

# Munich Cancer Registry



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## ICD-10 C00-C96.9: All cancers (excl. C44)

### Survival

Year of diagnosis	1988-1997	1998-2016
Patients	62,788	354,565
Diseases	66,269	391,736
Cases evaluated	58,576	288,230
Creation date	09/24/2018	
Export date	08/09/2018	
Population	4.81 m	



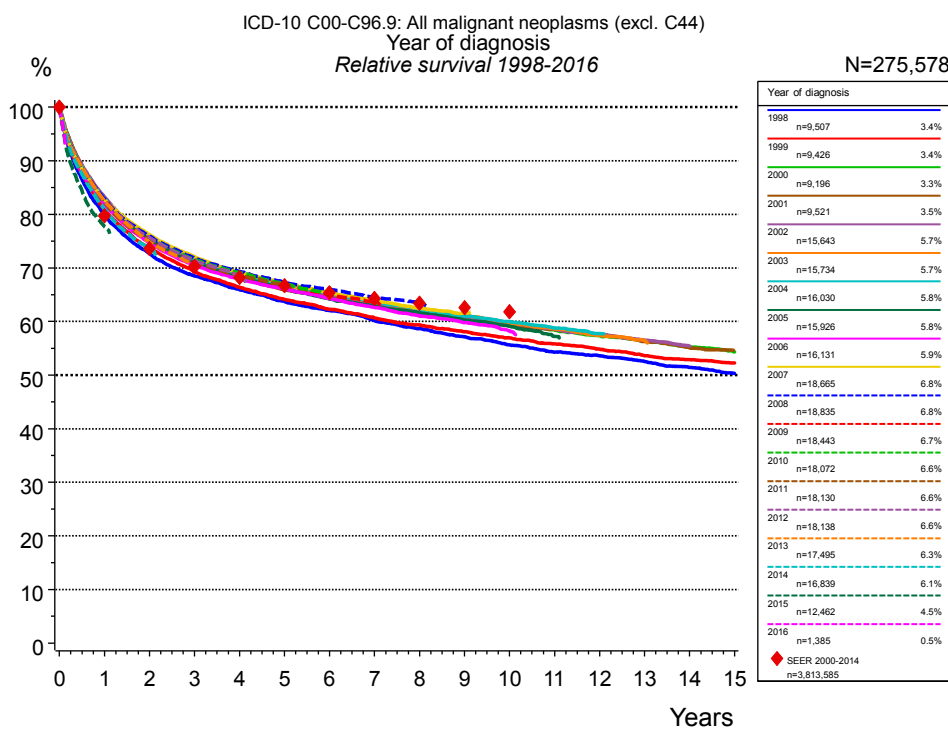
Munich Cancer Registry  
Cancer Registry Bavaria - Upper Bavaria Regional Center  
at Klinikum Grosshadern/IBE  
Marchioninstr. 15  
Munich, 81377  
Germany

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

<https://www.tumorregister-muenchen.de/en/facts/surv/sC0096E-ICD-10-C00-C96.9-All-cancers-excl.-C44-survival.pdf>

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**Figure 1a.** Relative survival of patients with all cancers (excl. C44) by year of diagnosis. Included in the evaluation are 275,578 cases diagnosed between 1998 and 2016.

The survival results of the SEER program (Surveillance, Epidemiology, and End Results) of the American National Cancer Institute (NCI) are summarized as the period of diagnosis from 2000 to 2014, and are represented by colored diamonds in order to facilitate comparisons between MCR and SEER.

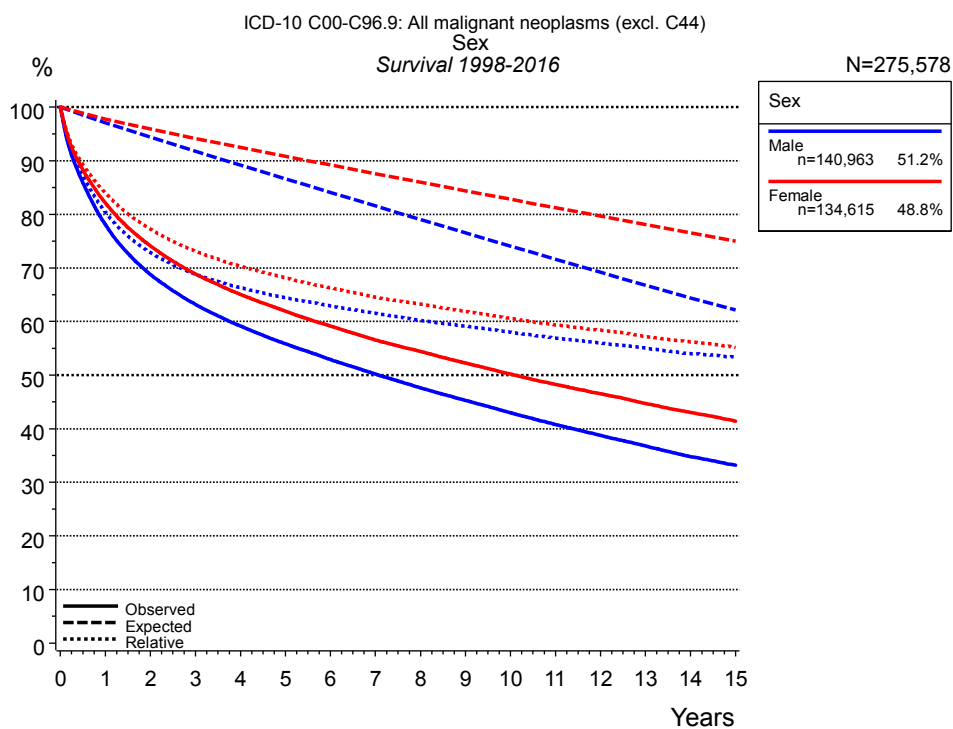
The presented survival curves are derived from clinical records with valid follow-up informations, which means that death certificate cases (DCO) cases are omitted from the analysis. With this one restriction, the MCR has provided population-based statistics since 1998, collecting data on all cancer cases in the region of southern Bavaria. Historical data of previous time periods can be heavily selected, therefore, univariate survival comparisons of the presented time periods must be carefully considered. Nonetheless, all calculable survival curves are depicted to facilitate the comparison of long time follow-up analyses of relative survival between particular cancers.

Years	Year of diagnosis													
	1998 n=9,507		1999 n=9,426		2000 n=9,196		2001 n=9,521		2002 n=15,643		2003 n=15,734		2004 n=16,030	
	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1	77.5	79.9	78.6	81.0	80.6	82.9	80.5	82.8	81.0	83.3	80.4	82.6	80.8	82.9
2	68.7	72.7	69.7	73.7	72.0	75.9	71.5	75.3	71.8	75.7	71.6	75.5	72.0	75.7
3	63.1	68.5	64.0	69.3	66.2	71.6	66.0	71.2	66.3	71.7	66.3	71.5	66.4	71.5
4	59.3	65.9	59.8	66.4	62.2	68.8	62.1	68.5	62.3	69.1	62.3	68.9	62.5	68.9
5	55.9	63.7	56.4	64.1	58.3	66.2	58.5	66.0	59.1	67.1	59.1	66.9	59.4	67.0
6	53.1	62.0	53.5	62.3	55.6	64.5	55.7	64.3	55.9	65.1	56.3	65.3	56.6	65.3
7	50.2	60.1	50.9	60.7	53.0	63.0	53.2	62.9	53.1	63.4	53.5	63.6	53.8	63.6
8	47.8	58.7	48.7	59.4	50.7	61.7	51.0	61.7	50.9	62.2	51.1	62.4	51.4	62.3
9	45.5	57.2	46.5	58.1	48.6	60.7	48.8	60.5	48.4	60.7	48.9	61.2	49.1	61.0
10	43.1	55.6	44.5	56.9	46.4	59.4	46.9	59.6	46.3	59.6	46.5	59.8	47.1	60.0
11	41.1	54.3	42.5	55.8	44.5	58.4	44.9	58.5	44.3	58.6	44.4	58.6	45.0	58.8
12	39.6	53.6	40.8	54.8	42.6	57.3	43.1	57.6	42.4	57.6	42.2	57.4	43.1	57.7
13	37.8	52.5	38.9	53.6	40.9	56.4	41.0	56.3	40.4	56.5	40.5	56.5		
14	36.0	51.4	37.4	52.9	39.0	55.2	39.2	55.1	38.5	55.4				
15	34.3	50.3	35.9	52.2	37.3	54.3								

<i>cont'd</i>	Year of diagnosis													
	2005		2006		2007		2008		2009		2010		2011	
	n=15,926		n=16,131		n=18,665		n=18,835		n=18,443		n=18,072		n=18,130	
Years	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1	80.2	82.3	79.9	82.0	80.6	82.7	80.8	82.9	80.6	82.6	80.4	82.5	80.2	82.3
2	71.6	75.3	71.0	74.6	72.6	76.2	72.3	75.9	71.7	75.2	72.0	75.5	71.5	75.1
3	66.1	71.1	65.5	70.4	67.1	72.1	66.9	71.9	66.5	71.3	66.7	71.5	66.3	71.1
4	61.8	68.1	61.6	67.9	62.9	69.2	63.1	69.3	62.5	68.6	63.0	69.1	62.6	68.6
5	58.7	66.2	58.6	66.1	59.7	67.2	59.9	67.3	59.5	66.8	59.8	67.0	59.5	66.8
6	55.5	64.2	55.6	64.3	56.8	65.4	57.4	66.0	56.7	65.0	56.9	65.2		
7	53.1	62.9	52.9	62.6	54.2	63.9	54.8	64.5	54.1	63.6				
8	50.7	61.6	50.3	61.1	51.7	62.5	52.7	63.6						
9	48.4	60.3	48.0	59.8	49.8	61.6								
10	46.3	59.1	45.6	58.2										
11	43.7	57.2												

<i>cont'd</i>	Year of diagnosis									
	2012		2013		2014		2015		2016	
	n=18,138		n=17,495		n=16,839		n=12,462		n=1,385	
Years	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1	80.4	82.5	80.5	82.5	78.9	80.9	75.7	77.7		
2	72.2	75.7	71.4	74.8	70.6	74.0				
3	66.6	71.4	66.0	70.7						
4	62.5	68.5								

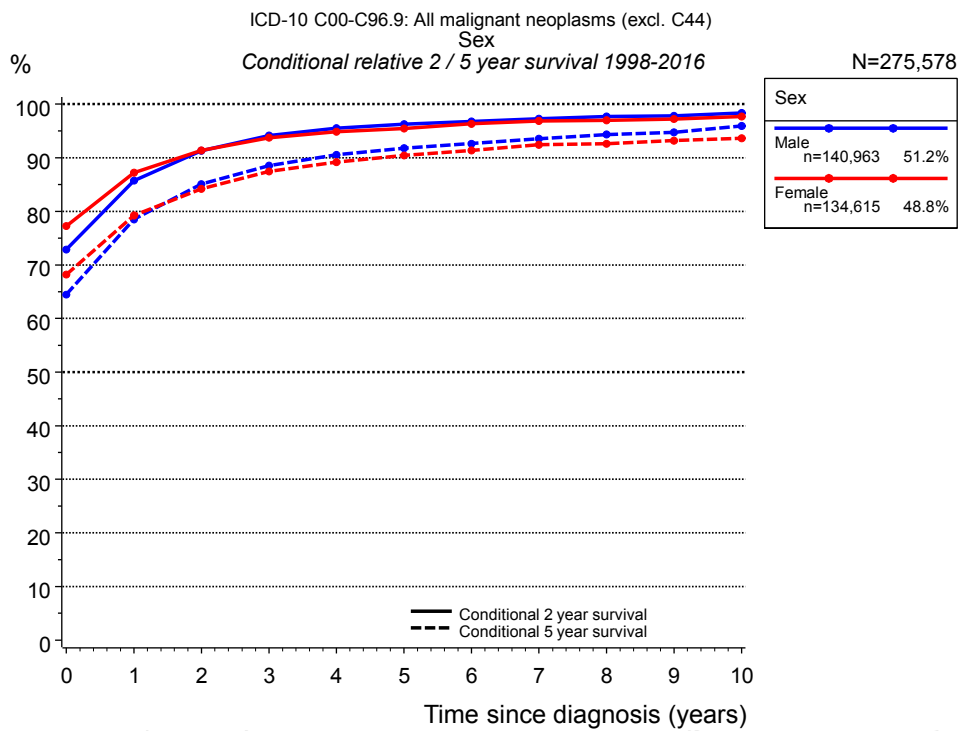
**Table 1b.** Observed (obs.) and relative (rel.) survival of patients with all cancers (excl. C44) by year of diagnosis for period 1998-2016 (N=275,578).



**Figure 2a.** Survival of patients with all cancers (excl. C44) by sex. Included in the evaluation are 275,578 cases diagnosed between 1998 and 2016.

Years	Sex			
	Male n=140,963		Female n=134,615	
	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	78.1	80.4	82.1	84.0
2	68.8	72.9	74.1	77.2
3	63.2	68.8	68.9	73.1
4	59.2	66.3	65.1	70.3
5	55.8	64.5	61.9	68.2
6	52.9	62.9	59.1	66.3
7	50.2	61.5	56.5	64.5
8	47.6	60.2	54.4	63.3
9	45.3	59.1	52.2	61.9
10	43.0	58.0	50.2	60.6
11	40.8	56.9	48.2	59.4
12	38.7	56.0	46.5	58.4
13	36.8	55.0	44.7	57.2
14	34.8	54.0	43.0	56.2
15	33.2	53.4	41.4	55.2

**Table 2b.** Observed (obs.) and relative (rel.) survival of patients with all cancers (excl. C44) by sex for period 1998-2016 (N=275,578).

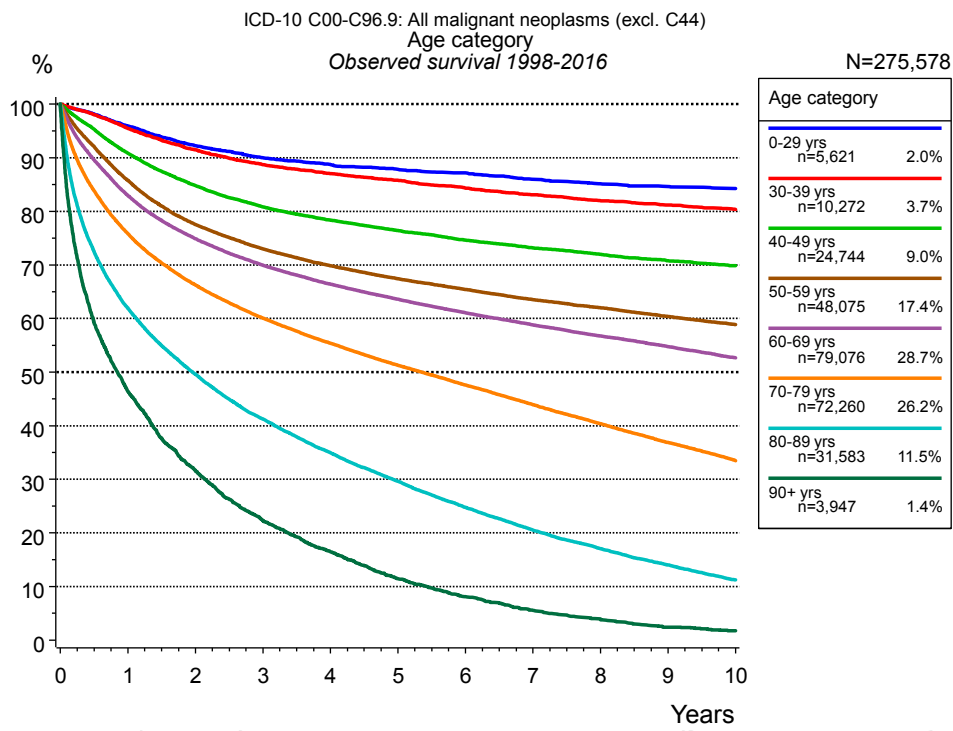


**Figure 2c.** Conditional relative 2 / 5-year survival of patients with all cancers (excl. C44) by sex. For 275,578 of 275,578 cases diagnosed between 1998 and 2016 valid data could be obtained for this item.

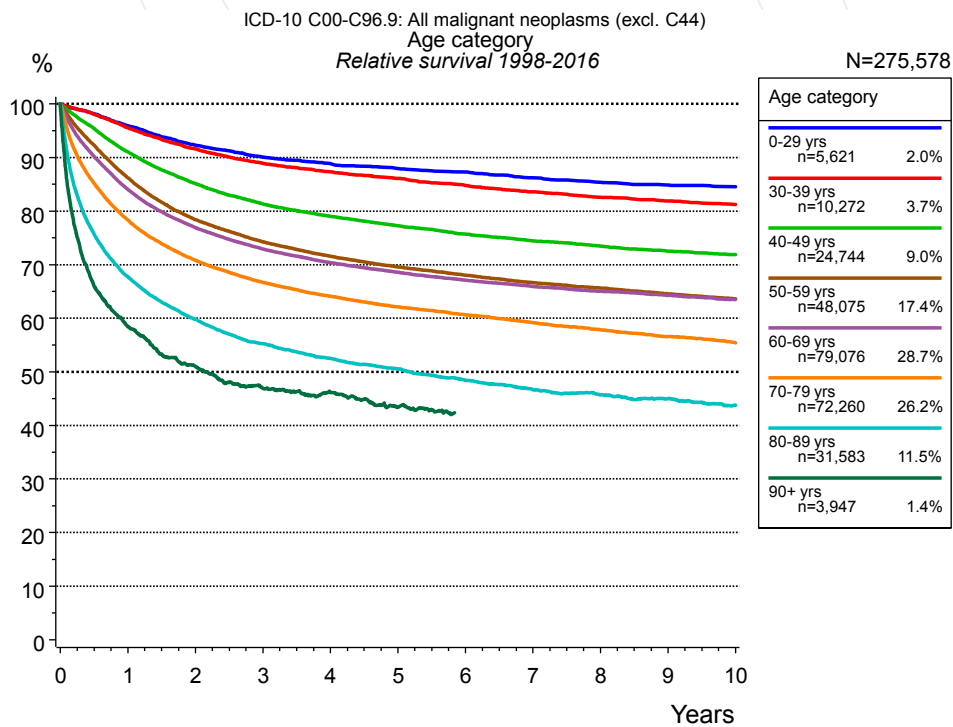
Years	Sex					
	n	Male		Female		n
		Cond. surv. % 2 yrs	5 yrs	Cond. surv. % 2 yrs	5 yrs	
0	140,963	72.9	64.5	134,615	77.2	68.2
1	103,282	85.7	78.5	103,082	87.2	79.2
2	85,147	91.3	85.1	86,675	91.4	84.2
3	72,404	94.2	88.6	74,230	93.7	87.4
4	62,021	95.5	90.5	64,076	94.9	89.2
5	53,140	96.3	91.8	55,176	95.5	90.4
6	45,463	96.8	92.6	47,093	96.4	91.3
7	38,470	97.3	93.6	39,545	96.9	92.5
8	31,805	97.7	94.3	32,813	97.0	92.6
9	25,624	97.8	94.8	26,834	97.2	93.2
10	20,851	98.3	96.0	22,075	97.7	93.6

**Table 2d.** Conditional relative 2 / 5-year survival of patients with all cancers (excl. C44) by sex for period 1998-2016 (N=275,578).

Conditional relative survival rates refer to the relative survival probability, in this case for 2 and 5 years after cancer diagnosis, compared to the age- and sex-matched population (=100 %) under the condition of being alive for a certain time period (x-axis in Figure 2a). The results illustrate to what extent the cancer induced mortality of particular subgroups declines in the subsequent years after detection of the malignancy. For instance, according to the presented survival statistics, patients in the subgroup sex="Male", who are alive at least 3 years after cancer diagnosis, the conditional relative 2-year survival rate is 94.2% (n=72,404).



**Figure 3a.** Observed survival of patients with all cancers (excl. C44) by age category. Included in the evaluation are 275,578 cases diagnosed between 1998 and 2016.



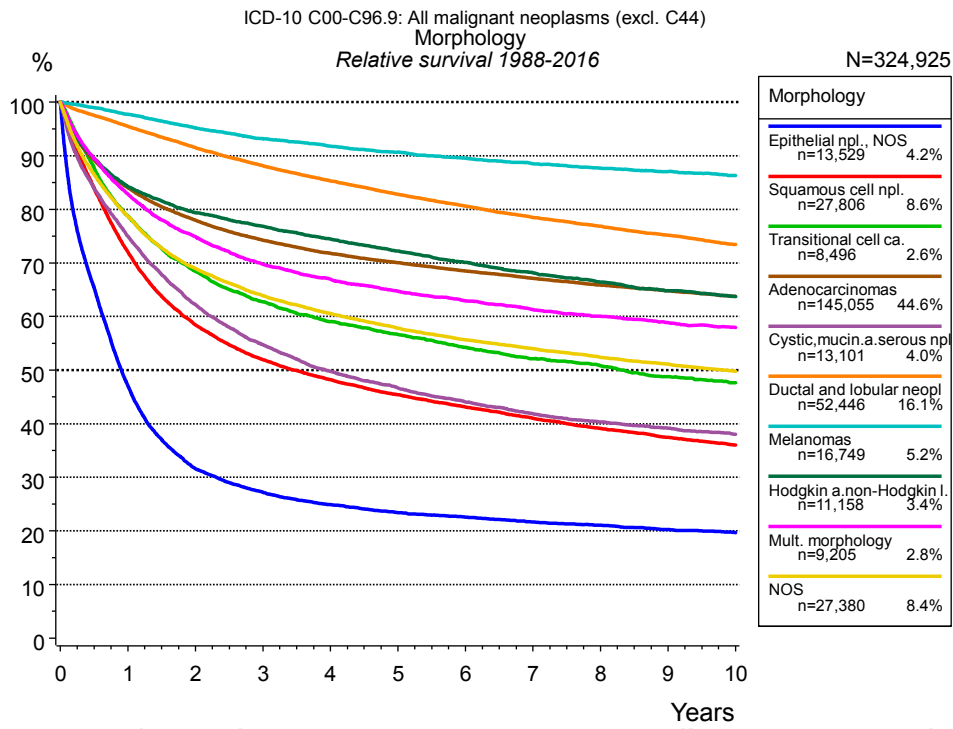
**Figure 3b.** Relative survival of patients with all cancers (excl. C44) by age category. Included in the evaluation are 275,578 cases diagnosed between 1998 and 2016.

Years	Age category													
	0-29 yrs n=5,621		30-39 yrs n=10,272		40-49 yrs n=24,744		50-59 yrs n=48,075		60-69 yrs n=79,076		70-79 yrs n=72,260		80-89 yrs n=31,583	
	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1	95.9	95.9	95.5	95.5	90.8	91.0	85.7	86.2	82.9	84.0	75.8	78.3	61.9	67.7
2	92.2	92.3	91.5	91.6	84.8	85.1	77.5	78.4	74.9	76.9	66.3	70.8	49.6	59.8
3	90.0	90.1	88.7	88.9	80.8	81.3	73.0	74.3	69.9	72.9	60.1	66.7	41.2	55.3
4	88.8	88.9	87.1	87.3	78.3	79.0	69.9	71.6	66.4	70.4	55.4	64.1	34.9	52.5
5	87.8	88.0	85.8	86.1	76.4	77.3	67.4	69.6	63.6	68.6	51.3	62.1	29.6	50.5
6	87.1	87.3	84.3	84.8	74.6	75.7	65.4	68.0	61.1	67.1	47.6	60.6	24.7	48.4
7	85.9	86.2	83.1	83.6	73.2	74.4	63.5	66.6	58.8	65.9	43.9	59.2	20.5	46.7
8	85.1	85.3	82.0	82.6	72.0	73.5	62.0	65.6	56.7	65.0	40.4	57.8	17.0	45.7
9	84.6	84.9	81.2	81.9	70.8	72.5	60.4	64.5	54.7	64.3	36.9	56.6	14.0	45.0
10	84.3	84.6	80.4	81.2	69.8	71.8	58.9	63.6	52.7	63.5	33.5	55.4	11.2	43.8

Years	Age category <i>cont'd</i>	
	obs. %	rel. %
	90+ yrs n=3,947	
0	100.0	100.0
1	46.3	58.4
2	31.6	50.9
3	22.3	46.9
4	16.4	46.0
5	11.4	43.4
6	8.1	42.6
7	5.5	41.5
8	4.0	41.8
9	2.4	39.3
10	1.7	42.4

**Table 3c.** Observed (obs.) and relative (rel.) survival of patients with all cancers (excl. C44) by age category for period 1998-2016 (N=275,578).



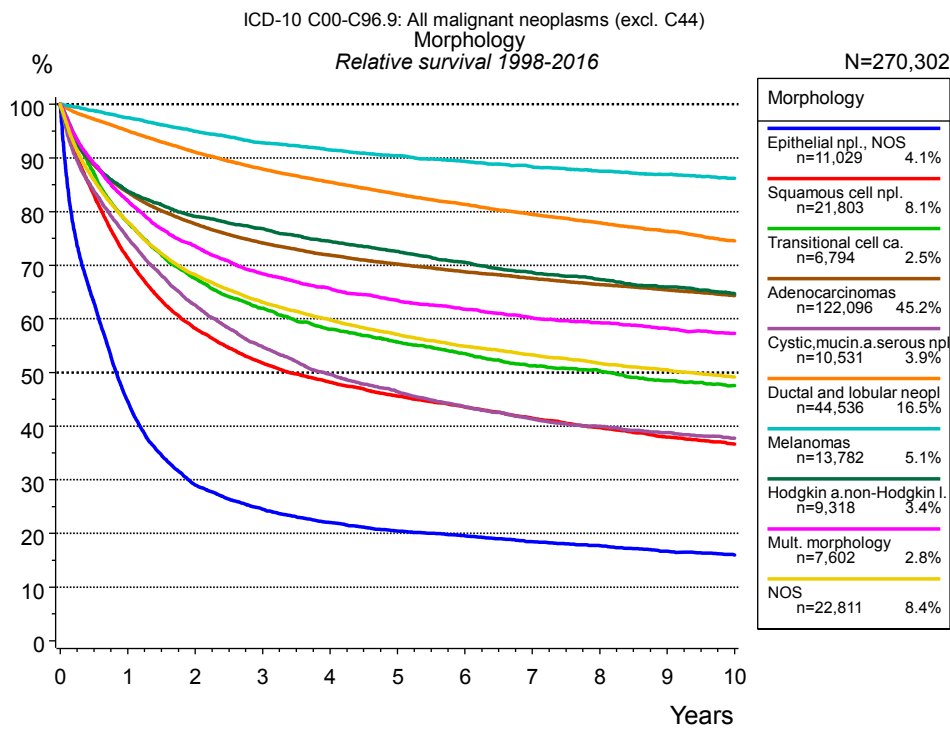


**Figure 4a.** Relative survival of patients with all cancers (excl. C44) by morphology. For 324,925 of 334,029 cases diagnosed between 1988 and 2016 valid data could be obtained for this item.

Years	Morphology													
	Epithelial npl., NOS		Squamous cell npl.		Adenocarcinomas		Cystic, mucin. a. serous npl.		Ductal and lobular neoplasms		Melanomas		Hodgkin a. non-Hodgkin l.	
	n=13,529	n=27,806	n=145,055	n=13,101	n=52,446	n=16,749	n=11,158							
0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1	45.8	47.1	70.4	72.0	81.5	84.0	72.8	75.0	93.9	95.5	95.9	97.7	82.3	84.2
2	30.0	31.6	56.0	58.4	73.4	77.9	58.9	62.2	88.6	91.5	91.7	95.2	76.1	79.4
3	25.2	27.2	48.8	51.9	67.9	74.2	50.5	54.7	84.0	88.1	88.2	93.2	72.4	76.9
4	22.5	24.9	44.5	48.2	63.7	71.8	44.7	49.8	80.0	85.3	85.4	91.8	68.8	74.4
5	20.6	23.4	41.1	45.4	60.3	70.0	40.8	46.6	76.5	82.8	82.9	90.7	65.6	72.2
6	19.4	22.6	38.2	43.1	57.2	68.5	37.5	44.1	73.3	80.6	80.5	89.6	62.6	70.1
7	18.2	21.7	35.7	41.0	54.2	67.1	34.6	41.9	70.3	78.5	78.2	88.5	59.9	68.2
8	17.2	21.1	33.4	39.1	51.5	65.9	32.5	40.4	67.7	76.8	76.1	87.7	57.4	66.4
9	16.2	20.2	31.3	37.4	49.0	64.8	30.6	39.2	65.1	75.2	74.3	87.1	55.1	64.8
10	15.4	19.7	29.6	36.0	46.6	63.7	28.9	38.0	62.6	73.4	72.4	86.3	53.3	63.7

Years	Morphology			
	Mult. morphology		NOS	
	n=9,205	n=35,876	n=9,205	n=35,876
0	100.0	100.0	100.0	100.0
1	80.9	82.8	76.7	78.7
2	71.6	74.9	65.7	68.8
3	65.3	69.7	59.6	63.6
4	61.5	67.0	55.3	60.2
5	58.2	64.7	51.9	57.5
6	55.5	62.9	48.9	55.2
7	53.0	61.3	46.6	53.5
8	50.9	60.1	44.4	51.9
9	48.9	58.9	42.4	50.4
10	47.1	58.0	40.6	49.1

**Table 4b.** Observed (obs.) and relative (rel.) survival of patients with all cancers (excl. C44) by morphology for period 1988-2016 (N=324,925).

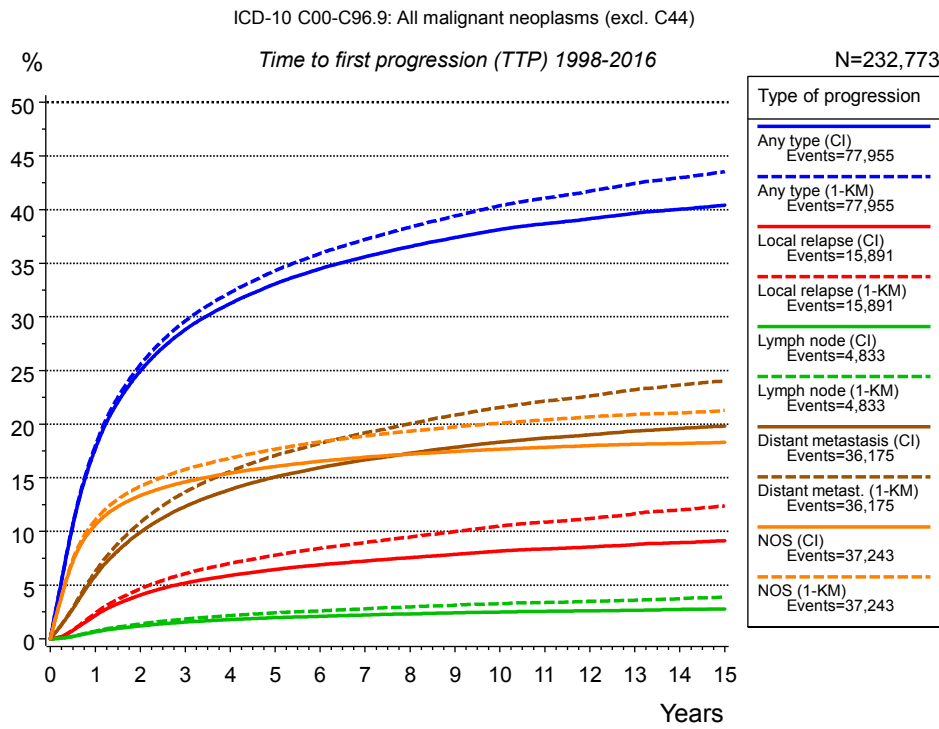


**Figure 4c.** Relative survival of patients with all cancers (excl. C44) by morphology. For 270,302 of 275,578 cases diagnosed between 1998 and 2016 valid data could be obtained for this item.

Years	Morphology													
	Epithelial npl., NOS		Squamous cell npl.		Adenocarcinomas		Cystic, mucin. a. serous npl.		Ductal and lobular neoplasms		Melanomas		Hodgkin a. non-Hodgkin l.	
	n=11,029	n=21,803	n=122,096	n=10,531	n=44,536	n=13,782	n=9,318	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	
0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1	43.3	44.6	69.8	71.3	81.1	83.6	72.9	75.1	93.5	95.1	95.7	97.5	81.8	83.8
2	27.5	29.0	55.8	58.2	73.3	77.7	59.2	62.6	88.2	91.1	91.5	95.0	75.7	79.1
3	22.6	24.5	48.7	51.8	67.9	74.1	50.5	54.8	83.8	87.9	87.9	92.8	72.3	76.9
4	19.8	22.0	44.5	48.2	64.0	71.9	44.6	49.6	80.2	85.5	85.1	91.5	68.7	74.4
5	17.9	20.4	41.3	45.6	60.7	70.2	40.5	46.4	76.9	83.3	82.7	90.4	65.8	72.6
6	16.7	19.5	38.7	43.6	57.6	68.8	37.1	43.6	74.0	81.3	80.3	89.4	62.8	70.5
7	15.3	18.4	36.2	41.5	54.9	67.5	34.1	41.3	71.1	79.5	78.0	88.3	60.1	68.7
8	14.3	17.7	34.0	39.7	52.2	66.4	32.1	40.0	68.6	77.9	76.0	87.5	57.9	67.3
9	13.2	16.7	31.9	38.0	49.7	65.4	30.2	38.8	66.1	76.3	74.2	86.9	55.8	65.9
10	12.3	16.0	30.2	36.7	47.3	64.3	28.6	37.7	63.5	74.5	72.4	86.2	53.8	64.7

Years	Morphology			
	Mult. morphology		NOS	
	n=7,602	n=29,605	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	80.1	82.0	76.1	78.0
2	70.4	73.6	65.0	68.1
3	64.2	68.4	58.8	62.8
4	60.4	65.7	54.6	59.4
5	57.2	63.4	51.2	56.7
6	54.6	61.8	48.3	54.5
7	52.2	60.2	45.9	52.7
8	50.3	59.3	43.9	51.2
9	48.4	58.2	42.0	49.9
10	46.7	57.3	40.2	48.6

**Table 4d.** Observed (obs.) and relative (rel.) survival of patients with all cancers (excl. C44) by morphology for period 1998-2016 (N=270,302).

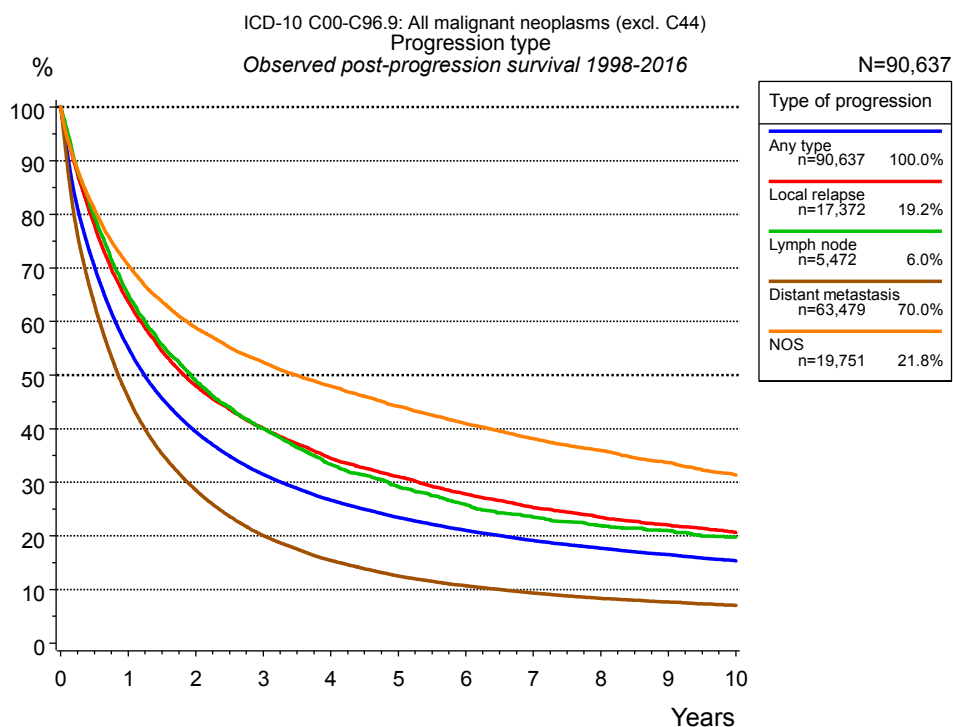


**Figure 5a.** Time to first progression of 232,773 patients with all cancers (excl. C44) diagnosed between 1998 and 2016 (in solid cancers M0 only) estimated by cumulative incidence function (CI, solid line) accounting for death as competing risk and by inverse Kaplan-Meier estimate (1-KM, dashed line). The frequency of events may be underestimated due to underreporting.

Years	Type of progression						
	Any type (CI)	Any type (1-KM)	Local relapse (CI)	Local relapse (1-KM)	Lymph node (CI)	Lymph node (1-KM)	Distant metastasis (CI)
	n=232,773 %	n=232,773 %	n=232,773 %	n=232,773 %	n=232,773 %	n=232,773 %	n=232,773 %
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	17.7	18.0	2.2	2.4	0.6	0.7	5.9
2	24.9	25.5	4.1	4.6	1.2	1.4	9.9
3	28.8	29.6	5.2	6.1	1.6	1.8	12.3
4	31.2	32.2	5.9	7.0	1.8	2.2	13.9
5	33.1	34.3	6.4	7.8	2.0	2.4	15.1
6	34.5	35.9	6.9	8.4	2.1	2.6	15.9
7	35.6	37.2	7.2	9.0	2.2	2.8	16.7
8	36.5	38.3	7.6	9.5	2.3	3.0	17.3
9	37.4	39.4	7.9	10.0	2.4	3.1	17.8
10	38.1	40.4	8.2	10.5	2.5	3.3	18.3
11	38.7	41.1	8.4	10.9	2.6	3.4	18.7
12	39.1	41.7	8.6	11.2	2.6	3.5	19.0
13	39.7	42.4	8.8	11.6	2.7	3.6	19.4
14	40.0	43.0	9.0	12.0	2.7	3.7	19.6
15	40.4	43.5	9.1	12.4	2.8	3.9	19.8

<i>cont'd</i>	Type of progression		
	Distant metast. (1-KM)	NOS (CI)	NOS (1-KM)
	n=232,773	n=232,773	n=232,773
Years	%	%	%
0	0.0	0.0	0.0
1	6.2	10.6	11.1
2	10.8	13.3	14.2
3	13.7	14.6	15.8
4	15.6	15.4	16.8
5	17.1	16.0	17.7
6	18.2	16.5	18.4
7	19.2	16.9	18.9
8	20.0	17.2	19.3
9	20.9	17.5	19.7
10	21.6	17.7	20.1
11	22.1	17.8	20.4
12	22.6	18.0	20.7
13	23.2	18.1	20.9
14	23.7	18.2	21.1
15	24.0	18.3	21.3

**Table 5b.** Time to first progression of patients with all cancers (excl. C44) for period 1998-2016 (N=232,773).

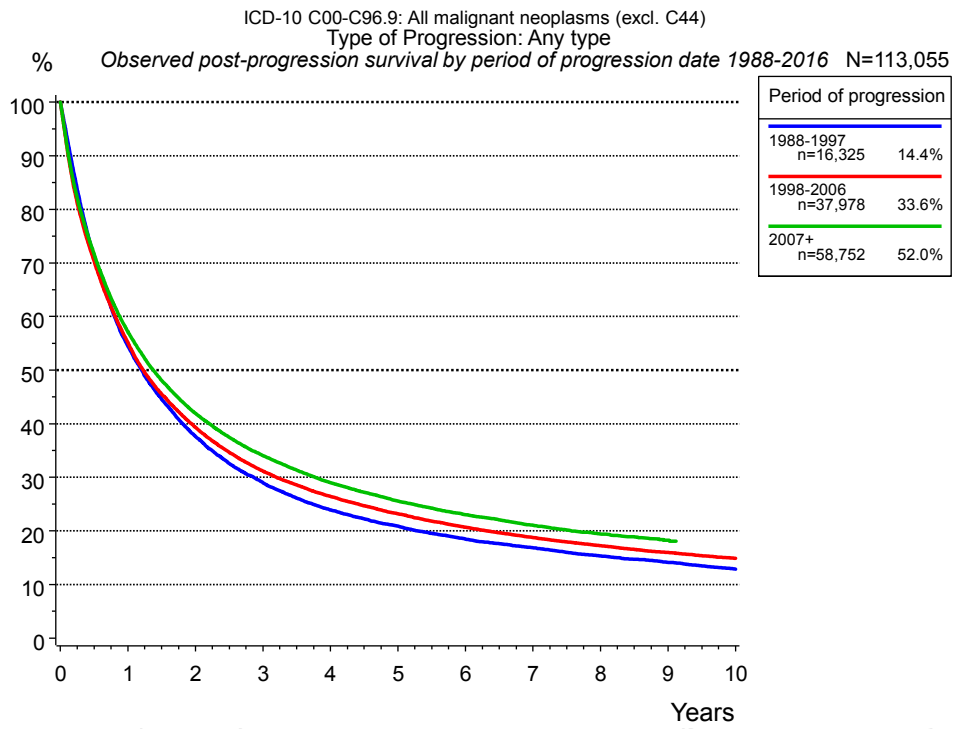


**Figure 5c.** Observed post-progression survival of 90,637 patients with all cancers (excl. C44) diagnosed between 1998 and 2016. These 90,637 patients with documented progression events during their course of disease represent 33.1 % of the totally 274,007 evaluated cases (incl. M1, n=41,234, 15.0 %). Patients with cancer relapse documented via death certificates only were excluded (n=28,552, 10.4 %). Multiple progression types on different sites are included in the evaluation even when not occurring synchronously. The NOS (not otherwise specified) class is included under the condition, that it is the one and only progression type during the course of disease.

Medical record documentation often lacks the linguistic severity to distinguish between local relapse, regional lymph node metastasis and distant spread in solid cancers. Frequently, the statement “not specified” is the only information in registries regarding relapse of the disease. The category “Any type” denotes all cases who suffered from at least one relapse during the course of disease (incl. primary M1-status). Although, the real number of relapsed patients is likely to be much higher. The accumulated percentage of patients with local relapse or distant metastasis exceeds the 100 % value because patients are potentially considered in more than one subgroup.

Years	Type of progression				
	Any type n=90,637 %	Local relapse n=17,372 %	Lymph node n=5,472 %	Distant metastasis n=63,479 %	NOS n=19,751 %
0	100.0	100.0	100.0	100.0	100.0
1	55.1	63.8	65.1	45.9	70.5
2	39.4	48.0	48.9	28.5	58.8
3	31.4	40.1	40.0	20.0	52.4
4	26.7	34.5	33.3	15.4	47.9
5	23.4	31.0	29.2	12.5	44.2
6	21.0	27.8	25.8	10.7	40.9
7	19.1	25.3	23.4	9.3	38.1
8	17.7	23.4	21.9	8.3	35.9
9	16.5	22.0	20.9	7.7	33.7
10	15.3	20.6	19.8	7.0	31.3

**Table 5d.** Observed post-progression survival of patients with all cancers (excl. C44) for period 1998-2016 (N=90,637).



**Figure 5e.** Observed post-progression (any type) survival of 113,055 patients with all cancers (excl. C44) diagnosed between 1988 and 2016 by period of progression.

Years	Period of progression		
	1988-1997 n=16,325 %	1998-2006 n=37,978 %	2007+ n=58,752 %
0	100.0	100.0	100.0
1	54.4	55.1	57.2
2	37.7	39.3	41.9
3	29.0	31.2	34.0
4	23.9	26.4	29.0
5	20.9	23.2	25.5
6	18.5	20.7	23.0
7	16.8	18.7	21.0
8	15.3	17.2	19.4
9	14.1	16.0	18.2
10	12.9	14.8	

**Table 5f.** Observed post-progression (any type) survival of patients with all cancers (excl. C44) for period 1988-2016 by period of progression (N=113,055).

## Shortcuts

MCR	Munich Cancer Registry, Germany	
NCI	National Cancer Institute, USA	
SEER	Surveillance, Epidemiology, and End Results, USA	
UICC	Union for International Cancer Control, Geneva	
DCO	Death certificate only	Death certificate provides the only notification to the registry.
NA	Not available	
NOS	Not otherwise specified	
OS	Overall/Observed survival	Overall/Observed survival (Kaplan-Meier estimate) Date of entry: diagnosis Event: death from any cause
RS	Relative survival	Survival compared to “general population”, ratio of observed to expected survival (Ederer II method), reflecting cancer specific survival
AS	Assembled survival	Assembled chart of observed, expected, relative survival
CS	Conditional survival	Survival probability under the condition of surviving a given period of time
TTP	Time to progression	Time to first progression / relapse Date of entry: diagnosis Event: (progression / relapse): first local-, lymph node recurrence, distant metastasis or unspecified progression
1-KM	1 minus Kaplan-Meier estimator ("inverse" Kaplan-Meier estimator)	
CI	Cumulative incidence Death as competing risk (according to Kalbfleisch und Prentice)	
PPS	Post-progression survival	Survival since first progression / relapse (Kaplan-Meier estimate) Date of entry (progression / relapse): first local-, lymph node recurrence, distant metastasis or unspecified progression Event: death from any cause

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