**Supplementary Table 1:** Data availability of four renal cancer cohorts.

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Cohort** | **Grade** | **Stage** | **Size (cm)** | **Histology/ Subtype** | **Tumor Pathology** | **Race/ Ethnicity** | **Sex/ Gender** |
| **PUF** | Yes | Yes | Yes | Yes (all malignant) | Yes | Yes | Yes |
| **Tertiary** | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **TCGA KIRC** | Yes | Yes | Yes | No  (all clear cell) | No  (all ccRCC) | Yes | Yes |
| **KiTS19** | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

*PUF: Participant User File; Tertiary: Tertiary hospital surgical cohort* [27]*; TCGA KIRC: The Cancer Genome Atlas Kidney Renal Clear Cell Carcinoma* [25]*; KiTS19: Kidney Tumor Segmentation Challenge (2019)* [26]