

**Supplementary Table S1. Demographics and tumor type of the anti-PD-(L)1 monotherapy cohort**

| <b>Variable</b>                     | <b>Statistic</b>  | <b>anti-PD-(L)1 mono validation cohort<br/>n (%)</b>            |
|-------------------------------------|---|---|
| <b>Age (yrs)</b>                    | n<br>median<br>(IQR)  | 352<br>67 (59-74)   |
| <b>Sex</b>                          | n (%)<br>Female<br>Male   | 158 (44.9%)<br>194 (55.1%)                                      |
| <b>Race</b>                         | n (%)<br>Asian<br>Black or African American<br>Other<br>Unknown, Missing, or Not Reported<br>White or Caucasian | 3 (0.9%)<br>27 (7.7%)<br>11 (3.1%)<br>91 (25.9%)<br>220 (62.5%) |
| <b>Ethnicity</b>                    | n (%)<br>Hispanic or Latino<br>Not Hispanic or Latino<br>Unknown, Missing, or Not Reported                      | 5 (1.4%)<br>239 (67.9%)<br>108 (30.7%)                          |
| <b>Anti-PD-(L)1 line of therapy</b> | n (%)<br>1<br>2<br>3+   | 245 (69.6%)<br>71 (20.2%)<br>36 (10.2%)                         |
| <b>Anti-PD-(L)1 therapy type</b>    | n (%)<br>pembrolizumab<br>other anti-PD-(L)1 therapy  | 288 (81.8%)<br>64 (18.2%)                                       |
| <b>Primary Tumor Type</b>           | n (%)   |   |
| Adrenocortical Carcinoma            | 1 (0.3%)  |   |
| Ampullary Carcinoma                 | 1 (0.3%)  |   |
| Appendiceal Cancer                  | 1 (0.3%)  |   |
| Bladder Cancer                      | 30 (8.5%)   |   |
| Breast Cancer                       | 9 (2.6%)  |   |
| Cancer of Unknown Primary           | 37 (10.5%)  |   |
| Cervical Cancer                     | 6 (1.7%)  |   |
| Colorectal Cancer                   | 14 (4.0%)   |   |
| Endometrial Cancer                  | 6 (1.7%)  |   |
| Esophagogastric Cancer              | 19 (5.4%)   |   |
| Glioma                              | 1 (0.3%)  |   |
| Head and Neck Cancer                | 24 (6.8%)   |   |
| Hepatobiliary Cancer                | 5 (1.4%)  |   |
| Lymphoma                            | 1 (0.3%)  |   |
| Melanoma                            | 26 (7.4%)   |   |
| Mesothelioma                        | 1 (0.3%)  |   |
| Non-Small Cell Lung Cancer          | 110 (31.2%)   |   |
| Other Cancer                        | 5 (1.4%)  |   |
| Ovarian Cancer                      | 4 (1.1%)  |   |
| Pancreatic Cancer                   | 4 (1.1%)  |   |
| Penile Cancer                       | 1 (0.3%)  |   |
| Prostate Cancer                     | 2 (0.6%)  |   |
| Renal Cell Carcinoma                | 7 (2.0%)  |   |
| Salivary Gland Cancer               | 2 (0.6%)  |   |
| Sarcoma                             | 10 (2.8%)   |   |
| Skin Cancer, Non-Melanoma           | 12 (3.4%)   |   |
| Small Bowel Cancer                  | 1 (0.3%)  |   |
| Small Cell Lung Cancer              | 7 (2.0%)  |   |
| Thymic Tumor                        | 1 (0.3%)  |   |
| Thyroid Cancer                      | 1 (0.3%)  |   |
| Vaginal Cancer                      | 3 (0.9%)  |   |

Demographics and tumor types for all included patients in the monotherapy validation cohort including age (in years), sex, self reported race, self reported ethnicity, and the anti-PD-(L)1 line of systemic therapy. The StrataNGS CGP assigned primary tumor type for each patient is provided. n= sample size, %= percentage, IQR = interquartile range.