Munich Cancer Registry

- Survival
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ICD-10 D03: Melanoma in situ

Incidence and Mortality

Year of diagnosis	1998-2016
Patients	5,466
Diseases	5,704
Creation date	08/21/2018
Export date	08/09/2018
Population	4.81 m

Munich Cancer Registry
Cancer Registry Bavaria - Upper Bavaria Regional Center
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Marchioninistr. 15
Munich, 81377
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https://www.tumorregister-muenchen.de/en

https://www.tumorregister-muenchen.de/en/facts/base/bD03__E-ICD-10-D03-Melanoma-in-situ-incidence-and-mortality.pdf

Index of figures and tables

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
D03.-	Melanoma in situ
D03.0	Lip
D03.1	Eyelid, including canthus
D03.2	Ear and external auricular canal
D03.3	Other and unspecified parts of face
D03.4	Scalp and neck
D03.5	Trunk
D03.6	Upper limb, including shoulder
D03.7	Lower limb, including hip
D03.8	Other sites
D03.9	Melanoma in situ, unspecified

INCIDENCE

Table 1

Cases by year of diagnosis, proportions of further malignancies, deaths, and active follow-up (ALL PATIENTS)

Year of diagnosis	All cases n	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	77	20.8	16.7	27.3	94.8
1999	113	20.0	16.5	23.9	92.9
2000	108	21.5	16.2	19.4	93.5
2001	93	23.0	16.0	16.1	93.5
2002	145	22.0	15.9	22.1	92.4 #
2003	168	21.7	15.4	21.4	91.7
2004	238	21.2	15.1	22.3	92.0
2005	257	21.3	14.3	27.2	91.4
2006	294	21.8	13.8	17.0	85.0
2007	252	22.5	13.2	20.6	59.5 #
2008	387	23.0	12.6	16.8	50.4
2009	374	23.1	11.6	12.0	41.7
2010	485	23.3	10.9	10.1	40.0
2011	564	23.2	9.7	6.4	37.1
2012	609	22.7	8.5	8.2	38.6
2013	535	22.7	7.4	4.9	34.2
2014	396	23.0	6.1	4.3	35.9
2015	319	23.1	4.8	0.9	97.2
2016	290	23.1	4.7	0.3	94.5 ##
1998-2016	5704	23.1	16.7	11.7	59.7

5,704 cases diagnosed 1998-2016 are related to a total of 5,466 patients. Currently, in 1,937 (35.4 %) of these 5,466 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 1,276 / 383 / 278 (23.3 % / 7.0 % / 5.1 %) 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 retreived from the respective headings.

How to interpret:
In 2014, a subgroup of 396 cases has been diagnosed, of which 23.0 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 6.1 % 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 by year of diagnosis, proportions of
further malignancies, deaths, and active follow-up (MALES)

Year of diagnosis	Males n	Males %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	35	45.5	28.6	19.4	40.0	94.3
1999	64	56.6	25.3	19.1	29.7	93.8
2000	61	56.5	28.1	18.9	27.9	95.1
2001	43	46.2	28.6	18.8	20.9	95.3
2002	66	45.5	26.4	18.7	27.3	95.5 #
2003	85	50.6	25.4	18.1	27.1	90.6
2004	115	48.3	24.5	17.7	23.5	89.6
2005	119	46.3	25.2	16.9	31.1	89.9
2006	132	44.9	25.4	16.1	18.9	89.4
2007	114	45.2	25.9	15.4	25.4	68.4 #
2008	190	49.1	26.9	15.0	18.9	52.6
2009	200	53.5	27.5	13.7	15.5	47.0
2010	229	47.2	27.8	12.8	12.7	44.5
2011	251	44.5	26.9	11.1	8.8	39.0
2012	297	48.8	26.4	10.3	10.8	39.7
2013	255	47.7	26.3	8.1	7.1	34.9
2014	190	48.0	26.6	6.8	6.3	36.3
2015	163	51.1	26.8	5.2		97.5
2016	149	51.4	27.0	5.5	0.7	94.6 ##
1998-2016	2758	48.4	27.0	19.4	14.5	61.9

2,758 cases diagnosed 1998-2016 are related to a total of 2,622 patients. Currently, in 1,071 (40.8 %) of these 2,622 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 670 / 213 / 188 (25.6 % / 8.1 % / 7.2 %) 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 retreived from the respective headings.

How to interpret:
In 2014, a subgroup of 190 cases has been diagnosed, of which 26.6 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 6.8 % 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 by year of diagnosis, proportions of further malignancies, deaths, and active follow-up (FEMALES)

Year of diagnosis	Females n	Females %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	42	54.5	14.3	14.2	16.7	95.2
1999	49	43.4	14.3	14.1	16.3	91.8
2000	47	43.5	13.8	13.8	8.5	91.5
2001	50	53.8	17.0	13.6	12.0	92.0
2002	79	54.5	17.6	13.3	17.7	89.9 #
2003	83	49.4	18.0	13.0	15.7	92.8
2004	123	51.7	18.0	12.7	21.1	94.3
2005	138	53.7	17.5	12.0	23.9	92.8
2006	162	55.1	18.5	11.7	15.4	81.5
2007	138	54.8	19.4	11.3	16.7	52.2 #
2008	197	50.9	19.5	10.4	14.7	48.2
2009	174	46.5	18.8	9.8	8.0	35.6
2010	256	52.8	19.1	9.3	7.8	35.9
2011	313	55.5	19.7	8.5	4.5	35.5
2012	312	51.2	19.3	6.9	5.8	37.5
2013	280	52.3	19.4	6.7	2.9	33.6
2014	206	52.0	19.6	5.5	2.4	35.4
2015	156	48.9	19.5	4.3	1.9	96.8
2016	141	48.6	19.5	3.8		94.3 ##
1998-2016	2946	51.6	19.5	14.2	9.2	57.6

2,946 cases diagnosed 1998-2016 are related to a total of 2,844 patients. Currently, in 866 (30.5 %) of these 2,844 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 606 / 170 / 90 (21.3 % / 6.0 % / 3.2 %) 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 retreived from the respective headings.

How to interpret:
In 2014, a subgroup of 206 cases has been diagnosed, of which 19.6 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 5.5 % 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
(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	35	42	3.2	3.6	2.0	2.6	2.8	3.1	3.5	3.4
1999	64	49	5.7	4.1	3.7	2.9	4.9	3.6	5.5	3.7
2000	61	47	5.4	3.9	3.3	2.7	4.6	3.3	5.5	3.7
2001	43	50	3.7	4.1	2.4	2.9	3.2	3.5	3.6	3.8
2002	66	79	3.5	4.0	2.2	2.9	3.1	3.4	3.4	3.9
2003	85	83	4.5	4.2	2.9	2.6	3.8	3.4	4.4	3.7
2004	115	123	6.1	6.2	3.7	3.7	5.1	4.8	6.0	5.4
2005	119	138	6.3	6.9	3.7	3.9	5.1	5.2	6.2	6.1
2006	132	162	6.9	8.1	4.1	4.8	5.5	6.2	6.5	7.1
2007	114	138	5.1	6.0	2.9	3.3	4.1	4.3	4.9	5.0
2008	190	197	8.5	8.5	4.8	4.7	6.7	6.2	7.9	7.2
2009	200	174	9.0	7.5	4.7	4.2	6.8	5.5	8.6	6.4
2010	229	256	10.2	10.9	5.5	5.9	7.7	7.9	9.4	9.2
2011	251	313	11.2	13.4	6.0	7.9	8.5	10.2	10.3	11.7
2012	297	312	13.1	13.2	6.8	7.3	9.6	9.7	11.8	11.3
2013	255	280	11.1	11.7	6.3	6.8	8.5	8.8	10.1	10.2
2014	190	206	8.1	8.6	4.3	4.9	6.0	6.4	7.3	7.4
2015	163	156	6.9	6.4	3.4	3.6	4.9	4.8	6.2	5.5
2016	149	141	6.2	5.7	2.9	3.3	4.3	4.3	5.5	4.9
1998-2016	2758	2946	7.5	7.7	4.2	4.5	5.9	5.9	7.2	6.7

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)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	77	55.8	16.7	19.5	92.2	31.4	41.5	59.6	67.3	76.2
1999	113	53.0	16.8	11.8	95.1	31.2	38.8	56.7	63.6	72.6
2000	108	58.3	15.3	22.8	87.1	34.3	46.0	62.2	70.2	75.1
2001	93	54.4	15.1	24.2	86.2	33.5	42.4	55.4	65.7	72.5
2002	145	56.3	16.3	19.9	84.1	32.0	42.2	59.6	67.7	77.5
2003	168	59.2	15.2	18.1	90.3	36.8	50.6	62.0	68.7	78.5
2004	238	60.2	16.2	20.3	94.7	36.4	48.0	63.7	71.5	81.0
2005	257	62.3	16.0	22.9	99.1	38.6	49.3	65.1	74.2	81.5
2006	294	61.6	15.4	16.2	94.5	39.4	51.0	64.5	71.4	81.1
2007	252	63.9	15.2	13.7	91.6	41.3	54.1	67.4	74.0	82.2
2008	387	63.1	14.6	16.0	93.7	42.5	52.4	66.6	72.9	81.4
2009	374	63.9	15.6	15.4	96.5	40.2	53.2	67.7	75.3	81.7
2010	485	64.0	15.2	18.1	97.7	42.2	53.1	67.7	74.5	81.6
2011	564	62.3	15.6	19.6	96.9	40.7	50.3	64.8	73.7	80.8
2012	609	64.0	15.1	12.1	95.7	41.6	53.4	67.8	74.8	80.9
2013	535	61.6	16.6	16.0	96.7	37.0	49.1	65.1	74.0	81.1
2014	396	63.5	15.3	18.4	94.9	41.6	51.9	66.5	75.0	81.2
2015	319	64.2	15.4	23.4	91.7	41.1	52.3	67.5	76.1	80.8
2016	290	65.2	14.3	24.2	91.3	45.3	54.3	68.2	76.7	81.8
1998-2016	5704	62.3	15.7	11.8	99.1	39.3	51.0	65.2	73.9	80.8

Table 3a

Age distribution parameters by year of diagnosis (MALES)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	35	62.1	14.5	36.1	92.2	41.5	52.5	61.1	72.9	82.6
1999	64	55.6	16.0	23.7	89.7	32.9	39.5	59.0	65.9	72.9
2000	61	62.6	13.1	33.5	87.1	40.4	57.4	64.9	71.0	78.1
2001	43	56.5	15.3	25.9	86.2	34.8	43.4	59.7	67.5	73.5
2002	66	60.3	11.4	32.0	78.8	40.1	56.4	61.6	67.4	73.4
2003	85	59.1	14.9	18.1	83.4	36.8	49.9	63.1	69.6	76.2
2004	115	60.8	14.7	24.5	89.3	38.4	49.7	64.1	71.3	76.6
2005	119	62.5	16.3	25.2	99.1	37.9	50.9	66.3	73.9	82.6
2006	132	62.0	14.8	18.3	94.5	40.1	52.1	66.1	71.2	77.6
2007	114	64.4	13.8	13.7	89.5	43.4	55.0	67.4	73.9	79.3
2008	190	64.4	12.7	16.0	93.2	44.4	57.8	67.1	72.2	77.5
2009	200	65.2	14.4	22.8	96.5	41.2	57.6	68.8	75.6	80.2
2010	229	64.9	14.1	20.9	95.7	44.2	55.6	68.7	74.4	81.6
2011	251	65.1	13.9	24.8	96.9	46.5	55.4	68.1	74.7	81.3
2012	297	66.3	13.0	29.5	95.7	47.0	59.2	69.4	74.6	79.8
2013	255	62.6	15.8	16.0	96.7	41.2	51.1	66.1	73.9	79.6
2014	190	65.6	14.2	22.0	94.9	45.3	55.9	69.6	75.3	81.2
2015	163	66.8	14.5	23.7	90.1	46.9	57.1	71.5	77.7	82.1
2016	149	69.1	12.4	32.6	91.3	51.3	60.4	72.7	78.1	82.7
1998-2016	2758	64.1	14.4	13.7	99.1	42.6	55.0	67.0	74.3	80.2

Table 3b

Age distribution parameters by year of diagnosis (FEMALES)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	42	50.5	16.7	19.5	82.3	29.5	35.8	53.0	63.0	71.2
1999	49	49.6	17.4	11.8	95.1	26.5	33.8	54.8	59.5	68.5
2000	47	52.6	16.2	22.8	81.3	29.2	36.4	55.6	66.4	72.0
2001	50	52.5	14.8	24.2	82.2	32.8	39.6	54.0	62.7	71.8
2002	79	52.9	18.9	19.9	84.1	27.5	35.7	52.2	68.9	79.1
2003	83	59.3	15.5	22.1	90.3	37.2	50.7	60.9	68.0	79.1
2004	123	59.7	17.5	20.3	94.7	35.5	45.6	62.3	72.0	82.0
2005	138	62.1	15.8	22.9	95.2	40.1	48.0	64.1	75.0	81.5
2006	162	61.2	16.0	16.2	89.2	39.4	49.9	63.5	71.5	82.5
2007	138	63.5	16.4	20.0	91.6	39.3	51.2	67.4	74.1	84.4
2008	197	61.8	16.1	25.5	93.7	39.7	47.3	65.2	73.4	82.5
2009	174	62.3	16.7	15.4	94.6	37.3	50.3	66.6	74.0	82.0
2010	256	63.3	16.1	18.1	97.7	41.2	50.8	66.5	74.6	81.7
2011	313	60.0	16.5	19.6	96.8	36.3	46.6	62.3	73.1	80.5
2012	312	61.9	16.6	12.1	93.4	38.4	48.6	65.1	74.9	81.4
2013	280	60.7	17.3	17.4	95.6	33.9	48.1	64.3	74.0	81.4
2014	206	61.6	16.0	18.4	93.4	38.0	48.3	64.1	74.7	81.4
2015	156	61.4	15.8	23.4	91.7	36.6	50.2	64.7	74.2	79.4
2016	141	61.1	15.0	24.2	89.7	42.8	49.4	61.9	74.1	78.4
1998-2016	2946	60.6	16.6	11.8	97.7	36.5	48.0	63.3	73.4	81.2

Table 4

Age distribution by 5-year age group and sex for period 2007-2016

Age at diagnosis Years	Cases n	%	Males Cum.%	n	%	Females Cum.%	n	%	Cum.%
0-4									
5-9									
10-14	2	0.0	0.0	1	0.0	0.0	1	0.0	0.0
15-19	9	0.2	0.3	3	0.1	0.2	6	0.3	0.3
20-24	21	0.5	0.8	6	0.3	0.5	15	0.7	1.0
25-29	79	1.9	2.6	22	1.1	1.6	57	2.6	3.6
30-34	100	2.4	5.0	25	1.2	2.8	75	3.5	7.1
35-39	156	3.7	8.7	53	2.6	5.4	103	4.7	11.8
40-44	232	5.5	14.2	101	5.0	10.4	131	6.0	17.9
45-49	318	7.6	21.8	121	5.9	16.3	197	9.1	26.9
50-54	298	7.1	28.9	138	6.8	23.1	160	7.4	34.3
55-59	300	7.1	36.0	148	7.3	30.3	152	7.0	41.3
60-64	416	9.9	45.9	213	10.5	40.8	203	9.3	50.6
65-69	562	13.3	59.2	289	14.2	55.0	273	12.6	63.2
70-74	697	16.6	75.8	388	19.0	74.0	309	14.2	77.4
75-79	508	12.1	87.8	299	14.7	88.7	209	9.6	87.0
80-84	304	7.2	95.0	137	6.7	95.4	167	7.7	94.7
85+	209	5.0	100.0	94	4.6	100.0	115	5.3	100.0
All ages	4211	100.0		2038	100.0		2173	100.0	

Table 5

Age-specific incidence
for period 2007-2016

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.
0- 4				
5- 9				
10-14	1	1	0.1	0.1
15-19	3	6	0.2	0.5
20-24	6	15	0.4	1.1
25-29	21	57	1.3	3.6
30-34	24	73	1.5	4.6
35-39	53	103	3.3	6.5
40-44	101	130	5.4	7.3
45-49	118	193	6.0	10.1
50-54	135	159	7.8	9.3
55-59	146	152	10.3	10.3
60-64	209	199	17.1	15.0
65-69	282	268	23.8	20.6
70-74	384	301	34.7	23.8
75-79	288	205	36.1	20.5
80-84	135	166	29.4	23.5
85+	89	112	29.1	15.3
All ages	1995	2140		
Incidence				
Raw			8.7	9.0
WS			4.7	5.1
ES			6.6	6.7
BRD-S			8.1	7.8

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).

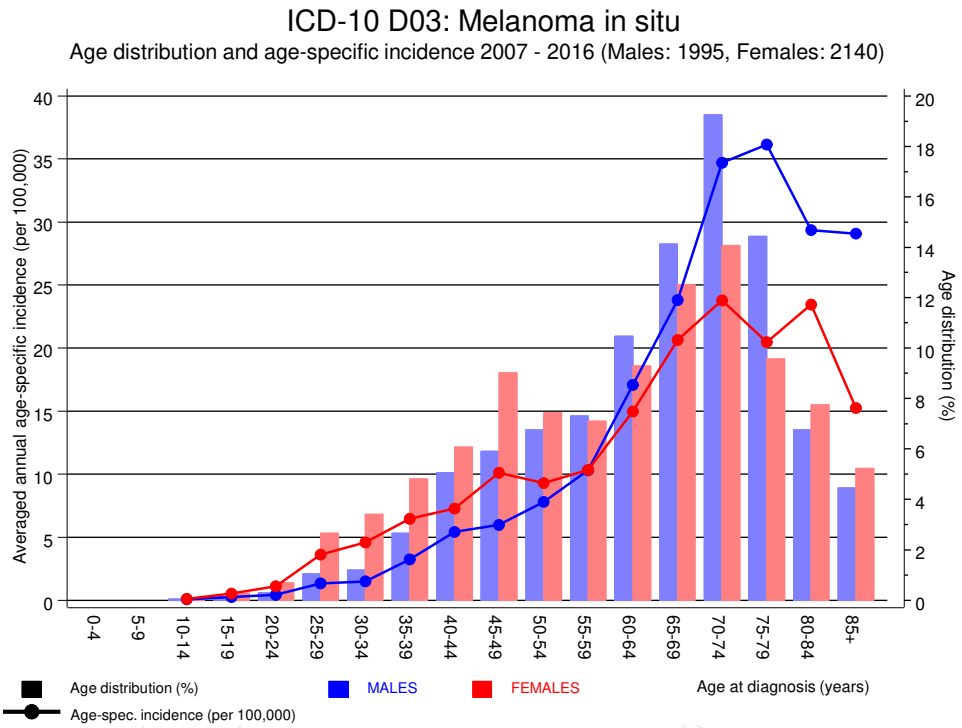


Figure 6. Age distribution (males: mean=65.3 yrs, median=68.5 yrs; females: mean=61.6 yrs, median=64.7 yrs) and age-specific incidence.

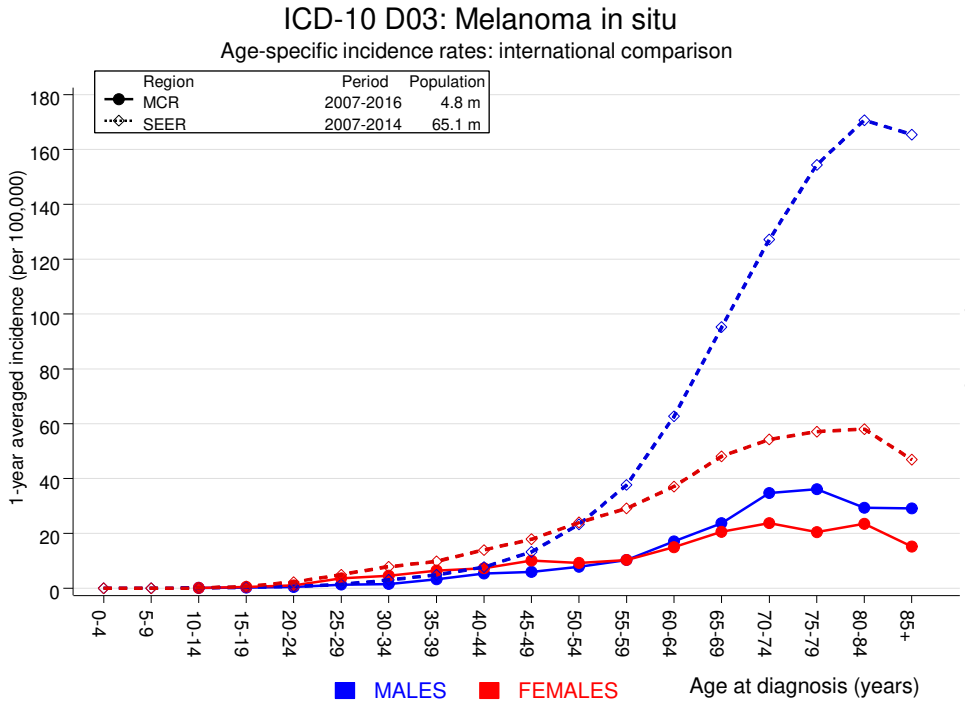


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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 %
C03–C06	Oral cavity	2	1.0	1.9	0.2	7.0		1.2	
C15	Oesophagus	5	2.4	2.1	0.7	4.8		3.2	
C16	Stomach	11	5.3	2.1	1.0	3.7	#	7.0	
C17	Small intestine	4	0.7	5.4	1.5	13.9	#	4.0	
C18	Colon	17	12.8	1.3	0.8	2.1		5.2	17.6
C19–C20	Rectum	10	6.9	1.4	0.7	2.6		3.7	
C22	Liver	6	3.7	1.6	0.6	3.5		2.8	16.7
C23–C24	Bile	3	1.3	2.3	0.5	6.6		2.1	
C25	Pancreas	14	5.1	2.7	1.5	4.6	#	10.9	14.3
C32	Larynx	2	1.3	1.5	0.2	5.6		0.9	50.0
C33–C34	Lung	25	15.4	1.6	1.1	2.4	#	11.8	12.0
C43	Malign. melanoma	234	5.9	39.9	35.0	45.4	#	279.4	0.4
C46,C49	Soft tissue	3	0.8	3.9	0.8	11.5		2.7	
C61	Prostate	105	37.3	2.8	2.3	3.4	#	82.9	10.5
C64	Kidney	8	4.5	1.8	0.8	3.5		4.2	
C67	Bladder	15	6.1	2.4	1.4	4.0	#	10.8	13.3
C69	Eye melanoma	2	0.1	17.4	2.1	62.9	#	2.3	
C70–C72	CNS cancer	6	1.7	3.5	1.3	7.7	#	5.3	
C73	Thyroid	5	0.8	6.0	1.9	13.9	#	5.1	
C76–C79	CUP	4	2.2	1.8	0.5	4.6		2.1	
C82–C85	NHL	8	5.5	1.5	0.6	2.9		3.1	
C90	Mult. myeloma	6	1.8	3.4	1.3	7.5	#	5.2	16.7
C91–C96	Leukaemia	2	2.3	0.9	0.1	3.2		−0.3	50.0
Others, specified		7	2.7	2.6	1.0	5.4	#	5.3	28.6
Not observed		0	4.8	0.0	0.0	0.8	#	−5.8	
All further malignancies		504	132.5	3.8	3.5	4.2	#	454.9	5.6

Patients	2482
Median age at next malignancy (years)	73.4
Person-years	8167
Mean observation time (years)	3.3
Median observation time (years)	1.5

The occurrence of further malignancy listed is statistically significant.

Observed further malignancies with count 1 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

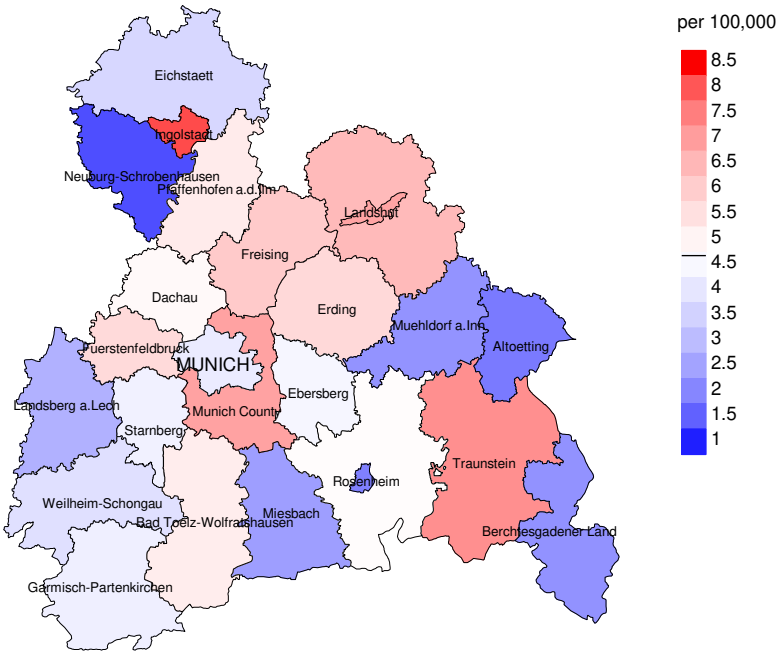
Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C15	Oesophagus	3	0.5	5.6	1.2	16.4	#	2.9	
C16	Stomach	6	2.8	2.2	0.8	4.7		3.8	
C18	Colon	21	7.9	2.7	1.7	4.1	#	15.3	9.5
C19–C20	Rectum	4	3.3	1.2	0.3	3.1		0.8	
C22	Liver	2	1.0	2.0	0.2	7.1		1.2	
C23–C24	Bile	4	1.1	3.5	1.0	8.9		3.3	
C25	Pancreas	5	3.8	1.3	0.4	3.1		1.4	40.0
C33–C34	Lung	15	6.1	2.5	1.4	4.1	#	10.4	6.7
C43	Malign. melanoma	152	3.3	45.4	38.5	53.2	#	173.7	
C46,C49	Soft tissue	3	0.5	6.1	1.3	17.9	#	2.9	
C50	Breast	66	25.5	2.6	2.0	3.3	#	47.4	3.0
C51	Vulva	2	0.9	2.3	0.3	8.3		1.3	
C53	Cervix uteri	2	1.2	1.6	0.2	5.9		0.9	
C54	Corpus uteri	4	4.5	0.9	0.2	2.3		−0.5	
C56	Ovary	9	3.3	2.7	1.2	5.2	#	6.6	
C64	Kidney	8	2.0	4.1	1.8	8.0	#	7.1	
C67	Bladder	4	1.6	2.5	0.7	6.5		2.8	
C70–C72	CNS cancer	3	1.1	2.7	0.6	7.9		2.2	
C73	Thyroid	3	1.6	1.9	0.4	5.6		1.7	
C82–C85	NHL	15	3.2	4.7	2.6	7.7	#	13.8	
C90	Mult. myeloma	4	1.0	4.0	1.1	10.1	#	3.5	25.0
C91–C96	Leukaemia	7	1.4	5.1	2.1	10.6	#	6.6	28.6
Others, specified		6	1.5	4.1	1.5	8.9	#	5.3	
Not observed		0	4.5	0.0	0.0	0.8	#	−5.3	
All further malignancies		348	83.5	4.2	3.7	4.6	#	309.1	2.9

Patients	2693
Median age at next malignancy (years)	71.2
Person-years	8557
Mean observation time (years)	3.2
Median observation time (years)	1.3

The occurrence of further malignancy listed is statistically significant.

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

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



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

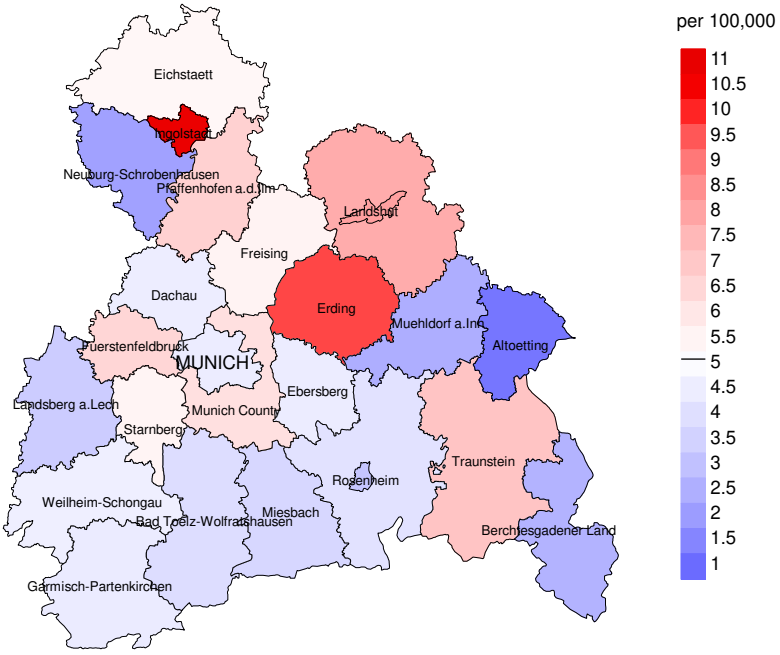
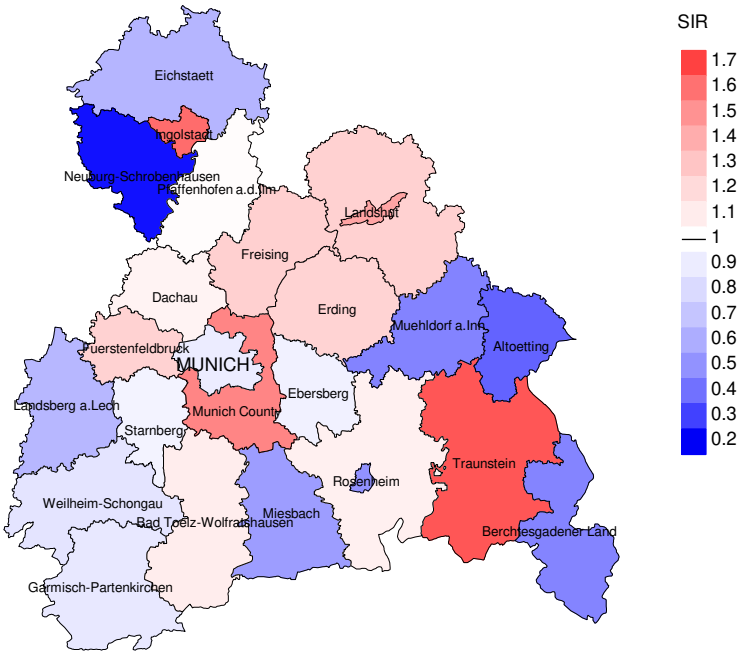


Figure 8a. Map of cancer incidence (world standard population) by county averaged for period 2007 to 2016. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 4.7/100,000 WS N=1,995, females 5.1/100,000 WS N=2,140).

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 56 women were identified with newly diagnosed melanoma in situ. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 4.4/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 3.0 and 6.5/100,000.

Standardized incidence ratio (SIR) 2007 - 2016: Males



Standardized incidence ratio (SIR) 2007 - 2016: Females

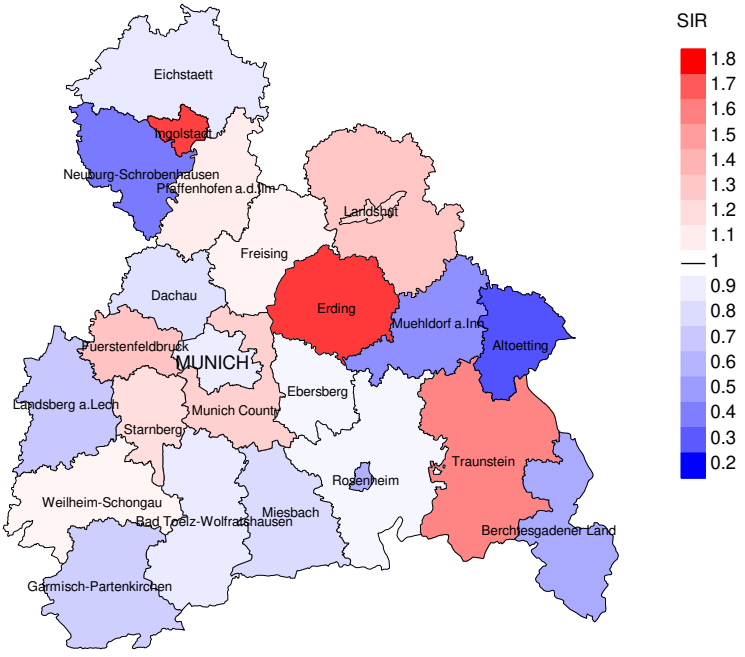


Figure 8b. Map of standardized incidence ratio (SIR) by county averaged for period 2007 to 2016. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=1,995, females N=2,140).

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 56 women were identified with newly diagnosed melanoma in situ. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.95. Though, the value of this parameter may vary with an underlying probability of 99% between 0.65 and 1.33, and is therefore not statistically striking.

MORTALITY

Table 9a

Annual cohorts: Incident cancers, follow-up status,
and deaths among the annual cohorts

(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 %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	77	94.8	21	27.3	95.2
1999	113	92.9	27	23.9	96.3
2000	108	93.5	21	19.4	90.5
2001	93	93.5	15	16.1	100.0
2002	145	92.4	32	22.1	100.0
2003	168	91.7	36	21.4	88.9
2004	238	92.0	53	22.3	100.0
2005	257	91.4	70	27.2	95.7
2006	294	85.0	50	17.0	96.0
2007	252	59.5	52	20.6	98.1
2008	387	50.4	65	16.8	98.5
2009	374	41.7	45	12.0	100.0
2010	485	40.0	49	10.1	100.0
2011	564	37.1	36	6.4	100.0
2012	609	38.6	50	8.2	96.0
2013	535	34.2	26	4.9	88.5
2014	396	35.9	17	4.3	100.0
2015	319	97.2	3	0.9	33.3
2016	290	94.5	1	0.3	100.0
1998-2016	5704	59.7	669	11.7	96.7

Table 9b

Annual cohorts of incident cancers and deaths,
and cases deceased within the same year of being diagnosed with cancer

(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	Deaths in same year n	Prop. deaths in same year %
1998	77	5		
1999	113	12		
2000	108	8		
2001	93	10	1	1.1
2002	145	16		
2003	168	15		
2004	238	14	1	0.4
2005	257	24		
2006	294	26	1	0.3
2007	252	38		
2008	387	38	4	1.0
2009	374	30	1	0.3
2010	485	64	4	0.8
2011	564	60	1	0.2
2012	609	74	5	0.8
2013	535	85	3	0.6
2014	396	93	2	0.5
2015	319	89		
2016	290	100	1	0.3
1998–2016	5704	801	24	0.4

Table 9c

Annual cohorts of deaths, and proportion of cancer-related and non-cancer-related deaths

(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	5	20.0	80.0	25.0
1999	12	33.3	66.7	33.3
2000	8	37.5	62.5	28.6
2001	10	40.0	60.0	62.5
2002	16	56.3	43.8	71.4
2003	15	46.7	53.3	57.1
2004	14	35.7	64.3	53.8
2005	24	50.0	50.0	52.2
2006	26	34.6	65.4	53.8
2007	38	36.8	63.2	50.0
2008	38	36.8	63.2	47.2
2009	30	40.0	60.0	57.1
2010	64	37.5	62.5	47.6
2011	60	38.3	61.7	39.0
2012	74	35.1	64.9	42.5
2013	85	48.2	51.8	51.8
2014	93	49.5	50.5	55.6
2015	89	39.3	60.7	44.8
2016	100	34.0	66.0	40.4
1998-2016	801	40.3	59.7	47.7

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	4	74.4	73.8	74.9	74.9
1999	9	79.3	69.9	83.1	69.9
2000	5	78.6	68.1	88.1	73.4
2001	7	73.7	81.0	72.2	75.9
2002	8	70.8	70.8	79.1	69.6
2003	9	81.7	74.5	82.5	67.2
2004	5	65.4	64.7	87.8	65.0
2005	17	77.3	78.3	76.4	78.3
2006	13	77.5	73.0	80.4	73.0
2007	23	78.3	77.1	78.3	79.1
2008	18	79.9	78.9	85.3	78.9
2009	19	81.7	78.3	84.7	79.4
2010	33	77.8	74.4	81.1	76.6
2011	31	82.3	81.4	83.3	81.4
2012	47	83.0	77.4	83.5	77.1
2013	47	80.2	79.4	80.8	79.8
2014	57	84.1	75.5	88.0	77.9
2015	47	83.5	80.1	85.4	80.2
2016	62	81.9	82.0	81.8	79.4
1998-2016	461	80.6	78.1	83.0	78.6

Deaths of patients are considered to be cancer-related, in case that fact was recorded on the death certificate, or patients had suffered from metastasis or recurrence.

Table 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	1	76.8		76.8	
1999	3	89.3	91.8	83.9	78.5
2000	3	86.8		86.8	
2001	3	81.0	75.5	88.8	75.5
2002	8	78.1	63.9	79.1	73.5
2003	6	77.7	64.5	85.2	64.5
2004	9	81.5	65.2	85.5	79.3
2005	7	83.4	74.0	90.7	74.0
2006	13	82.1	78.4	82.7	78.9
2007	15	82.4	77.4	83.5	77.9
2008	20	85.2	73.3	86.6	85.0
2009	11	83.6	81.9	84.2	80.6
2010	31	85.3	76.6	86.5	77.3
2011	29	88.4	85.1	90.4	85.1
2012	27	85.7	85.5	85.8	87.4
2013	38	85.2	78.4	90.6	79.8
2014	36	81.7	73.1	90.3	73.1
2015	42	87.9	75.6	89.8	76.9
2016	38	83.9	76.0	85.7	77.4
1998-2016	340	84.8	77.3	87.3	78.3

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	1	0.1	0.03	0.1	0.03	0.1	0.03	0.1	0.03
1999	3	0.3	0.05	0.2	0.04	0.2	0.05	0.3	0.06
2000	3	0.3	0.05	0.2	0.05	0.2	0.05	0.3	0.06
2001	3	0.3	0.07	0.1	0.05	0.2	0.07	0.3	0.09
2002	6	0.3	0.09	0.2	0.09	0.3	0.10	0.4	0.11
2003	4	0.2	0.05	0.1	0.04	0.2	0.05	0.2	0.06
2004	3	0.2	0.03	0.1	0.02	0.1	0.02	0.1	0.02
2005	8	0.4	0.07	0.2	0.05	0.3	0.07	0.5	0.08
2006	6	0.3	0.05	0.1	0.04	0.2	0.04	0.3	0.06
2007	8	0.4	0.07	0.1	0.05	0.2	0.06	0.4	0.08
2008	10	0.4	0.05	0.2	0.04	0.3	0.05	0.5	0.07
2009	8	0.4	0.04	0.2	0.03	0.3	0.04	0.4	0.04
2010	16	0.7	0.07	0.3	0.05	0.5	0.06	0.7	0.07
2011	14	0.6	0.06	0.2	0.04	0.4	0.05	0.6	0.06
2012	17	0.7	0.06	0.3	0.05	0.5	0.06	0.7	0.06
2013	24	1.0	0.10	0.4	0.06	0.6	0.08	1.0	0.10
2014	29	1.2	0.15	0.5	0.11	0.8	0.13	1.1	0.15
2015	24	1.0	0.15	0.3	0.09	0.6	0.12	0.9	0.15
2016	23	1.0	0.16	0.4	0.13	0.6	0.15	0.8	0.15
1998-2016	210	0.6	0.08	0.2	0.06	0.4	0.07	0.6	0.08

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									
1999	1	0.1	0.02	0.0	0.01	0.0	0.01	0.0	0.01
2000									
2001	1	0.1	0.02	0.0	0.01	0.0	0.01	0.1	0.02
2002	3	0.2	0.04	0.1	0.03	0.1	0.03	0.1	0.03
2003	3	0.2	0.04	0.1	0.04	0.1	0.04	0.1	0.04
2004	2	0.1	0.02	0.1	0.01	0.1	0.01	0.1	0.02
2005	4	0.2	0.03	0.1	0.02	0.1	0.02	0.1	0.02
2006	3	0.1	0.02	0.0	0.01	0.1	0.01	0.1	0.02
2007	6	0.3	0.04	0.1	0.03	0.2	0.04	0.2	0.05
2008	4	0.2	0.02	0.1	0.01	0.1	0.02	0.1	0.02
2009	4	0.2	0.02	0.0	0.01	0.1	0.01	0.1	0.02
2010	8	0.3	0.03	0.1	0.02	0.2	0.02	0.3	0.03
2011	9	0.4	0.03	0.1	0.01	0.2	0.02	0.2	0.02
2012	9	0.4	0.03	0.1	0.01	0.2	0.02	0.2	0.02
2013	17	0.7	0.06	0.2	0.03	0.4	0.04	0.5	0.05
2014	17	0.7	0.08	0.3	0.06	0.4	0.06	0.6	0.08
2015	11	0.5	0.07	0.1	0.04	0.2	0.05	0.3	0.05
2016	11	0.4	0.08	0.2	0.05	0.3	0.06	0.3	0.07
1998-2016	113	0.3	0.04	0.1	0.02	0.2	0.03	0.2	0.03

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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