Munich Cancer Registry

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ICD-10 C66: Ureteral cancer

Incidence and Mortality

Year of diagnosis	1998-2016
Patients	623
Diseases	631
Creation date	08/21/2018
Export date	08/09/2018
Population	4.81 m

Munich Cancer Registry
Cancer Registry Bavaria - Upper Bavaria Regional Center
at Klinikum Grosshadern/IBE
Marchioninistr. 15
Munich, 81377
Germany

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

https://www.tumorregister-muenchen.de/en/facts/base/bC66__E-ICD-10-C66-Ureteral-cancer-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
C66	Malignant neoplasm of ureter

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	20			45.0	37.4	90.0	100.0
1999	11			45.2	36.0	90.9	100.0
2000	12			44.2	35.7	75.0	100.0
2001	24			41.8	35.2	95.8	100.0
2002	30			39.2	35.4	86.7	100.0 #
2003	19			37.9	35.4	68.4	100.0
2004	24			37.9	35.9	75.0	91.7
2005	40			40.0	34.8	75.0	90.0
2006	35			40.0	34.8	80.0	100.0
2007	35			40.4	33.5	60.0	88.6 #
2008	40			40.3	32.7	57.5	72.5
2009	44			41.0	31.9	65.9	79.5
2010	48	1	2.1	42.4	31.4	79.2	85.4
2011	48			45.6	28.0	60.4	85.4
2012	44	1	2.3	46.4	26.4	59.1	77.3
2013	49			47.2	25.5	65.3	87.8
2014	45			48.4	22.8	51.1	84.4
2015	28	1	3.6	48.8	25.0	39.3	100.0
2016	35			49.9	18.5	20.0	68.6 ##
1998-2016	631	3	0.5	49.9	37.4	65.6	87.6

631 cases diagnosed 1998-2016 are related to a total of 623 patients. Currently, in 459 (73.7 %) of these 623 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 213 / 158 / 88 (34.2 % / 25.4 % / 14.1 %) 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 45 cases has been diagnosed, of which 48.4 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 22.8 % 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 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	13	65.0			53.8	40.2	92.3	100.0	
1999	7	63.6			50.0	38.3	85.7	100.0	
2000	7	58.3			48.1	38.2	71.4	100.0	
2001	13	54.2			47.5	37.7	92.3	100.0	
2002	17	56.7			45.6	37.8	82.4	100.0	#
2003	10	52.6			46.3	37.5	80.0	100.0	
2004	15	62.5			45.1	38.2	73.3	86.7	
2005	29	72.5			46.8	36.5	75.9	89.7	
2006	23	65.7			46.3	36.5	78.3	100.0	
2007	27	77.1			46.0	35.8	59.3	88.9	#
2008	20	50.0			43.6	35.1	50.0	65.0	
2009	30	68.2			45.0	33.3	63.3	76.7	
2010	34	70.8			46.5	33.3	94.1	94.1	
2011	28	58.3			49.5	27.6	67.9	85.7	
2012	27	61.4			50.0	24.8	55.6	81.5	
2013	26	53.1			50.6	24.7	61.5	76.9	
2014	32	71.1			51.4	24.6	50.0	84.4	
2015	18	64.3			51.3	34.4	27.8	100.0	
2016	24	68.6			52.5	23.5	20.8	66.7	##
1998-2016	400	63.4			52.5	40.2	65.3	87.0	

400 cases diagnosed 1998-2016 are related to a total of 394 patients. Currently, in 305 (77.4 %) of these 394 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 137 / 105 / 63 (34.8 % / 26.6 % / 16.0 %) 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 32 cases has been diagnosed, of which 51.4 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 24.6 % 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	7	35.0			28.6	32.5	85.7	100.0	
1999	4	36.4			36.4	32.2	100.0	100.0	
2000	5	41.7			37.5	31.7	80.0	100.0	
2001	11	45.8			33.3	31.0	100.0	100.0	
2002	13	43.3			30.0	31.2	92.3	100.0	#
2003	9	47.4			26.5	31.8	55.6	100.0	
2004	9	37.5			27.6	31.7	77.8	100.0	
2005	11	27.5			29.0	31.6	72.7	90.9	
2006	12	34.3			29.6	31.7	83.3	100.0	
2007	8	22.9			30.3	29.6	62.5	87.5	#
2008	20	50.0			34.9	28.9	65.0	80.0	
2009	14	31.8			34.1	29.4	71.4	85.7	
2010	14	29.2	1	7.1	35.0	28.1	42.9	64.3	
2011	20	41.7			38.9	28.6	50.0	85.0	
2012	17	38.6	1	5.9	40.2	29.2	64.7	70.6	
2013	23	46.9			41.6	26.9	69.6	100.0	
2014	13	28.9			43.3	19.4	53.8	84.6	
2015	10	35.7	1	10.0	44.5	10.0	60.0	100.0	
2016	11	31.4			45.5	10.0	18.2	72.7	##
1998-2016	231	36.6	3	1.3	45.5	32.5	66.2	88.7	

231 cases diagnosed 1998-2016 are related to a total of 229 patients. Currently, in 154 (67.2 %) of these 229 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 76 / 53 / 25 (33.2 % / 23.1 % / 10.9 %) 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 retreived from the respective headings.

How to interpret:
In 2014, a subgroup of 13 cases has been diagnosed, of which 43.3 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 19.4 % 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 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	13	7	1.2	0.6	0.8	0.3	1.1	0.4	1.5	0.5
1999	7	4	0.6	0.3	0.4	0.1	0.6	0.2	0.8	0.2
2000	7	5	0.6	0.4	0.4	0.2	0.6	0.2	0.8	0.4
2001	13	11	1.1	0.9	0.6	0.4	1.0	0.6	1.4	0.8
2002	17	13	0.9	0.7	0.5	0.3	0.8	0.5	1.0	0.6
2003	10	9	0.5	0.5	0.2	0.2	0.4	0.3	0.6	0.4
2004	15	9	0.8	0.5	0.4	0.2	0.6	0.3	0.9	0.4
2005	29	11	1.5	0.6	0.8	0.2	1.2	0.4	1.6	0.4
2006	23	12	1.2	0.6	0.6	0.2	0.9	0.3	1.2	0.5
2007	27	8	1.2	0.3	0.6	0.1	0.9	0.2	1.2	0.3
2008	20	20	0.9	0.9	0.5	0.3	0.7	0.5	0.9	0.7
2009	30	14	1.3	0.6	0.7	0.2	1.0	0.3	1.3	0.5
2010	34	14	1.5	0.6	0.6	0.3	1.0	0.4	1.5	0.5
2011	28	20	1.3	0.9	0.6	0.3	1.0	0.4	1.2	0.6
2012	27	17	1.2	0.7	0.5	0.2	0.8	0.4	1.2	0.6
2013	26	23	1.1	1.0	0.5	0.3	0.7	0.5	1.1	0.7
2014	32	13	1.4	0.5	0.6	0.2	0.9	0.3	1.3	0.4
2015	18	10	0.8	0.4	0.3	0.1	0.5	0.2	0.7	0.3
2016	24	11	1.0	0.4	0.4	0.2	0.6	0.3	0.9	0.3
1998-2016	400	231	1.1	0.6	0.5	0.2	0.8	0.3	1.1	0.5

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	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	20	70.4	9.0	49.0	83.3	57.1	66.9	70.0	78.3	81.1
1999	11	74.4	12.9	49.4	89.5	55.0	69.7	76.5	87.7	87.8
2000	12	71.2	10.4	45.2	81.7	62.8	66.7	73.1	79.8	80.6
2001	24	73.6	7.4	57.2	87.5	61.8	70.4	74.6	77.9	80.5
2002	30	70.0	9.9	51.7	91.1	56.6	62.3	71.5	75.3	82.7
2003	19	74.5	8.6	56.6	87.3	60.9	69.8	77.4	80.7	85.0
2004	24	72.8	11.4	46.3	94.6	54.9	69.6	74.2	79.8	84.2
2005	40	70.2	12.1	38.2	93.3	53.9	65.8	71.0	77.9	85.9
2006	35	73.0	9.4	50.5	88.7	59.2	67.0	73.4	80.4	84.6
2007	35	72.8	8.2	53.2	87.8	62.9	67.6	74.0	76.4	83.7
2008	40	72.4	9.5	49.3	87.2	61.5	64.5	73.5	79.8	84.5
2009	44	73.1	10.5	29.1	89.0	60.2	69.2	73.3	81.0	83.9
2010	48	74.0	8.8	52.4	92.7	60.0	70.0	74.0	80.4	84.6
2011	48	72.2	9.8	50.3	89.7	58.5	64.7	72.1	80.0	84.8
2012	44	75.6	9.7	49.0	92.8	63.2	69.1	77.5	82.5	83.9
2013	49	74.6	9.8	40.0	90.2	61.7	70.3	76.1	81.7	84.0
2014	45	73.6	10.3	45.1	90.8	59.5	68.0	75.0	80.4	87.1
2015	28	75.3	11.4	52.5	98.9	58.7	68.8	75.0	83.7	90.4
2016	35	73.5	10.2	49.9	87.9	60.3	66.7	76.9	80.8	86.4
1998-2016	631	73.1	9.9	29.1	98.9	59.5	67.4	74.0	80.3	84.7

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	13	69.5	9.1	49.0	81.7	55.6	67.8	69.9	74.9	80.4
1999	7	70.5	14.1	49.4	89.5	49.4	55.0	72.3	80.9	89.5
2000	7	68.9	11.5	45.2	80.3	45.2	66.2	73.0	76.6	80.3
2001	13	73.7	6.6	61.6	86.8	64.0	70.5	74.8	76.9	78.0
2002	17	69.2	9.9	52.0	91.1	55.1	62.3	70.9	74.4	80.3
2003	10	74.4	10.8	56.6	87.3	58.8	63.9	79.1	81.2	86.1
2004	15	73.4	9.8	54.9	86.9	55.9	69.8	74.9	80.1	84.2
2005	29	70.6	11.9	47.6	93.3	53.1	65.9	70.5	77.6	89.2
2006	23	71.4	8.0	50.5	84.3	64.0	65.8	71.2	79.7	80.5
2007	27	72.2	8.7	53.2	87.8	62.9	66.9	72.1	76.3	86.4
2008	20	70.0	10.9	49.3	87.2	55.0	62.5	70.3	78.8	85.0
2009	30	70.7	11.2	29.1	89.0	59.8	65.0	70.4	77.6	82.7
2010	34	76.3	7.6	60.0	92.7	67.4	70.4	76.8	82.1	85.1
2011	28	69.2	9.5	50.3	84.9	58.0	62.1	67.8	78.0	82.6
2012	27	73.6	9.6	49.0	89.1	61.7	67.5	75.1	82.4	83.4
2013	26	72.8	10.9	40.0	86.3	59.7	66.5	75.0	81.7	83.4
2014	32	74.4	10.8	45.1	90.8	59.6	68.4	76.9	81.1	87.1
2015	18	73.6	11.1	52.5	98.9	56.7	69.6	73.6	80.8	84.7
2016	24	74.6	9.1	49.9	86.4	61.3	70.2	76.9	81.1	86.1
1998-2016	400	72.3	10.0	29.1	98.9	58.9	66.7	73.1	79.7	84.0

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	7	72.2	9.1	58.5	83.3	58.5	64.7	72.4	80.2	83.3
1999	4	81.2	7.8	72.3	87.8	72.3	74.6	82.3	87.7	87.8
2000	5	74.3	8.7	62.8	81.7	62.8	67.3	79.2	80.6	81.7
2001	11	73.5	8.6	57.2	87.5	61.8	70.4	73.7	79.9	80.5
2002	13	71.1	10.1	51.7	87.0	58.6	65.3	72.7	76.0	85.0
2003	9	74.6	6.0	64.1	83.1	64.1	71.0	75.0	79.2	83.1
2004	9	71.8	14.3	46.3	94.6	46.3	69.4	73.5	79.4	94.6
2005	11	69.3	13.2	38.2	91.0	59.5	65.4	71.6	78.2	78.2
2006	12	76.0	11.4	52.1	88.7	58.1	73.1	75.8	85.4	87.4
2007	8	74.7	6.8	60.3	82.8	60.3	72.6	75.7	78.8	82.8
2008	20	74.7	7.3	63.4	85.7	64.1	68.6	74.5	81.0	84.5
2009	14	78.4	6.6	66.0	87.2	67.9	74.3	79.7	83.9	84.0
2010	14	68.5	9.4	52.4	79.8	54.6	59.4	72.4	75.6	78.5
2011	20	76.4	8.9	56.8	89.7	63.4	71.5	76.6	84.1	87.3
2012	17	78.9	9.3	56.7	92.8	67.2	77.7	80.0	83.3	91.5
2013	23	76.7	8.3	52.6	90.2	65.6	74.3	79.0	81.7	84.8
2014	13	71.6	9.0	59.5	88.0	59.5	65.4	71.2	76.5	85.4
2015	10	78.3	11.9	59.5	91.9	63.0	68.1	78.8	90.3	91.1
2016	11	71.2	12.4	53.0	87.9	53.7	60.3	73.8	80.4	87.1
1998-2016	231	74.5	9.7	38.2	94.6	60.3	68.6	75.2	80.9	86.1

Table 4

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

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4									
5-9									
10-14									
15-19									
20-24									
25-29	1	0.2	0.2	1	0.4	0.4			0.0
30-34	0	0.0	0.2			0.4			0.0
35-39	1	0.2	0.5	1	0.4	0.8			0.0
40-44	0	0.0	0.5			0.8			0.0
45-49	4	1.0	1.4	4	1.5	2.3			0.0
50-54	13	3.1	4.6	8	3.0	5.3	5	3.3	3.3
55-59	20	4.8	9.4	12	4.5	9.8	8	5.3	8.7
60-64	37	8.9	18.3	28	10.5	20.3	9	6.0	14.7
65-69	59	14.2	32.5	42	15.8	36.1	17	11.3	26.0
70-74	78	18.8	51.2	50	18.8	54.9	28	18.7	44.7
75-79	85	20.4	71.6	49	18.4	73.3	36	24.0	68.7
80-84	78	18.8	90.4	49	18.4	91.7	29	19.3	88.0
85+	40	9.6	100.0	22	8.3	100.0	18	12.0	100.0
All ages	416	100.0		266	100.0		150	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=0 %	Females DCO rate n=3 %	Males Prop.all cancers n=113978 %	Females Prop.all cancers n=112253 %
0- 4								
5- 9								
10-14								
15-19								
20-24								
25-29	1		0.1				0.1	
30-34								
35-39	1		0.1				0.1	
40-44								
45-49	4		0.2				0.1	
50-54	8	5	0.5	0.3			0.1	0.1
55-59	11	8	0.8	0.5			0.1	0.1
60-64	28	9	2.3	0.7			0.2	0.1
65-69	42	17	3.5	1.3			0.2	0.1
70-74	48	28	4.3	2.2			0.2	0.2
75-79	49	35	6.1	3.5		2.9	0.3	0.3
80-84	49	29	10.7	4.1		3.4	0.4	0.3
85+	22	18	7.2	2.5		5.6	0.3	0.1
All ages	263	149			0.0	2.0	0.2	0.1
Incidence								
Raw			1.2	0.6				
WS			0.5	0.2				
ES			0.8	0.3				
BRD-S			1.1	0.5				

The age-specific incidence characterizes the disease risk in a particular age group. The age distribution depends on the patient population frequency in each age group and reflects the tangible clinical picture of everyday patients care (see following chart).

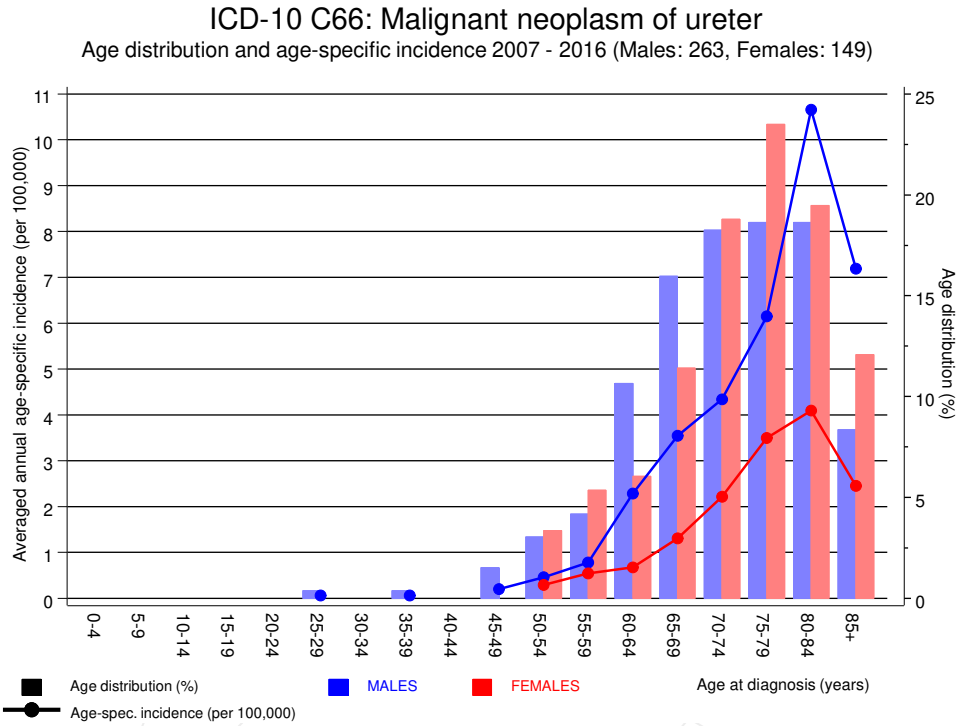


Figure 6. Age distribution (males: mean=72.9 yrs, median=73.8 yrs; females: mean=75.2 yrs, median=75.7 yrs) and age-specific incidence.

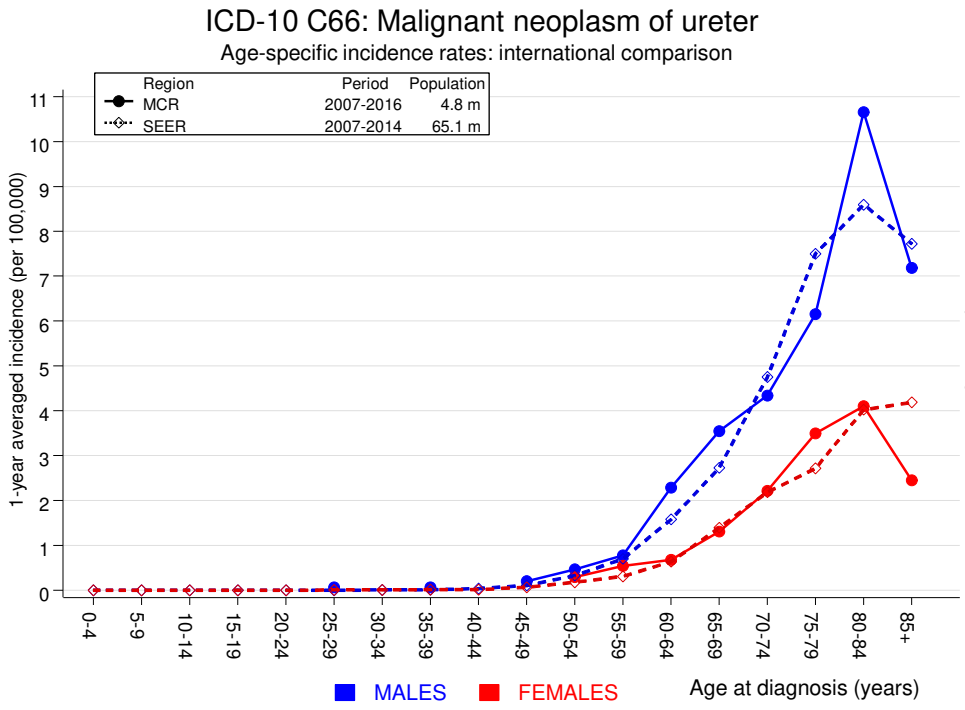


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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 %
C15	Oesophagus	3	0.4	7.4	1.5	21.6	#	22.3	33.3
C16	Stomach	2	1.1	1.9	0.2	6.8		8.0	
C18	Colon	3	2.5	1.2	0.2	3.5		4.5	33.3
C19–C20	Rectum	2	1.2	1.6	0.2	5.9		6.6	
C22	Liver	2	0.7	3.0	0.4	10.8		11.5	
C33–C34	Lung	10	2.8	3.6	1.7	6.6	#	62.1	20.0
C61	Prostate	30	6.7	4.5	3.0	6.4	#	200.0	3.3
C64	Kidney	12	0.8	15.2	7.9	26.6	#	96.4	50.0
C65	Renal pelvis	39	0.1	348.6	247.9	476.5	#	334.3	
C66	Ureter	6	0.1	93.9	34.5	204.5	#	51.0	
C67	Bladder	61	1.2	49.6	38.0	63.8	#	513.9	
C68	Urethra	7	0.0	327.6	131.7	674.9	#	60.0	
C68	Urinary org.	6	0.0	281.5	103.3	612.6	#	51.4	66.7
C90	Mult. myeloma	2	0.3	6.1	0.7	22.2		14.4	50.0
Others, specified		4	2.2	1.8	0.5	4.6		15.1	25.0
Not observed		0	3.9	0.0	0.0	0.9	#	-33.9	
All further malignancies		189	24.1	7.8	6.8	9.0	#	1418	9.0

Patients	382
Median age at next malignancy (years)	73.9
Person-years	1163
Mean observation time (years)	3.0
Median observation time (years)	1.9

The occurrence of further malignancy listed is statistically significant.

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

Table 7b

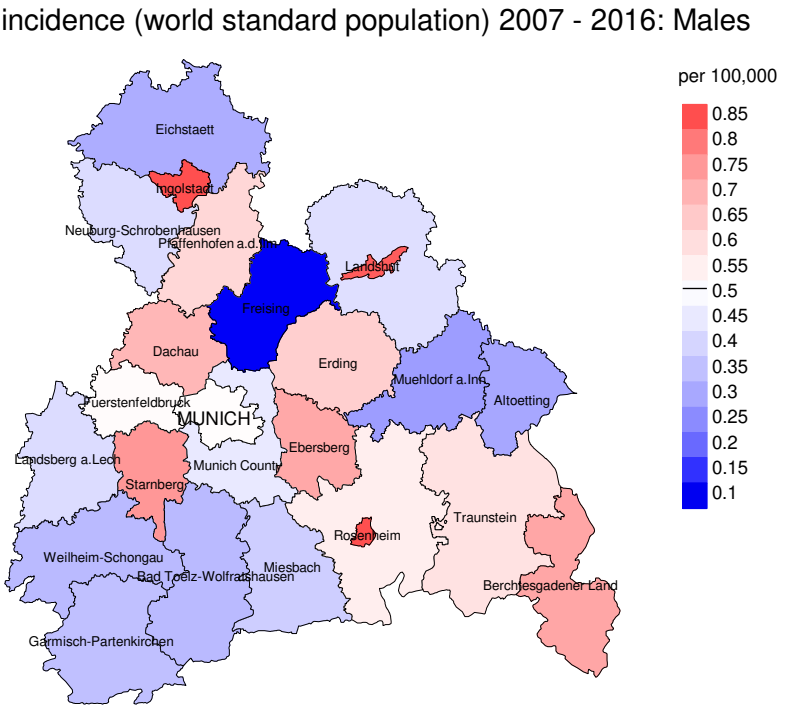
Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of further malignancies for period 1998–2016
FEMALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C16	Stomach	2	0.4	5.4	0.7	19.6		25.7	
C18	Colon	3	1.0	3.0	0.6	8.7		31.3	33.3
C33–C34	Lung	2	0.6	3.2	0.4	11.4		21.5	
C50	Breast	4	2.4	1.7	0.5	4.4		25.9	
C64	Kidney	9	0.2	38.2	17.5	72.6	#	137.9	66.7
C65	Renal pelvis	16	0.0	495.1	283.0	804.1	#	251.2	
C66	Ureter	2	0.0	112.3	13.6	405.8	#	31.2	
C67	Bladder	28	0.2	139.3	92.6	201.3	#	437.2	3.6
Others, specified		5	0.8	6.2	2.0	14.5	#	66.0	20.0
Not observed		0	3.3	0.0	0.0	1.1		−51.7	
All further malignancies		71	8.9	7.9	6.2	10.0	#	976.1	12.7

Patients	220
Median age at next malignancy (years)	76.8
Person-years	636
Mean observation time (years)	2.9
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”.



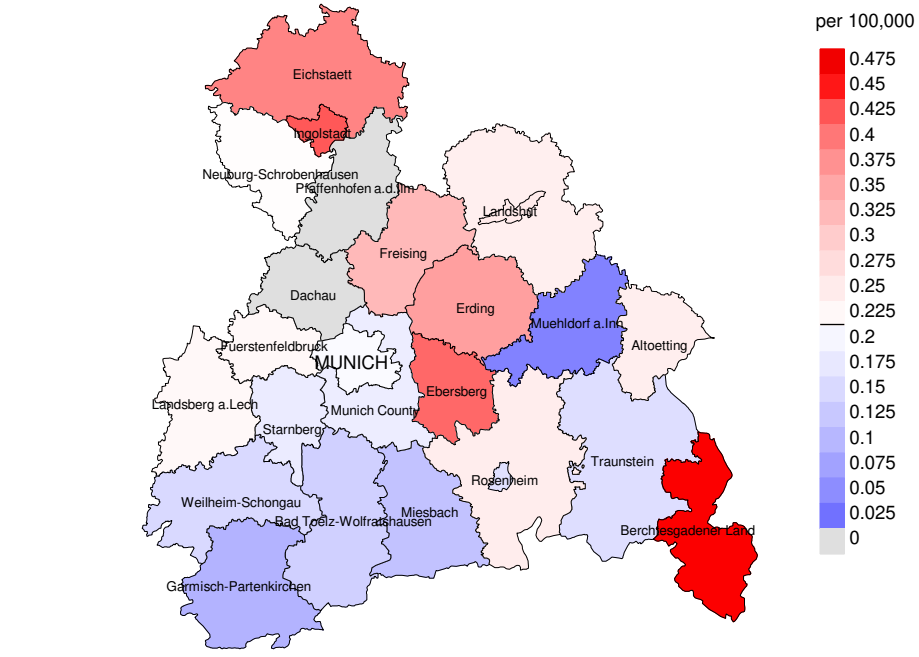
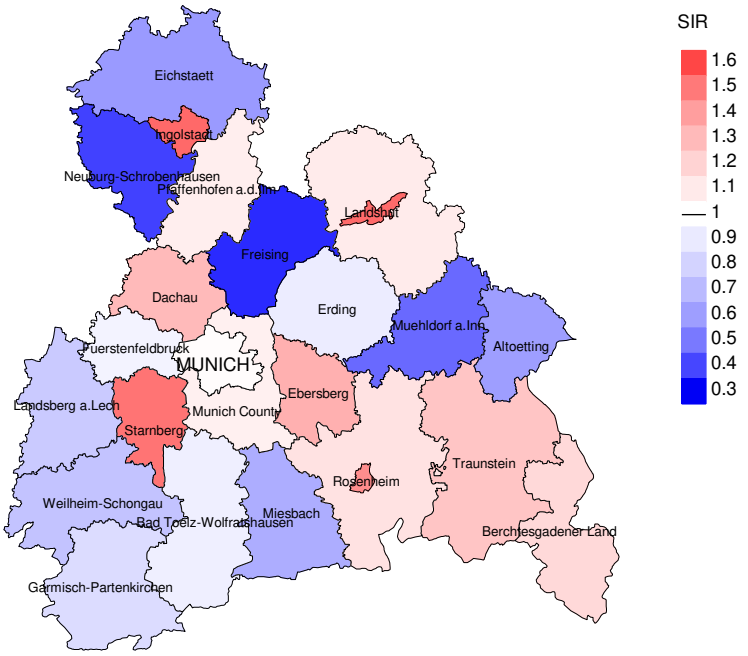


Figure 8a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.5/100,000 WS N=263, females 0.2/100,000 WS N=149).

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 6 women were identified with newly diagnosed ureteral cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 0.4/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.1 and 1.4/100,000.

Standardized incidence ratio (SIR) 2007 - 2016: Males



Standardized incidence ratio (SIR) 2007 - 2016: Females

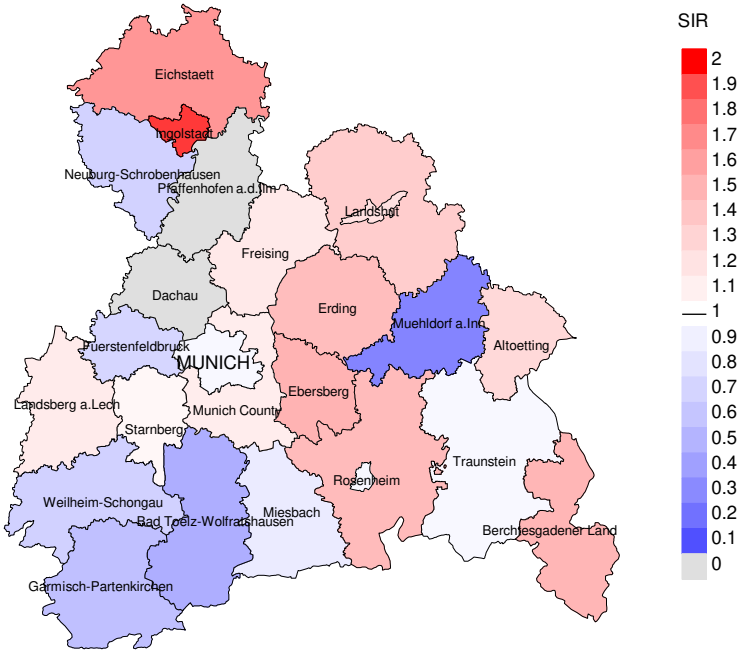


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=263, females N=149).

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 6 women were identified with newly diagnosed ureteral cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.50. Though, the value of this parameter may vary with an underlying probability of 99% between 0.39 and 3.93, and is therefore not statistically striking.

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	20	100.0		18	90.0	100.0
1999	11	100.0		10	90.9	100.0
2000	12	100.0		9	75.0	100.0
2001	24	100.0		23	95.8	100.0
2002	30	100.0		26	86.7	96.2
2003	19	100.0		13	68.4	100.0
2004	24	91.7		18	75.0	94.4
2005	40	90.0		30	75.0	96.7
2006	35	100.0		28	80.0	100.0
2007	35	88.6		21	60.0	100.0
2008	40	72.5		23	57.5	95.7
2009	44	79.5		29	65.9	100.0
2010	48	85.4	2.1	38	79.2	100.0
2011	48	85.4		29	60.4	96.6
2012	44	77.3	2.3	26	59.1	96.2
2013	49	87.8		32	65.3	100.0
2014	45	84.4		23	51.1	95.7
2015	28	100.0	3.6	11	39.3	100.0
2016	35	68.6		7	20.0	71.4
1998-2016	631	87.6	0.5	414	65.6	97.8

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	20	13	84.6	3	15.0
1999	11	8	100.0	1	9.1
2000	12	9	100.0	2	16.7
2001	24	12	100.0	3	12.5
2002	30	10	100.0	1	3.3
2003	19	25	96.0	4	21.1
2004	24	13	100.0	1	4.2
2005	40	16	100.0	4	10.0
2006	35	24	95.8	2	5.7
2007	35	20	95.0	1	2.9
2008	40	33	100.0	2	5.0
2009	44	33	100.0	7	15.9
2010	48	27	100.0	3	6.3
2011	48	45	97.8	7	14.6
2012	44	26	100.0	4	9.1
2013	49	31	100.0	9	18.4
2014	45	50	100.0	3	6.7
2015	28	48	97.9	3	10.7
2016	35	38	100.0	5	14.3
1998-2016	631	481	98.5	65	10.3

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	13	61.5	38.5	81.8
1999	8	75.0	25.0	87.5
2000	9	77.8	22.2	88.9
2001	12	75.0	25.0	83.3
2002	10	80.0	20.0	100.0
2003	25	84.0	16.0	87.5
2004	13	69.2	30.8	69.2
2005	16	81.3	18.8	81.3
2006	24	75.0	25.0	82.6
2007	20	85.0	15.0	94.7
2008	33	69.7	30.3	72.7
2009	33	84.8	15.2	90.9
2010	27	81.5	18.5	88.9
2011	45	80.0	20.0	88.6
2012	26	69.2	30.8	80.8
2013	31	71.0	29.0	83.9
2014	50	86.0	14.0	94.0
2015	48	64.6	35.4	72.3
2016	38	68.4	31.6	81.6
1998-2016	481	75.9	24.1	84.4

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	65.2	66.6	61.3	66.6
1999	5	75.8	76.4	69.1	75.8
2000	6	71.8	67.0	71.8	70.6
2001	8	75.2	74.9	75.6	75.2
2002	6	74.6	73.4	78.8	74.6
2003	17	76.3	76.1	85.0	75.9
2004	7	75.6	74.6	94.7	74.6
2005	6	74.8	72.1	84.5	72.5
2006	15	78.8	77.6	82.0	78.2
2007	18	75.2	73.4	80.9	75.2
2008	19	77.6	76.1	79.7	76.8
2009	24	74.1	73.9	76.5	73.7
2010	16	75.8	75.2	78.1	75.8
2011	28	80.9	79.2	84.6	80.2
2012	19	77.3	75.8	79.3	77.3
2013	20	80.4	80.4	83.4	80.4
2014	28	79.0	79.0	85.3	79.0
2015	30	78.9	77.2	80.8	77.1
2016	26	79.6	77.0	91.9	78.4
1998-2016	302	77.2	76.5	80.3	76.8

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 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	9	78.0	67.4	84.8	72.7
1999	3	77.2	79.5	77.2	79.5
2000	3	73.2	73.2		73.2
2001	4	75.0	69.6	83.7	69.6
2002	4	73.6	73.6		73.6
2003	8	82.4	80.7	89.2	82.4
2004	6	78.3	80.3	76.2	80.3
2005	10	76.2	75.2	77.2	74.7
2006	9	83.1	84.8	79.0	80.0
2007	2	84.1	84.1		84.1
2008	14	79.5	78.6	84.9	79.5
2009	9	76.3	78.5	65.0	76.3
2010	11	77.6	77.3	78.8	77.3
2011	17	80.8	80.3	84.4	80.8
2012	7	83.3	76.2	83.9	79.8
2013	11	80.9	80.9	82.1	80.4
2014	22	81.4	77.6	86.7	80.2
2015	18	83.1	78.4	87.5	80.6
2016	12	86.9	80.1	90.4	82.4
1998-2016	179	80.4	79.4	84.3	79.9

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	3	0.3	0.23	0.2	0.24	0.2	0.22	0.3	0.19
1999	4	0.4	0.57	0.2	0.43	0.3	0.52	0.6	0.66
2000	4	0.4	0.57	0.2	0.46	0.3	0.54	0.4	0.54
2001	7	0.6	0.54	0.3	0.54	0.5	0.53	0.8	0.57
2002	4	0.2	0.24	0.1	0.23	0.2	0.23	0.2	0.23
2003	14	0.7	1.40	0.4	1.43	0.6	1.46	0.9	1.46
2004	6	0.3	0.40	0.2	0.40	0.3	0.42	0.4	0.41
2005	4	0.2	0.14	0.1	0.14	0.2	0.14	0.2	0.13
2006	11	0.6	0.50	0.2	0.44	0.5	0.53	0.7	0.61
2007	15	0.7	0.58	0.3	0.59	0.5	0.62	0.7	0.64
2008	11	0.5	0.55	0.2	0.43	0.4	0.50	0.6	0.60
2009	20	0.9	0.67	0.4	0.60	0.6	0.65	0.8	0.65
2010	14	0.6	0.41	0.3	0.46	0.4	0.45	0.6	0.43
2011	22	1.0	0.81	0.4	0.59	0.6	0.70	0.9	0.78
2012	15	0.7	0.58	0.3	0.57	0.4	0.59	0.6	0.54
2013	15	0.7	0.58	0.3	0.55	0.4	0.58	0.6	0.58
2014	26	1.1	0.81	0.4	0.71	0.7	0.75	1.0	0.83
2015	20	0.8	1.11	0.3	0.98	0.5	1.06	0.7	1.10
2016	20	0.8	0.83	0.3	0.84	0.5	0.87	0.7	0.81
1998-2016	235	0.6	0.59	0.3	0.55	0.5	0.59	0.7	0.61

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	5	0.4	0.71	0.2	0.82	0.3	0.76	0.4	0.72
1999	2	0.2	0.50	0.1	0.66	0.1	0.62	0.2	0.72
2000	3	0.2	0.60	0.1	0.70	0.2	0.67	0.2	0.52
2001	2	0.2	0.18	0.1	0.18	0.1	0.17	0.1	0.18
2002	4	0.2	0.31	0.1	0.23	0.1	0.25	0.2	0.32
2003	7	0.4	0.78	0.1	0.67	0.2	0.67	0.2	0.64
2004	3	0.2	0.33	0.0	0.19	0.1	0.22	0.1	0.28
2005	9	0.5	0.82	0.2	0.62	0.3	0.68	0.3	0.73
2006	7	0.3	0.58	0.1	0.50	0.2	0.51	0.2	0.50
2007	2	0.1	0.25	0.0	0.11	0.0	0.14	0.1	0.19
2008	12	0.5	0.60	0.2	0.51	0.3	0.54	0.4	0.56
2009	8	0.3	0.57	0.1	0.66	0.2	0.64	0.2	0.50
2010	8	0.3	0.57	0.1	0.45	0.2	0.47	0.3	0.50
2011	14	0.6	0.70	0.1	0.51	0.3	0.58	0.4	0.70
2012	3	0.1	0.19	0.0	0.21	0.1	0.20	0.1	0.17
2013	7	0.3	0.30	0.1	0.24	0.1	0.26	0.2	0.29
2014	17	0.7	1.31	0.2	1.01	0.4	1.08	0.5	1.27
2015	11	0.5	1.10	0.2	1.11	0.2	1.10	0.3	1.23
2016	6	0.2	0.55	0.1	0.40	0.1	0.43	0.2	0.51
1998-2016	130	0.3	0.57	0.1	0.49	0.2	0.51	0.3	0.53

Table 12

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

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4									
5-9									
10-14									
15-19									
20-24									
25-29									
30-34									
35-39									
40-44									
45-49									
50-54	7	2.6	2.6	5	2.8	2.8	2	2.3	2.3
55-59	11	4.1	6.8	8	4.5	7.3	3	3.4	5.7
60-64	12	4.5	11.3	10	5.6	12.9	2	2.3	8.0
65-69	30	11.3	22.6	20	11.2	24.2	10	11.4	19.3
70-74	44	16.5	39.1	30	16.9	41.0	14	15.9	35.2
75-79	49	18.4	57.5	34	19.1	60.1	15	17.0	52.3
80-84	59	22.2	79.7	34	19.1	79.2	25	28.4	80.7
85+	54	20.3	100.0	37	20.8	100.0	17	19.3	100.0
All ages	266	100.0		178	100.0		88	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 n	Females n	Males Age-spec. mortal.	Males MI-index	Females Age-spec. mortal.	Females MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4								
5- 9								
10-14								
15-19								
20-24								
25-29								
30-34								
35-39								
40-44								
45-49								
50-54	5	2	0.3	0.63	0.1	0.40	0.2	0.1
55-59	8	3	0.6	0.73	0.2	0.38	0.2	0.1
60-64	10	2	0.8	0.36	0.2	0.22	0.2	0.1
65-69	20	10	1.7	0.48	0.8	0.59	0.3	0.2
70-74	30	14	2.7	0.63	1.1	0.50	0.3	0.2
75-79	34	15	4.3	0.69	1.5	0.43	0.4	0.2
80-84	34	25	7.4	0.69	3.5	0.86	0.5	0.4
85+	37	17	12.1	1.68	2.3	0.94	0.6	0.2
All ages	178	88					0.3	0.2
Mortality								
Raw			0.8	0.68	0.4	0.59		
WS			0.3	0.62	0.1	0.51		
ES			0.5	0.66	0.2	0.53		
BRD-S			0.7	0.68	0.3	0.56		
PYLL-70								
per 100,000			1.5		0.6			
ES			1.3		0.5			
AYLL-70			7.3		6.6			

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 ←%
C15	Oesophagus	4	1.5	1	25.0			3	75.0
C16	Stomach	3	1.1					3	100.0
C17	Small intestine	3	1.1	3	100.0				
C18	Colon	14	5.3	9	64.3	1	7.1	4	28.6
C19–C20	Rectum	6	2.3	3	50.0	1	16.7	2	33.3
C32	Larynx	3	1.1	1	33.3	1	33.3	1	33.3
C33–C34	Lung	11	4.1	2	18.2	1	9.1	8	72.7
C43	Malign. melanoma	4	1.5	3	75.0			1	25.0
C44	Skin others	9	3.4	7	77.8			2	22.2
C61	Prostate	34	12.8	19	55.9	7	20.6	8	23.5
C64	Kidney	21	7.9	9	42.9	4	19.0	8	38.1
C65	Renal pelvis	30	11.3	4	13.3	19	63.3	7	23.3
C66	Ureter	5	1.9			1	20.0	4	80.0
C67	Bladder	91	34.2	41	45.1	11	12.1	39	42.9
C68	Urethra	5	1.9	1	20.0			4	80.0
C68	Urinary org.	9	3.4	1	11.1	3	33.3	5	55.6
C82–C85	NHL	5	1.9	3	60.0	2	40.0		
Others, specified		9	3.4	5	55.6			4	44.4
All further malignancies		266	100.0	112	42.1	51	19.2	103	38.7

Further malignancies with number of cases 1 to 2 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	2	1.5					2	100.0
C18	Colon	12	9.1	7	58.3	2	16.7	3	25.0
C19–C20	Rectum	4	3.0	3	75.0			1	25.0
C33–C34	Lung	4	3.0			1	25.0	3	75.0
C44	Skin others	8	6.1	3	37.5			5	62.5
C50	Breast	13	9.8	9	69.2			4	30.8
C53	Cervix uteri	7	5.3	7	100.0				
C54	Corpus uteri	4	3.0	4	100.0				
C64	Kidney	7	5.3	1	14.3	2	28.6	4	57.1
C65	Renal pelvis	18	13.6	5	27.8	10	55.6	3	16.7
C67	Bladder	40	30.3	15	37.5	3	7.5	22	55.0
C68	Urinary org.	3	2.3	1	33.3	1	33.3	1	33.3
C73	Thyroid	2	1.5	2	100.0				
Others, specified		8	6.1	4	50.0			4	50.0
All further malignancies		132	100.0	61	46.2	19	14.4	52	39.4

Further malignancies with number of cases 1 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 n	Females n	Males Age-spec. mortal.	Males MI-index	Females Age-spec. mortal.	Females MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4								
5- 9								
10-14								
15-19								
20-24								
25-29								
30-34								
35-39								
40-44								
45-49								
50-54	3	1	0.2	0.60	0.1	0.50	0.2	0.1
55-59	5	1	0.4	1.00	0.1	0.33	0.2	0.0
60-64	3	1	0.2	0.21	0.1	0.33	0.1	0.0
65-69	10	7	0.8	0.59	0.5	0.88	0.2	0.2
70-74	10	4	0.9	0.91	0.3	0.44	0.1	0.1
75-79	13	9	1.6	0.62	0.9	0.56	0.2	0.2
80-84	11	10	2.4	0.55	1.4	0.77	0.2	0.2
85+	14	10	4.6	2.80	1.4	1.25	0.3	0.1
All ages	69	43					0.2	0.1
Mortality								
Raw			0.3	0.68	0.2	0.69		
WS			0.1	0.62	0.1	0.63		
ES			0.2	0.67	0.1	0.64		
BRD-S			0.3	0.67	0.1	0.65		
PYLL-70								
per 100,000			0.8		0.3			
ES			0.7		0.2			
AYLL-70			7.7		5.5			

* 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 n	Females n	Males Age-spec. mortal.	Males MI-index	Females Age-spec. mortal.	Females MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4								
5- 9								
10-14								
15-19								
20-24								
25-29								
30-34								
35-39								
40-44								
45-49								
50-54	2	1	0.1	0.67	0.1	0.50	0.1	0.1
55-59	2		0.1	0.50			0.1	
60-64	2	1	0.2	0.22	0.1	1.00	0.0	0.0
65-69	4	5	0.3	0.50	0.4	0.83	0.1	0.1
70-74	4	1	0.4	0.57	0.1	0.17	0.1	0.0
75-79	6	6	0.8	0.60	0.6	0.67	0.1	0.1
80-84	7	6	1.5	0.50	0.8	0.75	0.1	0.1
85+	5	4	1.6	2.50	0.5	0.50	0.1	0.1
All ages	32	24					0.1	0.1
Mortality								
Raw			0.1	0.53	0.1	0.59		
WS			0.1	0.47	0.0	0.59		
ES			0.1	0.52	0.1	0.58		
BRD-S			0.1	0.53	0.1	0.60		
PYLL-70								
per 100,000			0.4		0.2			
ES			0.4		0.1			
AYLL-70			8.5		5.4			

* See corresponding tables with multiple malignancies.

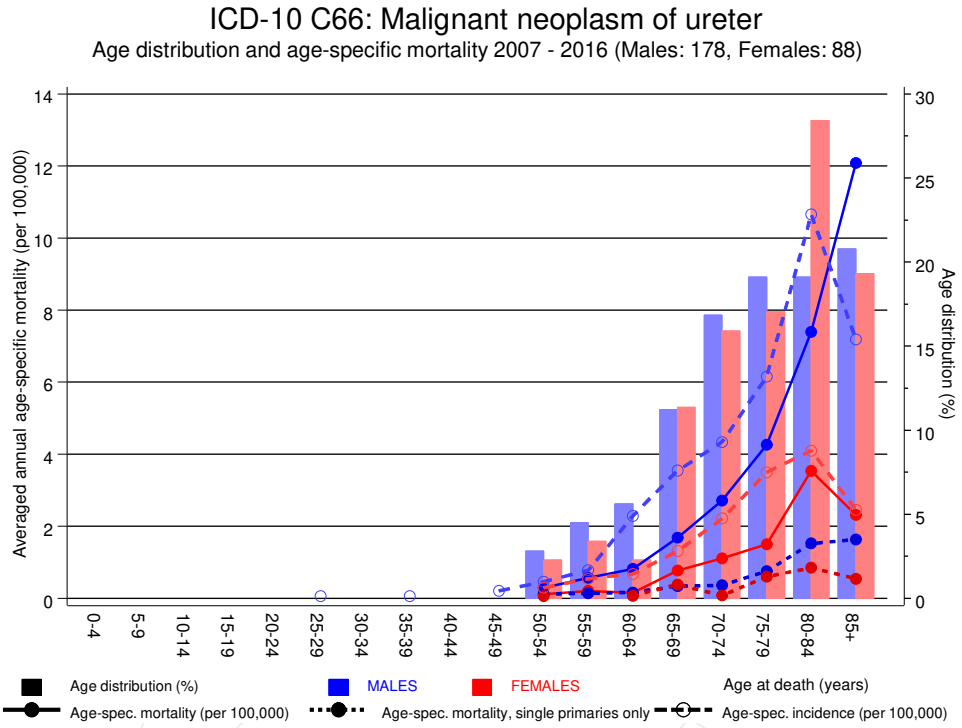


Figure 17. Distribution of age at death (bars; males: mean=73.4 yrs, median=74.8 yrs; females: mean=74.7 yrs, median=76.3 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

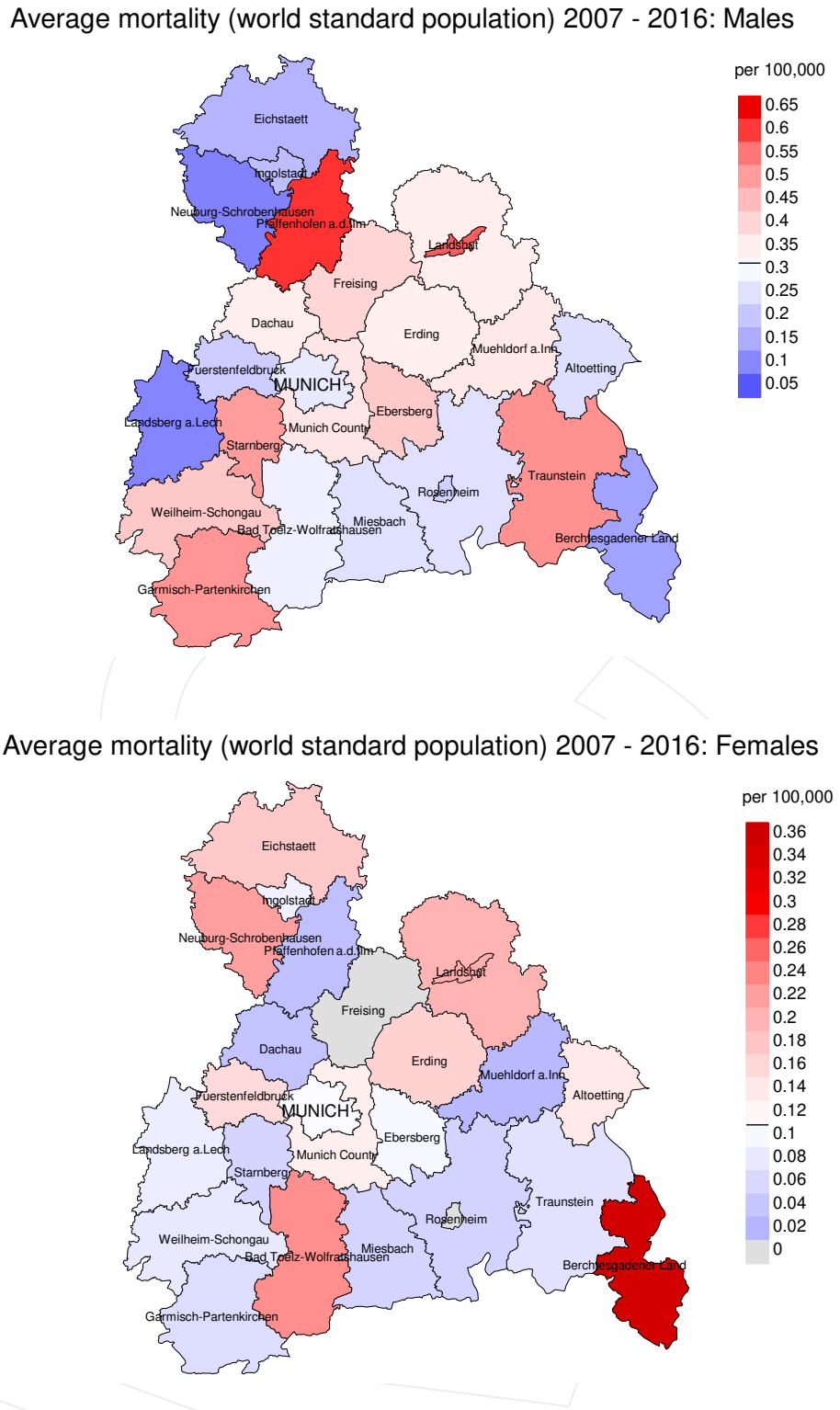
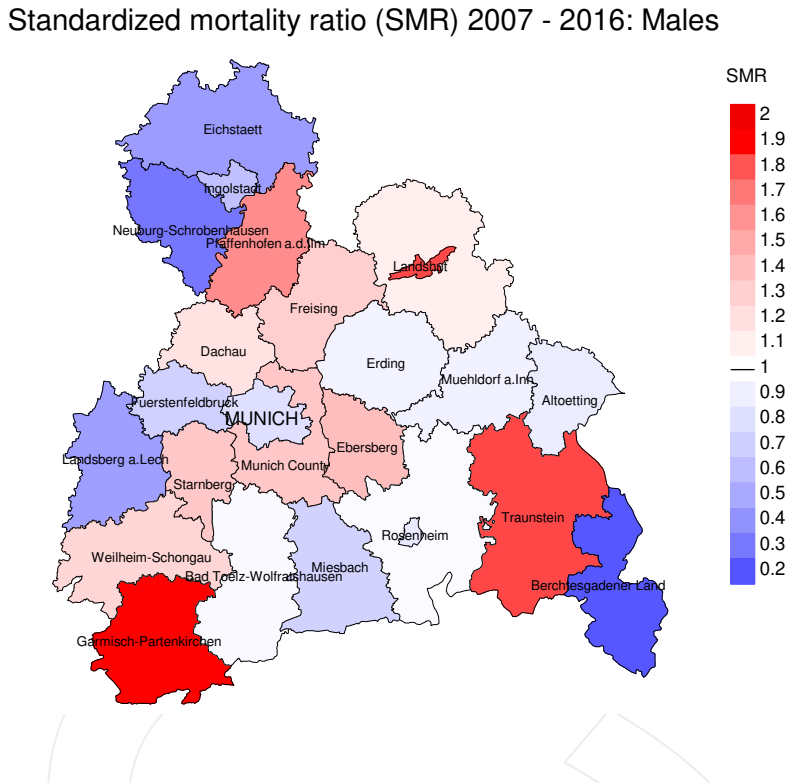


Figure 18a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2016. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.3/100,000 WS N=178, females 0.1/100,000 WS N=88).

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 3 women died from ureteral cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.1/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 1.0/100,000.



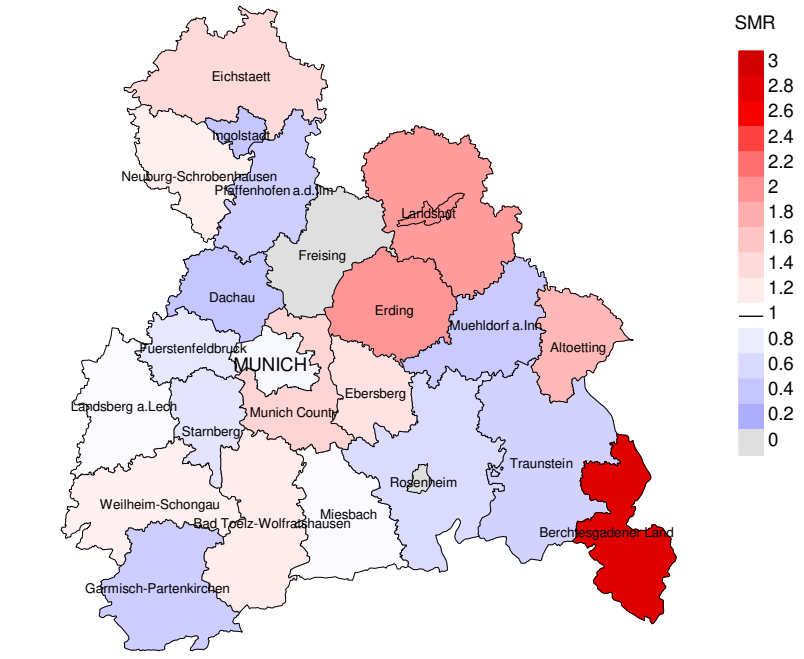


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=178, females N=88).

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 3 women died from ureteral cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.29. Though, the value of this parameter may vary with an underlying probability of 99% between 0.15 and 4.72, 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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