# Munich Cancer Registry

- Incidence and Mortality
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- *Deutsch*

# ICD-10 C73: Thyroid cancer

## Survival

| | | |
|---|---|---|
| Year of diagnosis | 1988-1997 | 1998-2020 |
| Patients | 964 | 9,142 |
| Diseases | 968 | 9,206 |
| Cases evaluated | 888 | 8,046 |

| | |
|---|---|
| Creation date | 04/15/2022 |
| Database export | 12/20/2021 |
| Population | 4.92 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/surv/sC73__E-ICD-10-C73-Thyroid-cancer-survival.pdf

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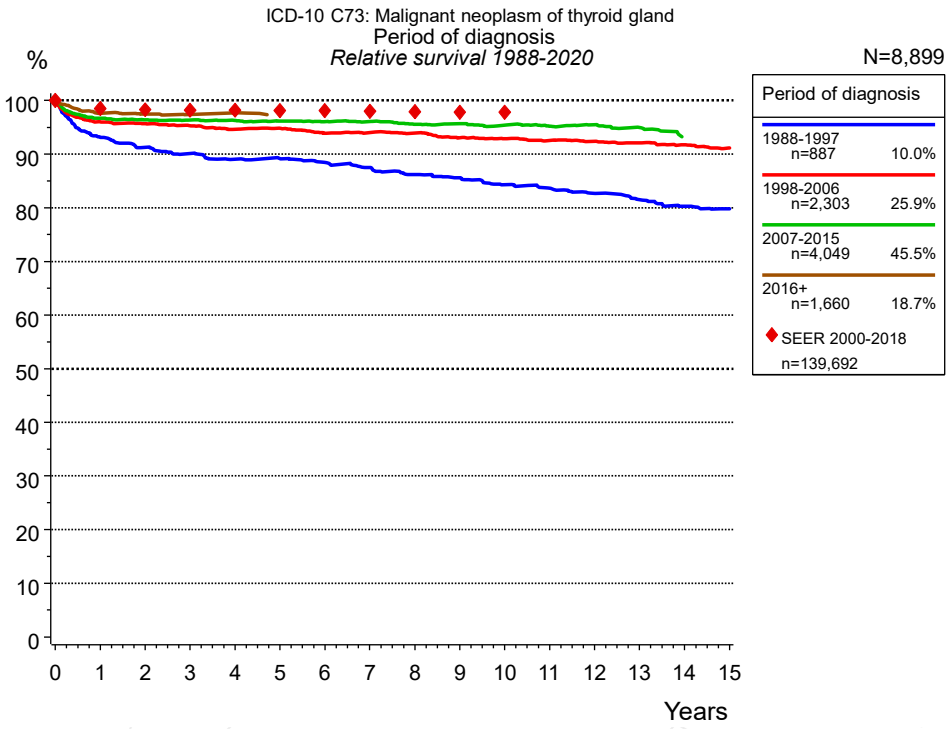


**Figure 1a.** Relative survival of patients with thyroid cancer by period of diagnosis. Included in the evaluation are 8,899 cases diagnosed between 1988 and 2020.

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=887 | | 1998-2006 n=2,303 | | 2007-2015 n=4,049 | | 2016+ n=1,660 | |
| 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 | 91.8 | 93.1 | 95.1 | 96.0 | 96.0 | 96.7 | 97.0 | 97.6 |
| 2 | 88.8 | 91.2 | 94.0 | 95.7 | 95.0 | 96.4 | 96.3 | 97.5 |
| 3 | 86.6 | 90.1 | 92.8 | 95.3 | 94.3 | 96.4 | 95.6 | 97.4 |
| 4 | 84.5 | 89.0 | 91.4 | 94.7 | 93.5 | 96.3 | 95.5 | 97.7 |
| 5 | 83.7 | 89.2 | 90.7 | 94.8 | 92.7 | 96.2 | | |
| 6 | 82.0 | 88.5 | 89.0 | 93.9 | 91.8 | 96.1 | | |
| 7 | 80.2 | 87.5 | 88.3 | 94.0 | 91.1 | 96.1 | | |
| 8 | 77.9 | 86.2 | 87.4 | 94.0 | 89.7 | 95.6 | | |
| 9 | 76.5 | 85.6 | 85.6 | 93.1 | 89.0 | 95.7 | | |
| 10 | 74.3 | 84.3 | 84.4 | 92.8 | 87.8 | 95.4 | | |
| 11 | 72.9 | 83.6 | 83.2 | 92.5 | 86.6 | 95.2 | | |
| 12 | 71.1 | 82.7 | 82.1 | 92.3 | 85.9 | 95.5 | | |
| 13 | 69.3 | 81.5 | 80.8 | 92.1 | 84.4 | 95.0 | | |
| 14 | 67.3 | 80.3 | 79.4 | 91.7 | | | | |
| 15 | 66.0 | 79.8 | 77.8 | 91.1 | | | | |
| Median | 25.4 | | | | | | | |

**Table 1b.** Observed (obs.) and relative (rel.) survival of patients with thyroid cancer by period of diagnosis for period 1988-2020 (N=8,899).

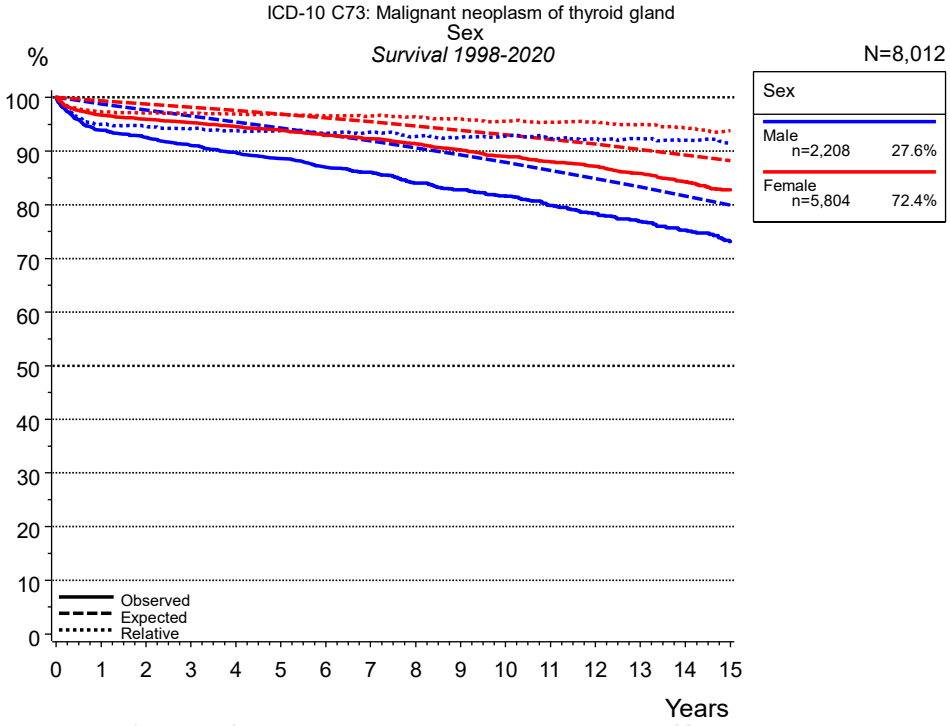


**Figure 2a.** Survival of patients with thyroid cancer by sex. Included in the evaluation are 8,012 cases diagnosed between 1998 and 2020.

| | Sex | | | |
|---|---|---|---|---|
| | Male n=2,208 | | Female n=5,804 | |
| Years | obs. % | rel. % | obs. % | rel. % |
| 0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1 | 93.9 | 95.0 | 96.7 | 97.3 |
| 2 | 92.5 | 94.6 | 96.0 | 97.1 |
| 3 | 91.0 | 94.2 | 95.3 | 97.1 |
| 4 | 89.7 | 93.9 | 94.6 | 96.9 |
| 5 | 88.6 | 93.9 | 93.9 | 96.9 |
| 6 | 86.9 | 93.3 | 92.9 | 96.5 |
| 7 | 86.1 | 93.6 | 92.3 | 96.6 |
| 8 | 84.1 | 92.8 | 91.4 | 96.4 |
| 9 | 82.8 | 92.6 | 90.2 | 96.0 |
| 10 | 81.6 | 92.8 | 89.0 | 95.6 |
| 11 | 79.8 | 92.4 | 88.0 | 95.4 |
| 12 | 78.4 | 92.3 | 87.2 | 95.5 |
| 13 | 76.9 | 92.3 | 85.8 | 95.0 |
| 14 | 75.3 | 92.0 | 84.3 | 94.3 |
| 15 | 73.1 | 91.5 | 82.8 | 93.8 |
| Median | | | | |

**Table 2b.** Observed (obs.) and relative (rel.) survival of patients with thyroid cancer by sex for period 1998-2020 (N=8,012).

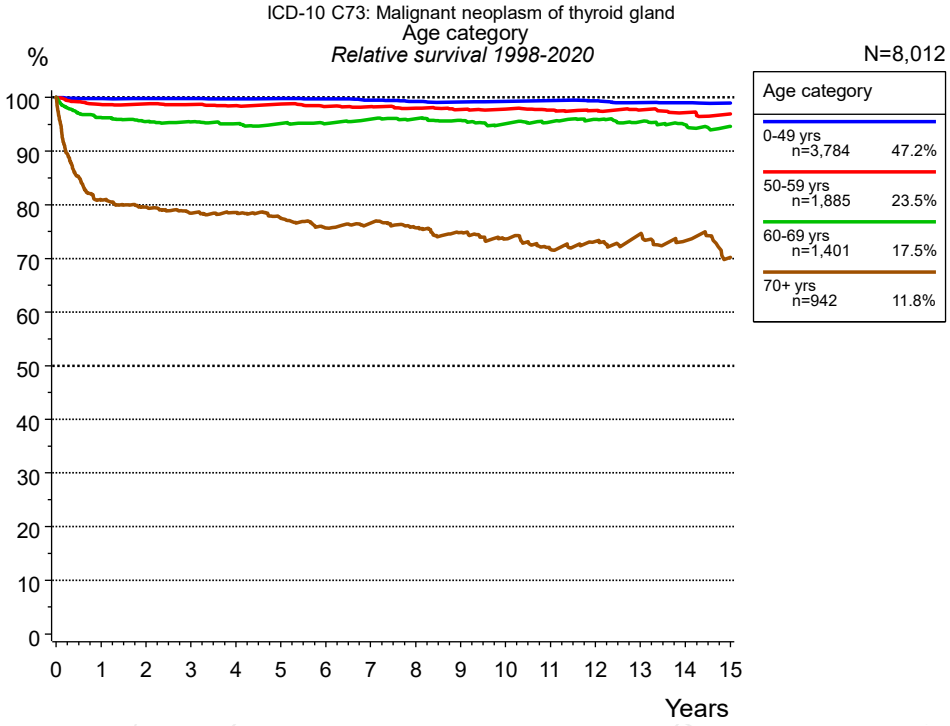


**Figure 3a.** Relative survival of patients with thyroid cancer by age category. Included in the evaluation are 8,012 cases diagnosed between 1998 and 2020.

| | Age category | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0-49 yrs n=3,784 | | 50-59 yrs n=1,885 | | 60-69 yrs n=1,401 | | 70+ yrs n=942 | |
| 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 | 99.7 | 99.8 | 98.3 | 98.7 | 95.4 | 96.3 | 77.6 | 80.9 |
| 2 | 99.6 | 99.8 | 98.0 | 98.8 | 93.5 | 95.5 | 73.7 | 79.6 |
| 3 | 99.5 | 99.8 | 97.3 | 98.7 | 92.4 | 95.5 | 69.8 | 78.4 |
| 4 | 99.3 | 99.7 | 96.6 | 98.5 | 90.9 | 95.1 | 67.1 | 78.6 |
| 5 | 99.2 | 99.8 | 96.3 | 98.8 | 89.7 | 95.2 | 63.3 | 77.5 |
| 6 | 99.0 | 99.7 | 95.2 | 98.3 | 88.4 | 95.2 | 59.1 | 75.7 |
| 7 | 98.6 | 99.5 | 94.6 | 98.3 | 87.7 | 96.0 | 56.9 | 76.6 |
| 8 | 98.1 | 99.2 | 93.6 | 98.0 | 86.2 | 96.0 | 53.3 | 75.8 |
| 9 | 97.9 | 99.2 | 92.6 | 97.8 | 84.4 | 95.8 | 49.6 | 74.9 |
| 10 | 97.8 | 99.3 | 91.8 | 97.8 | 82.1 | 95.1 | 45.7 | 73.7 |
| 11 | 97.6 | 99.4 | 90.8 | 97.6 | 80.4 | 95.5 | 41.3 | 71.7 |
| 12 | 97.3 | 99.4 | 89.8 | 97.6 | 78.8 | 95.9 | 39.0 | 73.2 |
| 13 | 96.7 | 99.0 | 88.8 | 97.7 | 76.3 | 95.5 | 36.5 | 74.6 |
| 14 | 96.4 | 99.0 | 87.4 | 97.2 | 73.5 | 95.0 | 32.4 | 73.3 |
| 15 | 96.0 | 98.9 | 86.1 | 96.9 | 70.7 | 94.6 | 28.1 | 70.2 |
| Median | | | | | 22.0 | | 8.8 | |

**Table 3b.** Observed (obs.) and relative (rel.) survival of patients with thyroid cancer by age category for period 1998-2020 (N=8,012).

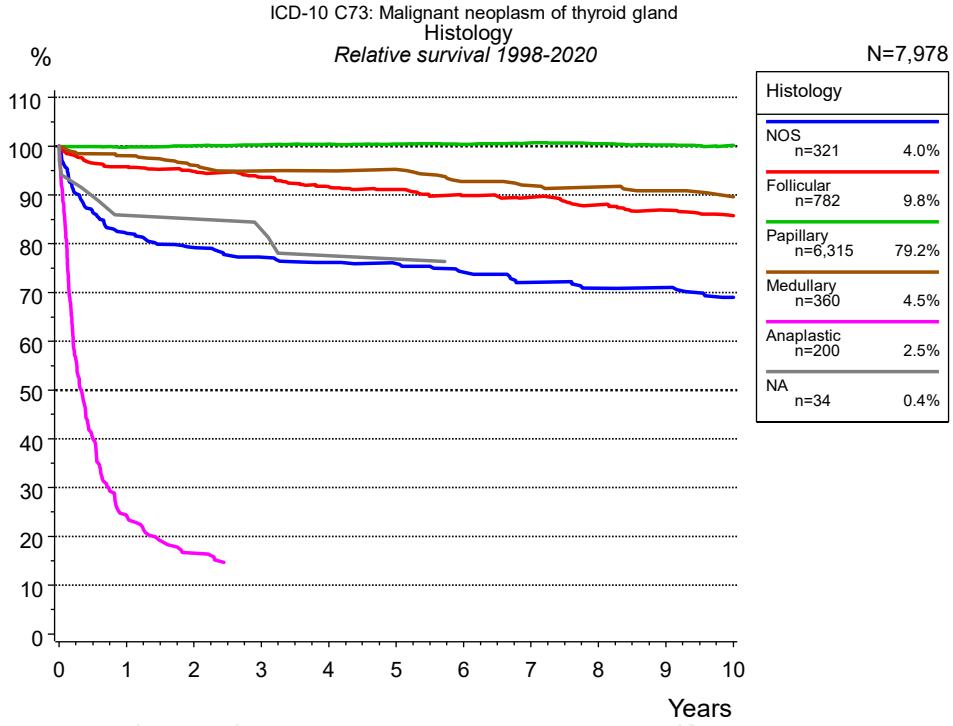


**Figure 4a.** Relative survival of patients with thyroid cancer by histology. For 7,978 of 8,012 cases diagnosed between 1998 and 2020 valid data could be obtained for this item. The grey line represents the subgroup of 34 patients with missing values regarding histology (0.4 % of 8,012 patients, the percent values of all other categories are related to n=7,978).

| | Histology | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NOS n=321 | | Follicular n=782 | | Papillary n=6,315 | | Medullary n=360 | | Anaplastic n=200 | | NA n=34 | |
| Years | 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 |
| 1 | 80.9 | 82.1 | 94.5 | 95.8 | 99.3 | 99.8 | 97.4 | 98.1 | 23.3 | 24.2 | 85.0 | 85.9 |
| 2 | 77.0 | 79.2 | 92.2 | 94.8 | 99.0 | 100.1 | 94.8 | 96.1 | 15.5 | 16.5 | 85.0 | 85.1 |
| 3 | 73.9 | 77.2 | 89.8 | 93.7 | 98.5 | 100.3 | 92.9 | 95.0 | | | 81.9 | 82.9 |
| 4 | 72.1 | 76.2 | 86.6 | 91.7 | 98.0 | 100.4 | 92.3 | 95.0 | | | 75.4 | 77.6 |
| 5 | 71.0 | 75.9 | 84.8 | 91.1 | 97.4 | 100.4 | 91.6 | 95.2 | | | 75.4 | 76.9 |
| 6 | 68.6 | 74.2 | 82.3 | 89.9 | 96.6 | 100.4 | 88.4 | 92.7 | | | 72.2 | 76.5 |
| 7 | 65.7 | 72.1 | 80.7 | 89.5 | 96.1 | 100.7 | 87.1 | 91.9 | | | 72.2 | 76.9 |
| 8 | 63.9 | 70.9 | 78.0 | 88.0 | 95.1 | 100.5 | 86.1 | 91.6 | | | | |
| 9 | 63.5 | 71.0 | 75.7 | 86.9 | 94.0 | 100.3 | 84.6 | 90.9 | | | | |
| 10 | 60.6 | 69.0 | 73.1 | 85.8 | 93.0 | 100.2 | 83.4 | 89.6 | | | | |
| Median | 17.8 | | 19.9 | | | | | | 0.3 | | | |

**Table 4b.** Observed (obs.) and relative (rel.) survival of patients with thyroid cancer by histology for period 1998-2020 (N=7,978).

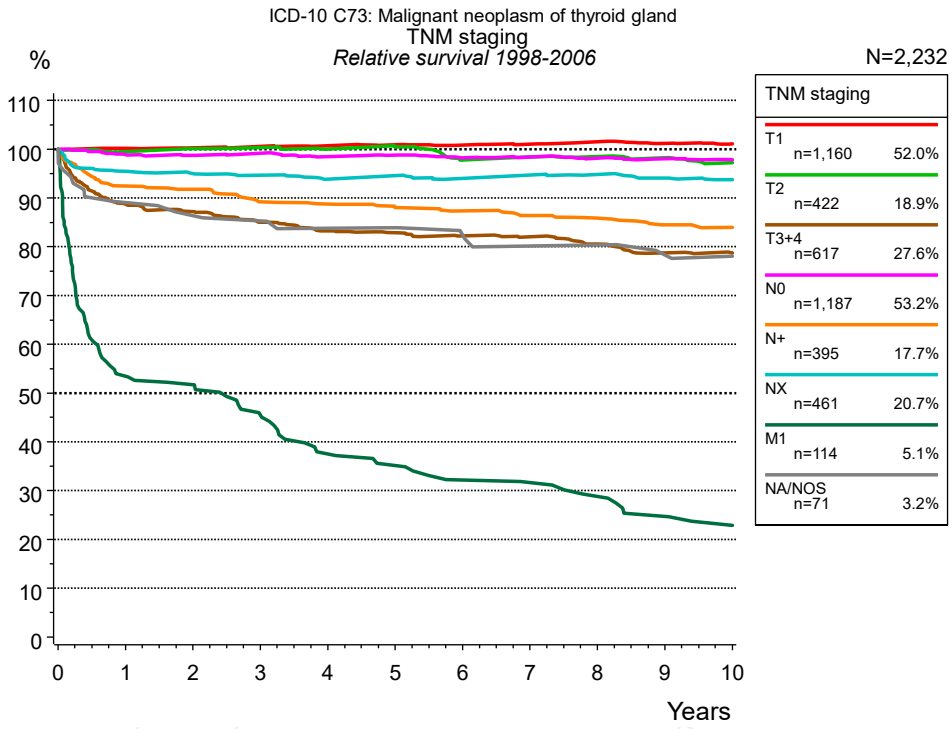


**Figure 4c.** Relative survival of patients with thyroid cancer by TNM staging. For 2,234 of 2,303 cases diagnosed between 1998 and 2006 valid data could be obtained for this item. For a total of 2,232 cases an evaluable classification was established. The accumulated percentage exceeds the 100 % value because patients are potientially considered in more than one subgroup. The grey line represents the subgroup of 71 patients with missing values regarding TNM staging (3.1 % of 2,303 patients, the percent values of all other categories are related to n=2,232).

Due to substantial changes in stage classification schemes long-term survival statistics over decades could not be created.

| | TNM staging | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | T1 n=1,160 | | T2 n=422 | | T3+4 n=617 | | N0 n=1,187 | | N+ n=395 | | NX n=461 | | M1 n=114 | |
| 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 | 99.7 | 100.2 | 98.8 | 99.5 | 87.3 | 88.8 | 98.1 | 98.9 | 91.9 | 92.5 | 94.6 | 95.5 | 52.6 | 53.5 |
| 2 | 99.2 | 100.3 | 98.5 | 100.1 | 84.8 | 87.2 | 97.2 | 98.7 | 90.5 | 91.8 | 93.3 | 95.0 | 50.0 | 51.7 |
| 3 | 98.9 | 100.6 | 98.0 | 100.3 | 81.5 | 85.0 | 96.8 | 99.2 | 87.2 | 89.2 | 92.1 | 94.7 | 42.8 | 45.6 |
| 4 | 98.3 | 100.7 | 96.7 | 100.0 | 78.9 | 83.2 | 95.3 | 98.5 | 86.4 | 88.7 | 90.2 | 93.9 | 34.8 | 37.5 |
| 5 | 97.8 | 100.9 | 96.2 | 100.4 | 77.7 | 82.9 | 94.8 | 98.8 | 85.0 | 88.0 | 90.2 | 94.6 | 32.1 | 35.2 |
| 6 | 97.0 | 100.9 | 92.7 | 97.8 | 76.1 | 82.2 | 93.3 | 98.2 | 83.8 | 87.3 | 88.6 | 94.0 | 28.6 | 32.2 |
| 7 | 96.4 | 101.0 | 92.5 | 98.4 | 75.0 | 82.0 | 92.7 | 98.4 | 82.4 | 86.4 | 88.3 | 94.7 | 27.7 | 31.6 |
| 8 | 96.0 | 101.5 | 91.6 | 98.5 | 72.8 | 80.5 | 91.5 | 98.2 | 81.5 | 85.9 | 87.4 | 94.9 | 25.0 | 28.8 |
| 9 | 94.8 | 101.2 | 90.6 | 98.3 | 70.1 | 78.7 | 90.4 | 98.0 | 79.4 | 84.6 | 85.7 | 94.1 | 21.4 | 24.7 |
| 10 | 93.8 | 101.1 | 88.6 | 97.2 | 69.2 | 78.8 | 89.2 | 97.9 | 78.5 | 84.0 | 84.2 | 93.8 | 18.7 | 22.8 |
| Median | | | | | 20.1 | | | | | | | | 1.6 | |

| **TNM staging** *cont'd* | NA/NOS n=71 | |
|---|---|---|
| Years | obs. % | rel. % |
| 0 | 100.0 | 100.0 |
| 1 | 88.3 | 89.1 |
| 2 | 85.3 | 86.4 |
| 3 | 83.7 | 85.3 |
| 4 | 80.5 | 83.8 |
| 5 | 80.5 | 83.9 |
| 6 | 77.3 | 82.3 |
| 7 | 74.0 | 80.2 |
| 8 | 74.0 | 80.4 |
| 9 | 70.8 | 78.4 |
| 10 | 69.1 | 78.0 |
| Median | 21.7 | |

**Table 4d.** Observed (obs.) and relative (rel.) survival of patients with thyroid cancer by TNM staging for period 1998-2006 (N=2,232).

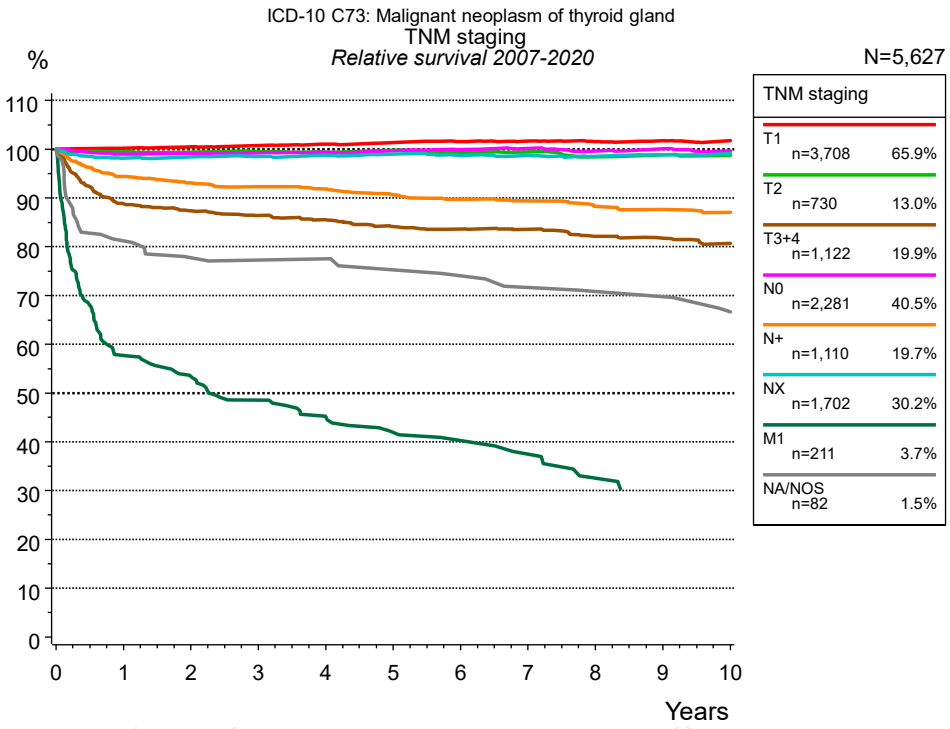


**Figure 4e.** Relative survival of patients with thyroid cancer by TNM staging. For 5,630 of 5,709 cases diagnosed between 2007 and 2020 valid data could be obtained for this item. For a total of 5,627 cases an evaluable classification was established. The accumulated percentage exceeds the 100 % value because patients are potientially considered in more than one subgroup. The grey line represents the subgroup of 82 patients with missing values regarding TNM staging (1.4 % of 5,709 patients, the percent values of all other categories are related to n=5,627).

Due to substantial changes in stage classification schemes long-term survival statistics over decades could not be created.

| | TNM staging | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | T1 n=3,708 | | T2 n=730 | | T3+4 n=1,122 | | N0 n=2,281 | | N+ n=1,110 | | NX n=1,702 | | M1 n=211 | |
| 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 | 99.7 | 100.2 | 99.0 | 99.5 | 87.7 | 88.8 | 98.5 | 99.0 | 93.8 | 94.4 | 97.4 | 98.2 | 56.4 | 57.7 |
| 2 | 99.5 | 100.5 | 98.4 | 99.4 | 85.3 | 87.4 | 98.1 | 99.1 | 92.0 | 93.1 | 96.9 | 98.4 | 50.8 | 53.4 |
| 3 | 99.1 | 100.7 | 97.9 | 99.5 | 83.5 | 86.4 | 97.6 | 99.3 | 90.7 | 92.3 | 96.2 | 98.5 | 45.6 | 48.6 |
| 4 | 98.8 | 101.0 | 97.2 | 99.4 | 81.9 | 85.6 | 97.1 | 99.3 | 89.9 | 91.9 | 95.6 | 98.8 | 41.3 | 45.1 |
| 5 | 98.4 | 101.3 | 97.1 | 99.8 | 79.7 | 84.2 | 96.7 | 99.7 | 88.2 | 90.7 | 95.1 | 99.0 | 37.9 | 41.9 |
| 6 | 97.8 | 101.5 | 95.8 | 99.3 | 78.5 | 83.6 | 96.3 | 99.9 | 86.8 | 89.8 | 93.8 | 98.7 | 36.3 | 40.3 |
| 7 | 97.2 | 101.7 | 95.3 | 99.4 | 77.6 | 83.6 | 95.8 | 100.2 | 85.9 | 89.4 | 93.0 | 98.7 | 33.1 | 37.5 |
| 8 | 96.3 | 101.6 | 93.5 | 98.5 | 75.3 | 82.1 | 94.5 | 99.6 | 84.3 | 88.3 | 91.7 | 98.5 | 28.2 | 32.5 |
| 9 | 95.6 | 101.7 | 93.2 | 98.8 | 74.2 | 81.8 | 94.1 | 100.2 | 83.4 | 87.6 | 91.0 | 98.9 | | |
| 10 | 94.6 | 101.8 | 92.1 | 98.7 | 72.3 | 80.7 | 92.7 | 99.7 | 82.3 | 87.1 | 90.1 | 99.2 | | |
| Median | | | | | | | | | | | | | 2.1 | |

| **TNM staging** *cont'd* | NA/NOS n=82 | |
|---|---|---|
| Years | obs. % | rel. % |
| 0 | 100.0 | 100.0 |
| 1 | 79.5 | 81.2 |
| 2 | 74.4 | 77.8 |
| 3 | 73.1 | 77.3 |
| 4 | 73.1 | 77.5 |
| 5 | 68.8 | 75.3 |
| 6 | 67.3 | 74.0 |
| 7 | 64.1 | 71.6 |
| 8 | 62.5 | 70.8 |
| 9 | 62.5 | 69.8 |
| 10 | 57.8 | 66.6 |
| Median | | |

**Table 4f.** Observed (obs.) and relative (rel.) survival of patients with thyroid cancer by TNM staging for period 2007-2020 (N=5,627).

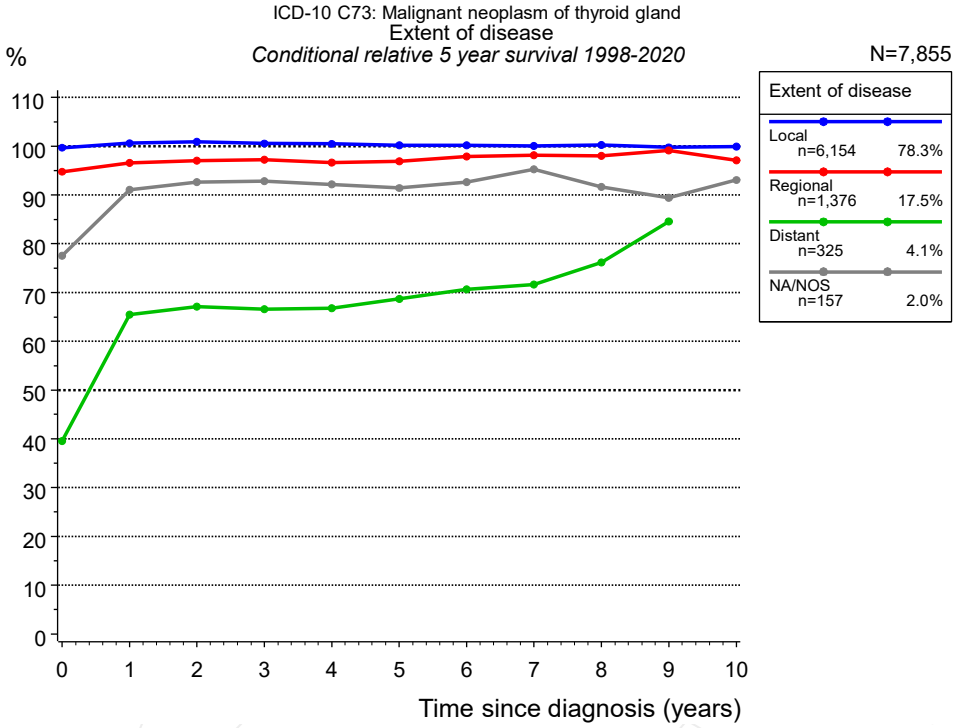


**Figure 4g.** Conditional relative 5-year survival of patients with thyroid cancer by extent of disease. For 7,864 of 8,012 cases diagnosed between 1998 and 2020 valid data could be obtained for this item. For a total of 7,855 cases an evaluable classification was established. The grey line represents the subgroup of 157 patients with missing values regarding extent of disease (2.0 % of 8,012 patients, the percent values of all other categories are related to n=7,855).

| | Extent of disease | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Local | | Regional | | Distant | | NA/NOS | |
| Years | n | Cond. surv. % 5 yrs | n | Cond. surv. % 5 yrs | n | Cond. surv. % 5 yrs | n | Cond. surv. % 5 yrs |
| 0 | 6,154 | 99.8 | 1,376 | 94.8 | 325 | 39.6 | 157 | 77.6 |
| 1 | 5,672 | 100.6 | 1,263 | 96.6 | 173 | 65.5 | 123 | 91.0 |
| 2 | 5,448 | 100.9 | 1,198 | 97.1 | 155 | 67.1 | 111 | 92.6 |
| 3 | 5,112 | 100.6 | 1,081 | 97.3 | 126 | 66.6 | 106 | 92.9 |
| 4 | 4,786 | 100.5 | 978 | 96.7 | 103 | 66.8 | 101 | 92.2 |
| 5 | 4,462 | 100.2 | 880 | 96.9 | 86 | 68.7 | 98 | 91.5 |
| 6 | 4,110 | 100.2 | 796 | 97.9 | 71 | 70.6 | 91 | 92.6 |
| 7 | 3,845 | 100.1 | 724 | 98.1 | 60 | 71.6 | 85 | 95.3 |
| 8 | 3,502 | 100.2 | 643 | 98.0 | 51 | 76.2 | 79 | 91.7 |
| 9 | 3,189 | 99.8 | 571 | 99.1 | 42 | 84.6 | 71 | 89.4 |
| 10 | 2,887 | 99.9 | 493 | 97.1 | | | 66 | 93.1 |

**Table 4h.** Conditional relative 5-year survival of patients with thyroid cancer by extent of disease for period 1998-2020 (N=7,855).

Conditional relative survival rates refer to the relative survival probability, in this case for 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 4e). 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 extent of disease="Local", who are alive at least 3 years after cancer diagnosis, the conditional relative 5-year survival rate is 100.6% (n=5,112).

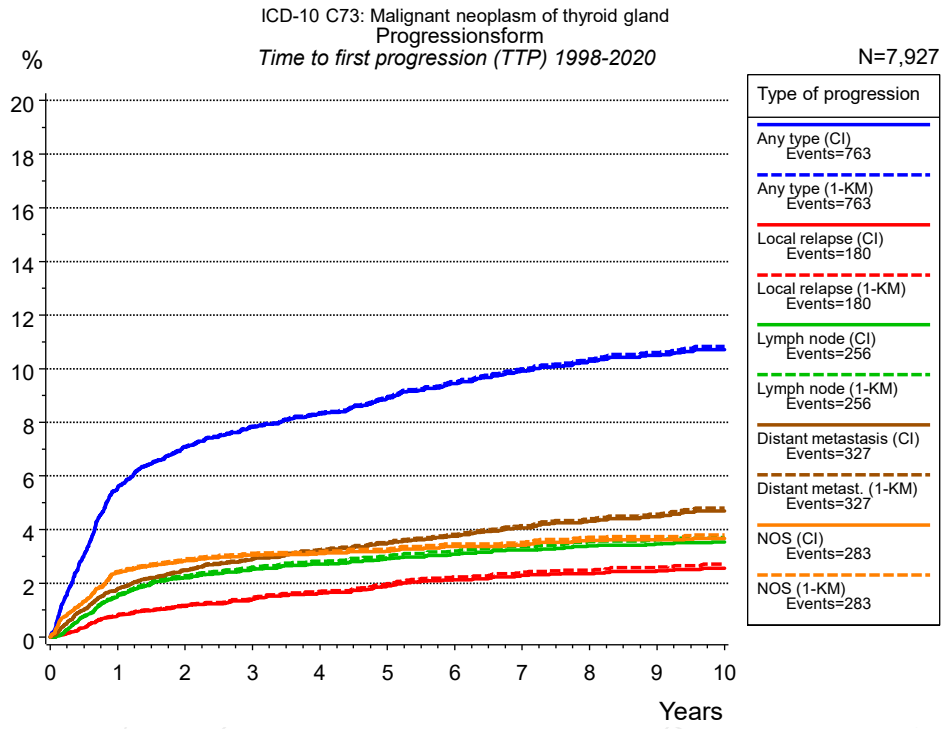


**Figure 5a.** Time to first progression of 7,927 patients with thyroid cancer diagnosed between 1998 and 2020 (in solid cancers M0 only) estimated by cumulative incidence function (CI, solid line) accounting for death as competing risk and by inverse Kaplan-Meier estimate (1-KM, dashed line). The frequency 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 | 7,609 | 7,609 | 7,927 | 7,927 | 7,927 | 7,927 | 7,609 |
| Events | 725 | 725 | 171 | 171 | 246 | 246 | 304 |
| compet. | 312 | | 751 | | 764 | | 416 |
| Years | % | % | % | % | % | % | % |
| 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1 | 5.6 | 5.6 | 0.8 | 0.8 | 1.5 | 1.6 | 1.8 |
| 2 | 7.1 | 7.1 | 1.1 | 1.2 | 2.2 | 2.3 | 2.5 |
| 3 | 7.8 | 7.9 | 1.4 | 1.4 | 2.5 | 2.6 | 2.9 |
| 4 | 8.3 | 8.3 | 1.6 | 1.7 | 2.7 | 2.8 | 3.2 |
| 5 | 8.9 | 9.0 | 1.9 | 2.0 | 2.9 | 3.0 | 3.5 |
| 6 | 9.4 | 9.5 | 2.1 | 2.2 | 3.1 | 3.2 | 3.8 |
| 7 | 9.9 | 10.0 | 2.3 | 2.4 | 3.2 | 3.4 | 4.1 |
| 8 | 10.3 | 10.4 | 2.4 | 2.5 | 3.4 | 3.6 | 4.3 |
| 9 | 10.5 | 10.6 | 2.5 | 2.6 | 3.5 | 3.6 | 4.5 |
| 10 | 10.7 | 10.8 | 2.6 | 2.7 | 3.5 | 3.7 | 4.7 |

| | Type of progression | | |
|---|---|---|---|
| *cont'd* | Distant metast. (1-KM) | NOS (CI) | NOS (1-KM) |
| N | 7,609 | 7,927 | 7,927 |
| Events | 304 | 266 | 266 |
| compet. | | 724 | |
| Years | % | % | % |
| 0 | 0.0 | 0.0 | 0.0 |
| 1 | 1.8 | 2.4 | 2.4 |
| 2 | 2.5 | 2.8 | 2.9 |
| 3 | 2.9 | 3.0 | 3.1 |
| 4 | 3.3 | 3.1 | 3.2 |
| 5 | 3.6 | 3.2 | 3.3 |
| 6 | 3.8 | 3.4 | 3.5 |
| 7 | 4.1 | 3.4 | 3.5 |
| 8 | 4.4 | 3.6 | 3.7 |
| 9 | 4.6 | 3.6 | 3.7 |
| 10 | 4.8 | 3.7 | 3.8 |

**Table 5b.** Time to first progression of patients with thyroid cancer for period 1998-2020 (N=7,927), also showing the total of progression events (Events) and of deaths as competing risk (compet.).

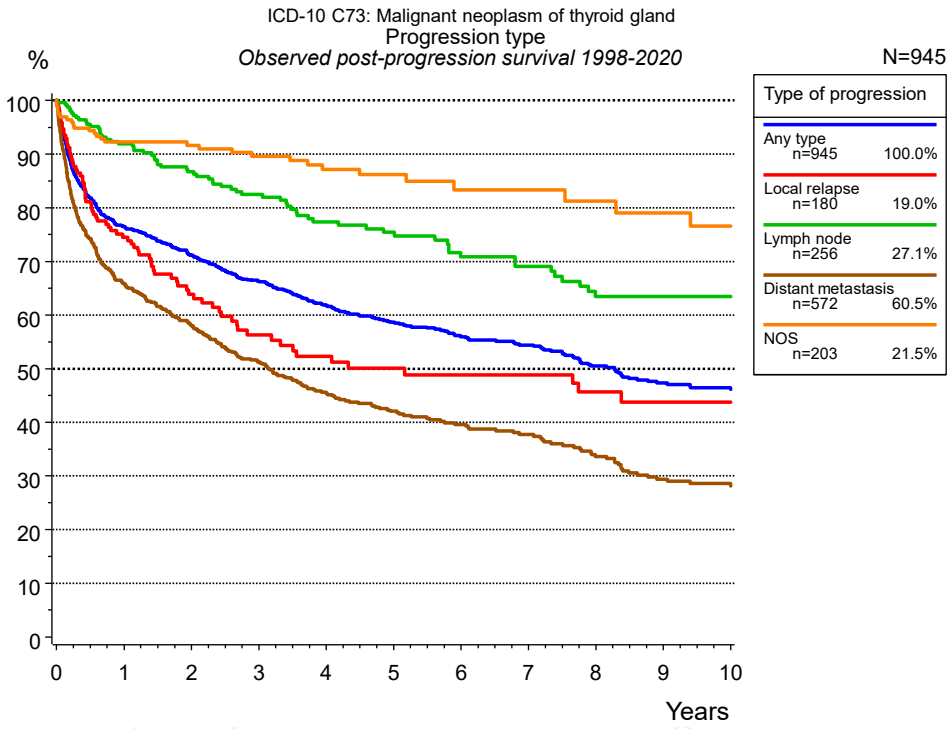


**Figure 5c.** Observed post-progression survival of 945 patients with thyroid cancer diagnosed between 1998 and 2020. These 945 patients with documented progression events during their course of disease represent 11.9 % of the totally 7,927 evaluated cases (incl. M1, n=318, 4.0 %). Patients with cancer relapse documented via death certificates only were excluded (n=136, 1.7 %). 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.

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 | Lymph node | Distant metastasis | NOS |
| | n=945 | n=180 | n=256 | n=572 | n=203 |
| Years | % | % | % | % | % |
| 0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1 | 76.6 | 74.5 | 91.9 | 65.9 | 92.2 |
| 2 | 71.1 | 63.9 | 86.7 | 58.0 | 91.6 |
| 3 | 66.3 | 56.3 | 82.5 | 51.2 | 89.6 |
| 4 | 61.7 | 52.3 | 77.4 | 45.4 | 87.2 |
| 5 | 58.7 | 50.1 | 75.4 | 42.0 | 86.2 |
| 6 | 55.9 | 48.8 | 70.8 | 39.6 | 83.3 |
| 7 | 54.4 | 48.8 | 69.1 | 37.7 | 83.3 |
| 8 | 50.5 | 45.7 | 63.4 | 33.6 | 81.2 |
| 9 | 47.3 | 43.8 | 63.4 | 29.4 | 79.0 |
| 10 | 46.1 | 43.8 | 63.4 | 28.1 | 76.6 |

**Table 5d.** Observed post-progression survival of patients with thyroid cancer for period 1998-2020 (N=945).

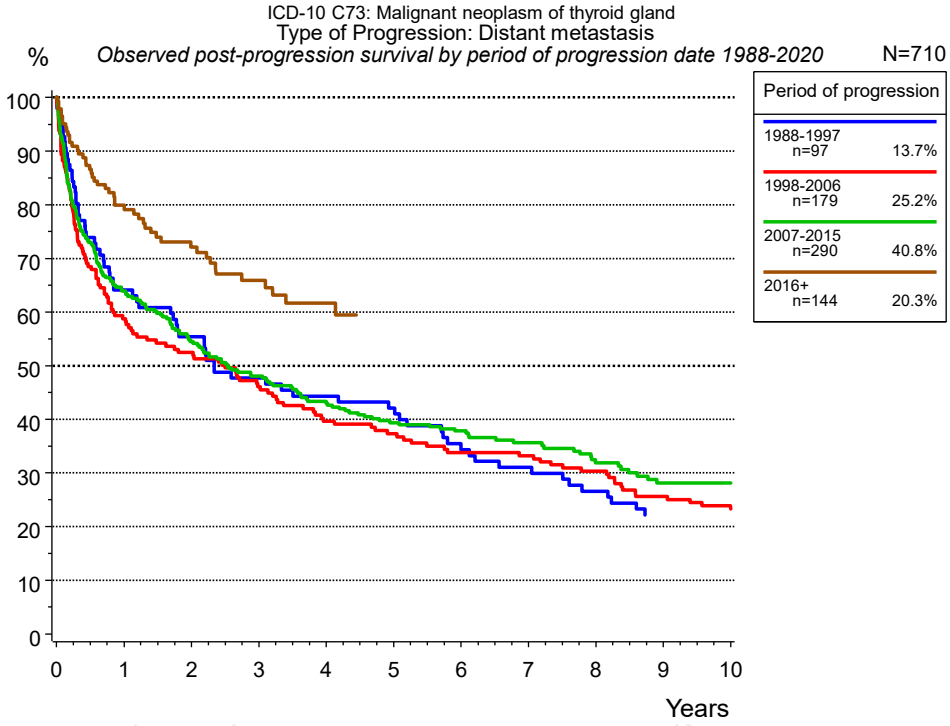


**Figure 5e.** Observed post-progression (distant metastasis) survival of 710 patients with thyroid cancer diagnosed between 1988 and 2020 by period of progression.

| | Period of progression | | | |
|---|---|---|---|---|
| | 1988-1997 n=97 | 1998-2006 n=179 | 2007-2015 n=290 | 2016+ n=144 |
| Years | % | % | % | % |
| 0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1 | 64.1 | 58.8 | 64.0 | 79.9 |
| 2 | 55.4 | 52.5 | 54.5 | 72.1 |
| 3 | 47.7 | 46.1 | 48.1 | 65.9 |
| 4 | 44.3 | 39.6 | 43.0 | 61.7 |
| 5 | 42.1 | 37.3 | 39.3 | |
| 6 | 35.5 | 33.8 | 37.8 | |
| 7 | 31.0 | 33.2 | 35.6 | |
| 8 | 26.6 | 30.3 | 31.9 | |
| 9 | 22.2 | 25.7 | 28.1 | |
| 10 | | 23.3 | 28.1 | |

**Table 5f.** Observed post-progression (distant metastasis) survival of patients with thyroid cancer for period 1988-2020 by period of progression (N=710).

**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)<br>Date of entry: diagnosis<br>Event: death from any cause |
| RS | Relative survival | Survival compared to “general population”,<br>ratio of observed to expected survival (Ederer II method),<br>reflecting cancer specific survival |
| AS | Assembled survival | Assembled chart of<br>observed, expected, relative survival |
| CS | Conditional survival | Survival probability under the condition of surviving<br>a given period of time |
| TTP | Time to progression | Time to first progression / relapse<br>Date of entry: diagnosis<br>Event: (progression / relapse): first local-, lymph node recurrence, distant metastasis or unspecified progression |
| | 1-KM | 1 minus Kaplan-Meier estimator<br>(“inverse” Kaplan-Meier estimator) |
| | CI | Cumulative incidence<br>Death as competing risk (according to Kalbfleisch und Prentice) |
| PPS | Post-progression survival | Survival since first progression / relapse (Kaplan-Meier estimate)<br>Date of entry (progression / relapse): first local-, lymph node recurrence, distant metastasis or unspecified progression<br>Event: death from any cause |

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