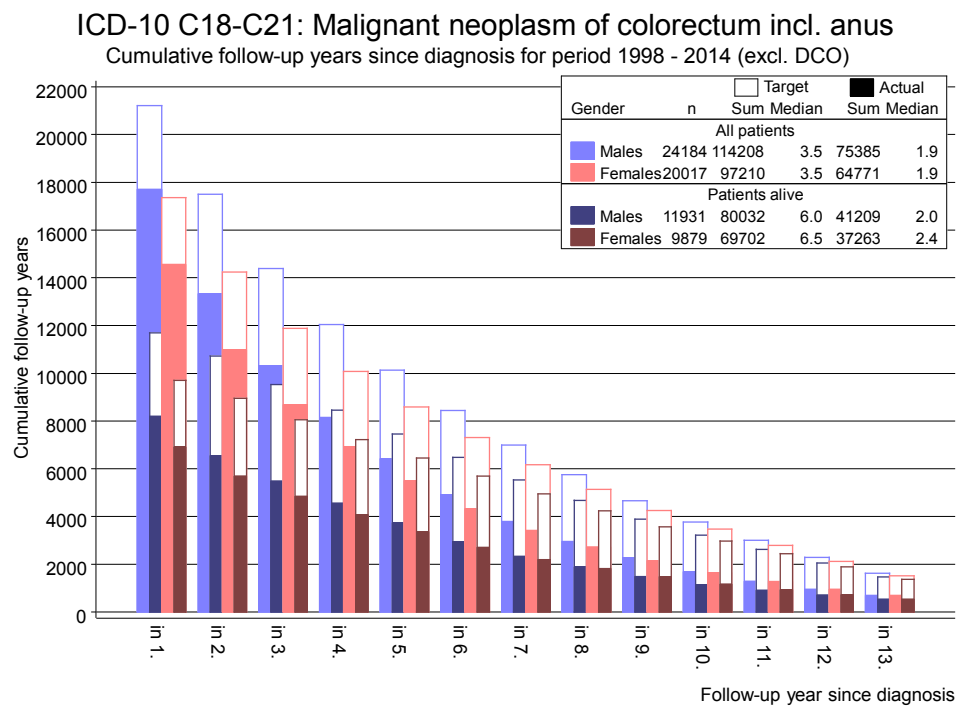


Figure 7. Cumulative follow-up years depending on time since diagnosis

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 %
C00	Lip	4	1.7	2.3	0.6	5.9	0.3	
C03-C06	Oral cavity	12	10.3	1.2	0.6	2.0	0.2	
C07-C08	Salivary gland	4	3.1	1.3	0.3	3.3	0.1	
C09-C10	Oropharynx	17	12.5	1.4	0.8	2.2	0.6	
C12-C13	Hypopharynx	10	6.8	1.5	0.7	2.7	0.4	10.0
C15	Oesophagus	64	23.6	2.7	2.1	3.5 #	5.5	14.1
C16	Stomach	164	59.6	2.8	2.3	3.2 #	14.2	7.3
C17	Small intestine	70	6.8	10.4	8.1	13.1 #	8.6	1.4
C18	Colon	526	141.7	3.7	3.4	4.0 #	52.4	1.1
C19-C20	Rectum	229	74.9	3.1	2.7	3.5 #	21.0	1.3
C21	Anus/canal	9	2.8	3.3	1.5	6.2 #	0.9	
C22	Liver	106	37.7	2.8	2.3	3.4 #	9.3	17.9
C23-C24	Bile	35	13.8	2.5	1.8	3.5 #	2.9	11.4
C25	Pancreas	108	51.1	2.1	1.7	2.6 #	7.8	24.1
C32	Larynx	23	13.2	1.7	1.1	2.6 #	1.3	17.4
C33-C34	Lung	329	162.0	2.0	1.8	2.3 #	22.8	14.3
C38,C45	Mesothelioma	11	9.1	1.2	0.6	2.2	0.3	
C43	Malign. melanoma	101	55.2	1.8	1.5	2.2 #	6.3	2.0
C46,C49	Soft tissue	15	7.4	2.0	1.1	3.3 #	1.0	
C50	Breast	9	3.6	2.5	1.1	4.7 #	0.7	11.1
C60	Penis	7	3.2	2.2	0.9	4.5	0.5	
C61	Prostate	709	413.0	1.7	1.6	1.8 #	40.4	5.1
C62	Testis	7	2.6	2.7	1.1	5.6 #	0.6	14.3
C64	Kidney	142	47.2	3.0	2.5	3.5 #	12.9	4.9
C65	Renal pelvis	18	6.0	3.0	1.8	4.8 #	1.6	
C66	Ureter	11	3.4	3.2	1.6	5.8 #	1.0	
C67	Bladder	131	66.0	2.0	1.7	2.4 #	8.9	7.6
C68	Urinary org.	3	0.9	3.4	0.7	10.0	0.3	66.7
C70-C72	CNS cancer	37	17.5	2.1	1.5	2.9 #	2.7	24.3
C73	Thyroid	12	7.9	1.5	0.8	2.6	0.6	16.7
C76-C79	CUP	37	24.1	1.5	1.1	2.1 #	1.8	2.7
C81	Hodgkin lymphoma	5	2.7	1.9	0.6	4.3	0.3	
C82-C85	NHL	114	56.4	2.0	1.7	2.4 #	7.9	4.4
C90	Mult. myeloma	31	18.1	1.7	1.2	2.4 #	1.8	25.8
C91-C96	Leukaemia	44	23.7	1.9	1.4	2.5 #	2.8	29.5
Other primaries		13	13.9	0.9	0.5	1.6	-0.1	7.7
Not observed		0	2.5	0.0	0.0	1.5	-0.3	
All mult. primaries		3167	1406.0	2.3	2.2	2.3 #	240.3	7.3

Patients 23621
Median age at second malignancy (years) 73.4
Person-years 73285
Mean observation time (years) 3.1
Median observation time (years) 1.8

The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 to 2 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

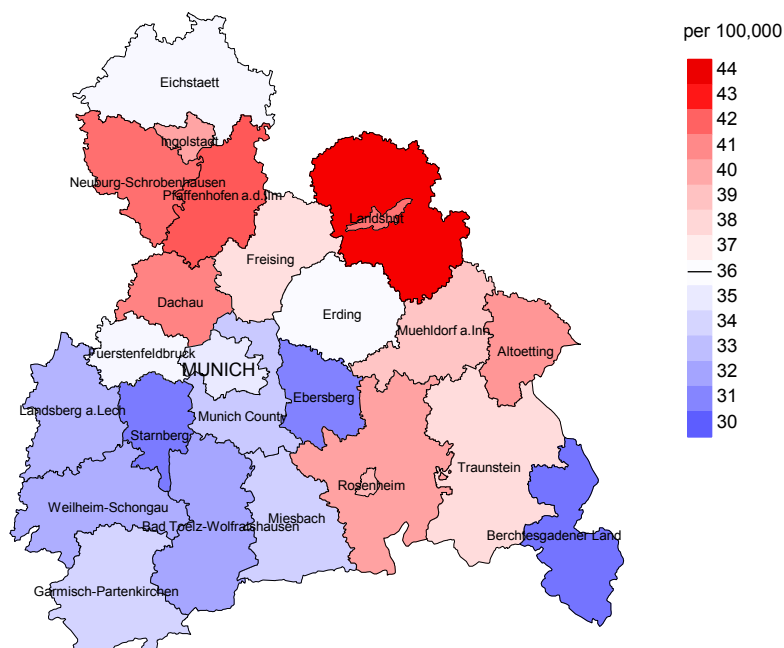
Diagnosis	Observed n	Expected n	SIR	LCL 95%	UCL 95%	EAR	DCO %
C03-C06 Oral cavity	8	4.7	1.7	0.7	3.4	0.5	
C09-C10 Oropharynx	8	2.8	2.9	1.2	5.7 #	0.8	
C15 Oesophagus	12	4.7	2.5	1.3	4.4 #	1.1	16.7
C16 Stomach	81	34.8	2.3	1.8	2.9 #	7.2	18.5
C17 Small intestine	40	3.7	10.8	7.7	14.7 #	5.7	2.5
C18 Colon	319	94.5	3.4	3.0	3.8 #	35.2	2.5
C19-C20 Rectum	109	38.1	2.9	2.3	3.5 #	11.1	1.8
C21 Anus/canal	11	4.3	2.6	1.3	4.6 #	1.1	
C22 Liver	29	10.4	2.8	1.9	4.0 #	2.9	41.4
C23-C24 Bile	26	13.8	1.9	1.2	2.8 #	1.9	15.4
C25 Pancreas	89	41.2	2.2	1.7	2.7 #	7.5	24.7
C33-C34 Lung	164	56.7	2.9	2.5	3.4 #	16.8	15.2
C43 Malign. melanoma	65	27.8	2.3	1.8	3.0 #	5.8	
C46,C49 Soft tissue	9	4.7	1.9	0.9	3.6	0.7	
C48 Peritoneal	10	2.9	3.5	1.7	6.4 #	1.1	20.0
C50 Breast	417	231.7	1.8	1.6	2.0 #	29.1	4.8
C51 Vulva	21	9.3	2.3	1.4	3.5 #	1.8	4.8
C52 Vagina	7	1.8	4.0	1.6	8.2 #	0.8	14.3
C53 Cervix uteri	21	9.8	2.1	1.3	3.3 #	1.7	14.3
C54 Corpus uteri	100	44.1	2.3	1.8	2.8 #	8.8	3.0
C55,C57 Fem. genitals un	6	2.7	2.2	0.8	4.8	0.5	16.7
C56 Ovary	105	33.9	3.1	2.5	3.7 #	11.1	27.6
C64 Kidney	68	21.1	3.2	2.5	4.1 #	7.4	11.8
C65 Renal pelvis	8	2.7	2.9	1.3	5.7 #	0.8	
C66 Ureter	4	1.4	2.9	0.8	7.5	0.4	25.0
C67 Bladder	43	18.5	2.3	1.7	3.1 #	3.8	20.9
C70-C72 CNS cancer	14	11.2	1.2	0.7	2.1	0.4	64.3
C73 Thyroid	19	11.3	1.7	1.0	2.6 #	1.2	5.3
C76-C79 CUP	13	17.5	0.7	0.4	1.3	-0.7	
C82-C85 NHL	65	33.8	1.9	1.5	2.4 #	4.9	15.4
C90 Mult. myeloma	22	10.9	2.0	1.3	3.1 #	1.7	27.3
C91-C96 Leukaemia	34	14.5	2.3	1.6	3.3 #	3.1	41.2
Other primaries	29	17.4	1.7	1.1	2.4 #	1.8	17.2
Not observed	0	1.5	0.0	0.0	2.4	-0.2	
All mult. primaries	1976	840.4	2.4	2.2	2.5 #	178.0	10.8

Patients 19937
 Median age at second malignancy (years) 75.8
 Person-years 63790
 Mean observation time (years) 3.2
 Median observation time (years) 1.8

The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 to 3 are pooled in category "Other primaries"

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



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

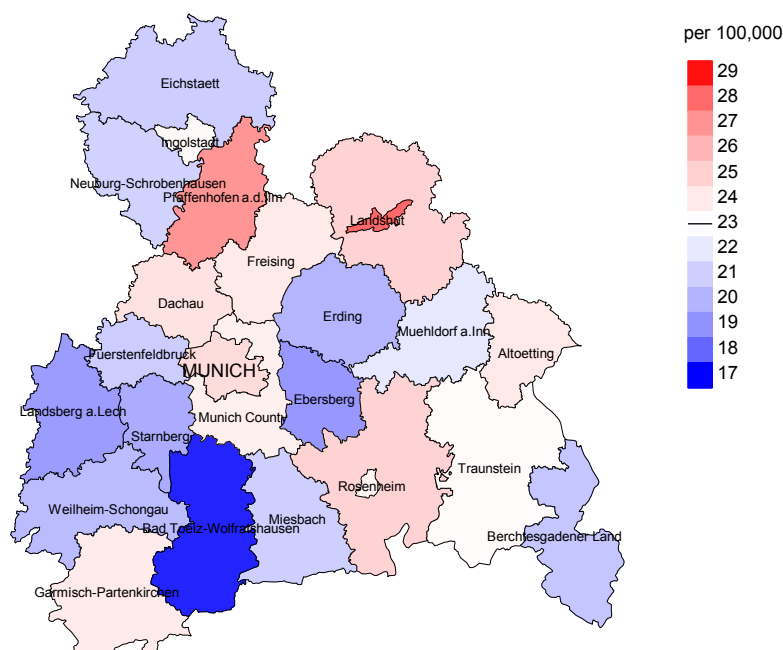
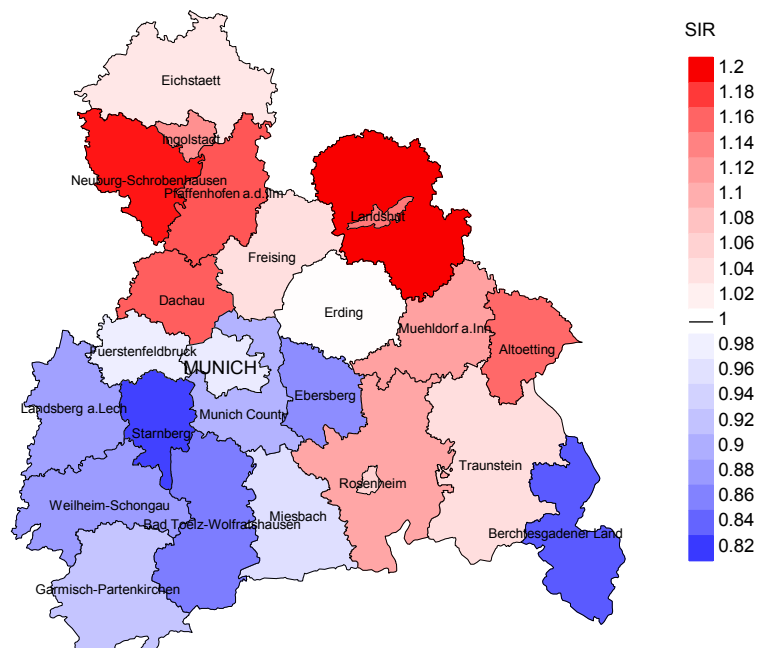


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 36.1/100,000 WS N=13,177, females 23.0/100,000 WS N=10,834).

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 223 women were identified with newly diagnosed colorectal cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 19.2/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 15.7 and 23.5/100,000.

Standardized incidence ratio (SIR) 2007 - 2014: Males



Standardized incidence ratio (SIR) 2007 - 2014: Females

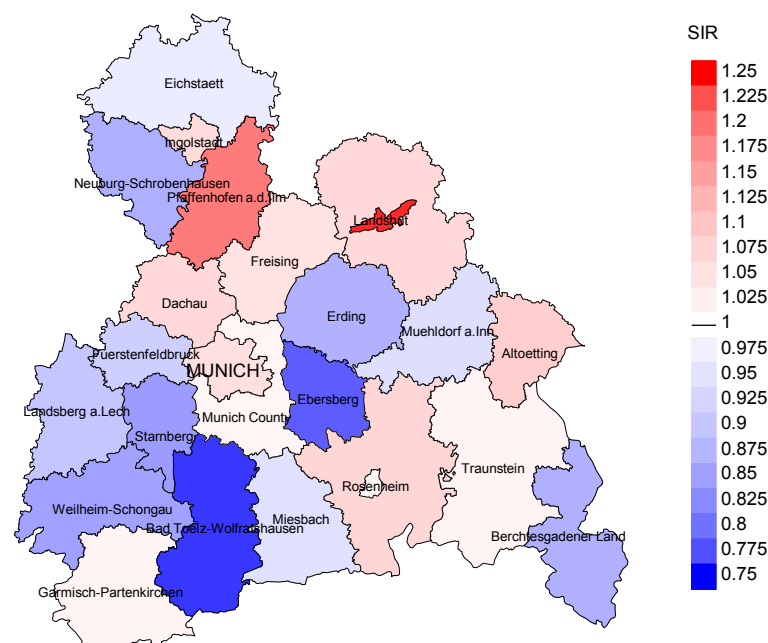


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=13,177, females N=10,834).

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 223 women were identified with newly diagnosed colorectal cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.78. Though, the value of this parameter may vary with an underlying probability of 99% between 0.65 and 0.93.

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	1869	97.9	5.2	1374	73.5	93.6
1999	1871	97.5	6.1	1354	72.4	94.8
2000	1727	98.3	5.4	1224	70.9	96.2
2001	1890	97.2	6.4	1257	66.5	97.3
2002	3212	97.6	11.4	2234	69.6	97.7
2003	3228	97.2	9.3	2072	64.2	98.1
2004	3109	97.1	7.8	1985	63.8	97.9
2005	3041	96.8	7.0	1938	63.7	98.0
2006	3134	94.0	5.1	1795	57.3	99.0
2007	3485	79.8	5.8	1970	56.5	98.4
2008	3428	73.5	5.6	1823	53.2	98.4
2009	3392	71.4	5.1	1679	49.5	98.4
2010	3184	69.8	5.7	1480	46.5	97.8
2011	3101	69.7	5.0	1321	42.6	97.7
2012	3022	72.4	5.2	1120	37.1	97.8
2013	2891	99.1	5.4	835	28.9	95.8
2014	1985	98.3	7.0	412	20.8	93.4
1998-2014	47569	87.2	6.4	25873	54.4	97.4

Table 10b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased the same year of cancer diagnosis
(incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002,
and from 3.96 to 4.64 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	1869	1054	90.2	301	16.1
1999	1871	1084	90.8	313	16.7
2000	1727	1060	93.6	286	16.6
2001	1890	1139	95.6	294	15.6
2002	3212	1617	98.0	698	21.7
2003	3228	1722	97.9	599	18.6
2004	3109	1741	98.3	557	17.9
2005	3041	1852	96.5	551	18.1
2006	3134	1912	97.5	514	16.4
2007	3485	2027	97.5	581	16.7
2008	3428	2117	98.6	610	17.8
2009	3392	2153	98.7	540	15.9
2010	3184	2249	98.7	543	17.1
2011	3101	2253	98.2	521	16.8
2012	3022	2250	98.4	531	17.6
2013	2891	2225	98.0	471	16.3
2014	1985	2011	98.4	361	18.2
1998-2014	47569	30466	97.3	8271	17.4

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	1054	71.7	28.3	87.0
1999	1084	73.2	26.8	86.5
2000	1060	73.8	26.2	86.2
2001	1139	69.2	30.8	84.8
2002	1617	75.5	24.5	87.3
2003	1722	74.0	26.0	86.8
2004	1741	76.2	23.8	86.6
2005	1852	71.9	28.1	82.0
2006	1912	71.5	28.5	82.8
2007	2027	71.7	28.3	83.6
2008	2117	71.8	28.2	82.2
2009	2153	69.7	30.3	80.0
2010	2249	66.9	33.1	79.0
2011	2253	67.4	32.6	78.9
2012	2250	66.3	33.7	78.2
2013	2225	63.0	37.0	74.1
2014	2011	63.3	36.7	75.5
1998-2014	30466	69.9	30.1	81.7

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	513	73.7	71.4	79.4	73.2
1999	534	73.3	71.4	78.4	72.7
2000	550	74.6	72.2	82.3	73.8
2001	548	74.2	71.2	81.1	72.9
2002	828	74.1	72.0	80.3	73.2
2003	883	74.9	72.6	80.7	73.8
2004	892	75.6	74.2	80.9	75.0
2005	960	75.4	73.1	81.3	73.7
2006	1042	76.4	74.3	80.6	75.4
2007	1098	76.0	73.7	80.9	74.6
2008	1178	76.6	74.6	82.1	75.3
2009	1132	76.3	73.6	81.1	74.4
2010	1215	76.5	74.2	82.0	75.4
2011	1232	76.5	73.3	82.6	75.1
2012	1225	77.3	75.4	82.3	76.2
2013	1204	78.8	76.3	83.4	77.1
2014	1094	78.0	75.5	83.0	76.4
1998-2014	16128	76.2	73.8	81.7	74.9

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

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	541	78.6	76.4	84.9	78.4
1999	550	79.9	78.3	86.0	79.7
2000	510	80.5	78.7	86.4	79.6
2001	591	81.0	78.1	86.8	80.2
2002	789	81.1	79.7	86.5	80.7
2003	839	81.3	78.9	86.0	80.3
2004	849	81.3	79.3	85.2	80.2
2005	892	81.8	80.0	85.3	80.7
2006	870	82.0	79.8	86.1	80.6
2007	929	81.9	79.3	86.7	80.4
2008	939	82.5	80.1	86.5	81.0
2009	1021	82.7	79.1	87.4	80.3
2010	1034	83.3	79.9	87.2	81.8
2011	1021	83.4	79.3	88.0	81.2
2012	1025	83.8	79.3	88.4	81.2
2013	1021	84.0	79.1	88.4	81.1
2014	917	83.9	78.3	88.2	80.5
1998-2014	14338	82.1	79.2	87.0	80.5

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	367	33.1	0.40	19.3	0.38	30.4	0.40	41.2	0.42
1999	392	35.0	0.42	20.2	0.41	31.7	0.42	44.2	0.45
2000	410	36.0	0.47	20.2	0.45	32.1	0.47	44.1	0.50
2001	392	33.8	0.40	19.1	0.39	29.9	0.41	40.1	0.43
2002	628	33.7	0.38	18.2	0.36	28.5	0.38	38.4	0.39
2003	665	35.5	0.39	18.5	0.37	29.3	0.39	40.5	0.42
2004	687	36.5	0.43	18.1	0.40	29.1	0.42	41.2	0.45
2005	704	37.2	0.45	18.4	0.42	28.8	0.44	40.0	0.47
2006	750	39.2	0.45	19.0	0.42	30.4	0.45	42.3	0.48
2007	809	36.5	0.43	17.1	0.39	27.2	0.41	38.2	0.45
2008	879	39.5	0.48	18.1	0.44	29.0	0.47	40.9	0.50
2009	797	35.7	0.43	16.5	0.40	25.9	0.42	35.5	0.44
2010	836	37.1	0.49	16.3	0.44	25.9	0.46	36.4	0.50
2011	865	37.9	0.52	17.1	0.48	26.7	0.50	36.1	0.53
2012	830	36.3	0.52	16.0	0.47	25.5	0.50	35.2	0.53
2013	789	34.5	0.50	14.7	0.44	23.8	0.47	33.5	0.51
2014	709	31.0	0.66	13.3	0.58	21.3	0.62	29.9	0.67
1998-2014	11509	35.9	0.46	17.2	0.42	27.3	0.45	37.8	0.48

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	390	33.2	0.42	12.6	0.37	19.9	0.39	27.6	0.41
1999	403	34.0	0.44	12.1	0.37	19.4	0.39	26.8	0.42
2000	373	31.1	0.45	11.2	0.39	17.8	0.41	23.9	0.42
2001	396	32.6	0.44	11.9	0.37	18.9	0.39	26.0	0.42
2002	594	30.3	0.39	10.2	0.32	16.4	0.34	22.7	0.36
2003	610	31.0	0.40	10.8	0.34	17.2	0.36	23.5	0.38
2004	639	32.3	0.44	10.8	0.35	17.4	0.38	24.4	0.41
2005	627	31.5	0.44	10.4	0.37	16.7	0.39	23.1	0.41
2006	619	30.8	0.43	9.8	0.33	15.9	0.37	22.7	0.40
2007	647	28.0	0.41	9.6	0.35	15.2	0.37	20.9	0.40
2008	643	27.7	0.42	9.0	0.34	14.3	0.37	19.8	0.39
2009	703	30.2	0.47	10.1	0.40	15.8	0.42	21.6	0.44
2010	670	28.6	0.48	9.2	0.40	14.6	0.42	19.8	0.43
2011	656	27.8	0.47	8.8	0.37	13.9	0.40	19.1	0.43
2012	662	28.1	0.49	9.0	0.38	14.3	0.41	19.7	0.44
2013	616	26.1	0.50	8.5	0.40	13.5	0.43	18.3	0.46
2014	563	23.9	0.64	7.8	0.51	12.3	0.55	16.7	0.58
1998-2014	9811	29.4	0.45	9.8	0.37	15.6	0.40	21.5	0.42

Table 13

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

Age at death Years	Cases			Males			Females		
	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
15-19	1	0.0	0.0	1	0.0	0.0			0.0
20-24	3	0.0	0.0	1	0.0	0.0	2	0.0	0.0
25-29	10	0.1	0.1	4	0.1	0.1	6	0.1	0.1
30-34	13	0.1	0.2	9	0.1	0.2	4	0.1	0.2
35-39	34	0.3	0.5	17	0.2	0.5	17	0.3	0.5
40-44	104	0.9	1.4	59	0.9	1.3	45	0.8	1.4
45-49	196	1.6	3.0	99	1.4	2.8	97	1.8	3.2
50-54	342	2.8	5.8	204	3.0	5.8	138	2.6	5.8
55-59	584	4.8	10.5	362	5.3	11.0	222	4.1	9.9
60-64	921	7.5	18.1	597	8.7	19.8	324	6.1	16.0
65-69	1411	11.6	29.7	932	13.6	33.4	479	8.9	24.9
70-74	1920	15.7	45.4	1208	17.6	51.0	712	13.3	38.2
75-79	1971	16.2	61.6	1230	18.0	69.0	741	13.8	52.0
80-84	2112	17.3	78.9	1145	16.7	85.7	967	18.1	70.1
85+	2579	21.1	100.0	978	14.3	100.0	1601	29.9	100.0
All ages	12201	100.0		6846	100.0		5355	100.0	

Included in the statistics are 32.7% multiple primaries in males and 26.5% 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			0.0		0.0			
10-14			0.0		0.0			
15-19	1		0.1	0.25	0.0		2.8	
20-24	1	2	0.1	0.07	0.2	0.09	2.1	7.1
25-29	4	6	0.3	0.16	0.5	0.17	6.5	9.4
30-34	9	4	0.7	0.17	0.3	0.08	10.2	3.6
35-39	17	17	1.3	0.18	1.3	0.21	9.6	6.6
40-44	59	45	3.6	0.27	2.9	0.24	12.8	7.1
45-49	99	97	6.3	0.24	6.4	0.28	9.7	8.0
50-54	204	138	15.8	0.30	10.8	0.26	10.9	7.7
55-59	362	222	34.1	0.34	19.8	0.31	11.7	8.5
60-64	597	324	60.8	0.38	30.6	0.36	12.5	9.1
65-69	932	479	96.9	0.44	45.9	0.39	13.0	9.2
70-74	1208	712	132.8	0.48	68.1	0.45	13.2	10.8
75-79	1230	741	223.4	0.60	103.9	0.48	14.4	11.8
80-84	1145	967	327.8	0.73	172.5	0.59	15.5	14.7
85+	978	1601	422.4	0.91	277.1	0.76	16.2	18.4
All ages	6846	5355					13.7	12.3
Mortality								
Raw			37.9	0.51	28.6	0.49		
WS			16.9	0.46	9.3	0.40		
ES			26.9	0.49	14.7	0.42		
BRD-S			37.4	0.52	20.2	0.45		
PYLL-70								
per 100,000			124.3		83.9			
ES			108.3		70.7			
AYLL-70			8.7		10.0			

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 ←%
C03-C06 Oral cavity	53	1.1	40	75.5	3	5.7	10	18.9
C15 Oesophagus	81	1.7	15	18.5	15	18.5	51	63.0
C16 Stomach	246	5.3	67	27.2	58	23.6	121	49.2
C17 Small intestine	51	1.1	6	11.8	20	39.2	25	49.0
C18 Colon	355	7.6			132	37.2	223	62.8
C19-C20 Rectum	209	4.5			128	61.2	81	38.8
C22 Liver	130	2.8	5	3.8	30	23.1	95	73.1
C23-C24 Bile	44	0.9	3	6.8	6	13.6	35	79.5
C25 Pancreas	157	3.4	10	6.4	28	17.8	119	75.8
C32 Larynx	72	1.5	51	70.8	1	1.4	20	27.8
C33-C34 Lung	503	10.8	83	16.5	70	13.9	350	69.6
C43 Malign. melanoma	179	3.8	107	59.8	3	1.7	69	38.5
C44 Skin others	254	5.4	120	47.2	22	8.7	112	44.1
C61 Prostate	1022	21.9	580	56.8	84	8.2	358	35.0
C64 Kidney	175	3.7	81	46.3	40	22.9	54	30.9
C67 Bladder	371	7.9	173	46.6	29	7.8	169	45.6
C70-C72 CNS cancer	81	1.7	25	30.9	5	6.2	51	63.0
C76-C79 CUP	53	1.1	9	17.0	9	17.0	35	66.0
C82-C85 NHL	178	3.8	74	41.6	30	16.9	74	41.6
C90 Mult. myeloma	53	1.1	18	34.0	6	11.3	29	54.7
C91-C96 Leukaemia	101	2.2	28	27.7	9	8.9	64	63.4
Other primaries	305	6.5	130	42.6	21	6.9	154	50.5
All mult. primaries	4673	100.0	1625	34.8	749	16.0	2299	49.2

Multiple primaries with number of cases 1 to 36 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	175	5.1	53	30.3	35	20.0	87	49.7
C18	Colon	241	7.0			76	31.5	165	68.5
C19-C20	Rectum	123	3.6			69	56.1	54	43.9
C22	Liver	36	1.0	2	5.6	9	25.0	25	69.4
C23-C24	Bile	44	1.3	9	20.5	8	18.2	27	61.4
C25	Pancreas	143	4.1	11	7.7	19	13.3	113	79.0
C33-C34	Lung	228	6.6	36	15.8	21	9.2	171	75.0
C43	Malign. melanoma	84	2.4	55	65.5	6	7.1	23	27.4
C44	Skin others	105	3.0	56	53.3	8	7.6	41	39.0
C50	Breast	857	24.8	562	65.6	65	7.6	230	26.8
C51	Vulva	37	1.1	19	51.4	2	5.4	16	43.2
C53	Cervix uteri	133	3.9	101	75.9	10	7.5	22	16.5
C54	Corpus uteri	223	6.5	145	65.0	11	4.9	67	30.0
C56	Ovary	221	6.4	76	34.4	52	23.5	93	42.1
C64	Kidney	73	2.1	36	49.3	13	17.8	24	32.9
C67	Bladder	123	3.6	59	48.0	4	3.3	60	48.8
C70-C72	CNS cancer	64	1.9	28	43.8	9	14.1	27	42.2
C73	Thyroid	35	1.0	17	48.6	3	8.6	15	42.9
C76-C79	CUP	31	0.9	9	29.0	7	22.6	15	48.4
C82-C85	NHL	107	3.1	47	43.9	14	13.1	46	43.0
C90	Mult. myeloma	53	1.5	17	32.1	4	7.5	32	60.4
C91-C96	Leukaemia	77	2.2	16	20.8	9	11.7	52	67.5
Other primaries		240	7.0	85	35.4	36	15.0	119	49.6
All mult. primaries		3453	100.0	1439	41.7	490	14.2	1524	44.1

Multiple primaries with number of cases 1 to 22 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			0.0		0.0			
10-14			0.0		0.0			
15-19	1		0.1	0.25	0.0		3.0	
20-24	1	2	0.1	0.07	0.2	0.09	2.3	7.7
25-29	4	6	0.3	0.19	0.5	0.18	7.3	10.2
30-34	9	4	0.7	0.17	0.3	0.09	10.5	4.2
35-39	15	13	1.2	0.18	1.0	0.17	9.1	5.7
40-44	56	41	3.4	0.27	2.7	0.24	13.2	7.4
45-49	94	85	5.9	0.25	5.6	0.27	10.2	8.3
50-54	175	121	13.5	0.29	9.5	0.26	11.0	8.1
55-59	308	187	29.0	0.33	16.6	0.31	11.8	8.7
60-64	496	259	50.5	0.37	24.4	0.35	12.6	9.1
65-69	734	395	76.3	0.43	37.8	0.41	13.0	9.6
70-74	930	549	102.2	0.50	52.5	0.44	13.3	10.8
75-79	894	562	162.3	0.60	78.8	0.47	14.3	11.6
80-84	809	740	231.6	0.78	132.0	0.56	15.2	14.7
85+	702	1247	303.2	0.96	215.8	0.75	15.9	18.4
All ages	5228	4211					13.6	12.2
Mortality								
Raw			28.9	0.50	22.5	0.47		
WS			13.2	0.45	7.5	0.39		
ES			20.7	0.48	11.7	0.41		
BRD-S			28.4	0.51	15.9	0.43		
PYLL-70								
per 100,000			107.4		71.6			
ES			93.6		60.5			
AYLL-70			9.1		10.2			

* 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			0.0		0.0			
10-14			0.0		0.0			
15-19	1		0.1	0.25	0.0		3.0	
20-24	1	2	0.1	0.07	0.2	0.10	2.6	8.3
25-29	4	6	0.3	0.20	0.5	0.18	7.8	10.7
30-34	9	4	0.7	0.17	0.3	0.09	10.6	4.8
35-39	15	12	1.2	0.19	1.0	0.16	9.5	5.9
40-44	54	39	3.3	0.26	2.5	0.23	13.6	7.7
45-49	90	83	5.7	0.25	5.5	0.27	10.5	9.1
50-54	164	115	12.7	0.28	9.0	0.26	11.4	8.7
55-59	272	166	25.6	0.30	14.8	0.29	11.7	8.8
60-64	441	226	44.9	0.35	21.3	0.33	12.9	9.3
65-69	623	328	64.8	0.40	31.4	0.36	13.1	9.7
70-74	725	457	79.7	0.42	43.7	0.39	12.8	11.0
75-79	691	469	125.5	0.52	65.7	0.41	14.3	11.8
80-84	583	616	166.9	0.61	109.9	0.49	14.3	15.1
85+	503	1030	217.3	0.72	178.2	0.65	14.7	18.3
All ages	4176	3553					13.2	12.4
Mortality								
Raw			23.1	0.43	19.0	0.42		
WS			10.9	0.39	6.4	0.35		
ES			16.8	0.41	10.0	0.37		
BRD-S			22.6	0.44	13.5	0.39		
PYLL-70								
per 100,000			98.2		65.9			
ES			85.6		55.7			
AYLL-70			9.4		10.6			

* See corresponding tables with multiple primaries.

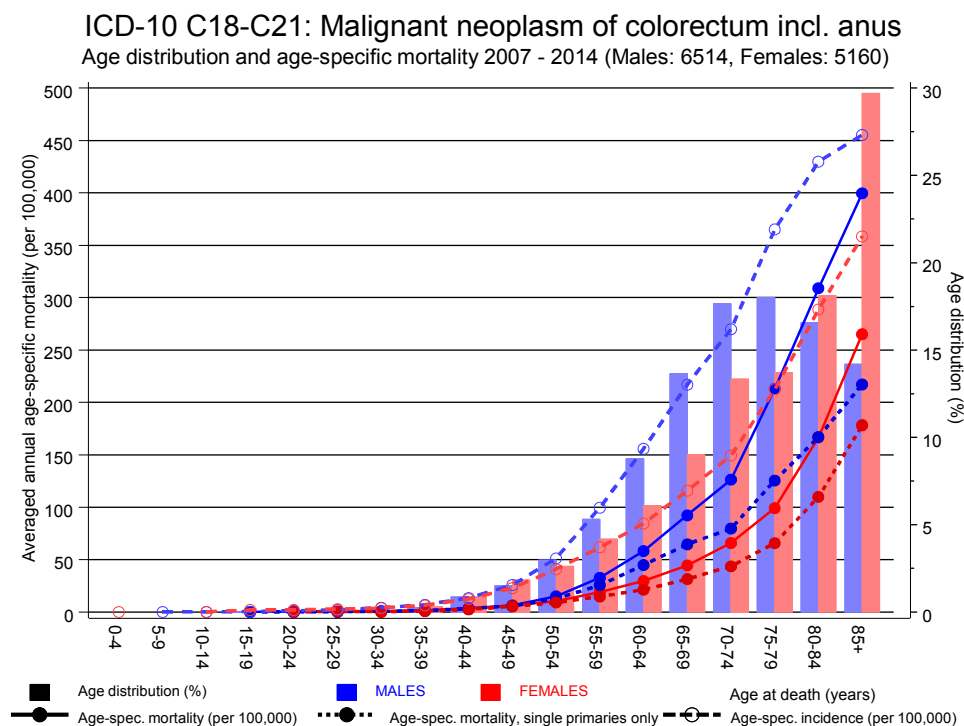
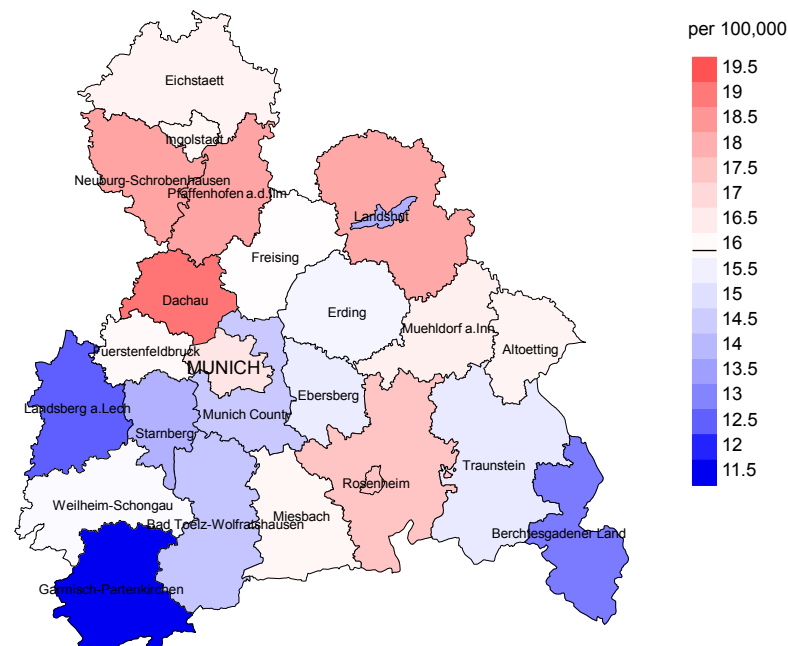


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

The difference between age at diagnosis (Table 3) and age at colorectal 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

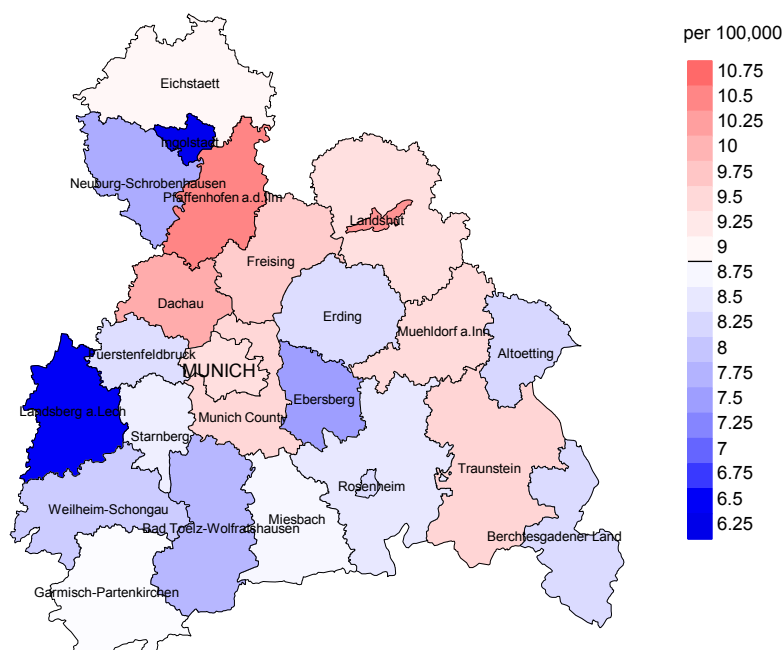
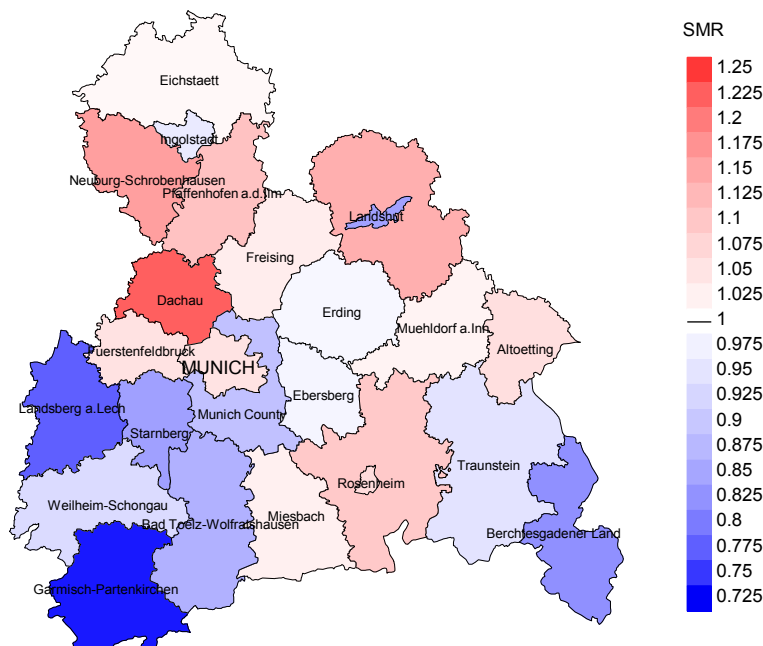


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2014. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 15.9/100,000 WS N=6,461, females 8.9/100,000 WS N=5,109).

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 108 women died from colorectal cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 7.5/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 5.5 and 10.3/100,000.

Standardized mortality ratio (SMR) 2007 - 2014: Males



Standardized mortality ratio (SMR) 2007 - 2014: Females

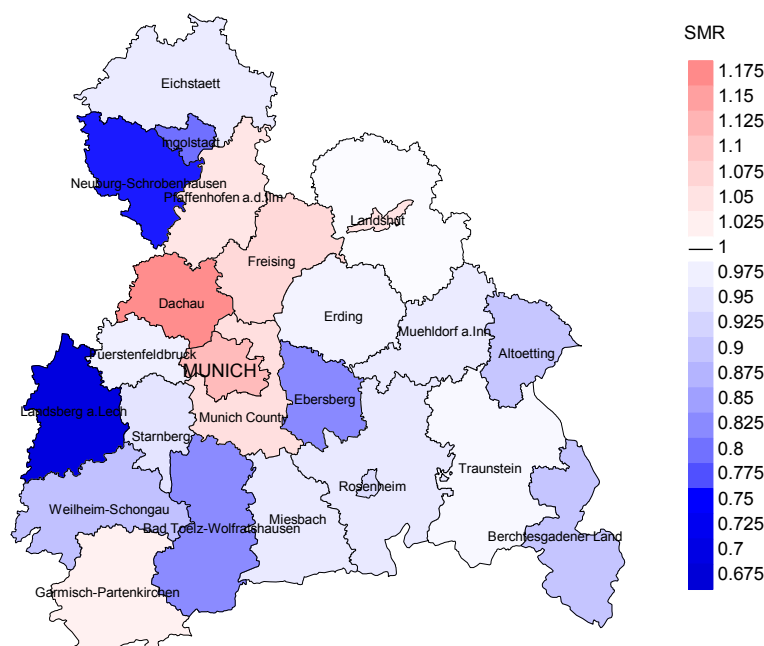


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=6,461, females N=5,109).

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 108 women died from colorectal cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.82. Though, the value of this parameter may vary with an underlying probability of 99% between 0.63 and 1.05, 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

Recommended Citation

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