Munich Cancer Registry

- Survival
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- *Deutsch*

ICD-10 C15-C26: GI cancer

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	84,430
Diseases	87,167
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/bC1526E-ICD-10-C15-C26-GI-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
C15	Oesophagus
C16	Stomach
C17	Small intestine
C18	Colon
C19	Rectosigmoid junction
C20	Rectum
C21	Anus and anal canal
C22	Liver and intrahepatic bile ducts
C23	Gallbladder
C24	Other and unspecified parts of biliary tract
C25	Pancreas
C26	Other and ill-defined digestive organs

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	3207	376	11.7	20.3	81.4	98.5
1999	3257	407	12.5	20.8	80.8	98.1
2000	3044	414	13.6	22.3	80.0	98.7
2001	3339	466	14.0	22.8	76.9	97.7
2002	5718	1105	19.3	22.9	79.5	98.3 #
2003	5503	878	16.0	23.1	75.1	97.9
2004	5553	791	14.2	23.1	74.4	97.7
2005	5474	735	13.4	25.2	74.6	97.4
2006	5635	604	10.7	25.3	70.1	95.7
2007	6343	713	11.2	24.0	69.7	85.7 #
2008	6348	691	10.9	25.3	67.1	81.4
2009	6308	655	10.4	24.8	64.4	80.1
2010	6051	633	10.5	24.9	62.4	79.3
2011	6025	603	10.0	25.2	59.5	79.2
2012	6025	609	10.1	24.6	54.2	80.6
2013	5577	596	10.7	24.7	45.7	99.2
2014	3760	574	15.3	24.5	33.4	98.4 ##
1998-2014	87167	10850	12.4	24.0	66.8	90.7

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

Year of diagnosis	All n	Males n	Females n	Prop. males %
1998	3207	1662	1545	51.8
1999	3257	1719	1538	52.8
2000	3044	1636	1408	53.7
2001	3339	1786	1553	53.5
2002	5718	3069	2649	53.7
2003	5503	2976	2527	54.1
2004	5553	3003	2550	54.1
2005	5474	2966	2508	54.2
2006	5635	3118	2517	55.3
2007	6343	3592	2751	56.6
2008	6348	3563	2785	56.1
2009	6308	3611	2697	57.2
2010	6051	3436	2615	56.8
2011	6025	3422	2603	56.8
2012	6025	3398	2627	56.4
2013	5577	3212	2365	57.6
2014	3760	2090	1670	55.6
1998–2014	87167	48259	38908	55.4

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	1662	1545	150.0	131.3	90.2	54.8	136.2	83.2	178.6	110.0
1999	1719	1538	153.6	129.6	90.8	53.2	137.6	81.0	180.6	107.4
2000	1636	1408	143.7	117.2	84.3	47.1	127.7	72.5	165.0	96.6
2001	1786	1553	154.1	127.7	90.1	54.2	135.5	81.6	174.5	106.2
2002	3069	2649	164.7	135.3	92.3	53.6	139.2	81.8	181.0	108.3
2003	2976	2527	158.8	128.3	87.2	51.5	131.7	78.2	171.6	102.3
2004	3003	2550	159.6	129.0	86.0	52.9	129.8	79.3	169.0	102.9
2005	2966	2508	156.6	126.0	82.8	49.5	124.4	74.7	162.1	98.4
2006	3118	2517	162.8	125.3	85.5	49.9	128.1	75.2	165.9	98.4
2007	3592	2751	162.2	119.1	84.9	46.9	126.6	70.7	164.0	92.2
2008	3563	2785	160.1	120.0	81.5	46.8	122.0	70.5	158.3	92.0
2009	3611	2697	161.8	116.0	80.4	44.9	120.6	67.6	156.8	88.7
2010	3436	2615	152.5	111.7	75.5	42.3	113.1	64.0	146.2	84.5
2011	3422	2603	149.8	110.3	72.7	42.8	108.8	64.1	141.3	82.6
2012	3398	2627	148.7	111.3	73.1	44.2	109.2	65.5	140.5	84.9
2013	3212	2365	140.6	100.2	67.7	39.4	102.1	58.8	133.2	76.4
2014	2090	1670	91.5	70.8	44.3	27.9	66.7	41.7	87.1	53.8
1998-2014	48259	38908	150.7	116.4	78.3	46.0	117.6	69.3	152.4	90.7

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	3207	70.2	12.7	13.2	102	53.4	61.0	71.6	79.3	86.3
1999	3257	70.7	12.6	10.8	102	54.6	62.0	71.6	79.6	86.5
2000	3044	70.6	12.5	21.7	103	54.4	61.8	71.7	79.5	86.9
2001	3339	70.1	12.7	0.6	103	53.9	61.6	70.6	79.5	86.7
2002	5718	71.1	12.3	17.7	104	55.1	62.7	72.1	80.3	87.0
2003	5503	71.1	12.1	8.4	101	55.6	63.1	71.9	80.2	86.3
2004	5553	70.7	12.3	3.1	101	54.7	62.9	71.2	79.9	85.5
2005	5474	71.3	12.3	1.0	100	55.9	63.7	71.7	80.4	86.0
2006	5635	70.8	12.2	12.3	102	54.9	63.2	71.4	80.1	85.6
2007	6343	70.8	12.4	0.3	103	54.2	63.4	71.4	80.2	86.1
2008	6348	71.2	12.4	1.1	105	55.0	63.8	71.9	80.4	86.3
2009	6308	71.2	12.3	1.4	102	54.5	63.9	72.0	80.3	86.3
2010	6051	71.3	12.4	0.8	103	54.6	63.6	72.2	80.8	86.2
2011	6025	71.4	12.6	0.7	101	54.2	63.9	72.4	80.7	86.8
2012	6025	71.0	12.6	0.0	101	54.5	63.5	72.4	79.9	86.1
2013	5577	71.2	12.7	0.6	105	54.1	63.6	72.9	79.9	86.3
2014	3760	71.3	13.0	0.4	103	53.6	63.7	73.1	80.3	86.7
1998-2014	87167	71.0	12.4	0.0	105	54.6	63.1	72.0	80.2	86.3

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	1662	67.8	12.1	16.5	98.1	52.3	58.9	68.6	76.7	84.0
1999	1719	68.3	11.9	10.8	97.4	53.8	60.2	68.8	76.9	83.6
2000	1636	68.4	11.6	25.1	97.8	53.9	60.4	68.6	76.7	84.3
2001	1786	68.1	11.8	14.5	102	53.5	60.6	67.9	76.7	83.5
2002	3069	68.9	11.3	20.9	98.5	54.4	61.6	69.3	76.7	82.7
2003	2976	69.2	11.3	8.4	99.4	55.0	62.4	69.4	76.9	83.0
2004	3003	69.1	11.3	22.5	101	54.5	62.0	69.2	77.1	83.7
2005	2966	69.2	11.3	19.0	99.6	55.0	62.5	69.3	77.3	83.5
2006	3118	69.0	11.3	12.3	102	54.7	62.2	69.3	77.1	83.0
2007	3592	68.9	11.8	0.3	99.4	53.7	62.0	69.4	77.6	83.2
2008	3563	69.5	11.4	6.5	105	54.5	62.7	70.1	77.7	83.4
2009	3611	69.7	11.4	1.4	102	54.1	62.7	70.8	77.8	83.4
2010	3436	69.7	11.6	0.8	98.9	54.3	62.1	70.6	78.1	83.8
2011	3422	70.0	11.7	0.8	97.3	54.1	63.3	71.3	78.2	84.2
2012	3398	69.9	11.4	0.0	101	54.9	62.8	71.0	77.8	83.8
2013	3212	70.2	11.8	0.6	99.8	54.3	63.0	71.8	78.3	84.3
2014	2090	70.2	12.3	18.4	102	53.5	62.8	72.0	78.7	84.9
1998-2014	48259	69.3	11.6	0.0	105	54.2	62.1	70.1	77.5	83.6

Table 3b

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	Median 10%	25%	50%	75%	90%
1998	1545	72.8	12.8	13.2	102	54.5	64.3	74.9	82.9	87.7
1999	1538	73.3	12.9	18.8	102	55.8	64.6	75.1	82.9	88.5
2000	1408	73.2	13.0	21.7	103	55.5	64.1	75.7	82.3	88.5
2001	1553	72.4	13.3	0.6	103	54.9	63.3	74.6	81.7	88.8
2002	2649	73.7	12.8	17.7	104	56.0	65.0	76.0	82.5	89.0
2003	2527	73.3	12.6	10.9	101	56.4	64.5	75.3	82.7	88.6
2004	2550	72.6	13.1	3.1	100	55.1	64.3	74.3	82.8	88.0
2005	2508	73.7	13.0	1.0	100	57.2	65.4	75.5	83.1	89.6
2006	2517	73.0	12.9	20.4	99.2	55.0	64.9	75.0	83.1	87.4
2007	2751	73.3	12.9	17.8	103	55.2	65.6	74.7	83.2	87.7
2008	2785	73.5	13.3	1.1	102	55.4	65.4	74.7	83.7	88.3
2009	2697	73.3	13.1	15.9	102	55.2	65.5	75.1	83.3	88.2
2010	2615	73.5	13.0	14.9	103	55.4	66.4	75.2	83.4	88.2
2011	2603	73.1	13.5	0.7	101	54.3	64.9	74.6	83.5	88.7
2012	2627	72.5	13.8	1.5	101	53.8	64.8	74.4	82.8	88.4
2013	2365	72.6	13.6	2.7	105	53.7	65.0	74.4	82.5	88.4
2014	1670	72.7	13.7	0.4	103	53.8	65.1	74.6	82.7	89.0
1998-2014	38908	73.1	13.1	0.4	105	55.1	64.9	74.9	83.0	88.4

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	18	0.0	0.0	10	0.0	0.0	8	0.0	0.0
5-9	3	0.0	0.0	3	0.0	0.0			0.0
10-14	3	0.0	0.1	1	0.0	0.1	2	0.0	0.0
15-19	31	0.1	0.1	7	0.0	0.1	24	0.1	0.2
20-24	47	0.1	0.2	20	0.1	0.2	27	0.1	0.3
25-29	89	0.2	0.4	39	0.1	0.3	50	0.2	0.6
30-34	168	0.4	0.8	84	0.3	0.6	84	0.4	1.0
35-39	305	0.7	1.4	163	0.6	1.2	142	0.7	1.7
40-44	684	1.5	2.9	381	1.4	2.7	303	1.5	3.2
45-49	1367	2.9	5.8	809	3.1	5.8	558	2.8	6.0
50-54	2279	4.9	10.8	1381	5.2	11.0	898	4.5	10.4
55-59	3316	7.1	17.9	2142	8.1	19.1	1174	5.8	16.3
60-64	4734	10.2	28.1	3121	11.9	31.0	1613	8.0	24.3
65-69	6520	14.0	42.1	4202	16.0	47.0	2318	11.5	35.8
70-74	7932	17.1	59.2	4881	18.5	65.5	3051	15.2	51.0
75-79	6932	14.9	74.1	4023	15.3	80.8	2909	14.5	65.4
80-84	5992	12.9	87.0	2964	11.3	92.0	3028	15.1	80.5
85+	6017	13.0	100.0	2093	8.0	100.0	3924	19.5	100.0
All ages	46437	100.0		26324	100.0		20113	100.0	

Included in the statistics are 29.6% multiple primaries in males and 25.5% 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=2282 %	Females DCO rate n=2712 %	Males Prop.all cancers n=91183 %	Females Prop.all cancers n=89596 %
0- 4	10	8	1.1	1.0	10.0	25.0	5.6	5.8
5- 9	3		0.3	0.0			3.1	
10-14	1	2	0.1	0.2			1.0	2.2
15-19	7	24	0.7	2.6			3.2	14.5
20-24	20	27	1.8	2.5	10.0		5.4	8.7
25-29	37	50	3.1	4.1			6.6	7.6
30-34	84	83	6.7	6.7		1.2	10.9	7.2
35-39	159	141	12.2	11.2		5.0	13.8	7.1
40-44	379	302	23.3	19.7	0.8	1.0	20.7	8.0
45-49	799	552	50.5	36.4	2.3	0.7	24.8	10.1
50-54	1358	893	104.9	69.8	5.3	2.8	27.8	13.2
55-59	2106	1156	198.3	102.9	3.6	2.2	28.8	15.5
60-64	3046	1593	310.1	150.2	4.8	3.6	28.3	17.3
65-69	4104	2279	426.6	218.3	5.5	4.6	26.3	19.9
70-74	4751	3001	522.2	287.1	6.6	6.5	28.0	25.3
75-79	3918	2852	711.5	399.8	9.6	10.3	31.4	28.4
80-84	2867	2988	820.8	532.9	16.0	18.9	33.5	34.0
85+	2043	3860	882.4	668.0	28.8	37.0	33.5	37.7
All ages	25692	19811			8.9	13.7	28.2	22.1
Incidence								
Raw			142.2	105.7				
WS			70.7	41.2				
ES			105.7	61.8				
BRD-S			136.9	80.5				

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).

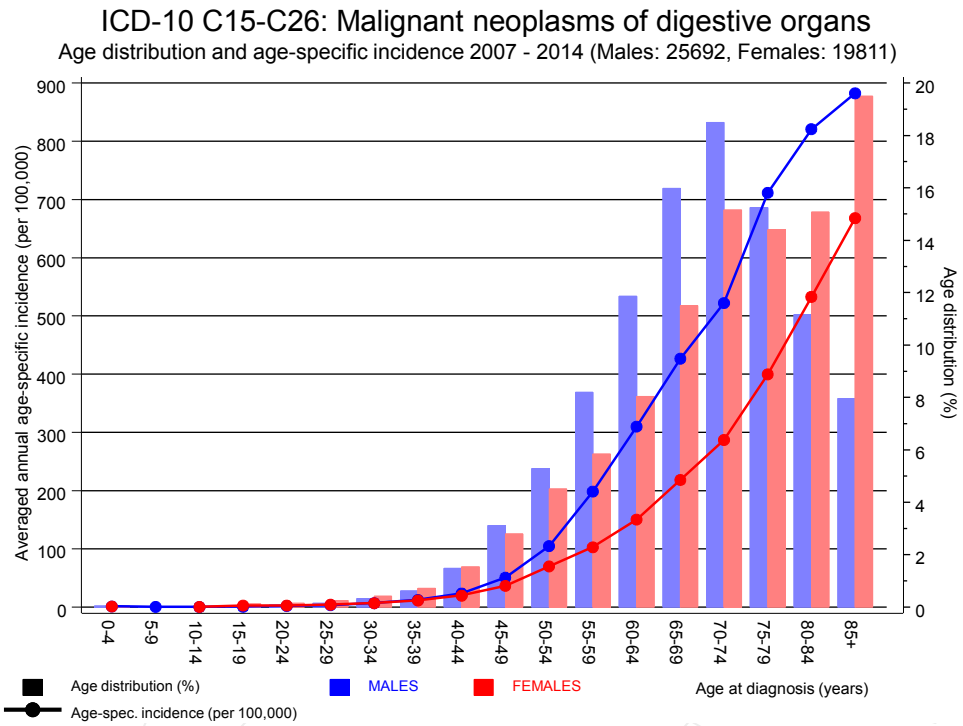


Figure 6. Age distribution and age-specific incidence

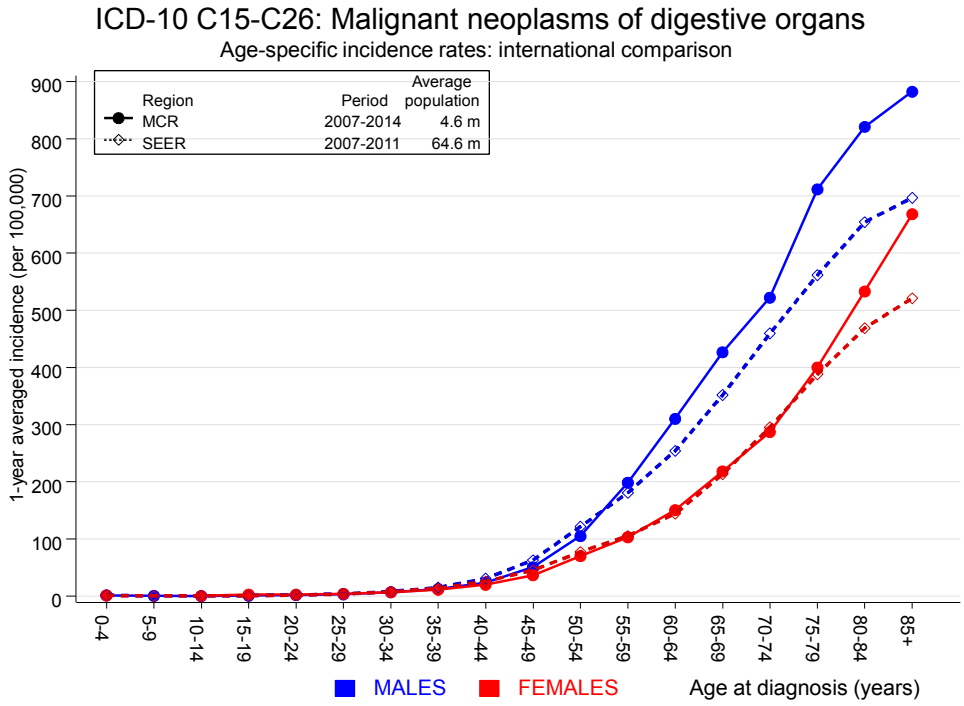


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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.

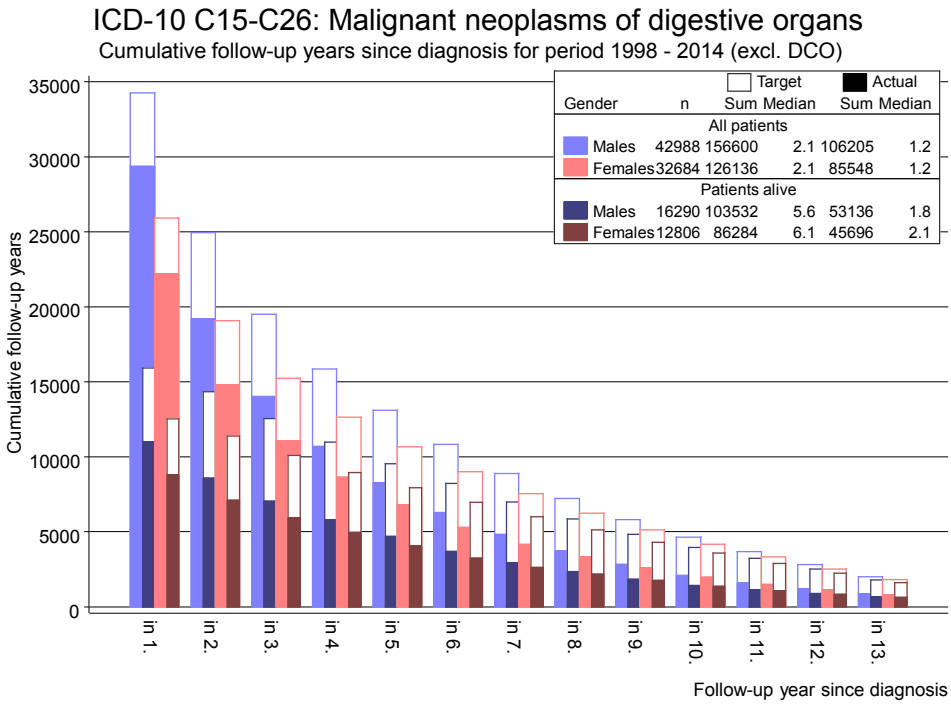


Figure 7. Cumulative follow-up years depending on time since diagnosis

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	6	2.3	2.6	0.9	5.6		0.4	
C03-C06	Oral cavity	36	14.5	2.5	1.7	3.4	#	2.1	2.8
C07-C08	Salivary gland	7	4.3	1.6	0.7	3.4		0.3	
C09-C10	Oropharynx	48	17.7	2.7	2.0	3.6	#	2.9	2.1
C12-C13	Hypopharynx	23	9.7	2.4	1.5	3.6	#	1.3	4.3
C14	ENT cancer	4	0.5	7.9	2.2	20.3	#	0.3	50.0
C15	Oesophagus	88	32.7	2.7	2.2	3.3	#	5.4	13.6
C16	Stomach	208	81.1	2.6	2.2	2.9	#	12.3	8.7
C17	Small intestine	84	9.3	9.0	7.2	11.1	#	7.2	1.2
C18	Colon	669	192.8	3.5	3.2	3.7	#	46.2	3.9
C19-C20	Rectum	288	102.8	2.8	2.5	3.1	#	17.9	3.1
C21	Anus/canal	14	3.8	3.7	2.0	6.1	#	1.0	7.1
C22	Liver	153	51.8	3.0	2.5	3.5	#	9.8	19.6
C23-C24	Bile	46	18.9	2.4	1.8	3.2	#	2.6	17.4
C25	Pancreas	171	69.9	2.4	2.1	2.8	#	9.8	23.4
C30-C31	Sinuses	4	3.1	1.3	0.3	3.3		0.1	
C32	Larynx	39	18.4	2.1	1.5	2.9	#	2.0	15.4
C33-C34	Lung	532	222.7	2.4	2.2	2.6	#	30.0	16.7
C38,C45	Mesothelioma	18	12.5	1.4	0.9	2.3		0.5	5.6
C43	Malign. melanoma	138	76.5	1.8	1.5	2.1	#	6.0	2.2
C46,C49	Soft tissue	23	10.2	2.3	1.4	3.4	#	1.2	4.3
C50	Breast	15	4.9	3.0	1.7	5.0	#	1.0	33.3
C60	Penis	9	4.4	2.0	0.9	3.9		0.4	
C61	Prostate	926	565.2	1.6	1.5	1.7	#	35.0	9.2
C62	Testis	11	3.8	2.9	1.5	5.2	#	0.7	9.1
C64	Kidney	208	65.0	3.2	2.8	3.7	#	13.9	7.2
C65	Renal pelvis	26	8.2	3.2	2.1	4.7	#	1.7	
C66	Ureter	14	4.6	3.0	1.7	5.1	#	0.9	
C67	Bladder	181	89.5	2.0	1.7	2.3	#	8.9	7.7
C68	Urinary org.	4	1.2	3.4	0.9	8.7		0.3	50.0
C70-C72	CNS cancer	49	24.2	2.0	1.5	2.7	#	2.4	26.5
C73	Thyroid	23	11.2	2.1	1.3	3.1	#	1.1	8.7
C76-C79	CUP	50	32.9	1.5	1.1	2.0	#	1.7	2.0
C81	Hodgkin lymphoma	10	3.8	2.6	1.3	4.9	#	0.6	10.0
C82-C85	NHL	160	76.9	2.1	1.8	2.4	#	8.1	6.3
C90	Mult. myeloma	43	24.7	1.7	1.3	2.3	#	1.8	25.6
C91-C96	Leukaemia	59	32.2	1.8	1.4	2.4	#	2.6	33.9
Other primaries		20	16.7	1.2	0.7	1.8		0.3	15.0
Not observed		0	2.1	0.0	0.0	1.8		-0.2	

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 %
All mult. primaries	4407	1926.9	2.3	2.2	2.4	#	240.4	9.8

Patients	42503
Median age at second malignancy (years)	73.0
Person-years	103166
Mean observation time (years)	2.4
Median observation time (years)	1.1

The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 to 3 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	13	6.1	2.1	1.1	3.6	#	0.8	
C09-C10	Oropharynx	18	3.7	4.9	2.9	7.7	#	1.7	5.6
C12-C13	Hypopharynx	5	1.0	5.1	1.7	12.0	#	0.5	20.0
C15	Oesophagus	13	6.2	2.1	1.1	3.6	#	0.8	23.1
C16	Stomach	104	45.0	2.3	1.9	2.8	#	7.0	22.1
C17	Small intestine	45	4.9	9.2	6.7	12.3	#	4.8	2.2
C18	Colon	418	122.1	3.4	3.1	3.8	#	35.1	6.5
C19-C20	Rectum	136	49.5	2.7	2.3	3.2	#	10.2	5.9
C21	Anus/canal	13	5.6	2.3	1.2	4.0	#	0.9	
C22	Liver	40	13.6	2.9	2.1	4.0	#	3.1	37.5
C23-C24	Bile	40	17.8	2.2	1.6	3.1	#	2.6	20.0
C25	Pancreas	122	53.3	2.3	1.9	2.7	#	8.1	27.0
C26	GI cancer	6	2.6	2.3	0.8	5.0		0.4	50.0
C32	Larynx	7	1.8	3.9	1.6	8.0	#	0.6	
C33-C34	Lung	236	74.7	3.2	2.8	3.6	#	19.1	16.1
C40-C41	Bone	4	0.8	4.7	1.3	12.1	#	0.4	25.0
C43	Malign. melanoma	79	36.7	2.2	1.7	2.7	#	5.0	
C46,C49	Soft tissue	13	6.2	2.1	1.1	3.6	#	0.8	
C48	Peritoneal	13	3.8	3.4	1.8	5.9	#	1.1	30.8
C50	Breast	565	304.7	1.9	1.7	2.0	#	30.8	8.3
C51	Vulva	25	12.0	2.1	1.3	3.1	#	1.5	4.0
C52	Vagina	8	2.3	3.5	1.5	6.9	#	0.7	12.5
C53	Cervix uteri	30	13.0	2.3	1.6	3.3	#	2.0	23.3
C54	Corpus uteri	119	58.0	2.1	1.7	2.5	#	7.2	5.0
C55,C57	Fem. genitals un	7	3.4	2.0	0.8	4.2		0.4	28.6
C56	Ovary	148	44.5	3.3	2.8	3.9	#	12.3	28.4
C64	Kidney	97	27.6	3.5	2.8	4.3	#	8.2	15.5
C65	Renal pelvis	10	3.6	2.8	1.3	5.1	#	0.8	
C66	Ureter	6	1.8	3.3	1.2	7.3	#	0.5	16.7
C67	Bladder	53	23.8	2.2	1.7	2.9	#	3.5	22.6
C70-C72	CNS cancer	21	14.7	1.4	0.9	2.2		0.7	52.4
C73	Thyroid	25	15.1	1.7	1.1	2.4	#	1.2	8.0
C74-C80	Cancer others	4	5.9	0.7	0.2	1.7		-0.2	75.0
C76-C79	CUP	26	22.5	1.2	0.8	1.7		0.4	7.7
C82-C85	NHL	95	44.0	2.2	1.7	2.6	#	6.0	15.8
C90	Mult. myeloma	29	14.2	2.0	1.4	2.9	#	1.8	27.6
C91-C96	Leukaemia	45	18.8	2.4	1.7	3.2	#	3.1	42.2
Other primaries		19	10.7	1.8	1.1	2.8	#	1.0	15.8
Not observed		0	1.7	0.0	0.0	2.2		-0.2	

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

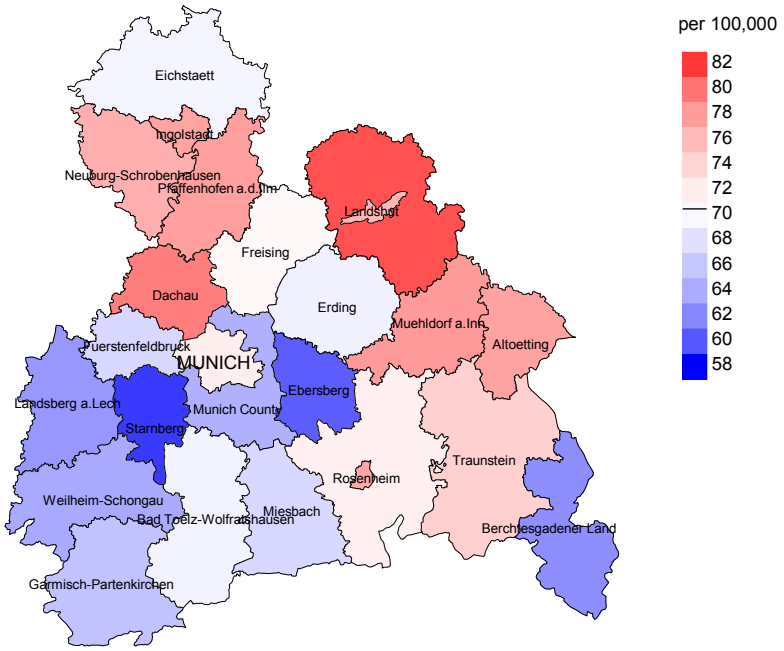
Diagnosis	Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
All mult. primaries	2657	1097.8	2.4	2.3	2.5	#	184.8	13.7

Patients	33339
Median age at second malignancy (years)	75.6
Person-years	84386
Mean observation time (years)	2.5
Median observation time (years)	1.1

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

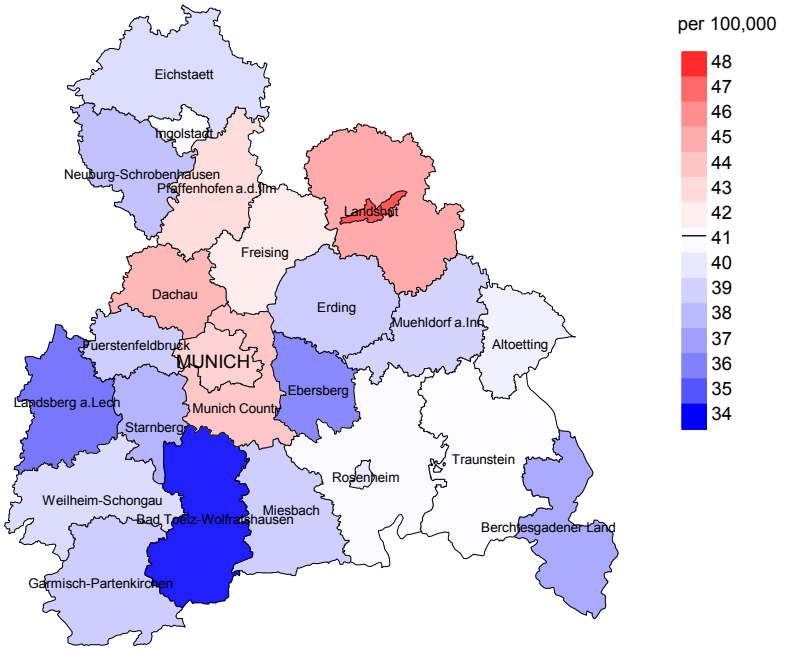


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 70.6/100,000 WS N=25,692, females 41.2/100,000 WS N=19,811).

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 444 women were identified with newly diagnosed GI cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 36.3/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 31.5 and 41.8/100,000.

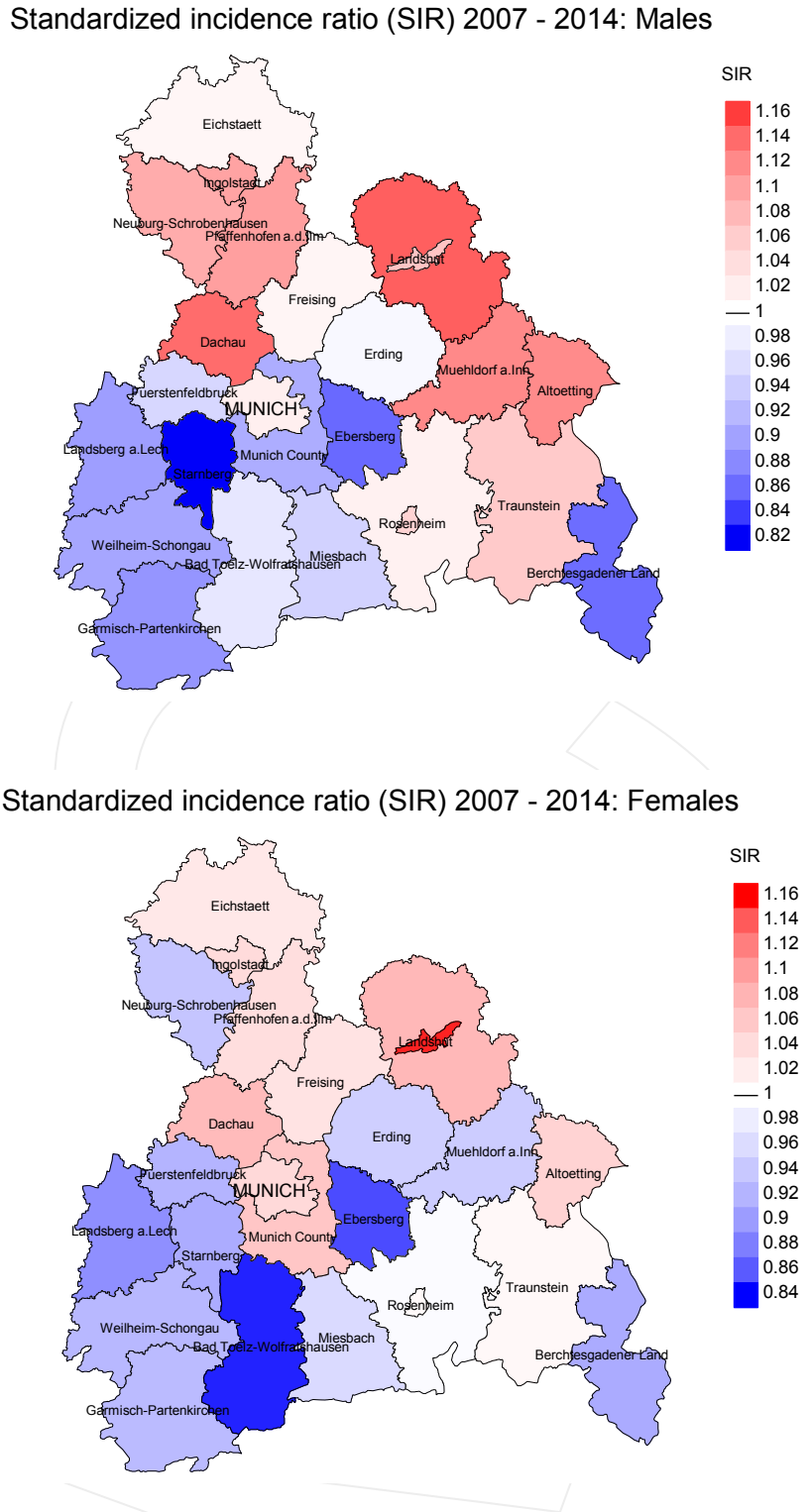


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=25,692, females N=19,811).

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 444 women were identified with newly diagnosed GI cancer. 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 0.75 and 0.96.

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	3207	98.5	11.7	2609	81.4	93.8
1999	3257	98.1	12.5	2632	80.8	94.9
2000	3044	98.7	13.6	2435	80.0	96.6
2001	3339	97.7	14.0	2568	76.9	96.6
2002	5718	98.3	19.3	4543	79.5	97.8
2003	5503	97.9	16.0	4132	75.1	98.2
2004	5553	97.7	14.2	4130	74.4	97.9
2005	5474	97.4	13.4	4086	74.6	98.4
2006	5635	95.7	10.7	3949	70.1	98.8
2007	6343	85.7	11.2	4418	69.7	98.8
2008	6348	81.4	10.9	4262	67.1	98.8
2009	6308	80.1	10.4	4062	64.4	98.7
2010	6051	79.3	10.5	3774	62.4	98.4
2011	6025	79.2	10.0	3586	59.5	98.2
2012	6025	80.6	10.1	3263	54.2	98.1
2013	5577	99.2	10.7	2550	45.7	96.9
2014	3760	98.4	15.3	1257	33.4	95.3
1998-2014	87167	90.7	12.4	58256	66.8	97.7

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	3207	2178	92.5	938	29.2
1999	3257	2262	92.1	978	30.0
2000	3044	2204	95.1	881	28.9
2001	3339	2354	95.6	969	29.0
2002	5718	3373	98.2	1967	34.4
2003	5503	3456	97.8	1679	30.5
2004	5553	3517	98.1	1613	29.0
2005	5474	3716	97.0	1607	29.4
2006	5635	3869	97.7	1609	28.6
2007	6343	4096	98.0	1760	27.7
2008	6348	4255	98.7	1831	28.8
2009	6308	4319	98.7	1714	27.2
2010	6051	4435	98.8	1676	27.7
2011	6025	4493	98.4	1706	28.3
2012	6025	4546	98.5	1737	28.8
2013	5577	4413	98.1	1575	28.2
2014	3760	3767	98.6	1121	29.8
1998–2014	87167	61253	97.6	25361	29.1

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	2178	76.3	23.7	91.3
1999	2262	80.0	20.0	91.6
2000	2204	81.7	18.3	91.2
2001	2354	78.4	21.6	91.0
2002	3373	82.9	17.1	91.8
2003	3456	81.9	18.1	91.2
2004	3517	83.4	16.6	91.0
2005	3716	81.3	18.7	89.1
2006	3869	81.4	18.6	89.6
2007	4096	80.8	19.2	89.2
2008	4255	81.3	18.7	88.5
2009	4319	79.9	20.1	87.5
2010	4435	78.1	21.9	86.6
2011	4493	78.1	21.9	86.7
2012	4546	77.5	22.5	86.1
2013	4413	75.5	24.5	83.4
2014	3767	73.6	26.4	83.1
1998-2014	61253	79.4	20.6	88.3

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	1104	72.5	70.8	78.4	72.2
1999	1184	72.3	70.6	77.9	71.8
2000	1157	72.8	70.9	80.7	71.9
2001	1222	71.9	70.1	79.5	71.1
2002	1793	72.3	70.7	79.9	71.7
2003	1887	72.6	71.2	78.9	72.2
2004	1879	73.6	71.8	80.5	72.7
2005	2029	73.0	71.2	80.3	71.6
2006	2151	73.7	71.8	80.2	72.6
2007	2281	73.2	71.9	80.2	72.5
2008	2375	74.2	72.7	80.5	73.3
2009	2428	73.6	71.8	80.0	72.5
2010	2468	74.2	72.8	81.2	73.5
2011	2573	74.2	72.5	81.8	73.3
2012	2559	74.9	73.2	81.0	73.8
2013	2487	75.7	73.6	82.8	74.4
2014	2115	75.9	74.5	82.0	75.0
1998-2014	33692	73.9	72.2	80.5	73.0

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	1074	78.2	76.2	84.3	78.3
1999	1078	79.5	78.0	84.9	79.2
2000	1047	79.2	78.0	85.4	78.8
2001	1132	79.4	77.2	86.7	78.7
2002	1580	79.8	78.6	85.8	79.3
2003	1569	79.6	77.8	85.7	78.7
2004	1638	79.8	78.2	84.8	78.8
2005	1687	79.8	78.1	84.9	78.8
2006	1718	80.2	78.4	85.8	79.2
2007	1815	80.0	77.8	86.4	78.9
2008	1880	80.3	78.1	86.4	79.1
2009	1891	80.7	78.2	86.9	79.0
2010	1967	80.9	78.2	86.7	79.4
2011	1920	80.8	77.8	87.6	78.9
2012	1987	80.5	77.2	87.7	78.2
2013	1926	80.6	77.2	87.8	78.6
2014	1652	80.5	77.4	87.4	78.5
1998-2014	27561	80.1	77.8	86.5	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	847	76.4	0.51	44.9	0.50	69.8	0.52	94.3	0.53
1999	956	85.4	0.56	49.6	0.55	77.1	0.57	104.6	0.59
2000	949	83.3	0.59	47.6	0.57	74.3	0.59	99.9	0.61
2001	982	84.7	0.56	48.5	0.55	75.2	0.56	99.0	0.58
2002	1486	79.8	0.49	43.9	0.48	67.5	0.49	89.5	0.50
2003	1568	83.6	0.53	44.8	0.52	69.2	0.53	93.1	0.55
2004	1582	84.1	0.54	43.4	0.51	67.8	0.53	92.6	0.56
2005	1682	88.8	0.58	45.2	0.56	69.6	0.57	94.2	0.59
2006	1754	91.6	0.58	45.6	0.55	71.1	0.57	96.3	0.59
2007	1863	84.1	0.53	41.2	0.50	63.9	0.52	86.7	0.54
2008	1972	88.6	0.57	42.6	0.54	66.4	0.56	90.5	0.59
2009	1964	88.0	0.55	42.4	0.54	65.1	0.55	86.1	0.56
2010	1954	86.7	0.58	40.2	0.55	62.1	0.56	84.0	0.59
2011	2036	89.1	0.61	41.6	0.58	63.8	0.60	84.7	0.61
2012	2006	87.8	0.61	40.1	0.57	62.2	0.59	83.9	0.62
2013	1922	84.1	0.62	38.3	0.58	59.7	0.60	80.6	0.62
2014	1569	68.7	0.77	30.6	0.71	48.1	0.74	65.8	0.78
1998-2014	27092	84.6	0.57	41.9	0.55	64.9	0.56	87.4	0.59

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	817	69.5	0.53	26.9	0.49	42.0	0.51	57.5	0.53
1999	855	72.1	0.56	26.3	0.50	41.7	0.52	57.7	0.54
2000	853	71.0	0.61	25.9	0.55	41.1	0.57	56.0	0.59
2001	864	71.0	0.56	26.8	0.50	42.2	0.52	57.3	0.55
2002	1311	67.0	0.50	23.8	0.45	37.5	0.46	51.4	0.48
2003	1263	64.1	0.50	23.5	0.46	36.9	0.48	50.1	0.49
2004	1350	68.3	0.54	23.8	0.46	37.8	0.48	52.0	0.51
2005	1338	67.2	0.54	24.0	0.49	37.5	0.51	50.8	0.52
2006	1399	69.6	0.56	23.7	0.48	37.6	0.51	52.1	0.54
2007	1452	62.9	0.54	22.5	0.49	35.0	0.50	47.3	0.52
2008	1488	64.1	0.54	22.2	0.48	34.9	0.50	47.3	0.52
2009	1486	63.9	0.56	21.8	0.49	34.2	0.51	46.6	0.53
2010	1512	64.6	0.59	21.7	0.52	34.1	0.54	46.2	0.55
2011	1474	62.5	0.58	21.0	0.50	32.8	0.52	44.4	0.55
2012	1520	64.4	0.59	22.1	0.51	34.4	0.53	46.4	0.56
2013	1412	59.8	0.61	20.5	0.53	32.0	0.55	43.2	0.57
2014	1204	51.0	0.73	17.1	0.62	26.8	0.65	36.6	0.69
1998-2014	21598	64.6	0.56	22.6	0.50	35.4	0.52	48.2	0.54

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.%
0-4	3	0.0	0.0	2	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	0	0.0	0.0			0.0			0.0
15-19	5	0.0	0.0	3	0.0	0.0	2	0.0	0.0
20-24	7	0.0	0.1	4	0.0	0.1	3	0.0	0.0
25-29	23	0.1	0.1	9	0.1	0.1	14	0.1	0.2
30-34	36	0.1	0.3	17	0.1	0.2	19	0.2	0.3
35-39	88	0.3	0.6	47	0.3	0.5	41	0.3	0.7
40-44	230	0.8	1.4	140	0.9	1.4	90	0.7	1.4
45-49	529	1.9	3.3	314	1.9	3.3	215	1.8	3.2
50-54	950	3.4	6.6	602	3.7	7.1	348	2.9	6.1
55-59	1613	5.7	12.4	1088	6.7	13.8	525	4.4	10.5
60-64	2457	8.7	21.1	1656	10.3	24.0	801	6.7	17.1
65-69	3644	12.9	34.0	2417	15.0	39.0	1227	10.2	27.3
70-74	4723	16.8	50.8	2952	18.3	57.3	1771	14.7	42.0
75-79	4516	16.0	66.8	2729	16.9	74.2	1787	14.9	56.9
80-84	4402	15.6	82.4	2320	14.4	88.5	2082	17.3	74.2
85+	4955	17.6	100.0	1851	11.5	100.0	3104	25.8	100.0
All ages	28182	100.0		16152	100.0		12030	100.0	

Included in the statistics are 29.6% multiple primaries in males and 25.5% 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	2	1	0.2	0.20	0.1	0.13	16.7	6.7
5- 9	1		0.1	0.33	0.0		4.8	
10-14			0.0		0.0			
15-19	3	2	0.3	0.43	0.2	0.08	8.3	9.1
20-24	4	3	0.4	0.20	0.3	0.11	8.3	10.7
25-29	9	14	0.7	0.23	1.1	0.28	14.5	21.9
30-34	17	19	1.4	0.20	1.5	0.23	19.3	17.3
35-39	47	41	3.6	0.29	3.3	0.29	26.6	15.9
40-44	140	90	8.6	0.37	5.9	0.30	30.4	14.2
45-49	314	215	19.9	0.39	14.2	0.39	30.6	17.7
50-54	602	348	46.5	0.44	27.2	0.39	32.2	19.5
55-59	1088	525	102.5	0.51	46.7	0.45	35.2	20.1
60-64	1656	801	168.6	0.53	75.5	0.50	34.7	22.5
65-69	2417	1227	251.2	0.58	117.5	0.53	33.8	23.5
70-74	2952	1771	324.4	0.60	169.4	0.58	32.3	26.9
75-79	2729	1787	495.6	0.68	250.5	0.61	32.1	28.4
80-84	2320	2082	664.2	0.78	371.3	0.69	31.4	31.7
85+	1851	3104	799.5	0.88	537.1	0.79	30.6	35.8
All ages	16152	12030					32.4	27.6
Mortality								
Raw			89.4	0.61	64.2	0.60		
WS			41.6	0.58	21.8	0.52		
ES			64.6	0.60	34.2	0.55		
BRD-S			87.3	0.62	46.5	0.57		
PYLL-70								
per 100,000			353.3		202.0			
ES			309.7		171.2			
AYLL-70			9.0		9.7			

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	162	2.0	122	75.3	13	8.0	27	16.7
C09-C10 Oropharynx	171	2.1	112	65.5	21	12.3	38	22.2
C12-C13 Hypopharynx	98	1.2	63	64.3	10	10.2	25	25.5
C15 Oesophagus	82	1.0			6	7.3	76	92.7
C16 Stomach	204	2.5			44	21.6	160	78.4
C18 Colon	517	6.3			199	38.5	318	61.5
C19-C20 Rectum	273	3.3			151	55.3	122	44.7
C22 Liver	179	2.2			42	23.5	137	76.5
C25 Pancreas	238	2.9			57	23.9	181	76.1
C32 Larynx	179	2.2	134	74.9	13	7.3	32	17.9
C33-C34 Lung	902	11.0	208	23.1	174	19.3	520	57.6
C43 Malign. melanoma	328	4.0	230	70.1	7	2.1	91	27.7
C44 Skin others	500	6.1	282	56.4	39	7.8	179	35.8
C61 Prostate	1961	23.8	1314	67.0	142	7.2	505	25.8
C64 Kidney	341	4.1	188	55.1	63	18.5	90	26.4
C67 Bladder	706	8.6	415	58.8	54	7.6	237	33.6
C70-C72 CNS cancer	131	1.6	54	41.2	11	8.4	66	50.4
C76-C79 CUP	107	1.3	43	40.2	21	19.6	43	40.2
C82-C85 NHL	306	3.7	157	51.3	48	15.7	101	33.0
C90 Mult. myeloma	103	1.3	43	41.7	15	14.6	45	43.7
C91-C96 Leukaemia	167	2.0	51	30.5	17	10.2	99	59.3
Other primaries	578	7.0	234	40.5	59	10.2	285	49.3
All mult. primaries	8233	100.0	3650	44.3	1206	14.6	3377	41.0

Multiple primaries with number of cases 1 to 65 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	134	2.3			22	16.4	112	83.6
C18	Colon	355	6.1			114	32.1	241	67.9
C19–C20	Rectum	155	2.7			76	49.0	79	51.0
C23–C24	Bile	51	0.9			13	25.5	38	74.5
C25	Pancreas	200	3.4			38	19.0	162	81.0
C33–C34	Lung	346	6.0	72	20.8	43	12.4	231	66.8
C43	Malign. melanoma	182	3.1	143	78.6	8	4.4	31	17.0
C44	Skin others	221	3.8	141	63.8	17	7.7	63	28.5
C50	Breast	1716	29.6	1274	74.2	119	6.9	323	18.8
C51	Vulva	55	0.9	34	61.8	2	3.6	19	34.5
C53	Cervix uteri	194	3.3	150	77.3	13	6.7	31	16.0
C54	Corpus uteri	372	6.4	277	74.5	20	5.4	75	20.2
C56	Ovary	353	6.1	146	41.4	74	21.0	133	37.7
C64	Kidney	156	2.7	87	55.8	33	21.2	36	23.1
C67	Bladder	214	3.7	132	61.7	10	4.7	72	33.6
C70–C72	CNS cancer	111	1.9	55	49.5	17	15.3	39	35.1
C73	Thyroid	70	1.2	48	68.6	4	5.7	18	25.7
C76–C79	CUP	71	1.2	26	36.6	21	29.6	24	33.8
C82–C85	NHL	188	3.2	101	53.7	28	14.9	59	31.4
C90	Mult. myeloma	77	1.3	27	35.1	11	14.3	39	50.6
C91–C96	Leukaemia	112	1.9	30	26.8	14	12.5	68	60.7
Other primaries		474	8.2	202	42.6	75	15.8	197	41.6
All mult. primaries		5807	100.0	2945	50.7	772	13.3	2090	36.0

Multiple primaries with number of cases 1 to 50 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	2	1	0.2	0.20	0.1	0.13	20.0	7.7
5- 9	1		0.1	0.33	0.0		5.0	
10-14			0.0		0.0			
15-19	3	2	0.3	0.43	0.2	0.08	9.1	10.0
20-24	3	3	0.3	0.16	0.3	0.11	7.0	11.5
25-29	9	13	0.7	0.26	1.1	0.28	16.4	22.0
30-34	17	16	1.4	0.20	1.3	0.21	19.8	16.8
35-39	45	36	3.5	0.30	2.9	0.27	27.3	15.9
40-44	135	84	8.3	0.38	5.5	0.31	31.8	15.1
45-49	289	189	18.3	0.39	12.5	0.37	31.4	18.4
50-54	525	307	40.6	0.43	24.0	0.39	32.9	20.7
55-59	941	446	88.6	0.50	39.7	0.45	36.0	20.8
60-64	1390	650	141.5	0.53	61.3	0.49	35.4	22.9
65-69	1944	983	202.1	0.58	94.2	0.54	34.4	24.0
70-74	2309	1399	253.8	0.63	133.8	0.58	33.1	27.6
75-79	2000	1373	363.2	0.70	192.5	0.61	32.1	28.2
80-84	1672	1621	478.7	0.82	289.1	0.67	31.3	32.2
85+	1337	2460	577.5	0.92	425.7	0.79	30.3	36.3
All ages	12622	9583					32.8	27.9
Mortality								
Raw			69.9	0.62	51.2	0.59		
WS			33.3	0.57	17.7	0.52		
ES			51.1	0.60	27.6	0.54		
BRD-S			67.8	0.62	37.1	0.56		
PYLL-70								
per 100,000			308.5		173.5			
ES			270.5		147.4			
AYLL-70			9.3		10.1			

* 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	2	1	0.2	0.20	0.1	0.13	20.0	7.7
5- 9	1		0.1	0.33	0.0		5.0	
10-14			0.0		0.0			
15-19	3	2	0.3	0.43	0.2	0.08	9.1	11.1
20-24	3	3	0.3	0.16	0.3	0.12	7.7	12.5
25-29	9	13	0.7	0.26	1.1	0.28	17.6	23.2
30-34	17	16	1.4	0.20	1.3	0.22	20.0	19.3
35-39	45	34	3.5	0.31	2.7	0.26	28.5	16.6
40-44	132	80	8.1	0.37	5.2	0.30	33.2	15.7
45-49	282	185	17.8	0.40	12.2	0.37	32.8	20.2
50-54	502	298	38.8	0.43	23.3	0.40	35.0	22.5
55-59	883	415	83.2	0.49	36.9	0.43	38.0	22.1
60-64	1292	604	131.5	0.52	57.0	0.48	37.9	24.9
65-69	1770	891	184.0	0.57	85.4	0.52	37.2	26.3
70-74	2026	1269	222.7	0.59	121.4	0.56	35.8	30.7
75-79	1718	1243	312.0	0.64	174.3	0.58	35.6	31.3
80-84	1359	1449	389.1	0.71	258.4	0.62	33.4	35.4
85+	1085	2189	468.6	0.77	378.8	0.73	31.8	38.9
All ages	11129	8692					35.3	30.3
Mortality								
Raw			61.6	0.57	46.4	0.56		
WS			29.9	0.54	16.3	0.49		
ES			45.4	0.56	25.2	0.51		
BRD-S			59.6	0.58	33.8	0.53		
PYLL-70								
per 100,000			292.6		164.8			
ES			256.7		140.2			
AYLL-70			9.5		10.3			

* See corresponding tables with multiple primaries.

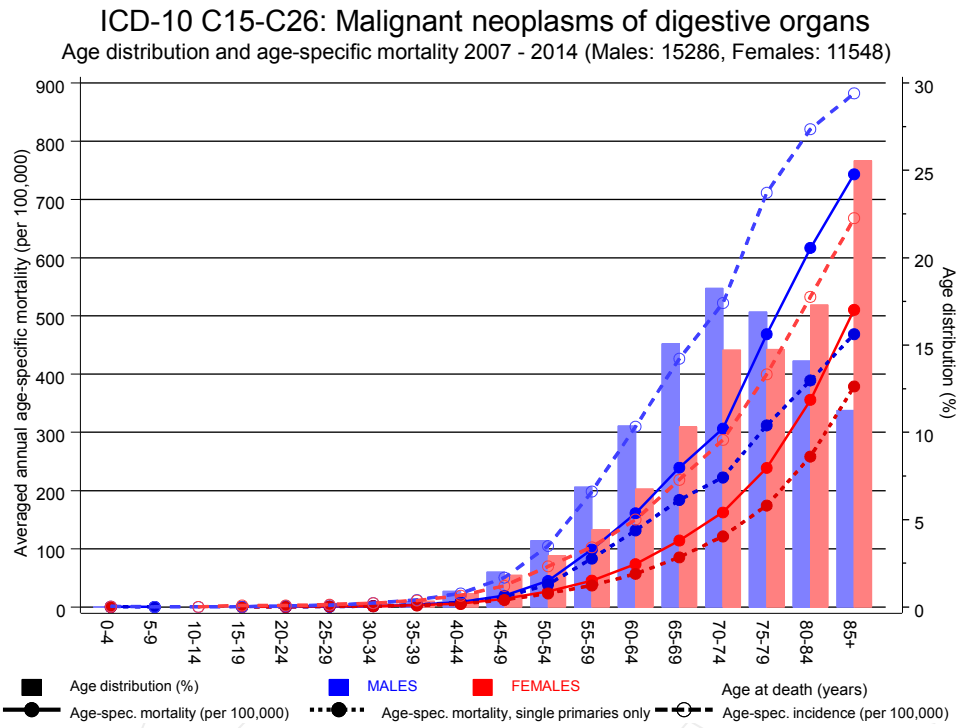
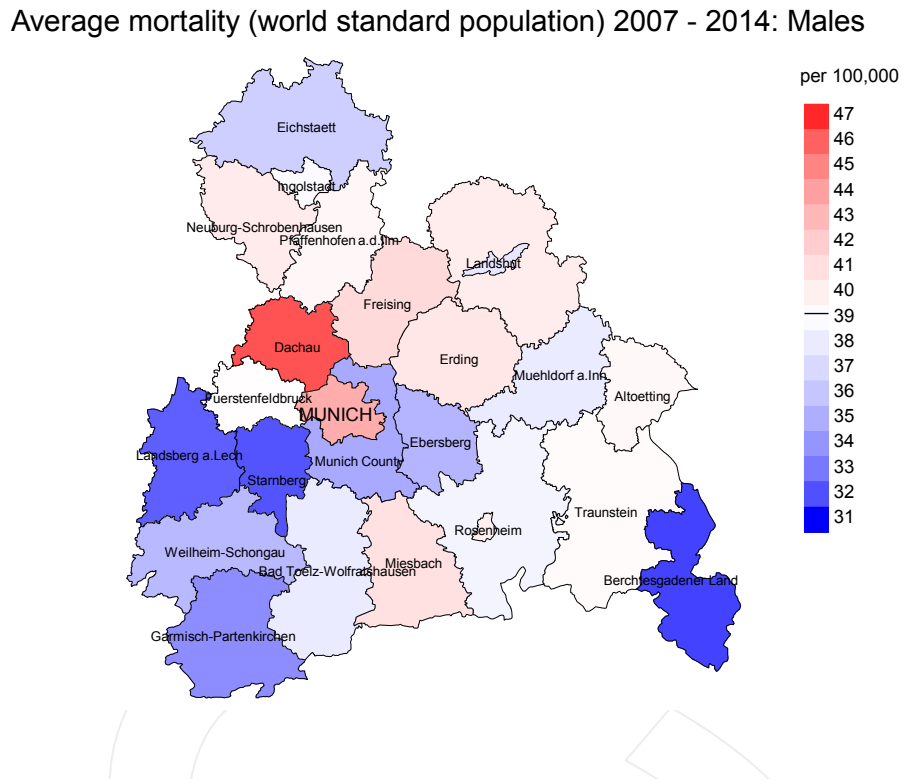


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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



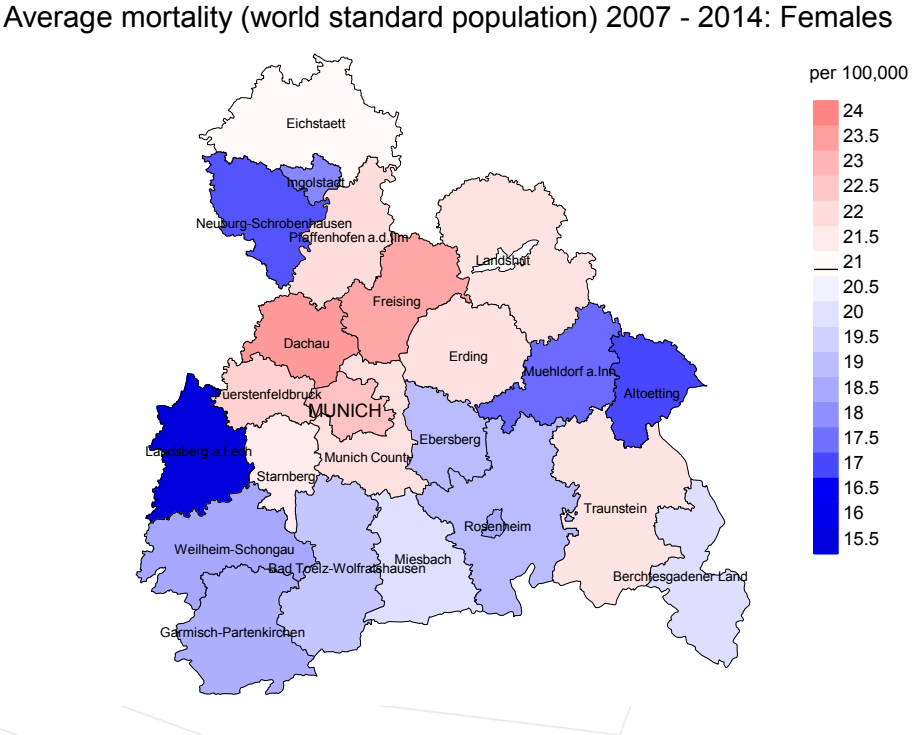
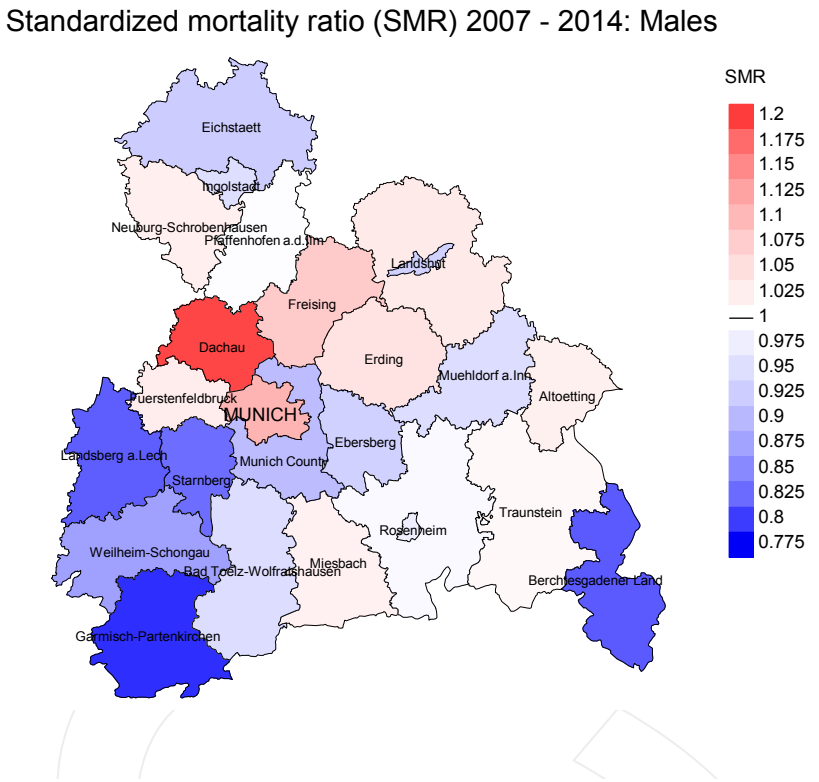


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2014. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 39.2/100,000 WS N=15,195, females 20.9/100,000 WS N=11,460).

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 272 women died from GI cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 19.0/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 15.7 and 22.9/100,000.



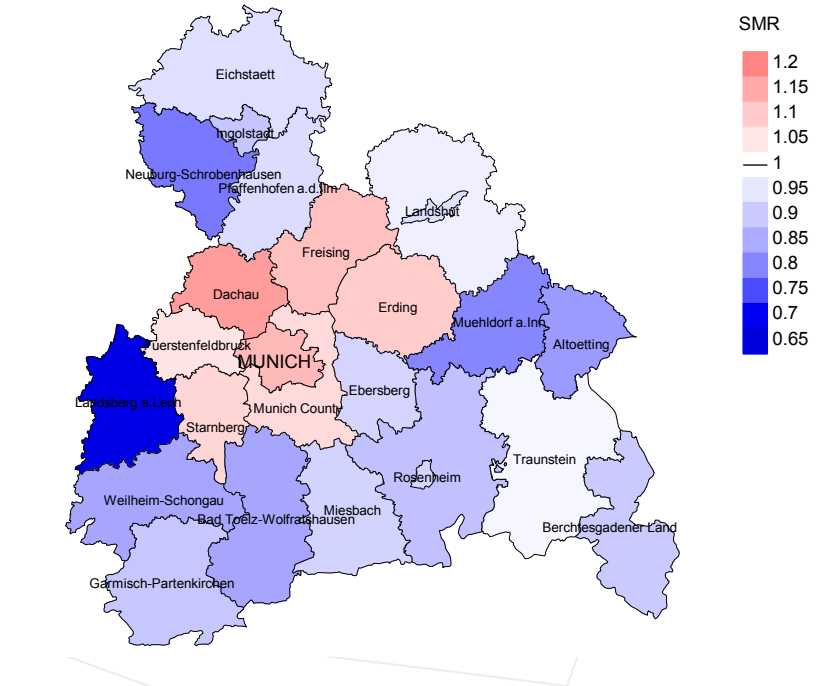


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=15,195, females N=11,460).

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 272 women died from GI cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.92. Though, the value of this parameter may vary with an underlying probability of 99% between 0.78 and 1.07, 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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