

Methods S1: Categorization of non-hematologic cancers, related to Star Methods

The clinical cohort included 51 distinct tumor types, which are listed below, followed by number of patients sequenced (A). Given the large number of distinct tumor types, an additional grouping was established to collapse the 51 tumor types into seven broader tumor categories for purposes of analyzing the proportion of patients with CH and CH-PD by tumor categorization (B) as described in **Table 1**.

A. Tumor types

- 1) Adrenocortical carcinomas: 13
- 2) Ampullary carcinomas: 14
- 3) Anal carcinoma: 21
- 4) Appendiceal carcinoma: 39
- 5) Biliary cancer (includes intra- and extrahepatic cholangiocarcinomas and gallbladder carcinomas): 137
- 6) Bladder carcinoma (includes urothelial, squamous, adenocarcinoma, small cell, plasmacytoid, and sarcomatoid histologies, also includes upper tract urothelial carcinomas): 268
- 7) Breast carcinoma (includes invasive ductal, invasive lobular, mixed invasive ductal/lobular, metaplastic, and adenoid cystic breast carcinomas): 722
- 8) Breast sarcoma (includes angiosarcoma of the breast and malignant phyllodes tumor of the breast): 5
- 9) Cancer of unknown primary (includes adenocarcinoma of unknown primary, neuroendocrine of unknown primary, squamous cell of unknown primary): 91
- 10) Cervical carcinoma (includes cervical adenocarcinoma, cervical adenosquamous carcinoma, cervical squamous carcinoma, etc.): 26
- 11) Chondrosarcomas: 22
- 12) Chordomas: 7

- 13) Colorectal carcinomas (includes colon and rectal carcinomas): 530
- 14) Embryonal tumors (includes neuroblastomas and olfactory neuroblastomas):
50
- 15) Endometrial carcinomas (includes uterine endometrioid carcinomas, uterine serous carcinomas, uterine carcinosarcoma/uterine malignant mixed mullerian tumors, etc.): 114
- 16) Ependymoma: 8
- 17) Esophagogastric carcinoma (includes carcinomas arising in the esophagus, stomach, and gastroesophageal junction): 201
- 18) Ewing sarcomas: 20
- 19) Gastrointestinal neuroendocrine tumors: 33
- 20) Gastrointestinal stromal tumors: 74
- 21) Germ cell tumors: 156
- 22) Gestational trophoblastic disease: 8
- 23) Gliomas (includes astrocytoma, oligodendroglioma, anaplastic astrocytoma, anaplastic oligodendroglioma, glioblastoma multiforme, etc.): 295
- 24) Head and neck carcinomas (includes oral cavity squamous cell carcinomas, oropharynx squamous cell carcinomas, sinonasal squamous cell carcinomas, nasopharyngeal carcinomas, larynx squamous cell carcinomas, etc.): 70
- 25) Hepatocellular carcinomas: includes hepatocellular carcinomas and fibrolamellar carcinomas: 61
- 26) Melanomas (includes acral melanomas, cutaneous melanomas, mucosal melanomas, uveal melanomas, etc.): 174
- 27) Meningothelial tumors (includes anaplastic and atypical meningiomas): 18
- 28) Mesotheliomas (includes pleural and peritoneal mesotheliomas): 57
- 29) Miscellaneous cancers, not meeting any of the other categories: 6

- 30) Nerve sheath tumors: 12
- 31) Non-small cell lung cancers (primarily adenocarcinoma and squamous cell carcinomas of the lung but also includes large cell neuroendocrine, poorly differentiated NSCLC, sarcomatoid carcinomas of the lung, etc.): 818
- 32) Osteosarcomas: 16
- 33) Ovarian carcinomas: 131
- 34) Pancreatic carcinomas (primarily pancreatic adenocarcinoma but also includes pancreatic neuroendocrine tumors and acinar cell carcinomas): 214
- 35) Penile carcinomas: 6
- 36) Pheochromocytoma: 2
- 37) Pineal tumor: 1
- 38) Prostate carcinomas (primarily prostate adenocarcinoma but also includes prostate neuroendocrine carcinomas and prostate small cell carcinomas): 363
- 39) Renal cell carcinomas: 183
- 40) Retinoblastoma: 1
- 41) Salivary carcinomas: 64
- 42) Sellar tumors (includes granular cell tumor and pituicytoma): 2
- 43) Sex cord stromal tumors (includes granulosa cell tumor and Sertoli-Leydig cell tumor): 13
- 44) Skin-cancers, non-melanoma (includes basal cell carcinomas, cutaneous squamous cell carcinomas, Merkel cell carcinomas): 73
- 45) Small bowel carcinoma: 22
- 46) Small cell lung carcinoma: 37
- 47) Soft tissue sarcoma (many types, most common types include undifferentiated pleomorphic sarcomas, dedifferentiated liposarcomas,

angiosarcomas, leiomyosarcomas, solitary fibrous tumors, and synovial sarcomas): 240

48) Thymic tumor (includes thymic carcinomas and thymomas): 8

49) Thyroid carcinoma: 134

50) Uterine sarcomas: 66

51) Vaginal/vulvar carcinomas: 3

B. Tumor categories:

- 1) Lung: includes Non-small cell lung cancers, small cell lung cancers, and mesotheliomas
- 2) Breast: Breast cancers only
- 3) Gastrointestinal (GI): includes colon cancer, rectal cancer, pancreatic adenocarcinoma, neuroendocrine cancers arising in GI tract, anal cancers, ampullary cancers, gallbladder cancers, cholangiocarcinomas, hepatocellular cancers, fibrolamellar hepatocellular cancers, esophageal cancers, gastric cancers, gastroesophageal junction cancers, appendical cancers, small bowel cancers
- 4) Sarcomas: includes soft tissue sarcomas, osteosarcomas, gastrointestinal stromal tumors, breast sarcomas, chondrosarcomas, Ewing sarcomas,
- 5) Genitourinary (GU): includes germ cell tumors, renal cell carcinomas, prostate cancers, penile cancers, urothelial cancers (arising in bladder and upper tract)
- 6) Gynecological (Gyn): includes cervical cancers, endometrial cancers, ovarian cancers, vaginal and vulvar cancers, gestational trophoblastic disease
- 7) Other: includes all other cancers types with most prominent subtypes including cancers of unknown primary site, cancers arising from the skin (melanomas, basal cell carcinomas, cutaneous squamous cell carcinomas,

Merkel cell carcinomas), thyroid cancers, central nervous system cancers,
head and neck cancers