

Supplementary Online Content

Goodman AM, Piccioni D, Kato S, et al. Prevalence of PDL1 Amplification and Preliminary Response to Immune Checkpoint Blockade in Solid Tumors. *JAMA Oncol*. Published online June 14, 2018. doi:10.1001/jamaoncol.2018.1701

Supplement. **eFigure**. CONSORT Diagram

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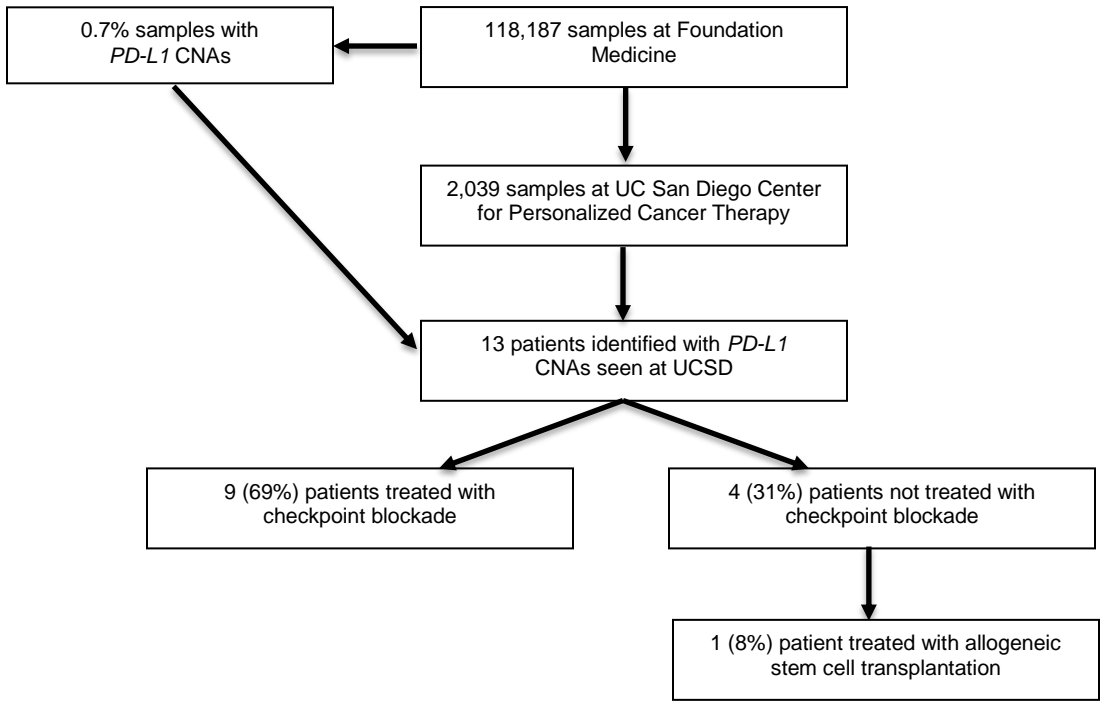
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This supplementary material has been provided by the authors to give readers additional information about their work.



eFigure. CONSORT Diagram

Abbreviations: CNAs = copy number alterations; UC = University of California

eTable 1. Biomarkers for Response to Immunotherapy in 13 Patients With PD-L1 Amplification Seen at University of California, San Diego Moores Cancer Center*

Patient	PD-L1 expression on tumor cells by IHC*	PD-L1 expression on TILs	Average percentage of TILs per high power field**	TMB (mutations/mb)**	MSI status	Histology/disease status
1	Low positive ¹	Low positive	NA	7.19	Stable	Head and neck squamous cell carcinoma/ Metastatic
2	NA	NA	NA	5	Stable	Ovarian serous carcinoma/ Metastatic
3	NA	NA	NA	13	NA	Gastric adenocarcinoma/ Metastatic
4	Negative ²	Negative ²	NA	2	Stable	Glioblastoma/Locally advanced
5	NA	NA	50%	4	Stable	Colon adenocarcinoma/ Metastatic
6	NA	NA	60%	9	Stable	Head and neck squamous cell carcinoma/ Metastatic
7	High positive ¹	High positive ¹	40%	21	Stable	Bladder urothelial carcinoma/ Metastatic
8	High positive ¹	Low positive ¹	40%	16	NA	Grey zone lymphoma/not applicable
9	NA	NA	NA	90	Stable	Basal cell carcinoma/ Metastatic
10	NA	NA	10%	15	Stable	Primary mediastinal B-cell lymphoma/not applicable
11	Negative ³	NA	NA	104	Stable	Basal cell carcinoma/ Metastatic ²¹
12	NA	NA	NA	5	Stable	Head and neck

					e	squamous cell carcinoma/locally advanced
13	High positive ²	NA	NA	7	Stable	Non-small cell lung cancer/ Metastatic

*Where data is not available, it is due to the fact that tissue was not tested for the marker and, in some patients, there is inadequate tissue or no consent for further research use of tissue; Also see **Supplementary Table 2** for definitions of IHC positivity.

**Average percentage of TILs using three different high power fields (400x magnification). Salgado et al. JAMA Oncology. 2015.²⁶

*** ≤ 5 mutations/megabase = TMB low; 6-19 mutations/megabase = TMB intermediate; ≥ 20 mutations/megabase = TMB high.

¹Pathline-EMERGE: Antibody SP142 (Ventana).

²Foundation Medicine: Antibody SP142 (Ventana) or Dako 22C3 (pharmDx).

³CARIS: Antibody SP142 (Ventana)

Abbreviations: IHC = immunohistochemistry; mb = megabase; MSI = microsatellite instability; NA = not available; PD-1 = programmed death inhibitor-1; PD-L1 = programmed death-ligand 1; TILs = tumor infiltrating lymphocytes

eTable 2. Definitions for PD-L1 IHC Positivity

Foundation Medicine Assay: Antibody SP142 (Ventana)	
Result	Description
High positive	≥50% proportion of positive staining of at least 1+ intensity
Moderate positive	25-49% proportion of positive staining of at least 1+ intensity
Low positive	1-24% proportion of positive staining of at least 1+ intensity
Negative	<1% proportion of positive staining of at least 1+ intensity, or no staining
Pathline-Emerge Assay: Antibody SP142 (Ventana) or Dako 22C3 (pharmDx)	
High positive	1+ or 2+ staining intensity and > 25% distribution
Low positive	1+ or 2+ staining intensity in 1-24% distribution
Negative	No staining
CARIS Assay: Antibody SP142 (Ventana)	
Positive	≥2+ staining intensity and ≥5% of cells staining positive
Negative	N2+ staining intensity of <5% of cells staining positive

eTable 3. PDL1 Amplification by Solid Tumor Type (PDL1 Amplification Was Seen in 0.7% of 118,187 Samples With Malignancies)

Disease	Cases with PD-L1 amplification						Cases without PD-L1 amplification					
	%	TMB mean	TMB median	TMB low fraction	TMB intermediate fraction	TMB high fraction	TMB mean	TMB median	TMB low fraction	TMB intermediate fraction	TMB high fraction	
All (n = 118,187)	0.713%	13.28	6.31	41.0%	43.8%	15.2%	7.44	3.60	63.7%	29.9%	6.4%	
lung adenocarcinoma ¹	0.604%	18.08	17.12	13.3%	53.3%	33.3%	9.92	6.31	43.4%	44.6%	12.0%	
colon adenocarcinoma ²	0.183%	7.46	4.50	55.6%	38.9%	5.6%	8.03	4.50	61.1%	33.5%	5.4%	
breast carcinoma (nos) ²	1.901%	5.92	4.50	50.5%	48.6%	0.9%	5.48	3.60	63.3%	33.7%	3.0%	
breast invasive ductal carcinoma ²	1.995%	8.00	4.50	65.2%	32.6%	2.2%	4.40	3.60	72.3%	26.4%	1.3%	
unknown primary adenocarcinoma ²	0.606%	12.44	8.11	28.6%	52.4%	19.0%	6.92	3.60	62.2%	31.3%	6.5%	
pancreas ductal adenocarcinoma ²	0.030%	4.50	4.50	100.0%	0.0%	0.0%	2.68	1.80	89.6%	9.8%	0.6%	
lung non-small cell lung carcinoma (nos) ²	1.063%	20.67	17.12	11.4%	45.7%	42.9%	12.06	8.11	32.5%	51.2%	16.3%	
brain glioblastoma ²	0.344%	31.04	1.80	72.7%	9.1%	18.2%	7.40	2.70	80.8%	15.2%	4.0%	
lung squamous cell carcinoma (scc) ²	1.694%	12.88	9.01	14.0%	74.0%	12.0%	12.10	9.01	22.3%	67.0%	10.6%	
ovary serous carcinoma ²	0.616%	6.84	5.86	43.8%	56.3%	0.0%	3.46	2.70	76.3%	23.6%	0.1%	
prostate acinar adenocarcinoma ²	0.203%	2.52	2.70	100.0%	0.0%	0.0%	5.54	2.70	81.1%	15.7%	3.3%	
gastroesophageal junction adenocarcinoma ²	0.256%	12.79	7.21	40.0%	40.0%	20.0%	6.65	4.50	50.5%	47.4%	2.2%	
liver cholangiocarcinoma ²	0.375%	5.08	5.41	28.6%	71.4%	0.0%	3.42	2.50	84.8%	13.3%	1.9%	
unknown primary carcinoma (nos) ²	1.278%	17.76	13.51	26.1%	56.5%	17.4%	10.54	4.50	52.5%	37.6%	9.9%	
rectum adenocarcinoma (crc) ²	0.174%	9.01	9.01	33.3%	66.7%	0.0%	5.95	3.60	70.1%	27.6%	2.3%	
unknown primary melanoma ²	0.501%	29.28	18.47	12.5%	37.5%	50.0%	26.92	12.61	28.7%	34.7%	36.6%	
bladder urothelial (transitional cell) carcinoma ²	0.814%	14.41	9.01	18.2%	54.5%	27.3%	10.10	7.21	33.6%	55.2%	11.2%	
stomach adenocarcinoma (nos) ²	0.604%	11.49	4.50	62.5%	25.0%	12.5%	6.14	3.60	65.5%	29.9%	4.6%	
head and neck squamous cell carcinoma (hnscc) ²	3.059%	12.10	7.21	41.0%	43.6%	15.4%	12.98	4.50	50.5%	37.7%	11.8%	
uterus endometrial adenocarcinoma (nos) ²	0.491%	3.30	3.15	66.7%	33.3%	0.0%	13.01	4.50	57.4%	28.2%	14.5%	
skin melanoma ²	0.092%	200.90	200.90	0.0%	0.0%	100.0%	31.23	14.41	25.5%	35.4%	39.1%	
lung small cell undifferentiated carcinoma ²	1.307%	14.22	12.61	7.1%	64.3%	28.6%	11.32	9.01	21.5%	69.8%	8.7%	
ovary epithelial carcinoma	1.331%	10.10	7.66	42.9%	50.0%	7.1%	5.64	3.60	68.3%	29.8%	1.9%	

(nos) ²												
pancreatobiliary carcinoma (nos) ³	0.100%	5.41	5.41	0.0%	100.0%	0.0%	3.74	2.70	80.5%	17.5%	2.0%	
pancreas carcinoma (nos)	0.106%	4.50	4.50	100.0%	0.0%	0.0%	3.32	1.80	88.5%	10.1%	1.4%	
ovary high grade serous carcinoma ³	0.962%	4.50	2.70	66.7%	33.3%	0.0%	3.74	3.60	73.2%	26.6%	0.1%	
soft tissue sarcoma (nos) ³	1.993%	8.30	2.92	66.7%	22.2%	11.1%	5.12	2.50	77.7%	18.2%	4.1%	
unknown primary squamous cell carcinoma (scc) ³	2.030%	25.62	9.91	18.8%	43.8%	37.5%	17.12	7.21	35.6%	45.5%	18.9%	
kidney renal cell carcinoma (nos) ³	0.522%	3.38	2.70	75.0%	25.0%	0.0%	3.23	2.70	80.2%	19.7%	0.1%	
unknown primary undifferentiated neuroendocrine carcinoma ³	0.133%	14.41	14.41	0.0%	100.0%	0.0%	6.55	2.70	68.0%	26.3%	5.7%	
liver hepatocellular carcinoma (hcc) ³	0.434%	4.20	4.50	66.7%	33.3%	0.0%	4.45	3.60	65.3%	34.0%	0.7%	
soft tissue leiomyosarcoma ³	0.723%	4.22	4.17	80.0%	20.0%	0.0%	3.54	2.50	77.3%	21.7%	1.0%	
uterus endometrial adenocarcinoma endometrioid ³	0.169%	2.70	2.70	100.0%	0.0%	0.0%	13.34	4.50	54.7%	26.7%	18.6%	
soft tissue liposarcoma ³	1.022%	1.39	0.83	100.0%	0.0%	0.0%	2.29	1.67	89.7%	10.2%	0.2%	
breast invasive lobular carcinoma (ilc) ³	0.347%	55.86	55.86	0.0%	50.0%	50.0%	6.06	2.70	69.2%	24.6%	6.3%	
kidney clear cell carcinoma ³	0.348%	2.70	2.70	100.0%	0.0%	0.0%	3.21	2.70	82.2%	17.6%	0.2%	
gallbladder adenocarcinoma ³	0.175%	0.90	0.90	100.0%	0.0%	0.0%	4.06	2.70	74.4%	24.4%	1.2%	
brain anaplastic astrocytoma ³	0.204%	3.60	3.60	100.0%	0.0%	0.0%	4.06	1.80	88.7%	9.8%	1.4%	
uterus endometrial adenocarcinoma papillary serous ³	0.207%	9.01	9.01	0.0%	100.0%	0.0%	5.75	2.70	76.6%	22.2%	1.2%	
appendix adenocarcinoma ³	0.217%	1.80	1.80	100.0%	0.0%	0.0%	3.66	1.80	82.4%	15.0%	2.6%	
uterus leiomyosarcoma ³	0.655%	6.12	6.68	33.3%	66.7%	0.0%	3.49	2.50	74.5%	25.1%	0.4%	
brain meningioma ³	0.000%	0.00	0.00	NA	NA	NA	2.05	1.80	93.2%	6.6%	0.2%	
pleura mesothelioma ³	0.000%	0.00	0.00	NA	NA	NA	2.31	1.80	91.7%	7.8%	0.5%	
unknown primary malignant neoplasm (nos) ³	2.103%	12.19	5.84	44.4%	22.2%	33.3%	11.99	3.34	60.4%	26.3%	13.4%	
bone osteosarcoma ³	0.721%	5.01	4.17	66.7%	33.3%	0.0%	3.49	2.50	80.1%	18.6%	1.2%	
thyroid papillary carcinoma ³	0.000%	0.00	0.00	NA	NA	NA	2.00	1.80	92.3%	7.7%	0.0%	
cervix squamous cell carcinoma (scc) ³	2.674%	8.65	4.95	50.0%	40.0%	10.0%	7.82	5.41	43.7%	50.0%	6.3%	
brain astrocytoma ³	0.000%	0.00	0.00	NA	NA	NA	2.64	1.80	91.1%	8.1%	0.8%	
uterus carcinosarcoma ³	0.560%	3.60	3.60	100.0%	0.0%	0.0%	7.37	3.60	70.7%	25.4%	3.9%	
soft tissue neuroblastoma ³	0.000%	0.00	0.00	NA	NA	NA	3.43	2.70	75.4%	24.3%	0.3%	
soft tissue sarcoma undifferentiated ³	3.939%	17.30	4.17	61.5%	15.4%	23.1%	7.39	2.50	74.1%	18.6%	7.3%	

small intestine adenocarcinoma ³	0.000%	0.00	0.00	NA	NA	NA	8.90	4.50	52.5%	39.5%	8.0%
ovary clear cell carcinoma ³	0.318%	10.81	10.81	0.0%	100.0%	0.0%	4.86	2.70	74.8%	23.0%	2.2%
fallopian tube serous carcinoma ³	0.319%	4.50	4.50	100.0%	0.0%	0.0%	3.84	2.70	71.5%	28.2%	0.3%
brain oligodendroglioma ³	0.000%	0.00	0.00	NA	NA	NA	13.41	2.70	79.2%	14.5%	6.3%
lung large cell neuroendocrine carcinoma ³	1.316%	24.77	24.77	0.0%	25.0%	75.0%	13.39	9.91	26.7%	53.3%	20.0%
brain glioma (nos) ³	0.337%	1.80	1.80	100.0%	0.0%	0.0%	6.08	1.80	86.8%	10.5%	2.7%
skin squamous cell carcinoma (scc) ³	1.712%	75.68	42.34	0.0%	40.0%	60.0%	53.57	41.44	19.5%	17.4%	63.1%
duodenum adenocarcinoma ³	0.352%	3.60	3.60	100.0%	0.0%	0.0%	8.47	3.60	67.5%	25.8%	6.7%
esophagus squamous cell carcinoma (scc) ³	1.434%	5.86	6.31	50.0%	50.0%	0.0%	6.54	4.50	51.3%	46.2%	2.5%
unknown primary urothelial carcinoma ³	0.730%	11.26	11.26	0.0%	100.0%	0.0%	11.30	7.21	34.9%	51.1%	14.0%
anus squamous cell carcinoma (scc) ³	1.812%	5.23	4.50	60.0%	40.0%	0.0%	6.60	5.41	48.0%	48.7%	3.3%
soft tissue ewing sarcoma ³	0.000%	0.00	0.00	NA	NA	NA	2.22	1.67	89.7%	10.0%	0.4%
peritoneum serous carcinoma ³	0.377%	1.80	1.80	100.0%	0.0%	0.0%	3.08	2.70	82.2%	17.8%	0.0%
pancreas neuroendocrine carcinoma ³	0.388%	14.41	14.41	0.0%	100.0%	0.0%	6.40	2.70	80.9%	17.1%	1.9%
bile duct adenocarcinoma ³	0.000%	0.00	0.00	NA	NA	NA	2.99	2.70	83.9%	15.7%	0.4%
soft tissue synovial sarcoma ³	0.000%	0.00	0.00	NA	NA	NA	2.22	1.67	90.8%	8.4%	0.8%
cervix adenocarcinoma ³	0.418%	4.50	4.50	100.0%	0.0%	0.0%	5.34	3.60	66.8%	30.3%	2.9%
adrenal gland cortical carcinoma ³	0.444%	5.41	5.41	0.0%	100.0%	0.0%	4.42	2.70	74.1%	23.7%	2.2%
skin merkel cell carcinoma ³	0.444%	63.06	63.06	0.0%	0.0%	100.0%	24.60	3.60	55.4%	8.9%	35.7%
unknown primary gist ³	0.461%	0.00	0.00	100.0%	0.0%	0.0%	2.43	1.80	90.7%	8.8%	0.5%
kidney urothelial carcinoma ³	0.472%	5.41	5.41	0.0%	100.0%	0.0%	10.41	5.41	46.0%	47.4%	6.6%
head and neck adenoid cystic carcinoma ³	0.000%	0.00	0.00	NA	NA	NA	7.66	1.80	94.2%	4.8%	1.0%
stomach adenocarcinoma diffuse type ³	0.000%	0.00	0.00	NA	NA	NA	4.64	2.70	81.8%	15.3%	3.0%
soft tissue angiosarcoma ³	1.478%	104.05	153.57	33.3%	0.0%	66.7%	8.38	3.34	65.0%	23.5%	11.5%
stomach gist ³	0.000%	0.00	0.00	NA	NA	NA	2.18	1.80	92.1%	7.9%	0.0%
lung adenosquamous carcinoma ³	1.047%	16.67	16.67	0.0%	50.0%	50.0%	9.93	6.31	40.2%	47.1%	12.7%
ovary granulosa cell tumor ³	0.000%	0.00	0.00	NA	NA	NA	2.19	1.80	90.7%	9.3%	0.0%
lung sarcomatoid carcinoma ³	2.674%	37.84	7.21	20.0%	40.0%	40.0%	11.68	7.21	40.7%	40.1%	19.2%
thyroid carcinoma (nos) ³	0.000%	0.00	0.00	NA	NA	NA	3.22	1.80	82.4%	15.9%	1.6%
salivary gland adenoid cystic carcinoma ³	1.111%	3.60	3.60	50.0%	50.0%	0.0%	2.03	1.80	94.9%	5.1%	0.0%
soft tissue malignant	0.559%	0.00	0.00	100.0%	0.0%	0.0%	8.14	2.50	75.3%	15.7%	9.0%

peripheral nerve sheath tumor (mpnst) ³												
ovary endometrioid adenocarcinoma ³	0.568%	9.01	9.01	0.0%	100.0%	0.0%	7.30	3.60	73.1%	20.0%	6.9%	
salivary gland carcinoma (nos) ³	0.568%	9.01	9.01	0.0%	100.0%	0.0%	9.68	3.60	65.1%	26.9%	8.0%	
unknown primary serous carcinoma ³	0.000%	0.00	0.00	NA	NA	NA	4.05	2.70	78.2%	19.5%	2.3%	
thyroid anaplastic carcinoma ³	5.085%	4.50	3.60	55.6%	44.4%	0.0%	3.74	2.70	83.3%	14.9%	1.8%	
ovary carcinosarcoma ³	0.000%	0.00	0.00	NA	NA	NA	8.19	3.60	71.3%	27.5%	1.2%	
brain medulloblastoma ³	0.613%	6.31	6.31	0.0%	100.0%	0.0%	2.64	1.91	88.3%	11.7%	0.0%	
brain astrocytoma pilocytic ³	0.000%	0.00	0.00	NA	NA	NA	5.73	0.90	97.5%	1.9%	0.6%	
soft tissue chondrosarcoma	0.000%	0.00	0.00	NA	NA	NA	2.23	1.67	90.6%	8.8%	0.6%	
unknown primary undifferentiated small cell carcinoma ³	0.000%	0.00	0.00	NA	NA	NA	10.07	7.21	42.7%	47.8%	9.6%	
colon neuroendocrine carcinoma ³	0.637%	63.96	63.96	0.0%	0.0%	100.0%	5.09	3.60	67.9%	29.5%	2.6%	
breast metaplastic carcinoma ³	0.645%	4.50	4.50	100.0%	0.0%	0.0%	4.37	2.70	80.5%	17.5%	1.9%	
thymus carcinoma (nos) ³	1.290%	7.21	7.21	50.0%	50.0%	0.0%	3.87	2.70	80.4%	16.3%	3.3%	
kidney renal papillary carcinoma ³	0.654%	3.60	3.60	100.0%	0.0%	0.0%	3.15	2.70	80.9%	19.1%	0.0%	
salivary gland adenocarcinoma ³	0.658%	6.31	6.31	0.0%	100.0%	0.0%	6.64	2.70	76.8%	19.2%	4.0%	
brain ependymoma ³	0.000%	0.00	0.00	NA	NA	NA	1.99	1.80	93.9%	6.1%	0.0%	
peritoneum mesothelioma ³	0.690%	3.60	3.60	100.0%	0.0%	0.0%	3.26	1.80	93.1%	5.6%	1.4%	
soft tissue fibromatosis ³	0.000%	0.00	0.00	NA	NA	NA	1.23	0.90	95.7%	4.3%	0.0%	
adrenal gland neuroblastoma ³	0.000%	0.00	0.00	NA	NA	NA	2.14	1.80	90.0%	10.0%	0.0%	
prostate neuroendocrine carcinoma ³	0.000%	0.00	0.00	NA	NA	NA	11.68	3.60	66.4%	28.5%	5.1%	
eye intraocular melanoma ³	0.000%	0.00	0.00	NA	NA	NA	1.74	0.90	93.8%	6.2%	0.0%	
thymus thymoma (nos) ³	0.000%	0.00	0.00	NA	NA	NA	1.85	0.90	96.1%	3.9%	0.0%	
small intestine gist ³	0.000%	0.00	0.00	NA	NA	NA	1.83	1.80	95.0%	5.0%	0.0%	
bone chondrosarcoma ³	0.000%	0.00	0.00	NA	NA	NA	3.19	1.67	83.5%	14.9%	1.7%	
uterus endometrial stromal sarcoma ³	0.000%	0.00	0.00	NA	NA	NA	2.90	1.80	86.7%	12.5%	0.8%	
bone chordoma ³	0.000%	0.00	0.00	NA	NA	NA	2.09	1.80	95.0%	5.0%	0.0%	
appendix mucinous neoplasm (nos) ³	0.000%	0.00	0.00	NA	NA	NA	1.95	1.80	90.8%	9.2%	0.0%	
thyroid medullary carcinoma ³	0.000%	0.00	0.00	NA	NA	NA	2.12	1.80	95.0%	5.0%	0.0%	
soft tissue rhabdomyosarcoma (nos) ³	0.000%	0.00	0.00	NA	NA	NA	3.75	2.50	73.9%	25.2%	0.8%	
unknown primary adenoid cystic carcinoma ³	0.000%	0.00	0.00	NA	NA	NA	2.48	1.80	91.5%	7.7%	0.9%	

ureter urothelial carcinoma ³	0.000%	0.00	0.00	NA	NA	NA	7.05	5.41	49.5%	45.0%	5.5%
vulva squamous cell carcinoma (scc) ³	0.971%	3.60	3.60	100.0%	0.0%	0.0%	7.21	5.41	47.1%	51.0%	2.0%
prostate undifferentiated carcinoma ³	0.990%	9.91	9.91	0.0%	100.0%	0.0%	7.54	3.60	67.0%	26.0%	7.0%
soft tissue solitary fibrous tumor ⁴	1.010%	0.00	0.00	100.0%	0.0%	0.0%	2.42	1.67	85.7%	13.3%	1.0%
unknown primary sarcomatoid carcinoma ⁴	1.020%	6.31	6.31	0.0%	100.0%	0.0%	8.32	4.50	51.5%	38.1%	10.3%
skin basal cell carcinoma ⁴	3.030%	103.00	88.29	0.0%	0.0%	100.0%	61.75	50.90	14.6%	17.7%	67.7%
uterus endometrial adenocarcinoma clear cell ⁴	1.031%	6.31	6.31	0.0%	100.0%	0.0%	7.09	3.60	72.9%	20.8%	6.3%
esophagus carcinoma (nos) ⁴	0.000%	0.00	0.00	NA	NA	NA	6.45	4.50	50.5%	47.4%	2.1%
bladder adenocarcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	5.02	3.60	60.0%	38.9%	1.1%
nasopharynx and paranasal sinuses undifferentiated carcinoma ⁴	5.051%	4.50	3.60	80.0%	20.0%	0.0%	3.54	2.70	78.7%	20.2%	1.1%
lung large cell carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	13.30	12.61	21.7%	54.3%	23.9%
unknown primary leiomyosarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.07	2.50	80.2%	19.8%	0.0%
brain oligoastrocytoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.51	1.80	91.1%	7.8%	1.1%
ovary low grade serous carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	1.56	0.90	95.5%	4.5%	0.0%
uterus sarcoma (nos) ⁴	1.136%	3.34	3.34	100.0%	0.0%	0.0%	3.38	2.50	74.7%	24.1%	1.1%
bladder carcinoma (nos) ⁴	1.163%	9.01	9.01	0.0%	100.0%	0.0%	10.20	7.21	32.9%	51.8%	15.3%
lung atypical carcinoid ⁴	0.000%	0.00	0.00	NA	NA	NA	5.05	1.80	82.1%	16.7%	1.2%
kidney wilms tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	2.64	1.80	86.9%	13.1%	0.0%
soft tissue myxofibrosarcoma ⁴	3.529%	3.89	4.17	66.7%	33.3%	0.0%	4.22	1.67	89.0%	9.8%	1.2%
soft tissue desmoplastic small round cell tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	2.44	2.09	87.8%	12.2%	0.0%
soft tissue rhabdomyosarcoma alveolar ⁴	0.000%	0.00	0.00	NA	NA	NA	2.11	1.67	86.6%	13.4%	0.0%
pancreas acinar cell carcinoma ⁴	2.410%	9.46	9.46	50.0%	50.0%	0.0%	3.35	2.70	75.3%	24.7%	0.0%
skin adnexal carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	14.51	3.60	54.3%	27.2%	18.5%
soft tissue fibrosarcoma ⁴	1.266%	4.17	4.17	100.0%	0.0%	0.0%	3.68	1.67	88.5%	10.3%	1.3%
unknown primary carcinoid ⁴	0.000%	0.00	0.00	NA	NA	NA	2.26	1.80	94.9%	3.8%	1.3%
thyroid follicular carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.93	2.70	88.3%	11.7%	0.0%
soft tissue rhabdomyosarcoma embryonal ⁴	0.000%	0.00	0.00	NA	NA	NA	2.99	2.50	77.9%	22.1%	0.0%
penis squamous cell carcinoma (scc) ⁴	2.597%	2.25	2.25	100.0%	0.0%	0.0%	6.28	4.50	54.7%	41.3%	4.0%
testis germ cell tumor (non-seminoma) ⁴	0.000%	0.00	0.00	NA	NA	NA	3.65	2.70	70.7%	29.3%	0.0%

salivary gland acinic cell tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	13.06	1.80	95.7%	1.4%	2.9%
myelodysplastic-myeloproliferative neoplasm (mds-mpn) ⁴	0.000%	0.00	0.00	NA	NA	NA	1.57	0.83	94.0%	6.0%	0.0%
head and neck melanoma ⁴	1.493%	12.61	12.61	0.0%	100.0%	0.0%	19.77	6.31	36.4%	40.9%	22.7%
kidney sarcomatoid carcinoma ⁴	6.061%	1.80	1.35	100.0%	0.0%	0.0%	3.84	3.60	77.4%	22.6%	0.0%
nasopharynx and paranasal sinuses squamous cell carcinoma (scc) ⁴	3.125%	1.80	1.80	100.0%	0.0%	0.0%	6.67	4.50	56.5%	35.5%	8.1%
lung adenoid cystic carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	4.69	1.80	88.7%	9.7%	1.6%
head and neck carcinoma (nos) ⁴	1.613%	7.21	7.21	0.0%	100.0%	0.0%	5.74	3.60	62.3%	34.4%	3.3%
brain gliosarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	5.71	3.34	82.0%	16.4%	1.6%
rectum squamous cell carcinoma (scc) ⁴	3.279%	2.70	2.70	100.0%	0.0%	0.0%	6.55	5.41	49.2%	47.5%	3.4%
soft tissue epithelioid sarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	1.87	1.67	94.9%	5.1%	0.0%
soft tissue paraganglioma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.61	1.80	83.1%	16.9%	0.0%
pancreas neuroendocrine tumor (pnet) ⁴	0.000%	0.00	0.00	NA	NA	NA	11.13	1.80	84.7%	11.9%	3.4%
ampullary adenocarcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	4.03	2.70	75.4%	22.8%	1.8%
ovary mucinous carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.72	1.80	85.7%	12.5%	1.8%
peritoneum adenocarcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.90	2.70	83.9%	16.1%	0.0%
stomach adenocarcinoma intestinal type ⁴	1.786%	5.41	5.41	0.0%	100.0%	0.0%	8.83	4.50	56.4%	34.5%	9.1%
unknown primary neuroendocrine tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	7.76	2.70	72.7%	23.6%	3.6%
soft tissue clear cell sarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.71	1.67	89.1%	7.3%	3.6%
salivary gland mucoepidermoid carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	12.93	3.60	68.5%	18.5%	13.0%
appendix goblet cell carcinoid (gcc) ⁴	0.000%	0.00	0.00	NA	NA	NA	3.67	2.70	77.8%	20.4%	1.9%
small intestine carcinoid ⁴	0.000%	0.00	0.00	NA	NA	NA	1.28	0.90	98.1%	1.9%	0.0%
salivary gland duct carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	4.71	3.60	71.2%	28.8%	0.0%
soft tissue hemangioendothelioma ⁴	0.000%	0.00	0.00	NA	NA	NA	1.24	0.83	94.2%	5.8%	0.0%
unknown primary malignant neoplasm ⁴	0.000%	0.00	0.00	NA	NA	NA	8.46	2.50	71.2%	17.3%	11.5%
prostate ductal adenocarcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.69	2.70	84.0%	14.0%	2.0%
breast angiosarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.56	2.50	89.8%	10.2%	0.0%
kidney carcinoma (nos) ⁴	2.041%	2.70	2.70	100.0%	0.0%	0.0%	4.99	2.70	81.3%	12.5%	6.3%
liver hepatoblastoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.82	1.67	81.3%	16.7%	2.1%

soft tissue inflammatory myofibroblastic tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	9.16	1.67	89.6%	8.3%	2.1%
brain ganglioglioma ⁴	0.000%	0.00	0.00	NA	NA	NA	1.25	0.90	100.0%	0.0%	0.0%
fallopian tube adenocarcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	4.58	3.60	65.2%	34.8%	0.0%
unknown primary undifferentiated large cell carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	8.46	4.50	54.3%	34.8%	10.9%
brain anaplastic oligodendroglioma ⁴	0.000%	0.00	0.00	NA	NA	NA	8.79	2.70	73.3%	15.6%	11.1%
small intestine neuroendocrine carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	4.14	1.80	91.1%	6.7%	2.2%
breast neuroendocrine carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	5.18	4.50	52.3%	47.7%	0.0%
anus melanoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.21	3.15	81.8%	18.2%	0.0%
adrenal gland pheochromocytoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.13	1.80	90.7%	9.3%	0.0%
brain hemangiopericytoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.46	1.67	92.9%	4.8%	2.4%
stomach neuroendocrine carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	8.52	3.60	64.3%	33.3%	2.4%
soft tissue alveolar soft part sarcoma ⁴	2.381%	3.60	3.60	100.0%	0.0%	0.0%	1.49	0.83	90.2%	9.8%	0.0%
ovary germ cell tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	5.30	2.70	70.7%	24.4%	4.9%
unknown primary sarcoma (nos) ⁴	0.000%	0.00	0.00	NA	NA	NA	6.57	2.50	85.4%	9.8%	4.9%
liver hepatocellular carcinoma (flo) ⁴	0.000%	0.00	0.00	NA	NA	NA	1.71	1.80	95.1%	4.9%	0.0%
uterus adenosarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.04	2.60	85.0%	15.0%	0.0%
soft tissue schwannoma ⁴	0.000%	0.00	0.00	NA	NA	NA	1.18	0.90	100.0%	0.0%	0.0%
vagina squamous cell carcinoma (scc) ⁴	0.000%	0.00	0.00	NA	NA	NA	7.21	4.50	53.8%	41.0%	5.1%
head and neck mucoepidermoid carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	7.14	3.60	76.9%	15.4%	7.7%
brain primitive neuroectoderm tumor (pnet) ⁴	0.000%	0.00	0.00	NA	NA	NA	2.84	2.70	81.6%	18.4%	0.0%
soft tissue hemangiopericytoma ⁴	0.000%	0.00	0.00	NA	NA	NA	1.41	0.83	92.1%	7.9%	0.0%
bladder squamous cell carcinoma (scc) ⁴	7.500%	15.32	11.71	33.3%	33.3%	33.3%	9.45	7.21	27.0%	62.2%	10.8%
cervix neuroendocrine carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	5.36	3.60	67.6%	29.7%	2.7%
soft tissue perivascular epithelioid cell tumor (pecoma) ⁴	0.000%	0.00	0.00	NA	NA	NA	2.39	2.50	91.9%	8.1%	0.0%

pituitary adenoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.31	1.80	91.9%	8.1%	0.0%
bladder small cell carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	6.72	5.41	42.9%	57.1%	0.0%
brain anaplastic meningioma ⁴	0.000%	0.00	0.00	NA	NA	NA	8.90	2.70	80.0%	8.6%	11.4%
unknown primary carcinosarcoma ⁴	2.857%	25.23	25.23	0.0%	0.0%	100.0%	5.36	3.60	73.5%	20.6%	5.9%
vulva melanoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.44	3.15	82.4%	17.6%	0.0%
breast phyllodes tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	2.98	2.70	85.3%	14.7%	0.0%
ovary small cell carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.80	0.90	88.2%	8.8%	2.9%
urachus carcinoma (nos) ⁴	0.000%	0.00	0.00	NA	NA	NA	3.79	3.60	72.7%	27.3%	0.0%
head and neck neuroendocrine carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	9.35	4.50	56.3%	25.0%	18.8%
kidney collecting duct carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.45	2.70	76.7%	23.3%	0.0%
nasopharynx and paranasal sinuses esthesioneuroblastoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.25	0.90	86.7%	13.3%	0.0%
bladder neuroendocrine carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	9.01	7.66	33.3%	60.0%	6.7%
brain astrocytoma pilomyxoid ⁴	0.000%	0.00	0.00	NA	NA	NA	1.11	0.90	93.1%	6.9%	0.0%
kidney chromophobe carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.30	1.80	96.6%	3.4%	0.0%
lymph node lymphoma marginal zone ⁴	0.000%	0.00	0.00	NA	NA	NA	3.19	3.34	79.3%	20.7%	0.0%
cervix adenosquamous carcinoma ⁴	3.448%	3.60	3.60	100.0%	0.0%	0.0%	7.82	3.60	64.3%	25.0%	10.7%
brain pleomorphic xanthoastrocytoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.25	1.29	89.3%	10.7%	0.0%
esophagus neuroendocrine carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	6.53	4.50	57.1%	39.3%	3.6%
colon gist ⁴	0.000%	0.00	0.00	NA	NA	NA	2.31	1.80	82.1%	17.9%	0.0%
lung sarcoma ⁴	3.571%	0.00	0.00	100.0%	0.0%	0.0%	11.23	3.34	55.6%	29.6%	14.8%
brain choroid plexus tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	3.32	2.70	77.8%	22.2%	0.0%
brain atypical teratoid rhabdoid tumor (atrt) ⁴	0.000%	0.00	0.00	NA	NA	NA	1.79	1.67	88.9%	11.1%	0.0%
spine ependymoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.43	1.80	92.6%	7.4%	0.0%
brain diffuse astrocytoma ⁴	0.000%	0.00	0.00	NA	NA	NA	1.67	0.90	92.6%	7.4%	0.0%
ovary carcinoma mixed histology ⁴	0.000%	0.00	0.00	NA	NA	NA	3.97	2.70	81.5%	14.8%	3.7%
nasopharynx and paranasal sinuses adenocarcinoma ⁴	3.704%	0.90	0.90	100.0%	0.0%	0.0%	4.29	2.70	69.2%	26.9%	3.8%
rectum neuroendocrine carcinoma ⁴	3.704%	8.11	8.11	0.0%	100.0%	0.0%	12.13	3.15	76.9%	11.5%	11.5%
soft tissue primitive neuroectoderm tumor (pnet) ⁴	0.000%	0.00	0.00	NA	NA	NA	6.98	3.34	65.4%	26.9%	7.7%

ovary neuroendocrine carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	9.77	2.70	76.9%	19.2%	3.8%
ovary sex-cord stromal tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	2.31	1.80	92.3%	7.7%	0.0%
mediastinum germ cell tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	4.24	1.80	80.8%	15.4%	3.8%
head and neck esthesioneuroblastoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.56	2.70	84.0%	12.0%	4.0%
kidney medullary carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.05	1.80	92.0%	8.0%	0.0%
brain embryonal tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	2.40	0.90	79.2%	20.8%	0.0%
vagina melanoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.64	3.60	62.5%	37.5%	0.0%
skin dermatofibrosarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	1.96	1.67	95.8%	4.2%	0.0%
anus basaloid carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	4.78	3.60	73.9%	21.7%	4.3%
gallbladder carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	4.58	3.60	73.9%	26.1%	0.0%
soft tissue rhabdomyosarcoma pleomorphic ⁴	0.000%	0.00	0.00	NA	NA	NA	3.52	2.50	69.6%	30.4%	0.0%
lung typical carcinoid ⁴	0.000%	0.00	0.00	NA	NA	NA	1.33	0.90	100.0%	0.0%	0.0%
breast adenoid cystic carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.23	2.70	95.7%	4.3%	0.0%
brain hemangioblastoma ⁴	0.000%	0.00	0.00	NA	NA	NA	1.64	1.80	100.0%	0.0%	0.0%
salivary gland myoepithelial carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	15.19	1.80	86.4%	4.5%	9.1%
cervix small cell carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	5.04	4.05	63.6%	36.4%	0.0%
vagina adenocarcinoma ⁴	4.545%	11.71	11.71	0.0%	100.0%	0.0%	6.48	3.60	66.7%	28.6%	4.8%
salivary gland carcinoma ex pleomorphic adenoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.65	3.60	66.7%	33.3%	0.0%
brain craniopharyngioma ⁴	0.000%	0.00	0.00	NA	NA	NA	0.94	0.90	100.0%	0.0%	0.0%
bone sarcoma (nos) ⁴	0.000%	0.00	0.00	NA	NA	NA	4.09	2.50	90.5%	4.8%	4.8%
soft tissue follicular dendritic cell sarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	10.53	2.50	76.2%	14.3%	9.5%
head and neck adenocarcinoma ⁴	4.762%	2.70	2.70	100.0%	0.0%	0.0%	5.36	3.60	55.0%	40.0%	5.0%
cervix clear cell adenocarcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	6.76	1.80	75.0%	15.0%	10.0%
gallbladder adenosquamous carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.69	3.60	85.0%	15.0%	0.0%
soft tissue round cell tumor (nos) ⁴	5.000%	2.50	2.50	100.0%	0.0%	0.0%	2.61	1.67	94.7%	5.3%	0.0%
testis germ cell tumor (seminoma) ⁴	0.000%	0.00	0.00	NA	NA	NA	2.13	1.80	89.5%	10.5%	0.0%
uterus neuroendocrine carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	10.57	4.50	52.6%	26.3%	21.1%
breast sarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.25	3.76	77.8%	22.2%	0.0%
cervix undifferentiated carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	6.46	3.60	66.7%	22.2%	11.1%
soft tissue myoepithelial	0.000%	0.00	0.00	NA	NA	NA	4.01	2.70	72.2%	27.8%	0.0%

carcinoma ⁴												
soft tissue teratoma ⁴	0.000%	0.00	0.00	NA	NA	NA	1.99	1.80	83.3%	16.7%	0.0%	
breast ductal carcinoma in situ (dcis) ⁴	0.000%	0.00	0.00	NA	NA	NA	1.80	1.35	100.0%	0.0%	0.0%	
skin extramammary pagets disease ⁴	0.000%	0.00	0.00	NA	NA	NA	5.91	5.41	44.4%	55.6%	0.0%	
bone giant cell tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	0.98	0.00	94.4%	5.6%	0.0%	
urethra urothelial carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	8.01	5.41	38.9%	44.4%	16.7%	
liver mixed hepatocellular cholangiocarcinoma ⁴	10.526%	2.25	2.25	100.0%	0.0%	0.0%	3.07	3.60	88.2%	11.8%	0.0%	
lung carcinosarcoma ⁴	5.556%	12.61	12.61	0.0%	100.0%	0.0%	7.63	6.31	29.4%	70.6%	0.0%	
soft tissue osteosarcoma (extraskkeletal) ⁴	0.000%	0.00	0.00	NA	NA	NA	3.31	2.50	82.4%	17.6%	0.0%	
urethra squamous cell carcinoma (scc) ⁴	0.000%	0.00	0.00	NA	NA	NA	7.06	5.41	47.1%	47.1%	5.9%	
soft tissue neurofibroma ⁴	0.000%	0.00	0.00	NA	NA	NA	1.02	0.90	100.0%	0.0%	0.0%	
breast mucinous carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.70	1.80	76.5%	23.5%	0.0%	
unknown primary germ cell tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	7.37	3.60	70.6%	23.5%	5.9%	
pancreas intraductal papillary mucinous tumor (ipmt) ⁴	0.000%	0.00	0.00	NA	NA	NA	2.48	1.80	88.2%	11.8%	0.0%	
brain pineoblastoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.72	1.80	88.2%	11.8%	0.0%	
breast inflammatory carcinoma ⁴	5.882%	7.21	7.21	0.0%	100.0%	0.0%	3.32	1.80	68.8%	31.3%	0.0%	
testis germ cell tumor (mixed) ⁴	0.000%	0.00	0.00	NA	NA	NA	4.90	1.80	68.8%	18.8%	12.5%	
parathyroid carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	6.25	1.80	68.8%	18.8%	12.5%	
soft tissue follicular dendrite cell sarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.07	2.50	75.0%	25.0%	0.0%	
pancreas solid pseudopapillary tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	1.35	0.90	100.0%	0.0%	0.0%	
pineal parenchymal tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	1.80	1.80	93.3%	6.7%	0.0%	
lung solitary fibrous tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	2.45	1.67	93.3%	6.7%	0.0%	
heart sarcoma (nos) ⁴	0.000%	0.00	0.00	NA	NA	NA	4.29	4.17	53.3%	46.7%	0.0%	
ovary serous tumor (lmp) ⁴	0.000%	0.00	0.00	NA	NA	NA	2.04	1.80	93.3%	6.7%	0.0%	
kidney sarcoma (nos) ⁴	0.000%	0.00	0.00	NA	NA	NA	2.75	2.50	85.7%	14.3%	0.0%	
soft tissue granular cell tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	1.14	1.29	100.0%	0.0%	0.0%	
colon carcinoid tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	2.06	0.90	78.6%	21.4%	0.0%	
soft tissue hemangioma ⁴	0.000%	0.00	0.00	NA	NA	NA	1.38	0.87	100.0%	0.0%	0.0%	
bone marrow leukemia non-lymphocytic acute promyelocytic (apl) ⁴	0.000%	0.00	0.00	NA	NA	NA	1.16	0.83	100.0%	0.0%	0.0%	
urethra adenocarcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	5.20	5.41	38.5%	61.5%	0.0%	
skin lymphoma (nos) ⁴	0.000%	0.00	0.00	NA	NA	NA	5.52	5.01	46.2%	53.8%	0.0%	
gallbladder squamous cell	0.000%	0.00	0.00	NA	NA	NA	6.63	5.41	36.4%	63.6%	0.0%	

carcinoma (scc) ⁴												
brain neurocytoma ⁴	0.000%	0.00	0.00	NA	NA	NA	1.56	1.80	100.0%	0.0%	0.0%	
lung mucoepidermoid carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.93	1.80	72.7%	27.3%	0.0%	
soft tissue ganglioneuroma ⁴	0.000%	0.00	0.00	NA	NA	NA	0.66	0.00	100.0%	0.0%	0.0%	
soft tissue myoepithelioma ⁴	0.000%	0.00	0.00	NA	NA	NA	9.51	0.83	90.9%	0.0%	9.1%	
eye lacrimal duct carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.93	4.50	63.6%	36.4%	0.0%	
thyroid follicular oncocyctic carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.46	2.70	100.0%	0.0%	0.0%	
vulva adenocarcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	6.31	5.41	36.4%	63.6%	0.0%	
skin sarcoma (nos) ⁴	9.091%	19.20	19.20	0.0%	100.0%	0.0%	18.28	1.29	70.0%	0.0%	30.0%	
soft tissue angiomyolipoma ⁴	0.000%	0.00	0.00	NA	NA	NA	1.60	1.29	100.0%	0.0%	0.0%	
pancreas islet cell tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	2.61	1.80	90.0%	10.0%	0.0%	
ovary sarcoma (nos) ⁴	0.000%	0.00	0.00	NA	NA	NA	4.34	3.76	60.0%	40.0%	0.0%	
liver angiosarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.35	1.67	77.8%	22.2%	0.0%	
placenta choriocarcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	5.51	4.50	55.6%	44.4%	0.0%	
soft tissue leiomyomatosis ⁴	0.000%	0.00	0.00	NA	NA	NA	3.20	2.70	88.9%	11.1%	0.0%	
soft tissue extrarenal rhabdoid tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	1.02	0.83	100.0%	0.0%	0.0%	
breast carcinoma (tnbc) ⁴	0.000%	0.00	0.00	NA	NA	NA	5.41	3.60	66.7%	33.3%	0.0%	
skin atypical fibroxanthoma ⁴	11.111%	81.79	81.79	0.0%	0.0%	100.0%	28.73	30.04	37.5%	0.0%	62.5%	
thymus neuroendocrine carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	1.80	0.90	100.0%	0.0%	0.0%	
small intestine leiomyosarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.26	1.25	87.5%	12.5%	0.0%	
brain germ cell tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	2.55	2.70	100.0%	0.0%	0.0%	
uterus perivascular epithelioid cell tumor (pecoma) ⁴	0.000%	0.00	0.00	NA	NA	NA	2.33	1.25	87.5%	12.5%	0.0%	
head and neck myoepithelial carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	1.46	0.90	100.0%	0.0%	0.0%	
anus adenosquamous carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	10.92	5.86	50.0%	25.0%	25.0%	
lung pulmonary blastoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.03	1.80	100.0%	0.0%	0.0%	
bladder leiomyosarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.22	2.50	100.0%	0.0%	0.0%	
kidney malignant rhabdoid tumor (mrt) ⁴	0.000%	0.00	0.00	NA	NA	NA	1.16	1.25	100.0%	0.0%	0.0%	
skin desmoplastic melanoma ⁴	0.000%	0.00	0.00	NA	NA	NA	59.46	49.10	0.0%	12.5%	87.5%	
spine glioma (nos) ⁴	0.000%	0.00	0.00	NA	NA	NA	2.19	1.80	85.7%	14.3%	0.0%	
testis sertoli cell tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	2.45	3.60	100.0%	0.0%	0.0%	
soft tissue ossifying fibromyxoid tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	3.22	1.67	71.4%	28.6%	0.0%	
head and neck ameloblastoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.09	2.70	85.7%	14.3%	0.0%	
soft tissue giant cell tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	1.19	0.83	100.0%	0.0%	0.0%	

spleen sarcoma (nos) ⁴	0.000%	0.00	0.00	NA	NA	NA	4.60	3.34	71.4%	28.6%	0.0%
unknown primary mucoepidermoid carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	5.53	5.41	42.9%	57.1%	0.0%
peritoneum mucinous carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	1.80	0.90	100.0%	0.0%	0.0%
placenta trophoblastic tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	5.92	5.41	42.9%	57.1%	0.0%
soft tissue nut midline carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	1.02	1.25	100.0%	0.0%	0.0%
liver hemangioendothelioma ⁴	0.000%	0.00	0.00	NA	NA	NA	1.39	0.83	100.0%	0.0%	0.0%
soft tissue granulocytic sarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	6.44	6.26	16.7%	83.3%	0.0%
soft tissue histiocytosis rosai-dorfman ⁴	0.000%	0.00	0.00	NA	NA	NA	0.74	0.42	100.0%	0.0%	0.0%
skin kaposi sarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.78	2.92	83.3%	16.7%	0.0%
spleen angiosarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.06	3.34	83.3%	16.7%	0.0%
rectum carcinoid tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	2.55	2.25	83.3%	16.7%	0.0%
stomach leiomyosarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.78	2.50	83.3%	16.7%	0.0%
urethra clear cell carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	5.26	5.41	33.3%	66.7%	0.0%
trachea adenoid cystic carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.25	1.35	83.3%	16.7%	0.0%
peritoneum clear cell carcinoma ⁴	16.667%	5.41	5.41	0.0%	100.0%	0.0%	4.86	4.50	60.0%	40.0%	0.0%
brain gliosis ⁴	0.000%	0.00	0.00	NA	NA	NA	2.16	0.90	80.0%	20.0%	0.0%
skin melanocyte dysplasia ⁴	0.000%	0.00	0.00	NA	NA	NA	3.06	2.70	80.0%	20.0%	0.0%
brain meningeal sarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	1.37	1.67	100.0%	0.0%	0.0%
pituitary carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.42	1.80	80.0%	20.0%	0.0%
small intestine gastrointestinal neuroectodermal tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	1.60	1.67	100.0%	0.0%	0.0%
salivary gland undifferentiated carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	37.84	14.41	20.0%	40.0%	40.0%
ovary sertoli-leydig cell tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	2.30	1.67	100.0%	0.0%	0.0%
pancreas mucinous cystadenocarcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.52	2.70	100.0%	0.0%	0.0%
unknown primary adenosarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	6.31	3.60	60.0%	40.0%	0.0%
bone giant cell lesion (nos) ⁴	0.000%	0.00	0.00	NA	NA	NA	0.36	0.00	100.0%	0.0%	0.0%
pancreas pancreatoblastoma ⁴	0.000%	0.00	0.00	NA	NA	NA	4.03	5.01	40.0%	60.0%	0.0%
thymus atypical carcinoid ⁴	0.000%	0.00	0.00	NA	NA	NA	1.98	1.80	100.0%	0.0%	0.0%
skin appendage tumor (nos) ⁴	0.000%	0.00	0.00	NA	NA	NA	7.39	3.60	80.0%	0.0%	20.0%
skin glomus tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	2.52	1.80	100.0%	0.0%	0.0%
unknown primary malignant solid tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	2.70	1.80	80.0%	20.0%	0.0%
bone adamantinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.92	2.50	80.0%	20.0%	0.0%
pancreas solid and papillary	0.000%	0.00	0.00	NA	NA	NA	1.80	1.80	100.0%	0.0%	0.0%

tumor ⁴												
soft tissue malignant fibrous histiocytoma (mfh) ⁴	0.000%	0.00	0.00	NA	NA	NA	2.22	2.50	100.0%	0.0%	0.0%	
prostate sarcoma (nos) ⁴	0.000%	0.00	0.00	NA	NA	NA	3.51	3.34	80.0%	20.0%	0.0%	
brain subependymoma ⁴	0.000%	0.00	0.00	NA	NA	NA	0.36	0.00	100.0%	0.0%	0.0%	
soft tissue hamartoma ⁴	0.000%	0.00	0.00	NA	NA	NA	0.85	0.83	100.0%	0.0%	0.0%	
colon dysplasia ⁴	0.000%	0.00	0.00	NA	NA	NA	4.32	4.50	60.0%	40.0%	0.0%	
extranodal malt lymphoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.09	2.09	100.0%	0.0%	0.0%	
vagina neuroendocrine carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	4.05	2.70	75.0%	25.0%	0.0%	
uterus endometrial small cell carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	7.21	3.60	75.0%	0.0%	25.0%	
uterus gestational trophoblastic tumor epitheloid ⁴	0.000%	0.00	0.00	NA	NA	NA	6.76	6.76	50.0%	50.0%	0.0%	
pancreas invasive intraductal papillary mucinous tumor (ipmt) ⁴	0.000%	0.00	0.00	NA	NA	NA	3.38	3.15	50.0%	50.0%	0.0%	
testis leydig cell tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	2.93	3.15	75.0%	25.0%	0.0%	
duodenum neuroendocrine tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	1.13	0.45	100.0%	0.0%	0.0%	
nasopharynx and paranasal sinuses teratocarcinosarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.15	3.60	100.0%	0.0%	0.0%	
brain pineal parenchymal tumor of intermediate differentiation (pptid) ⁴	0.000%	0.00	0.00	NA	NA	NA	2.93	2.25	75.0%	25.0%	0.0%	
pericardium mesothelioma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.70	2.25	75.0%	25.0%	0.0%	
bone chondroblastoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.92	2.92	75.0%	25.0%	0.0%	
head and neck odontogenic carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	15.77	4.95	50.0%	25.0%	25.0%	
soft tissue myoepithelial neoplasm ⁴	25.000%	3.34	3.34	100.0%	0.0%	0.0%	1.67	2.50	100.0%	0.0%	0.0%	
trachea squamous cell carcinoma (scc) ⁴	25.000%	9.01	9.01	0.0%	100.0%	0.0%	10.21	12.61	33.3%	66.7%	0.0%	
spine astrocytoma ⁴	0.000%	0.00	0.00	NA	NA	NA	0.30	0.00	100.0%	0.0%	0.0%	
ureter small cell carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	6.31	5.41	33.3%	66.7%	0.0%	
lung lymphoepithelioma ⁴	0.000%	0.00	0.00	NA	NA	NA	7.21	1.80	66.7%	33.3%	0.0%	
prostate carcinosarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.45	2.70	66.7%	33.3%	0.0%	
head and neck spindle cell carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	8.28	5.01	33.3%	66.7%	0.0%	
unknown primary myoepithelial carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.30	3.60	100.0%	0.0%	0.0%	
breast carcinosarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.40	1.80	100.0%	0.0%	0.0%	
duodenum adenosquamous carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.70	2.70	100.0%	0.0%	0.0%	

soft tissue pigmented villonodular synovitis ⁴	0.000%	0.00	0.00	NA	NA	NA	0.28	0.00	100.0%	0.0%	0.0%
head and neck endolymphatic sac tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	7.81	2.70	66.7%	33.3%	0.0%
thymus thymoma lymphocytic ⁴	0.000%	0.00	0.00	NA	NA	NA	0.56	0.83	100.0%	0.0%	0.0%
soft tissue arteriovenous malformation ⁴	0.000%	0.00	0.00	NA	NA	NA	0.60	0.90	100.0%	0.0%	0.0%
soft tissue lymphangioma ⁴	0.000%	0.00	0.00	NA	NA	NA	0.30	0.00	100.0%	0.0%	0.0%
penis urothelial carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	5.71	7.21	33.3%	66.7%	0.0%
bone odontogenic carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	6.31	5.41	33.3%	66.7%	0.0%
eye intraocular squamous cell carcinoma (scc) ⁴	0.000%	0.00	0.00	NA	NA	NA	64.57	6.31	0.0%	66.7%	33.3%
cns sarcoma (nos) ⁴	0.000%	0.00	0.00	NA	NA	NA	1.39	1.67	100.0%	0.0%	0.0%
bone osteoblastoma ⁴	0.000%	0.00	0.00	NA	NA	NA	6.40	7.51	33.3%	66.7%	0.0%
ureter adenocarcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.70	2.70	100.0%	0.0%	0.0%
soft tissue myofibromatosis ⁴	0.000%	0.00	0.00	NA	NA	NA	0.00	0.00	100.0%	0.0%	0.0%
salivary gland masc	0.000%	0.00	0.00	NA	NA	NA	3.90	4.50	66.7%	33.3%	0.0%
breast myoepithelial carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	1.80	1.80	100.0%	0.0%	0.0%
uterus smooth muscle tumor of uncertain malignant potential (stump) ⁴	0.000%	0.00	0.00	NA	NA	NA	2.50	1.67	66.7%	33.3%	0.0%
soft tissue ependymoma ⁴	33.333%	4.50	4.50	100.0%	0.0%	0.0%	1.67	1.67	100.0%	0.0%	0.0%
brain gangliocytoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.60	3.60	100.0%	0.0%	0.0%
uterus malignant mixed mesodermal tumor (mmt) ⁴	0.000%	0.00	0.00	NA	NA	NA	3.34	3.34	100.0%	0.0%	0.0%
fallopian tube carcinosarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	5.41	5.41	50.0%	50.0%	0.0%
scrotum squamous cell carcinoma (scc) ⁴	0.000%	0.00	0.00	NA	NA	NA	51.35	51.35	50.0%	0.0%	50.0%
ovary sex cord tumor with annular tubules (sctat) ⁴	0.000%	0.00	0.00	NA	NA	NA	1.35	1.35	100.0%	0.0%	0.0%
retroperitoneum germ cell tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	1.80	1.80	100.0%	0.0%	0.0%
kidney rhabdomyosarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	0.83	0.83	100.0%	0.0%	0.0%
soft tissue histiocytoma juvenile xanthogranuloma ⁴	0.000%	0.00	0.00	NA	NA	NA	0.00	0.00	100.0%	0.0%	0.0%
testis sex cord stromal tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	2.70	2.70	50.0%	50.0%	0.0%
ovary carcinoid tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	1.35	1.35	100.0%	0.0%	0.0%
ovary female adnexal tumor of wolffian origin ⁴	0.000%	0.00	0.00	NA	NA	NA	1.35	1.35	100.0%	0.0%	0.0%
salivary gland clear cell carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	5.86	5.86	50.0%	50.0%	0.0%
unknown primary, sarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.02	2.02	100.0%	0.0%	0.0%
head and neck	0.000%	0.00	0.00	NA	NA	NA	5.41	5.41	50.0%	50.0%	0.0%

lymphoepithelioma ⁴												
head and neck squamous papilloma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.25	2.25	100.0%	0.0%	0.0%	
mds-mpn ⁴	0.000%	0.00	0.00	NA	NA	NA	0.42	0.42	100.0%	0.0%	0.0%	
soft tissue rhabdomyosarcoma, embryonal ⁴	0.000%	0.00	0.00	NA	NA	NA	2.52	2.52	100.0%	0.0%	0.0%	
brain dysembryoplastic neuroepithelial tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	0.90	0.90	100.0%	0.0%	0.0%	
nasopharynx and paranasal sinuses lymphoepithelioma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.70	2.70	100.0%	0.0%	0.0%	
bone epithelioid hemangioendothelioma ⁴	0.000%	0.00	0.00	NA	NA	NA	0.83	0.83	100.0%	0.0%	0.0%	
brain dysembryonic neuroepithelial tumor (dnet) ⁴	0.000%	0.00	0.00	NA	NA	NA	0.45	0.45	100.0%	0.0%	0.0%	
breast papillary carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	4.50	4.50	50.0%	50.0%	0.0%	
head and neck squamous cell carcinoma (scc) ⁴	0.000%	0.00	0.00	NA	NA	NA	1.80	1.80	100.0%	0.0%	0.0%	
stomach kaposi sarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	0.00	0.00	100.0%	0.0%	0.0%	
pancreas hepatoid carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	0.90	0.90	100.0%	0.0%	0.0%	
esophagus squamous cell carcinoma (scc) in situ ⁴	0.000%	0.00	0.00	NA	NA	NA	6.31	6.31	0.0%	100.0%	0.0%	
liver embryonal sarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	5.01	5.01	0.0%	100.0%	0.0%	
soft tissue tumor with myopericytic differentiation ⁴	0.000%	0.00	0.00	NA	NA	NA	1.67	1.67	100.0%	0.0%	0.0%	
lung glomus tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	2.70	2.70	100.0%	0.0%	0.0%	
kidney oncocytoma ⁴	0.000%	0.00	0.00	NA	NA	NA	0.90	0.90	100.0%	0.0%	0.0%	
colon glomus tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	1.67	1.67	100.0%	0.0%	0.0%	
heart myxoma ⁴	0.000%	0.00	0.00	NA	NA	NA	4.17	4.17	100.0%	0.0%	0.0%	
gallbladder dysplasia ⁴	0.000%	0.00	0.00	NA	NA	NA	1.80	1.80	100.0%	0.0%	0.0%	
soft tissue rhabdomyosarcoma, pleomorphic ⁴	0.000%	0.00	0.00	NA	NA	NA	1.01	1.01	100.0%	0.0%	0.0%	
testis paratesticular serous carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	0.00	0.00	100.0%	0.0%	0.0%	
soft tissue angiomatoid fibrous histiocytoma ⁴	0.000%	0.00	0.00	NA	NA	NA	0.83	0.83	100.0%	0.0%	0.0%	
head and neck spindle epithelial tumor with thymus-like differentiation (settle) ⁴	0.000%	0.00	0.00	NA	NA	NA	4.17	4.17	100.0%	0.0%	0.0%	
prostate adenoid cystic carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	18.02	18.02	0.0%	100.0%	0.0%	
cowper's gland adenoid cystic carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.60	3.60	100.0%	0.0%	0.0%	

vulva basaloid carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	1.80	1.80	100.0%	0.0%	0.0%
soft tissue, proliferative disorder nos ⁴	0.000%	0.00	0.00	NA	NA	NA	0.90	0.90	100.0%	0.0%	0.0%
ovary mucinous tumor (Imp) ⁴	0.000%	0.00	0.00	NA	NA	NA	1.80	1.80	100.0%	0.0%	0.0%
fallopian tube lymphangioleiomyomatosis (lam) ⁴	0.000%	0.00	0.00	NA	NA	NA	0.90	0.90	100.0%	0.0%	0.0%
peritoneum endometrioid adenocarcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.70	2.70	100.0%	0.0%	0.0%
soft tissue spindle cell lipoma ⁴	0.000%	0.00	0.00	NA	NA	NA	0.00	0.00	100.0%	0.0%	0.0%
brain melanocytoma ⁴	0.000%	0.00	0.00	NA	NA	NA	0.90	0.90	100.0%	0.0%	0.0%
kidney sarcoma, clear cell ⁴	0.000%	0.00	0.00	NA	NA	NA	2.50	2.50	100.0%	0.0%	0.0%
peritoneum serous tumor (Imp) ⁴	0.000%	0.00	0.00	NA	NA	NA	0.00	0.00	100.0%	0.0%	0.0%
lung in situ adenocarcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.60	3.60	100.0%	0.0%	0.0%
bone osteochondroma ⁴	0.000%	0.00	0.00	NA	NA	NA	0.83	0.83	100.0%	0.0%	0.0%
head and neck schneiderian carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.60	3.60	100.0%	0.0%	0.0%
head and neck schneidarian carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	5.41	5.41	0.0%	100.0%	0.0%
lung sclerosing hemangioma ⁴	0.000%	0.00	0.00	NA	NA	NA	0.00	0.00	100.0%	0.0%	0.0%
vulva adenoid cystic carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	7.21	7.21	0.0%	100.0%	0.0%
ovary endometrioid tumor (ebt/apet) ⁴	0.000%	0.00	0.00	NA	NA	NA	6.31	6.31	0.0%	100.0%	0.0%
bone fibrous dysplasia ⁴	0.000%	0.00	0.00	NA	NA	NA	0.83	0.83	100.0%	0.0%	0.0%
ovary malignant mixed mesodermal tumor (mmt) ⁴	0.000%	0.00	0.00	NA	NA	NA	6.68	6.68	0.0%	100.0%	0.0%
unknown primary, carcinoma (nos) ⁴	0.000%	0.00	0.00	NA	NA	NA	4.04	4.04	100.0%	0.0%	0.0%
soft tissue histiocytic or dendritic cell neoplasm ⁴	0.000%	0.00	0.00	NA	NA	NA	0.83	0.83	100.0%	0.0%	0.0%
unknown primary carcinoma (nos) ⁴	0.000%	0.00	0.00	NA	NA	NA	0.90	0.90	100.0%	0.0%	0.0%
ovary female adnexal tumor of wolffian origin ⁴	0.000%	0.00	0.00	NA	NA	NA	0.00	0.00	100.0%	0.0%	0.0%
unknown primary, adenocarcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.02	2.02	100.0%	0.0%	0.0%
soft tissue angiomyxoma ⁴	0.000%	0.00	0.00	NA	NA	NA	1.67	1.67	100.0%	0.0%	0.0%
colon adenomatous polyp ⁴	0.000%	0.00	0.00	NA	NA	NA	0.90	0.90	100.0%	0.0%	0.0%
breast carcinoma (nos) ⁴	0.000%	0.00	0.00	NA	NA	NA	1.80	1.80	100.0%	0.0%	0.0%
heart fibroma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.50	2.50	100.0%	0.0%	0.0%
testis mesothelioma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.60	3.60	100.0%	0.0%	0.0%
bladder gist ⁴	0.000%	0.00	0.00	NA	NA	NA	3.60	3.60	100.0%	0.0%	0.0%

bladder sarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	0.00	0.00	100.0%	0.0%	0.0%
stomach neuroectodermal tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	2.70	2.70	100.0%	0.0%	0.0%
salivary gland polymorphous low grade adenocarcinoma (plga) ⁴	0.000%	0.00	0.00	NA	NA	NA	0.90	0.90	100.0%	0.0%	0.0%
rete testis adenocarcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	1.80	1.80	100.0%	0.0%	0.0%
prostate basal cell carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	2.70	2.70	100.0%	0.0%	0.0%
uterus endometrium atypical polypoid adenomyoma (apa) ⁴	0.000%	0.00	0.00	NA	NA	NA	2.70	2.70	100.0%	0.0%	0.0%
soft tissue fibrohistiocytic tumor ⁴	0.000%	0.00	0.00	NA	NA	NA	0.00	0.00	100.0%	0.0%	0.0%
head and neck polymorphous adenocarcinoma low grade ⁴	0.000%	0.00	0.00	NA	NA	NA	0.90	0.90	100.0%	0.0%	0.0%
unknown primary neuroendocrine tumor (net) ⁴	0.000%	0.00	0.00	NA	NA	NA	0.00	0.00	100.0%	0.0%	0.0%
soft tissue lipoblastoma ⁴	0.000%	0.00	0.00	NA	NA	NA	0.90	0.90	100.0%	0.0%	0.0%
thymus thymoma mixed ⁴	0.000%	0.00	0.00	NA	NA	NA	2.50	2.50	100.0%	0.0%	0.0%
brain malignant ependymoma ⁴	0.000%	0.00	0.00	NA	NA	NA	0.90	0.90	100.0%	0.0%	0.0%
ovary transitional cell carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	5.41	5.41	0.0%	100.0%	0.0%
ovary malignant struma ovarii ⁴	0.000%	0.00	0.00	NA	NA	NA	0.90	0.90	100.0%	0.0%	0.0%
esophagus adenocarcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	3.60	3.60	100.0%	0.0%	0.0%
testis embryonal rhabdomyosarcoma ⁴	0.000%	0.00	0.00	NA	NA	NA	5.01	5.01	0.0%	100.0%	0.0%
lung, non small cell lung carcinoma ⁴	0.000%	0.00	0.00	NA	NA	NA	7.21	7.21	0.0%	100.0%	0.0%

¹Tumors with ≥ 10,000 samples

²Tumors with 1,000 to 9,999 samples

³Tumors with 100 to 999 samples

⁴Tumors with 10-99 samples

Abbreviations: NA = not available; nos = not otherwise specified; TMB = tumor mutational burden

eTable 4. Clinical Characteristics of 13 Patients With *PDL1* and/or *PDCD1LG2* (*PDL2*) Amplifications Seen at UCSD Center for Personalized Cancer Therapy

	Number (%)
Sex	
Men	9 (69%)
Women	4 (31%)
Median age in years (range)¹	59 (36-90)
Ethnicity	
White	9 (69%)
Hispanic	2 (15%)
Black	1 (8%)
Asian	1 (8%)
Malignancy	
Head and neck squamous cell carcinoma	3 (23%)
Metastatic basal cell carcinoma	2 (15%)
B-cell Non-Hodgkin lymphoma ²	2 (15%)
Ovarian carcinoma	1 (8%)
Gastric adenocarcinoma	1 (8%)
Glioblastoma	1 (8%)
Colon adenocarcinoma	1 (8%)
Bladder urothelial carcinoma	1 (8%)
Non-small cell lung cancer	1 (8%)
Disease stage	
Locally advanced disease	3 (23%)
Metastatic disease	10 (77%)
Treatment	
Median number of systemic treatments (range)	4 (1-8)
Total number of patients who received checkpoint blockade therapy	9 (69%)
Number of patients treated with PD-1/PD-L1 inhibitor monotherapy	5 (38%)
Number of patients treated with anti-CTLA4/anti-PD-1 combination therapy	1 (8%)
Number of patients treated with a PD-1/PD-L1 inhibitor plus an investigational agent	3 (23%)
Number of patients treated allogeneic stem cell transplantation	1 (8%)
Overall response rate (CR+PR/number of patients treated with checkpoint blockade)	6/9 (67%)
Median progression-free survival in months from treatment with checkpoint blockade (range) ³	15.2 (1.6 to 24.1+)
Median survival in months (range) from treatment with checkpoint blockade ³	Not reached (1.6 to 24.1+)
Median time to treatment with checkpoint blockade from biopsy used for CGP in months (range)	6.7 (2.3 to 40.3)
Genomics	
Median number of characterized genomic alterations per patient (range) (N = 13 patients)	12 (3-19)

¹Patient's age is at the time of biopsy used for comprehensive genomic profiling

²Includes one patient with primary mediastinal B-cell lymphoma and a patient with grey zone lymphoma (features intermediate between Hodgkin lymphoma and diffuse large B-cell lymphoma)

³Calculated using the method of Kaplan and Meier

Abbreviations: CGP = comprehensive genomic profiling; CI = confidence interval; CR = complete response; CTLA4 = cytotoxic T-lymphocyte associated protein 4; mb = megabase; NR = not reached; OR = odds ratio; PR = partial response; PD-1 = programmed death inhibitor-1; PD-L1 = programmed death-ligand 1

eTable 5. Patient Profiles and Treatment Response*

Patient	Age (years) /Sex ¹	Histology/Disease status	TMB (mutations/mb)/TMB level/MSI status	Characterized alterations N	Genomic alterations (excludes variants of unknown significance) ²	Best response/PFS ³ (months) to checkpoint blockade (agent)	PD-L1 IHC/% TILs per HPF ⁴	Comment(s)
1	56/M	Head and neck squamous cell carcinoma/ Metastatic	7/Intermediate/MSI stable	3	PD-L1 (CD274) amplification PDCD1LG2 amplification <i>FAT1 E4156*</i>	SD/4.4 (avelumab/41BB agonist)	Low positive ⁵ /NA	Treated with PD-L1 blockade, however, he has amplification of both PD-L1 and PD-L2
2	59/F	Ovarian serous carcinoma/ Metastatic	5/Low/MSI stable	14	PD-L1 (CD274) amplification PDCD1LG2 (PD-L2) amplification JAK2 amplification – equivocal <i>BRAF amplification – equivocal</i> <i>KRAS amplification – equivocal</i> <i>KRAS G12V</i> <i>ATR E1602*</i> <i>CCND2 amplification</i> <i>MYC amplification</i> <i>TP53 splice site 783-2A>C</i> <i>FGF23 amplification</i> <i>FGF6 amplification</i> <i>KDM5A amplification</i> <i>KEL amplification – equivocal</i>	PD/1.7 (nivolumab)	NA/NA	Possible hyper-progressor ³¹
3	76/F	Gastric adenocarcinoma/ Metastatic	13/Intermediate/MSI NA	12	PD-L1 (CD274) amplification PDCD1LG2 (PD-L2) amplification JAK2 amplification <i>ERBB3 P1212S</i> <i>MET amplification</i> <i>CCND1 amplification</i> <i>TP53 V272M</i> <i>ARID2 K198*</i> <i>FGF19 amplification</i> <i>FGF3 amplification</i> <i>FGF4 amplification</i> <i>TERT promoter -124C>T</i>	Not treated with immunotherapy	NA/NA	
4	40/M	Glioblastoma/Locally advanced	2/Low/MSI stable	12	PD-L1 (CD274) amplification PDCD1LG2 (PD-L2) amplification JAK2 amplification <i>CDK4 amplification – equivocal</i> <i>KDR amplification</i> <i>KIT amplification</i> <i>MET amplification</i> <i>PDGFRA amplification</i>	PR/5.2+ (nivolumab/cabozantinib)	Negative ⁶ /NA	Cabozantinib added for MET amplification

					<i>MDM2 amplification – equivocal</i> <i>CDKN2A/B loss ☐</i> <i>FRS2 amplification – equivocal</i> <i>RB1 splice site 2107-1G>C</i>			
5	40/M	Colon adenocarcinoma/ Metastatic	4/Low/MSI stable	5	<i>PD-L1 (CD274) amplification</i> <i>PDCD1LG2 (PD-L2) amplification</i> <i>JAK2 amplification – equivocal</i> <i>KRAS G12D</i> <i>TP53 S90fs*33</i>	Not treated with checkpoint blockade	NA/50%	There is a prior case report of a dramatic response to PD-1 blockade in a MSI-stable colorectal cancer patient ²⁰ .
6	75/M	Head and neck squamous cell carcinoma/ Metastatic	9/Intermediate/MSI stable	10	<i>PD-L1 (CD274) amplification</i> <i>PDCD1LG2 (PD-L2) amplification</i> <i>JAK2 amplification</i> <i>PIK3CA E545K</i> <i>PTCH1 M1fs*81</i> <i>SOX2 amplification</i> <i>SUFU S79fs*5</i> <i>BCL2L2 amplification – equivocal</i> <i>KEAP1 R320Q</i> <i>MLL3 C310S – subclonal</i>	PR/15.2 (nivolumab/ipilimumab)	NA/60%	
7	65/M	Bladder urothelial carcinoma/ Metastatic	21/High/MSI stable	14	<i>PD-L1 (CD274) amplification</i> <i>PDCD1LG2 amplification</i> <i>JAK2 amplification</i> <i>PIK3CA Q546R</i> <i>PTEN L25F – subclonal</i> <i>CDK12 E205*</i> <i>MYCL1 amplification</i> <i>TP53 E271K</i> <i>TP53 Q331*</i> <i>EP300 splice site 3262-25_3326del88</i> <i>RB1 Q395*</i> <i>SETD2 splice site 6964-1G>A</i> <i>SOX9 W86*</i> <i>TERT promoter -124C>T</i>	PR/17.8+ (durvalumab/OX40 agonist)	High positive ⁵ /40%	
8	36/M	Grey zone lymphoma/not applicable	16/Intermediate/MSI NA	10	<i>PD-L1 (CD274) amplification – equivocal</i> <i>PDCD1LG2 (PD-L2) amplification – equivocal</i> <i>JAK2 amplification – equivocal</i> <i>RICTOR amplification</i> <i>ARID1A G149fs*77</i> <i>FGF10 amplification</i> <i>KDM4C amplification – equivocal☐</i> <i>SOCS1 S116N</i> <i>TNFAIP3 loss exons 3-4</i> <i>TP53 G266R</i>	Not treated with checkpoint blockade	High positive ⁵ /40%	

9	60/F	Basal cell carcinoma/ Metastatic	90/Very high/MSI stable	12	PD-L1 (CD274) amplification PDCD1LG2 (PD-L2) amplification JAK2 amplification – equivocal PTCH1 E684* TP53 R342* CREBBP H397fs*38 KDM5A P325S LRP1B R2553* STAG2 Q914* TAF1 splice site 2119-1G>A TERT promoter -138_-139CC>TT WT1 S461F	PR/3.8 (nivolumab)	NA/NA	
10	39/M	Primary mediastinal B-cell lymphoma/not applicable	15/Intermediate/MSI stable	11	PD-L1 (CD274) amplification PDCD1LG2 (PD-L2) amplification JAK2 amplification IDH1 R132C ARID1A P94fs*12 B2M L7* B2M L7fs*34 FBXO11 splice site 1009-2A>G KDM4C amplification TNFAIP3 F540fs*162 TNFAIP3 1629fs*71	CR/27.2+ (allogeneic stem cell transplantation) Not treated with checkpoint blockade	NA/10%	Patient's lymphoma was refractory to multiple chemotherapeutic regimens including prior autologous stem cell transplantation.
11	58/M	Basal cell carcinoma/ Metastatic ²¹	104/Very high/MSI stable	19	PD-L1 (CD274) amplification PDCD1LG2 (PD-L2) amplification JAK2 amplification FLT1 E487K PDGFRA E459K PIK3R2 Q412* PTCH1 Q1366* PTCH1 W197* CDKN2A p16INK4a P81L TP53 P278S CDKN1A R140Q CTNNA1 R383H LRP1B splice site 9121-1G>A LRP1B W2334* MLL2 splice site 4132-1G>A NOTCH1 W287* SLIT2 K325* SMARCA4 Q1166* TERT promoter -139_-138CC>TT	PR/24.1+ (nivolumab)	Negative ⁷ /NA	
12	90/M	Head and neck squamous cell carcinoma/locally advanced	5/low/MSI stable	9	PD-L1 (CD274) amplification PDCD1LG2 (PD-L2) amplification JAK2 amplification	PR/9.0+ (pembrolizumab)	NA/NA	

					<i>CDKN2A p16INK4a R58* and p14ARF P72L APC I1307K FAT1 S1357* TERT promoter -124C>T TP53 H193N TP53 R248W</i>			
13	63/F	Non-small cell lung cancer/ Metastatic	7/Intermediate/MSI stable	12	<i>PD-L1 (CD274) amplification</i> <i>PDCD1LG2 amplification</i> <i>JAK2 amplification</i> <i>BRCA1 R1835*</i> <i>HGF amplification – equivocal⁷</i> <i>KRAS amplification, G12F</i> <i>ARID2 S4fs*1</i> <i>FGF14 amplification</i> <i>RBM10 Q358fs*125</i> <i>TERT promoter -124C>T</i> <i>TP53 S241C</i>	PD/1.6 (pembrolizumab)	High positive ⁶ /NA	Patient died before response assessment

* Where data is not available, it is due to the fact that tissue was not tested for the marker and, in some patients, there is inadequate tissue or no consent for further research use of tissue.

¹Patient's age is at the time of biopsy used for comprehensive genomic profiling

²Alterations in bold are located on chromosome 9p24.1

³ + indicates that PFS is ongoing at the time of data censoring

⁴See **eTables 1 and 2**

⁵Pathline-EMERGE. Antibody SP142 (Ventana).

⁶Foundation Medicine. Antibody SP142 (Ventana) or Dako 22C3 (pharmDx).

⁷CARIS: Antibody SP142 (Ventana)

Abbreviations: CR = complete response; FDA = Food and Drug Administration; f = female; HPF = high power field; IHC = immunohistochemistry; m = male; mb = megabase; MSI = microsatellite instability; NA = not available; PD = progressive disease; PFS = progression -free survival; PR = partial response; SD = stable disease; TILs = tumor infiltrating lymphocytes; TMB = tumor mutational burden

eTable 6. PDL1/L2 Alterations Other Than Amplifications

Patient	Age (years) ¹	Sex	Histology	Locally advanced or metastatic disease	TMB (mutations /mb)	Genomic alterations ²	Best response/PFS (months) to checkpoint blockade (agent)	Disease status at biopsy	Comment(s)
14	63	M	Head and neck squamous cell carcinoma	Metastatic	9	CD274 (PD-L1) truncation exon 7 <i>ARID2 Q1462*</i> <i>BCL2L1 amplification -equivocal #</i> <i>BCORL1 R1297*</i> <i>LRP1B G1390*</i>	PR/9.3 (HPV vaccine plus durvalumab)	Metastatic	The alteration is predicted to disrupt the 3'UTR of <i>PD-L1</i> . <i>PD-L1</i> alterations disrupting the 3' UTR have been observed in many tumor types and correlated with increased PD-L1 expression, presumably via loss of inhibitory microRNA binding sites ²⁹ .
15	53	M	Cholangiocarcinoma	Metastatic	2	PDCD1LG2 (PD-L2) PKD1P1-PDCD1LG2 rearrangement <i>FGFR2 FGFR2-ATP6V1D fusion</i> <i>CDKN2A/B loss</i>	Did not receive checkpoint blockade	Metastatic	

¹Patient's age is at the time of biopsy used for comprehensive genomic profiling

²Alterations in bold are located on chromosome 9p24.1

Abbreviations: CR = complete response; FDA = Food and Drug Administration; f = female; m = male; mb = megabase; PD = progressive disease; PFS = progression free survival; PR = partial response; SD = stable disease; TMB = tumor mutational burden; UTR = untranslated region.

Cabozantinib: started (week 9)

Cabozantinib: held (weeks 14-22)

Cabozantinib: re-started (week 23)

Nivolumab: started (week 9)

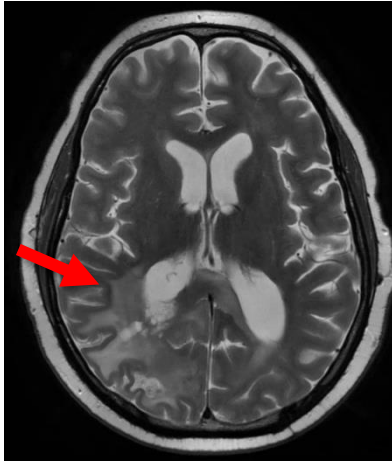
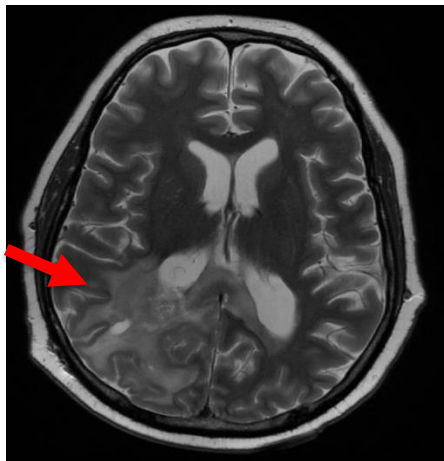
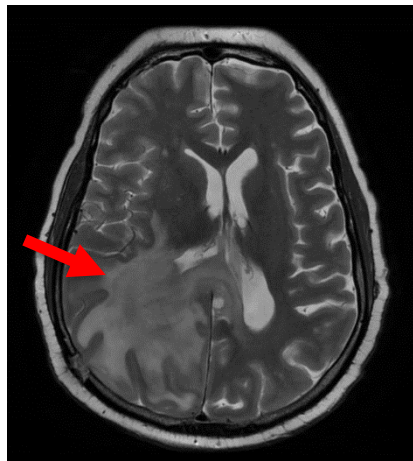
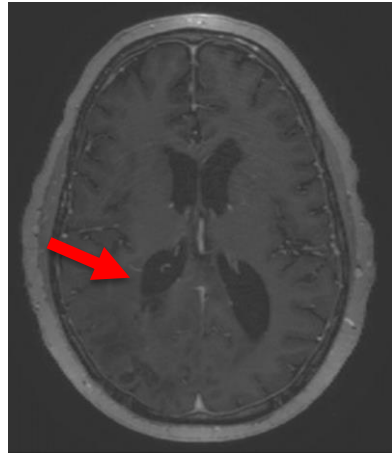
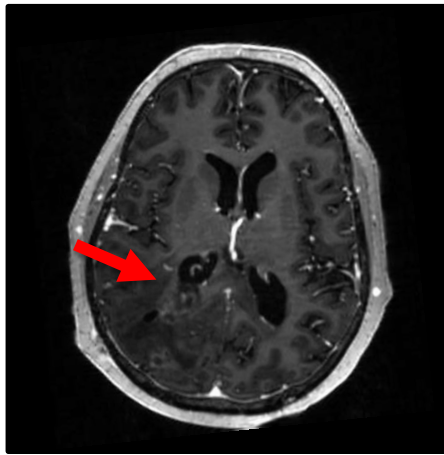
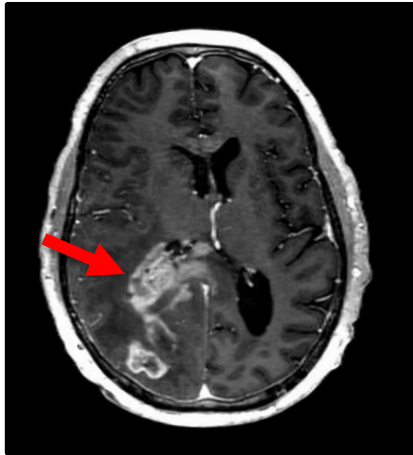
Nivolumab: held (weeks 11-23)

Nivolumab: re-started (week 24)

Baseline

Week 12

Week 26



eFigure 2: Patient # 4 with glioblastoma. Serial MRIs with contrast (T2 weighted) demonstrate decreased enhancement and mass effect about the right parietal occipital mass involving the posterior body/splenium of the corpus callosum. There is decreased leftward midline shift and less effacement of the right lateral ventric

