Munich Cancer Registry

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ICD-10 C16: Stomach cancer

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	12,317
Diseases	12,340
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/bC16__E-ICD-10-C16-Stomach-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
C16.-	Malignant neoplasm of stomach
C16.0	Cardia
C16.1	Fundus of stomach
C16.2	Body of stomach
C16.3	Pyloric antrum
C16.4	Pylorus
C16.5	Lesser curvature of stomach, unspecified
C16.6	Greater curvature of stomach, unspecified
C16.8	Overlapping lesion of stomach
C16.9	Stomach, unspecified

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	562	63	11.2	17.8	86.8	98.9	
1999	508	58	11.4	18.1	88.0	98.2	
2000	482	58	12.0	21.8	87.8	98.3	
2001	516	63	12.2	18.4	84.3	97.9	
2002	875	166	19.0	19.1	88.0	98.6	#
2003	764	102	13.4	20.8	85.9	98.7	
2004	841	89	10.6	21.6	81.8	98.5	
2005	771	92	11.9	24.0	80.8	96.6	
2006	764	47	6.2	22.9	75.8	95.8	
2007	878	79	9.0	23.8	77.2	87.6	#
2008	874	61	7.0	23.7	74.4	85.1	
2009	859	65	7.6	23.2	72.3	84.3	
2010	788	54	6.9	25.0	68.3	83.1	
2011	858	45	5.2	23.7	64.6	81.5	
2012	820	48	5.9	24.4	58.3	80.7	
2013	725	49	6.8	24.6	49.0	98.6	
2014	455	45	9.9	27.5	29.5	97.6	##
1998-2014	12340	1184	9.6	22.5	73.9	92.1	

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	562	293	269	52.1
1999	508	263	245	51.8
2000	482	263	219	54.6
2001	516	263	253	51.0
2002	875	455	420	52.0
2003	764	406	358	53.1
2004	841	470	371	55.9
2005	771	411	360	53.3
2006	764	429	335	56.2
2007	878	496	382	56.5
2008	874	492	382	56.3
2009	859	499	360	58.1
2010	788	472	316	59.9
2011	858	517	341	60.3
2012	820	475	345	57.9
2013	725	443	282	61.1
2014	455	273	182	60.0
1998-2014	12340	6920	5420	56.1

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	293	269	26.4	22.9	15.7	8.8	24.5	13.8	33.5	18.9
1999	263	245	23.5	20.6	13.6	7.7	21.4	11.9	29.3	16.6
2000	263	219	23.1	18.2	13.4	6.7	20.8	10.6	27.9	14.8
2001	263	253	22.7	20.8	13.1	8.5	20.1	12.9	26.7	17.0
2002	455	420	24.4	21.5	13.2	8.2	20.7	12.6	28.3	16.9
2003	406	358	21.7	18.2	11.6	6.6	18.1	10.3	24.5	14.1
2004	470	371	25.0	18.8	13.1	7.9	20.3	11.8	27.5	15.3
2005	411	360	21.7	18.1	10.9	6.8	17.1	10.5	23.6	14.0
2006	429	335	22.4	16.7	11.3	6.3	17.4	9.7	23.4	12.8
2007	496	382	22.4	16.5	11.1	5.8	17.2	9.1	23.3	12.3
2008	492	382	22.1	16.5	11.1	6.2	16.6	9.5	22.1	12.6
2009	499	360	22.4	15.5	10.7	5.8	16.5	8.8	22.0	11.7
2010	472	316	20.9	13.5	10.4	4.9	15.6	7.6	20.2	10.1
2011	517	341	22.6	14.5	10.7	5.4	16.3	8.2	21.4	10.7
2012	475	345	20.8	14.6	10.3	5.7	15.4	8.4	19.7	10.9
2013	443	282	19.4	12.0	9.3	4.8	14.0	7.1	18.4	9.1
2014	273	182	11.9	7.7	5.9	3.1	8.9	4.6	11.4	5.8
1998-2014	6920	5420	21.6	16.2	10.9	6.1	16.8	9.3	22.3	12.4

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	562	72.2	13.3	25.0	98.1	52.1	64.3	74.5	82.5	87.4
1999	508	73.0	13.3	18.8	99.9	55.6	64.3	74.8	83.1	88.4
2000	482	72.4	13.2	28.8	98.7	54.0	64.1	74.9	81.2	88.4
2001	516	71.1	13.8	14.5	96.8	53.5	62.5	72.9	81.2	88.3
2002	875	72.9	12.8	19.3	102	55.5	65.0	74.7	81.9	88.6
2003	764	73.0	12.6	17.9	98.5	56.2	64.7	74.9	82.5	87.5
2004	841	70.9	12.6	28.0	98.8	52.9	62.7	72.6	80.8	85.4
2005	771	72.8	12.9	22.1	99.3	55.6	65.1	74.7	82.2	86.8
2006	764	72.0	13.1	21.9	99.1	55.3	63.2	73.7	81.8	86.8
2007	878	72.7	12.8	27.8	101	54.6	65.4	74.6	82.3	87.4
2008	874	71.8	12.9	24.2	101	53.8	64.0	73.1	81.2	86.3
2009	859	71.9	12.9	31.1	102	53.5	64.5	73.7	81.4	87.2
2010	788	71.7	12.7	24.4	103	54.8	63.3	72.6	81.7	87.2
2011	858	71.9	12.9	18.9	98.3	53.6	64.5	73.4	81.3	87.7
2012	820	71.1	13.0	29.4	99.4	53.3	62.9	72.2	81.2	86.9
2013	725	71.0	13.4	16.2	99.5	52.7	63.2	73.2	79.9	87.1
2014	455	70.0	14.6	0.4	100	50.4	60.8	72.4	80.6	87.1
1998-2014	12340	71.9	13.0	0.4	103	53.9	63.9	73.6	81.6	87.4

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	293	70.0	13.4	25.0	94.1	50.0	59.3	72.3	79.2	86.9
1999	263	70.6	12.7	29.8	97.4	53.9	63.0	71.5	79.4	86.5
2000	263	70.0	12.8	28.8	97.2	53.5	62.4	71.3	78.3	86.7
2001	263	68.4	13.3	14.5	96.8	52.9	60.0	70.2	78.4	84.6
2002	455	71.2	11.9	32.8	95.8	55.5	63.7	72.7	79.3	85.8
2003	406	70.5	12.4	17.9	97.8	53.5	62.7	72.2	79.8	85.7
2004	470	70.2	11.9	33.1	97.4	53.7	62.5	71.3	78.9	84.5
2005	411	71.3	12.5	29.8	96.5	54.5	64.4	73.1	80.5	85.2
2006	429	70.2	12.2	29.5	99.1	54.9	62.2	71.5	79.1	84.3
2007	496	70.6	12.2	35.3	99.0	52.7	63.3	71.8	80.1	85.2
2008	492	69.9	11.8	24.2	99.5	54.0	63.5	71.2	78.4	83.7
2009	499	70.8	11.7	31.1	102	54.1	63.6	72.3	78.9	85.1
2010	472	69.9	11.9	24.4	96.4	54.8	61.0	69.9	79.9	84.2
2011	517	70.8	12.6	18.9	94.7	52.9	63.4	72.6	80.1	85.7
2012	475	69.9	12.3	29.4	99.4	53.3	61.4	70.5	79.1	84.9
2013	443	70.3	12.7	20.9	99.1	53.2	63.2	72.6	78.7	85.4
2014	273	68.5	13.5	30.9	97.7	50.4	59.5	70.4	78.0	85.0
1998-2014	6920	70.3	12.4	14.5	102	53.5	62.6	71.8	79.2	85.1

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	269	74.7	12.7	30.9	98.1	55.0	68.6	76.6	84.2	88.0
1999	245	75.6	13.4	18.8	99.9	59.4	68.5	78.4	85.2	89.8
2000	219	75.3	13.2	33.1	98.7	54.8	68.4	78.5	84.4	89.9
2001	253	73.9	13.9	26.4	96.7	54.4	65.4	75.7	84.0	90.6
2002	420	74.7	13.5	19.3	102	55.4	67.3	77.3	84.5	89.7
2003	358	75.7	12.3	30.3	98.5	59.7	68.5	77.8	83.9	89.6
2004	371	71.7	13.5	28.0	98.8	52.2	63.2	74.5	82.5	87.0
2005	360	74.5	13.1	22.1	99.3	56.7	65.7	77.3	83.8	90.8
2006	335	74.3	13.8	21.9	98.3	56.1	64.7	76.7	84.7	88.5
2007	382	75.4	13.2	27.8	101	57.1	68.3	78.1	85.4	88.7
2008	382	74.1	13.8	35.1	101	53.6	65.9	77.1	84.4	88.5
2009	360	73.6	14.2	32.6	101	51.4	66.1	77.0	84.6	88.4
2010	316	74.3	13.5	26.6	103	54.8	67.1	77.4	83.9	88.8
2011	341	73.5	13.3	28.6	98.3	54.0	66.9	74.7	82.4	89.6
2012	345	72.7	13.6	29.6	99.3	53.0	64.4	73.9	83.5	88.2
2013	282	72.1	14.3	16.2	99.5	52.5	63.1	74.2	82.6	89.3
2014	182	72.2	15.8	0.4	100	50.7	63.7	75.1	84.7	89.5
1998-2014	5420	74.0	13.6	0.4	103	54.5	66.1	76.5	84.2	89.1

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	1	0.0	0.0			0.0	1	0.0	0.0
5-9	0	0.0	0.0			0.0			0.0
10-14	0	0.0	0.0			0.0			0.0
15-19	2	0.0	0.0	1	0.0	0.0	1	0.0	0.1
20-24	3	0.0	0.1	3	0.1	0.1			0.1
25-29	11	0.2	0.3	5	0.1	0.2	6	0.2	0.3
30-34	29	0.5	0.7	11	0.3	0.5	18	0.7	1.0
35-39	67	1.1	1.8	36	1.0	1.5	31	1.2	2.2
40-44	106	1.7	3.5	61	1.7	3.2	45	1.7	3.9
45-49	216	3.5	7.0	131	3.6	6.8	85	3.3	7.2
50-54	314	5.0	12.0	194	5.3	12.1	120	4.6	11.9
55-59	415	6.6	18.6	284	7.7	19.8	131	5.1	16.9
60-64	549	8.8	27.4	381	10.4	30.2	168	6.5	23.4
65-69	780	12.5	39.8	528	14.4	44.6	252	9.7	33.1
70-74	998	16.0	55.8	632	17.2	61.8	366	14.1	47.3
75-79	958	15.3	71.1	572	15.6	77.4	386	14.9	62.2
80-84	870	13.9	85.0	465	12.7	90.1	405	15.6	77.8
85+	938	15.0	100.0	363	9.9	100.0	575	22.2	100.0
All ages	6257	100.0		3667	100.0		2590	100.0	

Included in the statistics are 31.6% multiple primaries in males and 27.6% 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=182 %	Females DCO rate n=263 %	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			0.0	0.0				
10-14			0.0	0.0				
15-19	1	1	0.1	0.1			0.5	0.6
20-24	3		0.3	0.0	33.3		0.8	
25-29	5	6	0.4	0.5			0.9	0.9
30-34	11	18	0.9	1.4			1.4	1.6
35-39	36	31	2.8	2.5		3.2	3.1	1.6
40-44	61	45	3.7	2.9		2.2	3.3	1.2
45-49	131	85	8.3	5.6			4.1	1.6
50-54	194	120	15.0	9.4	1.5	4.2	4.0	1.8
55-59	283	131	26.7	11.7	0.7	1.5	3.9	1.8
60-64	380	167	38.7	15.7	3.4	1.8	3.5	1.8
65-69	526	252	54.7	24.1	2.7	4.0	3.4	2.2
70-74	632	364	69.5	34.8	2.8	3.8	3.7	3.1
75-79	569	386	103.3	54.1	4.9	6.5	4.6	3.8
80-84	464	405	132.8	72.2	8.8	11.1	5.4	4.6
85+	363	575	156.8	99.5	17.1	27.1	6.0	5.6
All ages	3659	2587			5.0	10.2	4.0	2.9
Incidence								
Raw			20.3	13.8				
WS			9.9	5.2				
ES			15.0	7.9				
BRD-S			19.7	10.4				

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).

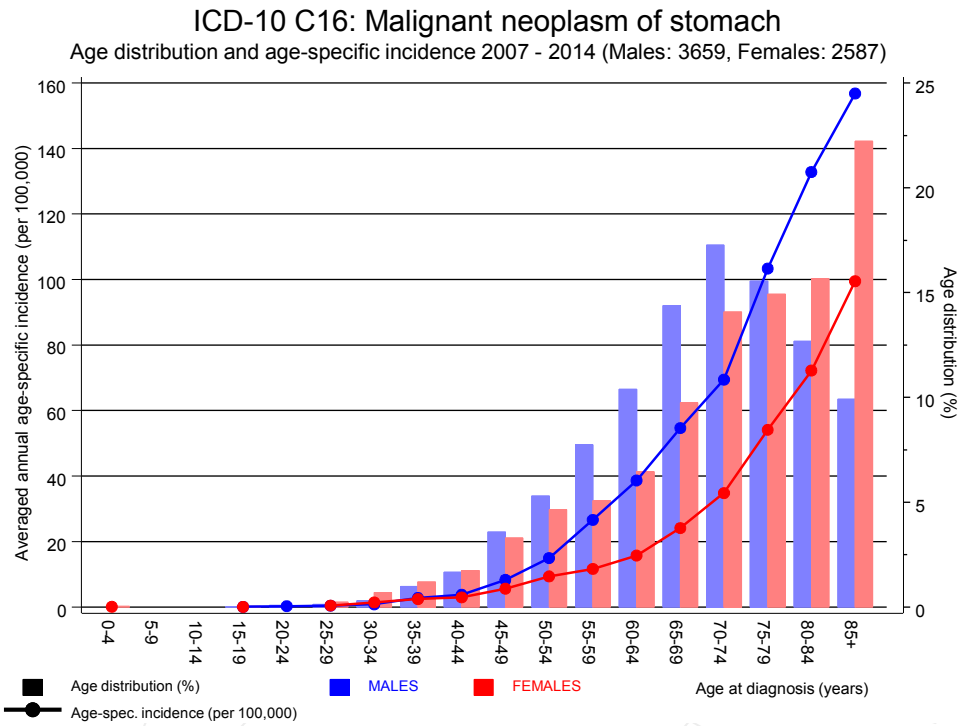


Figure 6. Age distribution and age-specific incidence

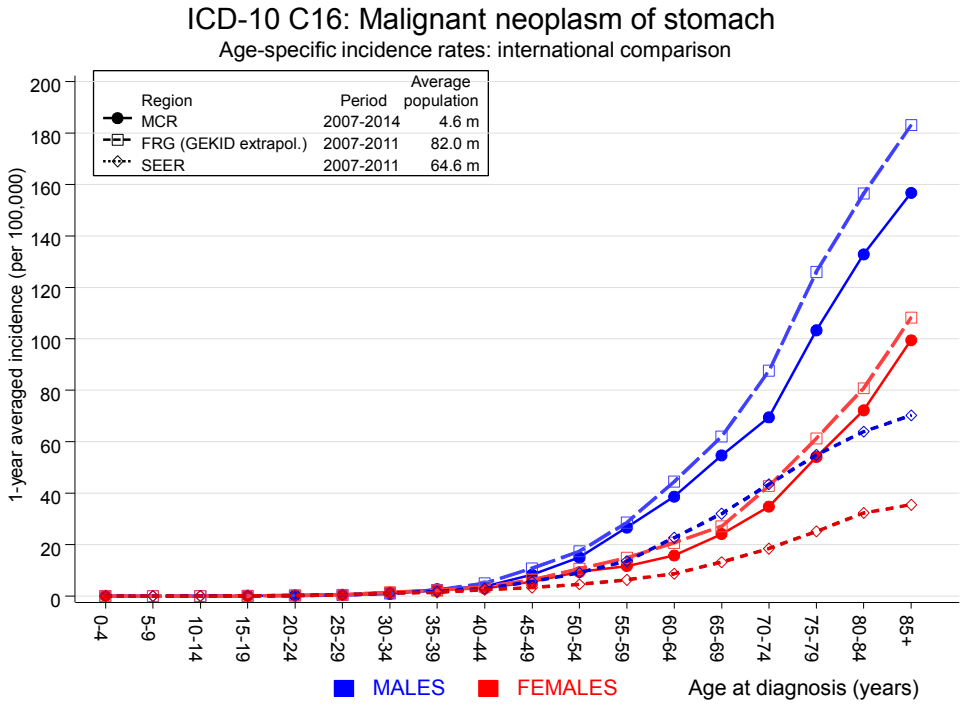


Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

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.

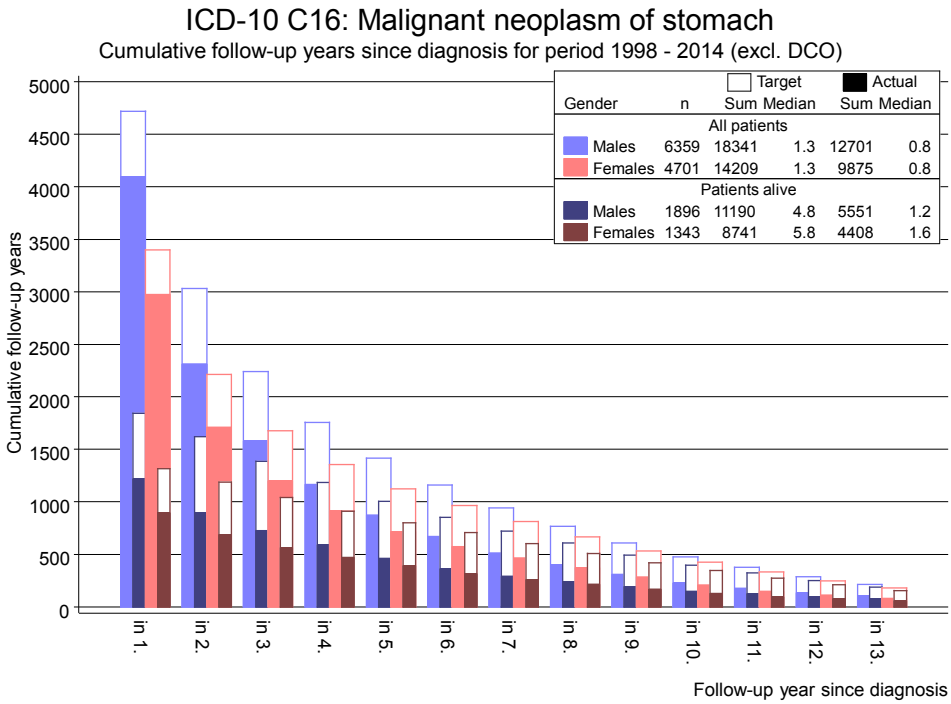


Figure 7. Cumulative follow-up years depending on time since diagnosis

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 %
C09-C10	Oropharynx	5	2.1	2.4	0.8	5.6		2.3	
C15	Oesophagus	25	4.0	6.3	4.1	9.3	#	16.5	4.0
C16	Stomach	12	10.5	1.1	0.6	2.0		1.2	8.3
C17	Small intestine	15	1.1	13.1	7.3	21.6	#	10.9	
C18	Colon	87	24.4	3.6	2.9	4.4	#	49.1	12.6
C19-C20	Rectum	37	12.7	2.9	2.1	4.0	#	19.1	5.4
C21	Anus/canal	2	0.5	4.3	0.5	15.4		1.2	50.0
C22	Liver	22	6.4	3.4	2.2	5.2	#	12.3	22.7
C23-C24	Bile	9	2.4	3.8	1.7	7.1	#	5.2	22.2
C25	Pancreas	42	8.8	4.8	3.5	6.5	#	26.1	19.0
C32	Larynx	5	2.2	2.3	0.7	5.3		2.2	40.0
C33-C34	Lung	74	27.5	2.7	2.1	3.4	#	36.5	20.3
C38,C45	Mesothelioma	5	1.5	3.3	1.1	7.7	#	2.7	
C43	Malign. melanoma	14	9.4	1.5	0.8	2.5		3.6	
C61	Prostate	96	69.8	1.4	1.1	1.7	#	20.6	20.8
C62	Testis	2	0.5	4.1	0.5	14.7		1.2	
C64	Kidney	28	7.9	3.5	2.3	5.1	#	15.7	17.9
C65	Renal pelvis	4	1.0	3.9	1.1	9.9	#	2.3	
C67	Bladder	22	11.5	1.9	1.2	2.9	#	8.2	4.5
C70-C72	CNS cancer	7	3.0	2.3	0.9	4.8		3.2	42.9
C73	Thyroid	4	1.4	2.9	0.8	7.5		2.1	
C76-C79	CUP	6	4.2	1.4	0.5	3.1		1.4	
C81	Hodgkin lymphoma	4	0.5	8.7	2.4	22.2	#	2.8	25.0
C82-C85	NHL	20	9.6	2.1	1.3	3.2	#	8.1	5.0
C90	Mult. myeloma	4	3.1	1.3	0.4	3.3		0.7	25.0
C91-C96	Leukaemia	6	4.1	1.5	0.5	3.2		1.5	50.0
Other primaries		11	3.3	3.4	1.7	6.0	#	6.1	18.2
Not observed		0	6.5	0.0	0.0	0.6	#	-5.1	
All mult. primaries		568	239.9	2.4	2.2	2.6	#	257.7	15.0

Patients	6447
Median age at second malignancy (years)	75.0
Person-years	12733
Mean observation time (years)	2.0
Median observation time (years)	0.8

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

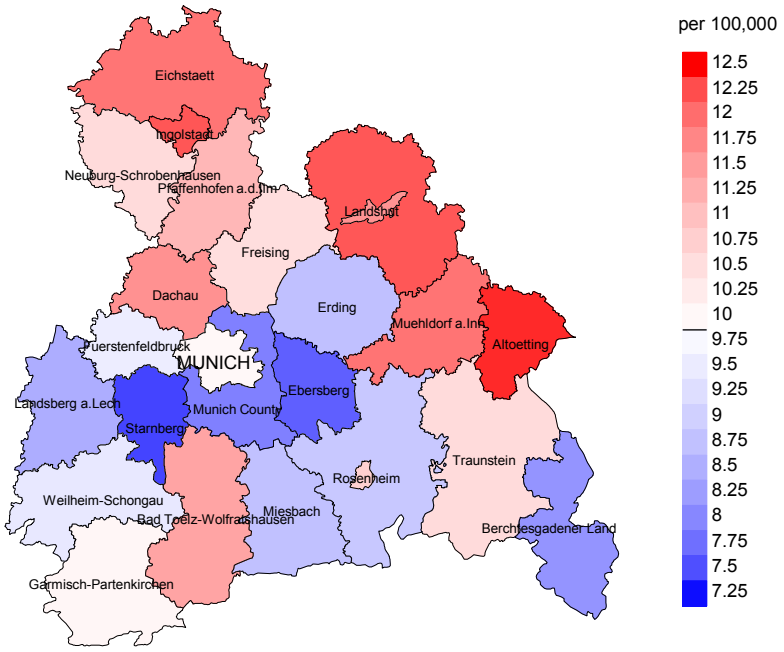
Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C03–C06	Oral cavity	2	0.7	2.8	0.3	10.0		1.3	
C09–C10	Oropharynx	2	0.4	4.8	0.6	17.3		1.6	
C16	Stomach	9	5.7	1.6	0.7	3.0		3.3	22.2
C17	Small intestine	4	0.6	7.1	1.9	18.1	#	3.5	
C18	Colon	57	15.2	3.8	2.8	4.9	#	42.1	8.8
C19–C20	Rectum	18	6.1	3.0	1.8	4.7	#	12.0	16.7
C22	Liver	7	1.6	4.2	1.7	8.7	#	5.4	28.6
C23–C24	Bile	2	2.2	0.9	0.1	3.3		−0.2	50.0
C25	Pancreas	23	6.5	3.5	2.2	5.3	#	16.6	43.5
C26	GI cancer	3	0.3	8.8	1.8	25.8	#	2.7	66.7
C33–C34	Lung	28	8.8	3.2	2.1	4.6	#	19.3	10.7
C43	Malign. melanoma	6	4.3	1.4	0.5	3.0		1.7	
C48	Peritoneal	2	0.4	4.6	0.6	16.5		1.6	100.0
C50	Breast	84	35.7	2.4	1.9	2.9	#	48.7	17.9
C51	Vulva	3	1.5	2.0	0.4	6.0		1.5	
C53	Cervix uteri	2	1.6	1.3	0.2	4.6		0.4	50.0
C54	Corpus uteri	6	6.8	0.9	0.3	1.9		−0.8	
C56	Ovary	14	5.4	2.6	1.4	4.4	#	8.7	35.7
C64	Kidney	14	3.3	4.2	2.3	7.0	#	10.7	21.4
C67	Bladder	6	3.0	2.0	0.7	4.4		3.0	33.3
C73	Thyroid	4	1.7	2.3	0.6	5.9		2.3	
C82–C85	NHL	15	5.3	2.8	1.6	4.6	#	9.7	6.7
C90	Mult. myeloma	5	1.7	2.9	0.9	6.7		3.3	20.0
C91–C96	Leukaemia	6	2.3	2.6	1.0	5.7		3.7	50.0
Other primaries		9	7.8	1.2	0.5	2.2		1.2	22.2
Not observed		0	3.0	0.0	0.0	1.2		−3.1	
All mult. primaries		331	132.1	2.5	2.2	2.8	#	200.4	19.0

Patients	4857
Median age at second malignancy (years)	76.8
Person-years	9926
Mean observation time (years)	2.0
Median observation time (years)	0.8

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

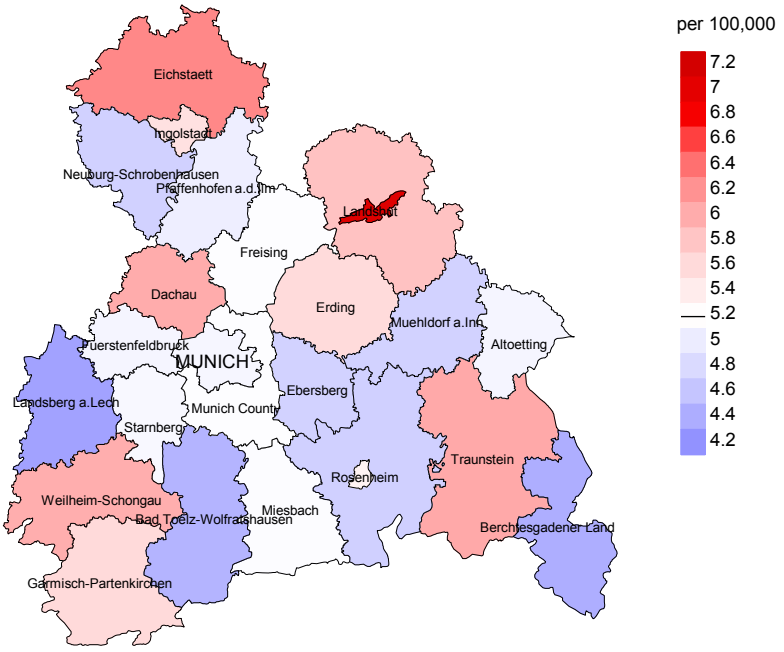
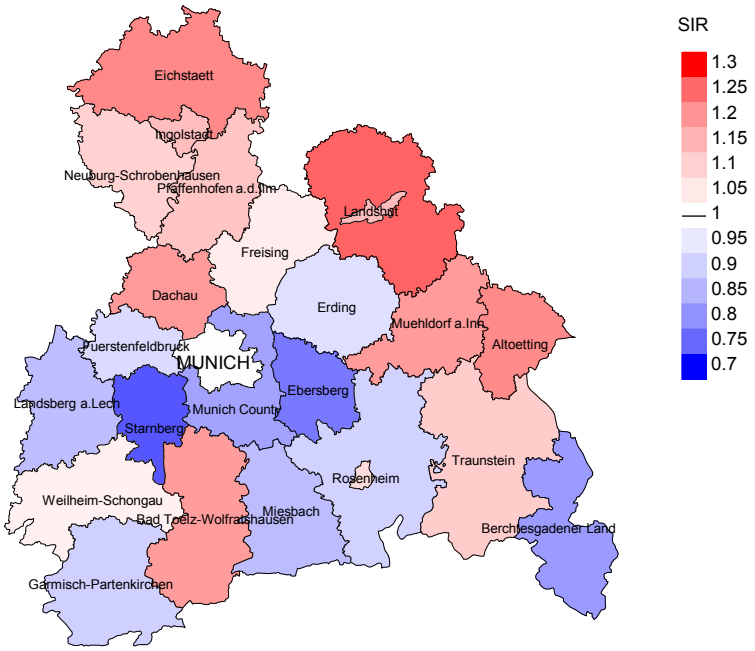


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 9.9/100,000 WS N=3,659, females 5.2/100,000 WS N=2,587).

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 65 women were identified with newly diagnosed stomach cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 4.7/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 3.2 and 6.9/100,000.

Standardized incidence ratio (SIR) 2007 - 2014: Males



Standardized incidence ratio (SIR) 2007 - 2014: Females

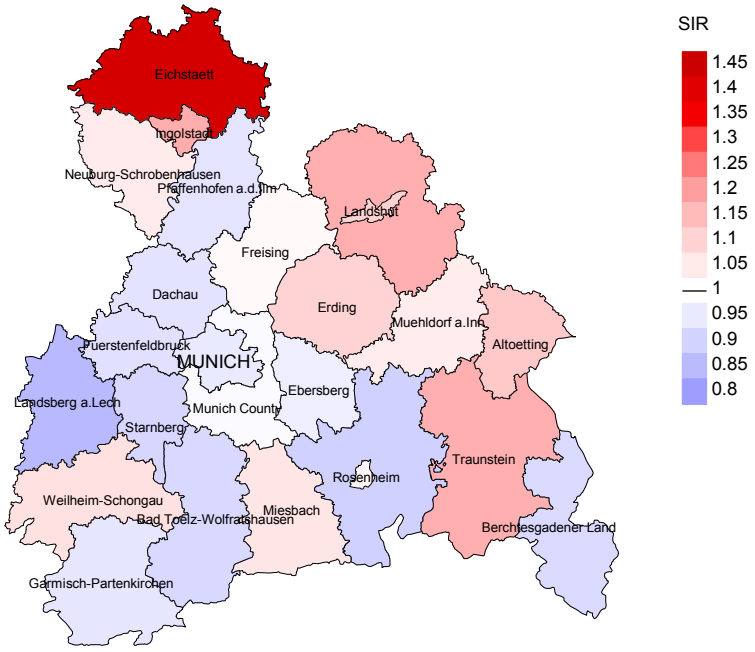


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=3,659, females N=2,587).

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 65 women were identified with newly diagnosed stomach cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.96. Though, the value of this parameter may vary with an underlying probability of 99% between 0.68 and 1.31, 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	562	98.9	11.2	488	86.8	93.4
1999	508	98.2	11.4	447	88.0	93.5
2000	482	98.3	12.0	423	87.8	97.9
2001	516	97.9	12.2	435	84.3	92.9
2002	875	98.6	19.0	770	88.0	97.8
2003	764	98.7	13.4	656	85.9	98.6
2004	841	98.5	10.6	688	81.8	97.5
2005	771	96.6	11.9	623	80.8	98.7
2006	764	95.8	6.2	579	75.8	98.1
2007	878	87.6	9.0	678	77.2	99.6
2008	874	85.1	7.0	650	74.4	98.5
2009	859	84.3	7.6	621	72.3	99.2
2010	788	83.1	6.9	538	68.3	98.3
2011	858	81.5	5.2	554	64.6	97.7
2012	820	80.7	5.9	478	58.3	97.9
2013	725	98.6	6.8	355	49.0	97.5
2014	455	97.6	9.9	134	29.5	96.3
1998-2014	12340	92.1	9.6	9117	73.9	97.5

Table 10b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased the same year of cancer diagnosis
(incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.64 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	562	452	92.9	220	39.1
1999	508	426	91.3	198	39.0
2000	482	409	95.8	167	34.6
2001	516	429	94.2	191	37.0
2002	875	611	98.0	350	40.0
2003	764	628	96.5	291	38.1
2004	841	631	97.8	265	31.5
2005	771	641	97.2	266	34.5
2006	764	615	96.7	219	28.7
2007	878	692	98.4	298	33.9
2008	874	712	98.3	279	31.9
2009	859	707	99.0	267	31.1
2010	788	664	98.5	227	28.8
2011	858	645	98.4	231	26.9
2012	820	692	99.0	237	28.9
2013	725	627	97.8	208	28.7
2014	455	530	99.2	119	26.2
1998-2014	12340	10111	97.3	4033	32.7

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	452	70.6	29.4	92.9
1999	426	81.2	18.8	93.8
2000	409	82.9	17.1	93.4
2001	429	80.0	20.0	94.3
2002	611	83.0	17.0	92.5
2003	628	83.0	17.0	91.6
2004	631	82.6	17.4	91.6
2005	641	81.3	18.7	91.5
2006	615	82.8	17.2	92.4
2007	692	81.1	18.9	90.3
2008	712	82.3	17.7	89.7
2009	707	81.5	18.5	90.1
2010	664	79.7	20.3	89.6
2011	645	78.9	21.1	88.5
2012	692	80.5	19.5	88.5
2013	627	78.6	21.4	85.6
2014	530	72.8	27.2	83.8
1998-2014	10111	80.3	19.7	90.4

Table 11a

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	219	75.4	72.7	79.6	75.4
1999	223	74.5	73.4	80.2	74.6
2000	206	74.3	72.0	79.0	73.0
2001	214	73.9	72.4	79.3	73.8
2002	320	75.1	73.8	81.6	74.6
2003	340	75.3	73.8	79.9	74.8
2004	345	76.0	74.1	82.9	74.8
2005	343	75.7	74.3	79.5	75.4
2006	342	76.8	75.4	82.5	76.2
2007	382	75.4	73.2	81.2	75.1
2008	374	76.0	74.5	81.9	75.2
2009	411	74.5	73.2	80.0	73.8
2010	391	74.5	73.1	81.8	73.8
2011	394	75.6	73.6	83.1	74.8
2012	397	75.2	73.6	82.5	73.9
2013	373	76.2	74.8	84.2	75.4
2014	307	76.3	75.0	80.9	75.7
1998-2014	5581	75.4	73.8	81.4	74.8

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	233	79.7	77.2	83.0	80.0
1999	203	80.1	78.3	85.2	80.2
2000	203	80.3	79.1	85.5	79.7
2001	215	79.5	78.2	85.7	79.5
2002	291	81.2	79.4	86.3	80.4
2003	288	79.1	77.7	86.5	78.7
2004	286	79.8	78.3	84.5	79.2
2005	298	79.7	78.3	84.4	78.9
2006	273	80.8	79.4	85.5	80.3
2007	310	81.7	80.9	85.9	81.3
2008	338	81.1	78.3	87.3	79.5
2009	296	81.5	80.4	85.0	80.8
2010	273	81.9	79.8	86.8	81.2
2011	251	81.4	79.4	87.7	80.3
2012	295	78.6	75.5	86.7	77.1
2013	254	82.4	78.4	87.1	79.3
2014	223	80.0	76.9	85.8	77.7
1998-2014	4530	80.6	78.7	85.8	79.7

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	155	14.0	0.53	8.1	0.52	12.8	0.52	17.5	0.52
1999	185	16.5	0.71	9.5	0.70	15.1	0.71	20.6	0.71
2000	166	14.6	0.63	8.3	0.62	13.1	0.63	17.9	0.65
2001	170	14.7	0.65	8.3	0.64	13.2	0.66	18.1	0.68
2002	261	14.0	0.57	7.5	0.57	12.0	0.58	16.5	0.58
2003	283	15.1	0.70	7.9	0.68	12.6	0.70	17.6	0.72
2004	291	15.5	0.62	7.7	0.59	12.5	0.62	17.6	0.64
2005	290	15.3	0.71	7.5	0.69	11.9	0.70	16.9	0.72
2006	274	14.3	0.64	6.9	0.61	11.1	0.64	15.6	0.67
2007	308	13.9	0.62	6.7	0.60	10.6	0.62	14.7	0.63
2008	316	14.2	0.64	6.6	0.60	10.6	0.64	14.7	0.67
2009	338	15.1	0.68	7.2	0.67	11.1	0.67	14.9	0.68
2010	316	14.0	0.67	6.6	0.63	10.0	0.64	13.5	0.67
2011	307	13.4	0.59	6.2	0.58	9.7	0.60	12.9	0.60
2012	317	13.9	0.67	6.3	0.61	9.7	0.63	13.2	0.67
2013	308	13.5	0.70	6.2	0.67	9.6	0.69	13.1	0.72
2014	219	9.6	0.81	4.3	0.73	6.8	0.77	9.2	0.82
1998-2014	4504	14.1	0.65	6.8	0.63	10.8	0.64	14.8	0.66

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	164	13.9	0.61	5.2	0.58	8.1	0.59	11.1	0.59
1999	161	13.6	0.66	5.3	0.68	8.1	0.68	11.0	0.67
2000	173	14.4	0.79	4.9	0.73	7.9	0.74	11.0	0.74
2001	173	14.2	0.68	5.1	0.61	8.2	0.63	11.1	0.65
2002	246	12.6	0.59	4.4	0.54	6.9	0.55	9.5	0.56
2003	238	12.1	0.66	4.5	0.68	7.0	0.68	9.5	0.68
2004	230	11.6	0.62	4.1	0.52	6.5	0.55	8.9	0.58
2005	231	11.6	0.64	4.3	0.63	6.6	0.63	8.9	0.63
2006	235	11.7	0.70	3.9	0.63	6.2	0.64	8.7	0.68
2007	253	11.0	0.66	3.8	0.65	5.9	0.65	7.8	0.63
2008	270	11.6	0.71	3.9	0.63	6.2	0.65	8.6	0.68
2009	238	10.2	0.66	3.3	0.57	5.3	0.60	7.4	0.63
2010	213	9.1	0.67	3.0	0.60	4.7	0.62	6.4	0.63
2011	202	8.6	0.59	2.9	0.53	4.5	0.55	6.1	0.56
2012	240	10.2	0.70	3.7	0.66	5.6	0.67	7.5	0.69
2013	185	7.8	0.66	2.5	0.53	4.1	0.57	5.5	0.61
2014	167	7.1	0.92	2.5	0.81	3.8	0.83	5.0	0.87
1998-2014	3619	10.8	0.67	3.7	0.61	5.9	0.63	8.0	0.64

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	1	0.0	0.0			0.0	1	0.1	0.1
5-9	0	0.0	0.0			0.0			0.1
10-14	0	0.0	0.0			0.0			0.1
15-19	0	0.0	0.0			0.0			0.1
20-24	3	0.1	0.1	2	0.1	0.1	1	0.1	0.1
25-29	7	0.2	0.3	3	0.1	0.2	4	0.2	0.3
30-34	10	0.2	0.5	2	0.1	0.3	8	0.5	0.8
35-39	28	0.7	1.2	17	0.7	1.0	11	0.6	1.4
40-44	41	1.0	2.1	23	0.9	1.9	18	1.0	2.4
45-49	105	2.5	4.6	62	2.5	4.5	43	2.4	4.9
50-54	141	3.4	8.0	85	3.5	8.0	56	3.2	8.0
55-59	247	5.9	13.9	164	6.7	14.7	83	4.7	12.7
60-64	332	7.9	21.8	235	9.7	24.4	97	5.5	18.2
65-69	484	11.5	33.3	327	13.4	37.8	157	8.9	27.0
70-74	629	15.0	48.2	408	16.8	54.6	221	12.5	39.5
75-79	621	14.8	63.0	375	15.4	70.0	246	13.9	53.4
80-84	711	16.9	79.9	396	16.3	86.3	315	17.8	71.2
85+	844	20.1	100.0	333	13.7	100.0	511	28.8	100.0
All ages	4204	100.0		2432	100.0		1772	100.0	

Included in the statistics are 31.6% multiple primaries in males and 27.6% 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		1	0.0		0.1	1.00		6.7
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	2	1	0.2	0.67	0.1	1.00	4.2	3.6
25-29	3	4	0.2	0.60	0.3	0.67	4.8	6.3
30-34	2	8	0.2	0.18	0.6	0.44	2.3	7.3
35-39	17	11	1.3	0.47	0.9	0.35	9.6	4.3
40-44	23	18	1.4	0.38	1.2	0.40	5.0	2.8
45-49	62	43	3.9	0.47	2.8	0.51	6.0	3.5
50-54	85	56	6.6	0.44	4.4	0.47	4.6	3.1
55-59	164	83	15.4	0.58	7.4	0.63	5.3	3.2
60-64	235	97	23.9	0.62	9.1	0.58	4.9	2.7
65-69	327	157	34.0	0.62	15.0	0.62	4.6	3.0
70-74	408	221	44.8	0.65	21.1	0.60	4.5	3.4
75-79	375	246	68.1	0.66	34.5	0.64	4.4	3.9
80-84	396	315	113.4	0.85	56.2	0.78	5.4	4.8
85+	333	511	143.8	0.92	88.4	0.89	5.5	5.9
All ages	2432	1772					4.9	4.1
Mortality								
Raw			13.5	0.66	9.5	0.68		
WS			6.2	0.63	3.2	0.62		
ES			9.7	0.65	5.0	0.63		
BRD-S			13.2	0.67	6.8	0.65		
PYLL-70								
per 100,000			56.1		35.0			
ES			49.1		30.3			
AYLL-70			9.8		11.6			

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	14	1.0	13	92.9			1	7.1
C09–C10 Oropharynx	19	1.3	10	52.6	3	15.8	6	31.6
C15 Oesophagus	15	1.0			3	20.0	12	80.0
C16 Stomach	26	1.8			14	53.8	12	46.2
C18 Colon	184	12.7	85	46.2	47	25.5	52	28.3
C19–C20 Rectum	78	5.4	42	53.8	15	19.2	21	26.9
C22 Liver	27	1.9	3	11.1	10	37.0	14	51.9
C23–C24 Bile	17	1.2	3	17.6	3	17.6	11	64.7
C25 Pancreas	63	4.4	13	20.6	20	31.7	30	47.6
C32 Larynx	25	1.7	18	72.0	2	8.0	5	20.0
C33–C34 Lung	160	11.1	41	25.6	33	20.6	86	53.8
C43 Malign. melanoma	42	2.9	33	78.6	1	2.4	8	19.0
C44 Skin others	77	5.3	54	70.1	5	6.5	18	23.4
C61 Prostate	313	21.6	218	69.6	25	8.0	70	22.4
C62 Testis	11	0.8	9	81.8			2	18.2
C64 Kidney	52	3.6	27	51.9	4	7.7	21	40.4
C67 Bladder	121	8.4	78	64.5	12	9.9	31	25.6
C70–C72 CNS cancer	17	1.2	10	58.8	1	5.9	6	35.3
C76–C79 CUP	15	1.0	10	66.7	2	13.3	3	20.0
C82–C85 NHL	47	3.2	25	53.2	8	17.0	14	29.8
C90 Mult. myeloma	16	1.1	10	62.5	2	12.5	4	25.0
C91–C96 Leukaemia	29	2.0	7	24.1	1	3.4	21	72.4
Other primaries	79	5.5	45	57.0	4	5.1	30	38.0
All mult. primaries	1447	100.0	754	52.1	215	14.9	478	33.0

Multiple primaries with number of cases 1 to 8 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	13	1.3			5	38.5	8	61.5
C18	Colon	131	13.2	58	44.3	30	22.9	43	32.8
C19-C20	Rectum	41	4.1	19	46.3	5	12.2	17	41.5
C25	Pancreas	44	4.4	5	11.4	13	29.5	26	59.1
C33-C34	Lung	46	4.6	13	28.3	10	21.7	23	50.0
C43	Malign. melanoma	27	2.7	22	81.5	1	3.7	4	14.8
C44	Skin others	37	3.7	27	73.0	2	5.4	8	21.6
C50	Breast	306	30.8	220	71.9	26	8.5	60	19.6
C53	Cervix uteri	18	1.8	15	83.3	1	5.6	2	11.1
C54	Corpus uteri	46	4.6	39	84.8	3	6.5	4	8.7
C56	Ovary	55	5.5	31	56.4	8	14.5	16	29.1
C64	Kidney	25	2.5	9	36.0	8	32.0	8	32.0
C67	Bladder	27	2.7	16	59.3	2	7.4	9	33.3
C70-C72	CNS cancer	16	1.6	8	50.0	2	12.5	6	37.5
C73	Thyroid	10	1.0	8	80.0			2	20.0
C82-C85	NHL	38	3.8	22	57.9	6	15.8	10	26.3
C90	Mult. myeloma	11	1.1	5	45.5	2	18.2	4	36.4
C91-C96	Leukaemia	14	1.4	3	21.4	1	7.1	10	71.4
Other primaries		89	9.0	46	51.7	17	19.1	26	29.2
All mult. primaries		994	100.0	566	56.9	142	14.3	286	28.8

Multiple primaries with number of cases 1 to 9 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		1	0.0		0.1	1.00		7.7
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	1	1	0.1	0.50	0.1	1.00	2.3	3.8
25-29	3	4	0.2	0.60	0.3	0.67	5.5	6.8
30-34	2	7	0.2	0.20	0.6	0.39	2.3	7.4
35-39	17	11	1.3	0.47	0.9	0.35	10.3	4.8
40-44	23	18	1.4	0.39	1.2	0.44	5.4	3.2
45-49	57	40	3.6	0.46	2.6	0.52	6.2	3.9
50-54	77	49	5.9	0.44	3.8	0.48	4.8	3.3
55-59	145	65	13.7	0.58	5.8	0.59	5.6	3.0
60-64	199	78	20.3	0.62	7.4	0.58	5.1	2.7
65-69	254	125	26.4	0.62	12.0	0.63	4.5	3.0
70-74	336	187	36.9	0.69	17.9	0.66	4.8	3.7
75-79	274	188	49.8	0.70	26.4	0.64	4.4	3.9
80-84	301	262	86.2	0.88	46.7	0.78	5.6	5.2
85+	247	404	106.7	0.98	69.9	0.90	5.6	6.0
All ages	1936	1440					5.0	4.2
Mortality								
Raw			10.7	0.67	7.7	0.69		
WS			5.1	0.63	2.6	0.62		
ES			7.8	0.66	4.1	0.64		
BRD-S			10.5	0.68	5.5	0.66		
PYLL-70								
per 100,000			50.0		30.7			
ES			43.6		26.6			
AYLL-70			10.3		12.2			

* 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		1	0.0		0.1	1.00		7.7
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	1	1	0.1	0.50	0.1	1.00	2.6	4.2
25-29	3	4	0.2	0.60	0.3	0.67	5.9	7.1
30-34	2	7	0.2	0.20	0.6	0.39	2.4	8.4
35-39	17	11	1.3	0.47	0.9	0.35	10.8	5.4
40-44	23	17	1.4	0.40	1.1	0.43	5.8	3.3
45-49	56	39	3.5	0.46	2.6	0.52	6.5	4.3
50-54	74	48	5.7	0.44	3.7	0.49	5.2	3.6
55-59	140	62	13.2	0.58	5.5	0.57	6.0	3.3
60-64	185	71	18.8	0.61	6.7	0.54	5.4	2.9
65-69	237	112	24.6	0.60	10.7	0.60	5.0	3.3
70-74	307	171	33.7	0.67	16.4	0.64	5.4	4.1
75-79	230	173	41.8	0.62	24.3	0.62	4.8	4.4
80-84	251	239	71.9	0.78	42.6	0.75	6.2	5.8
85+	219	366	94.6	0.89	63.3	0.83	6.4	6.5
All ages	1745	1322					5.5	4.6
Mortality								
Raw			9.7	0.64	7.1	0.66		
WS			4.6	0.61	2.5	0.60		
ES			7.1	0.62	3.8	0.61		
BRD-S			9.4	0.64	5.1	0.63		
PYLL-70								
per 100,000			48.2		29.5			
ES			42.1		25.7			
AYLL-70			10.5		12.5			

* See corresponding tables with multiple primaries.

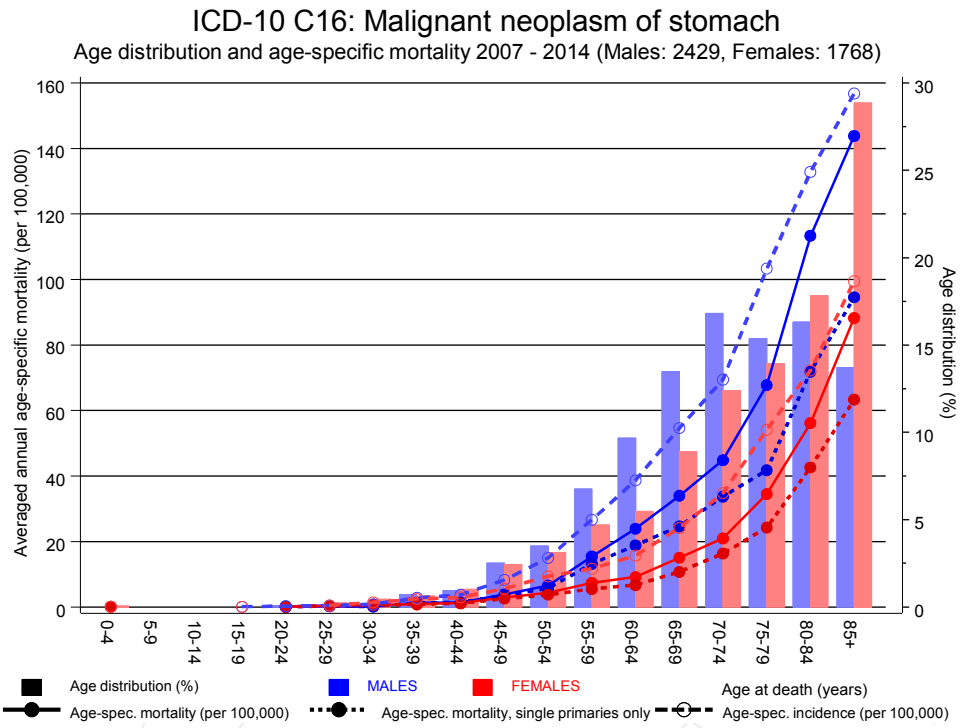


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

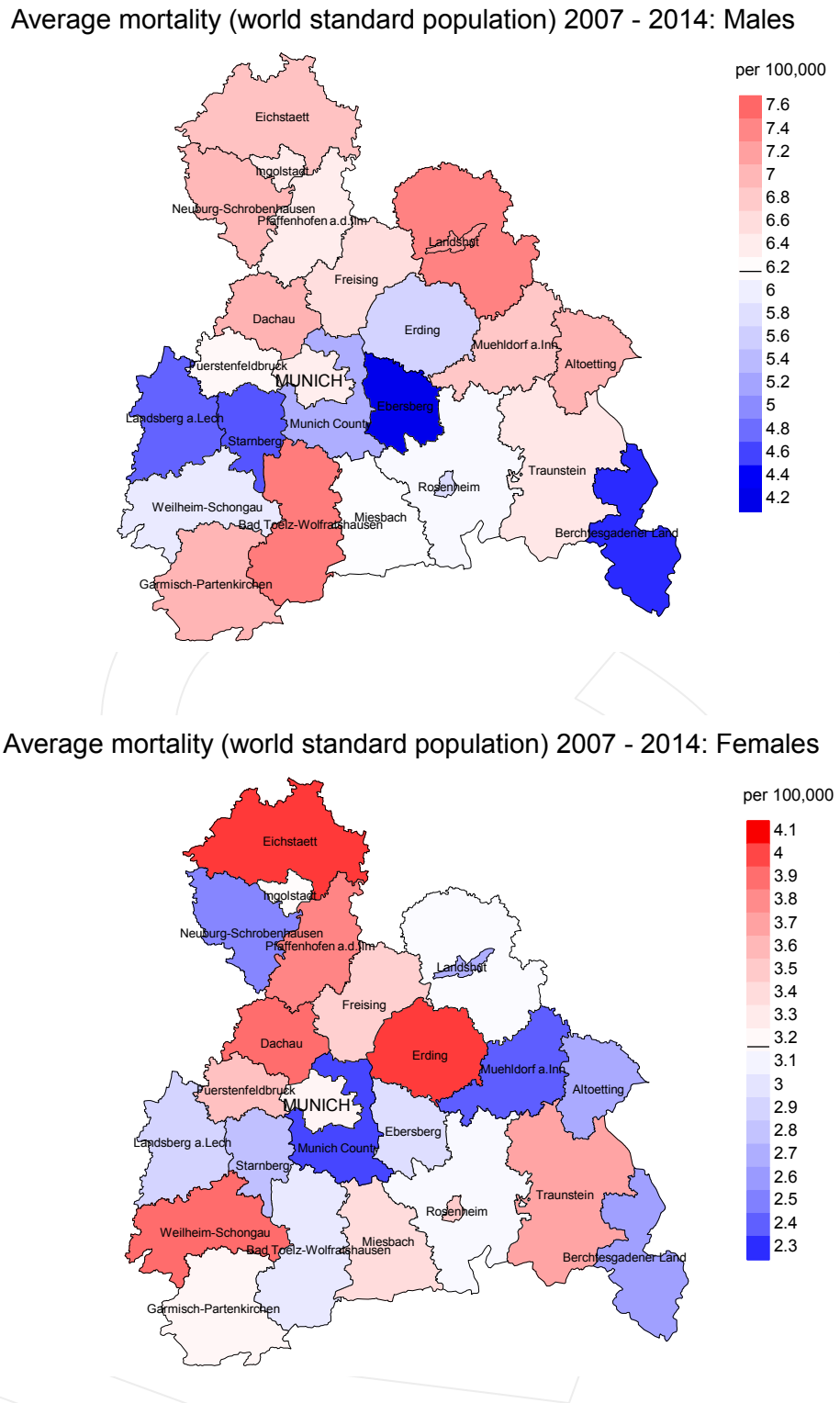
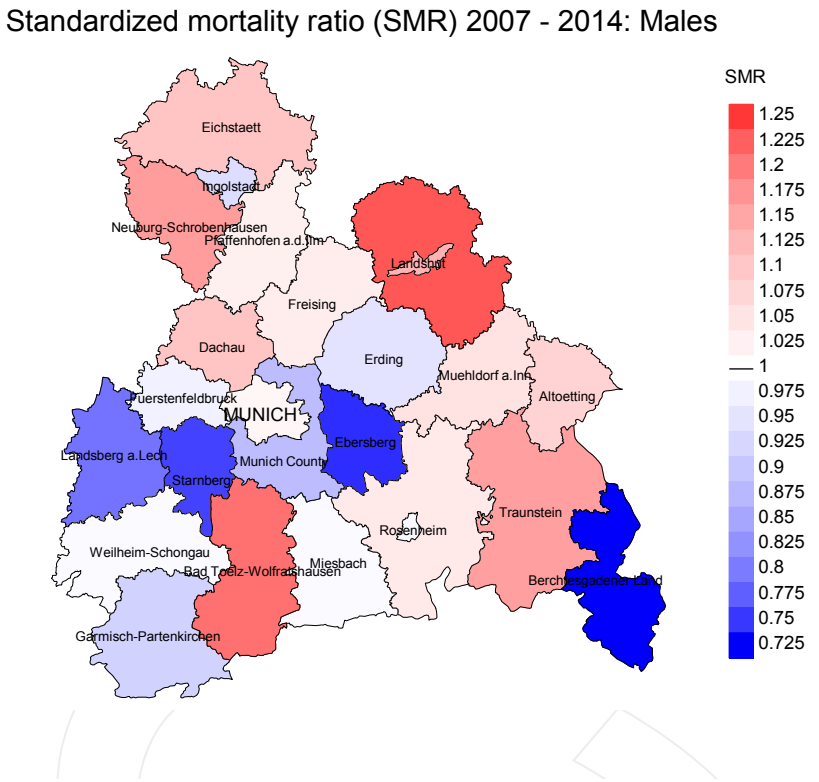


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2014. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 6.2/100,000 WS N=2,420, females 3.2/100,000 WS N=1,752).

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 45 women died from stomach cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 3.0/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.8 and 4.7/100,000.



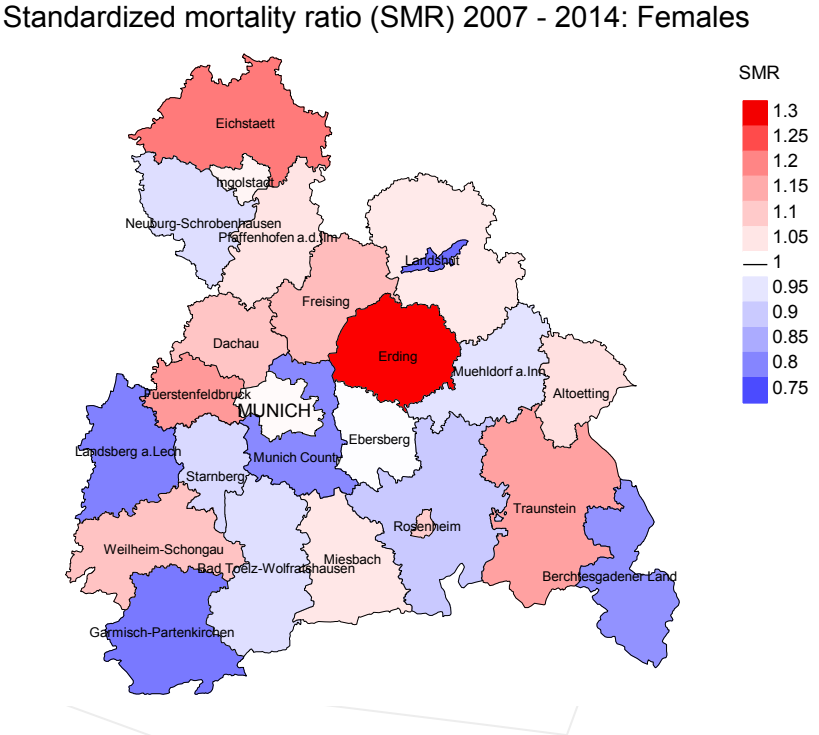


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=2,420, females N=1,752).

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 45 women died from stomach cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.00. Though, the value of this parameter may vary with an underlying probability of 99% between 0.66 and 1.45, 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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