

Distinct Characteristics of Rhabdomyosarcoma among Adolescents and Young Adults Compared to Children in California

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Introduction

- Rhabdomyosarcoma (RMS) is a cancer of skeletal muscles and is most common in children.
- For adults, RMS occurs extremely rarely and survival is markedly poor due to lack of adult focused treatment improvements.
- Adolescents and young adults (AYA), **aged 15 to 39**, experience overlap of cancer care between pediatric and adult medical settings. Detection/diagnosis and treatment of RMS among AYA is likely to be delayed
- We characterize incidence and survival pattern of RMS in California and report distinctive pattern of RMS in AYA compare to children.

Method

Data Source: From California Cancer Registry (CCR) data, we identified 508 AYA (age 15-39) and 1,009 pediatric (age 0-14) patients diagnosed with RMS in California from 1988 to 2016, using cancer registry data released on December 2018. RMS was defined as all invasive cancer with ICDO-3 histologic subtypes 8900, 8901, 8902, 8903, 8904, 8910, 8912, 8920 and all inclusive topographies.

Statistical Analysis: RMS incidence rates were estimated using incident counts and California's population size released by the California Cancer Registry, and age-standardized using 2000 US Standard Population. 5-year survival probabilities were calculated using incidence data from 1988 to 2011 to allow for 5 years of follow up time. Non-parametric Kaplan Meier product limit estimator was used to estimate survival function. Incidence and survival patterns were characterized within two age groups, AYA (age 15-39) and pediatric (age 0-14). The incidence and survival patterns were further assessed by sex (male, female), socioeconomic status (SES; low, med to low, medium, mid to high, high), race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, Asian/Pacific islander), tumor stage (localized, regional, distant) and histologic subtype (embryonal ICDO-3 8910, and alveolar ICDO-3 8920). For survival analysis, age group was further categorized into 0-14, 15-24, 25-34, and 35-39.

- AYA and pediatric RMS patients are similar in sex, SES, and race/ethnicity distribution. More proportion of AYA are diagnosed with advanced disease and alveolar histology

	Ages 0-14		Ages 15-39		P _X ²
	N	%	N	%	
Sex					
Males	593	58.8	313	61.6	
Females	416	41.2	195	38.4	0.29
SES					
Low	245	24.3	119	23.4	
Mid-to-Low	222	22.0	101	19.9	
Medium	191	18.9	117	23.0	
Mid-to-High	160	15.9	87	17.1	
High	191	18.9	84	16.5	0.29
Race Ethnicity					
Non-Hispanic white	383	38.0	210	41.3	
Non-Hispanic black	100	9.9	46	9.1	
Hispanic	417	41.3	196	38.6	
Asian/Pacific Islander	94	9.3	52	10.2	
Other/Unknown*	15	1.5	4	0.8	0.54
Stage					
Localized	311	30.8	100	19.7	
Regional	336	33.3	151	29.7	
Distant	324	32.1	223	43.9	
Unstageable*	38	3.8	34	6.7	<0.0001
Histology					
Embryonal	587	58.2	182	35.8	
Alveolar	265	26.3	185	36.4	
Others*	157	15.6	141	27.8	<0.0001

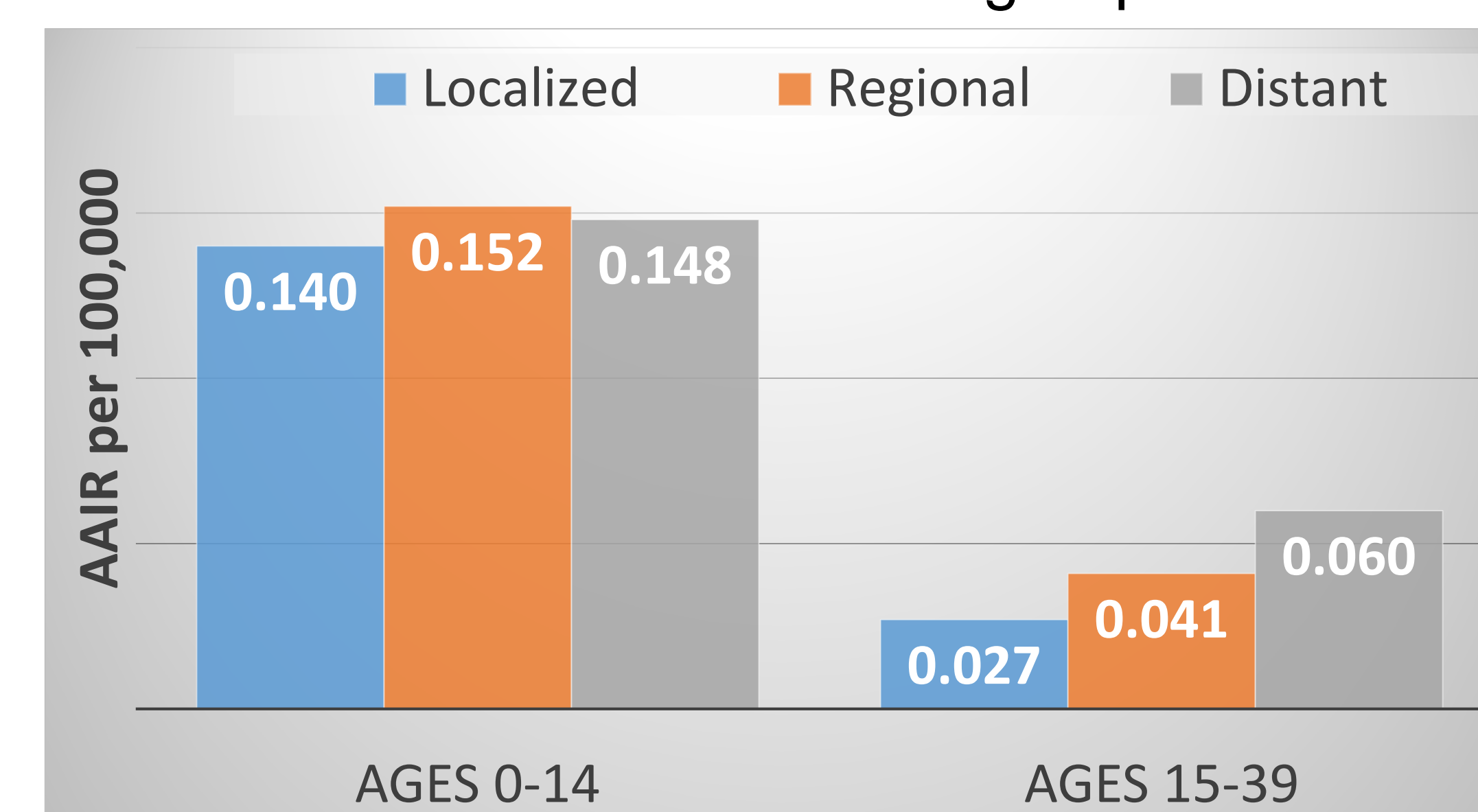
* Other/Unknown Race/ethnicity and Unstageable cases were not included in Chi-Square tests.

Acknowledgement

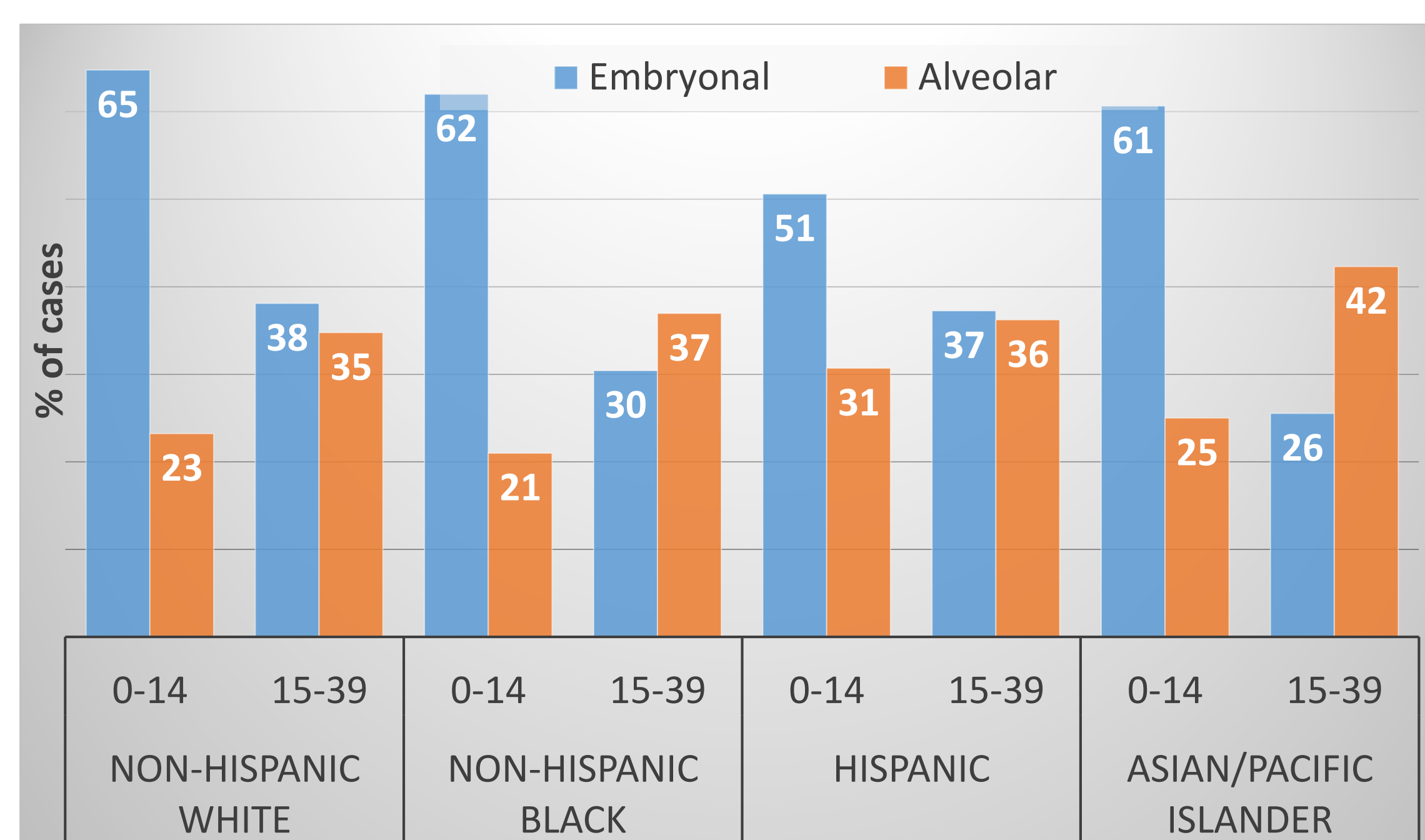
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Results

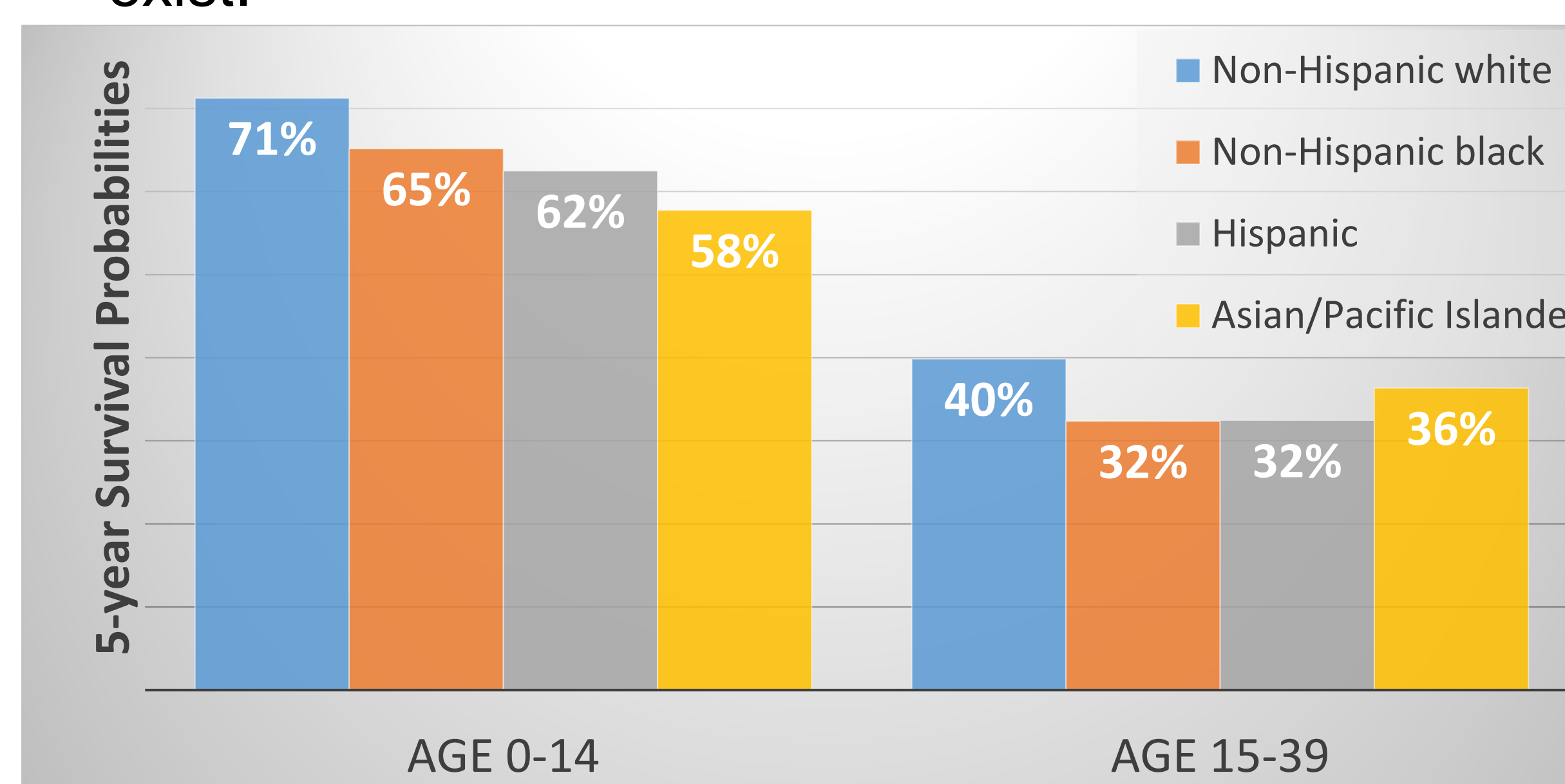
- AYA patients are most frequently diagnosed with advanced disease whereas in children the stage specific incidence rates are similar. This pattern is consistent for all race/ethnic groups.



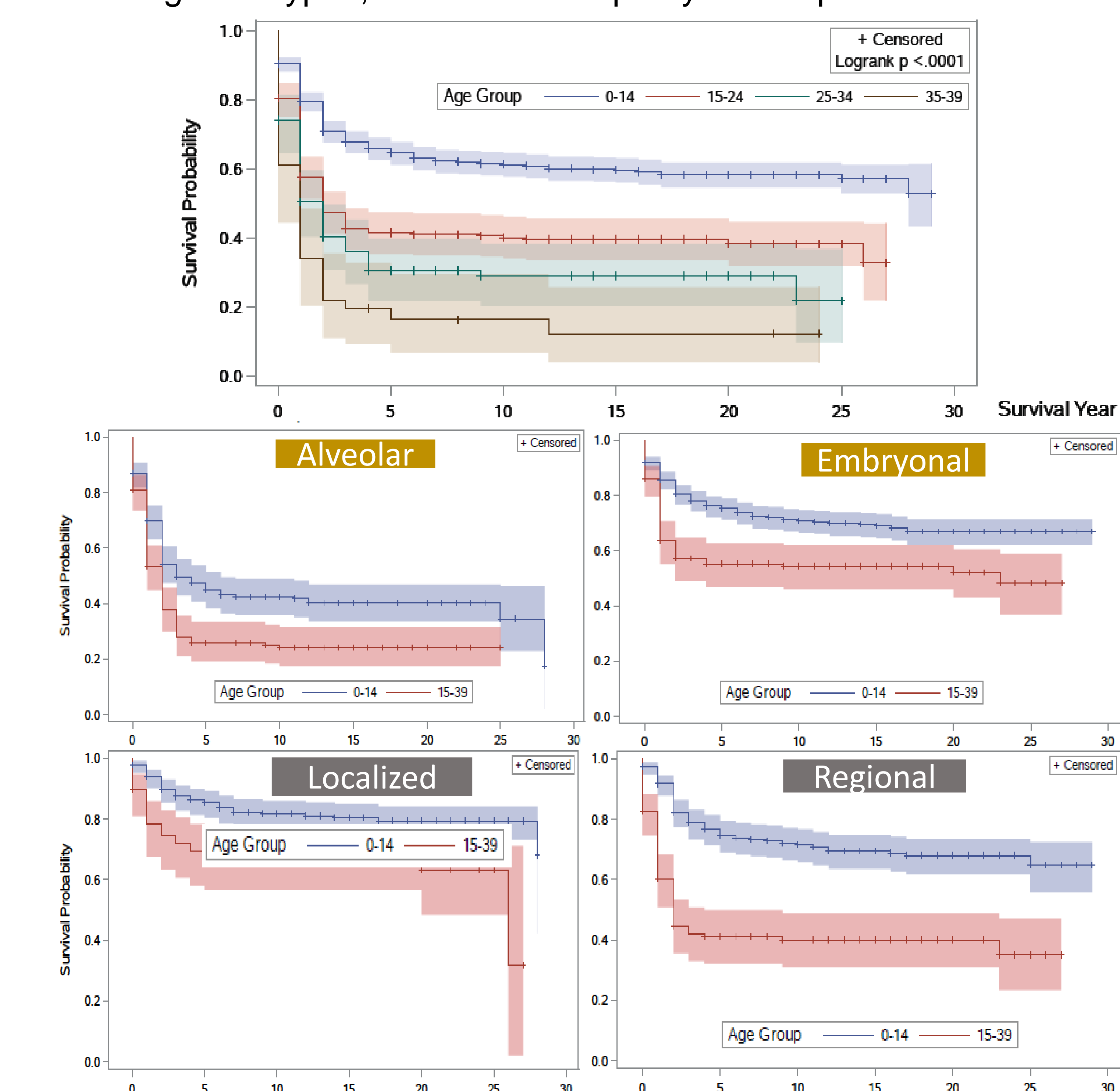
- Majority of pediatric RMS have embryonal histology. Among AYA, embryonal and alveolar subtypes are similarly distributed, except for Asians who has higher frequency of alveolar histology.



- Pediatric Asians and females have worse survival but for AYA the gender and racial disparity does not exist.



- AYA patients have worse survival than pediatric patients. This could be due to the fact that AYA have more distant disease and are diagnosed with alveolar RMS. But even within each stage and histologic subtypes, the survival disparity in AYA persists.



Conclusion

AYA patients experience heavier burden of RMS than pediatric patients. They are diagnosed with advanced stage and aggressive histologic subtype. They have worse survival from RMS although stage and histologic disparity does not explain this survival deficit. AYA patients do not have the survival differences by demographic factors seen among pediatric patients, suggesting that AYA have different underlying mechanism for overcoming this disease.