Munich Cancer Registry

- Incidence and Mortality
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ICD-10 C40, C41: Bone cancer

Survival

Year of diagnosis	1988-1997	1998-2020
Patients	131	735
Diseases	131	738
Cases evaluated	126	578

Creation date	04/15/2022
Database export	12/20/2021
Population	4.92 m

Munich Cancer Registry
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Munich, 81377
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https://www.tumorregister-muenchen.de/en

https://www.tumorregister-muenchen.de/en/facts/surv/sC4041E-ICD-10-C40-C41-Bone-cancer-survival.pdf

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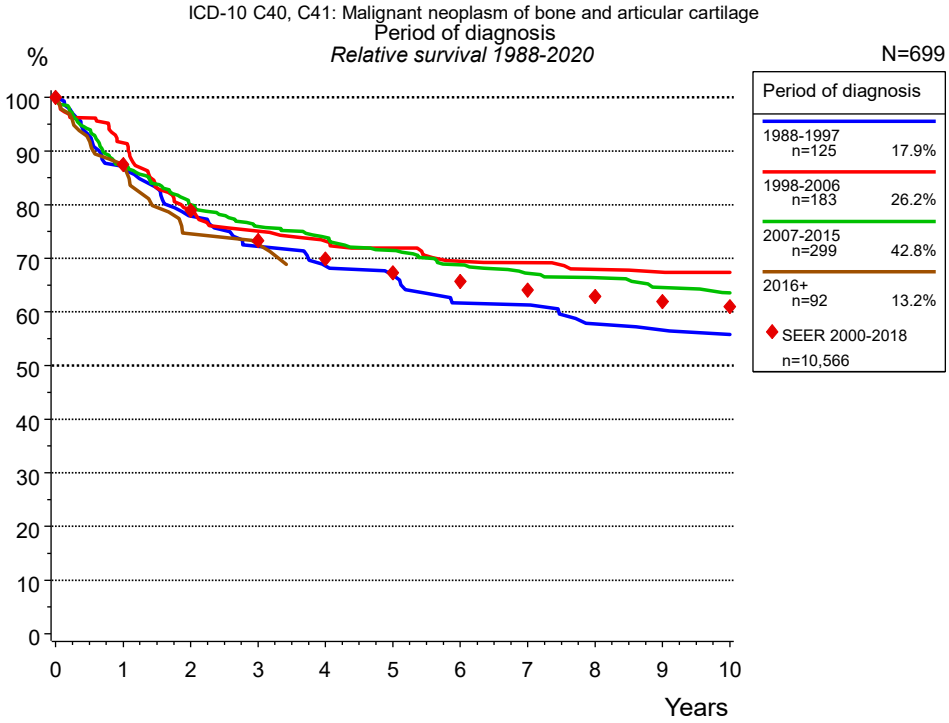

Figure 1a. Relative survival of patients with bone cancer by period of diagnosis. Included in the evaluation are 699 cases diagnosed between 1988 and 2020.

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 2018, 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.

	Period of diagnosis							
	1988-1997 n=125		1998-2006 n=183		2007-2015 n=299		2016+ n=92	
Years	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
1	86.3	86.9	90.9	91.5	86.7	87.4	87.8	87.4
2	76.5	77.8	78.0	79.1	78.5	80.0	73.5	74.5
3	70.8	72.3	73.2	75.1	73.9	75.9	71.6	72.6
4	66.6	68.6	70.8	73.2	71.4	73.9		
5	64.9	66.9	69.0	71.9	68.5	71.5		
6	58.8	61.7	66.0	69.5	65.2	68.8		
7	58.8	61.3	65.4	69.2	62.9	67.2		
8	54.4	57.8	63.5	67.9	61.6	66.4		
9	53.5	56.6	62.9	67.4	59.5	64.6		
10	52.6	55.8	62.3	67.4	58.1	63.6		
Median	10.2		20.4					

Table 1b. Observed (obs.) and relative (rel.) survival of patients with bone cancer by period of diagnosis for period 1988-2020 (N=699).

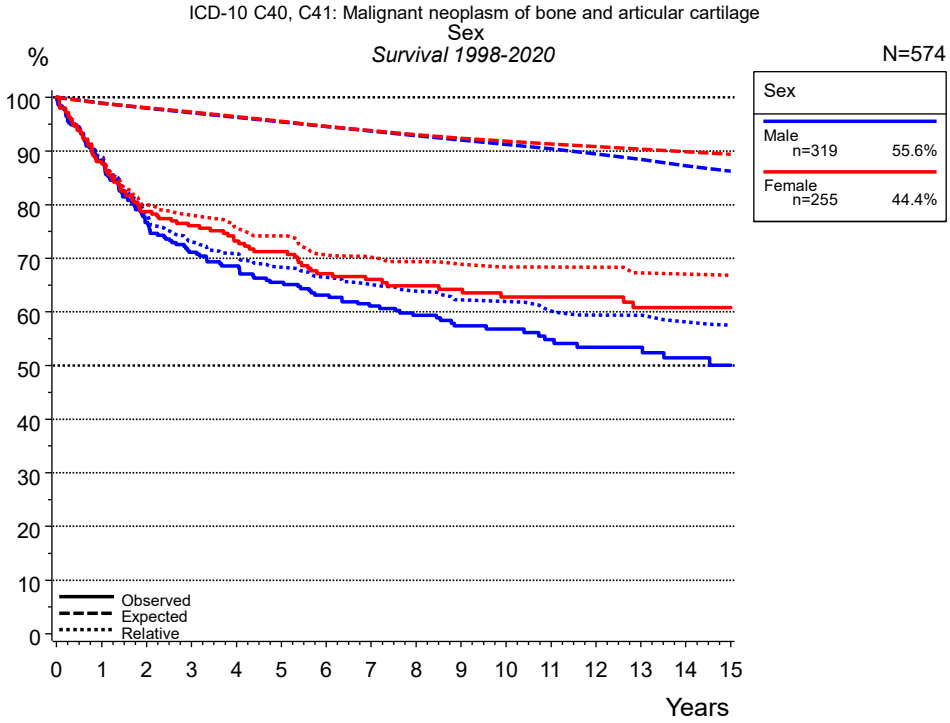

Figure 2a. Survival of patients with bone cancer by sex. Included in the evaluation are 574 cases diagnosed between 1998 and 2020.

	Sex			
	Male n=319		Female n=255	
Years	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	88.3	89.0	88.0	88.6
2	76.7	78.1	78.7	80.0
3	71.1	73.1	76.0	78.0
4	68.6	70.9	73.2	75.7
5	65.5	68.3	71.3	74.2
6	63.2	66.4	67.1	70.6
7	61.1	65.1	66.0	70.2
8	59.4	63.9	64.9	69.3
9	57.4	62.2	64.2	68.8
10	56.8	61.9	62.8	68.4
11	54.9	60.2	62.8	68.3
12	53.4	59.4	62.8	68.3
13	53.4	59.3	60.8	67.2
14	51.4	58.1	60.8	67.0
15	50.0	57.5	60.8	66.8
Median	16.2			

Table 2b. Observed (obs.) and relative (rel.) survival of patients with bone cancer by sex for period 1998-2020 (N=574).

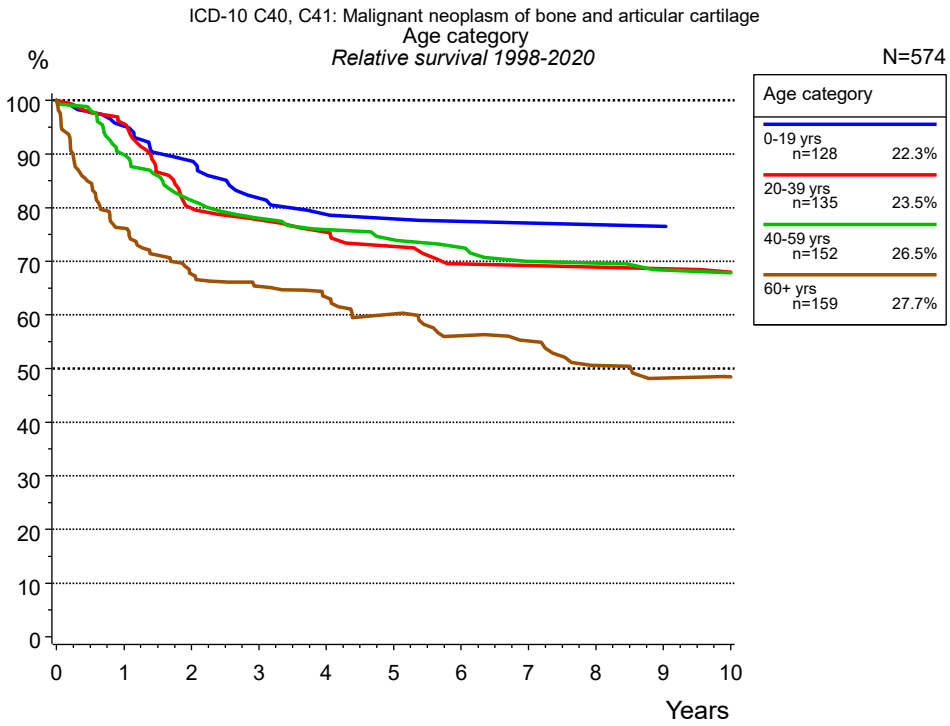

Figure 3a. Relative survival of patients with bone cancer by age category. Included in the evaluation are 574 cases diagnosed between 1998 and 2020.

	Age category							
	0-19 yrs n=128		20-39 yrs n=135		40-59 yrs n=152		60+ yrs n=159	
Years	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
1	95.7	95.2	96.1	95.6	90.2	89.9	74.0	76.1
2	89.5	88.7	80.3	79.9	80.8	81.3	63.5	67.6
3	82.3	81.8	77.8	77.7	77.1	78.0	59.4	65.3
4	79.5	78.7	76.0	75.4	74.8	75.9	55.8	63.3
5	78.5	77.9	73.2	72.8	73.1	74.0	51.4	60.2
6	77.5	77.4	69.4	69.6	71.3	72.6	45.9	56.1
7	77.5	77.1	69.4	69.2	67.7	70.0	43.3	55.2
8	77.5	76.8	69.4	68.9	67.7	69.7	37.9	50.5
9	77.5	76.5	69.4	68.6	65.3	68.4	34.9	48.3
10	76.3	75.9	68.0	68.0	65.3	67.8	33.6	48.5
Median							5.4	

Table 3b. Observed (obs.) and relative (rel.) survival of patients with bone cancer by age category for period 1998-2020 (N=574).

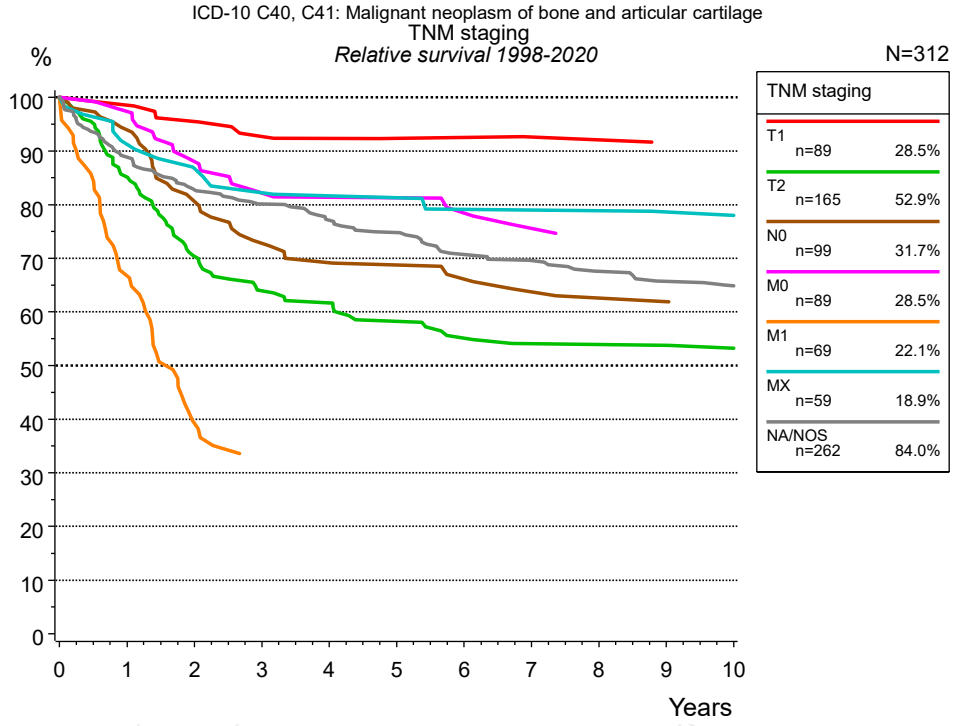

Figure 4a. Relative survival of patients with bone cancer by TNM staging. For 318 of 574 cases diagnosed between 1998 and 2020 valid data could be obtained for this item. For a total of 312 cases an evaluable classification was established. The accumulated percentage exceeds the 100 % value because patients are potientially considered in more than one subgroup. The grey line represents the subgroup of 262 patients with missing values regarding TNM staging (45.6 % of 574 patients, the percent values of all other categories are related to n=312).

	TNM staging													
	T1 n=89		T2 n=165		N0 n=99		M0 n=89		M1 n=69		MX n=59		NA/NOS n=262	
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	98.9	98.6	84.9	85.1	93.8	93.9	97.7	97.4	67.3	66.7	91.2	91.2	88.2	88.9
2	95.2	95.5	69.4	70.3	79.6	80.6	87.6	88.0	39.1	39.2	85.8	86.7	81.2	82.8
3	91.3	92.7	62.7	64.0	71.7	72.8	81.1	82.2	32.9	32.7	82.1	82.2	77.7	80.2
4	90.0	92.3	60.5	61.6	68.2	69.1	79.7	81.4			80.2	81.7	74.2	77.1
5	88.6	92.4	56.7	58.3	66.9	68.7	79.7	81.3			80.2	81.3	71.5	74.8
6	88.6	92.5	53.3	55.1	63.9	66.1	76.2	78.4			76.3	79.1	66.8	70.7
7	86.8	92.6	51.5	54.0	60.8	63.7	72.6	75.6			76.3	79.0	64.9	69.6
8	86.8	92.1	51.5	53.9	59.2	62.6	70.6	74.4			76.3	78.9	62.4	67.5
9	84.4	91.6	51.5	53.7	59.2	61.9	70.6	74.1			74.3	78.7	60.3	65.7
10	84.4	91.0	50.4	53.2	57.4	61.6	70.6	73.8			74.3	78.1	59.0	64.9
Median			10.9						1.7				19.0	

Table 4b. Observed (obs.) and relative (rel.) survival of patients with bone cancer by TNM staging for period 1998-2020 (N=312).

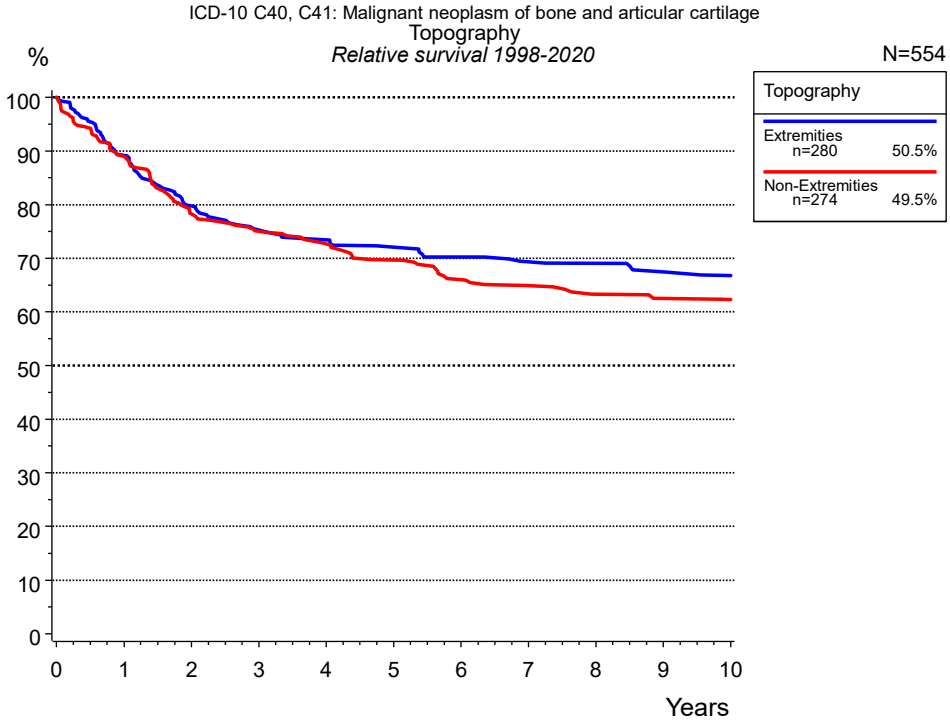

Figure 5a. Relative survival of patients with bone cancer by topography. For 554 of 574 cases diagnosed between 1998 and 2020 valid data could be obtained for this item.

	Topography			
	Extremities n=280		Non-Extremities n=274	
Years	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	88.6	89.2	88.3	89.1
2	78.7	79.8	76.7	78.3
3	73.8	75.3	72.8	75.0
4	71.6	73.4	69.8	72.7
5	69.8	72.1	66.4	69.7
6	67.4	70.3	62.3	66.0
7	65.8	69.3	60.4	64.9
8	65.3	69.1	58.3	63.3
9	63.6	67.5	57.0	62.5
10	62.3	66.8	56.3	62.3
Median			14.5	

Table 5b. Observed (obs.) and relative (rel.) survival of patients with bone cancer by topography for period 1998-2020 (N=554).

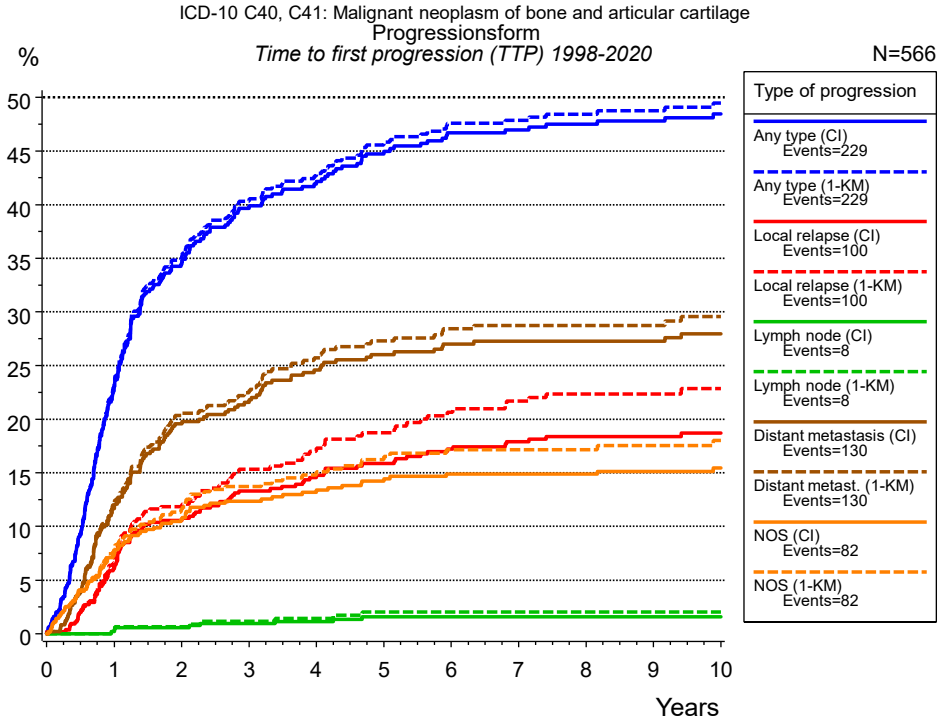

Figure 6a. Time to first progression of 566 patients with bone cancer diagnosed between 1998 and 2020 (in solid cancers M0 only) estimated by cumulative incidence function (CI, solid line) accounting for death as competing risk and by inverse Kaplan-Meier estimate (1-KM, dashed line). The frequency of events may be underestimated due to underreporting.

	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	498	498	566	566	566	566	498
Events	225	225	95	95	8	8	128
compet.	24		156		197		59
Years	%	%	%	%	%	%	%
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	23.1	23.4	6.2	6.8	0.4	0.4	11.7
2	34.5	35.0	10.6	11.9	0.6	0.6	19.6
3	39.6	40.3	13.3	15.4	0.9	1.1	21.6
4	41.9	42.7	14.6	17.0	1.2	1.4	24.6
5	44.7	45.6	15.9	18.8	1.6	2.0	26.0
6	46.7	47.6	17.2	20.6	1.6	2.0	27.0
7	47.0	47.9	17.9	21.7	1.6	2.0	27.3
8	47.5	48.4	18.4	22.4	1.6	2.0	27.3
9	47.8	48.8	18.4	22.4	1.6	2.0	27.3
10	48.4	49.5	18.7	22.9	1.6	2.0	28.0

	Type of progression		
cont'd	Distant metast. (1-KM)	NOS (CI)	NOS (1-KM)
N	498	566	566
Events	128	81	81
compet.		159	
Years	%	%	%
0	0.0	0.0	0.0
1	12.0	7.5	7.9
2	20.3	10.6	11.6
3	22.5	12.4	13.7
4	25.7	13.2	14.8
5	27.3	14.2	16.2
6	28.4	14.9	17.1
7	28.7	14.9	17.1
8	28.7	14.9	17.1
9	28.7	15.1	17.5
10	29.6	15.5	18.0

Table 6b. Time to first progression of patients with bone cancer for period 1998-2020 (N=566), also showing the total of progression events (Events) and of deaths as competing risk (compet.).

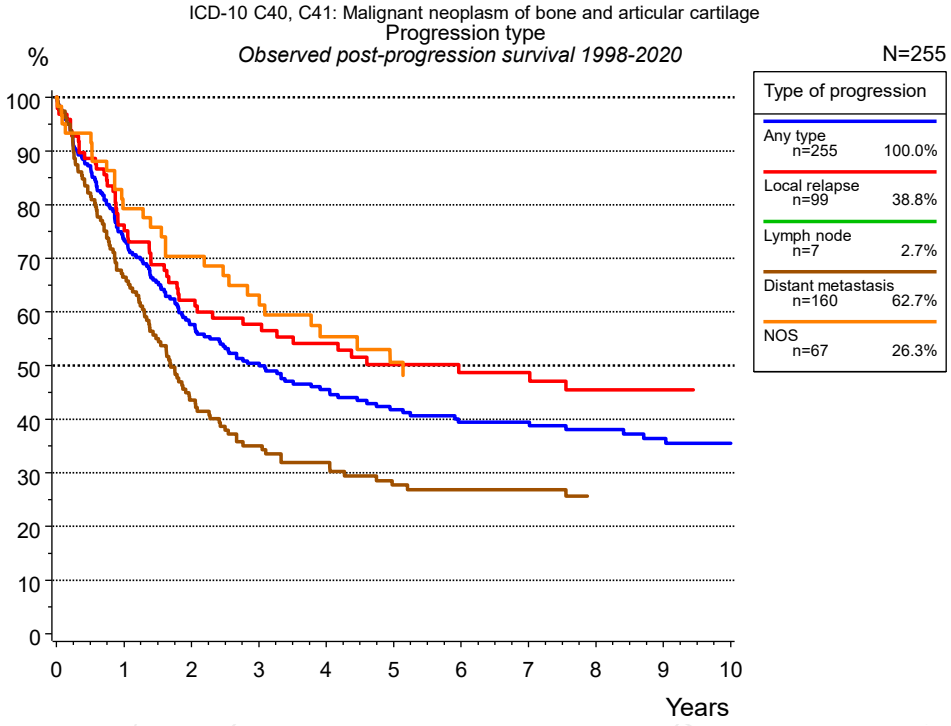

Figure 6c. Observed post-progression survival of 255 patients with bone cancer diagnosed between 1998 and 2020. These 255 patients with documented progression events during their course of disease represent 45.1 % of the totally 566 evaluated cases (incl. M1, n=68, 12.0 %). Patients with cancer relapse documented via death certificates only were excluded (n=42, 7.4 %). Multiple progression types on different sites are included in the evaluation even when not occuring 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. Subgroups with sample size <20 are omitted from the chart.

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 potientially considered in more than one subgroup.

	Type of progression			
	Any type	Local relapse	Distant metastasis	NOS
	n=255	n=99	n=160	n=67
Years	%	%	%	%
0	100.0	100.0	100.0	100.0
1	73.6	76.2	66.5	79.3
2	57.6	62.2	43.6	70.4
3	50.4	57.7	35.0	63.1
4	45.6	54.1	31.9	55.4
5	41.8	50.2	27.7	50.6
6	39.5	48.7	26.8	
7	39.5	48.7	26.8	
8	38.1	45.4	25.7	
9	36.4	45.4		
10	35.5	45.4		

Table 6d. Observed post-progression survival of patients with bone cancer for period 1998-2020 (N=255).

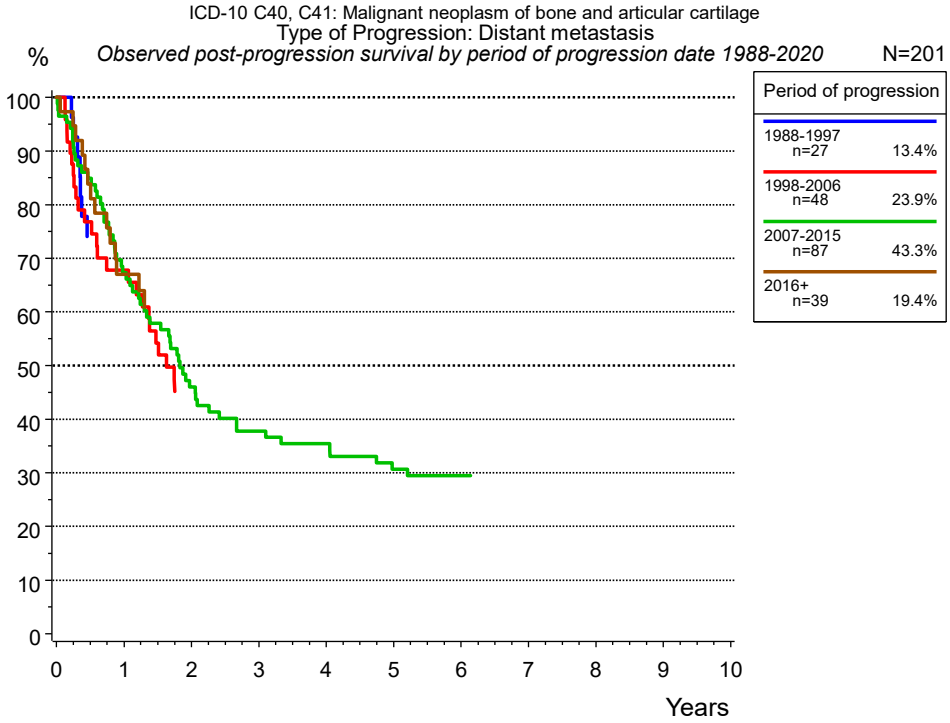

Figure 6e. Observed post-progression (distant metastasis) survival of 201 patients with bone cancer diagnosed between 1988 and 2020 by period of progression.

	Period of progression			
	1988-1997 n=27	1998-2006 n=48	2007-2015 n=87	2016+ n=39
Years	%	%	%	%
0	100.0	100.0	100.0	100.0
1		67.8	67.3	67.0
2			46.0	
3			37.8	
4			35.4	
5			30.7	
6			29.5	

Table 6f. Observed post-progression (distant metastasis) survival of patients with bone cancer for period 1988-2020 by period of progression (N=201).

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

Recommended Citation

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