SURVIVAL DISPARITIES FOR SOME CHILDHOOD BRAIN TUMORS EXIST WHEN DEFINED BY RACE/ETHNICITY AND SEX

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INTRODUCTION

Racial and ethnic differences in survival have been consistently reported in multiple brain tumors.

We have previously identified survival differences by sex in pediatric ependymoma.

Few studies have investigated the role of race/ethnicity and sex together.

PURPOSE

This analysis aims to understand how race/ethnicity and sex interact in pediatric brain tumor survival disparities. The findings from this study can shed light on potential biological and structural determinants of pediatric brain cancer.

METHODOLOGY

Children age 0-19 diagnosed with one of the four brain tumors (N=8,520) were identified using the Surveillance, Epidemiology, and End Results (SEER) program 18 registries (2000-2017).

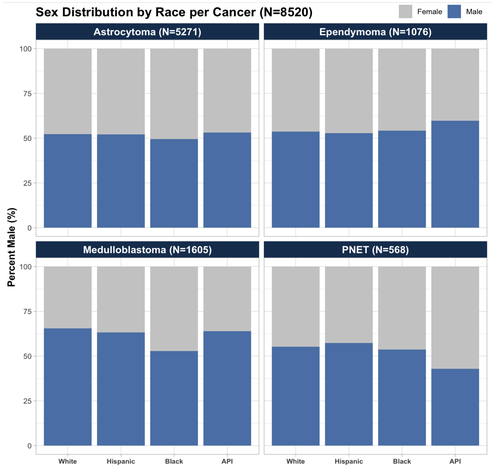
Kaplan Meier curves and Log-Rank p-values were used to identify significant differences in survival defined by race/ethnicity-sex and sex within races/ethnicity groups.

Cox proportional hazards models were used to estimate hazards ratios (HRs) and 95% confidence intervals (CIs) as the measure of association between race/ethnicity-sex and death. Sensitivity analyses were conducted using 5-, 10-, 15-year HRs.

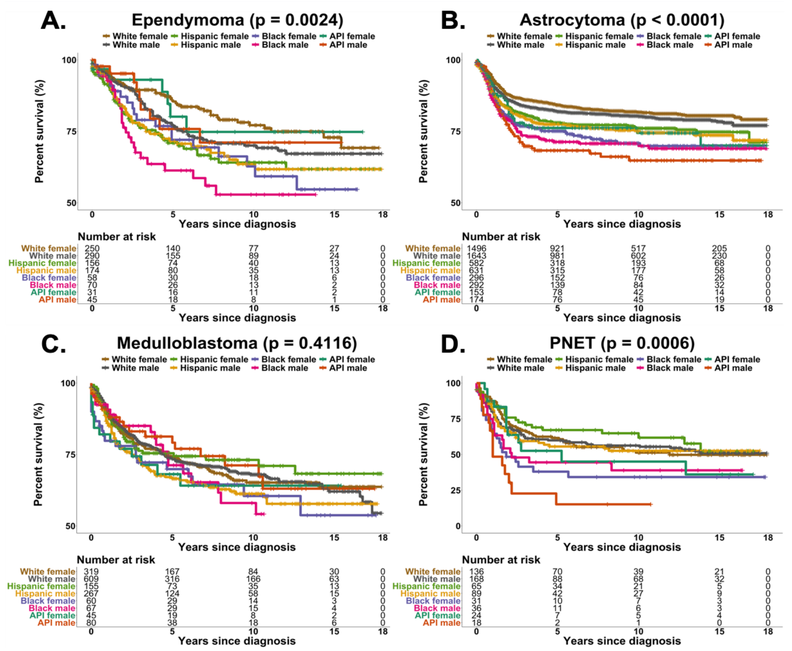
RESULTS

Without racial/ethnic stratification, there was a male excess in all 4 cancers.

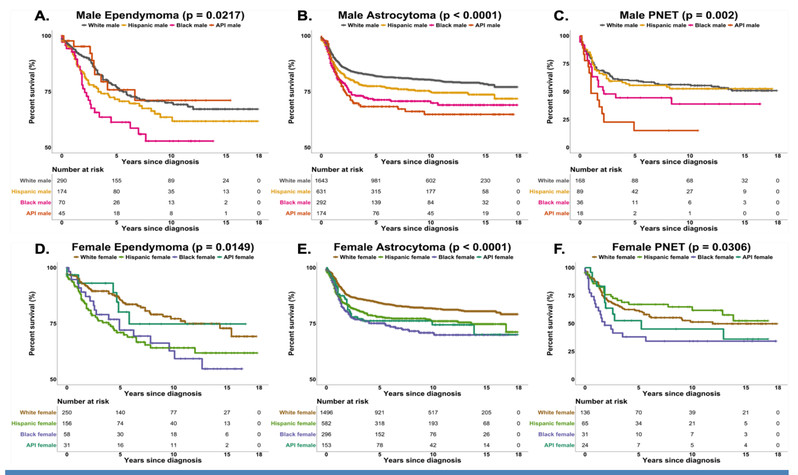
When taking race/ethnicity into account, sex-specific excess was not universal.



THREE CANCERS SHOWED A SIGNIFICANT DIFFERENCE IN 18-YEAR SURVIVAL



WHEN STRATIFIED BY SEX, SIGNIFICANT DIFFERENCES IN 18-YEAR SURVIVAL BY RACE WERE PERSISTENT IN THREE TUMOR TYPES



NONWHITE CHILDREN WERE AT HIGHER RISK OF DEATH FOR SOME CANCERS EVEN AFTER ADJUSTMENT FOR CONFOUNDING FACTORS

Cancer	White, female	White, male HR (95% CI)	Hispanic, female HR (95% CI)	Hispanic, male HR (95% CI)	Black, female HR (95% CI)	Black, male HR (95% CI)	API, female HR (95% CI)	API, male HR (95% CI)
Ependymoma	Referent	1.32 (0.90, 1.94)	**1.68** (1.11, 2.56)	**1.81** (1.20, 2.73)	1.71 (0.99, 2.98)	**2.77** (1.70, 4.51)	1.10 (0.47, 2.58)	1.42 (0.69, 2.92)
Astrocytoma	Referent	1.16 (0.97, 1.37)	**1.53** (1.23, 1.91)	**1.46** (1.18, 1.81)	**1.68** (1.29, 2.18)	**1.95** (1.51, 2.52)	**1.56** (1.09, 2.24)	**2.21** (1.63, 2.98)
Medulloblastoma	Referent	1.00 (0.77, 1.29)	0.81 (0.55, 1.18)	1.21 (0.90, 1.63)	1.33 (0.82, 2.14)	1.31 (0.81, 2.11)	1.42 (0.81, 2.50)	0.90 (0.55, 1.49)
PNET	Referent	1.02 (0.72, 1.45)	0.80 (0.50, 1.31)	1.06 (0.70, 1.61)	**1.73** (1.01, 2.96)	**1.75** (1.02, 2.98)	1.14 (0.61, 2.14)	**3.13** (1.73, 5.65)

ALL BRAIN CANCERS STUDIED SHOWED A GREATER THAN 12% DIFFERENCE IN 5-YEAR SURVIVAL BETWEEN HIGHEST AND LOWEST RACE-SEX GROUPS

Cancer	White		Hispanic		Black		API		Percent (%) difference highest-lowest
	Female	Male	Female	Male	Female	Male	Female	Male	
Ependymoma	83.9	75.5	71.3	67.2	71	58.1	83.6	75.2	25.6
Astrocytoma	84.6	82.2	80.7	77.9	75.1	72.6	77.3	74.6	12
Medulloblastoma	73.1	72.3	73.3	66.5	68.4	63.1	69.9	79.2	16.1
PNET	65	60.4	66.6	58.7	37.2	41.1	50.7	16.2	50.4

CONCLUSIONS

Using population-based data of 8520 children, we found significant differences in overall survival by race and sex in three of four cancers: Ependymoma, Astrocytoma, and PNET.

White-females never had statistically worse survival than any other group. Regardless of sex, Black children had statistically worse survival in three of four cancers.

Following racial stratification, only PNET in API children exhibited a sex-based disparity. In all three cancers with significant survival differences, racial disparities in survival persisted even after sex-based stratification.

The genetic and structural determinants of survival in pediatric brain cancer are complexly related, but our work points to the necessity of developing ethnically & socially diverse clinical cohorts to minimize these observed disparities.

IMPACT

Brain tumor survival cannot be singly explained by race or sex. Rather, survival appears to vary by race/ethnicity within sexes. These findings highlight the need for detailed, population-based studies with clinical, demographic, and genetic information to allow us to disentangle the roles of race/ethnicity and sex in survival from pediatric brain tumors.

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