**Supplementary Table 2.** Univariate and Multivariate Cox Proportional Hazards Regression Model Highlighting Cancer Specific Survival in the Parathyroid Carcinoma Patient Population with Dichotomous tumor size.

|                | Univariate |          |          | Multivariate |          |          |
|----------------|------------|----------|----------|--------------|----------|----------|
|                | HR (95% CI)| P        | HR (95% CI)| P            |          |          |
| Age (year)     | 1.03 (1.01-1.06) | 0.014    | 1.03 (1.00-1.05) | 0.028      |          |          |
| Gender         |            |          |          |              |          |          |
| Male           | 1 (referent) |          |          |              |          |          |
| Female         | 1.14 (0.58-2.24) | 0.711    |          |              |          |          |
| Race           |            |          |          |              |          |          |
| White          | 1 (referent) |          |          |              |          |          |
| Black          | 1.88 (0.81-4.36) | 0.142    |          |              |          |          |
| Other          | 1.66 (0.47-5.83) | 0.427    |          |              |          |          |
| Grade          |            |          |          |              |          |          |
| Unknown        | 1 (referent) |          |          |              |          |          |
| Well differentiated; Grade I | 0.30 (0.04-2.25) | 0.240    |          |              |          |          |
| SEER stage     |            |          |          |              |          |          |
| Localized      | 1 (referent) |          |          |              |          |          |
| Unknown        | 3.99 (0.85-18.71) | 0.080    |          |              |          |          |
| Regional       | 2.14 (0.77-5.90) | 0.143    |          |              |          |          |
| Distance       | 3.26 (0.68-15.57) | 0.138    |          |              |          |          |
| Tumor size     |            |          |          |              |          |          |
| <3cm           | 1 (referent) |          |          |              |          |          |
| ≥3cm           | 3.90 (1.53-9.92) | 0.004    | 4.49 (1.81-11.17) | 0.001      |          |          |
| Lymph nodes involvement |            |          |          |              |          |          |
| No reginl lymph node involvement | 1 (referent) |          | 1 (referent) |              |          |          |
| Unknown        | 0.21 (0.04-1.25) | 0.087    | 0.19 (0.04-0.97) | 0.045      |          |          |
| Yes            | 1.46 (0.22-9.63) | 0.692    | 2.22 (0.34-14.77) | 0.408      |          |          |
| Distant metastasis |            |          |          |              |          |          |
| No distant metastasis | 1 (referent) |          | 1 (referent) |              |          |          |
| Unknown        | 2.90 (0.56-15.09) | 0.207    | 4.96 (1.09-22.48) | 0.038      |          |          |
| Yes            | 7.00 (0.77-63.77) | 0.084    | 9.55 (1.66-54.97) | 0.012      |          |          |
| Primary surgery |            |          |          |              |          |          |
| Parathyroidectomy | 1 (referent) |          | 1 (referent) |              |          |          |
| En-bloc resection | 1.46 (0.69-3.10) | 0.327    | 1.37 (0.66-2.86) | 0.403      |          |          |
| No surgery     | 9.01 (2.64-30.75) | 0.000    | 11.89 (3.80-37.21) | 0.000      |          |          |
| Debulking surgery, NOS | 3.97 (1.15-13.73) | 0.029    | 4.93 (1.56-15.61) | 0.007      |          |          |
| Lymph node dissection |            |          |          |              |          |          |
| Lymph node dissection not performed | 1 (referent) |          | 1 (referent) |              |          |          |
| Unknown        | 3.61 (1.19-10.95) | 0.023    | 3.69 (1.33-10.23) | 0.012      |          |          |
| Yes            | 0.82 (0.27-2.48) | 0.725    | 0.74 (0.25-2.20) | 0.592      |          |          |
| Radiation      |            |          |          |              |          |          |
| None/Unknown   | 1 (referent) |          |          |              |          |          |
| Beam radiation | 1.45 (0.47-4.42) | 0.516    |          |              |          |          |
| Systemic therapy |            |          |          |              |          |          |
| No             | 1 (referent) |          |          |              |          |          |
| Unknown        | 0.48 (0.19-1.22) | 0.122    |          |              |          |          |
| Yes            | 0.71 (0.09-5.57) | 0.742    |          |              |          |          |

Abbreviations: HR, hazard ratio; CI, confidential interval; SEER, Surveillance, Epidemiology, and End Results Program; Others, American Indian/Alaska Native, Asian/Pacific Islander.