

Comparison of Demographics and Clinical Characteristics using Real World Data from Tempus Multimodal Database and SEER Cancer Registry Across 17 Solid Cancer Cohorts

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INTRODUCTION

- Tempus data is a valuable resource for real world evidence generation that is leveraged to support research and drug development efforts as a complement to clinical trials.
- The Tempus database consists of de-identified longitudinal clinical data collected and abstracted from electronic health records of cancer patients who undergo sequencing at Tempus from ~65% of US academic medical centers and several hundred community institutions.
- The Surveillance, Epidemiology, and End Results Program (SEER) database is a well-known source for population cancer surveillance and research in the US.
- This study aimed to benchmark the Tempus database against the SEER cancer registry.

METHODS

- A total of 63,520 patients from the Tempus database and 1,949,880 patients from the SEER database were analyzed. Tempus data was pulled in Dec 2024.
- Patients included in the study were:
 - Diagnosed with a Bladder, Brain, Breast, Cervical, Colorectal, Endometrial, Gallbladder & Biliary tract cancer (BTC), Gastroesophageal, Hepatocellular carcinoma (HCC), Head and neck squamous cell carcinoma (HNSCC), Melanoma, Non-small cell lung cancer (NSCLC), Ovarian, Pancreatic, Prostate, Renal-cell carcinoma (RCC), or Small-cell lung cancer (SCLC) tumor between 2016 and 2021
 - Age 18-89 years old at the time of diagnosis, and
 - Required to have at least one additional clinical event 90 days following diagnosis in the Tempus database
- Stage at diagnosis in the Tempus database were imputed if T, N, and M stage information was available. All other missing data were not imputed.
- Baseline demographic, clinical and treatment characteristics were descriptively compared to the SEER Research Plus Data, 17 Registries, Nov 2023 Sub (2000-2021).

SUMMARY

- Our analysis found that the Tempus and SEER databases are generally comparable with respect to demographics and clinical characteristics among cancer patients, while the Tempus database has more granularity on treatment data.
- There is greater representation of late stage disease in the Tempus database attributable to sequencing patterns in clinical care. These similarities and differences arise from the respective data generation mechanisms and should be considered in the design of real world data studies.

RESULTS

Figure 1. Proportion of Cancer Types of New Cancer Cases

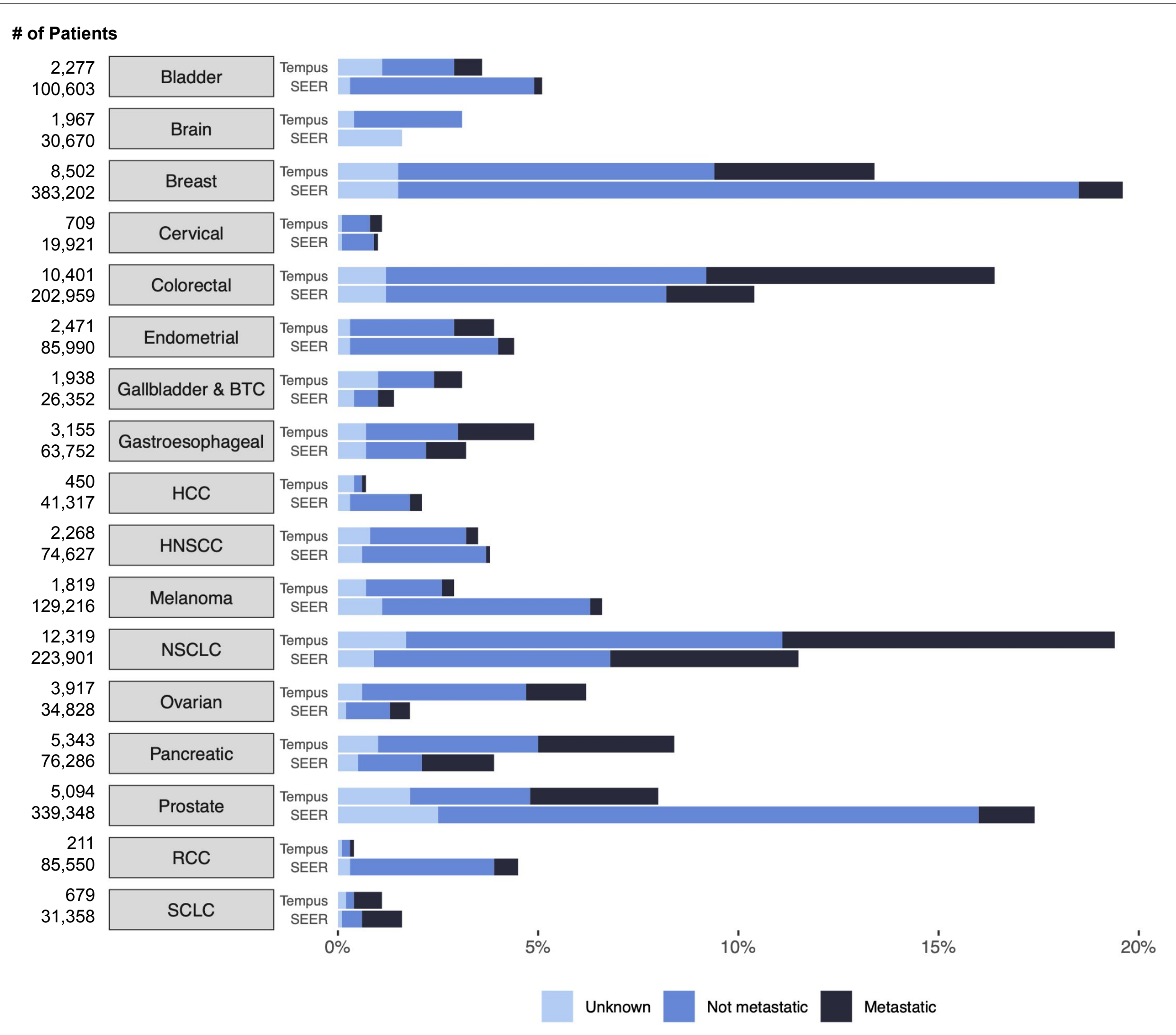


Figure 1. Cancer proportions were similar in both databases among the 17 cancers, although the Tempus database had higher proportion of NSCLC and Colorectal patients, while the SEER database had more Prostate and Breast patients.

Figure 2. Region

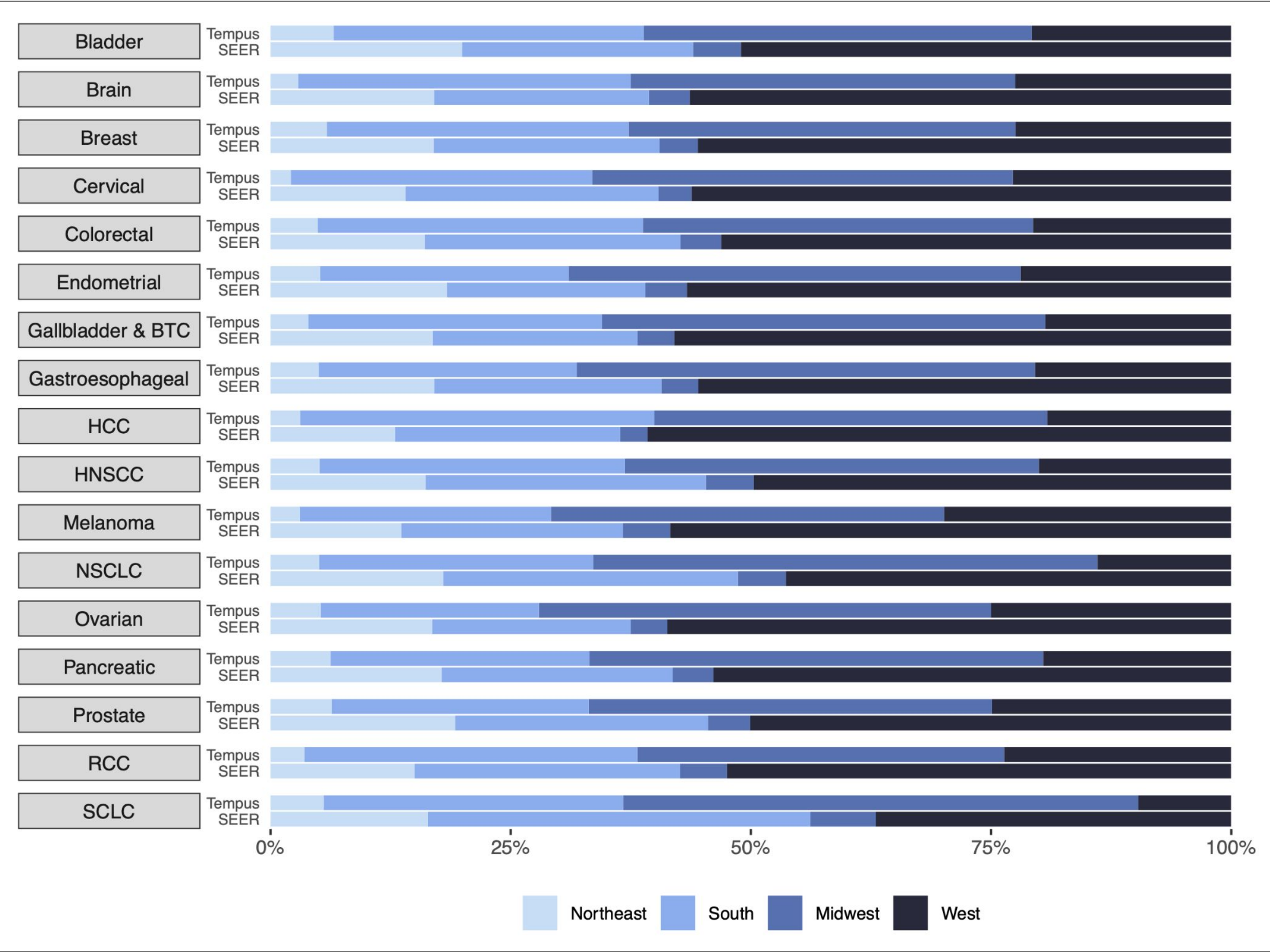


Figure 2. The Tempus database had representation from all regions in the US, with a largest representation from clinical sites in the Midwest. Region was missing on average 6% in Tempus data across the cohorts.

Figure 3. Stage at Diagnosis

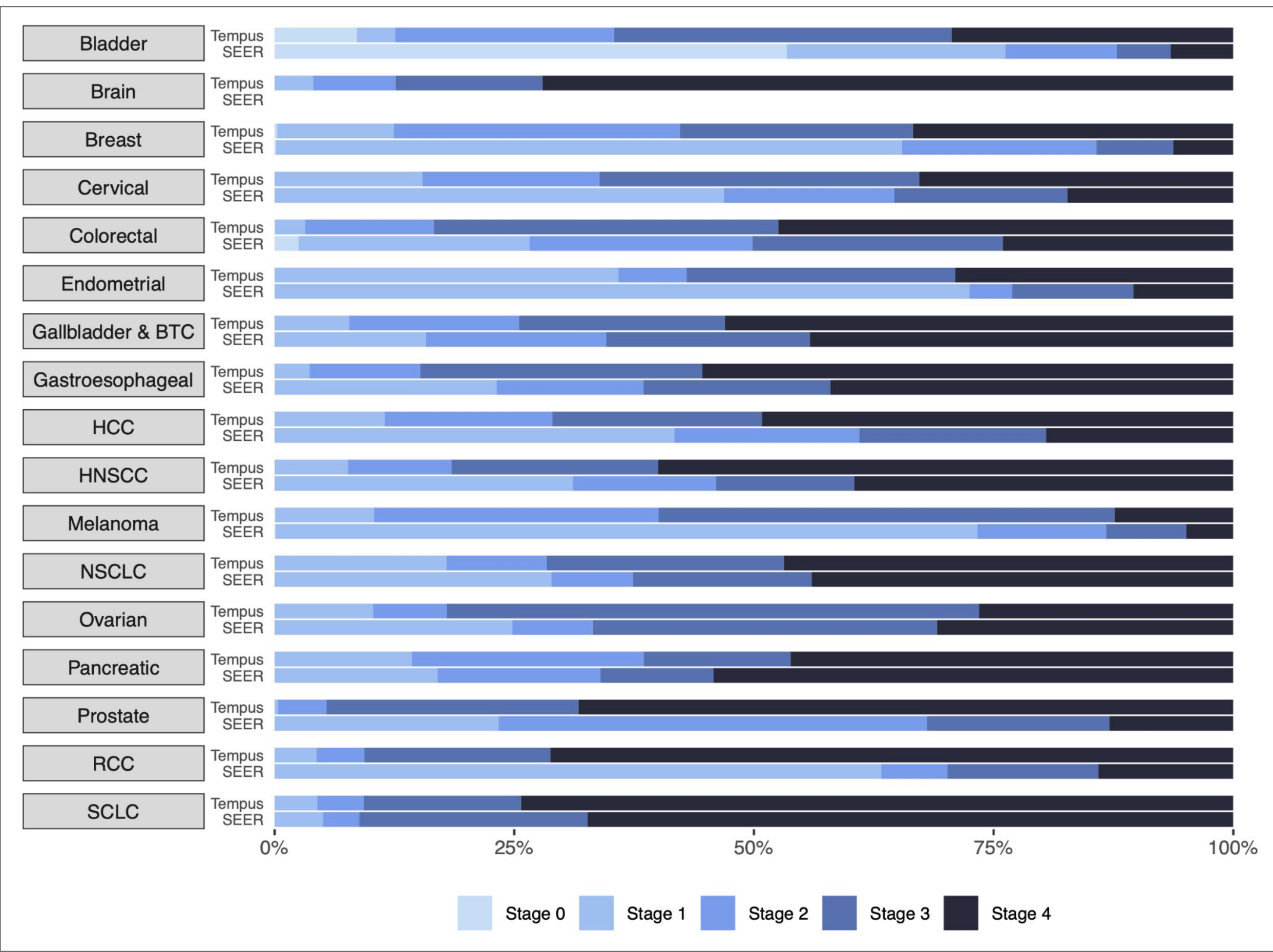


Figure 3. Staging was similar among BTC, Lung, and Pancreatic among the two databases. Tempus patients had more advanced cancer staging as compared to patients from the SEER database, especially in Bladder, Breast, Melanoma, Prostate, and RCC. Stage was missing on average 19% in Tempus data and 12% in SEER data (excluding Brain) across the cohorts.

Figure 4. Race

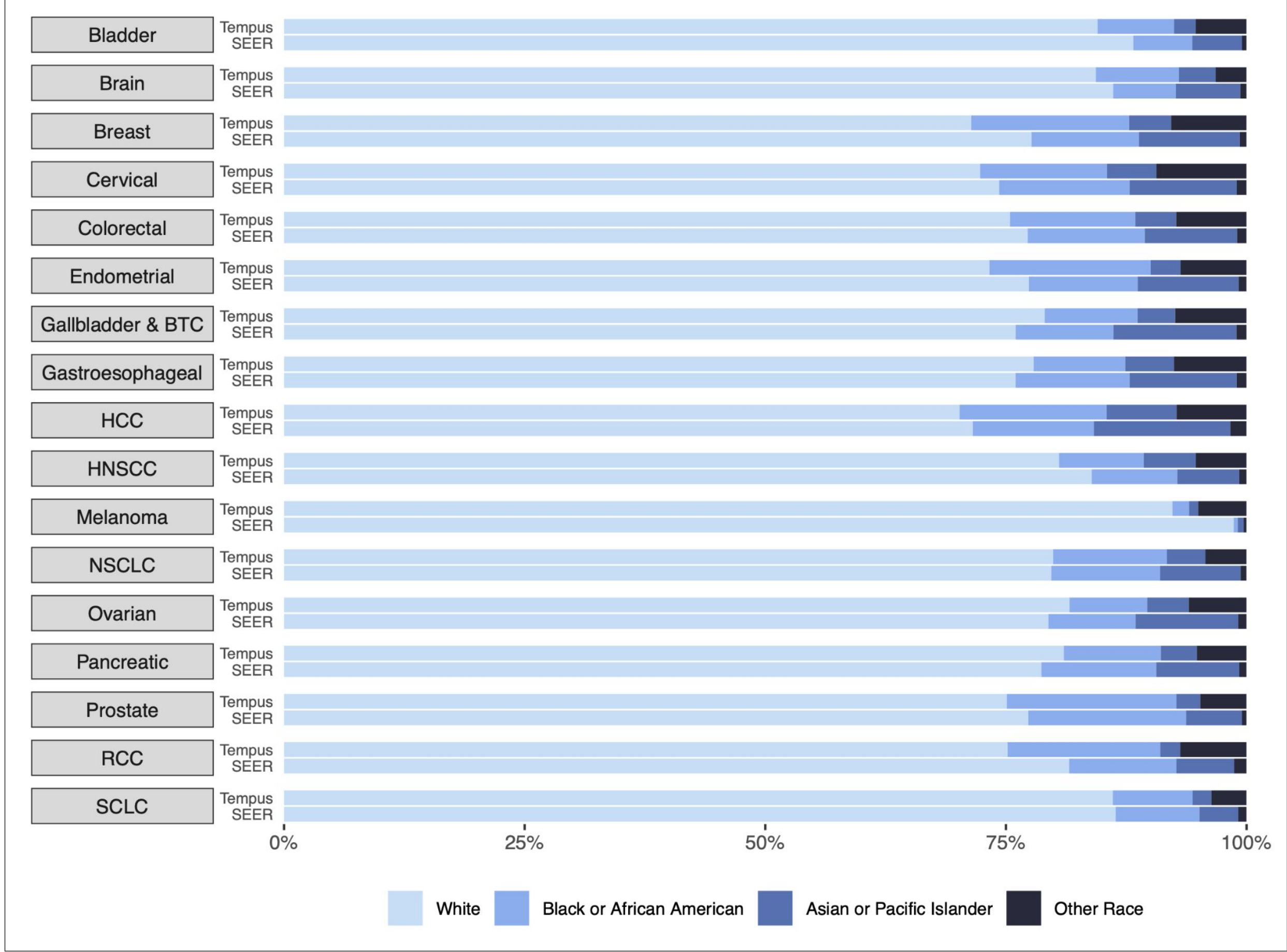


Figure 4. Tempus patients were more diverse based on available self-reported race. Tempus patients had a larger proportion of Other Race, and a smaller proportion of White among the majority of cohorts. Other Race also consists of those who self-identify as multiracial. Race was missing on average 35% in Tempus data and 2% in SEER data across the cohorts.

Figure 5. Age at Diagnosis

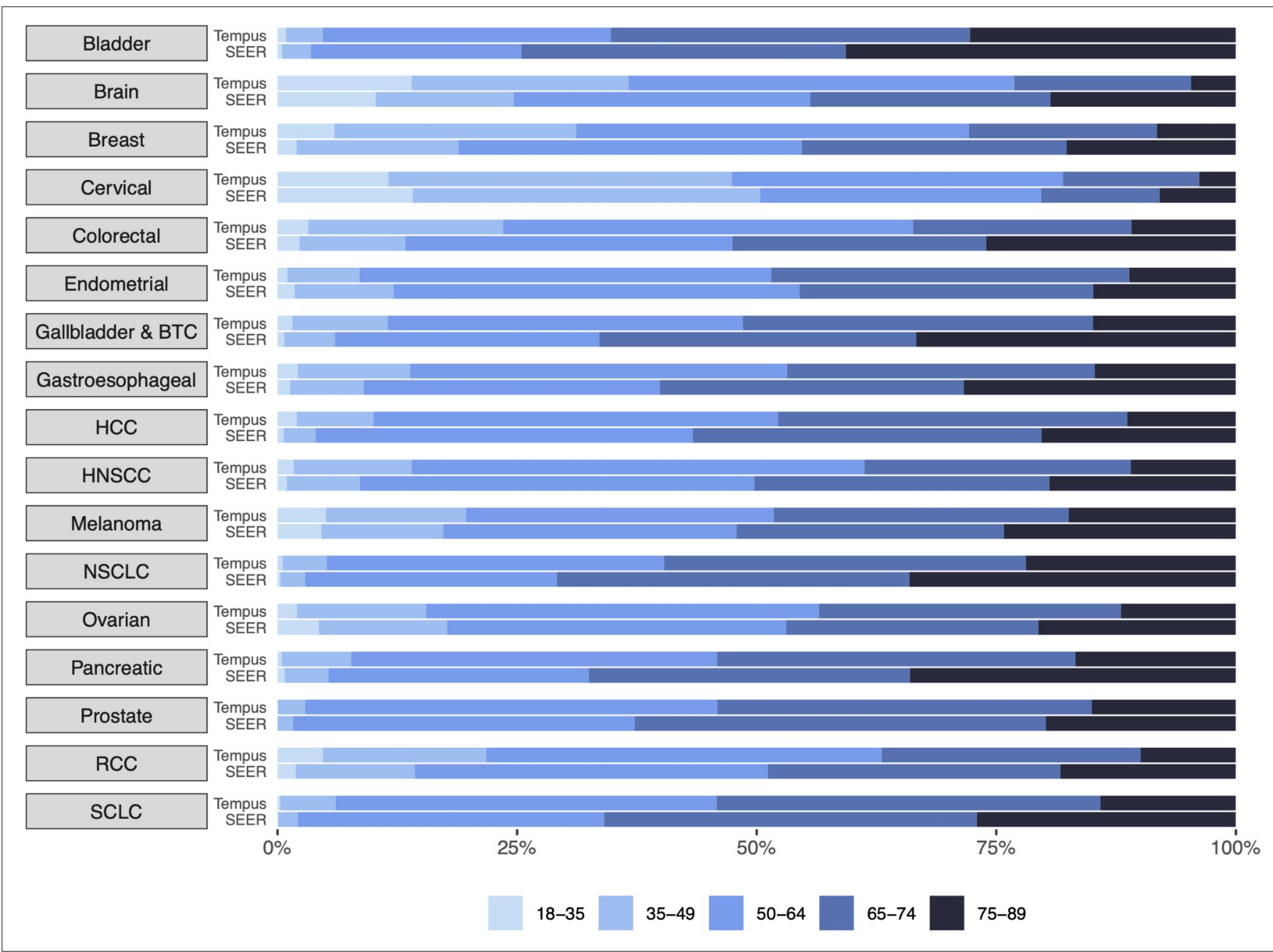


Figure 5. Tempus patients were generally younger, and had a larger proportion of patients in the 50-64 age range while a smaller proportion of patients in the 75-89 age range.

Figure 6. Chemotherapy Received Among Patients Metastatic at Diagnosis

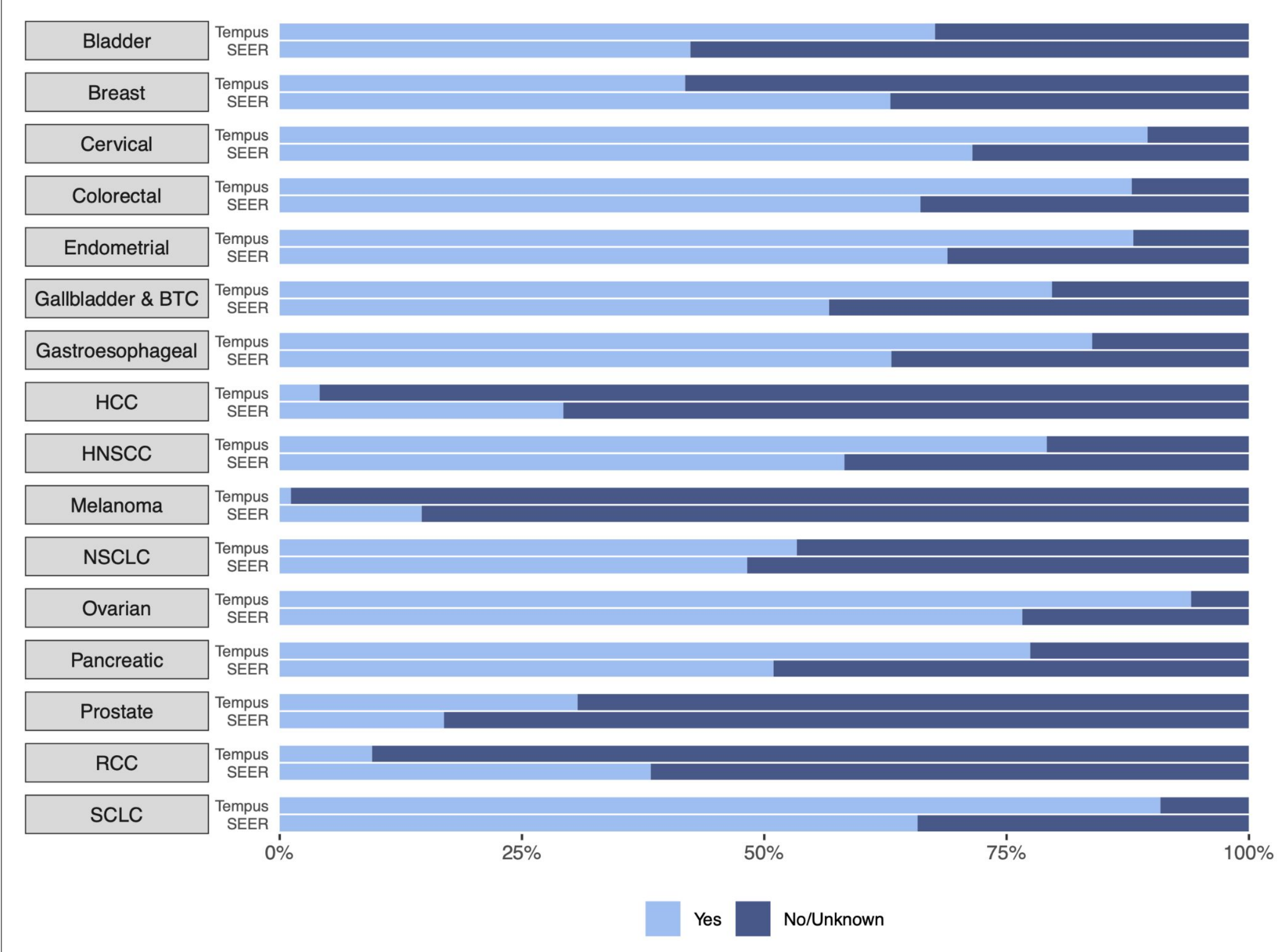


Figure 6. Tempus data had more complete capture of cytotoxic chemotherapy among patients who were metastatic at diagnosis, with the exception of patients with Breast, HCC, Melanoma, and RCC cancers, where other types of systemic therapies are more widely given (for example, endocrine therapies, immune checkpoint inhibitors, or targeted therapies). Tempus data captures receipt of any systemic therapy on average in 85% (range 77-95%) of patients across the cohorts.

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