Variable		P-value of association		
		2 clusters	3 clusters	4 clusters
	Age	0.45	0.45	0.59
	Sex	1	0.82	0.8
	Stage (4 levels)	0.56	0.2	0.12
	Stage 3/4 vs. 1/2	0.56	0.16	0.21
	Stage 4 vs. 1/2/3	0.2	0.11	0.17
	HPV (sequencing)	6.20E-08 *	1.40E-07 *	2.00E-15 *
	HPV (clinical)	8.40E-07 *	2.80E-06 *	5.60E-12 *
	Site	3.20E-08 *	2.70E-07 *	5.00E-09 *

Supplemental Table 4. **PDX cluster associations with patient demographic and tumor variables**. Correlation of demographic and clinical characteristics of PDXs with cluster membership reveals that HPV status and tumor site are the only variables significantly correlated with hierarchical gene expression-based clustering (when partitioned by either 2, 3, or 4 clusters). Age, sex, and stage were not significantly associated with expression-based clustering in any analyses conducted.