

Munich Cancer Registry



- ▶ Survival
- ▶ Selection Matrix
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- ▶ *Deutsch*

ICD-10 C15-C26: GI cancer

Incidence and Mortality

Year of diagnosis	1998-2016
Patients	96,513
Diseases	99,818
Creation date	08/21/2018
Export date	08/09/2018
Population	4.81 m



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

<https://www.tumorregister-muenchen.de/en/facts/base/bC1526E-ICD-10-C15-C26-GI-cancer-incidence-and-mortality.pdf>

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**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 4.69 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, August 2018

- [#] 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 2.65 million to 4.10 in 2002, and to 4.69 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

Cases with invasive cancer by year of diagnosis, proportions of DCO, further malignancies, deaths, and active follow-up (ALL PATIENTS) (incl. DCO)

Year of diagnosis	All cases n	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	3257	401	12.3	10.9	7.7	83.1	98.0
1999	3292	438	13.3	11.5	7.5	82.5	97.4
2000	3092	451	14.6	12.1	7.4	82.0	97.8
2001	3376	495	14.7	12.3	7.3	78.7	97.0
2002	5728	1105	19.3	12.4	7.2	81.4	97.9 #
2003	5510	879	16.0	12.7	7.0	77.1	97.4
2004	5570	790	14.2	12.8	6.8	76.5	97.3
2005	5487	738	13.4	13.4	6.5	77.1	97.0
2006	5649	605	10.7	13.8	6.3	72.9	95.2
2007	6368	713	11.2	14.0	6.0	72.2	85.7 #
2008	6376	691	10.8	14.4	5.7	70.1	80.9
2009	6355	655	10.3	14.7	5.2	68.2	79.8
2010	6093	634	10.4	15.0	4.8	66.6	79.6
2011	6084	603	9.9	15.4	4.5	65.1	79.9
2012	6121	612	10.0	15.6	4.1	61.9	78.5
2013	5930	596	10.1	15.9	3.7	57.8	77.2
2014	5817	619	10.6	16.2	3.4	55.0	79.9
2015	5252	602	11.5	16.4	3.0	48.5	98.3
2016	4461	573	12.8	16.6	2.7	35.8	78.3 ##
1998-2016	99818	12200	12.2	16.6	7.7	68.2	88.0

99,818 cases diagnosed 1998-2016 are related to a total of 96,513 patients. Currently, in 21,847 (22.6 %) of these 96,513 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 17,703 / 3,302 / 842 (18.3 % / 3.4 % / 0.9 %) patients exist having 2 / 3 / 4+ malignancies.

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 retrieved from the respective headings.

How to interpret:

In 2014, a subgroup of 5,817 cases has been diagnosed, of which 16.2 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 3.4 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 1a

Cases with invasive cancer by year of diagnosis, proportions of DCO, further malignancies, deaths, and active follow-up (MALES) (incl. DCO)

Year of diagnosis	Males n	Males %	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	1686	51.8	193	11.4	10.7	8.6	83.5	98.2
1999	1738	52.8	201	11.6	11.0	8.4	82.7	97.7
2000	1658	53.6	191	11.5	11.8	8.3	81.5	98.1
2001	1801	53.3	218	12.1	12.0	8.2	79.2	97.2
2002	3072	53.6	506	16.5	12.2	8.1	81.7	98.2 #
2003	2980	54.1	404	13.6	12.7	7.9	77.9	98.1
2004	3015	54.1	326	10.8	13.0	7.6	77.7	97.4
2005	2971	54.1	336	11.3	13.7	7.3	78.0	97.3
2006	3127	55.4	263	8.4	14.2	7.1	73.0	95.4
2007	3607	56.6	331	9.2	14.5	6.7	72.4	85.8 #
2008	3578	56.1	304	8.5	14.9	6.3	70.1	80.9
2009	3639	57.3	309	8.5	15.3	5.9	69.1	80.0
2010	3458	56.8	283	8.2	15.6	5.4	66.0	79.0
2011	3455	56.8	286	8.3	16.0	5.1	64.8	79.6
2012	3446	56.3	273	7.9	16.4	4.7	62.6	79.1
2013	3415	57.6	269	7.9	16.7	4.1	56.6	75.9
2014	3329	57.2	301	9.0	16.9	3.8	54.3	80.1
2015	3044	58.0	275	9.0	17.1	3.4	47.0	98.5
2016	2599	58.3	287	11.0	17.3	3.3	35.6	76.7 ##
1998-2016	55618	55.7	5556	10.0	17.3	8.6	68.0	87.8

55,618 cases diagnosed 1998-2016 are related to a total of 53,488 patients. Currently, in 12,823 (24.0 %) of these 53,488 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 10,291 / 1,967 / 565 (19.2 % / 3.7 % / 1.1 %) patients exist having 2 / 3 / 4+ malignancies.

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 retrieved from the respective headings.

How to interpret:

In 2014, a subgroup of 3,329 cases has been diagnosed, of which 16.9 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 3.8 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 1b

Cases with invasive cancer by year of diagnosis, proportions of DCO, further malignancies, deaths, and active follow-up (FEMALES) (incl. DCO)

Year of diagnosis	Females n	Females %	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	1571	48.2	208	13.2	11.1	6.5	82.8	97.7
1999	1554	47.2	237	15.3	12.1	6.4	82.2	97.1
2000	1434	46.4	260	18.1	12.5	6.3	82.5	97.5
2001	1575	46.7	277	17.6	12.7	6.2	78.2	96.8
2002	2656	46.4	599	22.6	12.7	6.1	81.1	97.4 #
2003	2530	45.9	475	18.8	12.6	5.9	76.2	96.6
2004	2555	45.9	464	18.2	12.7	5.7	75.1	97.1
2005	2516	45.9	402	16.0	13.1	5.6	76.1	96.7
2006	2522	44.6	342	13.6	13.3	5.3	72.8	95.1
2007	2761	43.4	382	13.8	13.5	5.1	71.8	85.6 #
2008	2798	43.9	387	13.8	13.8	4.7	70.0	80.9
2009	2716	42.7	346	12.7	14.0	4.4	67.0	79.5
2010	2635	43.2	351	13.3	14.3	4.1	67.2	80.3
2011	2629	43.2	317	12.1	14.6	3.7	65.5	80.2
2012	2675	43.7	339	12.7	14.8	3.3	60.9	77.6
2013	2515	42.4	327	13.0	15.0	3.1	59.4	78.8
2014	2488	42.8	318	12.8	15.3	2.8	56.0	79.6
2015	2208	42.0	327	14.8	15.5	2.6	50.5	98.1
2016	1862	41.7	286	15.4	15.7	1.9	36.3	80.4 ##
1998-2016	44200	44.3	6644	15.0	15.7	6.5	68.6	88.3

44,200 cases diagnosed 1998-2016 are related to a total of 43,025 patients. Currently, in 9,024 (21.0 %) of these 43,025 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 7,412 / 1,335 / 277 (17.2 % / 3.1 % / 0.6 %) patients exist having 2 / 3 / 4+ malignancies.

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 retrieved from the respective headings.

How to interpret:

In 2014, a subgroup of 2,488 cases has been diagnosed, of which 15.3 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 2.8 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 2

Incidence measures by year of diagnosis including DCO cases
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.81 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	1686	1571	152.2	133.5	91.4	55.6	138.2	84.5	181.0	111.9
1999	1738	1554	155.3	131.0	91.8	53.6	139.2	81.6	182.9	108.5
2000	1658	1434	145.6	119.4	85.4	47.9	129.4	73.7	167.7	98.1
2001	1801	1575	155.4	129.5	90.8	54.6	136.6	82.4	176.1	107.5
2002	3072	2656	164.9	135.7	92.4	53.8	139.4	82.1	181.2	108.6
2003	2980	2530	159.0	128.4	87.3	51.5	131.9	78.3	171.8	102.4
2004	3015	2555	160.3	129.3	86.4	53.0	130.3	79.5	169.7	103.1
2005	2971	2516	156.8	126.4	82.9	49.6	124.6	74.9	162.4	98.7
2006	3127	2522	163.3	125.5	85.8	50.0	128.5	75.3	166.3	98.6
2007	3607	2761	162.8	119.6	85.3	47.1	127.2	70.9	164.7	92.6
2008	3578	2798	160.8	120.6	81.9	47.2	122.5	71.0	158.9	92.5
2009	3639	2716	163.0	116.8	81.1	45.2	121.6	68.1	158.1	89.3
2010	3458	2635	153.4	112.6	76.0	42.7	113.8	64.5	147.1	85.2
2011	3455	2629	154.4	112.5	74.5	43.7	111.6	65.3	145.1	84.4
2012	3446	2675	151.8	113.4	73.7	44.7	109.9	66.2	141.0	85.8
2013	3415	2515	148.4	105.5	70.6	41.2	105.4	61.3	136.2	79.2
2014	3329	2488	142.8	103.3	67.3	40.0	100.5	59.4	129.9	76.4
2015	3044	2208	128.0	90.7	59.6	33.7	89.4	50.8	115.9	66.2
2016	2599	1862	108.1	75.8	50.8	29.4	75.4	43.7	97.7	56.4
1998-2016	55618	44200	151.1	115.2	77.1	45.2	115.4	68.0	149.3	88.8

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

Table 3

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

Year of diagnosis	Cases n	Std.		Median						
		Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	3257	70.3	12.7	13.2	102	53.5	61.1	71.7	79.4	86.3
1999	3292	70.7	12.6	10.8	102	54.7	62.1	71.7	79.7	86.6
2000	3092	70.7	12.5	21.7	103	54.4	61.8	71.9	79.6	87.0
2001	3376	70.2	12.7	14.5	103	54.0	61.7	70.7	79.6	86.7
2002	5728	71.1	12.3	17.7	104	55.1	62.7	72.1	80.2	87.0
2003	5510	71.1	12.1	8.4	101	55.6	63.1	71.9	80.2	86.3
2004	5570	70.7	12.3	3.1	101	54.7	62.9	71.1	79.9	85.5
2005	5487	71.3	12.3	1.0	100	55.9	63.7	71.7	80.4	86.0
2006	5649	70.8	12.2	12.3	102	54.9	63.2	71.3	80.0	85.6
2007	6368	70.8	12.5	0.3	103	54.2	63.4	71.4	80.2	86.1
2008	6376	71.2	12.4	1.1	105	55.0	63.8	71.8	80.4	86.3
2009	6355	71.2	12.3	1.4	102	54.5	63.9	72.0	80.3	86.3
2010	6093	71.3	12.4	0.8	103	54.5	63.6	72.2	80.7	86.1
2011	6084	71.4	12.6	0.7	101	54.2	63.9	72.4	80.7	86.7
2012	6121	71.1	12.6	0.0	101	54.6	63.5	72.4	80.0	86.2
2013	5930	71.1	12.7	0.6	105	54.1	63.5	72.8	79.8	86.3
2014	5817	71.5	12.7	0.4	103	54.1	63.9	73.3	80.3	86.7
2015	5252	71.8	12.5	15.0	105	54.4	64.3	73.6	80.3	86.8
2016	4461	71.2	12.8	3.0	102	53.6	63.4	73.2	80.2	86.0
1998-2016	99818	71.1	12.5	0.0	105	54.5	63.2	72.2	80.2	86.3

Table 3a

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

Year of diagnosis	Cases n	Std.		Median						
		Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	1686	67.9	12.1	16.5	98.1	52.3	59.0	68.6	76.7	84.0
1999	1738	68.3	11.9	10.8	97.4	53.9	60.2	68.9	76.9	83.7
2000	1658	68.5	11.6	25.1	97.8	53.8	60.4	68.6	76.8	84.3
2001	1801	68.1	11.8	14.5	102	53.6	60.6	67.9	76.7	83.5
2002	3072	68.9	11.3	20.9	98.5	54.4	61.6	69.3	76.7	82.7
2003	2980	69.2	11.3	8.4	99.4	55.0	62.4	69.4	76.9	83.0
2004	3015	69.1	11.3	22.5	101	54.4	62.0	69.2	77.1	83.7
2005	2971	69.2	11.3	19.0	99.6	55.0	62.5	69.3	77.3	83.4
2006	3127	69.0	11.3	12.3	102	54.7	62.1	69.3	77.1	83.0
2007	3607	68.9	11.7	0.3	99.4	53.7	62.0	69.4	77.5	83.2
2008	3578	69.5	11.4	6.5	105	54.5	62.7	70.1	77.7	83.4
2009	3639	69.7	11.5	1.4	102	54.1	62.7	70.8	77.8	83.4
2010	3458	69.7	11.6	0.8	98.9	54.3	62.1	70.6	78.1	83.8
2011	3455	70.1	11.7	0.8	97.3	54.2	63.4	71.3	78.2	84.2
2012	3446	69.9	11.5	0.0	101	55.0	62.8	71.2	77.8	83.8
2013	3415	70.1	11.9	0.6	99.8	54.3	63.0	71.8	78.2	84.1
2014	3329	70.4	12.0	18.4	102	54.0	63.0	72.1	78.7	84.8
2015	3044	70.5	11.8	18.3	105	53.9	63.1	72.4	78.8	84.4
2016	2599	70.3	12.3	9.4	96.6	53.7	62.7	72.2	79.1	84.5
1998-2016	55618	69.4	11.6	0.0	105	54.2	62.2	70.3	77.7	83.7

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		
				Min.	Max.	10%	25%	50%	75%	90%
1998	1571	72.9	12.8	13.2	102	54.5	64.3	75.0	82.9	87.6
1999	1554	73.4	12.9	18.8	102	56.0	64.7	75.4	83.0	88.6
2000	1434	73.2	13.0	21.7	103	55.5	64.1	75.8	82.4	88.5
2001	1575	72.6	13.3	26.4	103	54.9	63.4	74.7	81.9	89.0
2002	2656	73.6	12.9	17.7	104	55.9	65.0	76.0	82.4	89.0
2003	2530	73.3	12.6	10.9	101	56.4	64.5	75.4	82.7	88.6
2004	2555	72.6	13.1	3.1	100	55.1	64.3	74.3	82.8	88.0
2005	2516	73.7	13.0	1.0	100	57.2	65.4	75.5	83.1	89.6
2006	2522	73.0	12.9	20.4	99.2	55.0	64.9	75.0	83.1	87.4
2007	2761	73.3	12.9	13.4	103	55.1	65.7	74.7	83.2	87.7
2008	2798	73.5	13.2	1.1	102	55.5	65.4	74.7	83.7	88.3
2009	2716	73.3	13.1	15.9	102	55.2	65.5	75.1	83.3	88.2
2010	2635	73.5	13.0	14.9	103	55.4	66.4	75.2	83.3	88.2
2011	2629	73.0	13.6	0.7	101	54.3	64.9	74.5	83.5	88.7
2012	2675	72.5	13.7	1.5	101	53.8	64.9	74.4	82.8	88.4
2013	2515	72.5	13.6	2.7	105	53.7	64.8	74.4	82.5	88.5
2014	2488	72.9	13.5	0.4	103	54.3	65.3	74.7	82.8	88.7
2015	2208	73.7	13.1	15.0	101	55.2	66.5	75.5	83.0	89.3
2016	1862	72.5	13.4	3.0	102	53.4	64.3	74.9	81.7	88.0
1998-2016	44200	73.1	13.1	0.4	105	55.0	65.0	75.0	82.9	88.4

Table 4

Age distribution by 5-year age group and sex for period 2007-2016
(incl. DCO)

Age at diagnosis Years	Cases n	Males			Females				
		%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4	20	0.0	0.0	10	0.0	0.0	10	0.0	0.0
5-9	6	0.0	0.0	6	0.0	0.0			0.0
10-14	5	0.0	0.1	1	0.0	0.1	4	0.0	0.1
15-19	46	0.1	0.1	13	0.0	0.1	33	0.1	0.2
20-24	63	0.1	0.2	30	0.1	0.2	33	0.1	0.3
25-29	111	0.2	0.4	51	0.2	0.3	60	0.2	0.6
30-34	216	0.4	0.8	115	0.3	0.7	101	0.4	1.0
35-39	381	0.6	1.4	204	0.6	1.3	177	0.7	1.7
40-44	811	1.4	2.8	455	1.4	2.6	356	1.4	3.1
45-49	1760	3.0	5.8	1028	3.1	5.7	732	2.9	6.0
50-54	2937	5.0	10.8	1801	5.4	11.1	1136	4.5	10.4
55-59	4214	7.2	18.0	2707	8.1	19.1	1507	6.0	16.4
60-64	5854	9.9	27.9	3863	11.5	30.6	1991	7.9	24.3
65-69	8021	13.6	41.5	5176	15.4	46.1	2845	11.3	35.5
70-74	9975	16.9	58.5	6143	18.3	64.4	3832	15.2	50.7
75-79	9220	15.7	74.1	5366	16.0	80.3	3854	15.2	65.9
80-84	7602	12.9	87.1	3872	11.5	91.9	3730	14.8	80.7
85+	7615	12.9	100.0	2729	8.1	100.0	4886	19.3	100.0
All ages	58857	100.0		33570	100.0		25287	100.0	

Table 5

Age-specific incidence, DCO rate and proportion of all cancers for period 2007-2016

Age at diagnosis Years	Males n	Females n	Males Age- spec. incid.	Females Age- spec. incid.	Males DCO rate n=2855 %	Females DCO rate n=3346 %	Males	Females
							Prop.all cancers n=113978 %	Prop.all cancers n=112253 %
0- 4	10	10	0.9	0.9	10.0	30.0	5.1	6.7
5- 9	6		0.5				5.8	
10-14	1	4	0.1	0.4			0.9	4.0
15-19	13	33	1.1	2.9			5.1	15.9
20-24	30	33	2.1	2.4	6.7		6.5	8.8
25-29	49	60	3.1	3.8			7.2	7.2
30-34	115	100	7.2	6.3	0.9	1.0	12.1	6.8
35-39	200	175	12.3	11.0	2.5	4.0	14.5	7.0
40-44	453	355	24.3	19.8	0.7	1.1	20.9	7.8
45-49	1015	720	51.4	37.7	1.8	0.7	25.8	10.5
50-54	1768	1130	102.3	66.0	4.3	2.7	28.7	13.0
55-59	2665	1486	188.3	101.1	3.5	2.2	28.9	15.9
60-64	3776	1966	308.3	147.9	4.3	4.1	28.7	17.4
65-69	5054	2795	426.5	215.2	5.6	5.1	27.0	19.9
70-74	5975	3764	540.1	297.4	6.7	6.3	28.4	25.5
75-79	5223	3774	655.5	376.8	9.3	9.8	31.6	28.3
80-84	3748	3682	814.9	520.4	15.4	18.3	34.1	33.7
85+	2667	4812	871.1	655.7	28.2	36.6	33.7	37.8
All ages	32768	24899			8.7	13.4	28.7	22.2
Incidence								
Raw			143.4	105.2				
WS			70.0	40.7				
ES			104.3	60.9				
BRD-S			134.6	79.1				

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).

ICD-10 C15-C26: Malignant neoplasms of digestive organs
 Age distribution and age-specific incidence 2007 - 2016 (Males: 32768, Females: 24899)

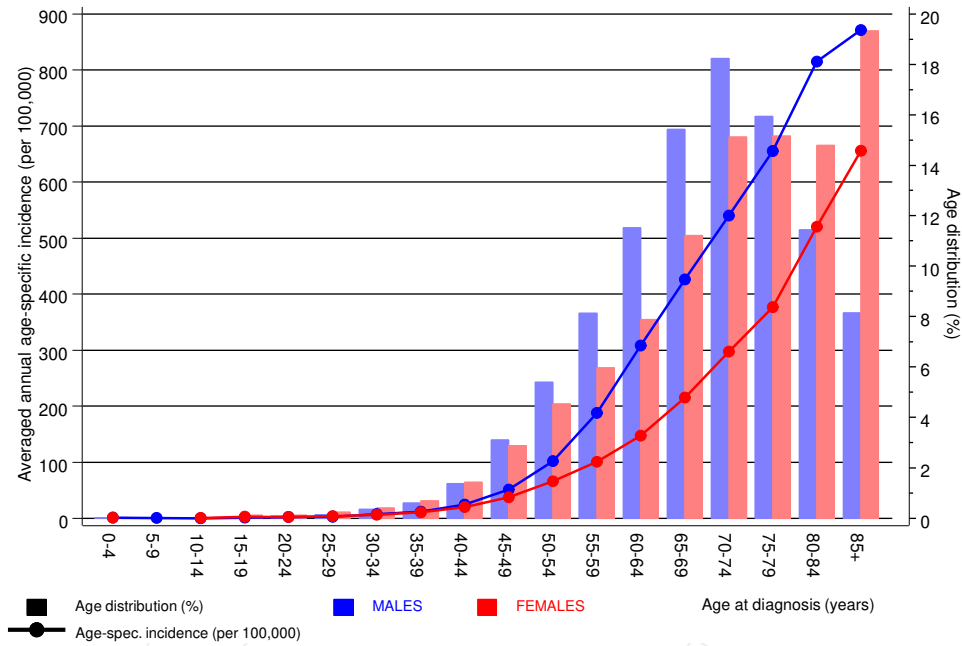


Figure 6. Age distribution (males: mean=69.8 yrs, median=71.0 yrs; females: mean=73.1 yrs, median=74.8 yrs) and age-specific incidence.

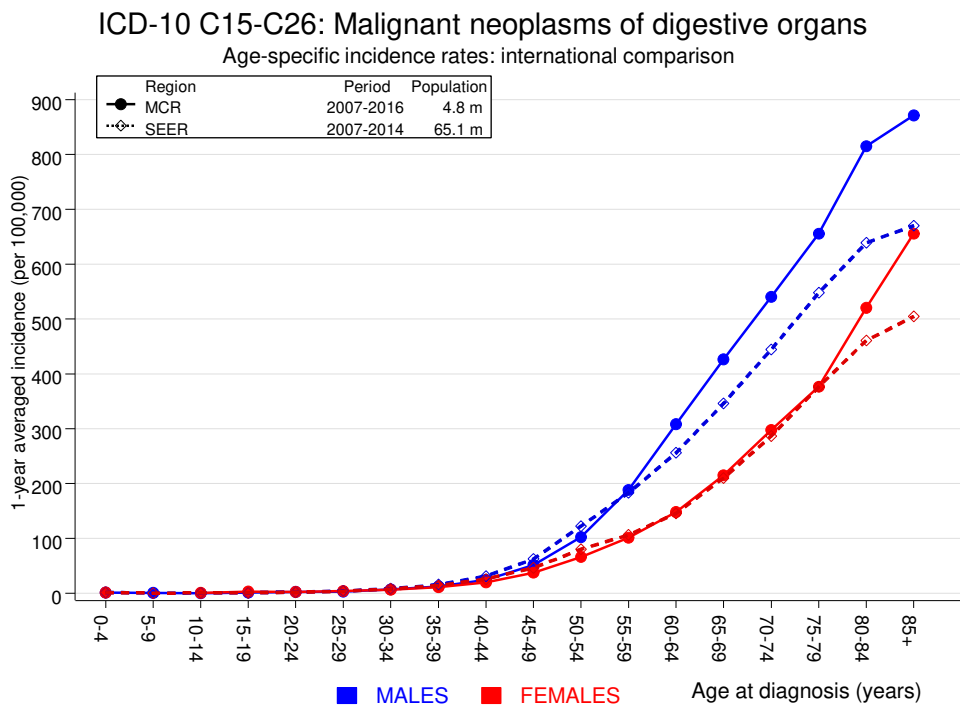


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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>.

Table 7a

Standardized incidence ratio (SIR, with 95% confidence limits),
excess absolute risk (EAR) and DCO rate of further malignancies
for period 1998–2016

MALES

Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C00 Lip	8	2.7	2.9	1.3	5.8 #	0.4	
C03–C06 Oral cavity	49	17.2	2.9	2.1	3.8 #	2.6	4.1
C07–C08 Salivary gland	8	5.3	1.5	0.7	3.0	0.2	
C09–C10 Oropharynx	57	20.9	2.7	2.1	3.5 #	2.9	1.8
C12–C13 Hypopharynx	36	11.4	3.2	2.2	4.4 #	2.0	2.8
C15 Oesophagus	115	40.3	2.9	2.4	3.4 #	6.1	10.4
C16 Stomach	258	95.5	2.7	2.4	3.1 #	13.2	9.3
C17 Small intestine	99	11.9	8.3	6.7	10.1 #	7.1	1.0
C18 Colon	774	226.5	3.4	3.2	3.7 #	44.6	4.0
C19–C20 Rectum	322	120.2	2.7	2.4	3.0 #	16.4	3.1
C21 Anus/canal	16	4.7	3.4	1.9	5.5 #	0.9	6.3
C22 Liver	183	63.5	2.9	2.5	3.3 #	9.7	19.1
C23–C24 Bile	53	22.8	2.3	1.7	3.0 #	2.5	17.0
C25 Pancreas	213	85.7	2.5	2.2	2.8 #	10.4	26.3
C32 Larynx	51	22.1	2.3	1.7	3.0 #	2.4	11.8
C33–C34 Lung	662	265.8	2.5	2.3	2.7 #	32.3	16.8
C38,C45 Mesothelioma	23	15.3	1.5	1.0	2.3	0.6	8.7
C43 Malign. melanoma	177	93.7	1.9	1.6	2.2 #	6.8	1.7
C46,C49 Soft tissue	29	12.6	2.3	1.5	3.3 #	1.3	3.4
C50 Breast	18	5.8	3.1	1.8	4.9 #	1.0	27.8
C60 Penis	10	5.3	1.9	0.9	3.4	0.4	10.0
C61 Prostate	1083	658.1	1.6	1.5	1.7 #	34.6	10.3
C62 Testis	12	4.4	2.7	1.4	4.7 #	0.6	16.7
C64 Kidney	252	77.2	3.3	2.9	3.7 #	14.2	8.3
C65 Renal pelvis	29	10.0	2.9	1.9	4.2 #	1.6	
C66 Ureter	16	5.6	2.9	1.6	4.6 #	0.8	
C67 Bladder	214	107.3	2.0	1.7	2.3 #	8.7	10.7
C70–C72 CNS cancer	53	28.4	1.9	1.4	2.4 #	2.0	26.4
C73 Thyroid	32	13.3	2.4	1.6	3.4 #	1.5	9.4
C76–C79 CUP	58	39.2	1.5	1.1	1.9 #	1.5	1.7
C81 Hodgkin lymphoma	12	4.7	2.5	1.3	4.4 #	0.6	8.3
C82–C85 NHL	198	93.5	2.1	1.8	2.4 #	8.5	7.6
C90 Mult. myeloma	50	30.0	1.7	1.2	2.2 #	1.6	28.0
C91–C96 Leukaemia	78	38.5	2.0	1.6	2.5 #	3.2	30.8
Others, specified	41	26.1	1.6	1.1	2.1 #	1.2	29.3
Not observed	0	1.8	0.0	0.0	2.0	-0.2	
All further malignancies	5289	2287.7	2.3	2.3	2.4 #	244.6	10.5

Patients	47368
Median age at next malignancy (years)	73.3
Person-years	122727
Mean observation time (years)	2.6
Median observation time (years)	1.2

The occurrence of further malignancy listed is statistically significant.

Observed further malignancies with count 1 to 5 are pooled in category “Others, specified”.

Table 7b

Standardized incidence ratio (SIR, with 95% confidence limits),
excess absolute risk (EAR) and DCO rate of further malignancies
for period 1998–2016

FEMALES

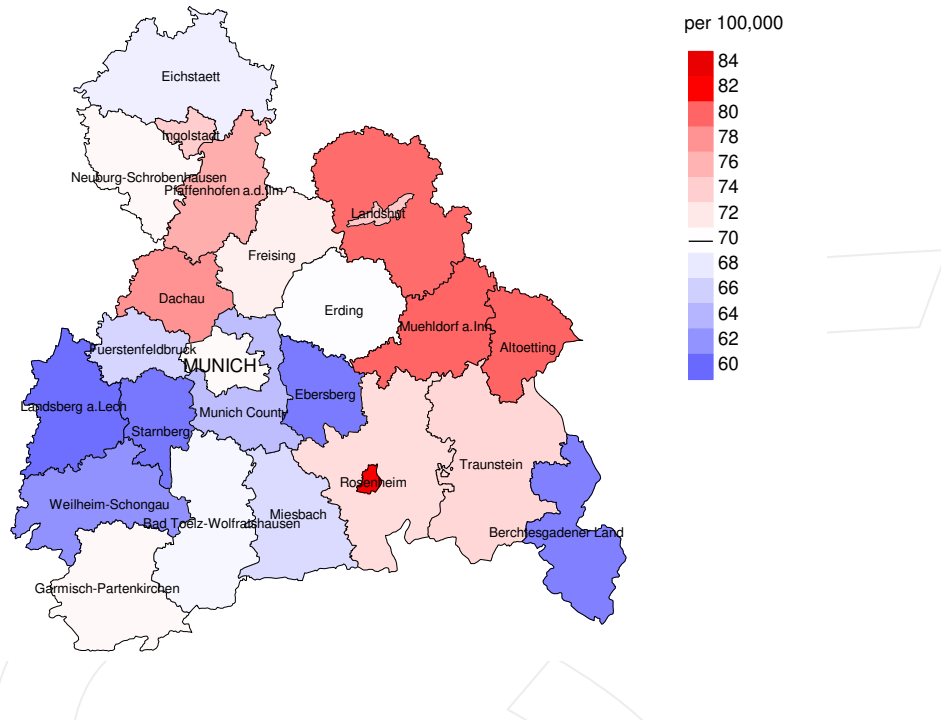
Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C03-C06 Oral cavity	15	7.1	2.1	1.2	3.5 #	0.8	
C09-C10 Oropharynx	20	4.3	4.6	2.8	7.1 #	1.6	5.0
C12-C13 Hypopharynx	6	1.2	5.1	1.9	11.2 #	0.5	16.7
C15 Oesophagus	18	7.7	2.3	1.4	3.7 #	1.0	22.2
C16 Stomach	120	51.9	2.3	1.9	2.8 #	6.9	20.0
C17 Small intestine	59	6.0	9.8	7.5	12.7 #	5.4	1.7
C18 Colon	492	140.9	3.5	3.2	3.8 #	35.6	7.1
C19-C20 Rectum	154	56.4	2.7	2.3	3.2 #	9.9	5.8
C21 Anus/canal	15	6.7	2.3	1.3	3.7 #	0.8	
C22 Liver	50	16.4	3.0	2.3	4.0 #	3.4	36.0
C23-C24 Bile	44	20.7	2.1	1.5	2.9 #	2.4	18.2
C25 Pancreas	157	63.9	2.5	2.1	2.9 #	9.4	28.0
C26 GI cancer	7	3.1	2.3	0.9	4.7	0.4	57.1
C32 Larynx	8	2.1	3.7	1.6	7.4 #	0.6	
C33-C34 Lung	305	89.6	3.4	3.0	3.8 #	21.9	15.4
C43 Malign. melanoma	90	43.9	2.1	1.6	2.5 #	4.7	1.1
C46,C49 Soft tissue	15	7.4	2.0	1.1	3.4 #	0.8	
C48 Peritoneal	17	4.5	3.8	2.2	6.1 #	1.3	35.3
C50 Breast	687	355.1	1.9	1.8	2.1 #	33.7	9.3
C51 Vulva	33	14.2	2.3	1.6	3.3 #	1.9	3.0
C52 Vagina	8	2.6	3.1	1.3	6.0 #	0.5	12.5
C53 Cervix uteri	38	14.9	2.6	1.8	3.5 #	2.3	26.3
C54 Corpus uteri	136	67.1	2.0	1.7	2.4 #	7.0	5.1
C55,C57 Fem. genitals un	8	4.0	2.0	0.9	4.0	0.4	37.5
C56 Ovary	160	51.4	3.1	2.6	3.6 #	11.0	28.1
C64 Kidney	112	31.8	3.5	2.9	4.2 #	8.1	17.0
C65 Renal pelvis	13	4.2	3.1	1.6	5.3 #	0.9	
C66 Ureter	7	2.1	3.4	1.4	6.9 #	0.5	14.3
C67 Bladder	65	28.0	2.3	1.8	3.0 #	3.8	21.5
C70-C72 CNS cancer	22	17.0	1.3	0.8	2.0	0.5	50.0
C73 Thyroid	28	17.3	1.6	1.1	2.3 #	1.1	7.1
C76-C79 CUP	33	26.7	1.2	0.8	1.7	0.6	6.1
C81 Hodgkin lymphoma	5	2.2	2.3	0.8	5.4	0.3	20.0
C82-C85 NHL	110	52.1	2.1	1.7	2.5 #	5.9	14.5
C90 Mult. myeloma	34	16.8	2.0	1.4	2.8 #	1.7	23.5
C91-C96 Leukaemia	52	22.1	2.4	1.8	3.1 #	3.0	44.2
Others, specified	30	18.8	1.6	1.1	2.3 #	1.1	20.0
Not observed	0	1.3	0.0	0.0	2.9	-0.1	
All further malignancies	3173	1283.3	2.5	2.4	2.6 #	191.8	13.8

Patients	36734
Median age at next malignancy (years)	75.7
Person-years	98527
Mean observation time (years)	2.7
Median observation time (years)	1.1

The occurrence of further malignancy listed is statistically significant.

Observed further malignancies with count 1 to 4 are pooled in category "Others, specified".

Average incidence (world standard population) 2007 - 2016: Males



Average incidence (world standard population) 2007 - 2016: Females

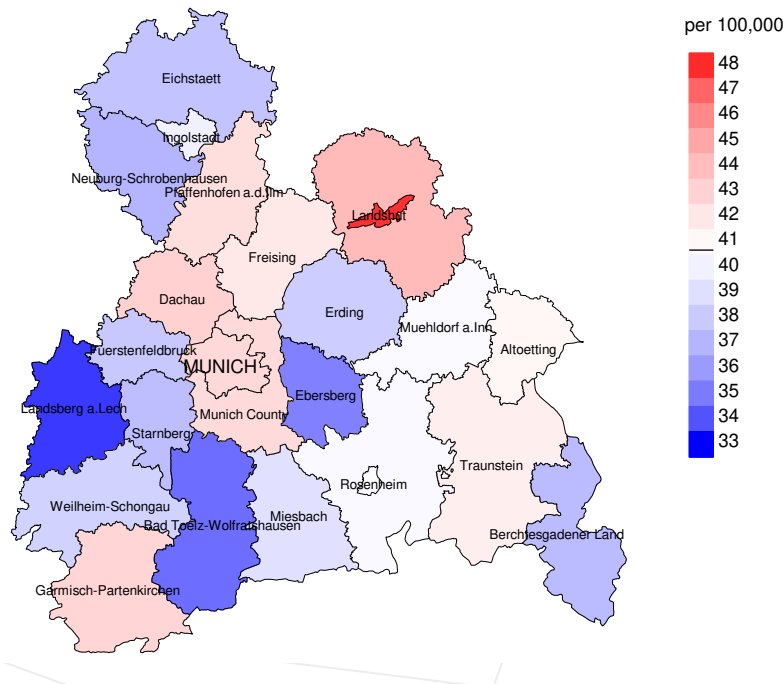
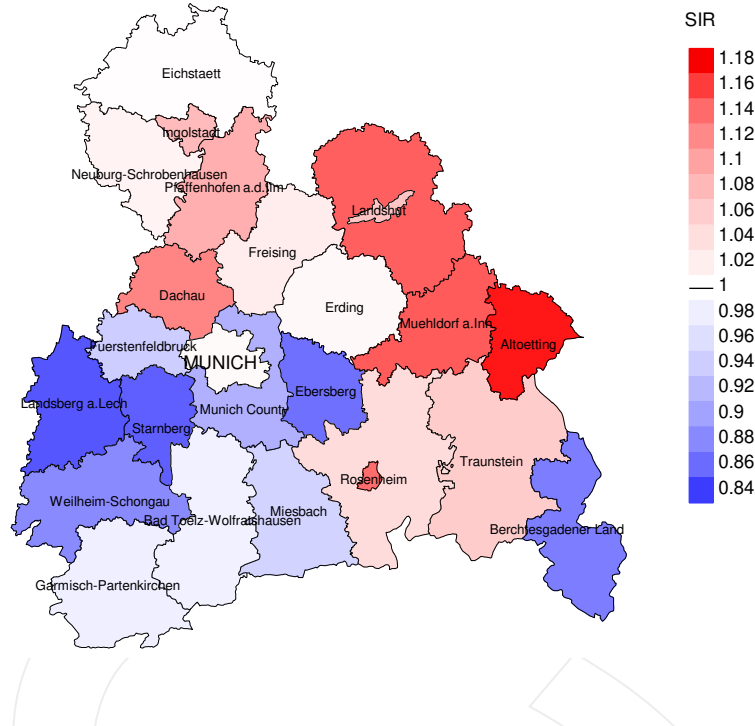


Figure 8a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 70.0/100,000 WS N=32,768, females 40.7/100,000 WS N=24,899).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 558 women were identified with newly diagnosed GI cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 35.1/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 30.9 and 39.8/100,000.

Standardized incidence ratio (SIR) 2007 - 2016: Males



Standardized incidence ratio (SIR) 2007 - 2016: Females

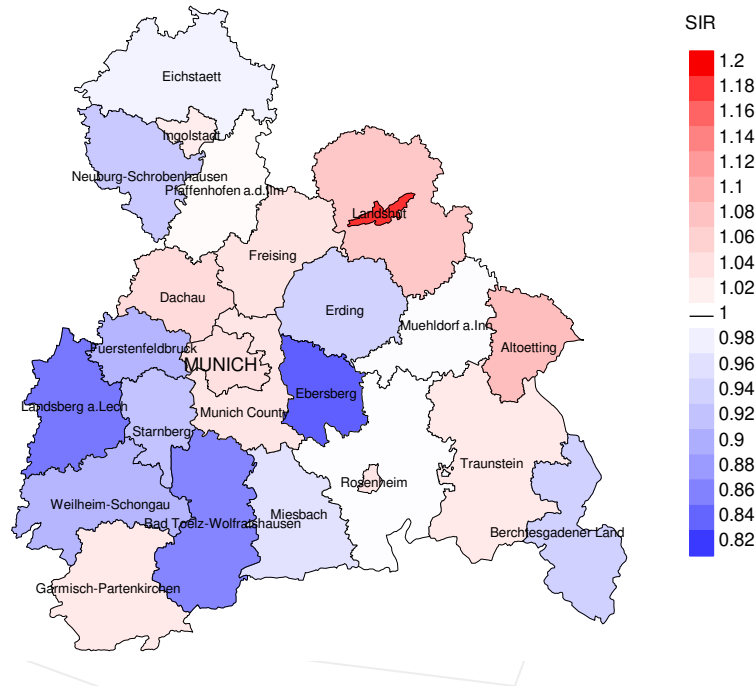


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=32,768, females N=24,899).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 558 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 0.84. Though, the value of this parameter may vary with an underlying probability of 99% between 0.75 and 0.93.

MORTALITY

Table 9a

Annual cohorts: Incident cancers, follow-up status, proportion of DCO, deaths among the annual cohorts and proportion of available death certificates (with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.81 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	3257	98.0	12.3	2708	83.1	94.0
1999	3292	97.4	13.3	2716	82.5	94.9
2000	3092	97.8	14.6	2534	82.0	96.6
2001	3376	97.0	14.7	2658	78.7	96.5
2002	5728	97.9	19.3	4663	81.4	97.8
2003	5510	97.4	16.0	4250	77.1	98.2
2004	5570	97.3	14.2	4262	76.5	97.8
2005	5487	97.0	13.4	4232	77.1	98.4
2006	5649	95.2	10.7	4118	72.9	98.6
2007	6368	85.7	11.2	4595	72.2	98.7
2008	6376	80.9	10.8	4468	70.1	98.6
2009	6355	79.8	10.3	4334	68.2	98.5
2010	6093	79.6	10.4	4055	66.6	98.2
2011	6084	79.9	9.9	3962	65.1	98.0
2012	6121	78.5	10.0	3786	61.9	97.5
2013	5930	77.2	10.1	3426	57.8	97.1
2014	5817	79.9	10.6	3202	55.0	97.0
2015	5252	98.3	11.5	2546	48.5	95.8
2016	4461	78.3	12.8	1599	35.8	85.9
1998-2016	99818	88.0	12.2	68114	68.2	97.3

Table 9b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased within the same year of being diagnosed with cancer (incl. DCO)

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.81 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	3257	2178	92.5	974	29.9
1999	3292	2261	92.1	1010	30.7
2000	3092	2204	95.1	921	29.8
2001	3376	2356	95.5	1004	29.7
2002	5728	3373	98.2	1967	34.3
2003	5510	3456	97.8	1680	30.5
2004	5570	3516	98.1	1614	29.0
2005	5487	3716	97.0	1607	29.3
2006	5649	3870	97.7	1608	28.5
2007	6368	4097	97.9	1758	27.6
2008	6376	4257	98.6	1830	28.7
2009	6355	4322	98.7	1716	27.0
2010	6093	4435	98.7	1675	27.5
2011	6084	4497	98.3	1707	28.1
2012	6121	4553	98.4	1737	28.4
2013	5930	4427	98.0	1577	26.6
2014	5817	4475	98.2	1673	28.8
2015	5252	4669	98.4	1651	31.4
2016	4461	3902	97.9	1413	31.7
1998-2016	99818	70564	97.6	29122	29.2

Table 9c

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 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.81 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	2261	80.0	20.0	91.6
2000	2204	81.7	18.3	91.2
2001	2356	78.4	21.6	91.0
2002	3373	82.9	17.1	91.8
2003	3456	81.9	18.1	91.2
2004	3516	83.4	16.6	91.0
2005	3716	81.3	18.7	89.1
2006	3870	81.4	18.6	89.6
2007	4097	80.8	19.2	89.2
2008	4257	81.3	18.7	88.5
2009	4322	79.9	20.1	87.5
2010	4435	78.2	21.8	86.6
2011	4497	78.1	21.9	86.7
2012	4553	77.5	22.5	86.1
2013	4427	75.6	24.4	83.4
2014	4475	75.6	24.4	84.8
2015	4669	74.0	26.0	82.9
2016	3902	70.9	29.1	82.5
1998-2016	70564	78.7	21.3	87.7

Table 10a

Medians of age at death according to the grouping in Table 9
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	80.1	72.6
2007	2280	73.2	72.0	80.2	72.5
2008	2376	74.2	72.7	80.5	73.2
2009	2431	73.6	71.8	80.0	72.5
2010	2470	74.2	72.8	81.2	73.5
2011	2575	74.2	72.5	81.8	73.3
2012	2564	74.9	73.2	81.0	73.8
2013	2496	75.7	73.6	82.8	74.4
2014	2535	75.7	74.5	81.3	75.0
2015	2662	76.6	74.4	82.6	75.2
2016	2289	76.8	74.9	82.0	75.7
1998-2016	39084	74.3	72.6	80.9	73.4

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 10b

Medians of age at death according to the grouping in Table 9
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	76.3	84.3	78.3
1999	1077	79.5	78.1	84.9	79.2
2000	1047	79.2	78.0	85.3	78.8
2001	1134	79.4	77.2	86.6	78.7
2002	1580	79.8	78.6	85.8	79.3
2003	1569	79.6	77.8	85.6	78.7
2004	1637	79.8	78.2	84.9	78.8
2005	1687	79.8	78.1	84.9	78.8
2006	1719	80.2	78.4	85.8	79.2
2007	1817	80.0	77.8	86.4	78.9
2008	1881	80.3	78.1	86.4	79.1
2009	1891	80.7	78.2	86.9	79.0
2010	1965	80.9	78.2	86.7	79.4
2011	1922	80.8	77.8	87.6	78.9
2012	1989	80.5	77.3	87.8	78.2
2013	1931	80.6	77.2	87.8	78.6
2014	1940	80.4	77.5	87.3	78.7
2015	2007	80.1	77.3	88.3	78.2
2016	1613	80.7	77.9	88.0	79.0
1998-2016	31480	80.1	77.8	86.7	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 11a

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	846	76.4	0.51	44.8	0.49	69.7	0.51	94.2	0.53
1999	956	85.4	0.56	49.6	0.55	77.1	0.56	104.6	0.58
2000	949	83.3	0.58	47.6	0.56	74.3	0.58	100.0	0.60
2001	982	84.7	0.55	48.5	0.54	75.1	0.56	99.0	0.57
2002	1486	79.8	0.49	43.9	0.48	67.5	0.49	89.5	0.50
2003	1567	83.6	0.53	44.7	0.52	69.2	0.53	93.0	0.55
2004	1584	84.2	0.53	43.4	0.51	67.9	0.53	92.7	0.55
2005	1683	88.9	0.58	45.3	0.56	69.6	0.57	94.3	0.59
2006	1754	91.6	0.57	45.6	0.54	71.1	0.57	96.3	0.59
2007	1863	84.1	0.53	41.2	0.49	63.9	0.51	86.7	0.54
2008	1975	88.7	0.57	42.7	0.53	66.5	0.56	90.6	0.59
2009	1968	88.2	0.55	42.5	0.53	65.2	0.55	86.3	0.56
2010	1956	86.8	0.58	40.3	0.54	62.2	0.56	84.1	0.59
2011	2037	91.0	0.60	42.3	0.58	65.2	0.60	86.4	0.61
2012	2011	88.6	0.60	40.1	0.56	62.0	0.58	83.3	0.61
2013	1934	84.0	0.58	37.5	0.54	58.1	0.57	77.9	0.59
2014	1931	82.8	0.60	36.1	0.55	55.9	0.57	75.4	0.60
2015	1972	82.9	0.66	36.1	0.62	55.8	0.64	75.0	0.66
2016	1658	69.0	0.65	29.3	0.59	45.6	0.62	61.6	0.65
1998-2016	31112	84.5	0.57	40.9	0.54	63.3	0.56	85.0	0.58

Table 11b

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	818	69.5	0.53	26.9	0.49	42.0	0.50	57.5	0.52
1999	855	72.1	0.56	26.3	0.50	41.7	0.52	57.7	0.54
2000	852	70.9	0.60	25.8	0.55	41.0	0.56	56.0	0.58
2001	865	71.1	0.56	26.8	0.50	42.2	0.52	57.3	0.54
2002	1311	67.0	0.50	23.8	0.45	37.5	0.46	51.4	0.48
2003	1264	64.2	0.50	23.5	0.46	36.9	0.48	50.1	0.49
2004	1352	68.4	0.54	23.9	0.46	37.9	0.48	52.1	0.51
2005	1339	67.3	0.54	23.9	0.49	37.5	0.51	50.8	0.52
2006	1399	69.6	0.56	23.8	0.48	37.6	0.51	52.1	0.54
2007	1454	63.0	0.53	22.6	0.49	35.1	0.50	47.4	0.52
2008	1489	64.2	0.54	22.2	0.48	34.9	0.50	47.3	0.52
2009	1484	63.8	0.55	21.8	0.49	34.2	0.51	46.6	0.53
2010	1514	64.7	0.58	21.7	0.52	34.1	0.53	46.3	0.55
2011	1478	63.2	0.57	21.3	0.49	33.1	0.52	45.1	0.54
2012	1521	64.5	0.58	21.9	0.50	34.2	0.53	46.2	0.55
2013	1415	59.4	0.57	20.2	0.50	31.4	0.52	42.3	0.54
2014	1453	60.3	0.59	19.9	0.51	31.1	0.53	42.1	0.56
2015	1481	60.9	0.68	20.3	0.61	31.7	0.63	42.6	0.65
2016	1115	45.4	0.61	14.8	0.51	23.3	0.54	31.7	0.57
1998-2016	24459	63.8	0.56	22.1	0.49	34.6	0.52	47.0	0.54

Table 12

Age distribution of age at death (cancer-related) for period 2007-2016
(incl. multiple malignancies)

Age at death Years	Cases			Males			Females		
	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4	4	0.0	0.0	2	0.0	0.0	2	0.0	0.0
5-9	1	0.0	0.0	1	0.0	0.0			0.0
10-14	2	0.0	0.0	2	0.0	0.0			0.0
15-19	6	0.0	0.0	4	0.0	0.0	2	0.0	0.0
20-24	10	0.0	0.1	5	0.0	0.1	5	0.0	0.1
25-29	27	0.1	0.1	12	0.1	0.1	15	0.1	0.2
30-34	45	0.1	0.3	22	0.1	0.2	23	0.2	0.3
35-39	102	0.3	0.6	57	0.3	0.5	45	0.3	0.6
40-44	266	0.8	1.4	162	0.8	1.4	104	0.7	1.4
45-49	634	1.9	3.3	378	2.0	3.3	256	1.8	3.1
50-54	1172	3.5	6.7	743	3.8	7.2	429	3.0	6.1
55-59	1958	5.8	12.5	1291	6.7	13.9	667	4.6	10.7
60-64	2874	8.5	21.1	1921	10.0	23.8	953	6.6	17.4
65-69	4245	12.6	33.7	2805	14.5	38.4	1440	10.0	27.4
70-74	5585	16.6	50.2	3486	18.1	56.4	2099	14.6	41.9
75-79	5680	16.9	67.1	3405	17.6	74.1	2275	15.8	57.7
80-84	5206	15.4	82.5	2757	14.3	88.3	2449	17.0	74.7
85+	5892	17.5	100.0	2252	11.7	100.0	3640	25.3	100.0
All ages	33709	100.0		19305	100.0		14404	100.0	

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007–2016
(incl. multiple malignancies)

Age at death Years	Males		Males		Females		Females	
	n	n	Age- spec. mortal.	MI-index	Age- spec. mortal.	MI-index	Prop.all cancers %	Prop.all cancers %
0– 4	2	2	0.2	0.20	0.2	0.20	13.3	13.3
5– 9	1		0.1	0.17			4.2	
10–14	2		0.2	2.00			8.7	
15–19	4	2	0.3	0.31	0.2	0.06	9.1	9.1
20–24	5	5	0.4	0.17	0.4	0.15	8.8	15.2
25–29	12	15	0.8	0.24	1.0	0.25	16.2	20.5
30–34	22	23	1.4	0.19	1.4	0.23	21.2	19.2
35–39	57	45	3.5	0.29	2.8	0.26	28.4	15.8
40–44	162	104	8.7	0.36	5.8	0.29	32.9	15.5
45–49	378	256	19.1	0.37	13.4	0.36	32.9	19.6
50–54	743	429	43.0	0.42	25.1	0.38	36.1	21.7
55–59	1291	667	91.2	0.48	45.4	0.45	38.2	23.4
60–64	1921	953	156.8	0.51	71.7	0.48	38.6	25.4
65–69	2805	1440	236.7	0.56	110.9	0.52	38.5	27.0
70–74	3486	2099	315.1	0.58	165.8	0.56	37.4	30.9
75–79	3405	2275	427.3	0.65	227.1	0.60	37.9	32.5
80–84	2757	2449	599.4	0.74	346.1	0.67	36.6	35.9
85+	2252	3640	735.5	0.84	496.0	0.76	34.5	39.4
All ages	19305	14404					36.9	31.1
Mortality								
Raw			84.5	0.59	60.8	0.58		
WS			38.5	0.55	20.6	0.51		
ES			59.6	0.57	32.2	0.53		
BRD-S			80.0	0.59	43.6	0.55		
PYLL-70								
per 100,000			334.3		193.6			
ES			288.9		162.3			
AYLL-70			9.1		9.8			

Table 14a

Further malignancies in deaths in period 1998–2016
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C03–C06 Oral cavity	177	2.0	131	74.0	14	7.9	32	18.1
C09–C10 Oropharynx	190	2.1	122	64.2	29	15.3	39	20.5
C12–C13 Hypopharynx	111	1.2	67	60.4	15	13.5	29	26.1
C15 Oesophagus	105	1.2			8	7.6	97	92.4
C16 Stomach	228	2.6			46	20.2	182	79.8
C18 Colon	549	6.2			199	36.2	350	63.8
C19–C20 Rectum	280	3.2			154	55.0	126	45.0
C22 Liver	205	2.3			48	23.4	157	76.6
C25 Pancreas	276	3.1			57	20.7	219	79.3
C32 Larynx	191	2.2	143	74.9	15	7.9	33	17.3
C33–C34 Lung	1036	11.7	239	23.1	192	18.5	605	58.4
C43 Malign. melanoma	333	3.7	233	70.0	10	3.0	90	27.0
C44 Skin others	626	7.0	365	58.3	38	6.1	223	35.6
C61 Prostate	2289	25.8	1534	67.0	159	6.9	596	26.0
C64 Kidney	421	4.7	233	55.3	77	18.3	111	26.4
C67 Bladder	468	5.3	233	49.8	41	8.8	194	41.5
C76–C79 CUP	117	1.3	49	41.9	22	18.8	46	39.3
C82–C85 NHL	360	4.1	181	50.3	56	15.6	123	34.2
C91–C96 Leukaemia	125	1.4	40	32.0	12	9.6	73	58.4
Others, specified	794	8.9	313	39.4	74	9.3	407	51.3
All further malignancies	8881	100.0	3883	43.7	1266	14.3	3732	42.0

Further malignancies with number of cases 1 to 79 are pooled in category “Others, specified”.

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 further malignancy.

Table 14b

Further malignancies in deaths in period 1998–2016
FEMALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C16 Stomach	146	2.4			21	14.4	125	85.6
C18 Colon	377	6.1			113	30.0	264	70.0
C19–C20 Rectum	167	2.7			80	47.9	87	52.1
C25 Pancreas	220	3.6			41	18.6	179	81.4
C33–C34 Lung	415	6.8	88	21.2	58	14.0	269	64.8
C43 Malign. melanoma	191	3.1	149	78.0	7	3.7	35	18.3
C44 Skin others	252	4.1	160	63.5	17	6.7	75	29.8
C50 Breast	1906	31.0	1398	73.3	136	7.1	372	19.5
C53 Cervix uteri	196	3.2	150	76.5	10	5.1	36	18.4
C54 Corpus uteri	417	6.8	311	74.6	23	5.5	83	19.9
C56 Ovary	362	5.9	151	41.7	70	19.3	141	39.0
C64 Kidney	174	2.8	100	57.5	34	19.5	40	23.0
C67 Bladder	157	2.6	83	52.9	8	5.1	66	42.0
C73 Thyroid	84	1.4	59	70.2	4	4.8	21	25.0
C76–C79 CUP	82	1.3	29	35.4	25	30.5	28	34.1
C82–C85 NHL	213	3.5	119	55.9	29	13.6	65	30.5
C90 Mult. myeloma	64	1.0	23	35.9	11	17.2	30	46.9
C91–C96 Leukaemia	76	1.2	22	28.9	10	13.2	44	57.9
Others, specified	647	10.5	258	39.9	90	13.9	299	46.2
All further malignancies	6146	100.0	3100	50.4	787	12.8	2259	36.8

Further malignancies with number of cases 1 to 55 are pooled in category "Others, specified".

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 further malignancy.

Table 15

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2016
(First primaries only *)

Age at death Years	Males		Males		Females		Females	
	n	n	Age- spec. mortal.	MI-index	Age- spec. mortal.	MI-index	Prop.all cancers %	Prop.all cancers %
0- 4	2	2	0.2	0.20	0.2	0.20	14.3	13.3
5- 9	1		0.1	0.17			4.3	
10-14	2		0.2	2.00			8.7	
15-19	4	2	0.3	0.31	0.2	0.06	9.5	10.0
20-24	4	5	0.3	0.14	0.4	0.15	7.8	16.1
25-29	12	14	0.8	0.26	0.9	0.25	17.9	20.9
30-34	22	20	1.4	0.19	1.3	0.22	21.6	18.9
35-39	55	40	3.4	0.29	2.5	0.25	29.1	15.6
40-44	157	98	8.4	0.37	5.5	0.31	34.4	16.5
45-49	347	231	17.6	0.37	12.1	0.36	33.1	20.4
50-54	664	384	38.4	0.42	22.4	0.38	36.7	22.9
55-59	1137	573	80.3	0.48	39.0	0.45	38.6	24.0
60-64	1644	794	134.2	0.50	59.7	0.49	39.4	25.9
65-69	2294	1155	193.6	0.56	88.9	0.52	39.2	27.3
70-74	2769	1673	250.3	0.60	132.2	0.56	38.5	31.5
75-79	2536	1784	318.3	0.66	178.1	0.60	38.3	32.9
80-84	2017	1946	438.5	0.76	275.0	0.65	36.7	36.5
85+	1657	2914	541.2	0.87	397.0	0.76	34.7	39.7
All ages	15324	11635					37.5	31.4
Mortality								
Raw			67.1	0.59	49.1	0.57		
WS			31.4	0.55	16.9	0.50		
ES			47.9	0.57	26.3	0.52		
BRD-S			63.3	0.59	35.4	0.55		
PYLL-70								
per 100,000			296.6		169.0			
ES			256.6		142.1			
AYLL-70			9.4		10.2			

* See corresponding tables with multiple malignancies.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2016
(**Single primaries only** *)

Age at death Years	Males		Males		Females		Females	
	n	n	Age- spec. mortal.	MI-index	Age- spec. mortal.	MI-index	Prop.all cancers %	Prop.all cancers %
0- 4	2	2	0.2	0.20	0.2	0.20	14.3	13.3
5- 9	1		0.1	0.17			4.3	
10-14	2		0.2	2.00			8.7	
15-19	4	2	0.3	0.31	0.2	0.06	9.5	10.5
20-24	4	5	0.3	0.14	0.4	0.16	7.8	16.1
25-29	12	14	0.8	0.27	0.9	0.25	17.9	21.5
30-34	22	20	1.4	0.19	1.3	0.22	21.6	19.2
35-39	55	38	3.4	0.30	2.4	0.24	29.3	15.0
40-44	155	94	8.3	0.37	5.2	0.31	34.1	15.9
45-49	345	228	17.5	0.38	11.9	0.36	33.3	20.4
50-54	645	376	37.3	0.43	22.0	0.40	36.2	22.8
55-59	1093	547	77.2	0.49	37.2	0.46	37.7	23.2
60-64	1565	747	127.8	0.51	56.2	0.49	38.1	24.9
65-69	2151	1073	181.5	0.57	82.6	0.52	37.7	26.0
70-74	2515	1566	227.3	0.59	123.7	0.56	36.2	30.4
75-79	2273	1666	285.3	0.64	166.3	0.59	35.8	31.6
80-84	1728	1787	375.7	0.70	252.6	0.63	33.5	34.9
85+	1406	2695	459.2	0.77	367.2	0.72	31.9	38.3
All ages	13978	10860					35.5	30.2
Mortality								
Raw			61.2	0.57	45.9	0.56		
WS			29.1	0.54	15.9	0.50		
ES			44.0	0.56	24.7	0.52		
BRD-S			57.6	0.58	33.1	0.54		
PYLL-70								
per 100,000			287.0		162.7			
ES			248.4		136.9			
AYLL-70			9.6		10.3			

* See corresponding tables with multiple malignancies.

ICD-10 C15-C26: Malignant neoplasms of digestive organs
 Age distribution and age-specific mortality 2007 - 2016 (Males: 19305, Females: 14404)

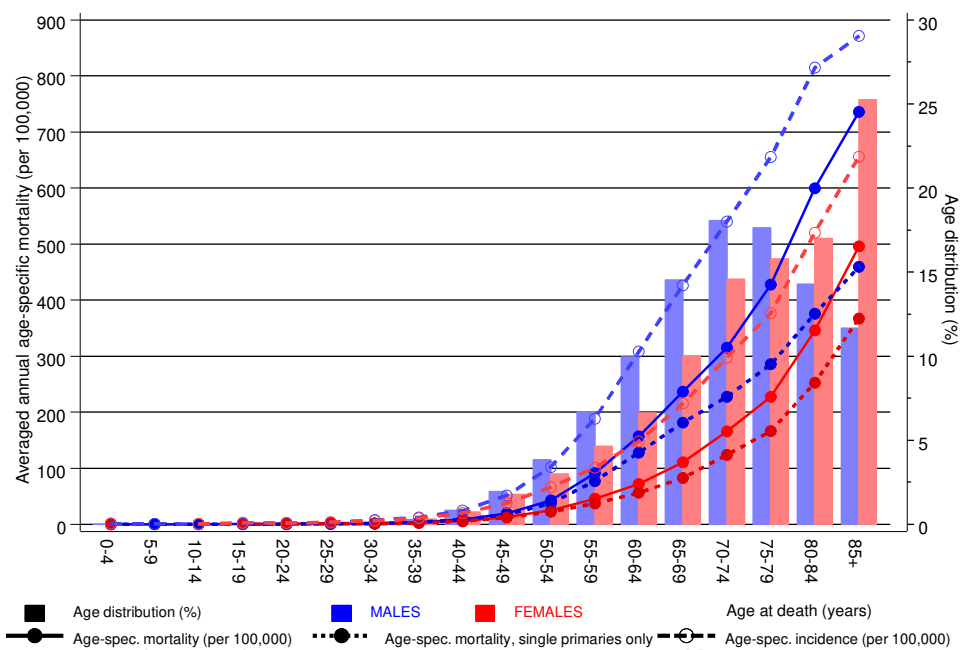
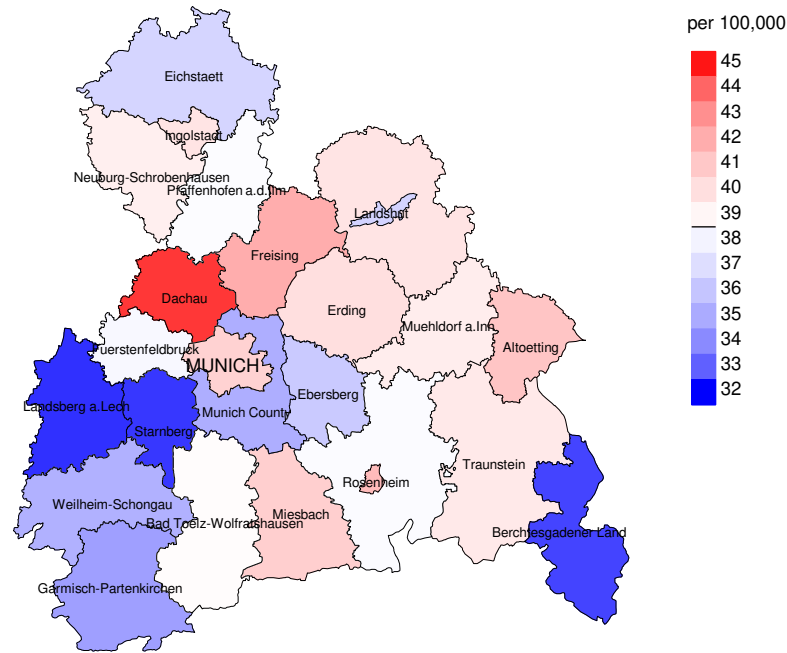


Figure 17. Distribution of age at death (bars; males: mean=70.0 yrs, median=70.9 yrs; females: mean=73.9 yrs, median=75.4 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (world standard population) 2007 - 2016: Males



Average mortality (world standard population) 2007 - 2016: Females

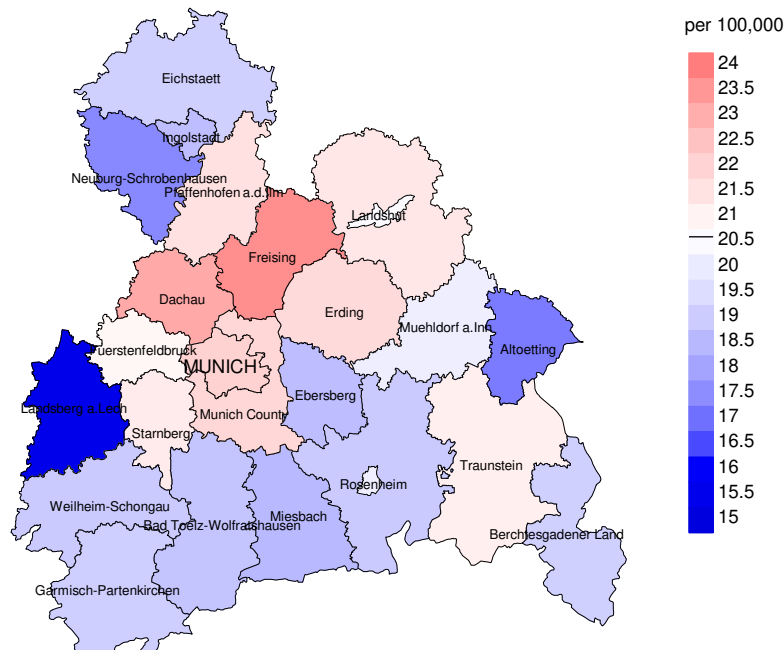
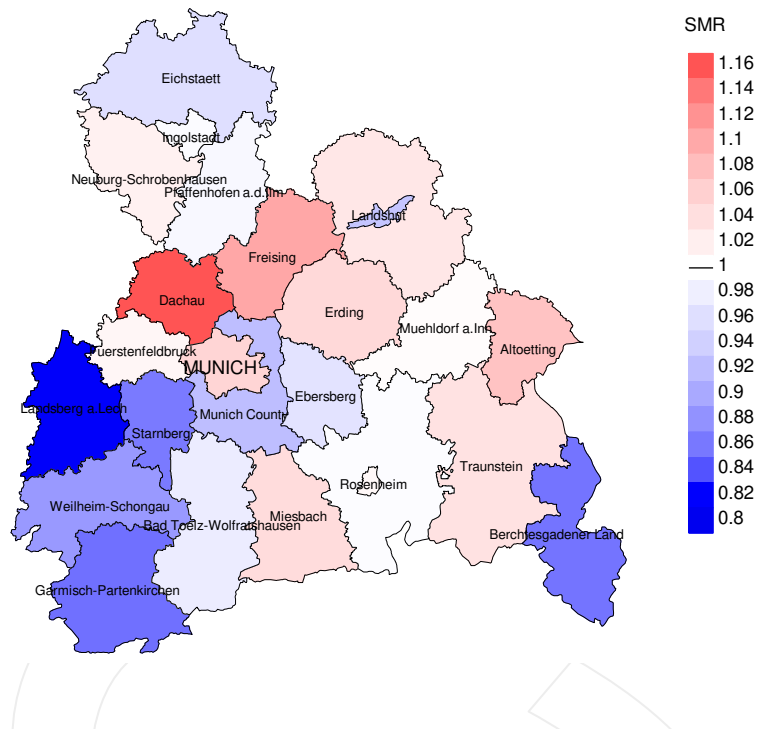


Figure 18a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2016. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 38.5/100,000 WS N=19,305, females 20.6/100,000 WS N=14,404).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 354 women died from GI cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 18.6/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 15.8 and 21.9/100,000.

Standardized mortality ratio (SMR) 2007 - 2016: Males



Standardized mortality ratio (SMR) 2007 - 2016: Females

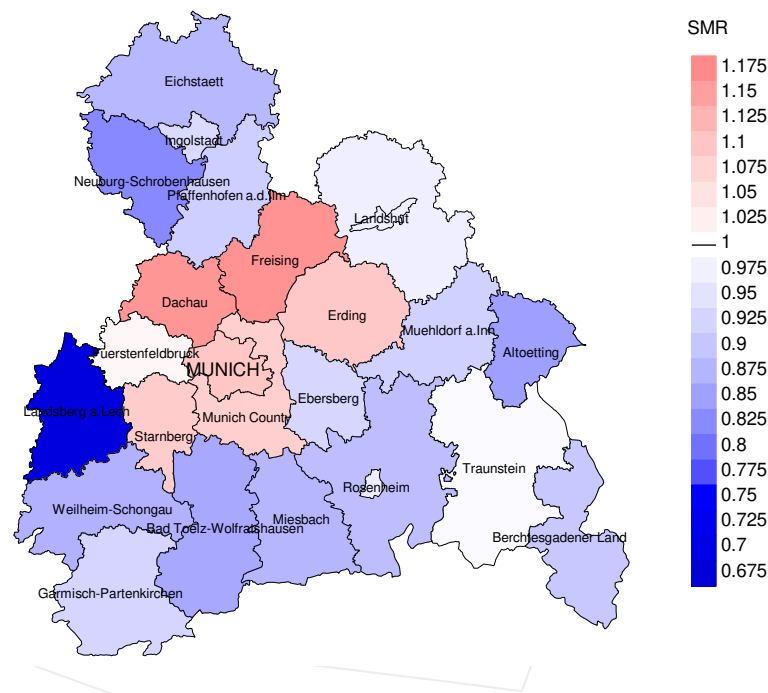


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=19,305, females N=14,404).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 354 women died from GI cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.93. Though, the value of this parameter may vary with an underlying probability of 99% between 0.81 and 1.06, 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

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

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