Munich Cancer Registry

Munich Cancer Registry at Munich Cancer Center
Marchioninistr. 15
Munich, 81377
Germany

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

Cancer statistics: Baseline statistics

C61: Prostate cancer

Year of diagnosis	1998-2013
Patients	43,573
Diseases	43,574
Creation date	05/19/2015
Export date	12/30/2014
Population (males)	2.28 m

Global Statements about the statistics on the Internet −
Baseline Statistics (grey button ⬜ **),** **Survival** (red button 🟥 **)**

In these analyses, the clinics and physicians of Upper Bavaria and the city and county of Landshut[#], with a total of 4.64 million inhabitants, account for the frequency of cancer diseases[##] and the achieved long term results. Additionally, the long term survival evaluated by the Munich Cancer Registry (MCR) is compared with the results of the population-based registry in the USA (SEER), which is useful for checking the consistency of the data on an international level.

In comparing several tables, inconsistent figures may be detected. This is based on the fact that different patient cohorts are included in the base calculation, for example when proportions of multiple tumors or DCO-cases[###] are concerned. In other cases the individual tumor diagnosis is the basis for calculation, for example with incidence.

The foot notes describe the currentness of the data. The baseline statistics and survival data are updated annually. This yearly analysis comprises the Annual Report of the MCR. The time-delayed acquisition of data and the occasionally high DCO-rates indicate optimizing reserves, among others, because of current financial and legal conditions that hinder the analyses.

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, May 2015

[#]   Base data has been collected since 1998. An increase in new diseases is apparent, which is an effect of two extensions in the MCR catchment area (from a base population of 2.51 million to 3.96 in 2002, and to 4.52 million in 2007). Death certificates from 2014 are incorporated into these analyses.

[##]   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. A high proportion of DCO cases (≥5%) in particular cancer types indicate insufficient participation of specific cancer specializations.

ICD-10 codes (ICD-10 2015) used for specifying cancer site

Code	Description
C61	Malignant neoplasm of prostate

INCIDENCE

Table 1

Patient cohorts by year of diagnosis including DCO cases
and multiple primaries, and with proportion of deaths and active follow-up

Year of diagnosis	Cases n	DCO cases n	Prop. DCO %	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %
1998	1551	145	9.3	26.4	65.2	98.1
1999	1509	109	7.2	26.1	59.9	98.5
2000	1690	138	8.2	24.1	56.2	98.3
2001	1764	109	6.2	25.3	50.1	97.7
2002	3345	308	9.2	25.1	49.1	97.1 #
2003	3287	228	6.9	25.4	44.2	96.7
2004	3218	219	6.8	23.9	39.9	96.7
2005	3134	195	6.2	22.2	36.6	95.0
2006	3048	180	5.9	23.6	34.8	90.7
2007	3587	239	6.7	22.5	32.0	76.0 # ##
2008	3265	196	6.0	22.4	29.6	57.6
2009	2977	168	5.6	23.4	27.0	56.9
2010	2901	190	6.5	20.9	24.4	56.7
2011	3129	189	6.0	19.3	19.5	54.7
2012	3171	158	5.0	17.8	13.0	58.6
2013	1998	146	7.3	17.3	12.1	98.9 ###
1998–2013	43574	2917	6.7	22.7	34.9	80.7

\#   The increases of incident cases in 2002 and 2007 reflect the expansion to additional registry areas.

\#\#   Since 2007 the percentage of actively followed patients sharply declined compared to the previous years. This is a consequence of ambiguous data protection rules that currently forbid cancer registries in Bavaria to obtain the essential life status informations from competent registration offices.

\#\#\#   Please be aware that data of recent annual patient cohorts may not yet be fully processed. Therefore, the presented figures and tables are potentially related to different time periods as pointed out in the respective headlines or legends.

Table 2

Incidence measures by year of diagnosis and gender including DCO cases
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002,
and from 3.96 to 4.64 m as of 2007, respectively)

Year of diagnosis	Cases n	Incidence raw	Incidence WS	Incidence ES	Incidence BRD-S
1998	1551	140.0	83.1	127.9	173.5
1999	1509	134.8	78.7	120.0	158.1
2000	1690	148.4	85.3	130.5	173.2
2001	1764	152.2	86.7	132.5	174.4
2002	3345	179.5	98.2	149.7	195.7
2003	3287	175.4	94.8	143.2	185.8
2004	3218	171.0	90.6	135.8	175.1
2005	3134	165.5	85.8	128.8	166.5
2006	3048	159.2	81.3	121.9	157.2
2007	3587	161.9	82.9	123.8	158.3
2008	3265	146.7	72.5	108.7	140.4
2009	2977	133.4	65.9	98.0	124.7
2010	2901	128.7	63.1	94.1	120.0
2011	3129	137.0	65.8	98.1	126.4
2012	3171	138.8	66.8	99.9	128.6
2013	1998	87.5	42.1	63.2	81.0
1998-2013	43574	146.5	75.4	113.1	145.9

The computation of the incidence measures includes all primaries, irrespective of first or subsequent malignancy.
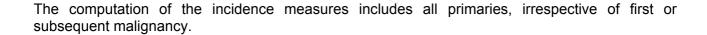
Table 3

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	1551	70.7	9.7	47.0	99.8	58.3	63.3	70.2	77.7	84.1
1999	1509	70.1	9.5	43.0	99.5	58.2	62.9	69.9	76.3	83.7
2000	1690	70.3	9.3	40.6	97.8	58.8	63.4	69.8	76.6	83.2
2001	1764	70.0	9.2	43.6	100	58.6	63.1	69.8	76.3	82.0
2002	3345	70.6	9.5	42.6	102	59.1	63.7	69.9	76.7	83.4
2003	3287	70.0	9.2	35.2	101	58.8	63.7	69.3	75.9	82.2
2004	3218	70.0	9.2	40.0	100	59.1	63.8	69.0	76.0	82.2
2005	3134	70.1	9.1	38.4	101	58.9	64.2	69.3	76.1	82.4
2006	3048	70.4	8.9	41.6	98.6	59.5	64.7	69.4	76.1	82.8
2007	3587	70.2	9.2	37.6	99.9	59.0	64.5	69.5	76.0	82.4
2008	3265	70.6	9.0	25.1	101	59.5	65.4	70.2	76.0	82.4
2009	2977	70.3	9.0	43.2	105	59.2	65.1	70.0	75.6	82.3
2010	2901	70.8	9.2	38.4	102	59.4	65.0	70.6	76.2	83.0
2011	3129	71.1	9.3	40.0	109	59.4	65.7	71.1	76.4	83.0
2012	3171	71.0	8.8	2.7	100	59.6	65.5	71.2	76.1	82.1
2013	1998	70.8	9.5	42.4	103	58.3	64.5	71.4	76.3	83.1
1998-2013	43574	70.5	9.2	2.7	109	59.1	64.4	70.1	76.2	82.7

Table 4

Age distribution by 5-year age group for period 1998-2013
(incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%
0-4	1	0.0	0.0
5-9	0	0.0	0.0
10-14	0	0.0	0.0
15-19	0	0.0	0.0
20-24	0	0.0	0.0
25-29	1	0.0	0.0
30-34	0	0.0	0.0
35-39	12	0.0	0.0
40-44	74	0.2	0.2
45-49	409	0.9	1.1
50-54	1298	3.0	4.1
55-59	3466	8.0	12.1
60-64	6722	15.4	27.5
65-69	9696	22.3	49.8
70-74	9227	21.2	70.9
75-79	6145	14.1	85.0
80-84	3574	8.2	93.2
85+	2949	6.8	100.0
All ages	43574	100.0	

Included in the statistics are 28.3% multiple primaries.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 1998-2013

Age at diagnosis Years	Cases n	Age-spec. incidence	DCO rate n=2916 %	Prop. all cancers n=158258 %
0- 4	1	0.1	100.0	0.3
5- 9		0.0		
10-14		0.0		
15-19		0.0		
20-24		0.0		
25-29	1	0.0		0.1
30-34		0.0		
35-39	12	0.5		0.5
40-44	74	2.8		2.3
45-49	409	17.3	0.5	7.7
50-54	1298	64.3	0.1	15.1
55-59	3466	188.9	0.3	24.0
60-64	6722	379.2	0.6	30.9
65-69	9696	614.2	1.1	35.3
70-74	9227	720.3	2.0	34.4
75-79	6145	743.5	6.2	29.8
80-84	3574	714.3	18.5	26.2
85+	2948	864.5	51.7	29.6
All ages	43573		6.7	27.5

Incidence	
Raw	146.5
WS	75.4
ES	113.1
BRD-S	145.9

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).

Table 6

Standardized incidence ratio (SIR, with 95% confidence limits),
excess absolute risk (EAR) and DCO rate of second primaries
for period 1998-2013

Diagnosis	Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C03-C06 Oral cavity	18	21.3	0.8	0.5	1.3		-0.2	
C07-C08 Salivary gland	13	6.6	2.0	1.1	3.4	#	0.4	23.1
C09-C10 Oropharynx	27	25.5	1.1	0.7	1.5		0.1	
C12-C13 Hypopharynx	17	14.4	1.2	0.7	1.9		0.2	5.9
C15 Oesophagus	78	50.0	1.6	1.2	1.9	#	1.9	10.3
C16 Stomach	197	129.1	1.5	1.3	1.8	#	4.6	7.1
C17 Small intestine	46	14.2	3.2	2.4	4.3	#	2.2	2.2
C18 Colon	491	309.0	1.6	1.5	1.7	#	12.4	3.9
C19-C20 Rectum	250	165.1	1.5	1.3	1.7	#	5.8	4.4
C21 Anus/canal	10	5.7	1.7	0.8	3.2		0.3	
C22 Liver	88	82.8	1.1	0.9	1.3		0.4	18.2
C23-C24 Bile	39	29.9	1.3	0.9	1.8		0.6	15.4
C25 Pancreas	209	108.8	1.9	1.7	2.2	#	6.8	24.9
C32 Larynx	44	28.5	1.5	1.1	2.1	#	1.1	6.8
C33-C34 Lung	495	353.7	1.4	1.3	1.5	#	9.6	8.3
C38,C45 Mesothelioma	37	20.4	1.8	1.3	2.5	#	1.1	2.7
C40-C41 Bone	9	2.1	4.4	2.0	8.3	#	0.5	
C43 Malign. melanoma	269	112.9	2.4	2.1	2.7	#	10.6	1.5
C46,C49 Soft tissue	25	15.4	1.6	1.0	2.4	#	0.7	
C50 Breast	14	7.8	1.8	1.0	3.0		0.4	7.1
C60 Penis	14	6.7	2.1	1.1	3.5	#	0.5	
C62 Testis	8	4.0	2.0	0.9	3.9		0.3	12.5
C64 Kidney	248	103.1	2.4	2.1	2.7	#	9.9	4.4
C65 Renal pelvis	32	12.9	2.5	1.7	3.5	#	1.3	
C66 Ureter	18	7.2	2.5	1.5	3.9	#	0.7	
C67 Bladder	387	140.2	2.8	2.5	3.0	#	16.8	4.7
C68 Urethra	13	1.9	6.9	3.7	11.7	#	0.8	
C69 Eye melanoma	10	3.3	3.1	1.5	5.6	#	0.5	
C70-C72 CNS cancer	72	37.4	1.9	1.5	2.4	#	2.4	6.9
C73 Thyroid	34	16.2	2.1	1.5	2.9	#	1.2	
C76-C79 CUP	80	51.3	1.6	1.2	1.9	#	2.0	2.5
C81 Hodgkin lymphoma	8	5.4	1.5	0.6	2.9		0.2	
C82-C85 NHL	217	120.8	1.8	1.6	2.1	#	6.6	4.6
C90 Mult. myeloma	86	39.6	2.2	1.7	2.7	#	3.2	9.3
C91-C96 Leukaemia	96	50.2	1.9	1.5	2.3	#	3.1	34.4
Other primaries	50	31.1	1.6	1.2	2.1	#	1.3	20.0
Not observed	0	921.6	0.0	0.0	0.0	#	-62.8	
All mult. primaries	3749	3056.3	1.2	1.2	1.3	#	47.2	7.4

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Patients                                    28877
Median age at second malignancy (years)      74.9
Person-years                               146830
Mean observation time (years)                 5.1
Median observation time (years)               4.4
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The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 to 7 are pooled in category "Other primaries".

C61: Malignant neoplasm of prostate
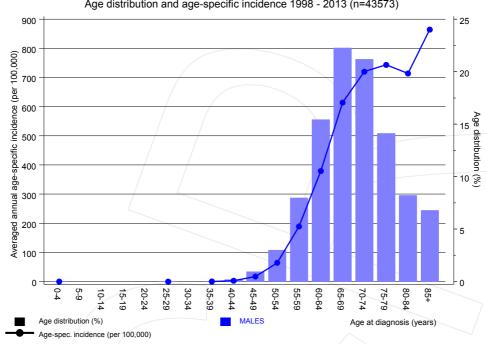Age distribution and age-specific incidence 1998 - 2013 (n=43573)

Figure 7. Age distribution and age-specific incidence

C61: Malignant neoplasm of prostate
Age-specific incidence in international comparison

Region	Period	Average population
MCR	2007-2013	2.3 m
FRG (GEKID extrapol.)	2007-2011	40.2 m
SEER	2007-2011	32.1 m

MALES   Age at diagnosis (years)

Figure 7a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Extrapolated age-specific patient population of Germany, data status middle of 2010. Association of Population-based Cancer Registries in Germany (GEKID e.V.). Berlin, 2014. http://www.gekid.de. Last access: 02/11/2015

Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2014, based on the November 2013 submission. http://www.seer.cancer.gov.
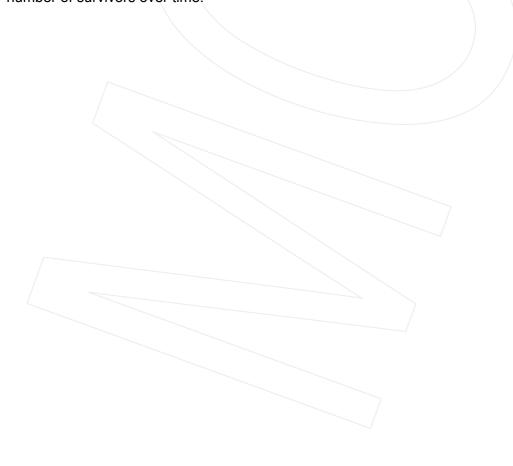
C61: Malignant neoplasm of prostate

Cumulative follow-up years since diagnosis for period 1998 - 2013 (excl. DCO)

	Target		Actual	
n	Sum	Median	Sum	Median
All patients				
27807	159847	5.0	151551	4.8
Patients alive				
21257	133045	5.6	124748	5.3
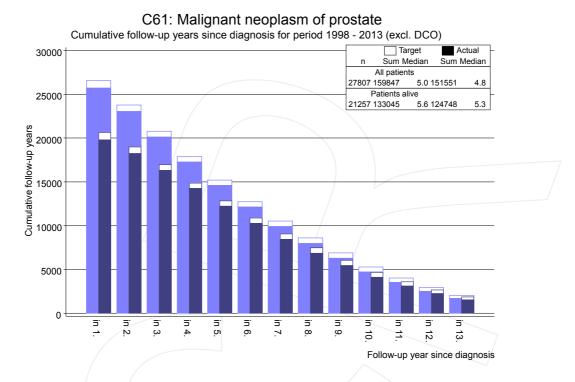
Figure 8. Cumulative follow-up years depending on time since diagnosis

The increase of the lost to follow-up rate can be interpreted as a consequence of a declining number of survivors over time.

Average incidence (world standard population) 2007 - 2013
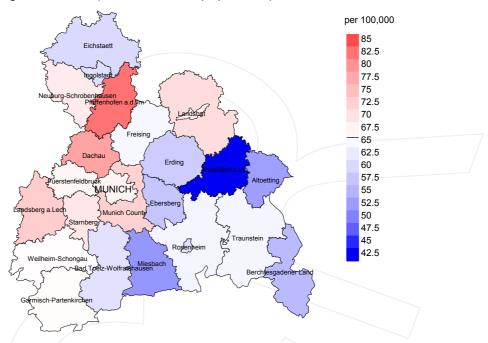
Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (65.7/100,000 WS N=21,027).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,385 male residents (averaged) in the period from 2007 to 2013 a total of 540 men were identified with newly diagnosed prostate cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 57.3/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 50.9 and 64.4/100,000.

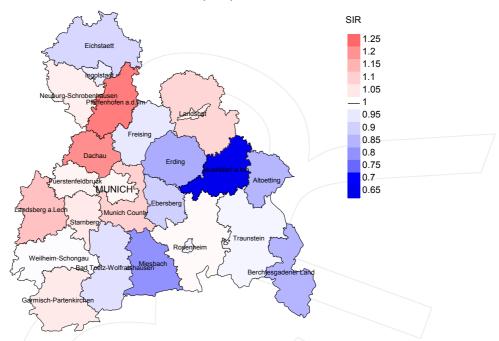## Standardized incidence ratio (SIR) 2007 - 2013

Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=21,027).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,006 male residents (averaged) in the period from 2007 to 2013 a total of 540 men were identified with newly diagnosed prostate cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.90. Though, the value of this parameter may vary with an underlying probability of 99% between 0.80 and 1.00, and is therefore not statistically striking.

MORTALITY

Table 10a

Patient cohorts of incident cancers by year of diagnosis, follow-up status,
proportion of DCO, deaths among the annual cohorts,
and proportion of available death certificates
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002,
and from 3.96 to 4.64 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Prop. DCO %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	1551	98.1	9.3	1012	65.2	95.3
1999	1509	98.5	7.2	904	59.9	95.7
2000	1690	98.3	8.2	950	56.2	95.2
2001	1764	97.7	6.2	883	50.1	95.5
2002	3345	97.1	9.2	1644	49.1	97.4
2003	3287	96.7	6.9	1453	44.2	97.4
2004	3218	96.7	6.8	1283	39.9	97.3
2005	3134	95.0	6.2	1147	36.6	97.0
2006	3048	90.7	5.9	1060	34.8	97.8
2007	3587	76.0	6.7	1147	32.0	97.6
2008	3265	57.6	6.0	965	29.6	97.7
2009	2977	56.9	5.6	804	27.0	97.9
2010	2901	56.7	6.5	707	24.4	97.2
2011	3129	54.7	6.0	611	19.5	96.2
2012	3171	58.6	5.0	412	13.0	93.2
2013	1998	98.9	7.3	242	12.1	90.5
1998-2013	43574	80.7	6.7	15224	34.9	96.7

Table 10b

Annual cohorts of incident cancers and deaths, proportion of death certificates
and cases deceased the same year of cancer diagnosis
(incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002,
and from 3.96 to 4.64 m as of 2007, respectively)

Year of diagnosis/ death	Incident cases n	Deaths n	Prop. deaths with death certific. %	Deaths in same year n	Prop. deaths in same year %
1998	1551	658	94.5	196	12.6
1999	1509	614	94.0	143	9.5
2000	1690	634	95.0	161	9.5
2001	1764	663	92.3	151	8.6
2002	3345	990	95.5	372	11.1
2003	3287	1049	97.4	274	8.3
2004	3218	1045	97.3	258	8.0
2005	3134	1148	96.6	235	7.5
2006	3048	1213	97.1	233	7.6
2007	3587	1386	97.3	299	8.3
2008	3265	1501	98.7	265	8.1
2009	2977	1533	98.3	232	7.8
2010	2901	1653	98.4	255	8.8
2011	3129	1756	98.8	262	8.4
2012	3171	1811	98.5	233	7.3
2013	1998	1777	98.6	187	9.4
1998-2013	43574	19431	97.4	3756	8.6

Table 10c

Annual cohorts of deaths, proportion of cancer-related and non-cancer-
related deaths, and cancer recorded on death certificates
(incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002,
and from 3.96 to 4.64 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	658	55.9	44.1	80.4
1999	614	58.1	41.9	77.8
2000	634	58.7	41.3	77.9
2001	663	53.8	46.2	76.0
2002	990	60.1	39.9	77.7
2003	1049	63.4	36.6	76.2
2004	1045	59.8	40.2	74.9
2005	1148	61.3	38.7	73.5
2006	1213	61.4	38.6	75.7
2007	1386	63.2	36.8	73.9
2008	1501	59.2	40.8	70.0
2009	1533	57.3	42.7	69.8
2010	1653	59.7	40.3	71.8
2011	1756	58.6	41.4	69.5
2012	1811	58.9	41.1	70.1
2013	1777	54.4	45.6	66.4
1998-2013	19431	59.1	40.9	72.6

Table 11

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

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	658	80.7	78.9	82.8	80.1
1999	614	80.4	78.0	83.1	79.7
2000	634	80.7	80.1	82.7	80.8
2001	663	80.5	78.7	82.6	80.9
2002	990	79.7	78.3	81.7	79.5
2003	1049	79.0	77.1	82.2	78.3
2004	1045	80.3	78.2	83.0	79.5
2005	1148	80.3	78.3	83.5	79.1
2006	1213	79.6	78.1	82.0	78.8
2007	1386	79.8	78.4	82.2	79.0
2008	1501	80.0	77.8	83.0	78.7
2009	1533	80.5	78.3	83.2	79.6
2010	1653	80.4	78.8	82.9	79.6
2011	1756	81.1	79.2	83.5	80.0
2012	1811	81.1	79.0	83.5	79.9
2013	1777	81.7	79.6	83.9	80.6
1998-2013	19431	80.4	78.5	83.1	79.6

By 2010, life expectancy for a newborn male in Germany is 77.5 years compared with 82.6 years for his female counterpart.

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 12

Mortality measures (cancer-related death) and mortality-incidence-index
by year of death

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	368	33.2	0.24	18.1	0.22	31.4	0.25	48.0	0.28
1999	357	31.9	0.24	17.0	0.22	29.5	0.25	44.7	0.28
2000	372	32.7	0.22	17.0	0.20	30.1	0.23	45.9	0.27
2001	357	30.8	0.20	15.9	0.18	28.2	0.21	42.7	0.25
2002	595	31.9	0.18	15.7	0.16	27.1	0.18	40.0	0.20
2003	665	35.5	0.20	17.0	0.18	29.2	0.20	43.7	0.24
2004	625	33.2	0.19	15.2	0.17	26.3	0.19	40.0	0.23
2005	704	37.2	0.22	16.3	0.19	28.4	0.22	43.8	0.26
2006	745	38.9	0.24	16.9	0.21	29.2	0.24	44.0	0.28
2007	876	39.5	0.24	16.9	0.20	29.1	0.24	43.8	0.28
2008	888	39.9	0.27	16.4	0.23	28.1	0.26	42.4	0.30
2009	878	39.3	0.29	15.8	0.24	27.0	0.28	40.3	0.32
2010	987	43.8	0.34	16.9	0.27	29.1	0.31	43.8	0.36
2011	1029	45.0	0.33	16.8	0.26	29.2	0.30	44.0	0.35
2012	1067	46.7	0.34	17.3	0.26	30.1	0.30	45.7	0.36
2013	966	42.3	0.48	15.7	0.37	27.4	0.43	41.4	0.51
1998-2013	11479	38.6	0.26	16.5	0.22	28.5	0.25	43.1	0.30

Table 13

Age distribution of age at death (cancer-related) for period 1998-2013
(**incl. multiple primaries**)

Age at death Years	Cases n	%	Cum.%
25-29	1	0.0	0.0
30-34	0	0.0	0.0
35-39	0	0.0	0.0
40-44	7	0.1	0.1
45-49	18	0.2	0.2
50-54	67	0.6	0.8
55-59	206	1.8	2.6
60-64	564	4.9	7.5
65-69	1236	10.8	18.3
70-74	1947	17.0	35.2
75-79	2429	21.2	56.4
80-84	2432	21.2	77.6
85+	2574	22.4	100.0
All ages	11481	100.0	

Included in the statistics are 28.3% multiple primaries.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2013
(**incl. multiple primaries**)

Age at death Years	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4		0.0		
5- 9		0.0		
10-14		0.0		
15-19		0.0		
20-24		0.0		
25-29	1	0.0	1.00	0.9
30-34		0.0		
35-39		0.0		
40-44	7	0.3	0.09	0.8
45-49	18	0.8	0.04	1.0
50-54	67	3.3	0.05	2.0
55-59	206	11.2	0.06	3.5
60-64	564	31.8	0.08	6.3
65-69	1236	78.3	0.13	10.3
70-74	1947	152.0	0.21	14.3
75-79	2429	293.9	0.40	18.4
80-84	2432	486.1	0.68	22.4
85+	2574	754.8	0.87	29.0
All ages	11481			14.3
Mortality				
Raw		38.6	0.26	
WS		16.5	0.22	
ES		28.6	0.25	
BRD-S		43.1	0.30	
PYLL-70				
per 100,000		43.7		
ES		36.7		
AYLL-70		5.6		

The rates underestimate the prognosis if other synchronous cancers are prognostic unfavorable.

Table 15

Multiple primaries in deaths in period 1998-2013

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C15	Oesophagus	106	1.7	19	17.9	7	6.6	80	75.5
C16	Stomach	273	4.4	60	22.0	22	8.1	191	70.0
C18	Colon	645	10.5	232	36.0	44	6.8	369	57.2
C19-C20	Rectum	364	5.9	137	37.6	33	9.1	194	53.3
C22	Liver	148	2.4	12	8.1	5	3.4	131	88.5
C23-C24	Bile	64	1.0	9	14.1	4	6.3	51	79.7
C25	Pancreas	313	5.1	22	7.0	15	4.8	276	88.2
C32	Larynx	71	1.2	37	52.1	5	7.0	29	40.8
C33-C34	Lung	798	13.0	91	11.4	50	6.3	657	82.3
C43	Malign. melanoma	269	4.4	133	49.4	10	3.7	126	46.8
C44	Skin others	325	5.3	88	27.1	16	4.9	221	68.0
C64	Kidney	279	4.5	132	47.3	38	13.6	109	39.1
C67	Bladder	1082	17.6	439	40.6	279	25.8	364	33.6
C70-C72	CNS cancer	141	2.3	20	14.2	4	2.8	117	83.0
C76-C79	CUP	136	2.2	17	12.5	16	11.8	103	75.7
C82-C85	NHL	250	4.1	80	32.0	37	14.8	133	53.2
C90	Mult. myeloma	112	1.8	22	19.6	6	5.4	84	75.0
C91-C96	Leukaemia	201	3.3	14	7.0	15	7.5	172	85.6
Other primaries		562	9.2	185	32.9	50	8.9	327	58.2
All mult. primaries		6139	100.0	1749	28.5	656	10.7	3734	60.8

Multiple primaries with number of cases 1 to 50 are pooled in category "Other primaries".

ICD-10 C44 (Other malignant neoplasms of skin) is not systematically recorded by MCR and therefore not considered for evaluation as a particular primary but at least as a multiple malignancy.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2013
(**Singular primaries only ***)

Age at death Years	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4		0.0		
5- 9		0.0		
10-14		0.0		
15-19		0.0		
20-24		0.0		
25-29		0.0		
30-34		0.0		
35-39		0.0		
40-44	5	0.2	0.07	0.6
45-49	14	0.6	0.04	0.9
50-54	52	2.6	0.04	1.8
55-59	171	9.3	0.05	3.3
60-64	455	25.7	0.07	6.1
65-69	1007	63.8	0.12	10.4
70-74	1576	123.0	0.20	14.7
75-79	1993	241.1	0.39	20.0
80-84	2003	400.3	0.70	24.7
85+	2142	628.1	0.89	31.9
All ages	9418			14.7
Mortality				
Raw		31.7	0.25	
WS		13.5	0.20	
ES		23.4	0.24	
BRD-S		35.4	0.28	
PYLL-70				
per 100,000		35.2		
ES		29.5		
AYLL-70		5.5		

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2013
(**Single primaries only ***)

Age at death Years	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4		0.0		
5- 9		0.0		
10-14		0.0		
15-19		0.0		
20-24		0.0		
25-29		0.0		
30-34		0.0		
35-39		0.0		
40-44	4	0.2	0.06	0.5
45-49	14	0.6	0.04	0.9
50-54	47	2.3	0.04	1.8
55-59	150	8.2	0.05	3.2
60-64	348	19.6	0.06	5.3
65-69	734	46.5	0.10	8.8
70-74	1095	85.5	0.16	12.3
75-79	1312	158.7	0.30	16.4
80-84	1382	276.2	0.54	21.6
85+	1610	472.1	0.71	29.9
All ages	6696			12.4
Mortality				
Raw		22.5	0.20	
WS		9.7	0.16	
ES		16.8	0.19	
BRD-S		25.0	0.22	
PYLL-70				
per 100,000		28.3		
ES		23.9		
AYLL-70		5.8		

* See corresponding tables with multiple primaries.

C61: Malignant neoplasm of prostate
Age distribution and age-specific mortality 1998 - 2013 (n=11479)
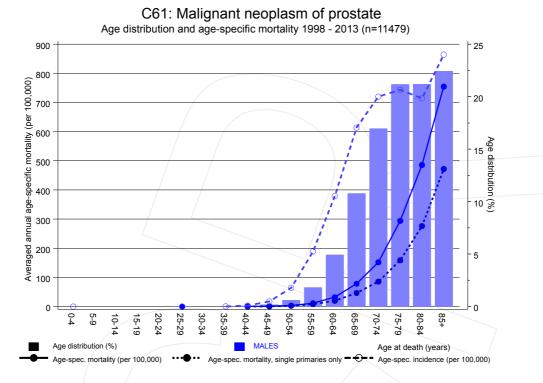
Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (world standard population) 2007 - 2013
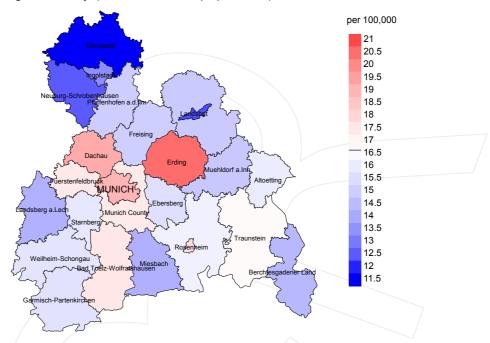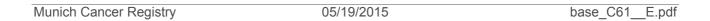
Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2013. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (16.7/100,000 WS N=6,659).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,385 male residents (averaged) in the period from 2007 to 2013 a total of 177 men died from prostate cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 15.6/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 12.6 and 19.1/100,000.

Standardized mortality ratio (SMR) 2007 - 2013
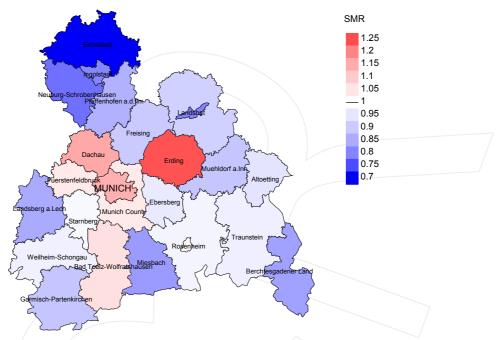
Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=6,659).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,006 male residents (averaged) in the period from 2007 to 2013 a total of 177 men died from prostate cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.96. Though, the value of this parameter may vary with an underlying probability of 99% between 0.78 and 1.16, 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. For mortality statistics patients, diagnoses and progressive course of disease are presented. In the calculations, all courses of disease are considered whereby progressions occurred and/or death certificate identified progressive cancers were ascertained. Additionally there are three groups of disease course to consider:

1. **All multiple primaries included**

   The mortality statistic describes the tumor-specific death, independent of any malignancy. The patient perspective, induced secondary malignancies, and the problem of multiple malignancies from the same primary tumor all have reasons for their inclusion.

2. **First singular primary** (no information about other prior or synchronous malignancy)

   The mortality statistic describes the cancer-related death for patients who have no therapeutic restrictions due to a previous or synchronous cancer. These statistics are comparable to studies that have exclusion criteria based on a second malignancy.

3. **Single primary** (no information about other prior, syn- or metachronous malignancy)

   The mortality statistic describes the tumor-specific death that occurs without any impact through secondary primaries, earlier, synchronous, later or induced. Precisely the difference between disease group 1 and 2 highlight the magnitude of the problem of secondary malignancies.

For this reason differences appear concerning official mono-causal mortality statistics. To judge the maximum deviation, 2 further tables are presented. In the first table the distribution of secondary malignancies before, at or after the described cancer are shown, that could be an alternative cause of death. In the second table, the age-specific mortality rates for all courses of disease, without designation of secondary malignancies are shown.

A previously minimally acknowledged statistic is the **age at death**, which allows for a good assessment of the quality of classification of the apparent tumor-specific death. For assumed tumor-independent deaths, the age of death should be estimated from the age of diagnosis and the normal life expectancy, whereas tumor-dependent deaths can be estimated from the age of diagnosis plus the average tumor-specific life expectancy. The comparison of different tumors demonstrates this association, if the causes of cancer and the competing cause of death are independent of each other (e.g. breast and colon versus head/neck and lung).

The index from mortality and incidence (Mortality-Incidence ratio, **MI-index**) is a statistic that allows for the evaluation of the quality of data. For diseases with poor prognoses, comparable values are obtained from all age groups, because to a large extent, the numerator and denominator contain the same cases. For tumors with a good prognosis, increasing and decreasing incidence and age-specific differences in prognosis can more strongly alter the MI- index. Additionally, attention should be paid to the confidence intervals where fewer cases are reported.

The complexity of problems identified here emphasizes the importance of relative survival data for the appropriate analysis of long term results.

As a measurement of the burden of disease, the number of potential life years loss due to premature deaths in a cohort can be calculated (**PYLL**, potential years of life lost, standardized per 100,000 persons or per European standard) as well as the average loss of life years per individual (**AYLL**, average years of life lost). Depending upon the analytic aim (health economy, prevention, health care research) different methods exist for the generation of these measurements. In the results presented here, the age for a premature death is considered to be before 70 years, according to the guidelines of the OECD and the WHO (as seen in the abbreviation PYLL-70 or AYLL-70).

Shortcuts

FRG   Federal Republic of Germany
GEKID   Association of Population-based Cancer Registries in Germany
           (Gesellschaft der epidemiologischen Krebsregister in Deutschland e.V.)
MCR   Munich Cancer Registry (Tumorregister München)
SEER   Surveillance, Epidemiology, and End Results (USA)

AYLL-70   Average years of life lost prior to age 70 given a person dies before that age
BRD-S   German standard population
DCO   Death certificate only
EAR   Excess absolute risk
            = excess cancer cases (O - E) per 10,000 person-years
ES   European standard population (old)
LCL   Lower confidence limit
MI-index   Ratio between mortality and incidence
PYLL-70   Potential years of life lost prior to age 70 given a person dies before that age
SIR   Standardized incidence ratio
SMR   Standardized mortality ratio
UCL   Upper confidence limit
WS   World standard population

Recommended Citation

Munich Cancer Registry. Baseline statistics C61: Prostate cancer [Internet]. 2015 [updated 2015 May 19; cited 2015 Jul 1]. Available from: http://www.tumorregister-muenchen.de/en/facts/base/base_C61__E.pdf

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